Proprietary & Confidential

Commonwealth of Massachusetts

Actuarial Estimate of Outstanding Liability

As of June 30, 2019

FINAL REPORT

Issue Date – October 23, 2019

53 State Street, Suite 2201
Boston, MA 02109
tel:617.457.7648
www.aon.com

Empower Results®

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Table of Contents

I. Narrative

II. Summary Exhibits

III. Supporting Exhibits

Section 1 *All Clusters Combined*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 2 *Department of Developmental Services - Cluster 1*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 3 *Department of Mental Health - Cluster 2*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 4 *Department of Corrections - Cluster 3*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 5 *University of Massachusetts (Amherst) - Cluster 4*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 6 *University of Massachusetts (Medical Center) - Cluster 4*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 7 *Massachusetts Colleges & Universities - Cluster 4*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 8 *All Other - Clusters 5-17 & 95*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Table of Contents

I. Introduction **4**
- Purpose 4
- Scope 4

II. Conditions and Limitations **6**
- Inherent Uncertainty 6
- Extraordinary Future Emergence 6
- Data Reliance 6
- Discounting 6
- Use and Distribution 6

III. Executive Summary **7**
- Summary of Results 7
- Total Gross Reserves 7
- Total Net Reserves 8
- All Other Departments – Decomposition of Departmental Liability 8
- Fiscal Year 2019 Loss Rates 9
- All Other Departments – Fiscal Year 2019 Loss Rates 9
- UMass Reserves 9

IV. Program Description **11**

V. Data **12**
- Loss 12
- Exposure 12
- Industry Data 12

VI. Actuarial Analysis **13**
- Overview 13
- Methods/Models of Estimating Unpaid Loss Estimates 13
- Actuarial Assumptions 16

VII. Arrangement of Exhibits **18**

VIII. Description of Exhibits **20**

IX. Exhibits **22**

I. Introduction

Purpose

Aon Global Risk Consulting ("AGRC") has conducted an actuarial review of the GAAP outstanding loss reserves of the Commonwealth of Massachusetts' ("Commonwealth") self-insured Workers Compensation program.

Scope

The specific scope of this study is to prepare an independent estimate of the required workers compensation reserves as of June 30, 2019 separately for seven clusters of agencies:

a) The Department of Developmental Services ("DDS") [1]
b) The Department of Mental Health ("DMH")
c) The Department of Corrections ("DOC")
d) UMass – Amherst
e) UMass – Medical School
f) All Other Colleges and Universities
g) All Other Departments

For the "All Other Colleges and Universities" cluster, we have provided estimates of each educational institution's obligations.

In addition, we have provided estimates of the outstanding liability contained within the "All Other Departments" cluster that is associated with agencies that during fiscal year 2010 ceased to be the liability of the Commonwealth and instead became the liability of the Massachusetts Department of Transportation (MassDOT).

We have provided a range of reserves that can be used to test the reasonableness of the carried reserves established by the Commonwealth. Estimates have been prepared on both a discounted and undiscounted basis, utilizing rates of discount equal to 4% and 6%.

Our estimates do not include any provision for allocated loss adjustment expenses (ALAE) that may be incurred in the processing and settlement of claims, other than rehabilitation/investigation payments included with medical losses as described in the Data section (Section V) of this report.

* * * * * *

[1] Formerly known as The Department of Mental Retardation ("DMR")

Vahan A. Mahdasian ACAS, MAAA and Kanika Vats, FCAS, MAAA, MBA are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial report contained herein.

We performed this analysis using generally accepted actuarial principles and in accordance with all relevant Actuarial Standards of Practice.

Please contact us if you have any questions regarding this report.

Respectfully submitted,

Aon Global Risk Consulting

Vahan A. Mahdasian, ACAS, MAAA
Director & Actuary
+1.617.457.7648
vahan.mahdasian@aon.com

Neil J. Fenton, CRIS
Actuarial Consultant
+1.617.457.7680
neil.fenton@aon.com

Kanika Vats, FCAS, MAAA, MBA
Associate Director & Actuary
+1.212.441.1452
kanika.vats@aon.com

II. Conditions and Limitations

Inherent Uncertainty

Actuarial calculations produce estimates of inherently uncertain future contingent events. We believe that the estimates provided represent reasonable provisions based on the appropriate application of actuarial techniques to the available data. However, there is no guarantee that actual future payments will not differ from estimates included herein.

Extraordinary Future Emergence

Our projections make no provision for the extraordinary future emergence of losses or types of losses not sufficiently represented in the historical data or which are not yet quantifiable.

Data Reliance

In conducting this analysis, we relied upon the provided data without audit or independent verification; however, we reviewed it for reasonableness and consistency. Any inaccuracies in quantitative data or qualitative representations could have a significant effect on the results of our review and analysis.

Discounting

The uncertainty inherent in the discounted unpaid loss estimates is greater than that of the undiscounted unpaid loss estimates. This is because undiscounted liabilities normally contemplate an implicit risk margin for the uncertainty in the loss estimation process (e.g., under-estimating). Discounting takes away this implicit risk margin and would subject the unpaid loss estimates to additional risks such as yields on the investment portfolio and the timing risk. Future loss payments could occur more or less rapidly than expected due to random variation and the timing of claim payments. We made no adjustment to account for these risks. The interest rate used to discount the unpaid losses was provided by the Commonwealth of Massachusetts. We express no opinion and have not independently evaluated the appropriateness of the interest rate.

Use and Distribution

Use of this report is limited to the Commonwealth of Massachusetts for the specific purpose described in the Introduction section. Other uses are prohibited without an executed release with Aon.

Distribution by the Commonwealth of Massachusetts is unrestricted. We recognize that this report may be distributed to others and we request that Aon be notified of further distribution of this report. The report should only be distributed in its entirety including all supporting exhibits.

III. Executive Summary

Summary of Results

As stated in the "Introduction" and detailed in the "Program Description" section of this report, this analysis considers those liabilities within the "All Other Departments" cluster that are attributed to the agencies of MassDOT; excluding the former Massachusetts Turnpike Authority (MTA).

Consistent with the methodology and presentation in the prior report issued in 2018, the liability amounts in the summary tables below are provided both **Gross** (including) and **Net** (excluding) of those liabilities associated with the MassDOT (excluding MTA).

A summary table of the composition of the "All Other Departments" cluster with respect to the MassDOT (excluding MTA) and Non-MassDOT agencies is also provided.

Total Gross Reserves

Based on our review, which utilized loss and exposure data valued as of June 30, 2019, we estimate that the range of reasonable undiscounted **gross** (inclusive of MassDOT liability, excluding MTA) loss reserves for the Commonwealth's aggregate workers compensation program to be: **$299.6M to $367.0M**.

We also calculated reasonable ranges on a present value basis, using interest rates of 4% and 6% and the Commonwealth's historical payment patterns. We estimate the range of reasonable **gross** reserves to be as follows:

Discounted at 4%: **$221.4 to $272.8M** | Discounted at 6%: **$196.8M to $242.9M**

The following table shows **gross** reserves for each cluster identified in the Scope section:

Cluster	Undiscounted	Discounted at 4%	Discounted at 6%
DDS	$22.3 - 27.4M	$17.6 - 21.6M	$16.0 - 19.7M
DMH	$25.5 - 31.7M	$18.8 - 23.4M	$16.9 - 20.9M
DOC	$36.5 - 48.8M	$27.9 - 37.2M	$25.1 - 33.4M
UMass - Amherst	$6.2 - 8.4M	$5.0 - 6.8M	$4.6 - 6.3M
UMass - Medical	$2.4 - 3.6M	$2.0 - 3.0M	$1.8 - 2.8M
Other Colleges & Universities	$17.3 - 22.9M	$13.9 - 18.5M	$12.7 - 16.9M
All Other Dept's (incl. MassDOT, excl. MTA)	$189.4 - 224.3M	$136.1 - 162.3M	$119.7 - 143.0M
Total	$299.6 - 367.0M	$221.4 - 272.8M	$196.8 - 242.9M

Total Net Reserves

Based on our review, which utilized loss and exposure data valued as of June 30, 2019 we estimate that the range of reasonable undiscounted **net** (excluding MassDOT and MTA liability) loss reserves for the Commonwealth's aggregate workers compensation program to be: **$287.2M to $352.3M**.

We also calculated reasonable ranges on a present value basis, using interest rates of 4% and 6% and the Commonwealth's historical payment patterns. We estimate the range of reasonable **net** reserves to be as follows:

Discounted at 4%: **$212.5 - 262.1M** | Discounted at 6%: **$189.0 - 233.5M**

The following shows **net** reserves for each cluster identified in the Scope section:

Cluster	Undiscounted	Discounted at 4%	Discounted at 6%
DDS	$22.3 - 27.4M	$17.6 - 21.6M	$16.0 - 19.7M
DMH	$25.5 - 31.7M	$18.8 - 23.4M	$16.9 - 20.9M
DOC	$36.5 - 48.8M	$27.9 - 37.2M	$25.1 - 33.4M
UMass - Amherst	$6.2 - 8.4M	$5.0 - 6.8M	$4.6 - 6.3M
UMass - Medical	$2.4 - 3.6M	$2.0 - 3.0M	$1.8 - 2.8M
Other Colleges & Universities	$17.3 - 22.9M	$13.9 - 18.5M	$12.7 - 16.9M
All Other Dept's (excl. MassDOT & MTA)	$177.1 - 209.6M	$127.3 - 151.7M	$111.8 - 133.6M
Total	$287.2 - 352.3M	$212.5 - 262.1M	$189.0 - 233.5M

All Other Departments – Decomposition of Departmental Liability

The total gross reserve of the All Other Departments cluster contains both MassDOT (excluding MTA) and Non-MassDOT liabilities. As shown in the table below, approximately 6.6% of the gross reserve for All Other Departments is attributed to MassDOT (excluding MTA) agencies.

The following shows the range of reasonable reserves at various discount rates for the cluster segments.

All Other Departments	Cluster	% of Cluster	Undiscounted	Discounted at 4%	Discounted at 6%
MassDOT Agencies (excl. MTA)	5	6.6%	$12.4 - 14.7M	$8.9 - 10.7M	$7.8 - 9.4M
Non-MassDOT Agencies	5	93.4%	$177.1 - 209.6M	$127.3 - 151.7M	$111.8 - 133.6M
Total			$189.4 - 224.3M	$136.1 - 162.3M	$119.7 - 143.0M

Fiscal Year 2019 Loss Rates

The cost of the workers compensation program as measured by the estimated FY2019 loss rates (losses per $100 payroll) varied significantly by cluster.

As shown in the table below, overall rates decreased by 4.6% when compared to the prior year

Cluster	Payroll (000)	Average Ult Loss	Average FY19 Loss Rate	Prior Loss Rate	% Change
DDS	308,002	4,832,500	1.569	1.495	4.9%
DMH	218,060	6,946,350	3.186	3.027	5.2%
DOC	357,324	9,999,000	2.798	2.523	10.9%
UMass - Amherst	656,644	1,999,925	0.305	0.358	-14.8%
UMass - Medical	410,826	925,475	0.225	0.193	16.6%
Other Colleges & Univ's	1,500,205	4,688,255	0.313	0.413	-24.3%
All Other Dept's (excl. MTA)	3,573,725	39,850,420	1.115	1.208	-7.7%
Total	7,024,786	69,241,925	0.986	1.034	-4.6%

All Other Departments – Fiscal Year 2019 Loss Rates

In the table below, we have estimated, the composition of the All Other Departments FY2019 loss rate as a function of both the MassDOT (excluding MTA) and Non-MassDOT departments experience and exposure:

All Other Dept's (excl. MTA)	Payroll (000)	Average Ult Loss	Average FY19 Loss Rate	Prior Loss Rate	% Change
MassDOT (excl. MTA)	204,258	2,678,778	1.311	1.211	8.3%
Non-MassDOT	3,369,467	37,171,642	1.103	1.230	-10.3%
Total	3,573,725	39,850,420	1.115	1.229	-9.3%

It is important to note that the loss rates estimated via the decomposition methodology are inherently volatile due to their derivation being reliant on a variety of assumptions and estimations which are themselves also volatile.

UMass Reserves

To facilitate the use of this report by the University of Massachusetts (“UMass”), we present an aggregate estimate of the liabilities for each UMass segment. These include UMass Amherst and UMass Medical School (shown separately in table above) as well as UMass Lowell, Boston, and Dartmouth (included as part of the “Other Colleges and & Universities” cluster above).

A reasonable range of reserves for the aggregate UMass program is estimated at **$14.3M to $19.6M**.

Discounted at 4%: **$11.6M to $15.9M** | Discounted at 6%: **$10.6M to $14.6M**

The following shows the range of reasonable reserves at various discount rates for each UMass segment.

Cluster	Undiscounted	Discounted at 4%	Discounted at 6%
UMass - Amherst	$6.2 - 8.4M	$5.0 - 6.8M	$4.6 - 6.3M
UMass - Medical	$2.4 - 3.6M	$2.0 - 3.0M	$1.8 - 2.8M
UMass - Dartmouth	$1.8 - 2.4M	$1.5 - 1.9M	$1.3 - 1.8M
University of Lowell	$2.3 - 3.0M	$1.8 - 2.4M	$1.7 - 2.2M
UMass - Boston	$1.6 - 2.1M	$1.3 - 1.7M	$1.2 - 1.6M
Total UMass	$14.3 - 19.6M	$11.6 - 15.9M	$10.6 - 14.6M

Other Colleges and Universities Reserve

We have allocated the aggregate reserve estimate for All Other Colleges and Universities to the individual institutions within the cluster. Estimates for each institution are shown on Summary Exhibit 7.

Short Term Reserve Percentages

We have determined the percentage of the reserve estimates that can be considered short-term, meaning the percentage of projected payments of the total reserves expected to be made over the next twelve month period. The calculation of these percentages is shown on Exhibit 1 Page 16 of Sections 1-8.

IV. Program Description

The Commonwealth has provided workers compensation coverage to its employees on a self-insured basis since the early 1920's ("the Program"). The Program covers all workers, except those employed by the Commonwealth's various public authorities and the State Police.

The Commonwealth retains responsibility for all claims and does not purchase per claim or aggregate reinsurance.

Pursuant to legislation effective July 1, 1997, the Program is administered by the Commonwealth's Human Resources Division ("HRD"); prior to that date, certain workers compensation administration responsibilities had been under the supervision of the Public Employee Retirement Administration Commission ("PERAC"). HRD is responsible for making fair and timely payments of indemnity and medical benefits to injured employees, maintaining the claim and financial records of the Program and for negotiating appropriate settlements for all Program claims.

Effective November 1, 2009 a new entity, the Massachusetts Department of Transportation (MassDOT) was created. As part of the creation, various agencies ceased to be considered part of the Commonwealth and became part of the MassDOT. The agencies, previously part of the Commonwealth, that now comprise the MassDOT are the Old Mass Highway Department (MHD), Registry of Motor Vehicle (RMV), The Office of Transportation (TRP); The Mass Aeronautics Commission (MAC); Tobin Bridge (TOBIN) and a small operation of the Department of Conservation and Recreation (DCR).

Per discussions with the Commonwealth, it is our understanding that the MassDOT would assume the total historical liability of each of those departments; MHD, RMV, TRP, MAC, TOBIN and DCR.

V. Data

Loss

Claim payments for the 12 month period ending June 30, 2019 were provided by the Commonwealth. Payments were provided by department and agency and were split into four categories: compensation, medical, lump sum, and rehabilitation/investigations. For our review, we analyzed compensation (Indemnity) and lump sum payments separately. Medical and rehabilitation/ investigation payments were combined and analyzed as “Medical” losses.

Our estimates do not include any provision for allocated loss adjustment expenses (ALAE) that may be incurred in the processing and settlement of claims, other than rehabilitation/investigation payments included with medical losses noted above. Also, the estimates do not consider unallocated loss adjustment expenses (ULAE), such as fees of adjusters and settling agents, etc.

The 12 month incremental payments provided by the Commonwealth were added to the cumulative claim payments from the prior analysis (at June 30, 2018) to derive cumulative paid figures as of June 30, 2019 found in this report.

Exposure

Exposure information for FY2019, in the form of payroll was provided by the Commonwealth and fully consistent with the “object code” classification which was revised as part of the FY2010 study.

We relied on loss and exposure data provided by responsible officers or employees of the Commonwealth. We also relied on data found in the prior analysis and thereby also those sources described in it; utilizing last year’s triangles and updating them with data provided by the HRD. We also relied on payroll data provided by the Office of the Comptroller. As mentioned previously, any inaccuracies in quantitative data or qualitative representations could have a significant effect on the results of our analysis.

Industry Data

Loss development factors were derived from the Commonwealth’s own triangles and industry data provided by:

- The National Council on Compensation Insurance (NCCI)
- The Workers Compensation Rating and Inspection Bureau of Massachusetts (WCRIBMA)

Trend factors used to adjust for changes in historical wage and benefit levels are based on data from these sources as well.

VI. Actuarial Analysis

Overview

Performing an actuarial analysis involves developing a qualitative understanding of the risk and applying actuarial techniques and methods to available data. These methods attempt to project unpaid losses to ultimate settlement value. Each method requires certain underlying assumptions and varies in its responsiveness to loss data. As a result, not all methods are appropriate for use in all circumstances. For each unique situation, actuaries assess the strengths and weaknesses inherent in the results of each method in producing reasonable estimates of ultimate loss.

The following methods were employed in developing the recommendations contained in this report.

Methods/Models of Estimating Unpaid Loss Estimates

Paid Loss Development Method

This method is based on the assumption that losses from a group of claims are paid in a sufficiently consistent pattern such that past experience can be used to predict future development. The term loss development is used to describe changes that take place in the value of a group of claims over time. In order to reflect loss development arithmetically, incremental loss development factors are calculated by dividing losses at a given evaluation date by the immediately preceding evaluation date. A multiplicative process is then used to calculate a cumulative loss development factor that represents the development to ultimate for a given age of maturity.

This method can be applied using either cumulative paid losses or incurred losses (cumulative paid losses plus case reserves). For a given group of claims, cumulative losses are multiplied by the appropriate cumulative loss development factor to estimate ultimate losses. For the Commonwealth, we relied on the Paid Loss Development Method only, as the Commonwealth does not currently establish case reserves.

This method relies heavily on data as of the most recent evaluation date and assumes past patterns are predictive of future development. If the program has inadequate history to develop predictive loss development patterns, other sources of loss development information may be considered.

In addition to the cumulative loss development factors, we apply an additional factor to bring losses from their current paid status to a projected ultimate basis. This factor is called an “Additional Tail Consideration” factor.

The “Additional Tail Factor” consideration is based on our observation that for certain clusters, some of the older policy periods showed more open claims and higher development than other periods. We also evaluated the average age of the paid claimants for each cluster and year and noticed that in certain years payments were being made to relatively young claimants. We judgmentally added a tail factor selection to account for these observations where appropriate.

Paid Bornhuetter-Ferguson (BF) Method

This method offers a blend of stability and responsiveness by estimating ultimate losses using a percentage of the expected loss results and current loss data. It calculates future loss development based on expected loss estimates and the cumulative loss development factors described in the Loss Development Method.

The B-F Method can be applied using either cumulative paid or incurred losses. Again, for the Commonwealth, we relied on the Paid B-F Method only as the Commonwealth does not currently establish case reserves.

In determining future loss development, the percent of expected losses remaining to be paid is based on the appropriate loss development factor. This percentage is multiplied by expected losses to determine expected future development. This estimate of future loss development is added to losses at the current evaluation date to project ultimate losses.

To determine the expected losses, we determine an initial expected pure premium (or an “a priori” loss rate) based upon (1) a review of the Commonwealth’s historic pure premiums (losses divided by payroll) as well as (2) consideration of the selected rate the trend and benefit level adjustments removed (“de-trended”). By considering both metrics, we attempt to balance stability and responsiveness in the selection of the initial expected pure premium.

Lump Sum Methodology

Lump sum indemnity payments are analyzed separately from all other indemnity payments. We relied on two methods to develop lump sum payments to ultimate levels. The first is a standard paid loss development method, where current lump sum payments are multiplied by a cumulative lump sum development factor to arrive at the estimate of ultimate lump sum losses.

The second method uses ultimate indemnity losses excluding lump sums as a base for estimating remaining outstanding lump sum payments. Outstanding lump sums payments are estimated by multiplying base ultimates by cumulative incremental lump sums as a percent of ultimate losses excluding lump sums ratio. The outstanding lump sum payments are added to payments to date to arrive at the estimate of ultimate lump sum losses. An estimate of ultimate lump sums is selected based on a review of both methods.

7/1/81-82 and Prior Periods Methodology

In order to estimate liabilities relating to periods 7/1/81-82 and prior, we again relied on two methods. The first uses an average payment trend to estimate the reserves needed for prior periods. This estimate is added to payments to date to arrive at the estimate of ultimate loss. The average payment trend is derived from the Commonwealth’s history of incremental payments and is credibility weighted with the total Commonwealth payment trend (derived from all Commonwealth data combined).

The second method multiplies average incremental payments over the last three fiscal years by a selected number of survival years in order to estimate the needed reserve. The needed reserve is added to payments to date to arrive at an estimate of the ultimate loss. An estimate of ultimate loss is selected based on a review of both methods

Selection of Ultimate Losses and Reasonable Reserve Estimates

Our estimates of ultimate losses by year were judgmentally selected based on the methods described above. Generally, we selected the lower and higher of the Paid Loss Development and Paid Bornhuetter-Ferguson methods as the “Low End” and “High End” selections by year. In certain cases, we judgmentally increased the high end of the range if we felt there was not enough “differential” in the two methodologies.

Similar to the prior analysis, we assume that any payment made during fiscal year 2019 implies an “open” claim and will remain open during fiscal year 2019. As a rule, if no payments were made for two years in a row, we project minimal reserves for that year, assuming the claims in that year are closed

Allocation Methodology for Massachusetts Colleges and Universities

The allocation of reserves to each college and university is based on a credibility weighting of expected loss experience based on exposure (payroll) and actual loss experience. The credibility weight is based on the formula P/ (P+K) where P is average payroll for the entity over the past five years and K is 20,000,000 for entities with a low coefficient of variation (CV) and 50,000,000 for entities with a high coefficient of variation (> 1.00).

The expected loss experience is the 5 year average payroll for each entity multiplied by the overall indemnity and medical loss rates for the entire Other Colleges and Universities group. The actual loss experience used in the allocation is a 5-year average ultimate loss for each entity. The ultimate loss for each entity is calculated by applying the paid loss development method to each entity’s loss experience.

The outstanding losses estimated for Other Colleges and Universities is then allocated to each entity based on its percentage share of the ultimate credibility weighted losses.

Composition Analysis Methodology for Cluster 5 - All Other Departments

The decomposition of the All Other Departments cluster into the liability associated with MassDOT (excl. MTA) and Non-MassDOT agencies is based on a blended consideration of three different methods. Each method, estimates a percentage share of the total liability for each fiscal year that is associated with the agencies of the MassDOT (excl. MTA) agencies. Each of the three methods described below are applied to both the Medical and Indemnity analyses independently:

Method 1: The number of loss payments made to claimants of the MassDOT (excl. MTA) agencies during the fiscal year as a proportion of the total number of claim payments made during the fiscal year to the All Other Departments in Cluster 5

Method 2: The value of loss payments made to claimants of the MassDOT (excl. MTA) during the fiscal year as a proportion of the total value of claim payments made during the fiscal year to All Other Departments in Cluster 5.

Method 3: The payroll of the MassDOT (excl. MTA) agencies during each of the past fiscal years as a proportion of the total payroll paid to All Other Departments in Cluster 5 over the past fiscal years. Where this historical payroll split was not available, an assumption was made based upon available information.

Actuarial Assumptions

Incurred But Not Reported (IBNR)

Generally, losses will increase over time for the following reasons:

1. It is impossible to estimate precisely the ultimate losses and allocated loss adjustment expenses for claims when they are initially reported.
2. It takes a period of time for some claims to be discovered, reported, and recorded. Unreported claims are referred to as “pure” IBNR claims. Claims that are reported but not yet recorded are referred to as “pipeline” IBNR claims.
3. Closed claims are sometimes reopened.

These three conditions result in the need for IBNR reserves.

Loss Trend

Loss trend is the change in claim frequency and cost levels from one time period to the next. Factors that affect the frequency and severity of claims are constantly changing over time. Examples of causes of these changes include inflation, societal attitudes toward legal action, and changes in laws. Actuaries use trend factors to adjust historical loss experience to comparable cost levels. Using workers compensation as an example, three elements of cost are combined within this single factor:

Increases in defined benefits for Workers Compensation: Benefits are established by legislative authority and typically reviewed annually by state legislatures. Many times, benefits are expanded by legislatures through changes such as broadening the definition of injury, decreasing waiting periods, increasing benefit duration, or increasing maximum benefit limits.

Increases in medical costs: This causes inflationary trend in the medical component of workers compensation losses.

Increase in wage costs: Wage inflation, although relatively small in some economic sectors, has occurred over the past several years as well.

Specifically, for this analysis, trend factors were obtained from the most recent rate filing published by the WCRIB of Massachusetts.

Exposure

Actuaries select an exposure base expected to vary directly with the incidence and/or severity of claims. The actuary must consider both the historical loss level and the corresponding exposures in evaluating claim liabilities and expected future costs.

As previously discussed, payroll exposure for FY1985 through FY2019 were provided by the Commonwealth. For the FY2019 non-MTA element of the MassDOT payroll in Cluster 5, MTA-only payroll was subtracted from the total MassDOT payroll.

Time Value of Money

Due to the time lag between when claims are incurred, reported, and finally paid, a sound funding recommendation may consider the time value of money. Income will be earned on self-insurance fund assets until those assets are liquidated to pay losses. If this income is retained in the self-insurance fund, such investment income may be considered.

At the Commonwealth's direction, we used 4% and 6% rates to discount the estimated reserves. We have not formed any opinion regarding the reasonability of these rates. It is noted that discounting reserves introduces additional risk to the analysis since the timing of actual loss payments may differ from the estimated payment pattern, and since the realized investment yield may differ from that assumed.

Provision for Uncertainty

An actuarial projection may consider the degree of uncertainty inherent in its projection. An estimate stated at its ultimate value on a nominal basis may include an implicit provision for uncertainty due to the time value of money. If an estimate is stated at present value, it may be appropriate to include an explicit provision for uncertainty. Further, an explicit provision for uncertainty may be warranted when losses are subject to a high degree of variability.

For the Commonwealth, we have not explicitly used any provision for risk in our calculations. Instead, we have determined a "low" and "high" end range of reasonable reserves. It should be understood that the range does not represent all possible outcomes, but rather a range of reasonable estimates

VII. Arrangement of Exhibits

This report contains eight sections preceded by a set of summary exhibits.

The summary exhibits include the following:

Summary Exhibit	Description
1	Summary of Reserve Estimates - Undiscounted
2	Summary of Reserve Estimates - Discounted at 4%
3	Summary of Reserve Estimates - Discounted at 6%
4	Summary of Change in Ultimate Loss
5	Summary of Estimates for 2018-19 Fiscal Year
6	Summary of Reserve Estimates by Cluster
7	Summary of Reserve Estimates by College
8	Summary of Ultimate Losses by Cluster
9	Calculation of Implied Development Factors
10	MA Colleges and Universities Allocation

The eight sections and their exhibits are organized as follows:

Section	Exhibit	Cluster
1	1	All Clusters Combined - Indemnity
1	2	All Clusters Combined - Medical
2	1	DDS - Indemnity
2	2	DDS - Medical
3	1	DMH - Indemnity
3	2	DMH - Medical
4	1	DOC - Indemnity
4	2	DOC - Medical
5	1	UMass Amherst - Indemnity
5	2	UMass Amherst - Medical
6	1	UMass Medical School - Indemnity
6	2	UMass Medical School - Medical
7	1	Other College and Universities - Indemnity
7	2	Other College and Universities - Medical
8	1	All Other - Indemnity
8	2	All Other - Medical

Within Sections 1 through 8, the worksheets are organized as follows:

Page	Description
1	Summary of Ultimate Losses
2	Paid Loss Development Method
3	Paid Bornhuetter-Ferguson Method
4	Calculation of Initial Expected Loss Rates
5	Calculation of 1982 and Prior Reserves Page 1
6	Calculation of 1982 and Prior Reserves Page 2
7	Paid Loss Triangle
8	Comparison of Ultimate Losses
9-12	Calculation of Ultimate Lump Sum Payments
13-15	Discounting Exhibits
16	Calculation of FY 2019 Payments

For the purpose of the allocation of liability to MassDOT (excl. MTA), within Section 8 only, there are two additional worksheet pages:

Page	Description
MassDOT - FY2018	MassDOT (excl. MTA) Reserve Allocation as of 06/30/18
MassDOT - FY2019	MassDOT (excl. MTA) Reserve Allocation as of 06/30/19

VIII. Description of Exhibits

Summary Exhibits

Summary Exhibit 1 shows the undiscounted low and high reserve estimates by cluster for indemnity and medical separately.

Summary Exhibit 2 shows the low and high reserve estimates by cluster for indemnity and medical separately, discounted at 4%.

Summary Exhibit 3 shows the low and high reserve estimates by cluster for indemnity and medical separately, discounted at 6%.

Summary Exhibit 4 shows the change in ultimate loss from the prior report by cluster and for indemnity and medical separately. Changes in the ultimate loss for the current fiscal year are excluded.

Summary Exhibit 5 shows the low and high ultimate loss estimate for the current fiscal year. The estimates are shown by cluster and for indemnity and medical separately. The midpoint of the range of estimates is used to calculate the loss rate for each cluster.

Summary Exhibit 6 contains an additional summary of reserve estimates by cluster, showing both the discounted and undiscounted ranges of reserves.

Summary Exhibit 7 contains a summary of reserve estimates by college. High and low reserve estimates are shown undiscounted as well as at 4% and 6% discount rates.

Summary Exhibit 8 shows the selection of ultimate losses by accident year for all clusters. A calculation of the outstanding losses and loss rates is also shown by accident year.

Page 1 shows results for all clusters combined.

Pages 2 – 8 show results for each of the clusters specified in the Scope section.

Summary Exhibit 9 shows the calculation of the implied loss development factors underlying the results of our analysis by accident year. The selected ultimate loss for all clusters is divided by the paid losses to date for all clusters to derive the indicated LDF by accident year.

Summary Exhibit 10 Page 1 shows the results of the methodology used to allocate ultimate losses to each of the college and universities contained in the Other Colleges and Universities group. This methodology is discussed in the Overview section of this report.

Summary Exhibit 10 Page 2 shows the estimated loss costs for indemnity and medical combined for each college and university. The loss costs are calculated by dividing the sum of the estimated ultimate indemnity and medical losses on Page 4 by the payroll figures on Page 3.

Summary Exhibit 10 Page 3 shows the historical payrolls for each college and university.

Summary Exhibit 10 Page 4 shows the estimated ultimate indemnity and medical losses for each college and university. The estimated ultimate losses are calculated by multiplying the cumulative paid indemnity and medical losses on Page 5 by the Age-to-Ultimate LDF's shown on Page 4.

Summary Exhibit 10 Page 5 shows the historical cumulative indemnity and medical payments for each college and university.

Summary Exhibit 10 Page 6 shows the current fiscal year indemnity and medical payments for each college and university.

Pages in Exhibits 1 and 2 of Sections 1 through 8

Page 1 shows the selected ultimate losses by accident year. A high and low selection is made for each accident year based on a review of the actuarial methods presented. Outstanding losses based on the low and high estimates are also calculated. The outstanding loss estimate equals the selected ultimate loss minus paid losses to date.

Page 2 shows the application of the Paid Loss Development Method to the applicable data. The number of paid counts in the last 12 months, average outstanding claim amounts, and the average age for claimants that had an indemnity payment within the last calendar year are also shown.

Page 3 shows the application of the Paid Bornhuetter-Ferguson Method to the applicable data. The ultimate loss cost resulting from the method is also shown.

Page 4 calculates the initial expected loss rate, which is used as the a priori loss rate in the B-F method. Expected ultimate losses from the Paid Loss Development Method are divided by payroll for each accident year. The resulting loss rates are trended to the current cost and wage level and adjusted for historical changes in benefit levels. A current loss cost is then selected.

Page 5 shows the application of the methodology used to estimate ultimate losses for periods 7/1/1981-82 and prior. This methodology is described in the Actuarial Analysis section of this report.

Page 6 shows the derivation of the selected trend using the applicable data for each section. The selected trend is used in the methodology for estimating the 7/1/1981-82 and prior reserves.

Page 7 shows the paid loss development triangle and selected LDF's underlying the paid loss development and paid B-F methods.

Page 8 shows the comparison of the selected ultimate losses to the selection from the prior actuarial reserve review. The changes in ultimates are shown on an absolute and percentage change basis.

Page 9 calculates the estimated ultimate lump sum payments. Two methodologies are reviewed and an estimate of the ultimate lump sum payments by accident year is made. The two methods are described in the Actuarial Analysis section of this report. A comparison to the prior ultimate lump sum selection is also shown.

Pages 10 through 12 show various lump sum development triangles underlying the lump sum methodology on Page 9. Incremental lump sum payments (in 12 month intervals) are accumulated to derive a cumulative lump sum payment triangle (Page 10). Page 11 shows the incremental lump sum payments as a percent of ultimate indemnity loss excluding lump sum payments. Page 12 shows the selection of the LDF's for the cumulative lump sum payment triangle.

Page 13 calculates the discount factors based on the selected payout patterns from Page 7. Discount factors are calculated assuming 4% and 6% interest rates.

Pages 14 and 15 show the application of the discount factors from Page 13 to the outstanding losses from Page 1. Page 14 shows the discounted outstanding losses at 4%; Page 15 shows them at 6%.

Page 16 estimates the percentage of reserve estimates which can be considered short-term; i.e., projected payments associated with the reserves which will be made over the next calendar period

Additional MassDOT Pages in Exhibits 1 and 2 of Section 8 ONLY

Page MassDOT FY2018 shows the results of the methodology used to allocate outstanding reserve liability to the MassDOT (excl. MTA) and Non-MassDOT agencies. This methodology is discussed in the Overview section of this report. This page utilizes the results of the previous actuarial analysis performed in 2018 and based on loss data valued as of 6/30/18.

Page MassDOT FY2019 shows the results of the methodology used to allocate outstanding reserve liability to the MassDOT (excl. MTA) and Non-MassDOT agencies. This methodology is discussed in the Overview section of this report. This page utilizes the results of the current actuarial analysis, based on data valued as of 6/30/19.

IX. Exhibits

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Table of Contents

I. Narrative

II. Summary Exhibits

III. Supporting Exhibits

Section 1 *All Clusters Combined*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 2 *Department of Developmental Services - Cluster 1*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 3 *Department of Mental Health - Cluster 2*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 4 *Department of Corrections - Cluster 3*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 5 *University of Massachusetts (Amherst) - Cluster 4*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 6 *University of Massachusetts (Medical Center) - Cluster 4*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 7 *Massachusetts Colleges & Universities - Cluster 4*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 8 *All Other - Clusters 5-17 & 95*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Summary of Reserve Estimates - Undiscounted

Cluster	Cluster #	Report Section	Loss Reserve Estimate Low End	Loss Reserve Estimate High End
Department of Developmental Services	1	Section 2		
Indemnity			19,510,386	22,115,385
Medical			2,834,121	5,282,782
Total			22,344,507	27,398,168
Department of Mental Health	2	Section 3		
Indemnity			21,839,098	26,996,428
Medical			3,617,350	4,669,738
Total			25,456,447	31,666,166
Department of Corrections	3	Section 4		
Indemnity			27,145,085	35,527,528
Medical			9,373,946	13,244,363
Total			36,519,032	48,771,891
UMass - Amherst	4	Section 5		
Indemnity			4,550,542	5,967,268
Medical			1,641,812	2,464,134
Total			6,192,354	8,431,402
UMass - Medical School	4	Section 6		
Indemnity			1,835,384	2,591,050
Medical			533,941	1,002,860
Total			2,369,324	3,593,910
Other Colleges & Universities	4	Section 7		
Indemnity			14,105,733	18,642,588
Medical			3,199,788	4,212,455
Total			17,305,521	22,855,043
All Others	5-17 & 95	Section 8		
Indemnity			157,861,262	186,066,487
Medical			31,561,067	38,240,196
Total			189,422,329	224,306,683
Grand Total		Section 1		
Indemnity			246,847,489	297,906,734
Medical			52,762,025	69,116,529
Total			299,609,515	367,023,263

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Summary of Reserve Estimates - Discounted at 4%

Cluster	Cluster #	Report Section	Loss Reserve Estimate Low End	Loss Reserve Estimate High End
Department of Developmental Services	1	Section 2		
Indemnity			15,229,852	17,310,950
Medical			2,343,074	4,300,699
Total			17,572,926	21,611,649
Department of Mental Health	2	Section 3		
Indemnity			15,952,543	19,686,268
Medical			2,863,814	3,697,828
Total			18,816,357	23,384,096
Department of Corrections	3	Section 4		
Indemnity			20,820,292	27,171,897
Medical			7,098,979	10,001,897
Total			27,919,271	37,173,794
UMass - Amherst	4	Section 5		
Indemnity			3,685,255	4,805,289
Medical			1,325,406	1,998,722
Total			5,010,660	6,804,011
UMass - Medical School	4	Section 6		
Indemnity			1,507,278	2,129,672
Medical			464,735	860,477
Total			1,972,013	2,990,149
Other Colleges & Universities	4	Section 7		
Indemnity			11,364,172	15,076,247
Medical			2,567,445	3,383,418
Total			13,931,617	18,459,666
All Others	5-17 & 95	Section 8		
Indemnity			112,378,810	133,557,337
Medical			23,763,008	28,770,658
Total			136,141,818	162,327,996
Grand Total		Section 1		
Indemnity			180,938,202	219,737,660
Medical			40,426,460	53,013,700
Total			221,364,662	272,751,361

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Summary of Reserve Estimates - Discounted at 6%

Cluster	Cluster #	Report Section	Loss Reserve Estimate Low End	Loss Reserve Estimate High End
Department of Developmental Services	1	Section 2		
Indemnity			13,817,082	15,716,143
Medical			2,169,600	3,956,808
Total			15,986,682	19,672,951
Department of Mental Health	2	Section 3		
Indemnity			14,247,289	17,561,442
Medical			2,609,015	3,368,310
Total			16,856,304	20,929,752
Department of Corrections	3	Section 4		
Indemnity			18,774,056	24,458,250
Medical			6,361,723	8,951,192
Total			25,135,779	33,409,442
UMass - Amherst	4	Section 5		
Indemnity			3,399,383	4,421,396
Medical			1,215,592	1,837,008
Total			4,614,975	6,258,404
UMass - Medical School	4	Section 6		
Indemnity			1,389,142	1,962,302
Medical			437,870	805,732
Total			1,827,012	2,768,033
Other Colleges & Universities	4	Section 7		
Indemnity			10,364,079	13,768,127
Medical			2,344,089	3,089,715
Total			12,708,169	16,857,842
All Others	5-17 & 95	Section 8		
Indemnity			98,435,834	117,322,771
Medical			21,219,124	25,677,015
Total			119,654,958	142,999,786
Grand Total		Section 1		
Indemnity			160,426,865	195,210,431
Medical			36,357,013	47,685,780
Total			196,783,878	242,896,211

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Summary of Change in Ultimate Loss (excluding current Fiscal Year)

Cluster	Cluster #	Report Section	Current Ult Loss Estimate less Previous Ult Loss Estimate Low End	High End
Department of Developmental Services	1	Section 2		
Indemnity			915,514	367,630
Medical			14,935	(163,578)
Total			930,450	204,052
Department of Mental Health	2	Section 3		
Indemnity			807,168	(7,357)
Medical			608,526	417,080
Total			1,415,694	409,723
Department of Corrections	3	Section 4		
Indemnity			(3,107,559)	(4,375,855)
Medical			(886,547)	(1,594,604)
Total			(3,994,106)	(5,970,459)
UMass - Amherst	4	Section 5		
Indemnity			(536,959)	(784,102)
Medical			(209,467)	(223,196)
Total			(746,426)	(1,007,298)
UMass - Medical School	4	Section 6		
Indemnity			107,000	(95,374)
Medical			(131,649)	(252,762)
Total			(24,649)	(348,136)
Other Colleges & Universities	4	Section 7		
Indemnity			(385,160)	(854,669)
Medical			(139,704)	(260,900)
Total			(524,864)	(1,115,568)
All Others	5-17 & 95	Section 8		
Indemnity			(7,742,390)	(11,171,683)
Medical			615,321	(681,423)
Total			(7,127,070)	(11,853,106)
Grand Total		Section 1		
Indemnity			(9,942,386)	(16,921,409)
Medical			(128,584)	(2,759,383)
Total			(10,070,970)	(19,680,793)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Summary of Estimates for 2018-19 Fiscal Year

Cluster	Cluster #	Report Section	Ultimate Loss Estimate Low End	Ultimate Loss Estimate High End	Average	Payroll (000)	Loss Rate
Department of Developmental Services	1	Section 2					
Indemnity			3,436,000	3,550,000			
Medical			1,256,000	1,423,000			
Total			4,692,000	4,973,000	4,832,500	308,002	1.569
Department of Mental Health	2	Section 3					
Indemnity			5,365,000	5,943,000			
Medical			1,184,000	1,400,700			
Total			6,549,000	7,343,700	6,946,350	218,060	3.186
Department of Corrections	3	Section 4					
Indemnity			7,180,000	8,354,000			
Medical			1,977,000	2,487,000			
Total			9,157,000	10,841,000	9,999,000	357,324	2.798
UMass - Amherst	4	Section 5					
Indemnity			1,347,000	1,441,000			
Medical			480,000	731,850			
Total			1,827,000	2,172,850	1,999,925	656,644	0.305
UMass - Medical School	4	Section 6					
Indemnity			574,000	636,000			
Medical			285,000	355,950			
Total			859,000	991,950	925,475	410,826	0.225
Other Colleges & Universities	4	Section 7					
Indemnity			3,068,380	3,912,000			
Medical			1,070,000	1,326,130			
Total			4,138,380	5,238,130	4,688,255	1,500,205	0.313
All Others	5-17 & 95	Section 8					
Indemnity			29,266,840	34,111,000			
Medical			7,900,000	8,423,000			
Total			37,166,840	42,534,000	39,850,420	3,573,725	1.115
Grand Total		Section 1					
Indemnity			50,237,220	57,947,000			
Medical			14,152,000	16,147,630			
Total			64,389,220	74,094,630	69,241,925	7,024,786	0.986

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Summary of Reserve Estimates by Cluster

Cluster	Cluster / Report Section	Undiscounted		Discounted at 4%		Discounted at 6%	
		Low End	High End	Low End	High End	Low End	High End
DDS	1 / 2	22,344,507	27,398,168	17,572,926	21,611,649	15,986,682	19,672,951
DMH	2 / 3	25,456,447	31,666,166	18,816,357	23,384,096	16,856,304	20,929,752
DOC	3 / 4	36,519,032	48,771,891	27,919,271	37,173,794	25,135,779	33,409,442
UMass - Amherst	4 / 5	6,192,354	8,431,402	5,010,660	6,804,011	4,614,975	6,258,404
UMass - Medical	4 / 6	2,369,324	3,593,910	1,972,013	2,990,149	1,827,012	2,768,033
Other Colleges & Universities	4 / 7	17,305,521	22,855,043	13,931,617	18,459,666	12,708,169	16,857,842
All Other Dept's (incl. MassDOT, excl. MTA)	5 / 8	189,422,329	224,306,683	136,141,818	162,327,996	119,654,958	142,999,786
Total		299,609,515	367,023,263	221,364,662	272,751,361	196,783,878	242,896,211

All Other Departments	Cluster / Report Section	Undiscounted		Discounted at 4%		Discounted at 6%	
		Low End	High End	Low End	High End	Low End	High End
MassDOT Agencies (excl. MTA)	5 / 8	12,355,661	14,749,560	8,882,566	10,675,608	7,807,590	9,404,939
Non-MassDOT Agencies	5 / 8	177,066,668	209,557,123	127,259,252	151,652,388	111,847,367	133,594,847
Total		189,422,329	224,306,683	136,141,818	162,327,996	119,654,958	142,999,786

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Summary of Reserve Estimates by College

	Undiscounted		Discounted at 4%		Discounted at 6%	
Cluster	Low End	High End	Low End	High End	Low End	High End
Berkshire Community College	153,388	202,576	123,483	163,618	112,639	149,420
Bridgewater State College	1,335,763	1,764,114	1,075,341	1,424,848	980,907	1,301,208
Bristol Community College	206,285	272,437	166,068	220,043	151,484	200,949
Bunker Hill Community College	425,847	562,408	342,824	454,248	312,718	414,831
Cape Cod Community College	356,522	470,852	287,014	380,300	261,809	347,299
Fitchburg State College	573,768	757,764	461,906	612,034	421,342	558,925
Framingham State College	479,557	633,340	386,062	511,539	352,159	467,151
Greenfield Community College	190,495	251,582	153,356	203,199	139,888	185,567
Holyoke Community College	398,754	526,627	321,013	425,348	292,822	388,439
Mass Bay Community College	277,703	366,756	223,561	296,223	203,929	270,519
Mass College of Art	644,397	851,042	518,765	687,374	473,208	627,727
Mass Maritime Academy	348,928	460,822	280,901	372,199	256,232	339,902
Massachusetts College of Liberal Arts	305,682	403,708	246,086	326,069	224,475	297,775
Massasoit Community College	451,475	596,254	363,455	481,585	331,537	439,796
Middlesex Community College	231,193	305,332	186,120	246,612	169,775	225,213
Mt Wachusett Community College	278,666	368,028	224,337	297,251	204,636	271,457
North Essex Community College	331,472	437,768	266,848	353,578	243,413	322,897
North Shore Community College	352,474	465,505	283,756	375,982	258,837	343,356
Quinsigamond Community College	687,698	908,229	553,624	733,562	505,006	669,908
Roxbury Community College	162,424	214,510	130,758	173,256	119,275	158,222
Salem State College	880,855	1,163,327	709,123	939,601	646,849	858,068
Springfield Tech Community College	542,412	716,353	436,663	578,587	398,316	528,380
UMass (Boston)	1,613,115	2,130,407	1,298,620	1,720,697	1,184,578	1,571,385
UMass (Dartmouth)	1,821,967	2,406,234	1,466,754	1,943,478	1,337,947	1,774,834
University of Lowell	2,289,559	3,023,773	1,843,184	2,442,255	1,681,319	2,230,330
Westfield State College	1,081,675	1,428,546	870,791	1,153,815	794,319	1,053,693
Worcester State College	883,446	1,166,749	711,208	942,365	648,751	860,592
Total	17,305,521	22,855,043	13,931,617	18,459,666	12,708,169	16,857,842

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

All Clusters Combined
Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		106,728,128			115,079,464	118,838,650	8,351,336	12,110,522		
6/30/82-83		18,411,516	18,588,689		18,532,366	18,653,909	120,851	242,393		
6/30/83-84		26,846,315	27,724,027		27,544,239	27,842,303	697,924	995,988		
6/30/84-85	1,823,085	39,972,803	40,644,549	40,457,882	40,356,434	40,735,129	383,631	762,326	2.214	2.234
6/30/85-86	1,952,445	52,759,167	53,696,123	53,505,455	53,227,999	53,574,975	468,833	815,808	2.726	2.744
6/30/86-87	2,220,820	59,869,146	61,027,242	60,865,104	60,368,586	60,670,490	499,440	801,344	2.718	2.732
6/30/87-88	2,885,583	86,888,042	88,933,336	88,694,846	88,604,789	89,579,947	1,716,747	2,691,905	3.071	3.104
6/30/88-89	3,098,180	85,478,228	87,797,660	87,472,432	87,505,084	88,493,274	2,026,856	3,015,046	2.824	2.856
6/30/89-90	3,079,763	82,543,784	85,060,790	84,901,786	84,664,827	85,536,087	2,121,042	2,992,302	2.749	2.777
6/30/90-91	2,914,364	68,290,552	70,658,718	70,543,527	69,888,974	70,826,434	1,598,422	2,535,882	2.398	2.430
6/30/91-92	2,880,434	46,543,671	48,312,795	48,227,096	47,879,755	49,030,501	1,336,084	2,486,831	1.662	1.702
6/30/92-93	2,887,238	31,390,521	32,853,579	32,781,236	32,678,207	32,913,877	1,287,685	1,523,355	1.132	1.140
6/30/93-94	3,056,850	34,894,602	36,711,833	36,566,975	36,497,524	37,116,803	1,602,922	2,222,201	1.194	1.214
6/30/94-95	3,158,808	31,079,292	32,840,994	32,789,629	32,522,861	33,351,386	1,443,569	2,272,095	1.030	1.056
6/30/95-96	3,301,791	29,814,947	31,808,910	31,744,002	31,578,111	32,408,582	1,763,164	2,593,635	0.956	0.982
6/30/96-97	3,902,868	29,951,673	32,092,421	32,030,592	31,782,726	32,640,789	1,831,053	2,689,116	0.814	0.836
6/30/97-98	3,776,138	33,305,733	35,813,937	35,726,976	35,006,793	35,953,042	1,701,059	2,647,308	0.927	0.952
6/30/98-99	4,017,530	31,173,681	33,995,826	33,902,238	33,442,504	34,309,073	2,268,823	3,135,392	0.832	0.854
6/30/99-00	4,221,786	35,073,771	38,782,925	38,626,853	38,019,053	39,059,215	2,945,282	3,985,444	0.901	0.925
6/30/00-01	4,310,725	41,250,901	45,814,284	45,607,196	44,859,911	45,951,483	3,609,010	4,700,582	1.041	1.066
6/30/01-02	4,438,755	35,787,155	40,119,203	39,979,913	39,167,661	40,579,643	3,380,505	4,792,487	0.882	0.914
6/30/02-03	4,423,888	35,880,793	40,552,522	40,412,129	39,933,580	41,363,100	4,052,787	5,482,307	0.903	0.935
6/30/03-04	4,482,207	35,598,984	40,633,125	40,495,705	39,862,077	40,920,460	4,263,092	5,321,476	0.889	0.913
6/30/04-05	4,639,517	36,963,431	42,894,993	41,242,462	40,703,311	42,284,800	3,739,880	5,321,369	0.877	0.911
6/30/05-06	4,938,165	32,706,279	38,254,474	37,782,174	37,356,949	38,470,900	4,650,670	5,764,621	0.756	0.779
6/30/06-07	5,183,126	31,231,333	37,254,241	37,171,482	36,092,597	37,907,570	4,861,264	6,676,237	0.696	0.731
6/30/07-08	5,508,425	35,504,329	43,079,447	42,705,762	41,806,790	43,541,016	6,302,461	8,036,687	0.759	0.790
6/30/08-09	5,447,676	35,510,311	43,847,975	43,369,536	42,822,340	44,515,328	7,312,029	9,005,017	0.786	0.817
6/30/09-10	5,525,579	34,134,321	42,947,208	43,020,024	42,075,650	44,012,611	7,941,329	9,878,290	0.761	0.797
6/30/10-11	5,712,303	38,235,809	49,326,434	48,460,607	47,759,870	50,072,874	9,524,061	11,837,065	0.836	0.877
6/30/11-12	5,880,714	36,977,205	49,242,592	48,794,375	48,145,880	50,327,379	11,168,675	13,350,174	0.819	0.856
6/30/12-13	6,162,621	31,639,561	43,520,325	45,675,959	43,461,490	46,122,250	11,821,929	14,482,689	0.705	0.748
6/30/13-14	6,442,136	37,027,478	53,516,461	54,407,907	52,241,270	55,477,000	15,213,792	18,449,522	0.811	0.861
6/30/14-15	6,758,892	38,531,813	59,550,103	60,119,429	58,294,360	61,709,470	19,762,547	23,177,657	0.862	0.913
6/30/15-16	6,843,054	38,643,555	66,314,890	65,352,523	63,699,820	67,961,090	25,056,265	29,317,535	0.931	0.993
6/30/16-17	6,638,078	32,519,309	65,120,534	64,059,821	62,546,850	66,925,170	30,027,541	34,405,861	0.942	1.008
6/30/17-18	6,709,926	23,754,264	65,408,378	65,255,487	63,176,330	67,218,760	39,422,066	43,464,496	0.942	1.002
6/30/18-19	7,024,786	11,054,333	66,464,593	70,849,306	64,389,220	74,094,630	53,334,887	63,040,297	0.917	1.055
Total	156,248,254	1,573,966,735	1,791,206,136	1,743,598,424	1,873,576,249	1,940,989,998	299,609,515	367,023,263		
Tot 6/30/84-19	156,248,254	1,421,980,776	1,744,893,420	1,743,598,424	1,712,420,180	1,775,655,136	290,439,404	353,674,360	1.096	1.136

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) - (9) = Sum of Summary Exhibit 8, Pages 2-8
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Department of Developmental Services - Cluster 1
Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		23,291,759			26,235,931	27,364,404	2,944,172	4,072,645		
6/30/82-83		4,960,536	4,984,470		4,984,296	4,992,019	23,760	31,483		
6/30/83-84		10,217,889	10,697,875		10,698,000	10,735,819	480,111	517,929		
6/30/84-85	181,560	7,574,989	7,631,037	7,633,966	7,584,000	7,646,721	9,011	71,732	4.177	4.212
6/30/85-86	195,247	11,874,262	11,988,165	11,989,932	11,890,000	11,902,000	15,739	27,739	6.090	6.096
6/30/86-87	224,370	15,376,859	15,540,879	15,550,283	15,399,000	15,414,000	22,141	37,141	6.863	6.870
6/30/87-88	262,864	22,516,796	22,800,125	22,784,978	22,783,000	22,802,000	266,204	285,204	8.667	8.674
6/30/88-89	283,884	24,268,333	24,639,213	24,648,280	24,639,000	24,701,434	370,667	433,101	8.679	8.701
6/30/89-90	285,078	18,704,794	19,033,481	19,093,205	18,884,000	18,887,000	179,206	182,206	6.624	6.625
6/30/90-91	267,732	13,792,748	14,075,176	14,073,125	13,924,049	13,927,000	131,301	134,252	5.201	5.202
6/30/91-92	261,442	10,467,217	10,722,148	10,718,812	10,691,720	10,722,000	224,503	254,783	4.090	4.101
6/30/92-93	259,992	5,947,948	6,112,578	6,110,275	5,994,190	6,054,000	46,242	106,052	2.306	2.329
6/30/93-94	257,062	4,770,402	4,915,513	4,913,673	4,846,090	4,894,000	75,688	123,598	1.885	1.904
6/30/94-95	255,854	3,009,689	3,109,700	3,110,156	3,100,560	3,110,000	90,871	100,311	1.212	1.216
6/30/95-96	255,539	4,179,296	4,345,097	4,342,469	4,343,000	4,355,000	163,704	175,704	1.700	1.704
6/30/96-97	270,071	3,349,690	3,486,637	3,486,983	3,380,000	3,402,000	30,310	52,310	1.252	1.260
6/30/97-98	245,367	3,498,515	3,671,742	3,669,167	3,669,000	3,687,000	170,485	188,485	1.495	1.503
6/30/98-99	251,453	3,044,847	3,196,580	3,197,176	3,196,000	3,210,000	151,153	165,153	1.271	1.277
6/30/99-00	255,641	3,394,938	3,598,239	3,595,377	3,595,000	3,616,000	200,062	221,062	1.406	1.414
6/30/00-01	263,918	5,062,870	5,400,267	5,386,731	5,387,000	5,482,000	324,130	419,130	2.041	2.077
6/30/01-02	267,598	3,244,904	3,476,575	3,476,771	3,287,000	3,319,000	42,096	74,096	1.228	1.240
6/30/02-03	274,465	3,925,464	4,263,135	4,256,129	4,256,000	4,282,000	330,536	356,536	1.551	1.560
6/30/03-04	272,384	4,348,917	4,764,023	4,751,611	4,751,000	4,784,000	402,083	435,083	1.744	1.756
6/30/04-05	273,647	3,710,687	4,081,279	4,042,526	3,779,000	3,814,000	68,313	103,313	1.381	1.394
6/30/05-06	285,139	4,025,763	4,471,545	4,413,680	4,414,000	4,499,000	388,237	473,237	1.548	1.578
6/30/06-07	298,516	4,104,967	4,596,310	4,552,865	4,489,250	4,634,000	384,283	529,033	1.504	1.552
6/30/07-08	314,231	3,025,275	3,384,417	3,522,281	3,294,700	3,567,000	269,425	541,725	1.048	1.135
6/30/08-09	302,998	3,583,139	4,092,699	4,131,833	4,023,500	4,162,000	440,361	578,861	1.328	1.374
6/30/09-10	297,252	4,702,621	5,468,633	5,326,654	5,253,250	5,498,000	550,629	795,379	1.767	1.850
6/30/10-11	292,432	3,951,211	4,688,430	4,624,802	4,497,500	4,724,000	546,289	772,789	1.538	1.615
6/30/11-12	295,908	4,242,644	5,132,566	5,040,640	4,896,500	5,162,000	653,856	919,356	1.655	1.744
6/30/12-13	301,541	3,802,326	4,736,511	4,746,154	4,593,900	4,781,000	791,574	978,674	1.523	1.586
6/30/13-14	309,910	4,083,302	5,228,766	5,167,410	5,022,500	5,274,000	939,198	1,190,698	1.621	1.702
6/30/14-15	316,552	4,038,621	5,582,129	5,391,424	5,245,800	5,621,000	1,207,179	1,582,379	1.657	1.776
6/30/15-16	316,565	2,916,886	4,401,791	4,578,621	4,266,000	4,606,000	1,349,114	1,689,114	1.348	1.455
6/30/16-17	292,403	2,734,929	4,786,621	4,754,314	4,624,000	4,813,000	1,889,071	2,078,071	1.581	1.646
6/30/17-18	292,956	1,993,304	4,664,609	4,680,736	4,503,000	4,749,000	2,509,696	2,755,696	1.537	1.621
6/30/18-19	308,002	1,028,892	4,831,229	4,932,973	4,692,000	4,973,000	3,663,108	3,944,108	1.523	1.615
Total	9,589,573	262,768,229	262,600,189	246,696,013	285,112,736	290,166,397	22,344,507	27,398,168		
Tot 6/30/84-19	9,589,573	224,298,044	246,917,844	246,696,013	243,194,509	247,074,155	18,896,465	22,776,110	2.536	2.576

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) - (9) = Sum of Section 2, Exhibit 1, Page 1 + Section 2, Exhibit 2, Page 1
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Department of Mental Health - Cluster 2
Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		21,692,565			23,175,628	23,630,760	1,483,063	1,938,195		
6/30/82-83		3,066,083	3,103,563		3,103,563	3,110,897	37,480	44,815		
6/30/83-84		2,864,047	2,917,299		2,890,082	2,917,154	26,036	53,107		
6/30/84-85	142,561	4,882,098	5,013,431	4,980,644	4,907,000	5,018,000	24,902	135,902	3.442	3.520
6/30/85-86	153,298	4,891,866	5,070,953	5,065,722	4,899,000	4,927,000	7,134	35,134	3.196	3.214
6/30/86-87	176,136	6,911,248	7,208,556	7,220,940	6,924,000	6,961,000	12,752	49,752	3.931	3.952
6/30/87-88	206,319	13,726,748	14,402,198	14,334,363	14,334,000	14,403,000	607,252	676,252	6.947	6.981
6/30/88-89	222,806	14,773,751	15,537,656	15,465,542	15,508,814	15,558,790	735,063	785,039	6.961	6.983
6/30/89-90	223,751	14,122,347	14,912,584	14,845,774	14,825,000	14,914,000	702,653	791,653	6.626	6.665
6/30/90-91	210,162	9,578,099	10,123,098	10,118,169	9,639,000	9,764,760	60,901	186,661	4.586	4.646
6/30/91-92	205,241	5,520,691	5,839,822	5,834,533	5,542,000	5,622,669	21,309	101,979	2.700	2.740
6/30/92-93	176,705	4,907,269	5,221,529	5,213,517	5,213,000	5,233,870	305,731	326,601	2.950	2.962
6/30/93-94	173,075	3,261,240	3,516,146	3,508,118	3,509,000	3,522,640	247,760	261,400	2.027	2.035
6/30/94-95	178,317	3,672,116	3,967,412	3,955,972	3,705,000	3,790,160	32,884	118,044	2.078	2.126
6/30/95-96	175,996	2,734,479	2,939,360	2,931,682	2,765,000	2,853,460	30,521	118,981	1.571	1.621
6/30/96-97	190,083	2,150,995	2,311,269	2,306,755	2,175,000	2,240,795	24,005	89,800	1.144	1.179
6/30/97-98	177,278	3,419,787	3,732,814	3,715,992	3,451,000	3,592,880	31,213	173,093	1.947	2.027
6/30/98-99	189,080	2,573,981	2,790,485	2,782,058	2,744,960	2,752,840	170,979	178,859	1.452	1.456
6/30/99-00	194,494	2,916,057	3,185,838	3,173,184	3,040,380	3,109,260	124,323	193,203	1.563	1.599
6/30/00-01	201,568	4,053,774	4,472,825	4,447,955	4,257,120	4,362,510	203,346	308,736	2.112	2.164
6/30/01-02	203,105	3,225,444	3,587,467	3,570,605	3,425,000	3,506,440	199,556	280,996	1.686	1.726
6/30/02-03	202,515	2,630,606	2,891,315	2,886,885	2,878,210	2,899,810	247,604	269,204	1.421	1.432
6/30/03-04	189,588	4,669,262	5,209,045	5,178,086	4,979,700	5,150,480	310,438	481,218	2.627	2.717
6/30/04-05	186,990	3,656,995	4,089,629	3,912,908	3,913,000	4,090,000	256,005	433,005	2.093	2.187
6/30/05-06	193,254	2,741,320	3,061,618	3,036,708	3,029,000	3,070,000	287,680	328,680	1.567	1.589
6/30/06-07	203,359	2,893,235	3,289,502	3,245,627	3,120,200	3,162,550	226,965	269,315	1.534	1.555
6/30/07-08	212,083	2,305,389	2,632,493	2,721,966	2,532,450	2,627,700	227,061	322,311	1.194	1.239
6/30/08-09	204,679	2,861,931	3,327,550	3,340,933	3,296,000	3,372,000	434,069	510,069	1.610	1.647
6/30/09-10	184,688	1,787,061	2,120,226	2,298,127	2,205,000	2,298,000	417,939	510,939	1.194	1.244
6/30/10-11	169,689	3,228,352	3,897,598	3,793,055	3,793,000	3,956,000	564,648	727,648	2.235	2.331
6/30/11-12	177,399	2,259,752	2,798,401	2,934,517	2,799,000	2,980,000	539,248	720,248	1.578	1.680
6/30/12-13	189,252	3,147,851	4,049,393	4,069,060	4,044,000	4,141,000	896,149	993,149	2.137	2.188
6/30/13-14	199,876	3,697,827	4,951,815	4,927,479	4,891,000	5,071,000	1,193,173	1,373,173	2.447	2.537
6/30/14-15	213,700	4,418,104	6,170,967	5,980,482	5,981,000	6,270,000	1,562,896	1,851,896	2.799	2.934
6/30/15-16	211,829	5,533,481	8,512,181	7,700,717	7,701,000	8,652,000	2,167,519	3,118,519	3.635	4.084
6/30/16-17	203,085	4,206,811	7,420,605	6,843,054	6,843,000	7,421,000	2,636,189	3,214,189	3.370	3.654
6/30/17-18	203,925	2,580,847	5,897,405	6,187,004	5,897,000	6,396,700	3,316,153	3,815,853	2.892	3.137
6/30/18-19	218,060	1,465,152	6,548,987	7,103,327	6,549,000	7,343,700	5,083,848	5,878,548	3.003	3.368
Total	6,763,947	189,028,660	196,723,033	189,631,458	214,485,107	220,694,825	25,456,447	31,666,166		
Tot 6/30/84-19	6,763,947	161,405,966	190,702,171	189,631,458	185,315,834	191,036,014	23,909,868	29,630,049	2.740	2.824

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) - (9) = Sum of Section 3, Exhibit 1, Page 1 + Section 3, Exhibit 2, Page 1
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Department of Corrections - Cluster 3
Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		5,673,893			6,671,335	7,251,960	997,443	1,578,067		
6/30/82-83		2,912,565	2,938,249		2,923,105	2,939,692	10,540	27,127		
6/30/83-84		2,135,674	2,227,483		2,205,425	2,234,949	69,751	99,275		
6/30/84-85	115,258	4,775,716	4,828,845	4,812,515	4,814,593	4,823,000	38,877	47,284	4.177	4.185
6/30/85-86	123,937	6,962,840	7,046,715	7,033,652	6,975,039	7,008,650	12,199	45,810	5.628	5.655
6/30/86-87	142,396	4,532,327	4,590,635	4,595,252	4,553,341	4,574,325	21,014	41,998	3.198	3.212
6/30/87-88	166,792	7,243,858	7,345,073	7,356,848	7,288,209	7,321,095	44,351	77,237	4.370	4.389
6/30/88-89	180,117	8,751,677	8,889,053	8,873,196	8,874,000	8,889,000	122,323	137,323	4.927	4.935
6/30/89-90	180,883	11,414,619	11,618,545	11,616,041	11,615,000	11,619,000	200,381	204,381	6.421	6.424
6/30/90-91	169,902	13,300,111	13,577,567	13,575,279	13,575,000	13,733,850	274,889	433,739	7.990	8.083
6/30/91-92	165,926	6,661,065	6,841,191	6,838,651	6,839,000	6,951,600	177,935	290,535	4.122	4.190
6/30/92-93	174,198	4,516,464	4,644,197	4,642,129	4,639,018	4,643,000	122,554	126,536	2.663	2.665
6/30/93-94	185,946	6,734,553	6,947,270	6,941,658	6,942,000	6,948,000	207,447	213,447	3.733	3.737
6/30/94-95	194,051	7,496,263	7,785,297	7,775,431	7,776,000	7,786,000	279,737	289,737	4.007	4.012
6/30/95-96	205,262	6,874,222	7,189,351	7,177,437	7,178,000	7,189,000	303,778	314,778	3.497	3.502
6/30/96-97	234,073	7,864,827	8,249,819	8,233,125	8,234,000	8,250,000	369,173	385,173	3.518	3.525
6/30/97-98	221,865	10,835,742	11,564,136	11,520,169	11,083,608	11,274,540	247,866	438,798	4.996	5.082
6/30/98-99	256,071	9,640,639	10,482,965	10,430,878	10,033,628	10,209,660	392,989	569,021	3.918	3.987
6/30/99-00	268,486	10,292,986	11,340,292	11,268,535	10,850,214	10,952,240	557,228	659,254	4.041	4.079
6/30/00-01	279,182	13,494,893	14,949,430	14,842,505	14,304,438	14,443,680	809,545	948,787	5.124	5.174
6/30/01-02	283,070	10,858,439	12,089,229	12,008,898	11,547,535	12,089,000	689,096	1,230,561	4.079	4.271
6/30/02-03	289,846	11,021,347	12,347,904	12,263,024	11,810,790	12,348,000	789,442	1,326,653	4.075	4.260
6/30/03-04	293,771	10,008,924	11,326,774	11,248,725	10,837,197	10,971,000	828,273	962,076	3.689	3.735
6/30/04-05	291,382	10,986,770	12,576,191	11,575,901	11,426,611	12,041,250	439,840	1,054,480	3.922	4.132
6/30/05-06	294,709	7,986,448	9,233,605	8,631,975	8,463,449	8,966,000	477,001	979,552	2.872	3.042
6/30/06-07	289,603	6,831,891	7,992,515	7,537,143	7,371,227	7,955,020	539,336	1,123,129	2.545	2.747
6/30/07-08	354,668	6,451,923	7,617,477	7,376,887	7,386,000	7,641,410	934,077	1,189,487	2.083	2.155
6/30/08-09	332,413	5,725,055	6,832,734	6,657,041	6,613,000	7,174,150	887,945	1,449,095	1.989	2.158
6/30/09-10	336,338	3,770,453	4,565,302	4,796,045	4,582,000	5,036,450	811,547	1,265,997	1.362	1.497
6/30/10-11	333,783	4,685,800	5,755,844	5,818,406	5,698,000	6,109,650	1,012,200	1,423,850	1.707	1.830
6/30/11-12	348,187	3,597,430	4,512,701	4,899,945	4,706,000	5,145,050	1,108,570	1,547,620	1.352	1.478
6/30/12-13	368,022	3,275,963	4,228,156	4,831,216	4,498,000	5,072,850	1,222,037	1,796,887	1.222	1.378
6/30/13-14	390,528	3,921,333	5,267,840	5,840,339	5,515,000	6,132,700	1,593,667	2,211,367	1.412	1.570
6/30/14-15	402,750	4,910,302	6,930,572	7,210,236	7,023,000	7,571,150	2,112,698	2,660,848	1.744	1.880
6/30/15-16	400,013	4,577,784	7,069,445	7,386,349	7,153,000	7,755,850	2,575,216	3,178,066	1.788	1.939
6/30/16-17	352,565	5,559,136	9,825,459	8,856,543	9,268,000	10,315,750	3,708,864	4,756,614	2.629	2.926
6/30/17-18	347,621	3,189,495	7,628,015	7,472,000	7,536,000	8,010,100	4,346,505	4,820,605	2.168	2.304
6/30/18-19	357,324	1,974,301	10,442,904	8,380,924	9,157,000	10,841,000	7,182,699	8,866,699	2.563	3.034
Total	9,330,938	261,447,729	299,298,779	290,324,900	297,966,761	310,219,620	36,519,032	48,771,891		
Tot 6/30/84-19	9,330,938	250,725,597	294,133,047	290,324,900	286,166,895	297,793,020	35,441,298	47,067,423	3.067	3.191

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) - (9) = Sum of Section 4, Exhibit 1, Page 1 + Section 4, Exhibit 2, Page 1
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		2,465,710			2,763,780	2,836,040	298,069	370,330		
6/30/82-83		225,530	226,344		229,124	232,246	3,594	6,716		
6/30/83-84		220,938	230,171		224,907	230,006	3,969	9,068		
6/30/84-85	176,924	2,017,397	2,033,909	2,031,009	2,030,953	2,035,034	13,555	17,637	1.148	1.150
6/30/85-86	188,662	1,676,445	1,691,636	1,689,118	1,709,741	1,743,263	33,296	66,818	0.906	0.924
6/30/86-87	212,277	2,738,466	2,767,193	2,761,516	2,762,000	2,767,000	23,534	28,534	1.301	1.303
6/30/87-88	243,118	2,649,762	2,683,229	2,679,392	2,679,000	2,684,000	29,238	34,238	1.102	1.104
6/30/88-89	248,990	2,352,557	2,388,049	2,384,640	2,384,000	2,389,000	31,443	36,443	0.957	0.959
6/30/89-90	250,404	679,355	690,817	695,384	692,000	702,000	12,645	22,645	0.276	0.280
6/30/90-91	235,170	2,996,766	3,054,966	3,054,531	3,027,000	3,052,000	30,234	55,234	1.287	1.298
6/30/91-92	235,607	3,150,744	3,216,387	3,215,378	3,183,000	3,209,000	32,256	58,256	1.351	1.362
6/30/92-93	241,161	712,440	723,671	723,633	719,696	740,317	7,256	27,877	0.298	0.307
6/30/93-94	254,321	1,252,669	1,276,978	1,276,495	1,268,000	1,296,000	15,331	43,331	0.499	0.510
6/30/94-95	256,665	1,067,175	1,091,212	1,090,684	1,078,423	1,111,476	11,248	44,301	0.420	0.433
6/30/95-96	265,739	835,707	856,880	856,541	844,425	870,865	8,718	35,158	0.318	0.328
6/30/96-97	296,336	700,495	723,328	723,096	707,847	730,726	7,352	30,232	0.239	0.247
6/30/97-98	296,982	651,847	670,562	670,836	661,000	679,000	9,153	27,153	0.223	0.229
6/30/98-99	299,530	930,096	960,865	960,420	943,000	975,300	12,904	45,204	0.315	0.326
6/30/99-00	323,627	1,577,004	1,646,581	1,642,962	1,600,000	1,648,000	22,996	70,996	0.494	0.509
6/30/00-01	338,348	1,853,822	1,943,870	1,938,885	1,938,000	1,944,000	84,178	90,178	0.573	0.575
6/30/01-02	329,555	1,337,631	1,398,652	1,396,771	1,397,000	1,399,000	59,369	61,369	0.424	0.425
6/30/02-03	329,179	1,221,168	1,282,059	1,280,663	1,281,000	1,283,670	59,832	62,502	0.389	0.390
6/30/03-04	344,547	414,340	438,130	441,024	438,000	441,000	23,660	26,660	0.127	0.128
6/30/04-05	325,530	912,330	976,769	977,394	975,000	979,000	62,670	66,670	0.300	0.301
6/30/05-06	403,750	640,322	691,966	729,197	692,000	729,000	51,678	88,678	0.171	0.181
6/30/06-07	420,219	658,010	713,375	758,172	713,000	758,000	54,990	99,990	0.170	0.180
6/30/07-08	425,998	977,819	1,069,962	1,087,458	1,066,000	1,091,000	88,181	113,181	0.250	0.256
6/30/08-09	420,566	1,486,900	1,638,233	1,606,577	1,607,000	1,638,000	120,100	151,100	0.382	0.389
6/30/09-10	433,206	1,002,315	1,108,455	1,137,493	1,108,000	1,158,000	105,685	155,685	0.256	0.267
6/30/10-11	444,673	1,409,520	1,593,477	1,569,637	1,560,000	1,626,000	150,480	216,480	0.351	0.366
6/30/11-12	467,753	1,441,155	1,653,958	1,635,120	1,635,000	1,654,000	193,845	212,845	0.350	0.354
6/30/12-13	495,398	998,924	1,183,894	1,227,182	1,184,000	1,250,200	185,076	251,276	0.239	0.252
6/30/13-14	518,391	836,248	988,171	1,128,642	989,000	1,151,900	152,752	315,652	0.191	0.222
6/30/14-15	539,631	1,389,605	1,846,692	1,819,012	1,819,000	1,998,450	429,395	608,845	0.337	0.370
6/30/15-16	585,875	1,344,001	2,001,136	1,960,218	1,933,000	2,200,600	588,999	856,599	0.330	0.376
6/30/16-17	594,787	1,209,636	2,061,915	2,068,970	2,013,000	2,300,000	803,364	1,090,364	0.338	0.387
6/30/17-18	607,484	709,863	1,626,465	1,811,919	1,626,000	1,842,000	916,137	1,132,137	0.268	0.303
6/30/18-19	656,644	371,828	1,827,098	2,138,600	1,827,000	2,172,850	1,455,172	1,801,022	0.278	0.331
Total	12,707,047	49,116,540	52,977,054	53,168,570	55,308,894	57,547,942	6,192,354	8,431,402		
Tot 6/30/84-19	12,707,047	46,204,362	52,520,539	53,168,570	52,091,083	54,249,651	5,886,722	8,045,289	0.410	0.427

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) - (9) = Sum of Section 5, Exhibit 1, Page 1 + Section 5, Exhibit 2, Page 1
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		1,455,812			1,455,812	1,455,812	0	0		
6/30/82-83		327,566	327,710		328,340	335,999	774	8,433		
6/30/83-84		1,494,800	1,556,459		1,496,283	1,502,058	1,483	7,258		
6/30/84-85	116,303	1,015,470	1,015,941	1,016,119	1,016,598	1,020,009	1,128	4,539	0.874	0.877
6/30/85-86	123,981	2,733,296	2,734,584	2,734,884	2,735,000	2,735,000	1,704	1,704	2.206	2.206
6/30/86-87	139,388	3,777,375	3,779,045	3,779,054	3,780,000	3,794,919	2,625	17,544	2.712	2.723
6/30/87-88	159,499	3,373,806	3,375,233	3,375,208	3,375,000	3,389,006	1,194	15,200	2.116	2.125
6/30/88-89	180,644	3,112,432	3,113,709	3,114,195	3,115,270	3,125,764	2,838	13,332	1.725	1.730
6/30/89-90	142,494	3,797,545	3,799,137	3,799,772	3,800,827	3,813,801	3,282	16,256	2.667	2.676
6/30/90-91	143,694	1,403,520	1,404,056	1,404,052	1,404,925	1,409,332	1,405	5,812	0.978	0.981
6/30/91-92	155,170	2,187,492	2,189,437	2,189,405	2,189,822	2,195,896	2,330	8,404	1.411	1.415
6/30/92-93	163,283	1,033,363	1,034,717	1,034,691	1,035,977	1,044,458	2,614	11,095	0.634	0.640
6/30/93-94	177,184	2,648,500	2,652,535	2,652,395	2,653,000	2,711,165	4,500	62,665	1.497	1.530
6/30/94-95	188,391	940,892	941,697	941,686	943,512	952,133	2,620	11,240	0.501	0.505
6/30/95-96	201,751	874,675	876,692	876,676	881,507	892,217	6,832	17,542	0.437	0.442
6/30/96-97	231,872	620,136	621,848	621,999	624,614	632,798	4,478	12,662	0.269	0.273
6/30/97-98	232,237	1,043,830	1,054,573	1,054,210	1,050,184	1,065,622	6,355	21,792	0.452	0.459
6/30/98-99	232,075	940,822	951,070	950,967	947,917	954,233	7,094	13,410	0.408	0.411
6/30/99-00	211,819	872,750	894,513	893,439	880,459	887,335	7,710	14,585	0.416	0.419
6/30/00-01	215,099	943,388	967,455	966,464	951,353	958,733	7,965	15,345	0.442	0.446
6/30/01-02	227,797	573,127	587,569	587,672	578,126	586,203	4,999	13,076	0.254	0.257
6/30/02-03	242,008	1,340,099	1,395,839	1,391,965	1,392,000	1,458,720	51,901	118,621	0.575	0.603
6/30/03-04	276,758	1,259,443	1,299,094	1,297,326	1,298,000	1,302,020	38,557	42,577	0.469	0.470
6/30/04-05	260,378	367,452	379,459	391,440	379,000	399,550	11,548	32,098	0.146	0.153
6/30/05-06	317,741	1,167,222	1,213,041	1,201,337	1,201,000	1,232,900	33,778	65,678	0.378	0.388
6/30/06-07	325,922	605,124	635,602	650,829	636,000	651,000	30,876	45,876	0.195	0.200
6/30/07-08	354,130	1,693,151	1,782,591	1,753,799	1,754,000	1,808,400	60,849	115,249	0.495	0.511
6/30/08-09	362,309	965,775	1,023,237	1,025,811	1,019,000	1,052,350	53,225	86,575	0.281	0.290
6/30/09-10	383,298	821,577	878,458	892,115	879,000	907,200	57,423	85,623	0.229	0.237
6/30/10-11	394,924	1,025,472	1,134,056	1,116,449	1,116,000	1,182,880	90,528	157,408	0.283	0.300
6/30/11-12	381,943	1,253,325	1,413,435	1,364,459	1,363,000	1,431,200	109,675	177,875	0.357	0.375
6/30/12-13	384,763	680,049	768,543	800,893	769,000	816,200	88,951	136,151	0.200	0.212
6/30/13-14	364,582	1,095,773	1,271,881	1,232,688	1,233,000	1,296,400	137,227	200,627	0.338	0.356
6/30/14-15	370,543	480,125	590,659	626,093	590,000	635,000	109,875	154,875	0.159	0.171
6/30/15-16	382,602	723,062	969,709	954,163	950,000	990,000	226,938	266,938	0.248	0.259
6/30/16-17	395,324	357,802	543,267	678,159	543,000	691,650	185,198	333,848	0.137	0.175
6/30/17-18	398,722	325,689	679,006	805,872	679,000	819,200	353,311	493,511	0.170	0.205
6/30/18-19	410,826	203,463	858,990	974,285	859,000	991,950	655,537	788,487	0.209	0.241
Total	9,249,456	49,535,200	50,714,849	49,150,570	51,904,525	53,129,110	2,369,324	3,593,910		
Tot 6/30/84-19	9,249,456	46,257,022	48,830,681	49,150,570	48,624,090	49,835,242	2,367,068	3,578,219	0.526	0.539

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) - (9) = Sum of Section 6, Exhibit 1, Page 1 + Section 6, Exhibit 2, Page 1
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		3,358,281			3,361,301	3,373,380	3,020	15,099		
6/30/82-83		796,317	796,695		811,448	826,578	15,131	30,261		
6/30/83-84		945,504	945,936		963,997	982,491	18,493	36,987		
6/30/84-85	357,749	1,604,929	1,605,667	1,606,041	1,635,334	1,665,739	30,405	60,810	0.457	0.466
6/30/85-86	380,112	2,253,254	2,254,293	2,254,650	2,291,785	2,329,932	38,531	76,678	0.603	0.613
6/30/86-87	423,770	3,208,911	3,210,422	3,210,390	3,211,000	3,211,736	2,089	2,825	0.758	0.758
6/30/87-88	480,405	5,069,952	5,072,223	5,072,239	5,072,000	5,091,986	2,048	22,033	1.056	1.060
6/30/88-89	495,261	1,941,224	1,942,006	1,942,441	1,943,000	1,949,786	1,776	8,562	0.392	0.394
6/30/89-90	502,691	4,397,880	4,399,719	4,399,670	4,400,000	4,417,676	2,120	19,796	0.875	0.879
6/30/90-91	482,143	1,866,079	1,866,802	1,866,798	1,867,000	1,887,511	921	21,432	0.387	0.391
6/30/91-92	492,539	2,203,879	2,205,825	2,205,802	2,209,213	2,281,666	5,334	77,787	0.449	0.463
6/30/92-93	524,541	1,653,844	1,660,415	1,660,307	1,679,326	1,716,282	25,482	62,438	0.320	0.327
6/30/93-94	584,853	1,938,298	1,946,935	1,946,758	1,951,434	2,010,128	13,137	71,830	0.334	0.344
6/30/94-95	587,701	2,390,138	2,403,005	2,402,607	2,406,366	2,489,597	16,228	99,459	0.409	0.424
6/30/95-96	614,868	1,850,889	1,872,448	1,872,179	1,879,180	1,920,160	28,290	69,271	0.306	0.312
6/30/96-97	700,686	2,023,122	2,048,789	2,048,326	2,052,265	2,117,290	29,143	94,168	0.293	0.302
6/30/97-98	684,415	2,860,293	2,904,239	2,902,921	2,903,000	2,908,440	42,707	48,147	0.424	0.425
6/30/98-99	707,796	1,891,536	1,926,506	1,926,097	1,926,000	1,945,750	34,464	54,214	0.272	0.275
6/30/99-00	760,477	1,668,934	1,710,823	1,710,886	1,711,000	1,723,000	42,066	54,066	0.225	0.227
6/30/00-01	811,600	2,312,030	2,386,484	2,384,899	2,385,000	2,386,000	72,970	73,970	0.294	0.294
6/30/01-02	835,038	3,127,474	3,270,068	3,264,899	3,265,000	3,275,620	137,526	148,146	0.391	0.392
6/30/02-03	825,340	2,035,541	2,161,847	2,160,341	2,146,580	2,177,000	111,039	141,459	0.260	0.264
6/30/03-04	849,216	2,181,691	2,347,728	2,346,055	2,331,180	2,364,000	149,489	182,309	0.275	0.278
6/30/04-05	992,508	1,683,526	1,842,698	1,895,740	1,828,700	1,907,000	145,174	223,474	0.184	0.192
6/30/05-06	962,878	2,393,029	2,679,363	2,650,196	2,632,500	2,769,000	239,471	375,971	0.273	0.288
6/30/06-07	1,032,930	1,651,123	1,869,870	1,972,775	1,854,920	1,973,000	203,797	321,877	0.180	0.191
6/30/07-08	1,063,597	3,570,917	4,073,495	3,965,045	3,944,640	4,074,000	373,723	503,083	0.371	0.383
6/30/08-09	1,073,805	3,051,582	3,577,857	3,489,621	3,348,750	3,578,000	297,168	526,418	0.312	0.333
6/30/09-10	1,084,749	4,425,969	5,311,898	4,953,564	4,740,270	5,311,000	314,301	885,031	0.437	0.490
6/30/10-11	1,134,164	3,598,938	4,375,141	4,235,463	4,062,780	4,375,000	463,842	776,062	0.358	0.386
6/30/11-12	1,202,674	3,196,106	4,066,178	3,969,800	3,797,380	4,071,000	601,274	874,894	0.316	0.338
6/30/12-13	1,284,741	2,749,568	3,676,708	3,757,083	3,530,590	3,757,000	781,022	1,007,432	0.275	0.292
6/30/13-14	1,346,902	3,087,287	4,388,015	4,361,732	4,176,690	4,455,000	1,089,403	1,367,713	0.310	0.331
6/30/14-15	1,404,093	2,713,848	4,095,220	4,258,302	4,072,020	4,417,870	1,358,172	1,704,022	0.290	0.315
6/30/15-16	1,454,612	3,044,885	5,095,536	4,970,483	4,944,440	5,102,640	1,899,555	2,057,755	0.340	0.351
6/30/16-17	1,461,588	2,436,821	4,760,662	4,945,514	4,665,780	4,989,770	2,228,959	2,552,949	0.319	0.341
6/30/17-18	1,457,740	2,196,543	5,798,618	5,501,412	5,271,150	5,890,760	3,074,607	3,694,217	0.362	0.404
6/30/18-19	1,500,205	725,734	4,201,148	5,186,237	4,138,380	5,238,130	3,412,646	4,512,396	0.276	0.349
Total	30,558,386	94,105,877	110,751,283	109,297,271	111,411,398	116,960,920	17,305,521	22,855,043		
Tot 6/30/84-19	30,558,386	89,005,775	109,008,652	109,297,271	106,274,652	111,778,471	17,268,877	22,772,695	0.348	0.366

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) - (9) = Sum of Section 7, Exhibit 1, Page 1 + Section 7, Exhibit 2, Page 1
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

All Other - Clusters 5-17 & 95
Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		48,790,108			51,415,678	52,926,294	2,625,569	4,136,186		
6/30/82-83		6,122,919	6,211,659		6,152,491	6,216,478	29,572	93,559		
6/30/83-84		8,967,463	9,148,804		9,065,544	9,239,827	98,081	272,364		
6/30/84-85	732,729	18,102,204	18,515,720	18,377,587	18,367,956	18,526,626	265,753	424,422	2.507	2.528
6/30/85-86	787,208	22,367,205	22,909,778	22,737,497	22,727,435	22,929,130	360,230	561,925	2.887	2.913
6/30/86-87	902,483	23,323,959	23,930,513	23,747,669	23,739,245	23,947,510	415,286	623,551	2.630	2.654
6/30/87-88	1,366,586	32,307,120	33,255,255	33,091,819	33,073,580	33,888,860	766,460	1,581,740	2.420	2.480
6/30/88-89	1,486,478	30,278,255	31,287,974	31,044,138	31,041,000	31,879,500	762,745	1,601,245	2.088	2.145
6/30/89-90	1,494,463	29,427,244	30,606,508	30,451,941	30,448,000	31,182,610	1,020,756	1,755,366	2.037	2.087
6/30/90-91	1,405,560	25,353,228	26,557,054	26,451,574	26,452,000	27,051,980	1,098,772	1,698,752	1.882	1.925
6/30/91-92	1,364,510	16,352,583	17,297,986	17,224,515	17,225,000	18,047,670	872,417	1,695,087	1.262	1.323
6/30/92-93	1,347,359	12,619,194	13,456,472	13,396,682	13,397,000	13,481,950	777,806	862,756	0.994	1.001
6/30/93-94	1,424,410	14,288,939	15,456,456	15,327,877	15,328,000	15,734,870	1,039,061	1,445,931	1.076	1.105
6/30/94-95	1,497,829	12,503,019	13,542,671	13,513,093	13,513,000	14,112,020	1,009,981	1,609,001	0.902	0.942
6/30/95-96	1,582,635	12,465,680	13,729,082	13,687,018	13,687,000	14,327,880	1,221,320	1,862,200	0.865	0.905
6/30/96-97	1,979,748	13,242,408	14,650,731	14,610,308	14,609,000	15,267,180	1,366,592	2,024,772	0.738	0.771
6/30/97-98	1,917,994	10,995,719	12,215,872	12,193,681	12,189,000	12,745,560	1,193,281	1,749,841	0.636	0.665
6/30/98-99	2,081,524	12,151,759	13,687,355	13,654,641	13,651,000	14,261,290	1,499,241	2,109,531	0.656	0.685
6/30/99-00	2,207,243	14,351,103	16,406,639	16,342,469	16,342,000	17,123,380	1,990,897	2,772,277	0.740	0.776
6/30/00-01	2,201,008	13,530,123	15,693,954	15,639,757	15,637,000	16,374,560	2,106,877	2,844,437	0.710	0.744
6/30/01-02	2,292,592	13,420,136	15,709,643	15,674,296	15,668,000	16,404,380	2,247,864	2,984,244	0.683	0.716
6/30/02-03	2,260,534	13,706,567	16,210,423	16,173,122	16,169,000	16,913,900	2,462,433	3,207,333	0.715	0.748
6/30/03-04	2,255,942	12,716,409	15,248,330	15,232,878	15,227,000	15,907,960	2,510,591	3,191,551	0.675	0.705
6/30/04-05	2,309,083	15,645,670	18,948,968	18,446,554	18,402,000	19,054,000	2,756,330	3,408,330	0.797	0.825
6/30/05-06	2,480,693	13,752,175	16,903,336	17,119,081	16,925,000	17,205,000	3,172,825	3,452,825	0.682	0.694
6/30/06-07	2,612,577	14,486,983	18,157,066	18,454,072	17,908,000	18,774,000	3,421,017	4,287,017	0.685	0.719
6/30/07-08	2,783,717	17,479,855	22,519,012	22,278,326	21,829,000	22,731,506	4,349,145	5,251,651	0.784	0.817
6/30/08-09	2,750,907	17,835,928	23,355,665	23,117,720	22,915,090	23,538,828	5,079,162	5,702,900	0.833	0.856
6/30/09-10	2,806,048	17,624,325	23,494,235	23,616,026	23,308,130	23,803,961	5,683,805	6,179,636	0.831	0.848
6/30/10-11	2,942,638	20,336,516	27,881,887	27,302,795	27,032,590	28,099,344	6,696,074	7,762,828	0.919	0.955
6/30/11-12	3,006,849	20,986,793	29,665,353	28,949,893	28,949,000	29,884,129	7,962,207	8,897,336	0.963	0.994
6/30/12-13	3,138,905	16,984,881	24,877,120	26,244,371	24,842,000	26,304,000	7,857,119	9,319,119	0.791	0.838
6/30/13-14	3,311,947	20,305,708	31,419,973	31,749,617	30,414,080	32,096,000	10,108,372	11,790,292	0.918	0.969
6/30/14-15	3,511,622	20,581,209	34,333,864	34,833,880	33,563,540	35,196,000	12,982,331	14,614,791	0.956	1.002
6/30/15-16	3,491,558	20,503,455	38,265,091	37,801,974	36,752,380	38,654,000	16,248,925	18,150,545	1.053	1.107
6/30/16-17	3,338,327	16,014,173	35,722,007	35,913,268	34,590,070	36,394,000	18,575,897	20,379,827	1.036	1.090
6/30/17-18	3,401,479	12,758,522	39,114,260	38,796,545	37,664,180	39,511,000	24,905,658	26,752,478	1.107	1.162
6/30/18-19	3,573,725	5,284,963	37,754,237	42,132,960	37,166,840	42,534,000	31,881,877	37,249,037	1.040	1.190
Total	78,048,908	667,964,500	818,140,950	805,329,644	857,386,829	892,271,183	189,422,329	224,306,683		
Tot 6/30/84-19	78,048,908	604,084,010	802,780,487	805,329,644	790,753,116	823,888,584	186,669,107	219,804,574	1.013	1.056

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) - (9) = Sum of Section 8, Exhibit 1, Page 1 + Section 8, Exhibit 2, Page 1
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

All Clusters Combined
Total Indemnity (Including Lump Sums) + Medical

Calculation of Implied Development Factors

(1)	(2)	(3)	(4)
Accident Year	Pd Loss Including Lump Sum	Implied Cumulative LDF	Selected Ult Loss Including Lump Sum
All Prior Yrs	106,728,128	1.096	116,959,057
6/30/82-83	18,411,516	1.010	18,593,138
6/30/83-84	26,846,315	1.032	27,693,271
6/30/84-85	39,972,803	1.014	40,545,782
6/30/85-86	52,759,167	1.012	53,401,487
6/30/86-87	59,869,146	1.011	60,519,538
6/30/87-88	86,888,042	1.025	89,092,368
6/30/88-89	85,478,228	1.029	87,999,179
6/30/89-90	82,543,784	1.031	85,100,457
6/30/90-91	68,290,552	1.030	70,357,704
6/30/91-92	46,543,671	1.041	48,455,128
6/30/92-93	31,390,521	1.045	32,796,042
6/30/93-94	34,894,602	1.055	36,807,164
6/30/94-95	31,079,292	1.060	32,937,124
6/30/95-96	29,814,947	1.073	31,993,347
6/30/96-97	29,951,673	1.075	32,211,757
6/30/97-98	33,305,733	1.065	35,479,917
6/30/98-99	31,173,681	1.087	33,875,788
6/30/99-00	35,073,771	1.099	38,539,134
6/30/00-01	41,250,901	1.101	45,405,697
6/30/01-02	35,787,155	1.114	39,873,652
6/30/02-03	35,880,793	1.133	40,648,340
6/30/03-04	35,598,984	1.135	40,391,268
6/30/04-05	36,963,431	1.123	41,494,055
6/30/05-06	32,706,279	1.159	37,913,925
6/30/06-07	31,231,333	1.185	37,000,083
6/30/07-08	35,504,329	1.202	42,673,903
6/30/08-09	35,510,311	1.230	43,668,834
6/30/09-10	34,134,321	1.261	43,044,131
6/30/10-11	38,235,809	1.279	48,916,372
6/30/11-12	36,977,205	1.332	49,236,630
6/30/12-13	31,639,561	1.416	44,791,870
6/30/13-14	37,027,478	1.455	53,859,135
6/30/14-15	38,531,813	1.557	60,001,915
6/30/15-16	38,643,555	1.704	65,830,455
6/30/16-17	32,519,309	1.991	64,736,010
6/30/17-18	23,754,264	2.745	65,197,545
6/30/18-19	11,054,333	6.264	69,241,925
Total	1,573,966,735		1,907,283,123

NOTES:
(2) From Summary Exhibit 8, Page 1, Column (3)
(3) = (4) / (2)
(4) From Summary Exhibit 8, Page 1, Average of Columns (6) and (7)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Massachusetts Colleges & Universities - Cluster 4

Allocation Methodology

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	5 Year							5 Year	Credibility	Distribution	CURRENT		PRIOR	
	Average	Initial Loss Costs		Expected Losses				Average	Weighted	of Total	Reserve Estimate		Reserve Estimate	
Cluster	Payroll	Indemnity	Medical	Indemnity	Medical	Total	Credibility	Ult Loss	Ult Loss	Losses	Low End	High End	Low End	High End
Berkshire Community College	14,482,326	0.24	0.10	34,758	13,758	48,516	22.5%	13,199	40,584	0.9%	153,388	202,576	151,093	192,735
Bridgewater State College	98,610,171	0.24	0.10	236,664	93,680	330,344	83.1%	358,100	353,420	7.7%	1,335,763	1,764,114	1,425,859	1,818,835
Bristol Community College	41,606,671	0.24	0.10	99,856	39,526	139,382	67.5%	13,816	54,580	1.2%	206,285	272,437	215,011	274,270
Bunker Hill Community College	52,833,167	0.24	0.10	126,800	50,192	176,991	72.5%	88,324	112,672	2.5%	425,847	562,408	488,212	622,766
Cape Cod Community College	19,979,092	0.24	0.10	47,950	18,980	66,930	28.6%	162,901	94,330	2.1%	356,522	470,852	329,921	420,849
Fitchburg State College	44,805,945	0.24	0.10	107,534	42,566	150,100	69.1%	152,572	151,809	3.3%	573,768	757,764	648,771	827,576
Framingham State College	48,407,605	0.24	0.10	116,178	45,987	162,165	70.8%	112,305	126,882	2.8%	479,557	633,340	448,709	572,376
Greenfield Community College	15,011,980	0.24	0.10	36,029	14,261	50,290	23.1%	50,773	50,402	1.1%	190,495	251,582	184,136	234,885
Holyoke Community College	34,691,975	0.24	0.10	83,261	32,957	116,218	41.0%	90,061	105,504	2.3%	398,754	526,627	365,763	466,569
Mass Bay Community College	24,082,959	0.24	0.10	57,799	22,879	80,678	32.5%	58,522	73,475	1.6%	277,703	366,756	261,739	333,876
Mass College of Art	33,817,775	0.24	0.10	81,163	32,127	113,290	62.8%	204,329	170,497	3.7%	644,397	851,042	581,978	742,375
Mass Maritime Academy	23,739,582	0.24	0.10	56,975	22,553	79,528	32.2%	119,264	92,320	2.0%	348,928	460,822	334,458	426,637
Massachusetts College of Liberal Arts	23,036,398	0.24	0.10	55,287	21,885	77,172	31.5%	88,923	80,878	1.8%	305,682	403,708	289,903	369,802
Massasoit Community College	37,187,607	0.24	0.10	89,250	35,328	124,578	65.0%	116,696	119,453	2.6%	451,475	596,254	390,028	497,523
Middlesex Community College	43,897,025	0.24	0.10	105,353	41,702	147,055	68.7%	22,040	61,170	1.3%	231,193	305,332	301,592	384,713
Mt Wachusett Community College	27,998,216	0.24	0.10	67,196	26,598	93,794	35.9%	37,900	73,730	1.6%	278,666	368,028	238,557	304,305
North Essex Community College	33,460,681	0.24	0.10	80,306	31,788	112,093	40.1%	51,254	87,702	1.9%	331,472	437,768	284,344	362,711
North Shore Community College	34,741,013	0.24	0.10	83,378	33,004	116,382	41.0%	59,978	93,259	2.0%	352,474	465,505	365,461	466,185
Quinsigamond Community College	42,790,014	0.24	0.10	102,696	40,651	143,347	46.1%	227,065	181,953	4.0%	687,698	908,229	766,459	977,700
Roxbury Community College	15,227,232	0.24	0.10	36,545	14,466	51,011	23.3%	16,586	42,975	0.9%	162,424	214,510	176,947	225,715
Salem State College	88,073,389	0.24	0.10	211,376	83,670	295,046	81.5%	218,983	233,059	5.1%	880,855	1,163,327	948,550	1,209,977
Springfield Tech Community College	34,629,426	0.24	0.10	83,111	32,898	116,009	63.4%	159,398	143,513	3.1%	542,412	716,353	602,538	768,601
UMass (Boston)	207,333,212	0.24	0.10	497,600	196,967	694,566	91.2%	400,973	426,802	9.3%	1,613,115	2,130,407	1,990,521	2,539,122
UMass (Dartmouth)	112,582,688	0.24	0.10	270,198	106,954	377,152	84.9%	500,698	482,061	10.5%	1,821,967	2,406,234	2,027,325	2,586,069
University of Lowell	196,509,272	0.24	0.10	471,622	186,684	658,306	90.8%	600,432	605,778	13.2%	2,289,559	3,023,773	2,601,251	3,318,172
Westfield State College	57,614,267	0.24	0.10	138,274	54,734	193,008	74.2%	318,541	286,193	6.3%	1,081,675	1,428,546	934,472	1,192,018
Worcester State College	48,497,951	0.24	0.10	116,395	46,073	162,468	70.8%	263,138	233,745	5.1%	883,446	1,166,749	935,081	1,192,796
Total	1,455,647,640			3,493,554	1,382,865			4,506,769	4,578,744		17,305,521	22,855,043	18,288,679	23,329,156

NOTES:

(1) Provided by Commonwealth of Massachusetts; From Summary Exhibit 10, Page 3
(2) From Section 7, Exhibit 1, Page 4
(3) From Section 7, Exhibit 2, Page 4
(4) = (1) * (2) / 100
(5) = (1) * (3) / 100
(6) = (4) + (5)
(7) = P / (P+K); where P = Column (1) and K = 20M (if CV < 1) and K = 50M (if CV > 1). CV is the Coefficient of Variation, as calculated on Summary Exhibit 10, Page 2.
(8) = The Average of Columns (2) - (6) plus The Average of Columns (8) - (12) on Summary Exhibit 10 Page 4.
(9) = (7) * (8) + [1.00 - (7)] * (6)
(10) = (9) / Total (9)
(11) = The Total from Summary Exhibit 8, Page7, Column (8), allocated according to Column (10) of this exhibit.
(12) = The Total from Summary Exhibit 8, Page7, Column (9), allocated according to Column (10) of this exhibit.
(13), (14) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Massachusetts Colleges & Universities - Cluster 4

Estimated Loss Costs (Indemnity and Medical Combined)

	(1)	(2)	(3)	(4)	(5)	(6)
Cluster	2019	2018	2017	2016	2015	Coefficient of Variation
Berkshire Community College	0.014	0.018	0.102	0.023	0.305	1.342
Bridgewater State College	0.382	0.447	0.209	0.558	0.210	0.421
Bristol Community College	0.011	0.040	0.036	0.049	0.029	0.434
Bunker Hill Community College	0.210	0.349	0.057	0.001	0.211	0.835
Cape Cod Community College	0.083	0.129	0.886	2.947	0.147	1.460
Fitchburg State College	0.554	0.674	0.171	0.093	0.178	0.782
Framingham State College	0.055	0.152	0.513	0.034	0.427	0.932
Greenfield Community College	0.577	0.930	0.111	0.010	0.081	1.164
Holyoke Community College	0.293	0.081	0.880	0.010	0.033	1.404
Mass Bay Community College	0.031	0.220	0.712	0.234	0.014	1.164
Mass College of Art	0.401	0.243	0.983	0.082	1.351	0.875
Mass Maritime Academy	0.143	0.143	0.119	2.010	0.111	1.665
Massachusetts College of Liberal Arts	0.192	0.179	1.169	0.206	0.179	1.139
Massasoit Community College	0.432	0.465	0.127	0.487	0.070	0.636
Middlesex Community College	0.036	0.042	0.086	0.029	0.057	0.456
Mt Wachusett Community College	0.044	0.379	0.157	0.070	0.036	1.044
North Essex Community College	0.531	0.017	0.054	0.180	0.000	1.411
North Shore Community College	0.033	0.108	0.045	0.639	0.038	1.520
Quinsigamond Community College	0.194	0.278	0.140	0.083	1.954	1.509
Roxbury Community College	0.000	0.025	0.000	0.488	0.012	2.038
Salem State College	0.303	0.116	0.036	0.308	0.486	0.709
Springfield Tech Community College	0.386	0.752	0.368	0.056	0.733	0.633
UMass (Boston)	0.108	0.358	0.019	0.219	0.274	0.685
UMass (Dartmouth)	0.315	0.642	0.187	0.972	0.097	0.816
University of Lowell	0.190	0.470	0.500	0.196	0.164	0.547
Westfield State College	0.364	0.447	1.017	0.329	0.610	0.508
Worcester State College	0.719	0.488	1.100	0.279	0.110	0.719

NOTES:

(1) - (5) - Sum of Indemnity + Medical Losses from Summary Exhibit 10, Page 4 divided by Payroll from Summary Exhibit 10, Page 3.

(6) = Std Deviation / Mean of Columns (1) - (5) Used to calculate "ballast factor" (K) on Summary Exhibit 10, Page 1, Column (7).

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Massachusetts Colleges & Universities - Cluster 4

Payroll

Cluster	2019	2018	2017	2016	2015
Berkshire Community College	14,683,061	14,513,016	14,696,718	14,456,120	14,062,716
Bridgewater State College	104,320,974	100,133,918	97,400,514	97,128,570	94,066,876
Bristol Community College	40,217,086	40,662,231	42,497,107	42,104,373	42,552,559
Bunker Hill Community College	54,879,900	54,081,418	53,589,800	51,343,817	50,270,901
Cape Cod Community College	20,739,078	20,323,018	20,065,891	19,144,217	19,623,257
Fitchburg State College	48,171,555	45,049,448	43,890,058	44,309,826	42,608,839
Framingham State College	51,449,954	48,824,202	48,220,544	47,747,768	45,795,557
Greenfield Community College	14,873,785	14,787,726	15,305,880	15,235,538	14,856,970
Holyoke Community College	34,348,857	34,789,710	34,835,042	35,011,610	34,474,656
Mass Bay Community College	24,319,504	24,302,975	24,251,880	23,795,629	23,744,806
Mass College of Art	35,421,336	33,915,892	33,946,011	33,494,988	32,310,647
Mass Maritime Academy	25,131,031	23,950,910	23,330,642	23,527,846	22,757,480
Massachusetts College of Liberal Arts	23,757,666	22,767,051	23,143,013	22,994,917	22,519,342
Massasoit Community College	35,939,034	36,026,658	37,949,986	38,340,014	37,682,345
Middlesex Community College	40,839,312	40,626,618	44,371,671	46,520,224	47,127,301
Mt Wachusett Community College	27,441,233	27,192,245	28,153,442	28,286,480	28,917,680
North Essex Community College	32,223,712	34,057,029	33,839,378	33,817,735	33,365,552
North Shore Community College	34,312,192	34,256,484	34,445,788	34,773,439	35,917,163
Quinsigamond Community College	43,018,023	42,665,806	42,310,090	43,077,361	42,878,790
Roxbury Community College	14,664,256	14,671,551	15,152,955	15,833,427	15,813,967
Salem State College	88,668,198	87,993,695	88,794,120	89,125,627	85,785,305
Springfield Tech Community College	34,391,222	34,598,242	34,485,179	34,472,989	35,199,500
UMass (Boston)	209,901,374	206,111,953	212,861,097	212,382,851	195,408,787
UMass (Dartmouth)	118,419,657	113,334,671	110,902,002	112,337,308	107,919,804
University of Lowell	214,532,333	200,073,066	196,482,825	192,533,065	178,925,071
Westfield State College	62,516,173	59,384,668	58,872,900	54,526,913	52,770,682
Worcester State College	51,024,319	48,645,329	47,793,656	48,289,827	46,736,625
UMass (Amherst)	656,644,000	607,483,570	594,786,634	585,875,165	539,631,010
UMass (Medical Center)	410,826,029	398,722,042	395,324,473	382,602,152	370,542,936
Total	2,567,674,851	2,463,945,144	2,451,699,296	2,423,089,795	2,314,267,125

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Massachusetts Colleges & Universities - Cluster 4

Estimated Ultimate Losses

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			Indemnity					Medical		
Cluster	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Berkshire Community College	14,239	0	1,146	100	1,752	28,669	3,289	13,868	2,580	349
Bridgewater State College	82,917	417,735	139,581	323,457	253,198	114,565	124,572	64,420	124,414	145,641
Bristol Community College	6,270	1,407	2,090	0	0	6,181	19,399	13,185	16,138	4,408
Bunker Hill Community College	63,958	0	4,000	129,463	86,019	42,323	693	26,452	59,500	29,210
Cape Cod Community College	12,842	435,236	92,024	14,649	0	16,053	128,957	85,824	11,657	17,263
Fitchburg State College	16,838	17,299	54,210	231,491	145,338	59,152	23,902	20,937	72,309	121,385
Framingham State College	154,250	2,291	221,009	49,631	9,518	41,253	13,772	26,376	24,449	18,977
Greenfield Community College	10,243	0	10,217	38,158	73,481	1,737	1,448	6,819	99,395	12,365
Holyoke Community College	3,207	0	276,911	15,382	73,935	8,176	3,644	29,534	12,939	26,578
Mass Bay Community College	0	31,654	162,875	26,713	7,596	3,336	23,934	9,823	26,678	0
Mass College of Art	340,622	22,932	266,224	57,118	108,759	95,802	4,378	67,390	25,226	33,193
Mass Maritime Academy	15,593	387,970	14,507	20,435	21,463	9,734	84,989	13,332	13,860	14,440
Massachusetts College of Liberal Arts	22,744	190	227,805	27,879	11,199	17,488	47,069	42,849	12,898	34,494
Massasoit Community College	8,553	125,240	16,753	127,303	135,475	17,669	61,431	31,296	40,128	19,631
Middlesex Community College	9,930	2,206	15,059	7,210	10,541	16,816	11,156	23,231	9,939	4,109
Mt Wachusett Community College	0	11,723	28,865	64,439	10,154	10,518	8,041	15,406	38,504	1,848
North Essex Community College	0	44,812	2,766	0	113,618	125	16,145	15,620	5,724	57,458
North Shore Community College	10,737	183,440	0	14,383	10,519	2,922	38,877	15,606	22,752	656
Quinsigamond Community College	740,094	10,737	16,189	87,372	28,538	97,932	25,108	43,125	31,222	55,008
Roxbury Community College	0	52,112	0	0	0	1,965	25,135	0	3,717	0
Salem State College	300,129	196,775	15,208	56,297	229,723	116,844	77,948	17,043	45,570	39,378
Springfield Tech Community College	226,416	9,436	109,243	160,315	100,478	31,484	9,770	17,627	99,972	32,249
UMass (Boston)	353,165	329,882	24,075	587,150	132,099	182,210	134,554	16,193	150,029	95,510
UMass (Dartmouth)	68,161	862,779	154,334	556,474	293,023	36,386	229,112	52,624	171,052	79,545
University of Lowell	191,740	236,899	759,898	719,058	342,860	101,035	140,464	223,323	221,747	65,135
Westfield State College	251,366	119,116	501,467	158,982	115,081	70,440	60,046	97,272	106,597	112,335
Worcester State College	33,031	124,801	436,936	133,976	318,114	18,237	9,992	88,868	103,227	48,509
Total	2,937,045	3,626,672	3,553,392	3,607,434	2,632,480	1,149,054	1,327,825	1,078,043	1,552,225	1,069,673
Age to Ultimate LDF's	1.627	1.789	2.138	2.860	6.275	1.265	1.304	1.391	1.660	3.494

NOTES:

(1) - (10) - Cumualtive Paid Losses from Summary Exhibit 10, Page 5 multiplied by Age to Ultimate LDF's at the bottom of this exhibit.

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Massachusetts Colleges & Universities - Cluster 4

Cumulative Paid Losses as of 6/30/19

	Indemnity					Medical				
Cluster	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Berkshire Community College	8,752	0	536	35	279	22,671	2,522	9,971	1,555	100
Bridgewater State College	50,964	233,443	65,274	113,102	40,353	90,596	95,523	46,318	74,954	41,689
Bristol Community College	3,854	786	977	0	0	4,888	14,875	9,480	9,723	1,262
Bunker Hill Community College	39,311	0	1,870	45,269	13,709	33,468	532	19,019	35,846	8,361
Cape Cod Community College	7,893	243,223	43,034	5,122	0	12,694	98,886	61,708	7,023	4,941
Fitchburg State College	10,349	9,667	25,351	80,944	23,163	46,776	18,329	15,054	43,563	34,745
Framingham State College	94,807	1,280	103,352	17,354	1,517	32,622	10,560	18,965	14,729	5,432
Greenfield Community College	6,296	0	4,778	13,343	11,711	1,374	1,110	4,903	59,881	3,539
Holyoke Community College	1,971	0	129,495	5,378	11,783	6,466	2,794	21,235	7,795	7,608
Mass Bay Community College	0	17,689	76,167	9,341	1,211	2,638	18,353	7,063	16,072	0
Mass College of Art	209,357	12,815	124,497	19,972	17,333	75,758	3,357	48,454	15,197	9,501
Mass Maritime Academy	9,584	216,809	6,784	7,145	3,421	7,698	65,171	9,585	8,350	4,133
Massachusetts College of Liberal Arts	13,979	106	106,531	9,748	1,785	13,829	36,093	30,809	7,771	9,873
Massasoit Community College	5,257	69,988	7,834	44,513	21,591	13,972	47,106	22,502	24,175	5,619
Middlesex Community College	6,103	1,233	7,042	2,521	1,680	13,297	8,555	16,703	5,988	1,176
Mt Wachusett Community College	0	6,551	13,498	22,532	1,618	8,317	6,166	11,077	23,197	529
North Essex Community College	0	25,042	1,294	0	18,108	99	12,380	11,231	3,449	16,447
North Shore Community College	6,599	102,512	0	5,029	1,677	2,311	29,811	11,221	13,707	188
Quinsigamond Community College	454,886	6,000	7,570	30,551	4,548	77,442	19,253	31,007	18,810	15,746
Roxbury Community College	0	29,122	0	0	0	1,554	19,274	0	2,239	0
Salem State College	184,469	109,964	7,112	19,685	36,612	92,398	59,772	12,254	27,454	11,272
Springfield Tech Community College	139,162	5,273	51,086	56,057	16,014	24,897	7,492	12,674	60,229	9,231
UMass (Boston)	217,066	184,348	11,258	205,306	21,053	144,088	103,178	11,643	90,386	27,339
UMass (Dartmouth)	41,894	482,146	72,173	194,580	46,700	28,773	175,686	37,837	103,052	22,769
University of Lowell	117,849	132,386	355,358	251,430	54,643	79,896	107,710	160,570	133,593	18,644
Westfield State College	154,498	66,566	234,506	55,590	18,341	55,703	46,044	69,939	64,220	32,155
Worcester State College	20,302	69,743	204,328	46,847	50,699	14,421	7,662	63,896	62,190	13,885
Total	1,805,203	2,026,691	1,661,705	1,261,395	419,549	908,646	1,018,194	775,115	935,148	306,185

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Massachusetts Colleges & Universities - Cluster 4

Fiscal Year 2019 Paid Losses

	Indemnity					Medical				
Cluster	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Berkshire Community College	0	0	0	0	279	0	0	66	0	100
Bridgewater State College	899	31,817	0	57,555	40,353	66	1,495	1,676	27,654	41,689
Bristol Community College	0	0	0	0	0	0	1,410	0	5,451	1,262
Bunker Hill Community College	0	0	0	18,227	13,709	0	0	102	8,411	8,361
Cape Cod Community College	0	106,105	26,640	0	0	0	16,456	26,895	3,614	4,941
Fitchburg State College	0	0	0	52,861	23,163	0	0	341	6,875	34,745
Framingham State College	0	0	59,721	3,347	1,517	0	0	5,258	11,142	5,432
Greenfield Community College	0	0	0	5,038	11,711	0	0	0	29,905	3,539
Holyoke Community College	0	0	56,678	0	11,783	0	0	0	962	7,608
Mass Bay Community College	0	63	35,790	4,588	1,211	0	27	1,672	14,230	0
Mass College of Art	48,759	0	41,141	7,347	17,333	2,096	0	1,196	8,233	9,501
Mass Maritime Academy	0	60,321	0	0	3,421	0	1,591	0	4,351	4,133
Massachusetts College of Liberal Arts	0	0	62,782	0	1,785	0	-525	2,504	66	9,873
Massasoit Community College	0	32,053	0	23,362	21,591	0	5,736	191	5,015	5,619
Middlesex Community College	0	0	0	0	1,680	0	0	584	84	1,176
Mt Wachusett Community College	0	0	0	17,132	1,618	0	0	0	8,177	529
North Essex Community College	0	0	0	0	18,108	0	0	0	992	16,447
North Shore Community College	0	24,221	0	3,777	1,677	0	2,529	0	8,327	188
Quinsigamond Community College	40,000	0	0	0	4,548	0	2,116	8,508	1,162	15,746
Roxbury Community College	0	0	0	0	0	0	0	0	514	0
Salem State College	40,023	33,430	0	1,840	36,612	25,509	9,468	213	12,727	11,272
Springfield Tech Community College	45,441	0	38,785	31,166	16,014	1,400	0	450	24,166	9,231
UMass (Boston)	0	37,415	0	139,412	21,053	596	12,404	465	43,370	27,339
UMass (Dartmouth)	0	45,894	25,361	85,555	46,700	0	382	11,281	46,438	22,769
University of Lowell	14,275	35,905	79,371	147,402	54,643	15,358	1,858	16,777	91,050	18,644
Westfield State College	7,367	16,090	125,378	28,140	18,341	698	1,186	17,930	36,118	32,155
Worcester State College	0	39,159	47,801	15,501	50,699	0	2,900	25,980	35,965	13,885
Total	196,764	462,473	599,449	642,250	419,549	45,723	59,033	122,090	434,998	306,185

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2019

Table of Contents

I. Narrative

II. Summary Exhibits

III. Supporting Exhibits

Section 1 *All Clusters Combined*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 2 *Department of Developmental Services - Cluster 1*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 3 *Department of Mental Health - Cluster 2*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 4 *Department of Corrections - Cluster 3*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 5 *University of Massachusetts (Amherst) - Cluster 4*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 6 *University of Massachusetts (Medical Center) - Cluster 4*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 7 *Massachusetts Colleges & Universities - Cluster 4*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 8 *All Other - Clusters 5-17 & 95*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		99,800,085			107,794,214	111,276,240	7,994,129	11,476,155		
6/30/82-83		17,167,966	17,340,626		17,287,145	17,392,611	119,179	224,645		
6/30/83-84		23,575,652	24,437,408		24,265,006	24,510,471	689,354	934,818		
6/30/84-85	1,823,085	36,673,697	37,323,790	37,140,110	37,048,069	37,379,449	374,372	705,752	2.032	2.050
6/30/85-86	1,952,445	47,790,668	48,691,875	48,501,990	48,232,324	48,547,313	441,656	756,646	2.470	2.486
6/30/86-87	2,220,820	54,053,652	55,163,727	55,000,443	54,513,341	54,785,244	459,690	731,592	2.455	2.467
6/30/87-88	2,885,583	76,883,698	78,822,424	78,582,604	78,515,209	79,430,087	1,631,512	2,546,389	2.721	2.753
6/30/88-89	3,098,180	73,330,627	75,502,023	75,174,654	75,210,084	76,082,550	1,879,457	2,751,923	2.428	2.456
6/30/89-90	3,079,763	69,922,718	72,251,581	72,084,551	71,875,827	72,678,477	1,953,108	2,755,758	2.334	2.360
6/30/90-91	2,914,364	56,202,011	58,346,737	58,232,994	57,580,925	58,325,664	1,378,914	2,123,652	1.976	2.001
6/30/91-92	2,880,434	35,624,388	37,184,750	37,101,465	36,794,822	37,768,053	1,170,434	2,143,665	1.277	1.311
6/30/92-93	2,887,238	23,423,560	24,709,262	24,639,289	24,550,269	24,717,229	1,126,709	1,293,668	0.850	0.856
6/30/93-94	3,056,850	26,439,536	28,040,567	27,899,522	27,837,000	28,383,120	1,397,464	1,943,583	0.911	0.929
6/30/94-95	3,158,808	24,061,187	25,611,529	25,563,506	25,301,648	26,067,375	1,240,461	2,006,188	0.801	0.825
6/30/95-96	3,301,791	23,215,389	24,986,967	24,924,926	24,759,068	25,535,197	1,543,679	2,319,808	0.750	0.773
6/30/96-97	3,902,868	22,650,275	24,494,971	24,437,116	24,187,614	24,984,413	1,537,339	2,334,138	0.620	0.640
6/30/97-98	3,776,138	26,558,077	28,743,006	28,660,687	27,944,793	28,819,822	1,386,716	2,261,745	0.740	0.763
6/30/98-99	4,017,530	24,131,508	26,553,001	26,465,468	26,011,504	26,813,733	1,879,996	2,682,225	0.647	0.667
6/30/99-00	4,221,786	27,163,008	30,342,354	30,198,859	29,596,323	30,527,835	2,433,315	3,364,827	0.701	0.723
6/30/00-01	4,310,725	31,527,166	35,363,990	35,182,132	34,444,791	35,346,923	2,917,625	3,819,756	0.799	0.820
6/30/01-02	4,438,755	27,941,323	31,631,552	31,499,701	30,693,661	31,981,463	2,752,337	4,040,139	0.691	0.721
6/30/02-03	4,423,888	27,376,012	31,228,628	31,103,840	30,652,790	31,927,000	3,276,777	4,550,988	0.693	0.722
6/30/03-04	4,482,207	26,754,893	30,846,776	30,724,777	30,128,047	31,015,260	3,373,154	4,260,368	0.672	0.692
6/30/04-05	4,639,517	26,620,602	31,156,690	29,926,283	29,511,611	30,560,000	2,891,009	3,939,398	0.636	0.659
6/30/05-06	4,938,165	23,387,238	27,638,557	27,314,701	27,035,449	27,617,000	3,648,211	4,229,762	0.547	0.559
6/30/06-07	5,183,126	21,303,874	25,653,889	25,888,315	25,008,427	26,094,550	3,704,552	4,790,676	0.482	0.503
6/30/07-08	5,508,425	25,964,508	31,913,558	31,538,319	30,929,450	32,106,206	4,964,942	6,141,698	0.561	0.583
6/30/08-09	5,447,676	25,345,422	31,810,408	31,501,195	31,162,640	32,167,828	5,817,218	6,822,406	0.572	0.590
6/30/09-10	5,525,579	25,099,892	32,111,768	32,090,978	31,454,680	32,733,961	6,354,788	7,634,069	0.569	0.592
6/30/10-11	5,712,303	28,279,839	37,128,255	36,368,133	35,998,090	37,484,624	7,718,251	9,204,785	0.630	0.656
6/30/11-12	5,880,714	27,588,270	37,507,960	36,983,889	36,579,800	38,149,129	8,991,530	10,560,859	0.622	0.649
6/30/12-13	6,162,621	23,379,769	32,928,408	34,579,865	33,000,950	34,830,000	9,621,181	11,450,231	0.536	0.565
6/30/13-14	6,442,136	27,842,073	41,349,541	41,866,236	40,199,530	42,430,000	12,357,457	14,587,927	0.624	0.659
6/30/14-15	6,758,892	28,911,733	46,272,206	46,537,348	45,163,540	47,562,300	16,251,807	18,650,567	0.668	0.704
6/30/15-16	6,843,054	28,698,589	51,863,664	50,830,998	49,679,380	52,761,400	20,980,791	24,062,811	0.726	0.771
6/30/16-17	6,638,078	23,510,421	50,553,056	49,728,089	48,713,410	51,638,200	25,202,989	28,127,779	0.734	0.778
6/30/17-18	6,709,926	16,469,954	51,028,182	50,889,022	49,396,830	51,977,000	32,926,876	35,507,046	0.736	0.775
6/30/18-19	7,024,786	7,778,710	51,981,434	55,784,281	50,237,220	57,947,000	42,458,510	50,168,290	0.715	0.825
Total	156,248,254	1,262,447,990	1,428,515,118	1,384,946,286	1,509,295,479	1,560,354,724	246,847,489	297,906,734		
Tot 6/30/84-19	156,248,254	1,121,904,286	1,386,737,084	1,384,946,286	1,359,949,114	1,407,175,402	238,044,828	285,271,116	0.870	0.901

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) Sum of Section 1, Exhibit 1, Page 2, Column 3 and Section 1, Exhibit 1, Page 9, Column 8
(4) From Section 1, Exhibit 1, Page 2, Column 8
(5) From Section 1, Exhibit 1, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Implied Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim	Average Age
All Prior Yrs		95,858,403							20	18		81
6/30/82-83		16,396,735	1.011	N/A	16,569,130	771,497	17,340,626		1	1	172,394	92
6/30/83-84		21,783,013	1.039	N/A	22,642,146	1,795,262	24,437,408		4	4	214,783	72
6/30/84-85	1,823,085	33,882,433	1.019	N/A	34,528,518	2,795,272	37,323,790	2.047	3	3	215,362	83
6/30/85-86	1,952,445	44,487,067	1.020	N/A	45,382,449	3,309,426	48,691,875	2.494	3	3	298,461	82
6/30/86-87	2,220,820	48,511,902	1.023	N/A	49,613,961	5,549,766	55,163,727	2.484	7	6	183,677	80
6/30/87-88	2,885,583	68,676,681	1.028	N/A	70,604,207	8,218,217	78,822,424	2.732	11	9	214,170	73
6/30/88-89	3,098,180	63,504,388	1.034	N/A	65,660,166	9,841,858	75,502,023	2.437	12	11	195,980	76
6/30/89-90	3,079,763	59,843,420	1.039	N/A	62,156,485	10,095,096	72,251,581	2.346	10	9	257,007	74
6/30/90-91	2,914,364	47,480,571	1.045	N/A	49,606,168	8,740,569	58,346,737	2.002	8	8	265,700	75
6/30/91-92	2,880,434	30,163,915	1.051	N/A	31,706,337	5,478,413	37,184,750	1.291	9	8	192,803	73
6/30/92-93	2,887,238	19,292,942	1.066	N/A	20,567,633	4,141,628	24,709,262	0.856	4	2	637,346	74
6/30/93-94	3,056,850	22,262,502	1.071	N/A	23,850,435	4,190,132	28,040,567	0.917	11	12	132,328	68
6/30/94-95	3,158,808	20,010,327	1.077	N/A	21,544,586	4,066,943	25,611,529	0.811	3	3	511,420	77
6/30/95-96	3,301,791	19,291,518	1.090	N/A	21,034,712	3,952,255	24,986,967	0.757	3	3	581,065	77
6/30/96-97	3,902,868	18,149,123	1.099	N/A	19,953,975	4,540,995	24,494,971	0.628	3	3	601,617	72
6/30/97-98	3,776,138	21,871,200	1.097	N/A	24,001,945	4,741,061	28,743,006	0.761	6	6	355,124	69
6/30/98-99	4,017,530	19,994,570	1.118	N/A	22,357,706	4,195,295	26,553,001	0.661	9	6	393,856	64
6/30/99-00	4,221,786	23,130,639	1.134	N/A	26,235,773	4,106,581	30,342,354	0.719	5	4	776,283	70
6/30/00-01	4,310,725	27,652,302	1.135	N/A	31,397,469	3,966,522	35,363,990	0.820	8	12	312,097	63
6/30/01-02	4,438,755	24,108,655	1.148	N/A	27,670,247	3,961,305	31,631,552	0.713	4	5	712,319	59
6/30/02-03	4,423,888	23,660,204	1.157	N/A	27,378,796	3,849,831	31,228,628	0.706	9	8	464,824	57
6/30/03-04	4,482,207	23,121,373	1.171	N/A	27,064,097	3,782,678	30,846,776	0.688	9	8	492,841	61
6/30/04-05	4,639,517	22,552,948	1.192	N/A	26,884,568	4,272,121	31,156,690	0.672	8	4	1,082,905	60
6/30/05-06	4,938,165	19,279,310	1.209	N/A	23,310,671	4,327,886	27,638,557	0.560	4	7	575,909	62
6/30/06-07	5,183,126	17,939,057	1.229	N/A	22,046,332	3,607,557	25,653,889	0.495	6	6	684,546	61
6/30/07-08	5,508,425	21,123,817	1.265	N/A	26,714,432	5,199,126	31,913,558	0.579	14	9	621,179	63
6/30/08-09	5,447,676	21,102,785	1.287	N/A	27,165,705	4,644,703	31,810,408	0.584	19	12	505,243	55
6/30/09-10	5,525,579	20,418,707	1.319	N/A	26,932,798	5,178,971	32,111,768	0.581	16	15	434,273	58
6/30/10-11	5,712,303	23,425,068	1.351	N/A	31,645,544	5,482,710	37,128,255	0.650	28	18	456,693	56
6/30/11-12	5,880,714	22,871,599	1.399	N/A	31,998,797	5,509,164	37,507,960	0.638	41	22	414,873	59
6/30/12-13	6,162,621	19,522,034	1.440	N/A	28,109,301	4,819,107	32,928,408	0.534	37	33	260,220	57
6/30/13-14	6,442,136	23,190,745	1.512	N/A	35,059,298	6,290,243	41,349,541	0.642	85	58	204,630	55
6/30/14-15	6,758,892	25,206,857	1.593	N/A	40,159,243	6,112,963	46,272,206	0.685	132	99	151,034	54
6/30/15-16	6,843,054	25,749,141	1.749	N/A	45,040,318	6,823,346	51,863,664	0.758	220	160	120,570	54
6/30/16-17	6,638,078	21,787,121	2.038	N/A	44,408,520	6,144,536	50,553,056	0.762	437	201	112,544	50
6/30/17-18	6,709,926	16,132,882	2.792	N/A	45,045,593	5,982,590	51,028,182	0.760	1,247	473	61,126	48
6/30/18-19	7,024,786	7,775,710	5.791	N/A	45,025,469	6,955,965	51,981,434	0.740		1,085	34,332	45
Total	156,248,254	1,101,211,664			1,241,073,530	187,441,588	1,428,515,118		2,456	2,354		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 1, Exhibit 1, Page 7

(4) = (6) / (5) / (3). For this All Clusters Combined exhibit only, this column includes the impact of the "Additional Tail consideration".

(5) Based on information from the MA WCRIB. For this All Clusters Combined exhibit only, impacts shown here are for Escalation of Benefits only.

(6) = (3) x (4) x (5)

(7) From Section 1, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

(13) Calculated for claimants that had an indemnity payment within the last calendar year.

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	1,823,085	2.991	33,882,433	1.019	34,344,837	2,795,272	37,140,110	2.037	1.884
6/30/85-86	1,952,445	3.712	44,487,067	1.020	45,192,564	3,309,426	48,501,990	2.484	2.315
6/30/86-87	2,220,820	3.485	48,511,902	1.023	49,450,678	5,549,766	55,000,443	2.477	2.227
6/30/87-88	2,885,583	3.526	68,676,681	1.028	70,364,387	8,218,217	78,582,604	2.723	2.438
6/30/88-89	3,098,180	2.963	63,504,388	1.034	65,332,796	9,841,858	75,174,654	2.426	2.109
6/30/89-90	3,079,763	2.802	59,843,420	1.039	61,989,456	10,095,096	72,084,551	2.341	2.013
6/30/90-91	2,914,364	1.688	47,480,571	1.045	49,492,425	8,740,569	58,232,994	1.998	1.698
6/30/91-92	2,880,434	1.084	30,163,915	1.051	31,623,052	5,478,413	37,101,465	1.288	1.098
6/30/92-93	2,887,238	0.698	19,292,942	1.066	20,497,661	4,141,628	24,639,289	0.853	0.710
6/30/93-94	3,056,850	0.759	22,262,502	1.071	23,709,390	4,190,132	27,899,522	0.913	0.776
6/30/94-95	3,158,808	0.661	20,010,327	1.077	21,496,563	4,066,943	25,563,506	0.809	0.681
6/30/95-96	3,301,791	0.615	19,291,518	1.090	20,972,672	3,952,255	24,924,926	0.755	0.635
6/30/96-97	3,902,868	0.495	18,149,123	1.099	19,896,121	4,540,995	24,437,116	0.626	0.510
6/30/97-98	3,776,138	0.608	21,871,200	1.097	23,919,625	4,741,061	28,660,687	0.759	0.633
6/30/98-99	4,017,530	0.534	19,994,570	1.118	22,270,173	4,195,295	26,465,468	0.659	0.554
6/30/99-00	4,221,786	0.592	23,130,639	1.134	26,092,278	4,106,581	30,198,859	0.715	0.618
6/30/00-01	4,310,725	0.690	27,652,302	1.135	31,215,610	3,966,522	35,182,132	0.816	0.724
6/30/01-02	4,438,755	0.597	24,108,655	1.148	27,538,397	3,961,305	31,499,701	0.710	0.620
6/30/02-03	4,423,888	0.594	23,660,204	1.157	27,254,009	3,849,831	31,103,840	0.703	0.616
6/30/03-04	4,482,207	0.582	23,121,373	1.171	26,942,099	3,782,678	30,724,777	0.685	0.601
6/30/04-05	4,639,517	0.401	22,552,948	1.192	25,654,162	4,272,121	29,926,283	0.645	0.553
6/30/05-06	4,938,165	0.419	19,279,310	1.209	22,986,815	4,327,886	27,314,701	0.553	0.465
6/30/06-07	5,183,126	0.437	17,939,057	1.229	22,280,758	3,607,557	25,888,315	0.499	0.430
6/30/07-08	5,508,425	0.457	21,123,817	1.265	26,339,193	5,199,126	31,538,319	0.573	0.478
6/30/08-09	5,447,676	0.477	21,102,785	1.287	26,856,491	4,644,703	31,501,195	0.578	0.493
6/30/09-10	5,525,579	0.495	20,418,707	1.319	26,912,007	5,178,971	32,090,978	0.581	0.487
6/30/10-11	5,712,303	0.511	23,425,068	1.351	30,885,422	5,482,710	36,368,133	0.637	0.541
6/30/11-12	5,880,714	0.531	22,871,599	1.399	31,474,725	5,509,164	36,983,889	0.629	0.535
6/30/12-13	6,162,621	0.553	19,522,034	1.440	29,760,758	4,819,107	34,579,865	0.561	0.483
6/30/13-14	6,442,136	0.574	23,190,745	1.512	35,575,993	6,290,243	41,866,236	0.650	0.552
6/30/14-15	6,758,892	0.596	25,206,857	1.593	40,424,385	6,112,963	46,537,348	0.689	0.598
6/30/15-16	6,843,054	0.620	25,749,141	1.749	44,007,652	6,823,346	50,830,998	0.743	0.643
6/30/16-17	6,638,078	0.646	21,787,121	2.038	43,583,553	6,144,536	49,728,089	0.749	0.657
6/30/17-18	6,709,926	0.674	16,132,882	2.792	44,906,432	5,982,590	50,889,022	0.758	0.669
6/30/18-19	7,024,786	0.702	7,775,710	5.791	48,828,315	6,955,965	55,784,281	0.794	0.695
Total	156,248,254		967,173,512		1,200,071,456	184,874,830	1,384,946,286		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 1, Exhibit 1, Page 4, Column 11
(4) From Section 1, Exhibit 1, Page 2, Column 3
(5) From Section 1, Exhibit 1, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) From Section 1, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									2.991	2.991
6/30/85-86									3.712	3.712
6/30/86-87									3.485	3.485
6/30/87-88									3.526	3.526
6/30/88-89									2.963	2.963
6/30/89-90									2.802	2.802
6/30/90-91	2,914,364	49,606,168	1.702	0.996	1.696	2.564	4.348	0.284	1.690	1.688
6/30/91-92	2,880,434	31,706,337	1.101	1.093	1.203	2.482	2.986	0.267	1.083	1.084
6/30/92-93	2,887,238	20,567,633	0.712	1.275	0.908	2.403	2.182	0.237	0.701	0.698
6/30/93-94	3,056,850	23,850,435	0.780	1.258	0.982	2.326	2.284	0.248	0.756	0.759
6/30/94-95	3,158,808	21,544,586	0.682	1.247	0.850	2.252	1.915	0.258	0.664	0.661
6/30/95-96	3,301,791	21,034,712	0.637	1.237	0.788	2.180	1.717	0.269	0.618	0.615
6/30/96-97	3,902,868	19,953,975	0.511	1.224	0.626	2.110	1.321	0.281	0.500	0.495
6/30/97-98	3,776,138	24,001,945	0.636	1.209	0.768	2.043	1.569	0.294	0.610	0.608
6/30/98-99	4,017,530	22,357,706	0.557	1.193	0.664	1.977	1.313	0.307	0.538	0.534
6/30/99-00	4,221,786	26,235,773	0.621	1.174	0.729	1.914	1.396	0.323	0.595	0.592
6/30/00-01	4,310,725	31,397,469	0.728	1.144	0.833	1.853	1.544	0.342	0.693	0.690
6/30/01-02	4,438,755	27,670,247	0.623	1.122	0.699	1.794	1.254	0.360	0.603	0.597
6/30/02-03	4,423,888	27,378,796	0.619	1.118	0.692	1.737	1.201	0.374	0.601	0.594
6/30/03-04	4,482,207	27,064,097	0.604	1.118	0.675	1.681	1.134	0.386	0.587	0.582
6/30/04-05	4,639,517	26,884,568	0.579	1.111	0.644	1.627	1.047	0.401	0.392	0.401
6/30/05-06	4,938,165	23,310,671	0.472	1.099	0.519	1.575	0.817	0.419	0.408	0.419
6/30/06-07	5,183,126	22,046,332	0.425	1.087	0.462	1.525	0.705	0.437	0.425	0.437
6/30/07-08	5,508,425	26,714,432	0.485	1.075	0.522	1.476	0.770	0.457	0.443	0.457
6/30/08-09	5,447,676	27,165,705	0.499	1.063	0.530	1.429	0.758	0.477	0.461	0.477
6/30/09-10	5,525,579	26,932,798	0.487	1.059	0.516	1.384	0.714	0.495	0.477	0.495
6/30/10-11	5,712,303	31,645,544	0.554	1.060	0.587	1.339	0.787	0.511	0.490	0.511
6/30/11-12	5,880,714	31,998,797	0.544	1.053	0.573	1.297	0.743	0.531	0.509	0.531
6/30/12-13	6,162,621	28,109,301	0.456	1.044	0.476	1.255	0.598	0.553	0.529	0.553
6/30/13-14	6,442,136	35,059,298	0.544	1.040	0.566	1.215	0.687	0.574	0.547	0.574
6/30/14-15	6,758,892	40,159,243	0.594	1.034	0.614	1.176	0.723	0.596	0.566	0.596
6/30/15-16	6,843,054	45,040,318	0.658	1.026	0.675	1.139	0.769	0.620	0.587	0.620
6/30/16-17	6,638,078	44,408,520	0.669	1.018	0.681	1.102	0.751	0.646	0.609	0.646
6/30/17-18	6,709,926	45,045,593	0.671	1.009	0.677	1.067	0.723	0.674	0.631	0.674
6/30/18-19	7,024,786	45,025,469	0.641	1.000	0.641	1.033	0.662	0.702		0.702
Total	141,188,379	873,916,469								

Trend Last 4 (ex 18-19):	3.0%	Avg 3 (ex 18-19):	0.747
Trend Last 8 (ex 18-19):	3.6%	Avg 5 (ex 18-19):	0.731
Trend Last 12 (ex 18-19):	3.1%	Avg 10 (ex 18-19):	0.725
Prior Selected Trend:	3.0%	Prior Sel Avg:	0.650
Selected Trend:	3.3%	Sel. Loss Cost:	0.725

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 1, Exhibit 1, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCRIB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.950	
(2)	Credibility		86%	
(3)	Average Pmt Trend Statewide		0.950	
(4)	Credibility Weighted Trend		0.950	
		(Low)		(High)
(5)	Selected Range	0.920		0.960
(6)	Incremental Paid for 2019	794,241		794,241
(7)	Estimated Reserve	9,133,775		19,061,791
(8)	Paid to Date (82 & Prior)	95,858,403		95,858,403
(9)	Est Ult Paid for 1982 & Prior	104,992,178		114,920,194

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	876,865	998,976
(11)	Projected Number of Years	5	2
(12)	Estimated Reserve	4,384,324	1,997,951
(13)	Paid to Date (82 & Prior)	95,858,403	95,064,162
(14)	Est Ult Paid for 1982 & Prior	100,242,728	97,062,113
(14a)	Paid Counts During Fiscal Year	18	20

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	103,840,878	107,310,825
(16)	Lump Sum Ultimates	3,950,316	3,950,316
(17)	Ult Loss Including Lump Sums	**107,791,194**	**111,261,141**
(18)	Implied Tail	1.083	1.119
(19)	Ult Loss Inc Lump Sums @ 6/18	106,840,876	113,852,857

NOTES:

(1) From Section 1, Exhibit 1, Page 6
(2) = (Average of Section 1, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 1, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 1, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 1, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	3,761,035	15.140			
1993	2	3,748,741	15.137	0.997		
1994	3	3,655,655	15.112	0.975		
1995	4	3,194,135	14.977	0.874		
1996	5	3,058,848	14.934	0.958		
1997	6	3,023,014	14.922	0.988		
1998	7	3,014,756	14.919	0.997		
1999	8	2,756,848	14.830	0.914		
2000	9	2,909,790	14.884	1.055	n =	28
2001	10	2,865,446	14.868	0.985	S(x) =	56,154
2002	11	2,547,239	14.751	0.889	S(x-sq) =	112,618,674
2003	12	2,422,167	14.700	0.951	S(xy) =	815,961
2004	13	2,289,077	14.644	0.945	S(y) =	407
2005	14	2,336,964	14.664	1.021	D =	51,156
2006	15	2,051,702	14.534	0.878	slope =	-0.052
2007	16	2,039,778	14.528	0.994	Avg Trend =	0.948
2008	17	1,799,337	14.403	0.882		
2009	18	1,743,820	14.372	0.969		
2010	19	1,812,753	14.410	1.040		
2011	20	1,656,071	14.320	0.914		
2012	21	1,565,889	14.264	0.946		
2013	22	1,527,315	14.239	0.975		
2014	23	1,439,828	14.180	0.943		
2015	24	1,427,174	14.171	0.991		
2016	25	1,160,574	13.964	0.813		
2017	26	964,853	13.780	0.831		
2018	27	871,501	13.678	0.903		
2019	28	794,241	13.585	0.911		
					Selected Trend:	**0.950**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2019: 0.911 = 794241 / 871501

Commonwealth of Massachusetts Workers Compensation
All Clusters Combined
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
June-83	858,552	2,079,063	3,017,221	3,810,750	4,609,642	5,393,851	6,194,575	7,153,066	7,958,008	8,806,991	9,470,978	10,033,054	10,617,896	11,118,585	11,511,440	11,832,357	12,136,396	12,447,391	12,810,499	13,089,144	13,380,298	13,654,129	13,942,380	14,231,914	14,539,406	14,849,146	15,118,643	15,379,653	15,594,288	15,766,236	15,942,952	16,094,979	16,155,821	16,220,281	16,286,464	16,354,893	16,396,735
June-84	1,522,536	3,686,963	5,350,672	6,757,899	8,148,886	9,608,045	10,911,357	12,126,179	13,057,188	13,815,581	14,430,389	14,959,403	15,419,688	15,772,255	16,197,151	16,639,612	17,122,286	17,516,764	17,977,580	18,438,292	18,803,484	19,139,323	19,459,619	19,718,217	19,937,128	20,149,887	20,327,863	20,472,356	20,620,991	20,774,456	20,930,657	21,089,748	21,253,389	21,422,776	21,597,478	21,783,013	
June-85	2,512,722	6,084,789	8,830,495	11,054,439	13,342,359	15,590,069	17,427,365	18,998,017	20,498,944	21,563,372	22,525,232	23,442,205	24,219,603	25,046,022	25,818,487	26,459,414	27,121,279	27,778,658	28,406,491	28,976,876	29,543,002	30,030,413	30,523,992	30,983,182	31,363,675	31,712,251	32,055,755	32,412,266	32,782,016	33,018,728	33,237,460	33,400,919	33,574,935	33,755,458	33,882,433		
June-86	3,828,307	9,270,600	13,395,875	16,854,774	20,186,912	22,858,610	24,903,526	26,819,536	28,134,649	29,661,018	30,865,387	32,219,696	33,488,982	34,570,174	35,702,155	36,866,038	37,770,882	38,520,460	39,153,946	39,794,497	40,432,599	41,063,216	41,644,745	42,241,569	42,712,869	43,097,941	43,312,360	43,486,990	43,647,976	43,812,752	43,984,709	44,161,262	44,343,804	44,487,067			
June-87	4,540,457	10,913,697	15,583,325	19,957,432	23,712,974	26,356,678	28,401,253	30,259,862	31,823,542	33,295,483	34,562,410	35,908,967	37,317,032	38,375,710	39,392,496	40,287,844	41,070,876	41,703,092	42,193,153	42,715,548	43,489,344	43,946,144	44,426,128	44,966,121	45,385,703	45,816,061	46,262,977	46,658,728	47,038,292	47,433,435	47,825,788	48,181,819	48,511,902				
June-88	6,620,154	15,480,715	23,458,326	30,204,560	36,116,026	39,838,569	42,256,230	44,503,212	46,313,785	47,917,629	49,366,750	50,785,172	52,214,314	53,499,831	54,758,162	56,029,186	57,216,310	58,242,797	59,272,196	60,251,502	61,225,020	62,100,854	62,859,543	63,676,981	64,434,879	65,136,208	65,842,992	66,547,037	67,192,308	67,731,263	68,229,244	68,676,681					
June-89	6,105,502	16,819,476	24,950,175	31,278,437	35,945,703	38,915,779	41,415,130	43,490,698	45,072,501	46,555,926	47,860,013	49,040,632	50,166,177	51,242,940	52,234,068	53,147,033	54,016,738	54,832,591	55,632,016	56,403,282	57,157,649	57,924,017	58,698,403	59,460,012	60,103,365	60,736,487	61,369,722	61,991,993	62,580,677	63,071,096	63,504,388						
June-90	8,325,393	19,198,639	27,299,181	32,979,315	36,467,113	39,225,080	41,403,021	43,119,245	44,619,978	46,178,291	47,478,622	48,500,081	49,380,975	50,215,035	50,970,670	51,700,073	52,443,554	53,046,968	53,676,223	54,272,144	54,832,428	55,362,682	55,910,367	56,499,344	57,103,580	57,669,285	58,209,342	58,764,730	59,320,504	59,843,420							
June-91	6,727,038	15,771,999	21,820,901	25,665,833	28,606,961	30,755,665	32,249,710	33,434,382	34,630,923	35,639,652	36,661,638	37,733,064	38,765,183	39,734,589	40,612,815	41,479,663	42,275,974	42,925,167	43,635,680	44,069,182	44,462,411	44,863,611	45,327,198	45,737,838	46,124,346	46,460,492	46,799,671	47,151,253	47,480,571								
June-92	5,529,696	11,010,530	14,154,478	16,707,353	18,010,508	19,080,293	19,981,070	20,663,423	21,458,872	22,141,168	22,851,311	23,533,251	24,097,364	24,573,283	25,143,387	25,744,950	26,283,250	26,767,829	27,207,194	27,587,356	27,962,307	28,341,430	28,639,184	28,939,814	29,250,064	29,555,803	29,857,025	30,163,915									
June-93	3,873,223	8,389,572	10,824,326	12,579,041	13,682,345	14,650,572	14,980,197	15,299,706	15,652,059	15,960,508	16,198,969	16,437,335	16,647,751	16,845,525	17,057,906	17,261,464	17,446,939	17,667,638	17,927,011	18,169,867	18,397,903	18,582,538	18,741,996	18,889,448	19,103,497	19,207,894	19,292,942										
June-94	3,781,238	7,763,240	10,451,304	12,041,730	13,184,654	14,033,719	14,780,593	15,679,180	16,229,340	16,777,362	17,232,935	17,804,861	18,235,433	18,616,699	18,971,484	19,309,314	19,603,806	19,888,097	20,167,726	20,466,005	20,764,911	21,069,099	21,363,244	21,655,777	21,954,364	22,262,502											
June-95	4,117,530	8,085,099	10,658,744	12,524,501	13,540,049	14,383,050	15,205,770	15,840,120	16,337,357	16,680,320	17,024,333	17,347,955	17,691,046	17,980,888	18,198,811	18,406,575	18,613,590	18,839,234	19,049,825	19,261,206	19,432,796	19,603,661	19,754,111	19,882,468	20,010,327												
June-96	3,925,641	7,606,581	10,157,406	11,265,946	12,618,021	13,573,564	14,313,197	14,989,243	15,617,069	16,021,237	16,346,275	16,663,225	16,942,675	17,212,063	17,486,480	17,759,866	18,012,627	18,213,137	18,448,007	18,735,501	18,936,140	19,066,742	19,191,051	19,291,518													
June-97	3,802,186	7,776,567	9,916,724	11,863,394	13,377,068	14,556,289	15,406,967	15,928,071	16,176,008	16,397,842	16,558,081	16,798,807	16,939,079	17,083,096	17,228,429	17,411,092	17,558,775	17,699,497	17,796,045	17,892,253	17,978,559	18,062,143	18,149,123														
June-98	3,999,102	8,090,389	11,057,251	13,063,666	14,725,657	15,964,487	16,892,108	17,479,286	18,004,896	18,445,861	18,841,212	19,225,160	19,574,481	19,929,478	20,239,681	20,466,987	20,696,672	20,925,824	21,160,830	21,393,405	21,630,180	21,871,200															
June-99	3,807,499	8,152,795	11,043,621	13,229,580	14,782,416	15,710,384	16,521,760	17,074,054	17,452,452	17,884,931	18,180,175	18,422,658	18,600,387	18,768,162	18,941,104	19,104,918	19,315,841	19,525,405	19,722,092	19,861,648	19,994,570																
June-00	4,950,740	10,538,860	14,135,679	16,504,973	18,268,102	19,419,784	20,242,086	20,650,338	21,022,134	21,259,984	21,435,910	21,642,301	21,850,101	22,046,094	22,243,202	22,435,849	22,633,033	22,831,619	22,993,427	23,130,639																	
June-01	5,803,207	12,402,263	16,670,356	19,654,595	21,577,531	22,938,517	23,908,952	24,600,463	24,859,220	25,164,944	25,501,251	25,878,042	26,218,857	26,521,603	26,803,745	27,072,761	27,282,429	27,462,873	27,652,302																		
June-02	5,765,203	12,277,793	16,238,526	18,865,437	20,310,007	21,368,596	21,931,812	22,319,683	22,695,839	22,992,294	23,221,272	23,431,357	23,602,864	23,742,912	23,833,350	23,923,456	24,014,301	24,108,655																			
June-03	6,502,533	13,090,711	16,966,298	18,968,477	20,360,493	21,059,553	21,569,956	21,885,146	22,172,772	22,423,326	22,650,331	22,839,648	23,075,202	23,267,338	23,452,866	23,563,202	23,660,204																				
June-04	5,782,322	12,048,196	15,821,995	18,335,339	19,734,152	20,590,574	21,163,829	21,542,100	21,767,551	21,965,260	22,174,954	22,374,675	22,578,182	22,775,503	22,959,430	23,121,373																					
June-05	5,772,533	11,867,294	15,701,108	18,020,724	19,113,731	19,972,058	20,719,729	21,201,896	21,449,586	21,670,607	21,920,513	22,106,069	22,237,839	22,388,318	22,552,948																						
June-06	4,757,322	10,205,384	13,459,435	15,194,558	16,291,664	17,297,747	17,913,398	18,224,087	18,407,895	18,771,968	18,961,972	19,087,957	19,179,683	19,279,310																							
June-07	4,763,872	9,431,881	11,584,810	13,586,119	15,001,635	15,786,760	16,403,895	16,782,459	17,158,453	17,399,867	17,594,111	17,764,535	17,939,057																								
June-08	4,973,425	10,276,897	13,437,601	15,869,686	17,473,101	18,454,471	19,096,705	19,591,508	19,964,151	20,335,410	20,733,972	21,123,817																									
June-09	4,815,871	10,151,475	13,666,751	16,148,288	17,821,067	19,248,559	19,973,479	20,414,941	20,595,458	20,880,688	21,102,785																										
June-10	5,243,901	10,948,444	14,508,772	16,517,571	17,830,710	18,623,670	19,213,928	19,635,668	20,060,838	20,418,707																											
June-11	6,252,011	12,542,403	16,418,085	18,781,010	20,600,606	21,620,084	22,471,802	23,025,405	23,425,068																												
June-12	5,840,358	12,172,326	16,214,542	18,988,063	20,565,799	21,638,630	22,364,552	22,871,599																													
June-13	5,964,573	11,594,933	14,963,475	16,921,102	17,900,204	18,848,558	19,522,034																														
June-14	6,327,324	13,568,028	17,741,202	20,360,105	21,993,453	23,190,745																															
June-15	7,233,041	14,180,886	19,044,154	22,685,743	25,206,857																																
June-16	8,117,063	16,348,717	21,947,145	25,749,141																																	
June-17	7,620,426	16,084,999	21,787,121																																		
June-18	7,872,188	16,132,882																																			
June-19	7,775,710																																				

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
June-83	2.422	1.451	1.263	1.210	1.170	1.148	1.155	1.113	1.107	1.075	1.059	1.058	1.047	1.035	1.028	1.026	1.026	1.029	1.022	1.022	1.020	1.021	1.021	1.022	1.021	1.018	1.017	1.014	1.011	1.011	1.010	1.004	1.004	1.004	1.004	1.003
June-84	2.422	1.451	1.263	1.206	1.179	1.136	1.111	1.077	1.058	1.045	1.037	1.031	1.023	1.027	1.027	1.029	1.023	1.026	1.026	1.020	1.018	1.017	1.013	1.011	1.011	1.009	1.007	1.007	1.007	1.008	1.008	1.008	1.008	1.008	1.009	
June-85	2.422	1.451	1.252	1.207	1.168	1.118	1.090	1.079	1.052	1.045	1.041	1.033	1.034	1.031	1.025	1.025	1.024	1.023	1.020	1.020	1.016	1.016	1.015	1.012	1.011	1.011	1.011	1.011	1.007	1.007	1.005	1.005	1.005	1.004		
June-86	2.422	1.445	1.258	1.198	1.132	1.089	1.077	1.049	1.054	1.041	1.044	1.039	1.032	1.033	1.033	1.025	1.020	1.016	1.016	1.016	1.016	1.014	1.014	1.011	1.009	1.005	1.004	1.004	1.004	1.004	1.004	1.004	1.003			
June-87	2.404	1.428	1.281	1.188	1.111	1.078	1.065	1.052	1.046	1.038	1.039	1.039	1.028	1.026	1.023	1.019	1.015	1.012	1.012	1.018	1.011	1.011	1.012	1.009	1.009	1.010	1.009	1.008	1.008	1.008	1.007	1.007				
June-88	2.338	1.515	1.288	1.196	1.103	1.061	1.053	1.041	1.035	1.030	1.029	1.028	1.025	1.024	1.023	1.021	1.018	1.018	1.017	1.016	1.014	1.012	1.013	1.012	1.011	1.011	1.011	1.010	1.008	1.007	1.007					
June-89	2.755	1.483	1.254	1.149	1.083	1.064	1.050	1.036	1.033	1.028	1.025	1.023	1.021	1.019	1.017	1.016	1.015	1.015	1.014	1.013	1.013	1.013	1.013	1.011	1.011	1.010	1.010	1.009	1.008	1.007						
June-90	2.306	1.422	1.208	1.106	1.076	1.056	1.041	1.035	1.035	1.028	1.022	1.018	1.017	1.015	1.014	1.014	1.012	1.012	1.011	1.010	1.010	1.010	1.011	1.011	1.010	1.009	1.010	1.009	1.009							
June-91	2.345	1.384	1.176	1.115	1.075	1.049	1.037	1.036	1.029	1.029	1.029	1.027	1.025	1.022	1.021	1.019	1.015	1.017	1.010	1.009	1.009	1.010	1.009	1.008	1.007	1.007	1.008	1.007								
June-92	1.991	1.286	1.180	1.078	1.059	1.047	1.034	1.038	1.032	1.032	1.030	1.024	1.020	1.023	1.024	1.021	1.018	1.016	1.014	1.014	1.014	1.011	1.010	1.011	1.010	1.010	1.010									
June-93	2.166	1.290	1.162	1.088	1.071	1.022	1.021	1.023	1.020	1.015	1.015	1.013	1.012	1.013	1.012	1.011	1.013	1.015	1.014	1.013	1.010	1.009	1.008	1.011	1.005	1.004										
June-94	2.053	1.346	1.152	1.095	1.064	1.053	1.061	1.035	1.034	1.027	1.033	1.024	1.021	1.019	1.018	1.015	1.015	1.014	1.015	1.015	1.015	1.014	1.014	1.014	1.014											
June-95	1.964	1.318	1.175	1.081	1.062	1.057	1.042	1.031	1.021	1.021	1.019	1.020	1.016	1.012	1.011	1.011	1.012	1.011	1.011	1.009	1.009	1.008	1.006	1.006												
June-96	1.938	1.335	1.109	1.120	1.076	1.054	1.047	1.042	1.026	1.020	1.019	1.017	1.016	1.016	1.016	1.014	1.011	1.013	1.016	1.011	1.007	1.007	1.005													
June-97	2.045	1.275	1.196	1.128	1.088	1.058	1.034	1.016	1.014	1.010	1.015	1.008	1.009	1.009	1.011	1.008	1.008	1.005	1.005	1.005	1.005	1.005														
June-98	2.023	1.367	1.181	1.127	1.084	1.058	1.035	1.030	1.024	1.021	1.020	1.018	1.018	1.016	1.011	1.011	1.011	1.011	1.011	1.011	1.011															
June-99	2.141	1.355	1.198	1.117	1.063	1.052	1.033	1.022	1.025	1.017	1.013	1.010	1.009	1.009	1.009	1.011	1.011	1.010	1.007	1.007																
June-00	2.129	1.341	1.168	1.107	1.063	1.042	1.020	1.018	1.011	1.008	1.010	1.010	1.009	1.009	1.009	1.009	1.009	1.007	1.006																	
June-01	2.137	1.344	1.179	1.098	1.063	1.042	1.029	1.011	1.012	1.013	1.015	1.013	1.012	1.011	1.010	1.008	1.007	1.007																		
June-02	2.130	1.323	1.162	1.077	1.052	1.026	1.018	1.017	1.013	1.010	1.009	1.007	1.006	1.004	1.004	1.004	1.004																			
June-03	2.013	1.296	1.118	1.073	1.034	1.024	1.015	1.013	1.011	1.010	1.008	1.010	1.008	1.008	1.005	1.004																				
June-04	2.084	1.313	1.159	1.076	1.043	1.028	1.018	1.010	1.009	1.010	1.009	1.009	1.009	1.008	1.007																					
June-05	2.056	1.323	1.148	1.061	1.045	1.037	1.023	1.012	1.010	1.012	1.008	1.006	1.007	1.007																						
June-06	2.145	1.319	1.129	1.072	1.062	1.036	1.017	1.010	1.010	1.010	1.007	1.005	1.005																							
June-07	1.980	1.228	1.173	1.104	1.052	1.039	1.023	1.022	1.014	1.011	1.010	1.010																								
June-08	2.066	1.308	1.181	1.101	1.056	1.035	1.026	1.019	1.019	1.020	1.019																									
June-09	2.108	1.346	1.182	1.104	1.080	1.038	1.022	1.009	1.014	1.011																										
June-10	2.088	1.325	1.138	1.079	1.044	1.032	1.022	1.022	1.018																											
June-11	2.006	1.309	1.144	1.097	1.049	1.039	1.025	1.017																												
June-12	2.084	1.332	1.171	1.083	1.052	1.034	1.023																													
June-13	1.944	1.291	1.131	1.058	1.053	1.036																														
June-14	2.144	1.308	1.148	1.080	1.054																															
June-15	1.961	1.343	1.191	1.111																																
June-16	2.014	1.342	1.173																																	
June-17	2.111	1.354																																		
June-18	2.049																																			

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*To Ult*
Simple Avg																																					
All Yrs	2.150	1.353	1.185	1.115	1.077	1.054	1.042	1.032	1.028	1.024	1.022	1.020	1.018	1.017	1.016	1.015	1.014	1.015	1.014	1.013	1.012	1.012	1.012	1.012	1.011	1.010	1.010	1.009	1.008	1.007	1.007	1.006	1.005	1.005	1.006	1.003	
Latest 5	2.056	1.328	1.163	1.086	1.051	1.036	1.023	1.018	1.017	1.013	1.011	1.008	1.007	1.008	1.007	1.007	1.008	1.008	1.009	1.008	1.009	1.008	1.009	1.010	1.009	1.008	1.010	1.009	1.007	1.007	1.006	1.006					
Latest 3	2.058	1.347	1.171	1.083	1.053	1.036	1.023	1.016	1.017	1.014	1.012	1.007	1.007	1.008	1.005	1.005	1.006	1.008	1.008	1.008	1.008	1.006	1.008	1.011	1.010	1.007	1.009	1.009	1.008	1.007	1.006	1.005	1.006	1.005			
Volume Wtd																																					
All Yrs	2.136	1.353	1.185	1.113	1.074	1.052	1.040	1.031	1.028	1.024	1.023	1.021	1.019	1.018	1.017	1.016	1.015	1.014	1.014	1.014	1.012	1.012	1.012	1.011	1.010	1.009	1.009	1.009	1.008	1.007	1.006	1.006	1.005	1.005	1.007	#DIV/0!	
Latest 5	2.053	1.330	1.165	1.087	1.051	1.036	1.023	1.018	1.017	1.013	1.011	1.008	1.007	1.008	1.007	1.007	1.008	1.008	1.009	1.009	1.009	1.008	1.009	1.010	1.009	1.009	1.010	1.009	1.008	1.007	1.006	1.006					
Latest 3	2.057	1.347	1.171	1.086	1.053	1.036	1.023	1.016	1.017	1.014	1.012	1.007	1.007	1.008	1.005	1.005	1.006	1.008	1.008	1.008	1.008	1.006	1.009	1.011	1.010	1.008	1.009	1.009	1.008	1.007	1.006	1.005	1.005	1.005			

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	108,674,640	114,499,962	107,794,214	111,276,240	(880,426)	-0.8%	(3,223,722)	-2.8%
6/30/82-83	17,220,955	17,326,760	17,287,145	17,392,611	66,190	0.4%	65,851	0.4%
6/30/83-84	24,031,022	24,694,685	24,265,006	24,510,471	233,984	1.0%	(184,214)	-0.7%
6/30/84-85	36,969,051	37,360,668	37,048,069	37,379,449	79,018	0.2%	18,781	0.1%
6/30/85-86	48,179,037	48,510,278	48,232,324	48,547,313	53,287	0.1%	37,035	0.1%
6/30/86-87	54,320,766	54,757,224	54,513,341	54,785,244	192,575	0.4%	28,020	0.1%
6/30/87-88	78,355,052	79,271,052	78,515,209	79,430,087	160,158	0.2%	159,035	0.2%
6/30/88-89	75,052,665	75,968,550	75,210,084	76,082,550	157,418	0.2%	114,000	0.2%
6/30/89-90	71,631,827	72,426,477	71,875,827	72,678,477	244,000	0.3%	252,000	0.3%
6/30/90-91	57,660,925	58,373,053	57,580,925	58,325,664	(80,000)	-0.1%	(47,389)	-0.1%
6/30/91-92	36,796,822	37,739,323	36,794,822	37,768,053	(2,000)	0.0%	28,730	0.1%
6/30/92-93	24,553,951	24,770,024	24,550,269	24,717,229	(3,682)	0.0%	(52,795)	-0.2%
6/30/93-94	27,724,000	28,270,033	27,837,000	28,383,120	113,000	0.4%	113,087	0.4%
6/30/94-95	25,406,648	26,169,304	25,301,648	26,067,375	(105,000)	-0.4%	(101,929)	-0.4%
6/30/95-96	24,866,068	25,654,242	24,759,068	25,535,197	(107,000)	-0.4%	(119,045)	-0.5%
6/30/96-97	24,379,614	25,191,508	24,187,614	24,984,413	(192,000)	-0.8%	(207,095)	-0.8%
6/30/97-98	28,013,170	28,906,067	27,944,793	28,819,822	(68,378)	-0.2%	(86,245)	-0.3%
6/30/98-99	26,149,133	26,966,203	26,011,504	26,813,733	(137,629)	-0.5%	(152,470)	-0.6%
6/30/99-00	29,690,492	30,642,005	29,596,323	30,527,835	(94,169)	-0.3%	(114,170)	-0.4%
6/30/00-01	34,639,450	35,564,353	34,444,791	35,346,923	(194,659)	-0.6%	(217,430)	-0.6%
6/30/01-02	31,002,883	32,321,373	30,693,661	31,981,463	(309,222)	-1.0%	(339,910)	-1.1%
6/30/02-03	30,847,538	32,147,950	30,652,790	31,927,000	(194,748)	-0.6%	(220,950)	-0.7%
6/30/03-04	30,416,243	31,325,140	30,128,047	31,015,260	(288,197)	-0.9%	(309,880)	-1.0%
6/30/04-05	29,751,918	30,960,000	29,511,611	30,560,000	(240,308)	-0.8%	(400,000)	-1.3%
6/30/05-06	27,501,137	27,965,000	27,035,449	27,617,000	(465,688)	-1.7%	(348,000)	-1.2%
6/30/06-07	25,442,016	26,354,950	25,008,427	26,094,550	(433,589)	-1.7%	(260,400)	-1.0%
6/30/07-08	31,118,050	32,488,061	30,929,450	32,106,206	(188,600)	-0.6%	(381,855)	-1.2%
6/30/08-09	31,524,400	32,873,331	31,162,640	32,167,828	(361,760)	-1.1%	(705,503)	-2.1%
6/30/09-10	31,978,370	33,534,462	31,454,680	32,733,961	(523,690)	-1.6%	(800,501)	-2.4%
6/30/10-11	36,441,210	38,332,531	35,998,090	37,484,624	(443,120)	-1.2%	(847,907)	-2.2%
6/30/11-12	37,304,150	39,412,767	36,579,800	38,149,129	(724,350)	-1.9%	(1,263,638)	-3.2%
6/30/12-13	33,899,300	35,849,000	33,000,950	34,830,000	(898,350)	-2.7%	(1,019,000)	-2.8%
6/30/13-14	41,043,990	43,252,000	40,199,530	42,430,000	(844,460)	-2.1%	(822,000)	-1.9%
6/30/14-15	45,641,300	47,960,100	45,163,540	47,562,300	(477,760)	-1.0%	(397,800)	-0.8%
6/30/15-16	50,184,860	53,680,500	49,679,380	52,761,400	(505,480)	-1.0%	(919,100)	-1.7%
6/30/16-17	48,387,250	51,931,200	48,713,410	51,638,200	326,160	0.7%	(293,000)	-0.6%
6/30/17-18	52,200,740	55,879,000	49,396,830	51,977,000	(2,803,910)	-5.4%	(3,902,000)	-7.0%
6/30/18-19								
Total	1,469,000,645	1,519,329,134	1,459,058,259	1,502,407,724	(9,942,386)	-0.7%	(16,921,409)	-1.1%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 1, Exhibit 1, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	95,858,403	1.101	105,575,852	0.0%	0.0%	0	3,941,682	3,941,682	3.7%	1.004	3,958,950	3,950,316	3,950,982
6/30/82-83	16,396,735	1.011	16,569,130	0.0%	0.0%	0	771,231	771,231	4.7%	1.001	771,763	771,497	771,591
6/30/83-84	21,783,013	1.039	22,642,146	0.0%	0.0%	0	1,792,639	1,792,639	7.9%	1.003	1,797,885	1,795,262	1,795,672
6/30/84-85	33,882,433	1.019	34,528,518	0.0%	0.0%	0	2,791,264	2,791,264	8.1%	1.003	2,799,280	2,795,272	2,795,823
6/30/85-86	44,487,067	1.020	45,382,449	0.0%	0.0%	0	3,303,601	3,303,601	7.3%	1.004	3,315,252	3,309,426	3,310,012
6/30/86-87	48,511,902	1.023	49,613,961	0.0%	0.0%	0	5,541,750	5,541,750	11.2%	1.003	5,557,781	5,549,766	5,550,598
6/30/87-88	68,676,681	1.028	70,604,207	0.0%	0.0%	0	8,207,017	8,207,017	11.6%	1.003	8,229,416	8,218,217	8,219,902
6/30/88-89	63,504,388	1.034	65,660,166	0.0%	0.0%	0	9,826,239	9,826,239	15.0%	1.003	9,857,477	9,841,858	9,854,345
6/30/89-90	59,843,420	1.039	62,156,485	0.0%	0.0%	2,401	10,079,298	10,081,699	16.2%	1.003	10,108,492	10,095,096	10,098,483
6/30/90-91	47,480,571	1.045	49,606,168	0.0%	0.0%	11,617	8,721,440	8,733,057	17.6%	1.003	8,748,081	8,740,569	8,754,975
6/30/91-92	30,163,915	1.051	31,706,337	0.0%	0.0%	12,000	5,460,474	5,472,474	17.3%	1.004	5,484,352	5,478,413	5,487,606
6/30/92-93	19,292,942	1.066	20,567,633	0.0%	0.0%	1,498	4,130,618	4,132,116	20.1%	1.005	4,151,141	4,141,628	4,129,198
6/30/93-94	22,262,502	1.071	23,850,435	0.0%	0.0%	2,981	4,177,034	4,180,015	17.5%	1.006	4,200,249	4,190,132	4,194,818
6/30/94-95	20,010,327	1.077	21,544,586	0.0%	0.0%	3,213	4,050,860	4,054,073	18.8%	1.007	4,079,813	4,066,943	4,083,860
6/30/95-96	19,291,518	1.090	21,034,712	0.0%	0.0%	3,396	3,923,871	3,927,267	18.7%	1.014	3,977,242	3,952,255	3,961,943
6/30/96-97	18,149,123	1.099	19,953,975	0.0%	0.1%	13,188	4,501,152	4,514,340	22.6%	1.015	4,567,650	4,540,995	4,553,374
6/30/97-98	21,871,200	1.097	24,001,945	0.0%	0.1%	19,107	4,686,877	4,705,984	19.6%	1.019	4,776,139	4,741,061	4,752,472
6/30/98-99	19,994,570	1.118	22,357,706	0.0%	0.1%	27,323	4,136,938	4,164,261	18.6%	1.022	4,226,328	4,195,295	4,182,268
6/30/99-00	23,130,639	1.134	26,235,773	0.1%	0.2%	46,432	4,032,368	4,078,801	15.5%	1.025	4,134,362	4,106,581	4,056,509
6/30/00-01	27,652,302	1.135	31,397,469	0.0%	0.2%	69,654	3,874,864	3,944,518	12.6%	1.029	3,988,526	3,966,522	3,997,799
6/30/01-02	24,108,655	1.148	27,670,247	0.1%	0.3%	86,785	3,832,669	3,919,454	14.2%	1.044	4,003,156	3,961,305	3,978,470
6/30/02-03	23,660,204	1.157	27,378,796	0.1%	0.4%	110,128	3,715,808	3,825,936	14.0%	1.042	3,873,727	3,849,831	3,718,234
6/30/03-04	23,121,373	1.171	27,064,097	0.1%	0.5%	124,671	3,633,520	3,758,191	13.9%	1.048	3,807,166	3,782,678	3,806,086
6/30/04-05	22,552,948	1.192	26,884,568	0.2%	0.6%	172,415	4,067,653	4,240,069	15.8%	1.058	4,304,174	4,272,121	4,297,723
6/30/05-06	19,279,310	1.209	23,310,671	0.1%	0.8%	182,615	4,107,929	4,290,544	18.4%	1.063	4,365,228	4,327,886	4,344,501
6/30/06-07	17,939,057	1.229	22,046,332	0.1%	0.9%	205,315	3,364,817	3,570,132	16.2%	1.073	3,611,853	3,607,557	3,636,859
6/30/07-08	21,123,817	1.265	26,714,432	0.2%	1.1%	298,540	4,840,691	5,139,231	19.2%	1.079	5,224,789	5,199,126	5,212,958
6/30/08-09	21,102,785	1.287	27,165,705	0.2%	1.3%	353,518	4,242,636	4,596,154	16.9%	1.099	4,663,309	4,644,703	4,591,183
6/30/09-10	20,418,707	1.319	26,932,798	0.2%	1.5%	394,718	4,681,185	5,075,902	18.8%	1.123	5,257,676	5,178,971	5,234,879
6/30/10-11	23,425,068	1.351	31,645,544	0.2%	1.7%	541,590	4,854,771	5,396,361	17.1%	1.142	5,546,241	5,482,710	5,454,417
6/30/11-12	22,871,599	1.399	31,998,797	0.5%	2.2%	698,171	4,716,671	5,414,842	16.9%	1.184	5,585,334	5,509,164	5,704,811
6/30/12-13	19,522,034	1.440	28,109,301	1.0%	3.2%	900,664	3,857,735	4,758,399	16.9%	1.261	4,864,916	4,819,107	4,931,580
6/30/13-14	23,190,745	1.512	35,059,298	1.3%	4.5%	1,581,003	4,651,328	6,232,331	17.8%	1.409	6,553,492	6,290,243	6,208,298
6/30/14-15	25,206,857	1.593	40,159,243	1.4%	5.9%	2,357,995	3,704,876	6,062,870	15.1%	1.654	6,127,503	6,112,963	6,296,057
6/30/15-16	25,749,141	1.749	45,040,318	2.8%	8.6%	3,885,387	2,949,448	6,834,835	15.2%	2.273	6,703,783	6,823,346	7,100,503
6/30/16-17	21,787,121	2.038	44,408,520	3.1%	11.7%	5,215,889	1,723,300	6,939,189	15.6%	4.072	7,017,476	6,144,536	6,160,421
6/30/17-18	16,132,882	2.792	45,045,593	3.7%	15.4%	6,953,722	337,072	7,290,795	16.2%	11.941	4,024,867	5,982,590	7,922,071
6/30/18-19	7,775,710	5.791	45,025,469	1.0%	16.4%	7,389,325	3,000	7,392,325	16.4%	22.315	66,944	6,955,965	
Total	1,101,211,664		1,346,649,382			31,665,261	161,236,326	192,901,587	14.3%		184,331,812	191,391,904	187,101,282

NOTES:
(2) From Section 1, Exhibit 1, Page 2, Column 3
(3) = (4) / (2)
(4) From Section 1, Exhibit 1, Page 2, Column 6
(5) From Section 1, Exhibit 1, Page 11
(6) Downward sum of (5)
(7) = (6) x (4)
(8) From Section 1, Exhibit 1, Page 10
(9) = (7) + (8)
(10) = (9) / (4)
(11) From Section 1, Exhibit 1, Page 12
(12) = (8) x (11)
(13) Selected based on (9) and (12)
(14) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts Workers Compensation
All Clusters Combined
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456
All Prior Yrs	0	0	0	0	0	0	12,000	46,500	31,000	20,000	184,000	115,000	138,000	550,984	594,000	318,784	155,500	30,000	362,833	369,668	354,998	72,250	145,500	201,500	118,040	28,000	78,125	0	0	7,500	7,500	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	20,000	0	32,500	37,500	80,000	153,481	90,750	77,000	110,000	160,000	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	25,750	32,500	110,600	178,437	119,500	233,650	204,200	246,501	48,000	102,001	50,000	30,000	37,500	85,000	45,000	0	0	84,000	0	10,000	0	0	150,000	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	98,476	35,500	126,500	146,555	201,250	383,400	565,833	337,200	193,500	294,550	40,000	0	133,500	120,000	30,000	35,000	25,000	0	0	0	0	0	0	0	0	25,000	0	0	0	0	0	0			
Jun-86	0	0	58,000	116,759	213,100	146,344	336,928	826,899	586,995	10,000	147,000	20,000	86,000	37,500	0	0	0	30,000	55,000	64,000	16,000	45,000	58,275	237,801	0	198,000	2,000	12,000	0	0	0	0	0	0				
Jun-87	0	81,440	184,322	246,666	253,462	621,607	1,050,537	509,001	398,456	184,806	186,424	102,671	334,859	406,500	240,000	239,999	50,000	132,000	80,000	10,000	0	0	0	135,000	0	0	0	0	0	0	94,000	0	0					
Jun-88	0	106,671	200,428	418,500	836,484	1,573,442	1,192,500	711,383	849,000	373,400	305,326	241,507	328,463	0	59,910	0	191,667	65,000	85,333	100,001	90,000	150,001	0	58,001	62,000	58,000	0	0	0	0	150,000	0						
Jun-89	0	239,195	381,000	997,744	1,789,441	1,630,950	1,022,995	995,502	531,500	332,500	603,811	258,100	276,500	92,500	25,000	18,500	63,500	218,333	116,383	160,284	62,500	0	0	10,000	0	1	0	0	0	0	0							
Jun-90	0	254,094	1,205,138	1,809,296	1,317,952	1,060,755	985,550	993,000	409,534	438,300	365,512	408,833	40,833	46,000	31,000	25,000	106,000	110,125	129,876	27,500	33,333	33,333	33,333	0	184,500	30,500	0	0	0	0								
Jun-91	13,500	438,707	1,994,750	1,433,327	920,426	1,217,840	758,000	203,289	232,000	140,000	100,001	54,000	0	0	70,000	178,100	102,500	280,000	130,000	0	0	0	60,000	0	158,000	237,000	0	0	0									
Jun-92	66,000	830,673	583,116	753,497	838,750	535,501	294,500	221,500	181,500	178,000	202,683	31,250	13,500	122,268	33,368	20,867	326,500	107,000	80,001	0	0	0	0	0	0	40,000	0	0										
Jun-93	62,000	654,058	665,328	971,951	408,250	415,801	286,729	103,000	190,000	85,000	12,000	55,000	0	0	0	0	50,000	58,000	35,000	35,000	0	0	13,500	1	0	14,500	15,500											
Jun-94	90,000	679,356	863,226	715,524	525,377	333,501	199,500	201,500	47,500	40,050	0	234,500	71,000	25,000	25,000	120,000	6,000	0	0	0	0	0	0	0	0	0												
Jun-95	219,963	888,102	977,200	797,324	399,770	225,600	67,000	10,000	70,625	134,875	58,400	35,000	0	112,000	42,500	12,500	0	0	0	0	0	1	0	0	0													
Jun-96	80,500	705,230	1,049,356	656,831	319,451	110,001	89,167	158,833	123,000	131,001	103,000	62,500	0	18,400	16,600	0	0	0	71,725	32,069	132,068	64,138	0	1														
Jun-97	134,365	1,184,751	1,074,000	820,183	422,500	172,251	16,000	140,600	106,501	109,001	167,000	17,000	0	0	40,000	40,000	0	0	30,000	27,000	0	0																
Jun-98	408,337	890,613	1,162,675	665,000	431,091	264,909	110,335	161,166	29,000	8,001	10,000	227,750	130,000	119,000	69,000	0	0	0	0	0	0	0																
Jun-99	251,500	439,250	1,042,681	765,621	367,556	218,197	270,076	179,055	73,001	180,000	52,000	73,001	0	0	65,000	110,000	0	0	0	25,000	25,000																	
Jun-00	135,731	994,493	726,541	532,050	394,551	264,499	364,884	198,118	118,001	76,000	31,500	34,000	25,000	12,000	0	0	0	0	45,000	80,000																		
Jun-01	108,490	517,820	838,510	515,804	486,170	523,565	239,504	370,500	134,000	18,000	0	0	62,500	0	0	0	60,001	0	0																			
Jun-02	48,000	251,595	619,400	692,914	768,087	556,815	356,721	325,000	45,136	69,000	53,000	42,000	0	5,000	1	0	0	0																				
Jun-03	20,000	243,617	973,654	830,735	554,982	452,423	125,001	80,000	6,000	96,000	77,500	60,000	1	1	5,000	45,894	145,000																					
Jun-04	47,500	153,200	552,463	917,102	829,753	553,000	162,000	241,501	100,000	0	1,001	36,000	0	0	40,000	0																						
Jun-05	6,157	171,103	840,367	1,359,602	649,723	301,000	271,000	217,001	194,200	0	0	20,000	0	37,500	0																							
Jun-06	0	307,301	772,454	1,353,001	484,173	445,500	363,000	103,000	19,700	15,300	177,000	50,000	0	17,500																								
Jun-07	36,000	451,583	914,752	703,751	416,002	193,002	149,442	275,002	148,783	76,500	0	0	0																									
Jun-08	17,730	728,501	774,649	979,000	795,250	372,462	679,872	198,334	148,893	0	105,000	41,000																										
Jun-09	285,000	362,500	783,767	808,001	522,676	524,500	314,501	373,691	75,000	65,001	128,000																											
Jun-10	0	601,092	797,379	946,609	922,799	554,305	511,501	192,500	136,250	18,750																												
Jun-11	315,691	461,993	1,026,227	799,329	1,115,029	406,000	349,502	188,000	193,000																													
Jun-12	0	441,786	742,328	1,621,090	868,462	640,401	264,104	138,500																														
Jun-13	113,000	371,012	696,259	1,337,661	871,178	145,625	323,000																															
Jun-14	102,000	301,628	1,569,902	1,187,866	841,730	648,202																																
Jun-15	0	377,841	1,376,990	962,545	987,500																																	
Jun-16	21,500	318,702	1,260,931	1,348,314																																		
Jun-17	37,200	798,100	888,000																																			
Jun-18	46,368	290,704																																				
Jun-19	3,000																																					

Cumulative Lump Sum Payments

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444	456
All Prior Yrs	0	0	0	0	0	0	12,000	58,500	89,500	109,500	293,500	408,500	546,500	1,097,484	1,691,484	2,010,268	2,165,768	2,195,768	2,558,601	2,928,269	3,283,267	3,355,517	3,501,017	3,702,517	3,820,557	3,848,557	3,926,682	3,926,682	3,926,682	3,934,182	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682
Jun-83	0	0	0	0	0	20,000	20,000	52,500	90,000	170,000	323,481	414,231	491,231	601,231	761,231	761,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	
Jun-84	0	0	0	0	25,750	58,250	168,850	347,287	466,787	700,437	904,637	1,151,138	1,199,138	1,301,139	1,351,139	1,381,139	1,418,639	1,503,639	1,548,639	1,548,639	1,548,639	1,632,639	1,632,639	1,642,639	1,642,639	1,642,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639		
Jun-85	0	0	0	98,476	133,976	260,476	407,031	608,281	991,681	1,557,514	1,894,714	2,088,214	2,382,764	2,422,764	2,422,764	2,556,264	2,676,264	2,706,264	2,741,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264			
Jun-86	0	0	58,000	174,759	387,859	534,203	871,131	1,698,030	2,285,025	2,295,025	2,442,025	2,462,025	2,548,025	2,585,525	2,585,525	2,585,525	2,585,525	2,615,525	2,670,525	2,734,525	2,750,525	2,795,525	2,853,800	3,091,601	3,091,601	3,289,601	3,291,601	3,303,601	3,303,601	3,303,601	3,303,601	3,303,601	3,303,601	3,303,601				
Jun-87	0	81,440	265,762	512,428	765,890	1,387,497	2,438,034	2,947,035	3,345,491	3,530,297	3,716,721	3,819,392	4,154,251	4,560,751	4,800,751	5,040,750	5,090,750	5,222,750	5,302,750	5,312,750	5,312,750	5,312,750	5,312,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,541,750	5,541,750	5,541,750					
Jun-88	0	106,671	307,099	725,599	1,562,083	3,135,525	4,328,025	5,039,408	5,888,408	6,261,808	6,567,134	6,808,641	7,137,104	7,137,104	7,197,014	7,197,014	7,388,681	7,453,681	7,539,014	7,639,015	7,729,015	7,879,016	7,879,016	7,937,017	7,999,017	8,057,017	8,057,017	8,057,017	8,057,017	8,057,017	8,207,017	8,207,017						
Jun-89	0	239,195	620,195	1,617,939	3,407,380	5,038,330	6,061,325	7,056,827	7,588,327	7,920,827	8,524,638	8,782,738	9,059,238	9,151,738	9,176,738	9,195,238	9,258,738	9,477,071	9,593,454	9,753,738	9,816,238	9,816,238	9,816,238	9,826,238	9,826,238	9,826,239	9,826,239	9,826,239	9,826,239	9,826,239	9,826,239							
Jun-90	0	254,094	1,459,232	3,268,528	4,586,480	5,647,235	6,632,785	7,625,785	8,035,319	8,473,619	8,839,131	9,247,964	9,288,797	9,334,797	9,365,797	9,390,797	9,496,797	9,606,922	9,736,798	9,764,298	9,797,631	9,830,965	9,864,298	9,864,298	10,048,798	10,079,298	10,079,298	10,079,298	10,079,298	10,079,298								
Jun-91	13,500	452,207	2,446,957	3,880,284	4,800,710	6,018,550	6,776,550	6,979,839	7,211,839	7,351,839	7,451,840	7,505,840	7,505,840	7,505,840	7,575,840	7,753,940	7,856,440	8,136,440	8,266,440	8,266,440	8,266,440	8,266,440	8,326,440	8,326,440	8,484,440	8,721,440	8,721,440	8,721,440	8,721,440								
Jun-92	66,000	896,673	1,479,789	2,233,286	3,072,036	3,607,537	3,902,037	4,123,537	4,305,037	4,483,037	4,685,720	4,716,970	4,730,470	4,852,738	4,886,106	4,906,973	5,233,473	5,340,473	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,460,474	5,460,474	5,460,474										
Jun-93	62,000	716,058	1,381,386	2,353,337	2,761,587	3,177,388	3,464,117	3,567,117	3,757,117	3,842,117	3,854,117	3,909,117	3,909,117	3,909,117	3,909,117	3,909,117	3,959,117	4,017,117	4,052,117	4,087,117	4,087,117	4,087,117	4,100,617	4,100,618	4,100,618	4,115,118	4,130,618											
Jun-94	90,000	769,356	1,632,582	2,348,106	2,873,483	3,206,984	3,406,484	3,607,984	3,655,484	3,695,534	3,695,534	3,930,034	4,001,034	4,026,034	4,051,034	4,171,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034												
Jun-95	219,963	1,108,065	2,085,265	2,882,589	3,282,359	3,507,959	3,574,959	3,584,959	3,655,584	3,790,459	3,848,859	3,883,859	3,883,859	3,995,859	4,038,359	4,050,859	4,050,859	4,050,859	4,050,859	4,050,859	4,050,859	4,050,860	4,050,860	4,050,860	4,050,860													
Jun-96	80,500	785,730	1,835,086	2,491,917	2,811,368	2,921,369	3,010,536	3,169,369	3,292,369	3,423,370	3,526,370	3,588,870	3,588,870	3,607,270	3,623,870	3,623,870	3,623,870	3,623,870	3,695,595	3,727,664	3,859,732	3,923,870	3,923,870	3,923,871														
Jun-97	134,365	1,319,116	2,393,116	3,213,299	3,635,799	3,808,050	3,824,050	3,964,650	4,071,151	4,180,152	4,347,152	4,364,152	4,364,152	4,364,152	4,404,152	4,444,152	4,444,152	4,444,152	4,474,152	4,501,152	4,501,152	4,501,152	4,501,152															
Jun-98	408,337	1,298,950	2,461,625	3,126,625	3,557,716	3,822,625	3,932,960	4,094,126	4,123,126	4,131,127	4,141,127	4,368,877	4,498,877	4,617,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877																
Jun-99	251,500	690,750	1,733,431	2,499,052	2,866,608	3,084,805	3,354,881	3,533,936	3,606,937	3,786,937	3,838,937	3,911,938	3,911,938	3,911,938	3,976,938	4,086,938	4,086,938	4,086,938	4,086,938	4,111,938	4,136,938																	
Jun-00	135,731	1,130,224	1,856,765	2,388,815	2,783,366	3,047,865	3,412,749	3,610,867	3,728,868	3,804,868	3,836,368	3,870,368	3,895,368	3,907,368	3,907,368	3,907,368	3,907,368	3,907,368	3,952,368	4,032,368																		
Jun-01	108,490	626,310	1,464,820	1,980,624	2,466,794	2,990,359	3,229,863	3,600,363	3,734,363	3,752,363	3,752,363	3,752,363	3,814,863	3,814,863	3,814,863	3,814,863	3,874,864	3,874,864	3,874,864																			
Jun-02	48,000	299,595	918,995	1,611,909	2,379,996	2,936,811	3,293,532	3,618,532	3,663,668	3,732,668	3,785,668	3,827,668	3,827,668	3,832,668	3,832,669	3,832,669	3,832,669	3,832,669																				
Jun-03	20,000	263,617	1,237,271	2,068,006	2,622,988	3,075,411	3,200,412	3,280,412	3,286,412	3,382,412	3,459,912	3,519,912	3,519,913	3,519,914	3,524,914	3,570,808	3,715,808																					
Jun-04	47,500	200,700	753,163	1,670,265	2,500,018	3,053,018	3,215,018	3,456,519	3,556,519	3,556,519	3,557,520	3,593,520	3,593,520	3,593,520	3,633,520	3,633,520																						
Jun-05	6,157	177,260	1,017,627	2,377,229	3,026,952	3,327,952	3,598,952	3,815,953	4,010,153	4,010,153	4,010,153	4,030,153	4,030,153	4,067,653	4,067,653																							
Jun-06	0	307,301	1,079,755	2,432,756	2,916,929	3,362,429	3,725,429	3,828,429	3,848,129	3,863,429	4,040,429	4,090,429	4,090,429	4,107,929																								
Jun-07	36,000	487,583	1,402,335	2,106,086	2,522,088	2,715,090	2,864,532	3,139,534	3,288,317	3,364,817	3,364,817	3,364,817	3,364,817																									
Jun-08	17,730	746,231	1,520,880	2,499,880	3,295,130	3,667,592	4,347,463	4,545,798	4,694,691	4,694,691	4,799,691	4,840,691																										
Jun-09	285,000	647,500	1,431,267	2,239,268	2,761,944	3,286,444	3,600,945	3,974,635	4,049,635	4,114,636	4,242,636																											
Jun-10	0	601,092	1,398,471	2,345,079	3,267,878	3,822,184	4,333,685	4,526,185	4,662,435	4,681,185																												
Jun-11	315,691	777,684	1,803,911	2,603,240	3,718,269	4,124,269	4,473,771	4,661,771	4,854,771																													
Jun-12	0	441,786	1,184,114	2,805,204	3,673,666	4,314,068	4,578,171	4,716,671																														
Jun-13	113,000	484,012	1,180,271	2,517,932	3,389,110	3,534,735	3,857,735																															
Jun-14	102,000	403,628	1,973,530	3,161,396	4,003,126	4,651,328																																
Jun-15	0	377,841	1,754,831	2,717,376	3,704,876																																	
Jun-16	21,500	340,202	1,601,133	2,949,448																																		
Jun-17	37,200	835,300	1,723,300																																			
Jun-18	46,368	337,072																																				
Jun-19	3,000																																					

Commonwealth of Massachusetts Workers Compensation
All Clusters Combined
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.001	0.005	0.006	0.003	0.001	0.000	0.003	0.004	0.003	0.001	0.001	0.002	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.002	0.005	0.009	0.005	0.005	0.007	0.010	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.001	0.001	0.005	0.008	0.005	0.010	0.009	0.011	0.002	0.005	0.002	0.001	0.002	0.004	0.002	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.003	0.001	0.004	0.004	0.006	0.011	0.016	0.010	0.006	0.009	0.001	0.000	0.004	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.001	0.003	0.005	0.003	0.007	0.018	0.013	0.000	0.003	0.000	0.002	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.001	0.001	0.005	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.002	0.004	0.005	0.005	0.013	0.021	0.010	0.008	0.004	0.004	0.002	0.007	0.008	0.005	0.005	0.001	0.003	0.002	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000					
Jun-88	0.000	0.002	0.003	0.006	0.012	0.022	0.017	0.010	0.012	0.005	0.004	0.003	0.005	0.000	0.001	0.000	0.003	0.001	0.001	0.001	0.001	0.002	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.002	0.000						
Jun-89	0.000	0.004	0.006	0.015	0.027	0.025	0.016	0.015	0.008	0.005	0.009	0.004	0.004	0.001	0.000	0.000	0.001	0.003	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.004	0.019	0.029	0.021	0.017	0.016	0.016	0.007	0.007	0.006	0.007	0.001	0.001	0.000	0.000	0.002	0.002	0.002	0.000	0.001	0.001	0.001	0.000	0.003	0.000	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.009	0.040	0.029	0.019	0.025	0.015	0.004	0.005	0.003	0.002	0.001	0.000	0.000	0.001	0.004	0.002	0.006	0.003	0.000	0.000	0.000	0.001	0.000	0.003	0.005	0.000	0.000	0.000									
Jun-92	0.002	0.026	0.018	0.024	0.026	0.017	0.009	0.007	0.006	0.006	0.006	0.001	0.000	0.004	0.001	0.001	0.010	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000										
Jun-93	0.003	0.032	0.032	0.047	0.020	0.020	0.014	0.005	0.009	0.004	0.001	0.003	0.000	0.000	0.000	0.000	0.002	0.003	0.002	0.002	0.000	0.000	0.001	0.000	0.000	0.001	0.001											
Jun-94	0.004	0.028	0.036	0.030	0.022	0.014	0.008	0.008	0.002	0.002	0.000	0.010	0.003	0.001	0.001	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.010	0.041	0.045	0.037	0.019	0.010	0.003	0.000	0.003	0.006	0.003	0.002	0.000	0.005	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.004	0.034	0.050	0.031	0.015	0.005	0.004	0.008	0.006	0.006	0.005	0.003	0.000	0.001	0.001	0.000	0.000	0.000	0.003	0.002	0.006	0.003	0.000	0.000														
Jun-97	0.007	0.059	0.054	0.041	0.021	0.009	0.001	0.007	0.005	0.005	0.008	0.001	0.000	0.000	0.002	0.002	0.000	0.000	0.002	0.001	0.000	0.000	0.000															
Jun-98	0.017	0.037	0.048	0.028	0.018	0.011	0.005	0.007	0.001	0.000	0.000	0.009	0.005	0.005	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.011	0.020	0.047	0.034	0.016	0.010	0.012	0.008	0.003	0.008	0.002	0.003	0.000	0.000	0.003	0.005	0.000	0.000	0.000	0.001	0.001																	
Jun-00	0.005	0.038	0.028	0.020	0.015	0.010	0.014	0.008	0.004	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.003																		
Jun-01	0.003	0.016	0.027	0.016	0.015	0.017	0.008	0.012	0.004	0.001	0.000	0.000	0.002	0.000	0.000	0.000	0.002	0.000	0.000																			
Jun-02	0.002	0.009	0.022	0.025	0.028	0.020	0.013	0.012	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.001	0.009	0.036	0.030	0.020	0.017	0.005	0.003	0.000	0.004	0.003	0.002	0.000	0.000	0.000	0.002	0.005																					
Jun-04	0.002	0.006	0.020	0.034	0.031	0.020	0.006	0.009	0.004	0.000	0.000	0.001	0.000	0.000	0.001	0.000																						
Jun-05	0.000	0.006	0.031	0.051	0.024	0.011	0.010	0.008	0.007	0.000	0.000	0.001	0.000	0.001	0.000																							
Jun-06	0.000	0.013	0.033	0.058	0.021	0.019	0.016	0.004	0.001	0.001	0.008	0.002	0.000	0.001																								
Jun-07	0.002	0.020	0.041	0.032	0.019	0.009	0.007	0.012	0.007	0.003	0.000	0.000	0.000																									
Jun-08	0.001	0.027	0.029	0.037	0.030	0.014	0.025	0.007	0.006	0.000	0.004	0.002																										
Jun-09	0.010	0.013	0.029	0.030	0.019	0.019	0.012	0.014	0.003	0.002	0.005																											
Jun-10	0.000	0.022	0.030	0.035	0.034	0.021	0.019	0.007	0.005	0.001																												
Jun-11	0.010	0.015	0.032	0.025	0.035	0.013	0.011	0.006	0.006																													
Jun-12	0.000	0.014	0.023	0.051	0.027	0.020	0.008	0.004																														
Jun-13	0.004	0.013	0.025	0.048	0.031	0.005	0.011																															
Jun-14	0.003	0.009	0.045	0.034	0.024	0.018																																
Jun-15	0.000	0.009	0.034	0.024	0.025																																	
Jun-16	0.000	0.007	0.028	0.030																																		
Jun-17	0.001	0.018	0.020																																			
Jun-18	0.001	0.006																																				
Jun-19	0.000																																					

Averages		*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
Simple Avg																																						
All Yrs (ex P)	0.003	0.016	0.027	0.028	0.020	0.014	0.010	0.008	0.005	0.004	0.004	0.003	0.002	0.002	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000		
Latest 5	0.000	0.010	0.030	0.037	0.028	0.015	0.012	0.008	0.005	0.001	0.003	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 3	0.001	0.011	0.027	0.029	0.027	0.015	0.010	0.006	0.005	0.001	0.003	0.001	0.000	0.001	0.001	0.001	0.002	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	
Olympic Avg																																						
All Yrs (ex P)	0.002	0.015	0.027	0.028	0.020	0.014	0.010	0.008	0.005	0.004	0.004	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 10	0.001	0.012	0.029	0.034	0.026	0.015	0.012	0.007	0.004	0.001	0.002	0.001	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000										
Latest 5	0.000	0.008	0.029	0.037	0.028	0.017	0.011	0.007	0.006	0.001	0.003	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000					

Commonwealth of Massachusetts Workers Compensation
All Clusters Combined
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444	456
All Prior Yrs	0	0	0	0	0	0	12,000	58,500	89,500	109,500	293,500	408,500	546,500	1,097,484	1,691,484	2,010,268	2,165,768	2,195,768	2,558,601	2,928,269	3,283,267	3,355,517	3,501,017	3,702,517	3,820,557	3,848,557	3,926,682	3,926,682	3,926,682	3,934,182	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682
Jun-83	0	0	0	0	0	20,000	20,000	52,500	90,000	170,000	323,481	414,231	491,231	601,231	761,231	761,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	
Jun-84	0	0	0	0	25,750	58,250	168,850	347,287	466,787	700,437	904,637	1,151,138	1,199,138	1,301,139	1,351,139	1,381,139	1,418,639	1,503,639	1,548,639	1,548,639	1,548,639	1,632,639	1,632,639	1,642,639	1,642,639	1,642,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639		
Jun-85	0	0	0	98,476	133,976	260,476	407,031	608,281	991,681	1,557,514	1,894,714	2,088,214	2,382,764	2,422,764	2,422,764	2,556,264	2,676,264	2,706,264	2,741,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264			
Jun-86	0	0	58,000	174,759	387,859	534,203	871,131	1,698,030	2,285,025	2,295,025	2,442,025	2,462,025	2,548,025	2,585,525	2,585,525	2,585,525	2,585,525	2,615,525	2,670,525	2,734,525	2,750,525	2,795,525	2,853,800	3,091,601	3,091,601	3,289,601	3,291,601	3,303,601	3,303,601	3,303,601	3,303,601	3,303,601	3,303,601	3,303,601				
Jun-87	0	81,440	265,762	512,428	765,890	1,387,497	2,438,034	2,947,035	3,345,491	3,530,297	3,716,721	3,819,392	4,154,251	4,560,751	4,800,751	5,040,750	5,090,750	5,222,750	5,302,750	5,312,750	5,312,750	5,312,750	5,312,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,541,750	5,541,750	5,541,750					
Jun-88	0	106,671	307,099	725,599	1,562,083	3,135,525	4,328,025	5,039,408	5,888,408	6,261,808	6,567,134	6,808,641	7,137,104	7,137,104	7,197,014	7,197,014	7,388,681	7,453,681	7,539,014	7,639,015	7,729,015	7,879,016	7,879,016	7,937,017	7,999,017	8,057,017	8,057,017	8,057,017	8,057,017	8,057,017	8,207,017	8,207,017						
Jun-89	0	239,195	620,195	1,617,939	3,407,380	5,038,330	6,061,325	7,056,827	7,588,327	7,920,827	8,524,638	8,782,738	9,059,238	9,151,738	9,176,738	9,195,238	9,258,738	9,477,071	9,593,454	9,753,738	9,816,238	9,816,238	9,816,238	9,826,238	9,826,238	9,826,239	9,826,239	9,826,239	9,826,239	9,826,239	9,826,239							
Jun-90	0	254,094	1,459,232	3,268,528	4,586,480	5,647,235	6,632,785	7,625,785	8,035,319	8,473,619	8,839,131	9,247,964	9,288,797	9,334,797	9,365,797	9,390,797	9,496,797	9,606,922	9,736,798	9,764,298	9,797,631	9,830,965	9,864,298	9,864,298	10,048,798	10,079,298	10,079,298	10,079,298	10,079,298	10,079,298								
Jun-91	13,500	452,207	2,446,957	3,880,284	4,800,710	6,018,550	6,776,550	6,979,839	7,211,839	7,351,839	7,451,840	7,505,840	7,505,840	7,505,840	7,575,840	7,753,940	7,856,440	8,136,440	8,266,440	8,266,440	8,266,440	8,266,440	8,326,440	8,326,440	8,484,440	8,721,440	8,721,440	8,721,440	8,721,440									
Jun-92	66,000	896,673	1,479,789	2,233,286	3,072,036	3,607,537	3,902,037	4,123,537	4,305,037	4,483,037	4,685,720	4,716,970	4,730,470	4,852,738	4,886,106	4,906,973	5,233,473	5,340,473	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,460,474	5,460,474	5,460,474										
Jun-93	62,000	716,058	1,381,386	2,353,337	2,761,587	3,177,388	3,464,117	3,567,117	3,757,117	3,842,117	3,854,117	3,909,117	3,909,117	3,909,117	3,909,117	3,909,117	3,959,117	4,017,117	4,052,117	4,087,117	4,087,117	4,087,117	4,100,617	4,100,618	4,100,618	4,115,118	4,130,618											
Jun-94	90,000	769,356	1,632,582	2,348,106	2,873,483	3,206,984	3,406,484	3,607,984	3,655,484	3,695,534	3,695,534	3,930,034	4,001,034	4,026,034	4,051,034	4,171,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034												
Jun-95	219,963	1,108,065	2,085,265	2,882,589	3,282,359	3,507,959	3,574,959	3,584,959	3,655,584	3,790,459	3,848,859	3,883,859	3,883,859	3,995,859	4,038,359	4,050,859	4,050,859	4,050,859	4,050,859	4,050,859	4,050,859	4,050,860	4,050,860	4,050,860	4,050,860													
Jun-96	80,500	785,730	1,835,086	2,491,917	2,811,368	2,921,369	3,010,536	3,169,369	3,292,369	3,423,370	3,526,370	3,588,870	3,588,870	3,607,270	3,623,870	3,623,870	3,623,870	3,623,870	3,695,595	3,727,664	3,859,732	3,923,870	3,923,870	3,923,871														
Jun-97	134,365	1,319,116	2,393,116	3,213,299	3,635,799	3,808,050	3,824,050	3,964,650	4,071,151	4,180,152	4,347,152	4,364,152	4,364,152	4,364,152	4,404,152	4,444,152	4,444,152	4,444,152	4,474,152	4,501,152	4,501,152	4,501,152	4,501,152															
Jun-98	408,337	1,298,950	2,461,625	3,126,625	3,557,716	3,822,625	3,932,960	4,094,126	4,123,126	4,131,127	4,141,127	4,368,877	4,498,877	4,617,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877																
Jun-99	251,500	690,750	1,733,431	2,499,052	2,866,608	3,084,805	3,354,881	3,533,936	3,606,937	3,786,937	3,838,937	3,911,938	3,911,938	3,911,938	3,976,938	4,086,938	4,086,938	4,086,938	4,086,938	4,111,938	4,136,938																	
Jun-00	135,731	1,130,224	1,856,765	2,388,815	2,783,366	3,047,865	3,412,749	3,610,867	3,728,868	3,804,868	3,836,368	3,870,368	3,895,368	3,907,368	3,907,368	3,907,368	3,907,368	3,907,368	3,952,368	4,032,368																		
Jun-01	108,490	626,310	1,464,820	1,980,624	2,466,794	2,990,359	3,229,863	3,600,363	3,734,363	3,752,363	3,752,363	3,752,363	3,814,863	3,814,863	3,814,863	3,814,863	3,874,864	3,874,864	3,874,864																			
Jun-02	48,000	299,595	918,995	1,611,909	2,379,996	2,936,811	3,293,532	3,618,532	3,663,668	3,732,668	3,785,668	3,827,668	3,827,668	3,832,668	3,832,669	3,832,669	3,832,669	3,832,669																				
Jun-03	20,000	263,617	1,237,271	2,068,006	2,622,988	3,075,411	3,200,412	3,280,412	3,286,412	3,382,412	3,459,912	3,519,912	3,519,913	3,519,914	3,524,914	3,570,808	3,715,808																					
Jun-04	47,500	200,700	753,163	1,670,265	2,500,018	3,053,018	3,215,018	3,456,519	3,556,519	3,556,519	3,557,520	3,593,520	3,593,520	3,593,520	3,633,520	3,633,520																						
Jun-05	6,157	177,260	1,017,627	2,377,229	3,026,952	3,327,952	3,598,952	3,815,953	4,010,153	4,010,153	4,010,153	4,030,153	4,030,153	4,067,653	4,067,653																							
Jun-06	0	307,301	1,079,755	2,432,756	2,916,929	3,362,429	3,725,429	3,828,429	3,848,129	3,863,429	4,040,429	4,090,429	4,090,429	4,107,929																								
Jun-07	36,000	487,583	1,402,335	2,106,086	2,522,088	2,715,090	2,864,532	3,139,534	3,288,317	3,364,817	3,364,817	3,364,817	3,364,817																									
Jun-08	17,730	746,231	1,520,880	2,499,880	3,295,130	3,667,592	4,347,463	4,545,798	4,694,691	4,694,691	4,799,691	4,840,691																										
Jun-09	285,000	647,500	1,431,267	2,239,268	2,761,944	3,286,444	3,600,945	3,974,635	4,049,635	4,114,636	4,242,636																											
Jun-10	0	601,092	1,398,471	2,345,079	3,267,878	3,822,184	4,333,685	4,526,185	4,662,435	4,681,185																												
Jun-11	315,691	777,684	1,803,911	2,603,240	3,718,269	4,124,269	4,473,771	4,661,771	4,854,771																													
Jun-12	0	441,786	1,184,114	2,805,204	3,673,666	4,314,068	4,578,171	4,716,671																														
Jun-13	113,000	484,012	1,180,271	2,517,932	3,389,110	3,534,735	3,857,735																															
Jun-14	102,000	403,628	1,973,530	3,161,396	4,003,126	4,651,328																																
Jun-15	0	377,841	1,754,831	2,717,376	3,704,876																																	
Jun-16	21,500	340,202	1,601,133	2,949,448																																		
Jun-17	37,200	835,300	1,723,300																																			
Jun-18	46,368	337,072																																				
Jun-19	3,000																																					

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
All Prior Yrs							4.875	1.530	1.223	2.680	1.392	1.338	2.008	1.541	1.188	1.077	1.014	1.165	1.144	1.121	1.022	1.043	1.058	1.032	1.007	1.020	1.000	1.000	1.002	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83						1.000	2.625	1.714	1.889	1.903	1.281	1.186	1.224	1.266	1.000	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84					2.262	2.899	2.057	1.344	1.501	1.292	1.272	1.042	1.085	1.038	1.022	1.027	1.060	1.030	1.000	1.000	1.054	1.000	1.006	1.000	1.000	1.091	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85				1.360	1.944	1.563	1.494	1.630	1.571	1.216	1.102	1.141	1.017	1.000	1.055	1.047	1.011	1.013	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.009	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86			3.013	2.219	1.377	1.631	1.949	1.346	1.004	1.064	1.008	1.035	1.015	1.000	1.000	1.000	1.012	1.021	1.024	1.006	1.016	1.021	1.083	1.000	1.000	1.064	1.001	1.004	1.000	1.000	1.000	1.000	1.000					
Jun-87		3.263	1.928	1.495	1.812	1.757	1.209	1.135	1.055	1.053	1.028	1.088	1.098	1.053	1.050	1.010	1.026	1.015	1.002	1.000	1.000	1.000	1.025	1.000	1.000	1.000	1.000	1.000	1.000	1.017	1.000	1.000						
Jun-88		2.879	2.363	2.153	2.007	1.380	1.164	1.168	1.063	1.049	1.037	1.048	1.000	1.008	1.000	1.027	1.009	1.011	1.013	1.012	1.019	1.000	1.007	1.008	1.007	1.000	1.000	1.000	1.000	1.019	1.000							
Jun-89		2.593	2.609	2.106	1.479	1.203	1.164	1.075	1.044	1.076	1.030	1.031	1.010	1.003	1.002	1.007	1.024	1.012	1.017	1.006	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-90		5.743	2.240	1.403	1.231	1.175	1.150	1.054	1.055	1.043	1.046	1.004	1.005	1.003	1.003	1.011	1.012	1.014	1.003	1.003	1.003	1.003	1.000	1.019	1.003	1.000	1.000	1.000	1.000									
Jun-91	33.497	5.411	1.586	1.237	1.254	1.126	1.030	1.033	1.019	1.014	1.007	1.000	1.000	1.009	1.024	1.013	1.036	1.016	1.000	1.000	1.000	1.007	1.000	1.019	1.028	1.000	1.000	1.000										
Jun-92	13.586	1.650	1.509	1.376	1.174	1.082	1.057	1.044	1.041	1.045	1.007	1.003	1.026	1.007	1.004	1.067	1.020	1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.007	1.000	1.000											
Jun-93	11.549	1.929	1.704	1.173	1.151	1.090	1.030	1.053	1.023	1.003	1.014	1.000	1.000	1.000	1.000	1.013	1.015	1.009	1.009	1.000	1.000	1.003	1.000	1.000	1.004	1.004												
Jun-94	8.548	2.122	1.438	1.224	1.116	1.062	1.059	1.013	1.011	1.000	1.063	1.018	1.006	1.006	1.030	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95	5.038	1.882	1.382	1.139	1.069	1.019	1.003	1.020	1.037	1.015	1.009	1.000	1.029	1.011	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96	9.761	2.336	1.358	1.128	1.039	1.031	1.053	1.039	1.040	1.030	1.018	1.000	1.005	1.005	1.000	1.000	1.000	1.020	1.009	1.035	1.017	1.000	1.000															
Jun-97	9.817	1.814	1.343	1.131	1.047	1.004	1.037	1.027	1.027	1.040	1.004	1.000	1.000	1.009	1.009	1.000	1.000	1.007	1.006	1.000	1.000	1.000																
Jun-98	3.181	1.895	1.270	1.138	1.074	1.029	1.041	1.007	1.002	1.002	1.055	1.030	1.026	1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99	2.747	2.509	1.442	1.147	1.076	1.088	1.053	1.021	1.050	1.014	1.019	1.000	1.000	1.017	1.028	1.000	1.000	1.000	1.006	1.006																		
Jun-00	8.327	1.643	1.287	1.165	1.095	1.120	1.058	1.033	1.020	1.008	1.009	1.006	1.003	1.000	1.000	1.000	1.000	1.012	1.020																			
Jun-01	5.773	2.339	1.352	1.245	1.212	1.080	1.115	1.037	1.005	1.000	1.000	1.017	1.000	1.000	1.000	1.016	1.000	1.000																				
Jun-02	6.242	3.067	1.754	1.477	1.234	1.121	1.099	1.012	1.019	1.014	1.011	1.000	1.001	1.000	1.000	1.000	1.000																					
Jun-03	13.181	4.693	1.671	1.268	1.172	1.041	1.025	1.002	1.029	1.023	1.017	1.000	1.000	1.001	1.013	1.041																						
Jun-04	4.225	3.753	2.218	1.497	1.221	1.053	1.075	1.029	1.000	1.000	1.010	1.000	1.000	1.011	1.000																							
Jun-05	28.790	5.741	2.336	1.273	1.099	1.081	1.060	1.051	1.000	1.000	1.005	1.000	1.009	1.000																								
Jun-06		3.514	2.253	1.199	1.153	1.108	1.028	1.005	1.004	1.046	1.012	1.000	1.004																									
Jun-07	13.544	2.876	1.502	1.198	1.077	1.055	1.096	1.047	1.023	1.000	1.000	1.000																										
Jun-08	42.089	2.038	1.644	1.318	1.113	1.185	1.046	1.033	1.000	1.022	1.009																											
Jun-09	2.272	2.210	1.565	1.233	1.190	1.096	1.104	1.019	1.016	1.031																												
Jun-10		2.327	1.677	1.394	1.170	1.134	1.044	1.030	1.004																													
Jun-11	2.463	2.320	1.443	1.428	1.109	1.085	1.042	1.041																														
Jun-12		2.680	2.369	1.310	1.174	1.061	1.030																															
Jun-13	4.283	2.439	2.133	1.346	1.043	1.091																																
Jun-14	3.957	4.889	1.602	1.266	1.162																																	
Jun-15		4.644	1.549	1.363																																		
Jun-16	15.823	4.706	1.842																																			
Jun-17	22.454	2.063																																				
Jun-18	7.269																																					

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
Simple Avg																																						
All Yrs (ex P)	11.601	3.031	1.786	1.368	1.269	1.208	1.200	1.106	1.091	1.074	1.041	1.026	1.023	1.020	1.011	1.014	1.011	1.010	1.007	1.004	1.007	1.002	1.009	1.003	1.009	1.009	1.000	1.001	1.000	1.005	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5	12.376	3.748	1.899	1.343	1.132	1.093	1.053	1.034	1.009	1.020	1.007	1.000	1.003	1.003	1.003	1.011	1.000	1.004	1.008	1.008	1.003	1.001	1.000	1.004	1.008	1.001	1.000	1.000	1.000	1.007	1.000	1.000						
Latest 3	15.182	3.805	1.664	1.325	1.126	1.079	1.039	1.030	1.007	1.018	1.007	1.000	1.005	1.004	1.004	1.019	1.000	1.004	1.009	1.002	1.006	1.000	1.000	1.000	1.004	1.001	1.000	1.000	1.000	1.012	1.000	1.000	1.000	1.000				
Volume Wtd																																						
All Yrs (ex P)	6.827	2.545	1.644	1.299	1.178	1.118	1.084	1.053	1.034	1.033	1.025	1.017	1.013	1.010	1.010	1.013	1.012	1.010	1.007	1.004	1.005	1.002	1.006	1.006	1.009	1.003	1.000	1.000	1.000	1.008	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5	11.079	3.373	1.839	1.339	1.133	1.092	1.051	1.034	1.009	1.020	1.007	1.000	1.003	1.002	1.002	1.011	1.000	1.004	1.008	1.007	1.003	1.001	1.000	1.006	1.010	1.000	1.000	1.000	1.000	1.008	1.000	1.000	1.000					
Latest 3	14.396	3.270	1.656	1.322	1.130	1.078	1.039	1.031	1.006	1.019	1.007	1.000	1.005	1.004	1.004	1.018	1.000	1.004	1.008	1.002	1.005	1.000	1.000	1.000	1.004	1.001	1.000	1.000	1.000	1.010	1.000	1.000	1.000	1.000				

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	1.0%	0.0%	0.2%	0.1%	1.000	1.000
444	99.0%	2.8%	1.0%	0.7%	0.3%	0.981	0.971
432	96.2%	-1.9%	3.8%	-0.5%	-0.2%	0.970	0.956
420	98.1%	0.1%	1.9%	0.0%	0.0%	0.884	0.831
408	98.0%	0.2%	2.0%	0.1%	0.0%	0.857	0.794
396	97.8%	0.5%	2.2%	0.1%	0.1%	0.841	0.774
384	97.3%	0.6%	2.7%	0.2%	0.1%	0.841	0.775
372	96.7%	0.4%	3.3%	0.1%	0.1%	0.838	0.771
360	96.3%	0.6%	3.7%	0.2%	0.1%	0.826	0.756
348	95.7%	0.6%	4.3%	0.2%	0.1%	0.819	0.748
336	95.1%	1.3%	4.9%	0.5%	0.3%	0.810	0.737
324	93.8%	0.5%	6.2%	0.2%	0.1%	0.822	0.755
312	93.3%	0.5%	6.7%	0.2%	0.1%	0.804	0.730
300	92.9%	1.2%	7.1%	0.4%	0.3%	0.787	0.707
288	91.7%	0.8%	8.3%	0.3%	0.2%	0.788	0.710
276	91.0%	-0.2%	9.0%	-0.1%	0.0%	0.776	0.695
264	91.1%	1.7%	8.9%	0.7%	0.5%	0.742	0.650
252	89.4%	1.3%	10.6%	0.6%	0.4%	0.756	0.670
240	88.2%	0.1%	11.8%	0.0%	0.0%	0.754	0.668
228	88.1%	0.9%	11.9%	0.5%	0.3%	0.727	0.633
216	87.1%	0.7%	12.9%	0.4%	0.3%	0.720	0.625
204	86.4%	1.0%	13.6%	0.5%	0.4%	0.707	0.609
192	85.4%	1.5%	14.6%	0.8%	0.6%	0.700	0.602
180	83.9%	1.2%	16.1%	0.7%	0.5%	0.703	0.606
168	82.7%	1.3%	17.3%	0.8%	0.6%	0.697	0.599
156	81.4%	2.3%	18.6%	1.4%	1.1%	0.692	0.595
144	79.1%	1.4%	20.9%	0.9%	0.7%	0.700	0.606
132	77.7%	1.9%	22.3%	1.2%	1.0%	0.692	0.597
120	75.8%	1.8%	24.2%	1.2%	1.0%	0.690	0.594
108	74.0%	2.5%	26.0%	1.8%	1.6%	0.685	0.589
96	71.5%	2.0%	28.5%	1.5%	1.3%	0.688	0.593
84	69.5%	3.3%	30.5%	2.6%	2.3%	0.682	0.587
72	66.1%	3.4%	33.9%	2.7%	2.5%	0.688	0.594
60	62.8%	5.6%	37.2%	4.7%	4.3%	0.690	0.598
48	57.2%	8.1%	42.8%	7.1%	6.6%	0.705	0.617
36	49.1%	13.2%	50.9%	12.0%	11.5%	0.726	0.644
24	35.8%	18.5%	64.2%	17.5%	17.0%	0.757	0.683
12	17.3%	17.3%	82.7%	16.9%	16.8%	0.784	0.717
Total		100.0%					

NOTES:
(2) = 1 / Section 1, Exhibit 1, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	7,994,129	11,476,155		7,047,051	10,117,953
6/30/82-83	119,179	224,645	0.981	116,865	220,282
6/30/83-84	689,354	934,818	0.970	655,868	888,654
6/30/84-85	374,372	705,752	0.884	343,975	650,675
6/30/85-86	441,656	756,646	0.857	394,020	675,752
6/30/86-87	459,690	731,592	0.841	399,865	637,027
6/30/87-88	1,631,512	2,546,389	0.841	1,417,911	2,200,760
6/30/88-89	1,879,457	2,751,923	0.838	1,609,588	2,350,391
6/30/89-90	1,953,108	2,755,758	0.826	1,647,096	2,324,271
6/30/90-91	1,378,914	2,123,652	0.819	1,158,473	1,781,306
6/30/91-92	1,170,434	2,143,665	0.810	985,594	1,807,821
6/30/92-93	1,126,709	1,293,668	0.822	933,267	1,076,243
6/30/93-94	1,397,464	1,943,583	0.804	1,146,236	1,605,522
6/30/94-95	1,240,461	2,006,188	0.787	1,018,759	1,649,758
6/30/95-96	1,543,679	2,319,808	0.788	1,258,004	1,888,236
6/30/96-97	1,537,339	2,334,138	0.776	1,235,592	1,875,743
6/30/97-98	1,386,716	2,261,745	0.742	1,100,095	1,788,012
6/30/98-99	1,879,996	2,682,225	0.756	1,465,574	2,100,231
6/30/99-00	2,433,315	3,364,827	0.754	1,871,784	2,586,095
6/30/00-01	2,917,625	3,819,756	0.727	2,201,520	2,877,156
6/30/01-02	2,752,337	4,040,139	0.720	2,046,025	3,005,824
6/30/02-03	3,276,777	4,550,988	0.707	2,383,986	3,327,571
6/30/03-04	3,373,154	4,260,368	0.700	2,413,286	3,036,672
6/30/04-05	2,891,009	3,939,398	0.703	2,028,187	2,769,877
6/30/05-06	3,648,211	4,229,762	0.697	2,549,883	2,980,164
6/30/06-07	3,704,552	4,790,676	0.692	2,558,457	3,325,437
6/30/07-08	4,964,942	6,141,698	0.700	3,415,803	4,223,300
6/30/08-09	5,817,218	6,822,406	0.692	3,924,844	4,626,455
6/30/09-10	6,354,788	7,634,069	0.690	4,262,908	5,191,049
6/30/10-11	7,718,251	9,204,785	0.685	5,157,985	6,178,443
6/30/11-12	8,991,530	10,560,859	0.688	5,989,930	7,060,932
6/30/12-13	9,621,181	11,450,231	0.682	6,409,050	7,645,158
6/30/13-14	12,357,457	14,587,927	0.688	8,293,188	9,817,504
6/30/14-15	16,251,807	18,650,567	0.690	11,049,032	12,713,515
6/30/15-16	20,980,791	24,062,811	0.705	14,587,867	16,745,558
6/30/16-17	25,202,989	28,127,779	0.726	18,157,104	20,320,579
6/30/17-18	32,926,876	35,507,046	0.757	24,601,299	26,569,643
6/30/18-19	42,458,510	50,168,290	0.784	33,102,231	39,098,094
Total	246,847,489	297,906,734		180,938,202	219,737,660
			(7) Total Discount Factor:	0.733	0.738

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	7,994,129	11,476,155
(9) Projected Number of Years:	1	1
(10) Projected Paid Loss per Year:	7,994,129	11,476,155
(11) Discounted Value at 4%:	34	34

NOTES:
(2), (3) From Section 1, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 1, Exhibit 1, Page 13, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	7,994,129	11,476,155		6,643,820	9,539,676
6/30/82-83	119,179	224,645	0.981	115,757	218,194
6/30/83-84	689,354	934,818	0.970	640,260	867,142
6/30/84-85	374,372	705,752	0.884	330,200	625,685
6/30/85-86	441,656	756,646	0.857	372,992	640,029
6/30/86-87	459,690	731,592	0.841	374,100	596,283
6/30/87-88	1,631,512	2,546,389	0.841	1,327,187	2,054,499
6/30/88-89	1,879,457	2,751,923	0.838	1,497,118	2,183,670
6/30/89-90	1,953,108	2,755,758	0.826	1,522,220	2,148,562
6/30/90-91	1,378,914	2,123,652	0.819	1,070,448	1,644,613
6/30/91-92	1,170,434	2,143,665	0.810	912,411	1,675,003
6/30/92-93	1,126,709	1,293,668	0.822	857,760	991,290
6/30/93-94	1,397,464	1,943,583	0.804	1,049,338	1,474,717
6/30/94-95	1,240,461	2,006,188	0.787	933,877	1,512,990
6/30/95-96	1,543,679	2,319,808	0.788	1,149,488	1,724,313
6/30/96-97	1,537,339	2,334,138	0.776	1,122,278	1,703,422
6/30/97-98	1,386,716	2,261,745	0.742	993,455	1,612,781
6/30/98-99	1,879,996	2,682,225	0.756	1,314,275	1,887,356
6/30/99-00	2,433,315	3,364,827	0.754	1,668,935	2,304,968
6/30/00-01	2,917,625	3,819,756	0.727	1,947,071	2,542,510
6/30/01-02	2,752,337	4,040,139	0.720	1,798,023	2,642,220
6/30/02-03	3,276,777	4,550,988	0.707	2,075,910	2,903,206
6/30/03-04	3,373,154	4,260,368	0.700	2,087,689	2,622,640
6/30/04-05	2,891,009	3,939,398	0.703	1,740,840	2,380,179
6/30/05-06	3,648,211	4,229,762	0.697	2,189,174	2,567,950
6/30/06-07	3,704,552	4,790,676	0.692	2,187,030	2,848,844
6/30/07-08	4,964,942	6,141,698	0.700	2,917,692	3,607,183
6/30/08-09	5,817,218	6,822,406	0.692	3,330,322	3,933,973
6/30/09-10	6,354,788	7,634,069	0.690	3,614,186	4,426,617
6/30/10-11	7,718,251	9,204,785	0.685	4,373,862	5,248,953
6/30/11-12	8,991,530	10,560,859	0.688	5,079,202	5,997,099
6/30/12-13	9,621,181	11,450,231	0.682	5,447,556	6,503,534
6/30/13-14	12,357,457	14,587,927	0.688	7,086,431	8,398,509
6/30/14-15	16,251,807	18,650,567	0.690	9,513,803	10,959,393
6/30/15-16	20,980,791	24,062,811	0.705	12,704,852	14,596,188
6/30/16-17	25,202,989	28,127,779	0.726	16,072,958	18,009,061
6/30/17-18	32,926,876	35,507,046	0.757	22,113,276	23,894,618
6/30/18-19	42,458,510	50,168,290	0.784	30,251,067	35,722,561
Total	246,847,489	297,906,734		160,426,865	195,210,431
			(7) Total Discount Factor:	0.650	0.655

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	7,994,129	11,476,155
(9) Projected Number of Years:	1	1
(10) Projected Paid Loss per Year:	7,994,129	11,476,155
(11) Discounted Value at 6%:	34	34

NOTES:
(2), (3) From Section 1, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 1, Exhibit 1, Page 13, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/19 - 20 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/19 - 06/30/20	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/19 - 06/30/20		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	117,584,758	121,379,336	108,970,045	8,614,712	12,409,290				759,928	835,920	8.8%	6.7%
6/30/82-83	18,579,242	18,701,663	18,454,798	124,445	246,866	99.0%	0.4%	42.3%	52,603	94,887	42.3%	38.4%
6/30/83-84	27,703,332	28,004,297	27,001,439	701,893	1,002,858	96.9%	1.1%	35.3%	247,623	405,087	35.3%	40.4%
6/30/84-85	42,235,481	42,616,095	41,839,799	395,682	776,296	98.6%	0.9%	65.9%	260,912	478,380	65.9%	61.6%
6/30/85-86	54,832,259	55,211,712	54,331,175	501,084	880,537	98.7%	0.8%	60.1%	301,374	506,693	60.1%	57.5%
6/30/86-87	62,724,586	63,031,490	62,204,282	520,304	827,208	98.9%	0.7%	66.4%	345,459	541,162	66.4%	65.4%
6/30/87-88	90,809,789	91,787,947	89,066,200	1,743,589	2,721,747	97.6%	0.8%	31.9%	556,263	953,223	31.9%	35.0%
6/30/88-89	89,287,084	90,278,274	87,233,675	2,053,409	3,044,599	97.2%	0.9%	32.6%	669,605	1,059,694	32.6%	34.8%
6/30/89-90	85,038,827	85,920,087	82,908,505	2,130,321	3,011,581	97.0%	0.8%	26.6%	566,006	833,794	26.6%	27.7%
6/30/90-91	71,881,974	72,844,434	70,263,483	1,618,491	2,580,951	97.1%	0.6%	19.5%	315,304	504,343	19.5%	19.5%
6/30/91-92	49,940,755	51,117,501	48,584,209	1,356,546	2,533,292	96.2%	1.1%	27.8%	376,953	717,982	27.8%	28.3%
6/30/92-93	32,868,511	33,119,560	31,578,811	1,289,700	1,540,749	95.7%	1.2%	27.3%	351,903	435,240	27.3%	28.2%
6/30/93-94	36,667,524	37,314,803	35,063,800	1,603,724	2,251,003	94.8%	1.1%	21.3%	342,347	486,881	21.3%	21.6%
6/30/94-95	32,984,438	33,839,910	31,535,729	1,448,709	2,304,181	94.4%	1.0%	18.5%	268,678	490,227	18.5%	21.3%
6/30/95-96	31,929,687	32,781,718	30,162,684	1,767,002	2,619,033	93.2%	1.1%	16.1%	284,697	474,641	16.1%	18.1%
6/30/96-97	32,110,879	32,988,063	30,276,233	1,834,646	2,711,830	93.0%	0.6%	7.9%	145,217	282,001	7.9%	10.4%
6/30/97-98	35,283,793	36,248,042	33,581,494	1,702,299	2,666,547	93.9%	0.7%	11.2%	190,009	366,811	11.2%	13.8%
6/30/98-99	33,855,504	34,743,773	31,584,953	2,270,551	3,158,819	92.1%	1.0%	13.0%	295,328	404,367	13.0%	12.8%
6/30/99-00	38,877,053	39,965,215	35,929,067	2,947,986	4,036,147	91.1%	1.2%	13.7%	405,243	555,749	13.7%	13.8%
6/30/00-01	45,979,911	47,075,483	42,311,437	3,668,474	4,764,046	90.9%	1.4%	15.1%	553,488	727,682	15.1%	15.3%
6/30/01-02	39,398,661	40,810,643	36,000,221	3,398,440	4,810,422	89.8%	1.8%	17.8%	605,223	840,059	17.8%	17.5%
6/30/02-03	40,546,580	41,975,430	36,462,111	4,084,469	5,513,319	88.4%	1.3%	11.1%	453,555	601,963	11.1%	10.9%
6/30/03-04	39,994,077	41,053,460	35,721,234	4,272,843	5,332,226	88.1%	1.5%	12.8%	548,155	715,510	12.8%	13.4%
6/30/04-05	41,066,311	42,647,800	37,300,511	3,765,800	5,347,289	89.1%	1.5%	14.1%	530,807	816,204	14.1%	15.3%
6/30/05-06	37,430,949	38,563,900	32,772,012	4,658,937	5,791,888	86.2%	2.0%	14.4%	668,566	853,031	14.4%	14.7%
6/30/06-07	36,337,597	38,161,570	31,458,862	4,878,735	6,702,708	84.5%	1.8%	11.7%	571,164	782,815	11.7%	11.7%
6/30/07-08	41,870,790	43,622,016	35,564,613	6,306,177	8,057,403	83.2%	1.4%	8.2%	516,453	722,823	8.2%	9.0%
6/30/08-09	43,155,340	44,841,328	35,816,527	7,338,813	9,024,801	81.4%	2.0%	10.8%	789,260	1,017,545	10.8%	11.3%
6/30/09-10	42,361,650	44,288,611	34,404,343	7,957,307	9,884,268	79.4%	2.0%	9.8%	780,362	1,029,076	9.8%	10.4%
6/30/10-11	48,459,870	50,774,874	38,893,279	9,566,591	11,881,595	78.4%	1.7%	7.9%	758,727	1,023,025	7.9%	8.6%
6/30/11-12	48,664,880	50,857,379	37,455,165	11,209,715	13,402,214	75.3%	2.7%	10.9%	1,223,974	1,513,297	10.9%	11.3%
6/30/12-13	43,761,490	46,398,050	31,903,961	11,857,529	14,494,089	70.8%	4.4%	15.2%	1,800,352	2,184,273	15.2%	15.1%
6/30/13-14	52,384,270	55,667,100	37,183,363	15,200,907	18,483,737	68.8%	2.3%	7.4%	1,127,714	1,434,225	7.4%	7.8%
6/30/14-15	58,831,360	62,357,620	38,916,901	19,914,459	23,440,719	64.2%	4.9%	13.8%	2,746,187	3,260,261	13.8%	13.9%
6/30/15-16	64,478,820	68,893,290	39,116,785	25,362,035	29,776,505	58.7%	5.4%	13.1%	3,326,957	3,933,287	13.1%	13.2%
6/30/16-17	63,479,850	67,973,570	33,021,154	30,458,696	34,952,416	50.2%	8.3%	16.8%	5,107,993	5,836,880	16.8%	16.7%
6/30/17-18	63,798,330	67,800,760	23,908,703	39,889,627	43,892,057	36.3%	12.9%	20.2%	8,064,685	8,893,941	20.2%	20.3%
6/30/18-19	65,256,220	74,803,780	11,152,622	54,103,598	63,651,158	15.9%	20.2%	24.0%	13,010,852	15,344,122	24.0%	24.1%
Total	1,902,452,429	1,970,460,582	1,599,934,184	302,518,245	370,526,398				49,919,928	61,957,099	16.5%	16.7%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)
(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)
(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)
(5) = (2) - (4)
(6) = (3) - (4)
(7) = (4) / Average of Columns (2), (3)
(8) = (7) - Prior Year's (7)
(9) = (8) / (1.00 - (7))
(10), (11) Sum of Columns (10), (11) for all clusters
(12) = (10) / (5)
(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		6,928,042			7,285,250	7,562,409	357,207	634,367		
6/30/82-83		1,243,549	1,248,063		1,245,221	1,261,298	1,671	17,748		
6/30/83-84		3,270,663	3,286,619		3,279,233	3,331,832	8,570	61,170		
6/30/84-85	1,823,085	3,299,106	3,320,759	3,317,772	3,308,365	3,355,680	9,259	56,574	0.181	0.184
6/30/85-86	1,952,445	4,968,499	5,004,247	5,003,465	4,995,676	5,027,662	27,176	59,162	0.256	0.258
6/30/86-87	2,220,820	5,815,494	5,863,515	5,864,661	5,855,245	5,885,246	39,751	69,752	0.264	0.265
6/30/87-88	2,885,583	10,004,344	10,110,913	10,112,242	10,089,580	10,149,860	85,236	145,516	0.350	0.352
6/30/88-89	3,098,180	12,147,601	12,295,637	12,297,778	12,295,000	12,410,724	147,399	263,123	0.397	0.401
6/30/89-90	3,079,763	12,621,066	12,809,210	12,817,234	12,789,000	12,857,610	167,934	236,544	0.415	0.417
6/30/90-91	2,914,364	12,088,540	12,311,981	12,310,533	12,308,049	12,500,770	219,509	412,230	0.422	0.429
6/30/91-92	2,880,434	10,919,282	11,128,045	11,125,631	11,084,933	11,262,448	165,650	343,166	0.385	0.391
6/30/92-93	2,887,238	7,966,961	8,144,318	8,141,947	8,127,937	8,196,648	160,977	229,687	0.282	0.284
6/30/93-94	3,056,850	8,455,066	8,671,266	8,667,453	8,660,524	8,733,684	205,459	278,618	0.283	0.286
6/30/94-95	3,158,808	7,018,105	7,229,465	7,226,123	7,221,213	7,284,012	203,108	265,907	0.229	0.231
6/30/95-96	3,301,791	6,599,559	6,821,943	6,819,076	6,819,043	6,873,386	219,484	273,827	0.207	0.208
6/30/96-97	3,902,868	7,301,398	7,597,450	7,593,476	7,595,112	7,656,376	293,714	354,979	0.195	0.196
6/30/97-98	3,776,138	6,747,657	7,070,930	7,066,289	7,062,000	7,133,220	314,343	385,563	0.187	0.189
6/30/98-99	4,017,530	7,042,173	7,442,825	7,436,770	7,431,000	7,495,340	388,827	453,167	0.185	0.187
6/30/99-00	4,221,786	7,910,764	8,440,571	8,427,994	8,422,730	8,531,380	511,966	620,616	0.200	0.202
6/30/00-01	4,310,725	9,723,734	10,450,294	10,425,064	10,415,120	10,604,560	691,386	880,826	0.242	0.246
6/30/01-02	4,438,755	7,845,832	8,487,651	8,480,212	8,474,000	8,598,180	628,168	752,348	0.191	0.194
6/30/02-03	4,423,888	8,504,781	9,323,894	9,308,289	9,280,790	9,436,100	776,009	931,319	0.210	0.213
6/30/03-04	4,482,207	8,844,092	9,786,349	9,770,927	9,734,030	9,905,200	889,938	1,061,108	0.217	0.221
6/30/04-05	4,639,517	10,342,829	11,738,304	11,316,178	11,191,700	11,724,800	848,871	1,381,971	0.241	0.253
6/30/05-06	4,938,165	9,319,041	10,615,918	10,467,473	10,321,500	10,853,900	1,002,459	1,534,859	0.209	0.220
6/30/06-07	5,183,126	9,927,458	11,600,353	11,283,167	11,084,170	11,813,020	1,156,712	1,885,562	0.214	0.228
6/30/07-08	5,508,425	9,539,821	11,165,889	11,167,443	10,877,340	11,434,810	1,337,519	1,894,989	0.197	0.208
6/30/08-09	5,447,676	10,164,889	12,037,567	11,868,341	11,659,700	12,347,500	1,494,811	2,182,611	0.214	0.227
6/30/09-10	5,525,579	9,034,429	10,835,439	10,929,046	10,620,970	11,278,650	1,586,541	2,244,221	0.192	0.204
6/30/10-11	5,712,303	9,955,971	12,198,180	12,092,474	11,761,780	12,588,250	1,805,809	2,632,279	0.206	0.220
6/30/11-12	5,880,714	9,388,935	11,734,632	11,810,486	11,566,080	12,178,250	2,177,145	2,789,315	0.197	0.207
6/30/12-13	6,162,621	8,259,792	10,591,917	11,096,094	10,460,540	11,292,250	2,200,748	3,032,458	0.170	0.183
6/30/13-14	6,442,136	9,185,405	12,166,920	12,541,671	12,041,740	13,047,000	2,856,335	3,861,595	0.187	0.203
6/30/14-15	6,758,892	9,620,080	13,277,896	13,582,081	13,130,820	14,147,170	3,510,740	4,527,090	0.194	0.209
6/30/15-16	6,843,054	9,944,966	14,451,226	14,521,525	14,020,440	15,199,690	4,075,474	5,254,724	0.205	0.222
6/30/16-17	6,638,078	9,008,888	14,567,478	14,331,733	13,833,440	15,286,970	4,824,552	6,278,082	0.208	0.230
6/30/17-18	6,709,926	7,284,310	14,380,195	14,366,465	13,779,500	15,241,760	6,495,190	7,957,450	0.205	0.227
6/30/18-19	7,024,786	3,275,623	14,483,158	15,065,025	14,152,000	16,147,630	10,876,377	12,872,007	0.201	0.230
Total	156,248,254	311,518,744	362,691,018	358,652,138	364,280,770	380,635,273	52,762,025	69,116,529		
Tot 6/30/84-19	156,248,254	300,076,490	358,156,336	358,652,138	352,471,066	368,479,734	52,394,576	68,403,244	0.226	0.236

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 1, Exhibit 2, Page 2, Column 3
(4) From Section 1, Exhibit 2, Page 2, Column 8
(5) From Section 1, Exhibit 2, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim
All Prior Yrs		6,928,042							11	4	
6/30/82-83		1,243,549	1.004	N/A	1,248,063	N/A	1,248,063		1	0	
6/30/83-84		3,270,663	1.005	N/A	3,286,619	N/A	3,286,619		3	2	7,978
6/30/84-85	1,823,085	3,299,106	1.007	N/A	3,320,759	N/A	3,320,759	0.182	3	2	10,827
6/30/85-86	1,952,445	4,968,499	1.007	N/A	5,004,247	N/A	5,004,247	0.256	1	1	35,748
6/30/86-87	2,220,820	5,815,494	1.008	N/A	5,863,515	N/A	5,863,515	0.264	3	2	24,011
6/30/87-88	2,885,583	10,004,344	1.011	N/A	10,110,913	N/A	10,110,913	0.350	7	8	13,321
6/30/88-89	3,098,180	12,147,601	1.012	N/A	12,295,637	N/A	12,295,637	0.397	9	6	24,673
6/30/89-90	3,079,763	12,621,066	1.015	N/A	12,809,210	N/A	12,809,210	0.416	7	5	37,629
6/30/90-91	2,914,364	12,088,540	1.018	N/A	12,311,981	N/A	12,311,981	0.422	15	12	18,620
6/30/91-92	2,880,434	10,919,282	1.019	N/A	11,128,045	N/A	11,128,045	0.386	11	8	26,095
6/30/92-93	2,887,238	7,966,961	1.022	N/A	8,144,318	N/A	8,144,318	0.282	5	5	35,471
6/30/93-94	3,056,850	8,455,066	1.026	N/A	8,671,266	N/A	8,671,266	0.284	14	16	13,513
6/30/94-95	3,158,808	7,018,105	1.030	N/A	7,229,465	N/A	7,229,465	0.229	13	12	17,613
6/30/95-96	3,301,791	6,599,559	1.034	N/A	6,821,943	N/A	6,821,943	0.207	4	4	55,596
6/30/96-97	3,902,868	7,301,398	1.041	N/A	7,597,450	N/A	7,597,450	0.195	11	12	24,671
6/30/97-98	3,776,138	6,747,657	1.048	N/A	7,070,930	N/A	7,070,930	0.187	9	7	46,182
6/30/98-99	4,017,530	7,042,173	1.057	N/A	7,442,825	N/A	7,442,825	0.185	14	15	26,710
6/30/99-00	4,221,786	7,910,764	1.067	N/A	8,440,571	N/A	8,440,571	0.200	18	14	37,843
6/30/00-01	4,310,725	9,723,734	1.075	N/A	10,450,294	N/A	10,450,294	0.242	14	14	51,897
6/30/01-02	4,438,755	7,845,832	1.082	N/A	8,487,651	N/A	8,487,651	0.191	19	21	30,563
6/30/02-03	4,423,888	8,504,781	1.096	N/A	9,323,894	N/A	9,323,894	0.211	21	17	48,183
6/30/03-04	4,482,207	8,844,092	1.107	N/A	9,786,349	N/A	9,786,349	0.218	28	24	39,261
6/30/04-05	4,639,517	10,342,829	1.135	N/A	11,738,304	N/A	11,738,304	0.253	23	20	69,774
6/30/05-06	4,938,165	9,319,041	1.139	N/A	10,615,918	N/A	10,615,918	0.215	25	27	48,032
6/30/06-07	5,183,126	9,927,458	1.169	N/A	11,600,353	N/A	11,600,353	0.224	31	24	69,704
6/30/07-08	5,508,425	9,539,821	1.170	N/A	11,165,889	N/A	11,165,889	0.203	25	18	90,337
6/30/08-09	5,447,676	10,164,889	1.184	N/A	12,037,567	N/A	12,037,567	0.221	46	39	48,017
6/30/09-10	5,525,579	9,034,429	1.199	N/A	10,835,439	N/A	10,835,439	0.196	47	37	48,676
6/30/10-11	5,712,303	9,955,971	1.225	N/A	12,198,180	N/A	12,198,180	0.214	58	43	52,144
6/30/11-12	5,880,714	9,388,935	1.250	N/A	11,734,632	N/A	11,734,632	0.200	65	48	48,869
6/30/12-13	6,162,621	8,259,792	1.282	N/A	10,591,917	N/A	10,591,917	0.172	72	45	51,825
6/30/13-14	6,442,136	9,185,405	1.325	N/A	12,166,920	N/A	12,166,920	0.189	133	84	35,494
6/30/14-15	6,758,892	9,620,080	1.380	N/A	13,277,896	N/A	13,277,896	0.196	191	120	30,482
6/30/15-16	6,843,054	9,944,966	1.453	N/A	14,451,226	N/A	14,451,226	0.211	442	214	21,057
6/30/16-17	6,638,078	9,008,888	1.617	N/A	14,567,478	N/A	14,567,478	0.219	1,335	344	16,159
6/30/17-18	6,709,926	7,284,310	1.974	N/A	14,380,195	N/A	14,380,195	0.214	2,213	1,340	5,295
6/30/18-19	7,024,786	3,275,623	4.421	N/A	14,483,158	N/A	14,483,158	0.206		2,044	5,483
Total	156,248,254	311,518,744			362,691,018		362,691,018		4,947	4,658	

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 1, Exhibit 2, Page 7
(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.
(6) = (3) x (4) x (5)
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	1,823,085	0.198	3,299,106	1.007	3,317,772	N/A	3,317,772	0.182	0.182
6/30/85-86	1,952,445	0.298	4,968,499	1.007	5,003,465	N/A	5,003,465	0.256	0.256
6/30/86-87	2,220,820	0.308	5,815,494	1.008	5,864,661	N/A	5,864,661	0.264	0.264
6/30/87-88	2,885,583	0.387	10,004,344	1.011	10,112,242	N/A	10,112,242	0.350	0.350
6/30/88-89	3,098,180	0.448	12,147,601	1.012	12,297,778	N/A	12,297,778	0.397	0.397
6/30/89-90	3,079,763	0.489	12,621,066	1.015	12,817,234	N/A	12,817,234	0.416	0.416
6/30/90-91	2,914,364	0.420	12,088,540	1.018	12,310,533	N/A	12,310,533	0.422	0.422
6/30/91-92	2,880,434	0.381	10,919,282	1.019	11,125,631	N/A	11,125,631	0.386	0.386
6/30/92-93	2,887,238	0.278	7,966,961	1.022	8,141,947	N/A	8,141,947	0.282	0.282
6/30/93-94	3,056,850	0.278	8,455,066	1.026	8,667,453	N/A	8,667,453	0.284	0.284
6/30/94-95	3,158,808	0.225	7,018,105	1.030	7,226,123	N/A	7,226,123	0.229	0.229
6/30/95-96	3,301,791	0.203	6,599,559	1.034	6,819,076	N/A	6,819,076	0.207	0.207
6/30/96-97	3,902,868	0.192	7,301,398	1.041	7,593,476	N/A	7,593,476	0.195	0.195
6/30/97-98	3,776,138	0.185	6,747,657	1.048	7,066,289	N/A	7,066,289	0.187	0.187
6/30/98-99	4,017,530	0.183	7,042,173	1.057	7,436,770	N/A	7,436,770	0.185	0.185
6/30/99-00	4,221,786	0.196	7,910,764	1.067	8,427,994	N/A	8,427,994	0.200	0.200
6/30/00-01	4,310,725	0.235	9,723,734	1.075	10,425,064	N/A	10,425,064	0.242	0.242
6/30/01-02	4,438,755	0.189	7,845,832	1.082	8,480,212	N/A	8,480,212	0.191	0.191
6/30/02-03	4,423,888	0.207	8,504,781	1.096	9,308,289	N/A	9,308,289	0.210	0.210
6/30/03-04	4,482,207	0.214	8,844,092	1.107	9,770,927	N/A	9,770,927	0.218	0.218
6/30/04-05	4,639,517	0.183	10,342,829	1.135	11,316,178	N/A	11,316,178	0.244	0.244
6/30/05-06	4,938,165	0.185	9,319,041	1.139	10,467,473	N/A	10,467,473	0.212	0.212
6/30/06-07	5,183,126	0.187	9,927,458	1.169	11,283,167	N/A	11,283,167	0.218	0.218
6/30/07-08	5,508,425	0.189	9,539,821	1.170	11,167,443	N/A	11,167,443	0.203	0.203
6/30/08-09	5,447,676	0.192	10,164,889	1.184	11,868,341	N/A	11,868,341	0.218	0.218
6/30/09-10	5,525,579	0.199	9,034,429	1.199	10,929,046	N/A	10,929,046	0.198	0.198
6/30/10-11	5,712,303	0.201	9,955,971	1.225	12,092,474	N/A	12,092,474	0.212	0.212
6/30/11-12	5,880,714	0.203	9,388,935	1.250	11,810,486	N/A	11,810,486	0.201	0.201
6/30/12-13	6,162,621	0.205	8,259,792	1.282	11,096,094	N/A	11,096,094	0.180	0.180
6/30/13-14	6,442,136	0.207	9,185,405	1.325	12,541,671	N/A	12,541,671	0.195	0.195
6/30/14-15	6,758,892	0.209	9,620,080	1.380	13,582,081	N/A	13,582,081	0.201	0.201
6/30/15-16	6,843,054	0.211	9,944,966	1.453	14,521,525	N/A	14,521,525	0.212	0.212
6/30/16-17	6,638,078	0.214	9,008,888	1.617	14,331,733	N/A	14,331,733	0.216	0.216
6/30/17-18	6,709,926	0.216	7,284,310	1.974	14,366,465	N/A	14,366,465	0.214	0.214
6/30/18-19	7,024,786	0.218	3,275,623	4.421	15,065,025	N/A	15,065,025	0.214	0.214
Total	156,248,254		300,076,490		358,652,138		358,652,138		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 1, Exhibit 2, Page 4, Column 11
(4) From Section 1, Exhibit 2, Page 2, Column 3
(5) From Section 1, Exhibit 2, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.198	0.198
6/30/85-86									0.298	0.298
6/30/86-87									0.308	0.308
6/30/87-88									0.387	0.387
6/30/88-89									0.448	0.448
6/30/89-90									0.489	0.489
6/30/90-91	2,914,364	12,311,981	0.422	1.194	0.504	1.335	0.673	0.138	0.420	0.420
6/30/91-92	2,880,434	11,128,045	0.386	1.189	0.459	1.321	0.607	0.140	0.381	0.381
6/30/92-93	2,887,238	8,144,318	0.282	1.189	0.335	1.308	0.439	0.141	0.278	0.278
6/30/93-94	3,056,850	8,671,266	0.284	1.178	0.334	1.295	0.433	0.144	0.277	0.278
6/30/94-95	3,158,808	7,229,465	0.229	1.170	0.268	1.282	0.343	0.147	0.225	0.225
6/30/95-96	3,301,791	6,821,943	0.207	1.155	0.239	1.270	0.303	0.150	0.204	0.203
6/30/96-97	3,902,868	7,597,450	0.195	1.137	0.221	1.257	0.278	0.154	0.192	0.192
6/30/97-98	3,776,138	7,070,930	0.187	1.135	0.213	1.245	0.265	0.156	0.185	0.185
6/30/98-99	4,017,530	7,442,825	0.185	1.135	0.210	1.232	0.259	0.157	0.182	0.183
6/30/99-00	4,221,786	8,440,571	0.200	1.135	0.227	1.220	0.277	0.159	0.195	0.196
6/30/00-01	4,310,725	10,450,294	0.242	1.109	0.269	1.208	0.325	0.164	0.234	0.235
6/30/01-02	4,438,755	8,487,651	0.191	1.101	0.211	1.196	0.252	0.167	0.189	0.189
6/30/02-03	4,423,888	9,323,894	0.211	1.073	0.226	1.184	0.268	0.173	0.207	0.207
6/30/03-04	4,482,207	9,786,349	0.218	1.046	0.228	1.173	0.268	0.179	0.215	0.214
6/30/04-05	4,639,517	11,738,304	0.253	1.036	0.262	1.161	0.304	0.183	0.189	0.183
6/30/05-06	4,938,165	10,615,918	0.215	1.032	0.222	1.149	0.255	0.185	0.192	0.185
6/30/06-07	5,183,126	11,600,353	0.224	1.032	0.231	1.138	0.263	0.187	0.193	0.187
6/30/07-08	5,508,425	11,165,889	0.203	1.032	0.209	1.127	0.236	0.189	0.195	0.189
6/30/08-09	5,447,676	12,037,567	0.221	1.027	0.227	1.116	0.253	0.192	0.198	0.192
6/30/09-10	5,525,579	10,835,439	0.196	1.000	0.196	1.105	0.217	0.199	0.206	0.199
6/30/10-11	5,712,303	12,198,180	0.214	1.000	0.214	1.094	0.234	0.201	0.208	0.201
6/30/11-12	5,880,714	11,734,632	0.200	1.000	0.200	1.083	0.216	0.203	0.210	0.203
6/30/12-13	6,162,621	10,591,917	0.172	1.000	0.172	1.072	0.184	0.205	0.212	0.205
6/30/13-14	6,442,136	12,166,920	0.189	1.000	0.189	1.062	0.200	0.207	0.214	0.207
6/30/14-15	6,758,892	13,277,896	0.196	1.000	0.196	1.051	0.206	0.209	0.216	0.209
6/30/15-16	6,843,054	14,451,226	0.211	1.000	0.211	1.041	0.220	0.211	0.218	0.211
6/30/16-17	6,638,078	14,567,478	0.219	1.000	0.219	1.030	0.226	0.214	0.221	0.214
6/30/17-18	6,709,926	14,380,195	0.214	1.000	0.214	1.020	0.219	0.216	0.223	0.216
6/30/18-19	7,024,786	14,483,158	0.206	1.000	0.206	1.010	0.208	0.218		0.218
Total	141,188,379	308,752,055								

Trend Last 4 (ex 18-19):	3.0%	Avg 3 (ex 18-19):	0.221
Trend Last 8 (ex 18-19):	1.4%	Avg 5 (ex 18-19):	0.214
Trend Last 12 (ex 18-19):	-0.5%	Avg 10 (ex 18-19):	0.218
Prior Selected Trend:	1.0%	Prior Sel Avg:	0.225
Selected Trend:	1.0%	Sel. Loss Cost:	0.220

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 1, Exhibit 2, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCIRB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.980	
(2)	Credibility		88%	
(3)	Average Pmt Trend Statewide		0.980	
(4)	Credibility Weighted Trend		0.980	
		(Low)		(High)
(5)	Selected Range	0.882		0.981
(6)	Incremental Paid for 2019	158,913		158,913
(7)	Estimated Reserve	1,187,811		8,204,952
(8)	Paid to Date (82 & Prior)	6,928,042		6,928,042
(9)	Est Ult Paid for 1982 & Prior	8,115,853		15,132,994

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	133,505	109,468
(11)	Projected Number of Years	5	5
(12)	Estimated Reserve	667,526	547,342
(13)	Paid to Date (82 & Prior)	6,928,042	6,769,129
(14)	Est Ult Paid for 1982 & Prior	7,595,568	7,316,471
(14a)	Paid Counts During Fiscal Year	4	11
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	7,716,162	11,364,281
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**7,716,162**	**11,364,281**
(18)	Implied Tail	1.114	1.640
(19)	Ult Loss Inc Lump Sums @ 6/18	7,773,780	10,667,689

NOTES:

(1) From Section 1, Exhibit 2, Page 6
(2) = (Average of Section 1, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 1, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 1, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	401,487	12.903			
1993	2	281,130	12.547	0.700		
1994	3	275,063	12.525	0.978		
1995	4	195,978	12.186	0.712		
1996	5	235,244	12.368	1.200		
1997	6	119,211	11.689	0.507		
1998	7	74,969	11.225	0.629		
1999	8	167,971	12.032	2.241		
2000	9	112,165	11.628	0.668	n =	28
2001	10	83,644	11.334	0.746	S(x) =	56,154
2002	11	54,441	10.905	0.651	S(x-sq) =	112,618,674
2003	12	53,298	10.884	0.979	S(xy) =	656,203
2004	13	73,810	11.209	1.385	S(y) =	327
2005	14	86,676	11.370	1.174	D =	51,156
2006	15	71,904	11.183	0.830	slope =	-0.022
2007	16	66,960	11.112	0.931	Avg Trend =	0.978
2008	17	71,871	11.183	1.073		
2009	18	156,441	11.960	2.177		
2010	19	168,137	12.033	1.075		
2011	20	139,603	11.847	0.830		
2012	21	102,690	11.539	0.736		
2013	22	106,562	11.576	1.038		
2014	23	115,903	11.661	1.088		
2015	24	120,640	11.701	1.041		
2016	25	86,803	11.371	0.720		
2017	26	79,162	11.279	0.912		
2018	27	162,440	11.998	2.052		
2019	28	158,913	11.976	0.978		
					Selected Trend:	**0.980**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2019: 0.978 = 158913 / 162440

Commonwealth of Massachusetts Workers Compensation
All Clusters Combined
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
June-83	80,157	194,108	281,698	355,785	430,372	505,456	583,349	673,674	790,768	861,582	915,134	975,815	1,007,922	1,082,827	1,139,603	1,141,641	1,147,008	1,150,280	1,152,153	1,152,412	1,154,034	1,170,882	1,177,268	1,193,197	1,205,857	1,216,414	1,222,393	1,225,876	1,230,254	1,233,433	1,237,128	1,241,152	1,241,812	1,242,695	1,242,918	1,243,549	1,243,549
June-84	278,846	675,251	979,952	1,237,679	1,497,148	1,692,853	1,965,008	2,259,281	2,488,041	2,658,528	2,815,940	2,906,236	2,927,914	2,961,604	2,990,903	3,026,971	3,061,107	3,088,013	3,103,364	3,110,882	3,148,274	3,167,361	3,181,238	3,187,495	3,198,788	3,205,196	3,216,959	3,243,352	3,245,106	3,246,544	3,252,369	3,255,405	3,256,073	3,260,710	3,267,811	3,270,663	
June-85	281,180	680,904	988,156	1,248,041	1,524,376	1,767,225	2,056,915	2,259,407	2,404,861	2,595,178	2,656,702	2,691,247	2,723,491	2,743,570	2,791,601	2,825,986	2,858,120	2,885,590	2,909,085	2,936,115	2,962,423	2,989,438	3,016,883	3,039,299	3,063,056	3,088,322	3,111,388	3,139,070	3,181,218	3,200,244	3,226,838	3,252,799	3,279,382	3,296,878	3,299,106		
June-86	525,630	1,272,862	1,847,229	2,295,762	2,801,909	3,261,873	3,656,708	3,915,488	4,146,092	4,242,208	4,302,418	4,368,117	4,405,703	4,495,556	4,540,345	4,569,414	4,631,690	4,679,159	4,717,866	4,751,566	4,788,347	4,826,166	4,848,695	4,868,351	4,898,350	4,937,177	4,944,321	4,952,720	4,957,299	4,962,311	4,967,016	4,968,034	4,968,398	4,968,499			
June-87	679,622	1,645,768	2,495,914	3,175,646	3,758,601	4,235,026	4,616,701	4,839,601	4,982,646	5,092,983	5,194,073	5,273,395	5,401,744	5,450,543	5,483,690	5,500,132	5,518,035	5,536,163	5,551,275	5,565,383	5,582,877	5,601,832	5,621,525	5,656,386	5,681,277	5,707,463	5,726,299	5,745,711	5,758,976	5,782,095	5,801,310	5,809,821	5,815,494				
June-88	1,191,827	3,330,054	5,139,009	6,298,489	7,138,465	7,736,797	8,238,504	8,487,549	8,654,240	8,771,119	8,871,380	8,936,796	8,998,468	9,039,583	9,080,840	9,108,289	9,182,392	9,269,235	9,323,809	9,379,358	9,460,451	9,506,848	9,566,385	9,624,005	9,677,988	9,708,186	9,746,800	9,886,893	9,920,342	9,951,259	9,968,732	10,004,344					
June-89	1,301,800	4,749,050	6,698,392	8,042,212	9,005,556	9,741,252	10,145,151	10,401,975	10,588,606	10,754,116	10,897,219	11,056,485	11,133,041	11,233,906	11,311,779	11,394,541	11,460,208	11,520,998	11,631,220	11,709,730	11,752,400	11,801,214	11,852,925	11,887,968	11,930,739	11,975,978	12,009,867	12,042,782	12,105,126	12,131,284	12,147,601						
June-90	1,971,011	6,207,955	8,378,887	9,502,646	10,377,079	10,866,795	11,178,293	11,460,398	11,654,311	11,744,612	11,853,219	11,929,544	12,013,692	12,102,616	12,193,641	12,288,370	12,363,890	12,414,703	12,454,464	12,472,674	12,492,856	12,504,730	12,520,503	12,538,576	12,563,968	12,583,220	12,596,340	12,608,229	12,614,539	12,621,066							
June-91	2,079,021	6,481,845	8,128,761	9,129,342	9,569,888	9,922,223	10,074,064	10,149,765	10,198,433	10,318,761	10,419,870	10,494,642	10,576,694	10,667,922	10,767,927	10,925,448	11,031,802	11,209,381	11,429,660	11,537,541	11,643,261	11,766,239	11,823,905	11,860,583	11,883,680	11,906,673	12,001,274	12,075,274	12,088,540								
June-92	2,582,717	6,069,511	7,466,854	8,202,774	8,503,875	8,669,993	8,827,343	9,030,623	9,135,160	9,257,875	9,372,582	9,437,134	9,514,021	9,594,979	9,639,410	9,684,641	9,729,562	9,777,992	9,843,570	9,998,090	10,162,177	10,366,472	10,602,914	10,713,579	10,783,184	10,867,633	10,901,411	10,919,282									
June-93	1,951,667	5,170,869	6,081,502	6,489,487	6,751,595	6,861,506	6,914,496	6,958,865	7,037,255	7,082,866	7,132,331	7,201,081	7,259,683	7,329,612	7,401,491	7,505,162	7,578,974	7,640,635	7,679,794	7,714,728	7,755,902	7,826,543	7,862,414	7,891,312	7,912,531	7,940,036	7,966,961										
June-94	2,254,109	4,622,918	5,401,604	5,967,695	6,235,895	6,548,173	6,736,695	6,864,534	6,987,145	7,147,202	7,266,001	7,394,198	7,524,153	7,640,660	7,736,000	7,790,584	7,842,474	7,909,569	7,974,641	8,037,509	8,101,818	8,151,347	8,269,070	8,324,376	8,390,929	8,455,066											
June-95	2,029,019	3,973,539	4,748,104	5,104,898	5,297,904	5,458,376	5,592,474	5,756,438	5,903,503	6,059,664	6,161,322	6,276,889	6,428,588	6,491,856	6,546,028	6,596,908	6,642,430	6,764,444	6,797,406	6,837,368	6,873,333	6,913,170	6,955,590	6,988,812	7,018,105												
June-96	1,766,253	4,182,294	4,865,024	5,174,865	5,452,218	5,598,854	5,739,120	5,855,214	5,980,868	6,100,238	6,209,752	6,290,753	6,361,945	6,411,788	6,464,381	6,495,988	6,521,070	6,537,735	6,548,588	6,563,090	6,572,319	6,581,022	6,589,792	6,599,559													
June-97	1,766,725	3,725,485	4,494,601	4,941,702	5,201,917	5,412,606	5,536,117	5,694,640	5,852,834	5,984,835	6,131,050	6,244,244	6,315,764	6,399,332	6,491,158	6,664,852	6,857,883	7,062,337	7,148,622	7,195,566	7,222,769	7,247,398	7,301,398														
June-98	1,434,653	3,363,240	4,046,082	4,435,465	4,731,267	4,919,954	5,122,526	5,375,830	5,487,330	5,608,858	5,703,803	5,850,033	5,931,380	6,078,298	6,191,362	6,271,642	6,360,866	6,472,141	6,564,185	6,651,123	6,704,825	6,747,657															
June-99	1,427,577	3,215,372	3,912,893	4,351,301	4,694,328	4,986,960	5,249,952	5,556,545	5,746,199	5,876,662	5,994,567	6,154,782	6,268,261	6,402,584	6,478,357	6,567,127	6,706,225	6,780,244	6,865,083	6,940,733	7,042,173																
June-00	1,919,617	4,021,129	4,792,481	5,313,057	5,734,824	6,105,211	6,329,799	6,555,866	6,681,932	6,813,975	6,898,518	6,996,942	7,138,790	7,262,102	7,372,673	7,504,980	7,586,347	7,678,527	7,785,609	7,910,764																	
June-01	1,955,272	4,077,952	5,089,014	5,933,836	6,650,457	7,105,631	7,471,084	7,767,438	8,000,937	8,307,585	8,507,669	8,703,774	8,845,415	9,003,056	9,140,745	9,370,399	9,497,154	9,600,632	9,723,734																		
June-02	1,477,425	3,509,146	4,573,760	5,338,916	5,731,628	5,955,713	6,085,017	6,292,071	6,517,249	6,663,212	6,917,679	7,073,118	7,209,384	7,329,953	7,511,596	7,630,888	7,753,775	7,845,832																			
June-03	969,154	3,818,930	5,475,517	6,135,434	6,529,665	6,778,078	6,990,986	7,205,533	7,374,939	7,547,463	7,650,965	7,822,367	7,992,803	8,161,223	8,308,529	8,391,707	8,504,781																				
June-04	1,457,859	4,815,053	6,241,371	6,962,594	7,265,206	7,595,768	7,812,538	7,975,825	8,092,945	8,180,931	8,285,856	8,395,996	8,479,408	8,616,680	8,726,226	8,844,092																					
June-05	2,296,467	6,044,403	7,443,461	8,222,874	8,698,237	9,004,663	9,337,914	9,544,673	9,739,666	9,917,957	10,021,865	10,121,156	10,181,518	10,256,720	10,342,829																						
June-06	2,480,251	5,605,314	6,838,991	7,488,958	7,923,458	8,230,916	8,500,027	8,685,758	8,828,551	8,921,703	9,020,980	9,122,357	9,232,800	9,319,041																							
June-07	2,697,227	6,287,742	7,783,576	8,319,615	8,708,706	8,952,407	9,197,087	9,352,229	9,474,608	9,611,791	9,739,228	9,816,055	9,927,458																								
June-08	3,229,281	6,460,123	7,505,731	8,076,203	8,364,088	8,613,325	8,799,265	9,008,163	9,151,259	9,310,231	9,443,394	9,539,821																									
June-09	3,247,133	6,451,648	7,766,520	8,400,468	8,775,739	9,090,669	9,368,582	9,601,209	9,871,493	10,017,460	10,164,889																										
June-10	3,060,289	6,279,753	7,213,128	7,731,312	8,124,749	8,370,005	8,627,030	8,770,757	8,859,634	9,034,429																											
June-11	3,709,038	7,016,744	8,085,690	8,709,130	9,137,711	9,403,213	9,626,927	9,830,522	9,955,971																												
June-12	3,189,372	6,711,576	7,783,683	8,387,093	8,798,309	9,000,424	9,232,426	9,388,935																													
June-13	2,903,130	6,057,463	7,167,331	7,672,962	7,986,604	8,133,027	8,259,792																														
June-14	2,931,171	6,504,914	7,878,217	8,567,157	8,915,793	9,185,405																															
June-15	3,735,022	6,999,911	8,327,951	9,203,521	9,620,080																																
June-16	4,192,776	7,734,684	9,247,350	9,944,966																																	
June-17	3,731,583	7,587,377	9,008,888																																		
June-18	3,577,517	7,284,310																																			
June-19	3,275,623																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
June-83	2.422	1.451	1.263	1.210	1.174	1.154	1.155	1.174	1.090	1.062	1.066	1.033	1.074	1.052	1.002	1.005	1.003	1.002	1.000	1.001	1.015	1.005	1.014	1.011	1.009	1.005	1.003	1.004	1.003	1.003	1.003	1.001	1.001	1.000	1.001	1.000
June-84	2.422	1.451	1.263	1.210	1.131	1.161	1.150	1.101	1.069	1.059	1.032	1.007	1.012	1.010	1.012	1.011	1.009	1.005	1.002	1.012	1.006	1.004	1.002	1.004	1.002	1.004	1.008	1.001	1.000	1.002	1.001	1.000	1.001	1.002	1.001	
June-85	2.422	1.451	1.263	1.221	1.159	1.164	1.098	1.064	1.079	1.024	1.013	1.012	1.007	1.018	1.012	1.011	1.010	1.008	1.009	1.009	1.009	1.009	1.007	1.008	1.008	1.007	1.009	1.013	1.006	1.008	1.008	1.008	1.005	1.001		
June-86	2.422	1.451	1.243	1.220	1.164	1.121	1.071	1.059	1.023	1.014	1.015	1.009	1.020	1.010	1.006	1.014	1.010	1.008	1.007	1.008	1.008	1.005	1.004	1.006	1.008	1.001	1.002	1.001	1.001	1.001	1.000	1.000	1.000			
June-87	2.422	1.517	1.272	1.184	1.127	1.090	1.048	1.030	1.022	1.020	1.015	1.024	1.009	1.006	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.004	1.006	1.004	1.005	1.003	1.003	1.002	1.004	1.003	1.001	1.001				
June-88	2.794	1.543	1.226	1.133	1.084	1.065	1.030	1.020	1.014	1.011	1.007	1.007	1.005	1.005	1.003	1.008	1.009	1.006	1.006	1.009	1.005	1.006	1.006	1.006	1.003	1.004	1.014	1.003	1.003	1.002	1.004					
June-89	3.648	1.410	1.201	1.120	1.082	1.041	1.025	1.018	1.016	1.013	1.015	1.007	1.009	1.007	1.007	1.006	1.005	1.010	1.007	1.004	1.004	1.004	1.003	1.004	1.004	1.003	1.003	1.005	1.002	1.001						
June-90	3.150	1.350	1.134	1.092	1.047	1.029	1.025	1.017	1.008	1.009	1.006	1.007	1.007	1.008	1.008	1.006	1.004	1.003	1.001	1.002	1.001	1.001	1.001	1.002	1.002	1.001	1.001	1.001	1.001							
June-91	3.118	1.254	1.123	1.048	1.037	1.015	1.008	1.005	1.012	1.010	1.007	1.008	1.009	1.009	1.015	1.010	1.016	1.020	1.009	1.009	1.011	1.005	1.003	1.002	1.002	1.008	1.006	1.001								
June-92	2.350	1.230	1.099	1.037	1.020	1.018	1.023	1.012	1.013	1.012	1.007	1.008	1.009	1.005	1.005	1.005	1.005	1.007	1.016	1.016	1.020	1.023	1.010	1.006	1.008	1.003	1.002									
June-93	2.649	1.176	1.067	1.040	1.016	1.008	1.006	1.011	1.006	1.007	1.010	1.008	1.010	1.010	1.014	1.010	1.008	1.005	1.005	1.005	1.009	1.005	1.004	1.003	1.003	1.003										
June-94	2.051	1.168	1.105	1.045	1.050	1.029	1.019	1.018	1.023	1.017	1.018	1.018	1.015	1.012	1.007	1.007	1.009	1.008	1.008	1.008	1.006	1.014	1.007	1.008	1.008											
June-95	1.958	1.195	1.075	1.038	1.030	1.025	1.029	1.026	1.026	1.017	1.019	1.024	1.010	1.008	1.008	1.007	1.018	1.005	1.006	1.005	1.006	1.006	1.005	1.004												
June-96	2.368	1.163	1.064	1.054	1.027	1.025	1.020	1.021	1.020	1.018	1.013	1.011	1.008	1.008	1.005	1.004	1.003	1.002	1.002	1.001	1.001	1.001	1.001													
June-97	2.109	1.206	1.099	1.053	1.041	1.023	1.029	1.028	1.023	1.024	1.018	1.011	1.013	1.014	1.027	1.029	1.030	1.012	1.007	1.004	1.003	1.007														
June-98	2.344	1.203	1.096	1.067	1.040	1.041	1.049	1.021	1.022	1.017	1.026	1.014	1.025	1.019	1.013	1.014	1.017	1.014	1.013	1.008	1.006															
June-99	2.252	1.217	1.112	1.079	1.062	1.053	1.058	1.034	1.023	1.020	1.027	1.018	1.021	1.012	1.014	1.021	1.011	1.013	1.011	1.015																
June-00	2.095	1.192	1.109	1.079	1.065	1.037	1.036	1.019	1.020	1.012	1.014	1.020	1.017	1.015	1.018	1.011	1.012	1.014	1.016																	
June-01	2.086	1.248	1.166	1.121	1.068	1.051	1.040	1.030	1.038	1.024	1.023	1.016	1.018	1.015	1.025	1.014	1.011	1.013																		
June-02	2.375	1.303	1.167	1.074	1.039	1.022	1.034	1.036	1.022	1.038	1.022	1.019	1.017	1.025	1.016	1.016	1.012																			
June-03	3.940	1.434	1.121	1.064	1.038	1.031	1.031	1.024	1.023	1.014	1.022	1.022	1.021	1.018	1.010	1.013																				
June-04	3.303	1.296	1.116	1.043	1.045	1.029	1.021	1.015	1.011	1.013	1.013	1.010	1.016	1.013	1.014																					
June-05	2.632	1.231	1.105	1.058	1.035	1.037	1.022	1.020	1.018	1.010	1.010	1.006	1.007	1.008																						
June-06	2.260	1.220	1.095	1.058	1.039	1.033	1.022	1.016	1.011	1.011	1.011	1.012	1.009																							
June-07	2.331	1.238	1.069	1.047	1.028	1.027	1.017	1.013	1.014	1.013	1.008	1.011																								
June-08	2.000	1.162	1.076	1.036	1.030	1.022	1.024	1.016	1.017	1.014	1.010																									
June-09	1.987	1.204	1.082	1.045	1.036	1.031	1.025	1.028	1.015	1.015																										
June-10	2.052	1.149	1.072	1.051	1.030	1.031	1.017	1.010	1.020																											
June-11	1.892	1.152	1.077	1.049	1.029	1.024	1.021	1.013																												
June-12	2.104	1.160	1.078	1.049	1.023	1.026	1.017																													
June-13	2.087	1.183	1.071	1.041	1.018	1.016																														
June-14	2.219	1.211	1.087	1.041	1.030																															
June-15	1.874	1.190	1.105	1.045																																
June-16	1.845	1.196	1.075																																	
June-17	2.033	1.187																																		
June-18	2.036																																			

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs	2.390	1.268	1.129	1.083	1.058	1.048	1.039	1.031	1.025	1.019	1.017	1.014	1.015	1.013	1.011	1.011	1.010	1.008	1.007	1.007	1.007	1.007	1.005	1.005	1.005	1.004	1.005	1.003	1.002	1.003	1.003	1.002	1.002	1.001	1.001	1.000	
Latest 5	2.002	1.193	1.083	1.045	1.026	1.025	1.021	1.016	1.015	1.013	1.011	1.012	1.014	1.016	1.016	1.015	1.013	1.013	1.010	1.007	1.005	1.007	1.005	1.005	1.004	1.004	1.005	1.002	1.002	1.003	1.003	1.002					
Latest 3	1.971	1.191	1.089	1.042	1.024	1.022	1.018	1.017	1.017	1.014	1.010	1.010	1.011	1.013	1.013	1.014	1.012	1.013	1.013	1.009	1.004	1.005	1.004	1.005	1.006	1.005	1.003	1.002	1.002	1.002	1.002	1.003	1.002	1.001			
Volume Wtd																																					
All Yrs	2.263	1.233	1.109	1.066	1.045	1.035	1.028	1.022	1.019	1.016	1.014	1.012	1.013	1.011	1.011	1.010	1.010	1.009	1.008	1.007	1.007	1.007	1.005	1.004	1.004	1.004	1.005	1.003	1.002	1.002	1.003	1.002	1.002	1.001	1.001		
Latest 5	1.988	1.193	1.083	1.045	1.026	1.025	1.021	1.016	1.015	1.013	1.010	1.012	1.014	1.015	1.017	1.015	1.012	1.013	1.010	1.007	1.005	1.007	1.006	1.005	1.004	1.004	1.005	1.002	1.002	1.002	1.003	1.002					
Latest 3	1.965	1.191	1.089	1.042	1.024	1.022	1.018	1.017	1.017	1.014	1.010	1.010	1.011	1.013	1.013	1.014	1.012	1.013	1.014	1.009	1.004	1.005	1.005	1.005	1.007	1.005	1.003	1.002	1.002	1.002	1.002	1.002	1.002	1.001			

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	7,308,855	7,561,294	7,285,250	7,562,409	(23,605)	-0.3%	1,115	0.0%
6/30/82-83	1,245,377	1,261,545	1,245,221	1,261,298	(156)	0.0%	(247)	0.0%
6/30/83-84	3,277,233	3,330,015	3,279,233	3,331,832	2,000	0.1%	1,818	0.1%
6/30/84-85	3,307,365	3,354,830	3,308,365	3,355,680	1,000	0.0%	850	0.0%
6/30/85-86	4,997,444	5,028,662	4,995,676	5,027,662	(1,769)	0.0%	(1,000)	0.0%
6/30/86-87	5,854,265	5,884,935	5,855,245	5,885,246	980	0.0%	311	0.0%
6/30/87-88	10,063,670	10,123,680	10,089,580	10,149,860	25,910	0.3%	26,180	0.3%
6/30/88-89	12,290,000	12,403,860	12,295,000	12,410,724	5,000	0.0%	6,864	0.1%
6/30/89-90	12,830,000	12,883,240	12,789,000	12,857,610	(41,000)	-0.3%	(25,630)	-0.2%
6/30/90-91	12,285,480	12,506,890	12,308,049	12,500,770	22,569	0.2%	(6,120)	0.0%
6/30/91-92	11,075,730	11,250,014	11,084,933	11,262,448	9,203	0.1%	12,433	0.1%
6/30/92-93	8,118,917	8,187,498	8,127,937	8,196,648	9,020	0.1%	9,150	0.1%
6/30/93-94	8,614,027	8,685,562	8,660,524	8,733,684	46,498	0.5%	48,121	0.6%
6/30/94-95	7,206,876	7,268,870	7,221,213	7,284,012	14,336	0.2%	15,142	0.2%
6/30/95-96	6,824,043	6,881,436	6,819,043	6,873,386	(5,000)	-0.1%	(8,050)	-0.1%
6/30/96-97	7,583,082	7,641,056	7,595,112	7,656,376	12,030	0.2%	15,320	0.2%
6/30/97-98	7,070,000	7,141,280	7,062,000	7,133,220	(8,000)	-0.1%	(8,060)	-0.1%
6/30/98-99	7,382,000	7,447,030	7,431,000	7,495,340	49,000	0.7%	48,310	0.6%
6/30/99-00	8,348,700	8,455,720	8,422,730	8,531,380	74,030	0.9%	75,660	0.9%
6/30/00-01	10,362,080	10,551,200	10,415,120	10,604,560	53,040	0.5%	53,360	0.5%
6/30/01-02	8,435,000	8,552,050	8,474,000	8,598,180	39,000	0.5%	46,130	0.5%
6/30/02-03	9,253,160	9,404,610	9,280,790	9,436,100	27,630	0.3%	31,490	0.3%
6/30/03-04	9,737,080	9,909,180	9,734,030	9,905,200	(3,050)	0.0%	(3,980)	0.0%
6/30/04-05	11,321,560	11,896,550	11,191,700	11,724,800	(129,860)	-1.1%	(171,750)	-1.4%
6/30/05-06	10,323,400	10,859,850	10,321,500	10,853,900	(1,900)	0.0%	(5,950)	-0.1%
6/30/06-07	11,099,980	11,887,650	11,084,170	11,813,020	(15,810)	-0.1%	(74,630)	-0.6%
6/30/07-08	10,865,070	11,461,150	10,877,340	11,434,810	12,270	0.1%	(26,340)	-0.2%
6/30/08-09	11,620,290	12,309,850	11,659,700	12,347,500	39,410	0.3%	37,650	0.3%
6/30/09-10	10,547,550	11,219,700	10,620,970	11,278,650	73,420	0.7%	58,950	0.5%
6/30/10-11	11,790,520	12,675,050	11,761,780	12,588,250	(28,740)	-0.2%	(86,800)	-0.7%
6/30/11-12	11,520,520	12,299,000	11,566,080	12,178,250	45,560	0.4%	(120,750)	-1.0%
6/30/12-13	10,594,820	11,424,550	10,460,540	11,292,250	(134,280)	-1.3%	(132,300)	-1.2%
6/30/13-14	12,010,460	13,078,000	12,041,740	13,047,000	31,280	0.3%	(31,000)	-0.2%
6/30/14-15	13,121,800	14,243,450	13,130,820	14,147,170	9,020	0.1%	(96,280)	-0.7%
6/30/15-16	14,213,000	15,613,400	14,020,440	15,199,690	(192,560)	-1.4%	(413,710)	-2.6%
6/30/16-17	13,971,000	15,815,320	13,833,440	15,286,970	(137,560)	-1.0%	(528,350)	-3.3%
6/30/17-18	13,787,000	16,749,050	13,779,500	15,241,760	(7,500)	-0.1%	(1,507,290)	-9.0%
6/30/18-19								
Total	350,257,354	367,247,027	350,128,770	364,487,643	(128,584)	0.0%	(2,759,383)	-0.8%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 1, Exhibit 2, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.4%	0.0%	0.1%	0.0%	1.000	1.000
444	99.6%	0.1%	0.4%	0.0%	0.0%	0.981	0.971
432	99.5%	0.2%	0.5%	0.0%	0.0%	0.952	0.930
420	99.3%	0.1%	0.7%	0.0%	0.0%	0.932	0.902
408	99.3%	0.1%	0.7%	0.0%	0.0%	0.904	0.861
396	99.2%	0.2%	0.8%	0.1%	0.0%	0.883	0.833
384	98.9%	0.1%	1.1%	0.0%	0.0%	0.879	0.827
372	98.8%	0.3%	1.2%	0.1%	0.0%	0.862	0.804
360	98.5%	0.3%	1.5%	0.1%	0.1%	0.856	0.797
348	98.2%	0.1%	1.8%	0.0%	0.0%	0.853	0.794
336	98.1%	0.3%	1.9%	0.1%	0.1%	0.826	0.756
324	97.8%	0.3%	2.2%	0.1%	0.1%	0.820	0.749
312	97.5%	0.4%	2.5%	0.2%	0.1%	0.812	0.740
300	97.1%	0.3%	2.9%	0.1%	0.1%	0.811	0.738
288	96.7%	0.6%	3.3%	0.3%	0.2%	0.800	0.725
276	96.1%	0.7%	3.9%	0.3%	0.2%	0.804	0.731
264	95.4%	0.8%	4.6%	0.3%	0.2%	0.804	0.731
252	94.6%	0.9%	5.4%	0.4%	0.3%	0.804	0.732
240	93.7%	0.7%	6.3%	0.3%	0.2%	0.803	0.731
228	93.0%	0.6%	7.0%	0.3%	0.2%	0.792	0.717
216	92.4%	1.2%	7.6%	0.6%	0.4%	0.779	0.700
204	91.2%	0.8%	8.8%	0.4%	0.3%	0.781	0.704
192	90.4%	2.3%	9.6%	1.2%	0.9%	0.772	0.691
180	88.1%	0.3%	11.9%	0.2%	0.1%	0.787	0.712
168	87.8%	2.2%	12.2%	1.3%	1.0%	0.763	0.680
156	85.6%	0.1%	14.4%	0.1%	0.1%	0.771	0.692
144	85.4%	1.0%	14.6%	0.6%	0.5%	0.744	0.656
132	84.4%	1.1%	15.6%	0.7%	0.6%	0.732	0.641
120	83.4%	1.8%	16.6%	1.2%	1.0%	0.722	0.628
108	81.6%	1.6%	18.4%	1.2%	1.0%	0.722	0.629
96	80.0%	2.0%	20.0%	1.5%	1.3%	0.717	0.624
84	78.0%	2.5%	22.0%	1.9%	1.7%	0.716	0.624
72	75.5%	3.0%	24.5%	2.5%	2.2%	0.718	0.627
60	72.5%	3.6%	27.5%	3.0%	2.8%	0.723	0.634
48	68.8%	7.0%	31.2%	6.1%	5.7%	0.728	0.641
36	61.8%	11.2%	38.2%	10.1%	9.7%	0.751	0.672
24	50.7%	28.0%	49.3%	26.4%	25.7%	0.781	0.710
12	22.6%	22.6%	77.4%	22.2%	22.0%	0.834	0.779
Total		100.0%					

NOTES:
(2) = 1 / Section 1, Exhibit 2, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	357,207	634,367		343,210	609,120
6/30/82-83	1,671	17,748	0.981	1,644	17,414
6/30/83-84	8,570	61,170	0.952	8,205	58,637
6/30/84-85	9,259	56,574	0.932	8,644	52,964
6/30/85-86	27,176	59,162	0.904	24,885	54,172
6/30/86-87	39,751	69,752	0.883	35,502	62,446
6/30/87-88	85,236	145,516	0.879	74,932	128,114
6/30/88-89	147,399	263,123	0.862	127,616	228,150
6/30/89-90	167,934	236,544	0.856	143,700	201,864
6/30/90-91	219,509	412,230	0.853	183,948	345,375
6/30/91-92	165,650	343,166	0.826	136,400	282,987
6/30/92-93	160,977	229,687	0.820	130,176	185,110
6/30/93-94	205,459	278,618	0.812	165,807	223,199
6/30/94-95	203,108	265,907	0.811	161,815	211,158
6/30/95-96	219,484	273,827	0.800	173,051	215,523
6/30/96-97	293,714	354,979	0.804	230,584	278,620
6/30/97-98	314,343	385,563	0.804	245,142	302,328
6/30/98-99	388,827	453,167	0.804	303,883	354,069
6/30/99-00	511,966	620,616	0.803	399,608	483,054
6/30/00-01	691,386	880,826	0.792	536,139	679,800
6/30/01-02	628,168	752,348	0.779	485,356	581,071
6/30/02-03	776,009	931,319	0.781	594,759	715,128
6/30/03-04	889,938	1,061,108	0.772	681,910	814,437
6/30/04-05	848,871	1,381,971	0.787	661,438	1,073,101
6/30/05-06	1,002,459	1,534,859	0.763	772,220	1,177,680
6/30/06-07	1,156,712	1,885,562	0.771	886,612	1,440,416
6/30/07-08	1,337,519	1,894,989	0.744	1,014,618	1,436,002
6/30/08-09	1,494,811	2,182,611	0.732	1,108,753	1,614,460
6/30/09-10	1,586,541	2,244,221	0.722	1,154,890	1,634,580
6/30/10-11	1,805,809	2,632,279	0.722	1,299,706	1,901,709
6/30/11-12	2,177,145	2,789,315	0.717	1,553,317	2,001,338
6/30/12-13	2,200,748	3,032,458	0.716	1,572,028	2,177,435
6/30/13-14	2,856,335	3,861,595	0.718	2,042,501	2,774,748
6/30/14-15	3,510,740	4,527,090	0.723	2,515,050	3,254,330
6/30/15-16	4,075,474	5,254,724	0.728	2,956,945	3,823,019
6/30/16-17	4,824,552	6,278,082	0.751	3,599,850	4,696,840
6/30/17-18	6,495,190	7,957,450	0.781	5,050,033	6,203,760
6/30/18-19	10,876,377	12,872,007	0.834	9,041,582	10,719,538
Total	52,762,025	69,116,529		40,426,460	53,013,700
			(7) Total Discount Factor:	0.766	0.767

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	357,207	634,367
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	71,441	126,873
(11) Discounted Value at 4%:	324,406	576,114

NOTES:
(2), (3) From Section 1, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 1, Exhibit 2, Page 9, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Clusters Combined
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	357,207	634,367		336,718	597,426
6/30/82-83	1,671	17,748	0.971	1,631	17,254
6/30/83-84	8,570	61,170	0.930	8,034	57,453
6/30/84-85	9,259	56,574	0.902	8,364	51,316
6/30/85-86	27,176	59,162	0.861	23,864	51,946
6/30/86-87	39,751	69,752	0.833	33,649	59,257
6/30/87-88	85,236	145,516	0.827	70,530	120,673
6/30/88-89	147,399	263,123	0.804	119,316	213,444
6/30/89-90	167,934	236,544	0.797	133,689	187,561
6/30/90-91	219,509	412,230	0.794	169,565	318,365
6/30/91-92	165,650	343,166	0.756	124,798	259,112
6/30/92-93	160,977	229,687	0.749	118,191	167,832
6/30/93-94	205,459	278,618	0.740	150,570	202,090
6/30/94-95	203,108	265,907	0.738	146,204	190,557
6/30/95-96	219,484	273,827	0.725	155,726	193,861
6/30/96-97	293,714	354,979	0.731	207,283	250,499
6/30/97-98	314,343	385,563	0.731	219,998	272,075
6/30/98-99	388,827	453,167	0.732	273,315	318,376
6/30/99-00	511,966	620,616	0.731	359,481	433,933
6/30/00-01	691,386	880,826	0.717	481,128	608,595
6/30/01-02	628,168	752,348	0.700	435,126	520,817
6/30/02-03	776,009	931,319	0.704	531,573	639,672
6/30/03-04	889,938	1,061,108	0.691	609,854	728,932
6/30/04-05	848,871	1,381,971	0.712	596,670	966,449
6/30/05-06	1,002,459	1,534,859	0.680	692,907	1,054,716
6/30/06-07	1,156,712	1,885,562	0.692	793,953	1,288,079
6/30/07-08	1,337,519	1,894,989	0.656	904,358	1,279,213
6/30/08-09	1,494,811	2,182,611	0.641	977,916	1,422,300
6/30/09-10	1,586,541	2,244,221	0.628	1,009,974	1,430,141
6/30/10-11	1,805,809	2,632,279	0.629	1,131,871	1,659,348
6/30/11-12	2,177,145	2,789,315	0.624	1,348,986	1,743,042
6/30/12-13	2,200,748	3,032,458	0.624	1,368,015	1,899,782
6/30/13-14	2,856,335	3,861,595	0.627	1,780,622	2,424,651
6/30/14-15	3,510,740	4,527,090	0.634	2,197,166	2,847,360
6/30/15-16	4,075,474	5,254,724	0.641	2,600,892	3,366,864
6/30/16-17	4,824,552	6,278,082	0.672	3,210,535	4,193,212
6/30/17-18	6,495,190	7,957,450	0.710	4,586,621	5,639,809
6/30/18-19	10,876,377	12,872,007	0.779	8,437,920	10,009,768
Total	52,762,025	69,116,529		36,357,013	47,685,780
			(7) Total Discount Factor:	0.689	0.690

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	357,207	634,367
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	71,441	126,873
(11) Discounted Value at 6%:	309,966	550,470

NOTES:
(2), (3) From Section 1, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 1, Exhibit 2, Page 9, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		22,076,721			25,019,683	26,147,420	2,942,962	4,070,698		
6/30/82-83		4,699,567	4,723,296		4,723,296	4,728,019	23,729	28,452		
6/30/83-84		8,796,100	9,273,545		9,274,000	9,282,819	477,900	486,719		
6/30/84-85	181,560	6,810,805	6,864,721	6,867,535	6,818,000	6,864,721	7,195	53,917	3.755	3.781
6/30/85-86	195,247	10,272,096	10,379,925	10,381,440	10,282,000	10,293,000	9,904	20,904	5.266	5.272
6/30/86-87	224,370	13,480,506	13,635,434	13,644,069	13,494,000	13,507,000	13,494	26,494	6.014	6.020
6/30/87-88	262,864	20,031,760	20,300,677	20,284,269	20,284,000	20,301,000	252,240	269,240	7.717	7.723
6/30/88-89	283,884	20,252,221	20,595,771	20,604,978	20,596,000	20,605,000	343,779	352,779	7.255	7.258
6/30/89-90	285,078	15,018,718	15,318,608	15,375,418	15,169,000	15,169,000	150,282	150,282	5.321	5.321
6/30/90-91	267,732	10,867,057	11,123,679	11,121,810	10,976,000	10,976,000	108,943	108,943	4.100	4.100
6/30/91-92	261,442	7,767,995	7,993,672	7,990,737	7,991,000	7,994,000	223,005	226,005	3.057	3.058
6/30/92-93	259,992	4,189,576	4,331,595	4,329,643	4,231,000	4,273,000	41,424	83,424	1.627	1.644
6/30/93-94	257,062	3,498,323	3,624,499	3,622,911	3,568,000	3,603,000	69,677	104,677	1.388	1.402
6/30/94-95	255,854	2,081,529	2,165,840	2,166,359	2,166,000	2,166,000	84,471	84,471	0.847	0.847
6/30/95-96	255,539	3,175,273	3,322,050	3,319,578	3,320,000	3,322,000	144,727	146,727	1.299	1.300
6/30/96-97	270,071	2,467,027	2,585,450	2,585,721	2,479,000	2,492,000	11,973	24,973	0.918	0.923
6/30/97-98	245,367	2,720,158	2,875,461	2,872,750	2,873,000	2,875,000	152,842	154,842	1.171	1.172
6/30/98-99	251,453	2,410,298	2,546,120	2,546,172	2,546,000	2,546,000	135,702	135,702	1.013	1.013
6/30/99-00	255,641	2,525,665	2,705,387	2,702,460	2,702,000	2,705,000	176,335	179,335	1.057	1.058
6/30/00-01	263,918	3,479,691	3,770,892	3,759,215	3,759,000	3,771,000	279,309	291,309	1.424	1.429
6/30/01-02	267,598	2,231,075	2,431,077	2,431,411	2,242,000	2,253,000	10,925	21,925	0.838	0.842
6/30/02-03	274,465	3,053,235	3,358,061	3,350,502	3,351,000	3,358,000	297,765	304,765	1.221	1.223
6/30/03-04	272,384	3,411,467	3,785,274	3,772,429	3,772,000	3,785,000	360,533	373,533	1.385	1.390
6/30/04-05	273,647	2,658,617	2,974,551	2,935,962	2,672,000	2,685,000	13,383	26,383	0.976	0.981
6/30/05-06	285,139	2,773,292	3,140,646	3,092,882	3,093,000	3,141,000	319,708	367,708	1.085	1.102
6/30/06-07	298,516	2,910,215	3,317,344	3,277,784	3,278,000	3,317,000	367,785	406,785	1.098	1.111
6/30/07-08	314,231	1,633,170	1,883,021	2,036,231	1,883,000	2,036,000	249,830	402,830	0.599	0.648
6/30/08-09	302,998	2,377,397	2,778,503	2,822,329	2,779,000	2,822,000	401,603	444,603	0.917	0.931
6/30/09-10	297,252	3,366,864	3,994,192	3,871,203	3,871,000	3,994,000	504,136	627,136	1.302	1.344
6/30/10-11	292,432	2,929,326	3,543,093	3,467,302	3,467,000	3,543,000	537,674	613,674	1.186	1.212
6/30/11-12	295,908	2,973,667	3,673,818	3,605,210	3,605,000	3,674,000	631,333	700,333	1.218	1.242
6/30/12-13	301,541	2,658,427	3,378,393	3,395,567	3,378,000	3,396,000	719,573	737,573	1.120	1.126
6/30/13-14	309,910	3,071,159	3,983,882	3,902,223	3,902,000	3,984,000	830,841	912,841	1.259	1.286
6/30/14-15	316,552	2,994,776	4,250,092	4,046,977	4,047,000	4,250,000	1,052,224	1,255,224	1.278	1.343
6/30/15-16	316,565	1,907,571	3,048,419	3,214,309	3,048,000	3,214,000	1,140,429	1,306,429	0.963	1.015
6/30/16-17	292,403	1,873,097	3,492,066	3,459,186	3,459,000	3,492,000	1,585,903	1,618,903	1.183	1.194
6/30/17-18	292,956	1,370,701	3,486,064	3,442,438	3,442,000	3,486,000	2,071,299	2,115,299	1.175	1.190
6/30/18-19	308,002	670,450	3,435,971	3,549,711	3,436,000	3,550,000	2,765,550	2,879,550	1.116	1.153
Total	9,589,573	211,485,593	208,091,093	193,848,720	230,995,979	233,600,979	19,510,386	22,115,385		
Tot 6/30/84-19	9,589,573	175,913,205	194,094,252	193,848,720	191,979,000	193,442,721	16,065,795	17,529,516	2.002	2.017

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) Sum of Section 2, Exhibit 1, Page 2, Column 3 and Section 2, Exhibit 1, Page 9, Column 8
(4) From Section 2, Exhibit 1, Page 2, Column 8
(5) From Section 2, Exhibit 1, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim	Average Age
All Prior Yrs		20,811,223							5	5		81
6/30/82-83		4,309,167	1.006	1.000	4,332,896	390,400	4,723,296		0	0		
6/30/83-84		8,246,950	1.008	1.050	8,724,395	549,150	9,273,545		3	3	159,148	72
6/30/84-85	181,560	5,655,954	1.010	1.000	5,709,870	1,154,851	6,864,721	3.781	0	0		
6/30/85-86	195,247	9,334,452	1.012	1.000	9,442,281	937,644	10,379,925	5.316	0	0		
6/30/86-87	224,370	11,412,789	1.014	1.000	11,567,717	2,067,717	13,635,434	6.077	0	0		
6/30/87-88	262,864	17,235,996	1.016	1.000	17,504,913	2,795,764	20,300,677	7.723	2	2	134,458	70
6/30/88-89	283,884	16,612,609	1.021	1.000	16,956,158	3,639,613	20,595,771	7.255	2	1	343,549	91
6/30/89-90	285,078	11,631,137	1.026	1.000	11,931,027	3,387,581	15,318,608	5.373	0	0		
6/30/90-91	267,732	8,301,627	1.031	1.000	8,558,249	2,565,430	11,123,679	4.155	0	0		
6/30/91-92	261,442	5,961,583	1.037	1.000	6,182,744	1,810,928	7,993,672	3.058	2	2	110,581	67
6/30/92-93	259,992	3,210,473	1.043	1.000	3,349,552	982,043	4,331,595	1.666	0	0		
6/30/93-94	257,062	2,529,622	1.049	1.000	2,652,403	972,097	3,624,499	1.410	0	1	122,780	47
6/30/94-95	255,854	1,526,329	1.054	1.000	1,608,415	557,426	2,165,840	0.847	0	0		
6/30/95-96	255,539	2,428,633	1.059	1.000	2,572,041	750,010	3,322,050	1.300	1	1	143,407	62
6/30/96-97	270,071	1,787,477	1.064	1.000	1,902,490	682,960	2,585,450	0.957	0	0		
6/30/97-98	245,367	2,186,995	1.070	1.000	2,339,354	536,107	2,875,461	1.172	1	1	152,358	58
6/30/98-99	251,453	1,758,227	1.075	1.000	1,890,118	656,002	2,546,120	1.013	0	0		
6/30/99-00	255,641	2,183,164	1.081	1.000	2,360,648	344,739	2,705,387	1.058	1	1	177,484	74
6/30/00-01	263,918	3,228,588	1.090	1.000	3,518,022	252,871	3,770,892	1.429	2	4	72,358	62
6/30/01-02	267,598	1,947,862	1.101	1.000	2,144,654	286,423	2,431,077	0.908	0	1	196,792	59
6/30/02-03	274,465	2,720,211	1.110	1.000	3,019,336	338,726	3,358,061	1.223	1	0		
6/30/03-04	272,384	3,101,642	1.118	1.000	3,467,595	317,680	3,785,274	1.390	3	3	121,984	61
6/30/04-05	273,647	2,315,265	1.131	1.000	2,619,144	355,407	2,974,551	1.087	0	0		
6/30/05-06	285,139	2,451,790	1.143	1.000	2,801,693	338,953	3,140,646	1.101	1	1	349,903	68
6/30/06-07	298,516	2,490,682	1.153	1.000	2,871,616	445,728	3,317,344	1.111	1	1	380,934	71
6/30/07-08	314,231	1,426,669	1.163	1.000	1,659,215	223,806	1,883,021	0.599	2	1	232,546	58
6/30/08-09	302,998	2,043,397	1.180	1.000	2,410,793	367,710	2,778,503	0.917	2	2	183,698	57
6/30/09-10	297,252	2,848,986	1.198	1.000	3,414,065	580,127	3,994,192	1.344	1	1	565,079	43
6/30/10-11	292,432	2,510,326	1.219	1.000	3,059,522	483,571	3,543,093	1.212	2	1	549,195	55
6/30/11-12	295,908	2,460,231	1.241	1.000	3,053,143	620,675	3,673,818	1.242	4	1	592,912	63
6/30/12-13	301,541	2,124,200	1.276	1.000	2,710,467	667,926	3,378,393	1.120	3	2	293,133	58
6/30/13-14	309,910	2,463,658	1.313	1.000	3,235,458	748,424	3,983,882	1.285	13	10	77,180	50
6/30/14-15	316,552	2,687,276	1.384	1.000	3,718,284	531,809	4,250,092	1.343	19	13	79,308	55
6/30/15-16	316,565	1,666,384	1.526	1.000	2,542,352	506,066	3,048,419	0.963	16	11	79,634	54
6/30/16-17	292,403	1,658,597	1.752	1.000	2,906,041	586,025	3,492,066	1.194	47	25	49,898	55
6/30/17-18	292,956	1,297,701	2.276	1.000	2,953,390	532,674	3,486,064	1.190	166	57	29,047	46
6/30/18-19	308,002	670,450	4.351	1.000	2,917,018	518,953	3,435,971	1.116	0	165	13,616	#N/A
Total	9,589,573	179,238,321			174,607,077	33,484,016	208,091,093		300	316		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 2, Exhibit 1, Page 7
(5) Based on information from the MA WCIRB
(6) = (3) x (4) x (5)
(7) From Section 2, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0
(13) Calculated for claimants that had an indemnity payment within the last calendar year.

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	181,560	3.309	5,655,954	1.010	5,712,684	1,154,851	6,867,535	3.783	3.146
6/30/85-86	195,247	4.904	9,334,452	1.012	9,443,796	937,644	10,381,440	5.317	4.837
6/30/86-87	224,370	5.443	11,412,789	1.014	11,576,352	2,067,717	13,644,069	6.081	5.159
6/30/87-88	262,864	6.253	17,235,996	1.016	17,488,505	2,795,764	20,284,269	7.717	6.653
6/30/88-89	283,884	6.133	16,612,609	1.021	16,965,365	3,639,613	20,604,978	7.258	5.976
6/30/89-90	285,078	4.978	11,631,137	1.026	11,987,837	3,387,581	15,375,418	5.393	4.205
6/30/90-91	267,732	3.173	8,301,627	1.031	8,556,380	2,565,430	11,121,810	4.154	3.196
6/30/91-92	261,442	2.333	5,961,583	1.037	6,179,809	1,810,928	7,990,737	3.056	2.364
6/30/92-93	259,992	1.270	3,210,473	1.043	3,347,600	982,043	4,329,643	1.665	1.288
6/30/93-94	257,062	1.018	2,529,622	1.049	2,650,814	972,097	3,622,911	1.409	1.031
6/30/94-95	255,854	0.633	1,526,329	1.054	1,608,933	557,426	2,166,359	0.847	0.629
6/30/95-96	255,539	0.989	2,428,633	1.059	2,569,569	750,010	3,319,578	1.299	1.006
6/30/96-97	270,071	0.706	1,787,477	1.064	1,902,761	682,960	2,585,721	0.957	0.705
6/30/97-98	245,367	0.936	2,186,995	1.070	2,336,642	536,107	2,872,750	1.171	0.952
6/30/98-99	251,453	0.752	1,758,227	1.075	1,890,170	656,002	2,546,172	1.013	0.752
6/30/99-00	255,641	0.908	2,183,164	1.081	2,357,721	344,739	2,702,460	1.057	0.922
6/30/00-01	263,918	1.279	3,228,588	1.090	3,506,344	252,871	3,759,215	1.424	1.329
6/30/01-02	267,598	0.803	1,947,862	1.101	2,144,988	286,423	2,431,411	0.909	0.802
6/30/02-03	274,465	1.072	2,720,211	1.110	3,011,777	338,726	3,350,502	1.221	1.097
6/30/03-04	272,384	1.228	3,101,642	1.118	3,454,749	317,680	3,772,429	1.385	1.268
6/30/04-05	273,647	0.836	2,315,265	1.131	2,580,555	355,407	2,935,962	1.073	0.943
6/30/05-06	285,139	0.848	2,451,790	1.143	2,753,929	338,953	3,092,882	1.085	0.966
6/30/06-07	298,516	0.862	2,490,682	1.153	2,832,056	445,728	3,277,784	1.098	0.949
6/30/07-08	314,231	0.876	1,426,669	1.163	1,812,424	223,806	2,036,231	0.648	0.577
6/30/08-09	302,998	0.891	2,043,397	1.180	2,454,618	367,710	2,822,329	0.931	0.810
6/30/09-10	297,252	0.899	2,848,986	1.198	3,291,075	580,127	3,871,203	1.302	1.107
6/30/10-11	292,432	0.902	2,510,326	1.219	2,983,731	483,571	3,467,302	1.186	1.020
6/30/11-12	295,908	0.912	2,460,231	1.241	2,984,536	620,675	3,605,210	1.218	1.009
6/30/12-13	301,541	0.925	2,124,200	1.276	2,727,640	667,926	3,395,567	1.126	0.905
6/30/13-14	309,910	0.934	2,463,658	1.313	3,153,799	748,424	3,902,223	1.259	1.018
6/30/14-15	316,552	0.943	2,687,276	1.384	3,515,168	531,809	4,046,977	1.278	1.110
6/30/15-16	316,565	0.955	1,666,384	1.526	2,708,242	506,066	3,214,309	1.015	0.856
6/30/16-17	292,403	0.968	1,658,597	1.752	2,873,161	586,025	3,459,186	1.183	0.983
6/30/17-18	292,956	0.982	1,297,701	2.276	2,909,764	532,674	3,442,438	1.175	0.993
6/30/18-19	308,002	0.995	670,450	4.351	3,030,758	518,953	3,549,711	1.152	0.984
Total	9,589,573		145,870,981		161,304,254	32,544,466	193,848,720		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 2, Exhibit 1, Page 4, Column 11
(4) From Section 2, Exhibit 1, Page 2, Column 3
(5) From Section 2, Exhibit 1, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) From Section 2, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Benefit Adjusted Loss Cost	Loss Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									3.309	3.309
6/30/85-86									4.904	4.904
6/30/86-87									5.443	5.443
6/30/87-88									6.253	6.253
6/30/88-89									6.133	6.133
6/30/89-90									4.978	4.978
6/30/90-91	267,732	8,558,249	3.197	0.996	3.185	1.156	3.681	0.869	3.187	3.173
6/30/91-92	261,442	6,182,744	2.365	1.093	2.585	1.150	2.972	0.796	2.324	2.333
6/30/92-93	259,992	3,349,552	1.288	1.275	1.642	1.144	1.879	0.686	1.275	1.270
6/30/93-94	257,062	2,652,403	1.032	1.258	1.298	1.138	1.478	0.698	1.021	1.018
6/30/94-95	255,854	1,608,415	0.629	1.247	0.784	1.133	0.888	0.708	0.635	0.633
6/30/95-96	255,539	2,572,041	1.007	1.237	1.245	1.127	1.403	0.717	0.990	0.989
6/30/96-97	270,071	1,902,490	0.704	1.224	0.863	1.122	0.967	0.728	0.709	0.706
6/30/97-98	245,367	2,339,354	0.953	1.209	1.152	1.116	1.286	0.741	0.931	0.936
6/30/98-99	251,453	1,890,118	0.752	1.193	0.897	1.110	0.996	0.755	0.756	0.752
6/30/99-00	255,641	2,360,648	0.923	1.174	1.084	1.105	1.197	0.771	0.898	0.908
6/30/00-01	263,918	3,518,022	1.333	1.144	1.525	1.099	1.676	0.795	1.267	1.279
6/30/01-02	267,598	2,144,654	0.801	1.122	0.899	1.094	0.983	0.815	0.806	0.803
6/30/02-03	274,465	3,019,336	1.100	1.118	1.229	1.088	1.338	0.822	1.076	1.072
6/30/03-04	272,384	3,467,595	1.273	1.118	1.423	1.083	1.541	0.826	1.210	1.228
6/30/04-05	273,647	2,619,144	0.957	1.111	1.063	1.078	1.145	0.836	0.851	0.836
6/30/05-06	285,139	2,801,693	0.983	1.099	1.080	1.072	1.158	0.848	0.864	0.848
6/30/06-07	298,516	2,871,616	0.962	1.087	1.046	1.067	1.116	0.862	0.878	0.862
6/30/07-08	314,231	1,659,215	0.528	1.075	0.568	1.062	0.603	0.876	0.892	0.876
6/30/08-09	302,998	2,410,793	0.796	1.063	0.846	1.056	0.893	0.891	0.907	0.891
6/30/09-10	297,252	3,414,065	1.149	1.059	1.216	1.051	1.278	0.899	0.915	0.899
6/30/10-11	292,432	3,059,522	1.046	1.060	1.109	1.046	1.160	0.902	0.918	0.902
6/30/11-12	295,908	3,053,143	1.032	1.053	1.087	1.041	1.131	0.912	0.929	0.912
6/30/12-13	301,541	2,710,467	0.899	1.044	0.938	1.036	0.972	0.925	0.942	0.925
6/30/13-14	309,910	3,235,458	1.044	1.040	1.085	1.030	1.118	0.934	0.951	0.934
6/30/14-15	316,552	3,718,284	1.175	1.034	1.215	1.025	1.245	0.943	0.961	0.943
6/30/15-16	316,565	2,542,352	0.803	1.026	0.824	1.020	0.841	0.955	0.973	0.955
6/30/16-17	292,403	2,906,041	0.994	1.018	1.012	1.015	1.027	0.968	0.984	0.968
6/30/17-18	292,956	2,953,390	1.008	1.009	1.017	1.010	1.027	0.982	0.995	0.982
6/30/18-19	308,002	2,917,018	0.947	1.000	0.947	1.005	0.952	0.995		0.995
Total	8,156,569	88,437,820								

Trend Last 4 (ex 18-19):	-3.2%	Avg 3 (ex 18-19):	0.965
Trend Last 8 (ex 18-19):	-1.5%	Avg 5 (ex 18-19):	1.052
Trend Last 12 (ex 18-19):	1.6%	Avg 10 (ex 18-19):	1.069
Prior Selected Trend:	0.5%	Prior Sel Avg:	1.000
Selected Trend:	0.5%	Sel. Loss Cost:	1.000

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 2, Exhibit 1, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCRIB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.960	
(2)	Credibility		40%	
(3)	Average Pmt Trend Statewide		0.950	
(4)	Credibility Weighted Trend		0.954	
		(Low)		(High)
(5)	Selected Range	0.944		0.959
(6)	Incremental Paid for 2019	245,631		245,631
(7)	Estimated Reserve	4,140,641		5,714,637
(8)	Paid to Date (82 & Prior)	20,811,223		20,811,223
(9)	Est Ult Paid for 1982 & Prior	24,951,864		26,525,861

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	249,326	264,346
(11)	Projected Number of Years	7	7
(12)	Estimated Reserve	1,745,282	1,850,421
(13)	Paid to Date (82 & Prior)	20,811,223	20,565,592
(14)	Est Ult Paid for 1982 & Prior	22,556,506	22,416,013
(14a)	Paid Counts During Fiscal Year	5	5
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	23,754,185	24,881,922
(16)	Lump Sum Ultimates	1,265,498	1,265,498
(17)	Ult Loss Including Lump Sums	**25,019,683**	**26,147,420**
(18)	Implied Tail	1.141	1.196
(19)	Ult Loss Inc Lump Sums @ 6/18	25,012,244	26,489,327

NOTES:

(1) From Section 2, Exhibit 1, Page 6
(2) = (Average of Section 2, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 2, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 2, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 2, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	689,918	13.444			
1993	2	793,381	13.584	1.150		
1994	3	677,152	13.426	0.854		
1995	4	616,229	13.331	0.910		
1996	5	581,038	13.273	0.943		
1997	6	667,765	13.412	1.149		
1998	7	676,041	13.424	1.012		
1999	8	626,143	13.347	0.926		
2000	9	638,144	13.366	1.019	n =	28
2001	10	586,837	13.283	0.920	S(x) =	56,154
2002	11	551,859	13.221	0.940	S(x-sq) =	112,618,674
2003	12	510,510	13.143	0.925	S(xy) =	732,177
2004	13	475,438	13.072	0.931	S(y) =	365
2005	14	461,151	13.041	0.970	D =	51,156
2006	15	476,801	13.075	1.034	slope =	-0.039
2007	16	429,059	12.969	0.900	Avg Trend =	0.961
2008	17	388,693	12.871	0.906		
2009	18	397,505	12.893	1.023		
2010	19	401,537	12.903	1.010		
2011	20	390,154	12.874	0.972		
2012	21	372,558	12.828	0.955		
2013	22	384,664	12.860	1.032		
2014	23	380,197	12.848	0.988		
2015	24	352,959	12.774	0.928		
2016	25	290,691	12.580	0.824		
2017	26	264,879	12.487	0.911		
2018	27	237,468	12.378	0.897		
2019	28	245,631	12.412	1.034		
					Selected Trend:	**0.960**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2019: 1.034 = 245631 / 237468

Commonwealth of Massachusetts Workers Compensation
Department of Developmental Services - Cluster 1
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Accident Yr End	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
June-83	303,088	716,212	1,018,528	1,273,160	1,522,276	1,772,634	2,026,466	2,293,172	2,479,591	2,709,942	2,878,245	2,989,792	3,133,165	3,273,307	3,334,466	3,383,940	3,420,864	3,471,952	3,531,863	3,593,426	3,656,287	3,718,769	3,782,583	3,849,168	3,918,660	3,991,417	4,067,350	4,144,239	4,190,906	4,231,391	4,273,198	4,309,167	4,309,167	4,309,167	4,309,167	4,309,167	4,309,167
June-84	588,752	1,391,250	1,978,503	2,473,129	2,957,038	3,430,512	3,850,638	4,248,292	4,569,012	4,852,567	5,084,077	5,325,765	5,500,225	5,591,777	5,716,071	5,844,905	5,981,927	6,097,750	6,217,962	6,335,407	6,446,404	6,561,447	6,682,092	6,807,737	6,918,835	7,027,806	7,138,148	7,248,169	7,362,291	7,479,325	7,598,225	7,719,150	7,843,266	7,972,071	8,104,814	8,246,950	
June-85	722,238	1,706,685	2,427,085	3,021,356	3,575,162	4,153,362	4,555,210	4,859,145	5,067,185	5,195,242	5,289,258	5,335,046	5,422,572	5,464,010	5,505,997	5,522,923	5,523,036	5,580,502	5,609,877	5,639,252	5,659,166	5,650,202	5,650,202	5,650,202	5,650,202	5,650,202	5,650,202	5,652,195	5,655,860	5,655,860	5,655,954	5,655,954	5,655,954	5,655,954	5,655,954		
June-86	1,095,655	2,589,088	3,658,454	4,589,190	5,452,112	6,125,447	6,630,963	7,055,749	7,268,651	7,575,650	7,835,016	8,089,718	8,284,822	8,452,458	8,677,431	8,856,536	8,960,945	9,024,666	9,066,019	9,108,290	9,147,296	9,188,006	9,230,664	9,275,183	9,320,262	9,334,452	9,334,452	9,334,452	9,334,452	9,334,452	9,334,452	9,334,452	9,334,452	9,334,452			
June-87	1,432,565	3,348,783	4,705,173	6,001,822	7,077,490	7,800,986	8,402,000	9,027,460	9,393,871	9,735,307	10,048,389	10,319,413	10,602,871	10,771,580	10,933,614	11,088,267	11,148,911	11,204,986	11,255,712	11,281,293	11,313,500	11,347,192	11,382,355	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789				
June-88	2,142,725	4,931,624	7,312,968	9,157,962	10,751,119	11,652,385	12,239,990	12,826,004	13,145,803	13,410,989	13,647,380	13,914,189	14,176,053	14,393,869	14,564,189	14,732,219	14,899,699	15,069,301	15,232,127	15,401,826	15,590,731	15,776,168	15,939,935	16,091,855	16,248,755	16,410,714	16,574,836	16,739,445	16,857,172	16,979,214	17,105,435	17,235,996					
June-89	2,139,859	5,737,843	8,345,508	10,235,005	11,538,085	12,380,476	13,056,104	13,607,875	13,950,193	14,223,676	14,460,790	14,677,503	14,820,152	14,959,611	15,088,991	15,215,644	15,354,762	15,504,713	15,612,328	15,710,703	15,815,015	15,923,590	16,033,593	16,140,651	16,239,237	16,310,241	16,382,887	16,458,118	16,535,361	16,577,438	16,612,609						
June-90	2,678,119	5,989,136	8,059,169	9,355,215	10,163,757	10,729,296	11,079,915	11,298,239	11,383,933	11,541,269	11,650,902	11,599,979	11,605,663	11,609,714	11,609,714	11,609,714	11,609,714	11,609,714	11,610,392	11,610,392	11,612,790	11,614,053	11,614,400	11,617,685	11,631,137	11,631,137	11,631,137	11,631,137	11,631,137	11,631,137							
June-91	2,055,995	4,525,519	5,956,270	6,809,892	7,377,934	7,700,162	7,848,119	7,941,980	8,070,661	8,111,443	8,150,308	8,195,730	8,243,748	8,275,457	8,287,806	8,289,633	8,289,633	8,289,927	8,295,115	8,296,069	8,296,953	8,297,667	8,298,631	8,299,673	8,300,774	8,301,627	8,301,627	8,301,627	8,301,627								
June-92	1,556,680	2,907,997	3,613,911	4,262,894	4,511,682	4,736,540	4,868,155	4,962,680	5,049,867	5,098,658	5,131,848	5,177,939	5,259,492	5,311,896	5,373,855	5,435,773	5,480,341	5,518,481	5,558,121	5,598,760	5,641,750	5,685,342	5,729,682	5,774,150	5,819,387	5,864,563	5,912,050	5,961,583									
June-93	931,603	1,916,981	2,439,817	2,755,036	2,906,872	3,136,998	3,162,217	3,209,301	3,219,019	3,198,001	3,197,828	3,197,728	3,197,728	3,197,728	3,204,287	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473									
June-94	923,316	1,598,259	1,935,049	2,093,050	2,066,940	2,146,254	2,134,209	2,198,365	2,247,827	2,310,431	2,340,041	2,380,852	2,417,221	2,452,624	2,487,353	2,524,486	2,527,522	2,527,522	2,527,522	2,527,522	2,527,522	2,527,522	2,527,522	2,527,522	2,527,522	2,529,622											
June-95	684,696	1,108,550	1,371,127	1,495,864	1,512,391	1,513,346	1,516,782	1,516,872	1,519,087	1,525,732	1,525,732	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329												
June-96	662,860	1,328,147	1,644,584	1,839,246	1,990,102	2,077,055	2,112,857	2,140,474	2,201,270	2,201,845	2,202,890	2,202,890	2,182,890	2,187,427	2,194,160	2,208,436	2,231,248	2,258,374	2,287,650	2,319,312	2,348,935	2,388,784	2,421,465	2,428,633													
June-97	698,135	1,214,849	1,461,845	1,657,511	1,722,983	1,773,677	1,788,438	1,787,621	1,785,332	1,785,117	1,785,270	1,787,627	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477														
June-98	573,338	1,086,539	1,414,459	1,559,175	1,673,532	1,729,564	1,772,059	1,810,392	1,842,420	1,881,278	1,926,278	1,959,704	1,981,242	2,002,689	2,024,867	2,047,330	2,069,948	2,092,836	2,116,101	2,139,333	2,162,985	2,186,995															
June-99	474,980	1,002,186	1,286,380	1,461,855	1,602,851	1,676,266	1,728,806	1,734,926	1,734,926	1,735,176	1,735,217	1,735,938	1,735,938	1,745,975	1,758,227	1,758,227	1,758,227	1,758,227	1,758,227	1,758,227	1,758,227																
June-00	554,623	1,006,163	1,264,666	1,446,800	1,556,201	1,579,597	1,684,607	1,741,958	1,774,284	1,814,835	1,849,313	1,888,484	1,924,733	1,960,546	1,996,627	2,033,129	2,070,234	2,107,204	2,144,841	2,183,164																	
June-01	727,441	1,320,455	1,784,558	2,038,666	2,257,429	2,391,407	2,505,985	2,630,995	2,692,967	2,745,367	2,798,403	2,855,751	2,911,077	2,965,792	3,017,890	3,070,914	3,124,951	3,174,172	3,228,588																		
June-02	660,993	1,170,323	1,474,134	1,719,436	1,840,352	1,925,268	1,929,260	1,934,317	1,935,028	1,938,322	1,946,247	1,946,268	1,946,268	1,946,268	1,946,268	1,946,268	1,946,268	1,947,862																			
June-03	681,649	1,386,238	1,930,433	2,233,645	2,345,508	2,434,780	2,476,294	2,514,232	2,549,374	2,574,011	2,599,103	2,623,851	2,648,895	2,674,405	2,699,825	2,720,211	2,720,211																				
June-04	615,642	1,250,196	1,708,083	2,040,603	2,220,200	2,394,408	2,518,890	2,590,854	2,651,972	2,714,242	2,777,430	2,840,573	2,904,693	2,968,719	3,034,745	3,101,642																					
June-05	629,880	1,271,294	1,746,413	2,055,018	2,203,801	2,285,267	2,302,225	2,315,265	2,315,265	2,315,265	2,315,265	2,315,265	2,315,265	2,315,265	2,315,265																						
June-06	562,846	1,157,132	1,564,874	1,794,067	1,951,884	2,062,228	2,165,020	2,239,388	2,319,829	2,390,156	2,415,470	2,427,360	2,439,465	2,451,790																							
June-07	526,806	1,054,827	1,513,205	1,806,536	2,009,359	2,144,089	2,257,101	2,357,734	2,399,788	2,422,230	2,444,639	2,467,452	2,490,682																								
June-08	492,006	840,226	1,027,421	1,150,550	1,226,279	1,259,770	1,289,567	1,309,318	1,325,773	1,349,256	1,381,465	1,426,669																									
June-09	609,589	1,045,186	1,367,431	1,598,834	1,731,424	1,807,061	1,866,572	1,918,036	1,959,565	2,000,096	2,043,397																										
June-10	611,726	1,437,135	2,071,218	2,345,985	2,542,928	2,700,053	2,771,498	2,805,389	2,829,952	2,848,986																											
June-11	714,837	1,318,901	1,664,634	1,948,510	2,176,832	2,332,885	2,417,198	2,466,418	2,510,326																												
June-12	737,468	1,470,092	1,872,540	2,089,074	2,233,894	2,365,672	2,431,645	2,460,231																													
June-13	748,452	1,316,963	1,677,597	1,855,465	1,995,318	2,076,543	2,124,200																														
June-14	693,795	1,434,737	1,895,910	2,203,839	2,380,774	2,463,658																															
June-15	685,778	1,336,264	1,894,169	2,294,853	2,687,276																																
June-16	713,131	1,227,202	1,453,482	1,666,384																																	
June-17	684,027	1,290,456	1,658,597																																		
June-18	624,664	1,297,701																																			
June-19	670,450																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
June-83	2.363	1.422	1.250	1.196	1.164	1.143	1.132	1.081	1.093	1.062	1.039	1.048	1.045	1.019	1.015	1.011	1.015	1.017	1.017	1.017	1.017	1.017	1.018	1.018	1.019	1.019	1.019	1.011	1.010	1.010	1.008	1.000	1.000	1.000	1.000	1.000
June-84	2.363	1.422	1.250	1.196	1.160	1.122	1.103	1.075	1.062	1.048	1.048	1.033	1.017	1.022	1.023	1.023	1.019	1.020	1.019	1.018	1.018	1.018	1.019	1.016	1.016	1.016	1.015	1.016	1.016	1.016	1.016	1.016	1.016	1.017	1.018	
June-85	2.363	1.422	1.245	1.183	1.162	1.097	1.067	1.043	1.025	1.018	1.009	1.016	1.008	1.008	1.003	1.000	1.010	1.005	1.005	1.004	0.998	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000		
June-86	2.363	1.413	1.254	1.188	1.123	1.083	1.064	1.030	1.042	1.034	1.033	1.024	1.020	1.027	1.021	1.012	1.007	1.005	1.005	1.004	1.004	1.005	1.005	1.005	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.338	1.405	1.276	1.179	1.102	1.077	1.074	1.041	1.036	1.032	1.027	1.027	1.016	1.015	1.014	1.005	1.005	1.005	1.002	1.003	1.003	1.003	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.302	1.483	1.252	1.174	1.084	1.050	1.048	1.025	1.020	1.018	1.020	1.019	1.015	1.012	1.012	1.011	1.011	1.011	1.011	1.012	1.012	1.010	1.010	1.010	1.010	1.010	1.010	1.007	1.007	1.007	1.008					
June-89	2.681	1.454	1.226	1.127	1.073	1.055	1.042	1.025	1.020	1.017	1.015	1.010	1.009	1.009	1.008	1.009	1.010	1.007	1.006	1.007	1.007	1.007	1.007	1.006	1.004	1.004	1.005	1.005	1.003	1.002						
June-90	2.236	1.346	1.161	1.086	1.056	1.033	1.020	1.008	1.014	1.009	0.996	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000							
June-91	2.201	1.316	1.143	1.083	1.044	1.019	1.012	1.016	1.005	1.005	1.006	1.006	1.004	1.001	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
June-92	1.868	1.243	1.180	1.058	1.050	1.028	1.019	1.018	1.010	1.007	1.009	1.016	1.010	1.012	1.012	1.008	1.007	1.007	1.007	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008									
June-93	2.058	1.273	1.129	1.055	1.079	1.008	1.015	1.003	0.993	1.000	1.000	1.000	1.000	1.002	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	1.731	1.211	1.082	0.988	1.038	0.994	1.030	1.022	1.028	1.013	1.017	1.015	1.015	1.014	1.015	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001											
June-95	1.619	1.237	1.091	1.011	1.001	1.002	1.000	1.001	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	2.004	1.238	1.118	1.082	1.044	1.017	1.013	1.028	1.000	1.000	1.000	0.991	1.002	1.003	1.007	1.010	1.012	1.013	1.014	1.013	1.017	1.014	1.003													
June-97	1.740	1.203	1.134	1.040	1.029	1.008	1.000	0.999	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	1.895	1.302	1.102	1.073	1.033	1.025	1.022	1.018	1.021	1.024	1.017	1.011	1.011	1.011	1.011	1.011	1.011	1.011	1.011	1.011	1.011															
June-99	2.110	1.284	1.136	1.096	1.046	1.031	1.004	1.000	1.000	1.000	1.000	1.000	1.006	1.007	1.000	1.000	1.000	1.000	1.000	1.000																
June-00	1.814	1.257	1.144	1.076	1.015	1.066	1.034	1.019	1.023	1.019	1.021	1.019	1.019	1.018	1.018	1.018	1.018	1.018	1.018																	
June-01	1.815	1.351	1.142	1.107	1.059	1.048	1.050	1.024	1.019	1.019	1.020	1.019	1.019	1.018	1.018	1.018	1.016	1.017																		
June-02	1.771	1.260	1.166	1.070	1.046	1.002	1.003	1.000	1.002	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.001																			
June-03	2.034	1.393	1.157	1.050	1.038	1.017	1.015	1.014	1.010	1.010	1.010	1.010	1.010	1.010	1.008	1.000																				
June-04	2.031	1.366	1.195	1.088	1.078	1.052	1.029	1.024	1.023	1.023	1.023	1.023	1.022	1.022	1.022																					
June-05	2.018	1.374	1.177	1.072	1.037	1.007	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
June-06	2.056	1.352	1.146	1.088	1.057	1.050	1.034	1.036	1.030	1.011	1.005	1.005	1.005																							
June-07	2.002	1.435	1.194	1.112	1.067	1.053	1.045	1.018	1.009	1.009	1.009	1.009																								
June-08	1.708	1.223	1.120	1.066	1.027	1.024	1.015	1.013	1.018	1.024	1.033																									
June-09	1.715	1.308	1.169	1.083	1.044	1.033	1.028	1.022	1.021	1.022																										
June-10	2.349	1.441	1.133	1.084	1.062	1.026	1.012	1.009	1.007																											
June-11	1.845	1.262	1.171	1.117	1.072	1.036	1.020	1.018																												
June-12	1.993	1.274	1.116	1.069	1.059	1.028	1.012																													
June-13	1.760	1.274	1.106	1.075	1.041	1.023																														
June-14	2.068	1.321	1.162	1.080	1.035																															
June-15	1.949	1.418	1.212	1.171																																
June-16	1.721	1.184	1.146																																	
June-17	1.887	1.285																																		
June-18	2.077																																			

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs	2.024	1.327	1.167	1.098	1.063	1.041	1.032	1.022	1.019	1.016	1.014	1.012	1.010	1.010	1.009	1.007	1.007	1.007	1.006	1.006	1.006	1.005	1.005	1.005	1.005	1.005	1.006	1.004	1.004	1.005	1.005	1.003	1.004	1.006	1.009	1.000	
Latest 5	1.940	1.296	1.148	1.103	1.054	1.029	1.017	1.016	1.017	1.013	1.014	1.009	1.007	1.010	1.013	1.007	1.009	1.009	1.009	1.005	1.006	1.003	1.002	1.002	1.002	1.003	1.005	1.002	1.002	1.002	1.005	1.003					
Latest 3	1.895	1.296	1.173	1.109	1.045	1.029	1.015	1.016	1.015	1.018	1.016	1.005	1.009	1.011	1.010	1.006	1.011	1.012	1.010	1.004	1.009	1.005	1.001	1.000	1.003	1.003	1.003	1.002	1.003	1.003	1.003	1.000	1.005	1.006			
Volume Wtd																																					
All Yrs	2.089	1.348	1.182	1.110	1.070	1.046	1.038	1.024	1.021	1.018	1.015	1.014	1.011	1.011	1.010	1.007	1.007	1.007	1.006	1.006	1.006	1.006	1.006	1.005	1.005	1.005	1.005	1.004	1.004	1.004	1.005	1.003	1.005	1.007	1.011		
Latest 5	1.936	1.299	1.150	1.104	1.054	1.029	1.017	1.016	1.016	1.012	1.013	1.010	1.008	1.011	1.014	1.008	1.010	1.011	1.009	1.006	1.006	1.003	1.003	1.002	1.002	1.003	1.005	1.003	1.002	1.003	1.005						
Latest 3	1.887	1.299	1.176	1.112	1.045	1.029	1.015	1.015	1.014	1.017	1.013	1.005	1.010	1.011	1.011	1.007	1.012	1.013	1.010	1.004	1.010	1.006	1.001	1.000	1.004	1.003	1.002	1.002	1.004	1.004	1.003	1.000	1.006				

Dev Factor Selection																																					
Industry 1	2.958	1.587	1.232	1.108	1.038	1.023	1.014	1.008	1.006	1.007	1.006	1.010	1.003	1.004	1.003	1.003	1.005	1.003																			
Industry 2		1.877	1.312	1.143	1.055	1.028	1.016	1.015	1.006	1.005	1.007	1.007	1.004	1.002	1.005	1.002	1.003	1.002	1.001	1.001																	
Prior	1.862	1.304	1.153	1.085	1.055	1.030	1.028	1.019	1.017	1.015	1.009	1.010	1.010	1.012	1.010	1.007	1.008	1.009	1.006	1.006	1.005	1.005	1.005	1.005	1.005	1.005	1.006	1.006	1.005	1.005	1.005	1.002	1.002	1.002	1.002	1.006	
Selected	1.912	1.299	1.148	1.103	1.054	1.029	1.028	1.018	1.017	1.016	1.014	1.009	1.009	1.010	1.012	1.007	1.008	1.010	1.008	1.006	1.005	1.005	1.005	1.005	1.005	1.005	1.006	1.006	1.005	1.005	1.005	1.002	1.002	1.002	1.002	1.002	1.006
FacToUlt	4.351	2.276	1.752	1.526	1.384	1.313	1.276	1.241	1.219	1.198	1.180	1.163	1.153	1.143	1.131	1.118	1.110	1.101	1.090	1.081	1.075	1.070	1.064	1.059	1.054	1.049	1.043	1.037	1.031	1.026	1.021	1.016	1.014	1.012	1.010	1.008	1.006
Percent of Ult	23.0%	43.9%	57.1%	65.5%	72.3%	76.1%	78.4%	80.6%	82.0%	83.4%	84.8%	86.0%	86.7%	87.5%	88.4%	89.4%	90.1%	90.8%	91.8%	92.5%	93.0%	93.5%	94.0%	94.4%	94.9%	95.4%	95.8%	96.4%	97.0%	97.5%	98.0%	98.5%	98.7%	98.9%	99.1%	99.3%	99.5%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	25,012,244	26,489,327	25,019,683	26,147,420	7,439	0.0%	(341,908)	-1.3%
6/30/82-83	4,724,221	4,728,945	4,723,296	4,728,019	(925)	0.0%	(926)	0.0%
6/30/83-84	9,125,000	9,134,136	9,274,000	9,282,819	149,000	1.6%	148,682	1.6%
6/30/84-85	6,818,000	6,865,940	6,818,000	6,864,721	0	0.0%	(1,219)	0.0%
6/30/85-86	10,282,000	10,293,000	10,282,000	10,293,000	0	0.0%	0	0.0%
6/30/86-87	13,494,000	13,507,000	13,494,000	13,507,000	0	0.0%	0	0.0%
6/30/87-88	20,205,000	20,224,000	20,284,000	20,301,000	79,000	0.4%	77,000	0.4%
6/30/88-89	20,614,000	20,624,000	20,596,000	20,605,000	(18,000)	-0.1%	(19,000)	-0.1%
6/30/89-90	15,169,000	15,169,000	15,169,000	15,169,000	0	0.0%	0	0.0%
6/30/90-91	10,976,000	10,976,000	10,976,000	10,976,000	0	0.0%	0	0.0%
6/30/91-92	7,966,000	7,969,000	7,991,000	7,994,000	25,000	0.3%	25,000	0.3%
6/30/92-93	4,231,000	4,273,000	4,231,000	4,273,000	0	0.0%	0	0.0%
6/30/93-94	3,566,000	3,601,000	3,568,000	3,603,000	2,000	0.1%	2,000	0.1%
6/30/94-95	2,171,000	2,172,000	2,166,000	2,166,000	(5,000)	-0.2%	(6,000)	-0.3%
6/30/95-96	3,321,000	3,323,000	3,320,000	3,322,000	(1,000)	0.0%	(1,000)	0.0%
6/30/96-97	2,479,000	2,492,000	2,479,000	2,492,000	0	0.0%	0	0.0%
6/30/97-98	2,855,000	2,857,000	2,873,000	2,875,000	18,000	0.6%	18,000	0.6%
6/30/98-99	2,554,000	2,554,000	2,546,000	2,546,000	(8,000)	-0.3%	(8,000)	-0.3%
6/30/99-00	2,671,000	2,673,000	2,702,000	2,705,000	31,000	1.2%	32,000	1.2%
6/30/00-01	3,720,000	3,732,000	3,759,000	3,771,000	39,000	1.0%	39,000	1.0%
6/30/01-02	2,241,000	2,252,000	2,242,000	2,253,000	1,000	0.0%	1,000	0.0%
6/30/02-03	3,359,000	3,367,000	3,351,000	3,358,000	(8,000)	-0.2%	(9,000)	-0.3%
6/30/03-04	3,719,000	3,732,000	3,772,000	3,785,000	53,000	1.4%	53,000	1.4%
6/30/04-05	2,672,000	2,685,000	2,672,000	2,685,000	0	0.0%	0	0.0%
6/30/05-06	3,101,000	3,145,000	3,093,000	3,141,000	(8,000)	-0.3%	(4,000)	-0.1%
6/30/06-07	3,279,000	3,312,000	3,278,000	3,317,000	(1,000)	0.0%	5,000	0.2%
6/30/07-08	1,801,000	1,973,000	1,883,000	2,036,000	82,000	4.6%	63,000	3.2%
6/30/08-09	2,748,000	2,807,000	2,779,000	2,822,000	31,000	1.1%	15,000	0.5%
6/30/09-10	3,890,000	4,009,000	3,871,000	3,994,000	(19,000)	-0.5%	(15,000)	-0.4%
6/30/10-11	3,482,000	3,547,000	3,467,000	3,543,000	(15,000)	-0.4%	(4,000)	-0.1%
6/30/11-12	3,658,000	3,726,000	3,605,000	3,674,000	(53,000)	-1.4%	(52,000)	-1.4%
6/30/12-13	3,409,000	3,441,000	3,378,000	3,396,000	(31,000)	-0.9%	(45,000)	-1.3%
6/30/13-14	3,935,000	4,024,000	3,902,000	3,984,000	(33,000)	-0.8%	(40,000)	-1.0%
6/30/14-15	3,797,000	3,922,000	4,047,000	4,250,000	250,000	6.6%	328,000	8.4%
6/30/15-16	3,013,000	3,255,000	3,048,000	3,214,000	35,000	1.2%	(41,000)	-1.3%
6/30/16-17	3,479,000	3,488,000	3,459,000	3,492,000	(20,000)	-0.6%	4,000	0.1%
6/30/17-18	3,108,000	3,341,000	3,442,000	3,486,000	334,000	10.7%	145,000	4.3%
6/30/18-19								
Total	226,644,465	229,683,349	227,559,979	230,050,979	915,514	0.4%	367,630	0.2%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 2, Exhibit 1, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	20,811,223	1.169	24,318,053	0.0%	0.0%	0	1,265,498	1,265,498	5.2%	1.000	1,265,498	1,265,498	1,265,498
6/30/82-83	4,309,167	1.006	4,332,896	0.0%	0.0%	0	390,400	390,400	9.0%	1.000	390,400	390,400	390,400
6/30/83-84	8,246,950	1.058	8,724,395	0.0%	0.0%	0	549,150	549,150	6.3%	1.000	549,150	549,150	549,150
6/30/84-85	5,655,954	1.010	5,709,870	0.0%	0.0%	0	1,154,851	1,154,851	20.2%	1.000	1,154,851	1,154,851	1,154,851
6/30/85-86	9,334,452	1.012	9,442,281	0.0%	0.0%	0	937,644	937,644	9.9%	1.000	937,644	937,644	937,644
6/30/86-87	11,412,789	1.014	11,567,717	0.0%	0.0%	0	2,067,717	2,067,717	17.9%	1.000	2,067,717	2,067,717	2,067,717
6/30/87-88	17,235,996	1.016	17,504,913	0.0%	0.0%	0	2,795,764	2,795,764	16.0%	1.000	2,795,764	2,795,764	2,795,764
6/30/88-89	16,612,609	1.021	16,956,158	0.0%	0.0%	0	3,639,613	3,639,613	21.5%	1.000	3,639,613	3,639,613	3,639,613
6/30/89-90	11,631,137	1.026	11,931,027	0.0%	0.0%	0	3,387,581	3,387,581	28.4%	1.000	3,387,581	3,387,581	3,387,581
6/30/90-91	8,301,627	1.031	8,558,249	0.0%	0.0%	0	2,565,430	2,565,430	30.0%	1.000	2,565,430	2,565,430	2,571,844
6/30/91-92	5,961,583	1.037	6,182,744	0.0%	0.0%	0	1,806,412	1,806,412	29.2%	1.005	1,815,444	1,810,928	1,811,836
6/30/92-93	3,210,473	1.043	3,349,552	0.0%	0.0%	0	979,103	979,103	29.2%	1.006	984,983	982,043	982,535
6/30/93-94	2,529,622	1.049	2,652,403	0.0%	0.0%	0	968,701	968,701	36.5%	1.007	975,493	972,097	972,585
6/30/94-95	1,526,329	1.054	1,608,415	0.0%	0.0%	0	555,200	555,200	34.5%	1.008	559,652	557,426	557,706
6/30/95-96	2,428,633	1.059	2,572,041	0.0%	0.0%	0	746,640	746,640	29.0%	1.009	753,379	750,010	750,386
6/30/96-97	1,787,477	1.064	1,902,490	0.0%	0.0%	0	679,550	679,550	35.7%	1.010	686,369	682,960	683,303
6/30/97-98	2,186,995	1.070	2,339,354	0.0%	0.0%	0	533,163	533,163	22.8%	1.011	539,052	536,107	536,377
6/30/98-99	1,758,227	1.075	1,890,118	0.0%	0.0%	0	652,071	652,071	34.5%	1.012	659,932	656,002	656,332
6/30/99-00	2,183,164	1.081	2,360,648	0.0%	0.0%	0	342,501	342,501	14.5%	1.013	346,977	344,739	344,912
6/30/00-01	3,228,588	1.090	3,518,022	0.0%	0.0%	0	251,103	251,103	7.1%	1.014	254,639	252,871	254,737
6/30/01-02	1,947,862	1.101	2,144,654	0.1%	0.1%	2,145	283,214	285,358	13.3%	1.015	287,489	286,423	287,644
6/30/02-03	2,720,211	1.110	3,019,336	0.1%	0.2%	6,039	333,024	339,062	11.2%	1.016	338,389	338,726	340,415
6/30/03-04	3,101,642	1.118	3,467,595	0.1%	0.3%	10,403	309,825	320,228	9.2%	1.017	315,131	317,680	323,315
6/30/04-05	2,315,265	1.131	2,619,144	0.2%	0.5%	13,096	343,352	356,448	13.6%	1.032	354,366	355,407	360,723
6/30/05-06	2,451,790	1.143	2,801,693	0.2%	0.7%	19,612	321,502	341,114	12.2%	1.048	336,793	338,953	344,275
6/30/06-07	2,490,682	1.153	2,871,616	0.2%	0.9%	25,845	419,533	445,377	15.5%	1.063	446,078	445,728	451,879
6/30/07-08	1,426,669	1.163	1,659,215	0.2%	1.1%	18,251	206,501	224,752	13.5%	1.079	222,861	223,806	185,151
6/30/08-09	2,043,397	1.180	2,410,793	0.3%	1.4%	33,751	334,000	367,751	15.3%	1.101	367,670	367,710	375,600
6/30/09-10	2,848,986	1.198	3,414,065	0.3%	1.7%	58,039	517,879	575,918	16.9%	1.128	584,337	580,127	594,019
6/30/10-11	2,510,326	1.219	3,059,522	0.3%	2.0%	61,190	419,000	480,190	15.7%	1.162	486,952	483,571	514,174
6/30/11-12	2,460,231	1.241	3,053,143	0.3%	2.3%	71,540	513,436	584,976	19.2%	1.278	656,374	620,675	651,915
6/30/12-13	2,124,200	1.276	2,710,467	0.8%	3.1%	84,525	534,227	618,752	22.8%	1.342	717,101	667,926	705,302
6/30/13-14	2,463,658	1.313	3,235,458	1.2%	4.4%	140,923	607,501	748,424	23.1%	1.409	856,231	748,424	752,410
6/30/14-15	2,687,276	1.384	3,718,284	1.7%	6.0%	223,552	307,500	531,052	14.3%	1.732	532,565	531,809	500,000
6/30/15-16	1,666,384	1.526	2,542,352	2.7%	8.7%	222,024	241,188	463,212	18.2%	2.276	548,921	506,066	513,002
6/30/16-17	1,658,597	1.752	2,906,041	4.1%	12.8%	371,525	214,500	586,025	20.2%	4.094	878,111	586,025	594,334
6/30/17-18	1,297,701	2.276	2,953,390	2.8%	15.6%	459,674	73,000	532,674	18.0%	10.897	795,447	532,674	500,000
6/30/18-19	670,450	4.351	2,917,018	2.2%	17.8%	518,953	0	518,953	17.8%	59.931	0	518,953	
Total	179,238,321		198,925,130			2,341,086	32,247,272	34,588,358	17.4%		35,054,382	34,749,514	34,304,928

NOTES:
(2) From Section 2, Exhibit 1, Page 2, Column 3
(3) = (4) / (2)
(4) From Section 2, Exhibit 1, Page 2, Column 6
(5) From Section 2, Exhibit 1, Page 11
(6) Downward sum of (5)
(7) = (6) x (4)
(8) From Section 2, Exhibit 1, Page 10
(9) = (7) + (8)
(10) = (9) / (4)
(11) From Section 2, Exhibit 1, Page 12
(12) = (8) x (11)
(13) Selected based on (9) and (12)
(14) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts Workers Compensation
Department of Developmental Services - Cluster 1
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0	0	0	0	0	0	12,000	24,000	9,000	0	0	40,000	0	172,000	110,000	50,000	70,500	30,000	208,333	116,667	324,998	0	60,000	35,000	0	3,000	0	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	0	25,500	25,000	52,900	7,000	30,000	95,000	145,000	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	32,500	19,000	0	45,000	108,650	69,000	145,000	0	45,000	0	30,000	10,000	0	45,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	12,500	32,500	24,500	92,001	128,250	196,400	182,000	70,000	48,500	205,700	0	0	30,000	52,500	30,000	0	25,000	0	0	0	0	0	0	0	0	25,000	0	0	0	0	0	0			
Jun-86	0	0	23,500	19,200	19,100	93,844	174,500	476,000	95,500	0	0	0	36,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Jun-87	0	36,440	6,089	107,500	67,961	393,241	517,987	205,500	149,499	10,000	92,500	15,000	146,000	125,000	120,000	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	9,000	98,700	314,201	299,750	663,711	365,000	263,001	345,000	230,400	71,500	91,500	40,000	0	0	0	0	0	0	0	0	1	0	0	4,000	0	0	0	0	0	0	0						
Jun-89	0	51,500	107,000	525,918	831,350	467,250	201,495	468,000	227,500	96,000	182,000	228,100	128,500	0	0	0	0	33,333	45,833	45,834	0	0	0	0	0	0	0	0	0	0	0							
Jun-90	0	83,875	561,509	740,856	246,000	295,600	525,500	290,000	127,241	77,000	235,834	135,833	33,333	0	0	0	0	0	0	0	0	0	0	0	4,500	30,500	0	0	0	0								
Jun-91	10,000	315,052	866,050	279,500	174,700	509,340	313,000	57,788	15,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Jun-92	54,000	344,161	128,250	87,501	545,500	236,500	52,500	15,000	30,000	60,000	88,000	0	0	0	0	0	165,000	0	0	0	0	0	0	0	0	0	0	0										
Jun-93	33,000	174,000	164,503	395,750	49,500	66,500	75,850	0	20,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Jun-94	20,500	90,701	289,500	222,500	110,000	82,500	118,000	0	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Jun-95	4,000	156,500	207,200	162,500	15,000	0	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Jun-96	52,000	212,180	221,000	48,960	42,000	0	48,667	18,833	43,000	35,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0														
Jun-97	36,500	178,250	214,000	155,300	85,500	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0															
Jun-98	10,000	108,163	240,000	120,000	30,000	0	0	0	0	0	0	25,000	0	0	0	0	0	0	0	0	0	0																
Jun-99	0	182,500	192,000	113,220	1,824	7,437	11,035	14,055	0	0	0	0	0	0	65,000	65,000	0	0	0	0	0																	
Jun-00	12,500	57,501	82,000	36,500	38,500	8,500	10,500	27,500	10,000	0	0	34,000	25,000	0	0	0	0	0	0	0																		
Jun-01	17,500	22,844	43,510	37,903	34,170	41,676	38,500	15,000	0	0	0	0	0	0	0	0	0	0	0																			
Jun-02	0	800	23,940	52,775	72,135	32,564	76,000	25,000	0	0	0	0	0	0	0	0	0	0																				
Jun-03	0	0	48,352	99,400	91,822	48,450	10,000	0	0	30,000	0	0	0	0	5,000	0	0																					
Jun-04	0	0	88,974	64,100	121,250	0	0	5,501	0	0	0	30,000	0	0	0	0																						
Jun-05	0	7,500	39,052	104,600	42,000	94,000	20,000	0	36,200	0	0	0	0	0	0																							
Jun-06	0	14,800	50,202	87,500	46,500	30,000	3,500	14,000	19,700	15,300	35,000	5,000	0	0																								
Jun-07	0	8,500	85,000	83,750	78,000	6,000	6,000	20,000	120,783	11,500	0	0	0																									
Jun-08	0	37,000	17,501	25,000	45,000	30,000	3,000	8,000	0	0	0	41,000																										
Jun-09	0	24,000	55,000	41,000	35,500	90,500	34,500	48,500	5,000	0	0																											
Jun-10	0	12,500	57,878	128,398	138,602	52,001	98,500	30,000	0	0																												
Jun-11	0	27,523	53,478	75,263	75,237	72,000	67,500	48,000	0																													
Jun-12	0	35,436	120,064	151,936	128,500	42,500	35,000	0																														
Jun-13	0	101,200	70,600	223,200	111,602	27,625	0																															
Jun-14	0	35,000	261,500	187,500	65,000	58,501																																
Jun-15	0	10,000	80,000	112,500	105,000																																	
Jun-16	0	115,000	17,501	108,687																																		
Jun-17	35,000	100,000	79,500																																			
Jun-18	25,000	48,000																																				
Jun-19	0																																					

Cumulative Lump Sum Payments

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*	*456*
All Prior Yrs	0	0	0	0	0	0	12,000	36,000	45,000	45,000	45,000	85,000	85,000	257,000	367,000	417,000	487,500	517,500	725,833	842,500	1,167,498	1,167,498	1,227,498	1,262,498	1,262,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498
Jun-83	0	0	0	0	0	0	0	0	25,500	50,500	103,400	110,400	140,400	235,400	380,400	380,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400		
Jun-84	0	0	0	0	0	32,500	51,500	51,500	96,500	205,150	274,150	419,150	419,150	464,150	464,150	494,150	504,150	504,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150			
Jun-85	0	0	0	12,500	45,000	69,500	161,501	289,751	486,151	668,151	738,151	786,651	992,351	992,351	992,351	1,022,351	1,074,851	1,104,851	1,104,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851		
Jun-86	0	0	23,500	42,700	61,800	155,644	330,144	806,144	901,644	901,644	901,644	901,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644				
Jun-87	0	36,440	42,529	150,029	217,990	611,231	1,129,218	1,334,718	1,484,217	1,494,217	1,586,717	1,601,717	1,747,717	1,872,717	1,992,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717						
Jun-88	0	9,000	107,700	421,901	721,651	1,385,362	1,750,362	2,013,363	2,358,363	2,588,763	2,660,263	2,751,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,764	2,791,764	2,791,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764						
Jun-89	0	51,500	158,500	684,418	1,515,768	1,983,018	2,184,513	2,652,513	2,880,013	2,976,013	3,158,013	3,386,113	3,514,613	3,514,613	3,514,613	3,514,613	3,514,613	3,547,946	3,593,779	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613							
Jun-90	0	83,875	645,384	1,386,240	1,632,240	1,927,840	2,453,340	2,743,340	2,870,581	2,947,581	3,183,415	3,319,248	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,357,081	3,387,581	3,387,581	3,387,581	3,387,581	3,387,581								
Jun-91	10,000	325,052	1,191,102	1,470,602	1,645,302	2,154,642	2,467,642	2,525,430	2,540,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430								
Jun-92	54,000	398,161	526,411	613,912	1,159,412	1,395,912	1,448,412	1,463,412	1,493,412	1,553,412	1,641,412	1,641,412	1,641,412	1,641,412	1,641,412	1,641,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412										
Jun-93	33,000	207,000	371,503	767,253	816,753	883,253	959,103	959,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103											
Jun-94	20,500	111,201	400,701	623,201	733,201	815,701	933,701	933,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701												
Jun-95	4,000	160,500	367,700	530,200	545,200	545,200	545,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200													
Jun-96	52,000	264,180	485,180	534,140	576,140	576,140	624,807	643,640	686,640	721,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640														
Jun-97	36,500	214,750	428,750	584,050	669,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550															
Jun-98	10,000	118,163	358,163	478,163	508,163	508,163	508,163	508,163	508,163	508,163	508,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163																
Jun-99	0	182,500	374,500	487,720	489,544	496,981	508,016	522,071	522,071	522,071	522,071	522,071	522,071	522,071	587,071	652,071	652,071	652,071	652,071	652,071	652,071																	
Jun-00	12,500	70,001	152,001	188,501	227,001	235,501	246,001	273,501	283,501	283,501	283,501	317,501	342,501	342,501	342,501	342,501	342,501	342,501	342,501	342,501																		
Jun-01	17,500	40,344	83,854	121,757	155,927	197,603	236,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103																			
Jun-02	0	800	24,740	77,515	149,650	182,214	258,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214																				
Jun-03	0	0	48,352	147,752	239,574	288,024	298,024	298,024	298,024	328,024	328,024	328,024	328,024	328,024	333,024	333,024	333,024																					
Jun-04	0	0	88,974	153,074	274,324	274,324	274,324	279,825	279,825	279,825	279,825	309,825	309,825	309,825	309,825	309,825																						
Jun-05	0	7,500	46,552	151,152	193,152	287,152	307,152	307,152	343,352	343,352	343,352	343,352	343,352	343,352	343,352																							
Jun-06	0	14,800	65,002	152,502	199,002	229,002	232,502	246,502	266,202	281,502	316,502	321,502	321,502	321,502																								
Jun-07	0	8,500	93,500	177,250	255,250	261,250	267,250	287,250	408,033	419,533	419,533	419,533	419,533																									
Jun-08	0	37,000	54,501	79,501	124,501	154,501	157,501	165,501	165,501	165,501	165,501	206,501																										
Jun-09	0	24,000	79,000	120,000	155,500	246,000	280,500	329,000	334,000	334,000	334,000																											
Jun-10	0	12,500	70,378	198,776	337,378	389,379	487,879	517,879	517,879	517,879																												
Jun-11	0	27,523	81,000	156,263	231,500	303,500	371,000	419,000	419,000																													
Jun-12	0	35,436	155,500	307,436	435,936	478,436	513,436	513,436																														
Jun-13	0	101,200	171,800	395,000	506,602	534,227	534,227																															
Jun-14	0	35,000	296,500	484,000	549,000	607,501																																
Jun-15	0	10,000	90,000	202,500	307,500																																	
Jun-16	0	115,000	132,501	241,188																																		
Jun-17	35,000	135,000	214,500																																			
Jun-18	25,000	73,000																																				
Jun-19	0																																					

Commonwealth of Massachusetts Workers Compensation
Department of Developmental Services - Cluster 1
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.002	0.000	0.007	0.005	0.002	0.003	0.001	0.009	0.005	0.013	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.006	0.012	0.002	0.007	0.022	0.033	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.004	0.002	0.000	0.005	0.012	0.008	0.017	0.000	0.005	0.000	0.003	0.001	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.002	0.006	0.004	0.016	0.022	0.034	0.032	0.012	0.008	0.036	0.000	0.000	0.005	0.009	0.005	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.002	0.002	0.002	0.010	0.018	0.050	0.010	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.003	0.001	0.009	0.006	0.034	0.045	0.018	0.013	0.001	0.008	0.001	0.013	0.011	0.010	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.001	0.006	0.018	0.017	0.038	0.021	0.015	0.020	0.013	0.004	0.005	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-89	0.000	0.003	0.006	0.031	0.049	0.028	0.012	0.028	0.013	0.006	0.011	0.013	0.008	0.000	0.000	0.000	0.000	0.002	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.007	0.047	0.062	0.021	0.025	0.044	0.024	0.011	0.006	0.020	0.011	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000								
Jun-91	0.001	0.037	0.101	0.033	0.020	0.060	0.037	0.007	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-92	0.009	0.056	0.021	0.014	0.088	0.038	0.008	0.002	0.005	0.010	0.014	0.000	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.010	0.052	0.049	0.118	0.015	0.020	0.023	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-94	0.008	0.034	0.109	0.084	0.041	0.031	0.044	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.002	0.097	0.129	0.101	0.009	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.020	0.082	0.086	0.019	0.016	0.000	0.019	0.007	0.017	0.014	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000														
Jun-97	0.019	0.094	0.112	0.082	0.045	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
Jun-98	0.004	0.046	0.103	0.051	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.000	0.097	0.102	0.060	0.001	0.004	0.006	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.034	0.000	0.000	0.000	0.000	0.000																	
Jun-00	0.005	0.024	0.035	0.015	0.016	0.004	0.004	0.012	0.004	0.000	0.000	0.014	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-01	0.005	0.006	0.012	0.011	0.010	0.012	0.011	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-02	0.000	0.000	0.011	0.025	0.034	0.015	0.035	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.000	0.000	0.016	0.033	0.030	0.016	0.003	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.002	0.000	0.000																					
Jun-04	0.000	0.000	0.026	0.018	0.035	0.000	0.000	0.002	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000																						
Jun-05	0.000	0.003	0.015	0.040	0.016	0.036	0.008	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000																							
Jun-06	0.000	0.005	0.018	0.031	0.017	0.011	0.001	0.005	0.007	0.005	0.012	0.002	0.000	0.000																								
Jun-07	0.000	0.003	0.030	0.029	0.027	0.002	0.002	0.007	0.042	0.004	0.000	0.000	0.000																									
Jun-08	0.000	0.022	0.011	0.015	0.027	0.018	0.002	0.005	0.000	0.000	0.000	0.025																										
Jun-09	0.000	0.010	0.023	0.017	0.015	0.038	0.014	0.020	0.002	0.000	0.000																											
Jun-10	0.000	0.004	0.017	0.038	0.041	0.015	0.029	0.009	0.000	0.000																												
Jun-11	0.000	0.009	0.017	0.025	0.025	0.024	0.022	0.016	0.000																													
Jun-12	0.000	0.012	0.039	0.050	0.042	0.014	0.011	0.000																														
Jun-13	0.000	0.037	0.026	0.082	0.041	0.010	0.000																															
Jun-14	0.000	0.011	0.081	0.058	0.020	0.018																																
Jun-15	0.000	0.003	0.022	0.030	0.028																																	
Jun-16	0.000	0.045	0.007	0.043																																		
Jun-17	0.012	0.034	0.027																																			
Jun-18	0.008	0.016																																				
Jun-19	0.000																																					

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
Simple Avg																																					
All Yrs (ex P)	0.024	0.037	0.037	0.023	0.017	0.014	0.009	0.008	0.004	0.004	0.005	0.003	0.002	0.003	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 5	0.022	0.033	0.053	0.031	0.016	0.015	0.010	0.009	0.002	0.002	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 3	0.032	0.019	0.044	0.030	0.014	0.011	0.008	0.001	0.000	0.000	0.009	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Olympic Avg																																					
All Yrs (ex P)	0.022	0.036	0.035	0.022	0.016	0.014	0.008	0.007	0.003	0.004	0.004	0.002	0.001	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 10	0.017	0.023	0.036	0.028	0.018	0.008	0.005	0.003	0.001	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Latest 5	0.020	0.025	0.050	0.031	0.016	0.016	0.010	0.001	0.001	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					

Dev Factor Selection		*0.022*	*0.030*	*0.039*	*0.028*	*0.017*	*0.013*	*0.009*	*0.004*	*0.003*	*0.003*	*0.003*	*0.002*	*0.002*	*0.002*	*0.002*	*0.001*	*0.001*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	
Prior	*NA*																																				
Selected	NA	0.022	0.028	0.041	0.027	0.017	0.012	0.008	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.178	0.156	0.128	0.087	0.060	0.044	0.031	0.023	0.020	0.017	0.014	0.011	0.009	0.007	0.005	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
Department of Developmental Services - Cluster 1
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444	456
All Prior Yrs	0	0	0	0	0	0	12,000	36,000	45,000	45,000	45,000	85,000	85,000	257,000	367,000	417,000	487,500	517,500	725,833	842,500	1,167,498	1,167,498	1,227,498	1,262,498	1,262,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498
Jun-83	0	0	0	0	0	0	0	0	25,500	50,500	103,400	110,400	140,400	235,400	380,400	380,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400
Jun-84	0	0	0	0	0	32,500	51,500	51,500	96,500	205,150	274,150	419,150	419,150	464,150	464,150	494,150	504,150	504,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	
Jun-85	0	0	0	12,500	45,000	69,500	161,501	289,751	486,151	668,151	738,151	786,651	992,351	992,351	992,351	1,022,351	1,074,851	1,104,851	1,104,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851		
Jun-86	0	0	23,500	42,700	61,800	155,644	330,144	806,144	901,644	901,644	901,644	901,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644			
Jun-87	0	36,440	42,529	150,029	217,990	611,231	1,129,218	1,334,718	1,484,217	1,494,217	1,586,717	1,601,717	1,747,717	1,872,717	1,992,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717			
Jun-88	0	9,000	107,700	421,901	721,651	1,385,362	1,750,362	2,013,363	2,358,363	2,588,763	2,660,263	2,751,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,764	2,791,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764					
Jun-89	0	51,500	158,500	684,418	1,515,768	1,983,018	2,184,513	2,652,513	2,880,013	2,976,013	3,158,013	3,386,113	3,514,613	3,514,613	3,514,613	3,514,613	3,514,613	3,547,946	3,593,779	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613						
Jun-90	0	83,875	645,384	1,386,240	1,632,240	1,927,840	2,453,340	2,743,340	2,870,581	2,947,581	3,183,415	3,319,248	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,357,081	3,387,581	3,387,581	3,387,581	3,387,581	3,387,581							
Jun-91	10,000	325,052	1,191,102	1,470,602	1,645,302	2,154,642	2,467,642	2,525,430	2,540,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430								
Jun-92	54,000	398,161	526,411	613,912	1,159,412	1,395,912	1,448,412	1,463,412	1,493,412	1,553,412	1,641,412	1,641,412	1,641,412	1,641,412	1,641,412	1,641,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412									
Jun-93	33,000	207,000	371,503	767,253	816,753	883,253	959,103	959,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103										
Jun-94	20,500	111,201	400,701	623,201	733,201	815,701	933,701	933,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701											
Jun-95	4,000	160,500	367,700	530,200	545,200	545,200	545,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200												
Jun-96	52,000	264,180	485,180	534,140	576,140	576,140	624,807	643,640	686,640	721,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640													
Jun-97	36,500	214,750	428,750	584,050	669,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550														
Jun-98	10,000	118,163	358,163	478,163	508,163	508,163	508,163	508,163	508,163	508,163	508,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163															
Jun-99	0	182,500	374,500	487,720	489,544	496,981	508,016	522,071	522,071	522,071	522,071	522,071	522,071	522,071	587,071	652,071	652,071	652,071	652,071	652,071	652,071																
Jun-00	12,500	70,001	152,001	188,501	227,001	235,501	246,001	273,501	283,501	283,501	283,501	317,501	342,501	342,501	342,501	342,501	342,501	342,501	342,501	342,501																	
Jun-01	17,500	40,344	83,854	121,757	155,927	197,603	236,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103																		
Jun-02	0	800	24,740	77,515	149,650	182,214	258,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214																			
Jun-03	0	0	48,352	147,752	239,574	288,024	298,024	298,024	298,024	328,024	328,024	328,024	328,024	328,024	328,024	333,024	333,024																				
Jun-04	0	0	88,974	153,074	274,324	274,324	274,324	279,825	279,825	279,825	279,825	309,825	309,825	309,825	309,825	309,825																					
Jun-05	0	7,500	46,552	151,152	193,152	287,152	307,152	307,152	343,352	343,352	343,352	343,352	343,352	343,352	343,352																						
Jun-06	0	14,800	65,002	152,502	199,002	229,002	232,502	246,502	266,202	281,502	316,502	321,502	321,502	321,502																							
Jun-07	0	8,500	93,500	177,250	255,250	261,250	267,250	287,250	408,033	419,533	419,533	419,533	419,533																								
Jun-08	0	37,000	54,501	79,501	124,501	154,501	157,501	165,501	165,501	165,501	165,501	206,501																									
Jun-09	0	24,000	79,000	120,000	155,500	246,000	280,500	329,000	334,000	334,000	334,000																										
Jun-10	0	12,500	70,378	198,776	337,378	389,379	487,879	517,879	517,879	517,879																											
Jun-11	0	27,523	81,000	156,263	231,500	303,500	371,000	419,000	419,000																												
Jun-12	0	35,436	155,500	307,436	435,936	478,436	513,436	513,436																													
Jun-13	0	101,200	171,800	395,000	506,602	534,227	534,227																														
Jun-14	0	35,000	296,500	484,000	549,000	607,501																															
Jun-15	0	10,000	90,000	202,500	307,500																																
Jun-16	0	115,000	132,501	241,188																																	
Jun-17	35,000	135,000	214,500																																		
Jun-18	25,000	73,000																																			
Jun-19	0																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
All Prior Yrs							3.000	1.250	1.000	1.000	1.889	1.000	3.024	1.428	1.136	1.169	1.062	1.403	1.161	1.386	1.000	1.051	1.029	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83									1.980	2.048	1.068	1.272	1.677	1.616	1.000	1.026	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84						1.585	1.000	1.874	2.126	1.336	1.529	1.000	1.107	1.000	1.065	1.020	1.000	1.089	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85				3.600	1.544	2.324	1.794	1.678	1.374	1.105	1.066	1.261	1.000	1.000	1.030	1.051	1.028	1.000	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.022	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86			1.817	1.447	2.519	2.121	2.442	1.118	1.000	1.000	1.000	1.040	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87		1.167	3.528	1.453	2.804	1.847	1.182	1.112	1.007	1.062	1.009	1.091	1.072	1.064	1.038	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-88		11.967	3.917	1.710	1.920	1.263	1.150	1.171	1.098	1.028	1.034	1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-89		3.078	4.318	2.215	1.308	1.102	1.214	1.086	1.033	1.061	1.072	1.038	1.000	1.000	1.000	1.000	1.009	1.013	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90		7.695	2.148	1.177	1.181	1.273	1.118	1.046	1.027	1.080	1.043	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.009	1.000	1.000	1.000	1.000									
Jun-91	32.505	3.664	1.235	1.119	1.310	1.145	1.023	1.006	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-92	7.373	1.322	1.166	1.889	1.204	1.038	1.010	1.021	1.040	1.057	1.000	1.000	1.000	1.000	1.000	1.101	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93	6.273	1.795	2.065	1.065	1.081	1.086	1.000	1.021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94	5.424	3.603	1.555	1.177	1.113	1.145	1.000	1.037	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95	40.125	2.291	1.442	1.028	1.000	1.000	1.018	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96	5.080	1.837	1.101	1.079	1.000	1.084	1.030	1.067	1.051	1.035	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
Jun-97	5.884	1.997	1.362	1.146	1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
Jun-98	11.816	3.031	1.335	1.063	1.000	1.000	1.000	1.000	1.000	1.000	1.049	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99		2.052	1.302	1.004	1.015	1.022	1.028	1.000	1.000	1.000	1.000	1.000	1.000	1.125	1.111	1.000	1.000	1.000	1.000	1.000																		
Jun-00	5.600	2.171	1.240	1.204	1.037	1.045	1.112	1.037	1.000	1.000	1.120	1.079	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01	2.305	2.078	1.452	1.281	1.267	1.195	1.064	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-02		30.925	3.133	1.931	1.218	1.417	1.097	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03			3.056	1.621	1.202	1.035	1.000	1.000	1.101	1.000	1.000	1.000	1.000	1.015	1.000	1.000																						
Jun-04			1.720	1.792	1.000	1.000	1.020	1.000	1.000	1.000	1.107	1.000	1.000	1.000	1.000																							
Jun-05		6.207	3.247	1.278	1.487	1.070	1.000	1.118	1.000	1.000	1.000	1.000	1.000	1.000																								
Jun-06		4.392	2.346	1.305	1.151	1.015	1.060	1.080	1.057	1.124	1.016	1.000	1.000																									
Jun-07		11.000	1.896	1.440	1.024	1.023	1.075	1.420	1.028	1.000	1.000	1.000																										
Jun-08		1.473	1.459	1.566	1.241	1.019	1.051	1.000	1.000	1.000	1.248																											
Jun-09		3.292	1.519	1.296	1.582	1.140	1.173	1.015	1.000	1.000																												
Jun-10		5.630	2.824	1.697	1.154	1.253	1.061	1.000	1.000																													
Jun-11		2.943	1.929	1.481	1.311	1.222	1.129	1.000																														
Jun-12		4.388	1.977	1.418	1.097	1.073	1.000																															
Jun-13		1.698	2.299	1.283	1.055	1.000																																
Jun-14		8.471	1.632	1.134	1.107																																	
Jun-15		9.000	2.250	1.519																																		
Jun-16		1.152	1.820																																			
Jun-17	3.857	1.589																																				
Jun-18	2.920																																					

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
Simple Avg																																						
All Yrs (ex P)	10.764	4.893	2.067	1.465	1.298	1.218	1.133	1.104	1.105	1.072	1.052	1.032	1.036	1.036	1.011	1.009	1.002	1.005	1.002	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		4.382	1.996	1.367	1.145	1.138	1.083	1.087	1.017	1.025	1.074	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		3.914	1.901	1.312	1.086	1.099	1.064	1.005	1.000	1.000	1.088	1.000	1.000	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Volume Wtd																																						
All Yrs (ex P)		2.619	1.683	1.318	1.229	1.160	1.106	1.069	1.039	1.039	1.033	1.026	1.010	1.013	1.008	1.009	1.003	1.004	1.003	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		2.285	1.926	1.314	1.123	1.121	1.074	1.073	1.016	1.023	1.050	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 3		1.681	1.787	1.260	1.086	1.078	1.057	1.004	1.000	1.000	1.051	1.000	1.000	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		

Dev Factor Selection																																						
Prior	5.500	2.704	1.854	1.337	1.233	1.050	1.050	1.100	1.030	1.025	1.020	1.015	1.015	1.015	1.015	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Selected	5.500	2.662	1.799	1.314	1.229	1.050	1.050	1.100	1.030	1.025	1.020	1.015	1.015	1.015	1.015	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	59.931	10.897	4.094	2.276	1.732	1.409	1.342	1.278	1.162	1.128	1.101	1.079	1.063	1.048	1.032	1.017	1.016	1.015	1.014	1.013	1.012	1.011	1.010	1.009	1.008	1.007	1.006	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	1.7%	9.2%	24.4%	43.9%	57.7%	71.0%	74.5%	78.2%	86.0%	88.6%	90.8%	92.7%	94.0%	95.5%	96.9%	98.3%	98.4%	98.5%	98.6%	98.7%	98.8%	98.9%	99.0%	99.1%	99.2%	99.3%	99.4%	99.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.5%	0.0%	0.1%	0.1%	1.000	1.000
444	99.5%	0.2%	0.5%	0.0%	0.0%	0.981	0.971
432	99.3%	0.2%	0.7%	0.0%	0.0%	0.953	0.931
420	99.1%	0.2%	0.9%	0.1%	0.0%	0.930	0.898
408	98.9%	0.2%	1.1%	0.1%	0.0%	0.909	0.868
396	98.7%	0.2%	1.3%	0.1%	0.0%	0.890	0.842
384	98.5%	0.5%	1.5%	0.1%	0.1%	0.872	0.817
372	98.0%	0.5%	2.0%	0.1%	0.1%	0.872	0.819
360	97.5%	0.5%	2.5%	0.2%	0.1%	0.866	0.811
348	97.0%	0.6%	3.0%	0.2%	0.1%	0.857	0.799
336	96.4%	0.6%	3.6%	0.2%	0.1%	0.849	0.789
324	95.8%	0.5%	4.2%	0.2%	0.1%	0.839	0.775
312	95.4%	0.5%	4.6%	0.2%	0.1%	0.825	0.756
300	94.9%	0.5%	5.1%	0.2%	0.1%	0.811	0.737
288	94.4%	0.5%	5.6%	0.2%	0.1%	0.796	0.719
276	94.0%	0.5%	6.0%	0.2%	0.1%	0.783	0.701
264	93.5%	0.5%	6.5%	0.2%	0.1%	0.769	0.684
252	93.0%	0.5%	7.0%	0.2%	0.2%	0.755	0.667
240	92.5%	0.7%	7.5%	0.3%	0.2%	0.745	0.654
228	91.8%	0.9%	8.2%	0.5%	0.3%	0.739	0.647
216	90.8%	0.7%	9.2%	0.4%	0.3%	0.738	0.648
204	90.1%	0.6%	9.9%	0.3%	0.2%	0.730	0.638
192	89.4%	1.0%	10.6%	0.6%	0.4%	0.719	0.624
180	88.4%	0.9%	11.6%	0.5%	0.4%	0.717	0.623
168	87.5%	0.8%	12.5%	0.5%	0.4%	0.710	0.615
156	86.7%	0.7%	13.3%	0.5%	0.4%	0.701	0.603
144	86.0%	1.2%	14.0%	0.8%	0.6%	0.690	0.591
132	84.8%	1.3%	15.2%	0.9%	0.7%	0.689	0.591
120	83.4%	1.4%	16.6%	1.0%	0.8%	0.688	0.590
108	82.0%	1.5%	18.0%	1.1%	0.9%	0.686	0.589
96	80.6%	2.2%	19.4%	1.6%	1.4%	0.684	0.587
84	78.4%	2.2%	21.6%	1.7%	1.5%	0.691	0.596
72	76.1%	3.9%	23.9%	3.1%	2.8%	0.694	0.601
60	72.3%	6.7%	27.7%	5.6%	5.2%	0.711	0.623
48	65.5%	8.5%	34.5%	7.4%	6.9%	0.741	0.663
36	57.1%	13.1%	42.9%	11.9%	11.4%	0.766	0.694
24	43.9%	21.0%	56.1%	19.8%	19.2%	0.794	0.729
12	23.0%	23.0%	77.0%	22.5%	22.3%	0.822	0.765
Total		100.0%					

NOTES:
(2) = 1 / Section 2, Exhibit 1, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	2,942,962	4,070,698		2,573,870	3,560,172
6/30/82-83	23,729	28,452	0.981	23,268	27,900
6/30/83-84	477,900	486,719	0.953	455,391	463,794
6/30/84-85	7,195	53,917	0.930	6,690	50,129
6/30/85-86	9,904	20,904	0.909	9,003	19,001
6/30/86-87	13,494	26,494	0.890	12,005	23,572
6/30/87-88	252,240	269,240	0.872	219,835	234,651
6/30/88-89	343,779	352,779	0.872	299,941	307,793
6/30/89-90	150,282	150,282	0.866	130,204	130,204
6/30/90-91	108,943	108,943	0.857	93,357	93,357
6/30/91-92	223,005	226,005	0.849	189,399	191,947
6/30/92-93	41,424	83,424	0.839	34,769	70,021
6/30/93-94	69,677	104,677	0.825	57,479	86,352
6/30/94-95	84,471	84,471	0.811	68,475	68,475
6/30/95-96	144,727	146,727	0.796	115,272	116,865
6/30/96-97	11,973	24,973	0.783	9,369	19,542
6/30/97-98	152,842	154,842	0.769	117,506	119,044
6/30/98-99	135,702	135,702	0.755	102,499	102,499
6/30/99-00	176,335	179,335	0.745	131,292	133,525
6/30/00-01	279,309	291,309	0.739	206,331	215,196
6/30/01-02	10,925	21,925	0.738	8,065	16,186
6/30/02-03	297,765	304,765	0.730	217,320	222,429
6/30/03-04	360,533	373,533	0.719	259,168	268,513
6/30/04-05	13,383	26,383	0.717	9,600	18,926
6/30/05-06	319,708	367,708	0.710	227,125	261,225
6/30/06-07	367,785	406,785	0.701	257,635	284,954
6/30/07-08	249,830	402,830	0.690	172,380	277,949
6/30/08-09	401,603	444,603	0.689	276,675	306,299
6/30/09-10	504,136	627,136	0.688	346,667	431,247
6/30/10-11	537,674	613,674	0.686	368,891	421,034
6/30/11-12	631,333	700,333	0.684	431,818	479,013
6/30/12-13	719,573	737,573	0.691	496,983	509,415
6/30/13-14	830,841	912,841	0.694	576,284	633,161
6/30/14-15	1,052,224	1,255,224	0.711	747,872	892,156
6/30/15-16	1,140,429	1,306,429	0.741	845,554	968,633
6/30/16-17	1,585,903	1,618,903	0.766	1,214,387	1,239,656
6/30/17-18	2,071,299	2,115,299	0.794	1,643,625	1,678,540
6/30/18-19	2,765,550	2,879,550	0.822	2,273,847	2,367,578
Total	19,510,386	22,115,385		15,229,852	17,310,950
			(7) Total Discount Factor:	0.781	0.783

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	2,942,962	4,070,698
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	420,423	581,528
(11) Discounted Value at 4%:	2,573,870	3,560,172

NOTES:
(2), (3) From Section 2, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 2, Exhibit 1, Page 13, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	2,942,962	4,070,698		2,417,371	3,343,702
6/30/82-83	23,729	28,452	0.971	23,048	27,635
6/30/83-84	477,900	486,719	0.931	444,894	453,103
6/30/84-85	7,195	53,917	0.898	6,460	48,404
6/30/85-86	9,904	20,904	0.868	8,601	18,155
6/30/86-87	13,494	26,494	0.842	11,358	22,300
6/30/87-88	252,240	269,240	0.817	206,024	219,909
6/30/88-89	343,779	352,779	0.819	281,582	288,954
6/30/89-90	150,282	150,282	0.811	121,913	121,913
6/30/90-91	108,943	108,943	0.799	87,005	87,005
6/30/91-92	223,005	226,005	0.789	175,874	178,240
6/30/92-93	41,424	83,424	0.775	32,124	64,695
6/30/93-94	69,677	104,677	0.756	52,696	79,166
6/30/94-95	84,471	84,471	0.737	62,293	62,293
6/30/95-96	144,727	146,727	0.719	104,064	105,502
6/30/96-97	11,973	24,973	0.701	8,394	17,508
6/30/97-98	152,842	154,842	0.684	104,491	105,859
6/30/98-99	135,702	135,702	0.667	90,474	90,474
6/30/99-00	176,335	179,335	0.654	115,249	117,210
6/30/00-01	279,309	291,309	0.647	180,753	188,518
6/30/01-02	10,925	21,925	0.648	7,077	14,203
6/30/02-03	297,765	304,765	0.638	189,891	194,355
6/30/03-04	360,533	373,533	0.624	225,070	233,186
6/30/04-05	13,383	26,383	0.623	8,344	16,449
6/30/05-06	319,708	367,708	0.615	196,749	226,288
6/30/06-07	367,785	406,785	0.603	221,936	245,470
6/30/07-08	249,830	402,830	0.591	147,598	237,989
6/30/08-09	401,603	444,603	0.591	237,188	262,584
6/30/09-10	504,136	627,136	0.590	297,438	370,007
6/30/10-11	537,674	613,674	0.589	316,644	361,402
6/30/11-12	631,333	700,333	0.587	370,614	411,120
6/30/12-13	719,573	737,573	0.596	429,198	439,934
6/30/13-14	830,841	912,841	0.601	499,173	548,439
6/30/14-15	1,052,224	1,255,224	0.623	655,856	782,387
6/30/15-16	1,140,429	1,306,429	0.663	755,935	865,968
6/30/16-17	1,585,903	1,618,903	0.694	1,099,984	1,122,872
6/30/17-18	2,071,299	2,115,299	0.729	1,509,147	1,541,205
6/30/18-19	2,765,550	2,879,550	0.765	2,114,572	2,201,738
Total	19,510,386	22,115,385		13,817,082	15,716,143
			(7) Total Discount Factor:	0.708	0.711

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	2,942,962	4,070,698
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	420,423	581,528
(11) Discounted Value at 6%:	2,417,371	3,343,702

NOTES:
(2), (3) From Section 2, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 2, Exhibit 1, Page 13, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/19 - 20 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/19 - 06/30/20	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/19 - 06/30/20		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	26,235,931	27,364,404	23,291,759	2,944,172	4,072,645				235,806	259,387	8.0%	6.4%
6/30/82-83	4,984,296	4,992,019	4,960,536	23,760	31,483	99.4%	0.5%	90.3%	21,454	28,428	90.3%	90.3%
6/30/83-84	10,698,000	10,735,819	10,217,889	480,111	517,929	95.3%	1.5%	32.2%	154,662	166,845	32.2%	32.2%
6/30/84-85	7,584,000	7,646,721	7,574,989	9,011	71,732	99.5%	0.4%	75.5%	6,799	54,124	75.5%	75.5%
6/30/85-86	11,890,000	11,902,000	11,874,262	15,739	27,739	99.8%	0.1%	54.7%	8,613	15,179	54.7%	54.7%
6/30/86-87	15,399,000	15,414,000	15,376,859	22,141	37,141	99.8%	0.1%	52.0%	11,508	19,305	52.0%	52.0%
6/30/87-88	22,783,000	22,802,000	22,516,796	266,204	285,204	98.8%	0.5%	41.3%	110,036	117,889	41.3%	41.3%
6/30/88-89	24,639,000	24,701,434	24,268,333	370,667	433,101	98.4%	1.0%	61.4%	227,539	265,865	61.4%	61.4%
6/30/89-90	18,884,000	18,887,000	18,704,794	179,206	182,206	99.0%	0.5%	52.3%	93,644	95,211	52.3%	52.3%
6/30/90-91	13,924,049	13,927,000	13,792,748	131,301	134,252	99.0%	0.5%	52.4%	68,854	70,401	52.4%	52.4%
6/30/91-92	10,691,720	10,722,000	10,467,217	224,503	254,783	97.8%	0.8%	33.5%	75,228	85,375	33.5%	33.5%
6/30/92-93	5,994,190	6,054,000	5,947,948	46,242	106,052	98.7%	0.8%	59.3%	27,437	62,924	59.3%	59.3%
6/30/93-94	4,846,090	4,894,000	4,770,402	75,688	123,598	98.0%	1.0%	48.9%	36,992	60,408	48.9%	48.9%
6/30/94-95	3,100,560	3,110,000	3,009,689	90,871	100,311	96.9%	1.0%	32.5%	29,520	32,586	32.5%	32.5%
6/30/95-96	4,343,000	4,355,000	4,179,296	163,704	175,704	96.1%	1.0%	25.6%	41,952	45,028	25.6%	25.6%
6/30/96-97	3,380,000	3,402,000	3,349,690	30,310	52,310	98.8%	1.0%	82.1%	24,881	42,939	82.1%	82.1%
6/30/97-98	3,669,000	3,687,000	3,498,515	170,485	188,485	95.1%	1.0%	20.5%	34,936	38,624	20.5%	20.5%
6/30/98-99	3,196,000	3,210,000	3,044,847	151,153	165,153	95.1%	1.0%	20.3%	30,612	33,448	20.3%	20.3%
6/30/99-00	3,595,000	3,616,000	3,394,938	200,062	221,062	94.2%	1.0%	17.1%	34,257	37,853	17.1%	17.1%
6/30/00-01	5,387,000	5,482,000	5,062,870	324,130	419,130	93.2%	1.0%	14.6%	47,399	61,291	14.6%	14.6%
6/30/01-02	3,287,000	3,319,000	3,244,904	42,096	74,096	98.2%	1.0%	56.9%	23,933	42,127	56.9%	56.9%
6/30/02-03	4,256,000	4,282,000	3,925,464	330,536	356,536	92.0%	1.0%	12.4%	41,075	44,305	12.4%	12.4%
6/30/03-04	4,751,000	4,784,000	4,348,917	402,083	435,083	91.2%	0.7%	8.3%	33,555	36,309	8.3%	8.3%
6/30/04-05	3,779,000	3,814,000	3,710,687	68,313	103,313	97.7%	1.0%	44.2%	30,223	45,707	44.2%	44.2%
6/30/05-06	4,414,000	4,499,000	4,025,763	388,237	473,237	90.3%	2.0%	20.7%	80,336	97,924	20.7%	20.7%
6/30/06-07	4,489,250	4,634,000	4,104,967	384,283	529,033	90.0%	2.0%	20.0%	76,773	105,692	20.0%	20.0%
6/30/07-08	3,294,700	3,567,000	3,025,275	269,425	541,725	88.2%	2.0%	16.9%	45,583	91,651	16.9%	16.9%
6/30/08-09	4,023,500	4,162,000	3,583,139	440,361	578,861	87.5%	2.0%	16.1%	70,732	92,978	16.1%	16.1%
6/30/09-10	5,253,250	5,498,000	4,702,621	550,629	795,379	87.5%	2.0%	16.0%	87,963	127,062	16.0%	16.0%
6/30/10-11	4,497,500	4,724,000	3,951,211	546,289	772,789	85.7%	2.0%	14.0%	76,381	108,049	14.0%	14.0%
6/30/11-12	4,896,500	5,162,000	4,242,644	653,856	919,356	84.4%	2.0%	12.8%	83,610	117,560	12.8%	12.8%
6/30/12-13	4,593,900	4,781,000	3,802,326	791,574	978,674	81.1%	3.2%	17.2%	135,914	168,040	17.2%	17.2%
6/30/13-14	5,022,500	5,274,000	4,083,302	939,198	1,190,698	79.3%	1.8%	8.7%	81,853	103,772	8.7%	8.7%
6/30/14-15	5,245,800	5,621,000	4,038,621	1,207,179	1,582,379	74.3%	5.0%	19.4%	234,417	307,275	19.4%	19.4%
6/30/15-16	4,266,000	4,606,000	2,916,886	1,349,114	1,689,114	65.8%	8.6%	25.0%	337,805	422,938	25.0%	25.0%
6/30/16-17	4,624,000	4,813,000	2,734,929	1,889,071	2,078,071	58.0%	7.8%	18.5%	350,196	385,233	18.5%	18.5%
6/30/17-18	4,503,000	4,749,000	1,993,304	2,509,696	2,755,696	43.1%	14.9%	26.1%	655,866	720,154	26.1%	26.1%
6/30/18-19	4,692,000	4,973,000	1,028,892	3,663,108	3,944,108	21.3%	21.8%	27.7%	1,014,481	1,092,303	27.7%	27.7%
Total	285,112,736	290,166,397	262,768,229	22,344,507	27,398,168				4,782,824	5,702,191	21.4%	20.8%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)
(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)
(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)
(5) = (2) - (4)
(6) = (3) - (4)
(7) = (4) / Average of Columns (2), (3)
(8) = (7) - Prior Year's (7)
(9) = (8) / (1.00 - (7))
(10) = (5) * (9)
(11) = (6) * (9)
(12) = (10) / (5)
(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		1,215,038			1,216,248	1,216,984	1,210	1,947		
6/30/82-83		260,969	261,174		261,000	264,000	31	3,031		
6/30/83-84		1,421,790	1,424,330		1,424,000	1,453,000	2,210	31,210		
6/30/84-85	181,560	764,185	766,315	766,431	766,000	782,000	1,815	17,815	0.422	0.431
6/30/85-86	195,247	1,602,166	1,608,239	1,608,492	1,608,000	1,609,000	5,835	6,835	0.824	0.824
6/30/86-87	224,370	1,896,353	1,905,445	1,906,214	1,905,000	1,907,000	8,647	10,647	0.849	0.850
6/30/87-88	262,864	2,485,036	2,499,448	2,500,709	2,499,000	2,501,000	13,964	15,964	0.951	0.951
6/30/88-89	283,884	4,016,111	4,043,443	4,043,302	4,043,000	4,096,434	26,889	80,322	1.424	1.443
6/30/89-90	285,078	3,686,076	3,714,873	3,717,787	3,715,000	3,718,000	28,924	31,924	1.303	1.304
6/30/90-91	267,732	2,925,692	2,951,496	2,951,314	2,948,049	2,951,000	22,357	25,308	1.101	1.102
6/30/91-92	261,442	2,699,222	2,728,476	2,728,075	2,700,720	2,728,000	1,498	28,778	1.033	1.043
6/30/92-93	259,992	1,758,372	1,780,983	1,780,632	1,763,190	1,781,000	4,818	22,628	0.678	0.685
6/30/93-94	257,062	1,272,079	1,291,014	1,290,762	1,278,090	1,291,000	6,011	18,921	0.497	0.502
6/30/94-95	255,854	928,160	943,860	943,797	934,560	944,000	6,400	15,840	0.365	0.369
6/30/95-96	255,539	1,004,022	1,023,047	1,022,891	1,023,000	1,033,000	18,978	28,978	0.400	0.404
6/30/96-97	270,071	882,663	901,187	901,262	901,000	910,000	18,337	27,337	0.334	0.337
6/30/97-98	245,367	778,357	796,281	796,417	796,000	812,000	17,643	33,643	0.324	0.331
6/30/98-99	251,453	634,549	650,460	651,004	650,000	664,000	15,451	29,451	0.258	0.264
6/30/99-00	255,641	869,273	892,852	892,917	893,000	911,000	23,727	41,727	0.349	0.356
6/30/00-01	263,918	1,583,179	1,629,375	1,627,516	1,628,000	1,711,000	44,821	127,821	0.617	0.648
6/30/01-02	267,598	1,013,829	1,045,498	1,045,360	1,045,000	1,066,000	31,171	52,171	0.391	0.398
6/30/02-03	274,465	872,229	905,073	905,626	905,000	924,000	32,771	51,771	0.330	0.337
6/30/03-04	272,384	937,450	978,749	979,183	979,000	999,000	41,550	61,550	0.359	0.367
6/30/04-05	273,647	1,052,070	1,106,729	1,106,564	1,107,000	1,129,000	54,930	76,930	0.405	0.413
6/30/05-06	285,139	1,252,471	1,330,899	1,320,798	1,321,000	1,358,000	68,529	105,529	0.463	0.476
6/30/06-07	298,516	1,194,752	1,278,967	1,275,081	1,211,250	1,317,000	16,498	122,248	0.406	0.441
6/30/07-08	314,231	1,392,105	1,501,396	1,486,051	1,411,700	1,531,000	19,595	138,895	0.449	0.487
6/30/08-09	302,998	1,205,743	1,314,195	1,309,504	1,244,500	1,340,000	38,757	134,257	0.411	0.442
6/30/09-10	297,252	1,335,757	1,474,440	1,455,451	1,382,250	1,504,000	46,493	168,243	0.465	0.506
6/30/10-11	292,432	1,021,885	1,145,337	1,157,500	1,030,500	1,181,000	8,615	159,115	0.352	0.404
6/30/11-12	295,908	1,268,977	1,458,748	1,435,430	1,291,500	1,488,000	22,523	219,023	0.436	0.503
6/30/12-13	301,541	1,143,899	1,358,118	1,350,587	1,215,900	1,385,000	72,001	241,101	0.403	0.459
6/30/13-14	309,910	1,012,142	1,244,884	1,265,187	1,120,500	1,290,000	108,358	277,858	0.362	0.416
6/30/14-15	316,552	1,043,844	1,332,036	1,344,447	1,198,800	1,371,000	154,956	327,156	0.379	0.433
6/30/15-16	316,565	1,009,315	1,353,373	1,364,312	1,218,000	1,392,000	208,685	382,685	0.385	0.440
6/30/16-17	292,403	861,832	1,294,554	1,295,128	1,165,000	1,321,000	303,168	459,168	0.398	0.452
6/30/17-18	292,956	622,604	1,178,545	1,238,298	1,061,000	1,263,000	438,396	640,396	0.362	0.431
6/30/18-19	308,002	358,442	1,395,257	1,383,262	1,256,000	1,423,000	897,558	1,064,558	0.408	0.462
Total	9,589,573	51,282,635	54,509,096	52,847,293	54,116,757	56,565,418	2,834,121	5,282,782		
Tot 6/30/84-19	9,589,573	48,384,839	52,823,592	52,847,293	51,215,509	53,631,434	2,830,670	5,246,594	0.534	0.559

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 2, Exhibit 2, Page 2, Column 3
(4) From Section 2, Exhibit 2, Page 2, Column 8
(5) From Section 2, Exhibit 2, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim
All Prior Yrs		1,215,038							3	0	
6/30/82-83		260,969	1.001	1.000	261,174	N/A	261,174		0	0	
6/30/83-84		1,421,790	1.002	1.000	1,424,330	N/A	1,424,330		2	2	1,270
6/30/84-85	181,560	764,185	1.003	1.000	766,315	N/A	766,315	0.422	0	0	
6/30/85-86	195,247	1,602,166	1.004	1.000	1,608,239	N/A	1,608,239	0.824	0	0	
6/30/86-87	224,370	1,896,353	1.005	1.000	1,905,445	N/A	1,905,445	0.849	0	0	
6/30/87-88	262,864	2,485,036	1.006	1.000	2,499,448	N/A	2,499,448	0.951	1	1	14,412
6/30/88-89	283,884	4,016,111	1.007	1.000	4,043,443	N/A	4,043,443	1.424	2	2	13,666
6/30/89-90	285,078	3,686,076	1.008	1.000	3,714,873	N/A	3,714,873	1.303	1	1	28,796
6/30/90-91	267,732	2,925,692	1.009	1.000	2,951,496	N/A	2,951,496	1.102	2	2	12,902
6/30/91-92	261,442	2,699,222	1.011	1.000	2,728,476	N/A	2,728,476	1.044	3	2	14,627
6/30/92-93	259,992	1,758,372	1.013	1.000	1,780,983	N/A	1,780,983	0.685	0	0	
6/30/93-94	257,062	1,272,079	1.015	1.000	1,291,014	N/A	1,291,014	0.502	1	2	9,467
6/30/94-95	255,854	928,160	1.017	1.000	943,860	N/A	943,860	0.369	0	0	
6/30/95-96	255,539	1,004,022	1.019	1.000	1,023,047	N/A	1,023,047	0.400	0	0	
6/30/96-97	270,071	882,663	1.021	1.000	901,187	N/A	901,187	0.334	0	0	
6/30/97-98	245,367	778,357	1.023	1.000	796,281	N/A	796,281	0.325	2	0	
6/30/98-99	251,453	634,549	1.025	1.000	650,460	N/A	650,460	0.259	0	0	
6/30/99-00	255,641	869,273	1.027	1.000	892,852	N/A	892,852	0.349	1	1	23,579
6/30/00-01	263,918	1,583,179	1.029	1.000	1,629,375	N/A	1,629,375	0.617	4	3	15,399
6/30/01-02	267,598	1,013,829	1.031	1.000	1,045,498	N/A	1,045,498	0.391	3	3	10,556
6/30/02-03	274,465	872,229	1.038	1.000	905,073	N/A	905,073	0.330	3	3	10,948
6/30/03-04	272,384	937,450	1.044	1.000	978,749	N/A	978,749	0.359	4	3	13,766
6/30/04-05	273,647	1,052,070	1.052	1.000	1,106,729	N/A	1,106,729	0.404	1	1	54,659
6/30/05-06	285,139	1,252,471	1.063	1.000	1,330,899	N/A	1,330,899	0.467	3	2	39,214
6/30/06-07	298,516	1,194,752	1.070	1.000	1,278,967	N/A	1,278,967	0.428	4	3	28,072
6/30/07-08	314,231	1,392,105	1.079	1.000	1,501,396	N/A	1,501,396	0.478	3	2	54,645
6/30/08-09	302,998	1,205,743	1.090	1.000	1,314,195	N/A	1,314,195	0.434	7	4	27,113
6/30/09-10	297,252	1,335,757	1.104	1.000	1,474,440	N/A	1,474,440	0.496	4	3	46,228
6/30/10-11	292,432	1,021,885	1.121	1.000	1,145,337	N/A	1,145,337	0.392	6	5	24,690
6/30/11-12	295,908	1,268,977	1.150	1.000	1,458,748	N/A	1,458,748	0.493	7	4	47,443
6/30/12-13	301,541	1,143,899	1.187	1.000	1,358,118	N/A	1,358,118	0.450	6	6	35,703
6/30/13-14	309,910	1,012,142	1.230	1.000	1,244,884	N/A	1,244,884	0.402	26	11	21,158
6/30/14-15	316,552	1,043,844	1.276	1.000	1,332,036	N/A	1,332,036	0.421	23	13	22,169
6/30/15-16	316,565	1,009,315	1.341	1.000	1,353,373	N/A	1,353,373	0.428	39	18	19,114
6/30/16-17	292,403	861,832	1.502	1.000	1,294,554	N/A	1,294,554	0.443	125	34	12,727
6/30/17-18	292,956	622,604	1.893	1.000	1,178,545	N/A	1,178,545	0.402	237	152	3,658
6/30/18-19	308,002	358,442	3.893	1.000	1,395,257	N/A	1,395,257	0.453		219	4,734
Total	9,589,573	51,282,635			54,509,096		54,509,096		523	502	

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 2, Exhibit 2, Page 7
(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.
(6) = (3) x (4) x (5)
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	181,560	0.445	764,185	1.003	766,431	N/A	766,431	0.422	0.422
6/30/85-86	195,247	0.858	1,602,166	1.004	1,608,492	N/A	1,608,492	0.824	0.824
6/30/86-87	224,370	0.921	1,896,353	1.005	1,906,214	N/A	1,906,214	0.850	0.850
6/30/87-88	262,864	1.034	2,485,036	1.006	2,500,709	N/A	2,500,709	0.951	0.951
6/30/88-89	283,884	1.417	4,016,111	1.007	4,043,302	N/A	4,043,302	1.424	1.424
6/30/89-90	285,078	1.435	3,686,076	1.008	3,717,787	N/A	3,717,787	1.304	1.304
6/30/90-91	267,732	1.095	2,925,692	1.009	2,951,314	N/A	2,951,314	1.102	1.102
6/30/91-92	261,442	1.029	2,699,222	1.011	2,728,075	N/A	2,728,075	1.043	1.043
6/30/92-93	259,992	0.674	1,758,372	1.013	1,780,632	N/A	1,780,632	0.685	0.685
6/30/93-94	257,062	0.496	1,272,079	1.015	1,290,762	N/A	1,290,762	0.502	0.502
6/30/94-95	255,854	0.367	928,160	1.017	943,797	N/A	943,797	0.369	0.369
6/30/95-96	255,539	0.397	1,004,022	1.019	1,022,891	N/A	1,022,891	0.400	0.400
6/30/96-97	270,071	0.335	882,663	1.021	901,262	N/A	901,262	0.334	0.334
6/30/97-98	245,367	0.327	778,357	1.023	796,417	N/A	796,417	0.325	0.325
6/30/98-99	251,453	0.268	634,549	1.025	651,004	N/A	651,004	0.259	0.259
6/30/99-00	255,641	0.350	869,273	1.027	892,917	N/A	892,917	0.349	0.349
6/30/00-01	263,918	0.593	1,583,179	1.029	1,627,516	N/A	1,627,516	0.617	0.617
6/30/01-02	267,598	0.389	1,013,829	1.031	1,045,360	N/A	1,045,360	0.391	0.391
6/30/02-03	274,465	0.335	872,229	1.038	905,626	N/A	905,626	0.330	0.330
6/30/03-04	272,384	0.363	937,450	1.044	979,183	N/A	979,183	0.359	0.359
6/30/04-05	273,647	0.403	1,052,070	1.052	1,106,564	N/A	1,106,564	0.404	0.404
6/30/05-06	285,139	0.407	1,252,471	1.063	1,320,798	N/A	1,320,798	0.463	0.463
6/30/06-07	298,516	0.409	1,194,752	1.070	1,275,081	N/A	1,275,081	0.427	0.427
6/30/07-08	314,231	0.411	1,392,105	1.079	1,486,051	N/A	1,486,051	0.473	0.473
6/30/08-09	302,998	0.415	1,205,743	1.090	1,309,504	N/A	1,309,504	0.432	0.432
6/30/09-10	297,252	0.428	1,335,757	1.104	1,455,451	N/A	1,455,451	0.490	0.490
6/30/10-11	292,432	0.430	1,021,885	1.121	1,157,500	N/A	1,157,500	0.396	0.396
6/30/11-12	295,908	0.432	1,268,977	1.150	1,435,430	N/A	1,435,430	0.485	0.485
6/30/12-13	301,541	0.435	1,143,899	1.187	1,350,587	N/A	1,350,587	0.448	0.448
6/30/13-14	309,910	0.437	1,012,142	1.230	1,265,187	N/A	1,265,187	0.408	0.408
6/30/14-15	316,552	0.439	1,043,844	1.276	1,344,447	N/A	1,344,447	0.425	0.425
6/30/15-16	316,565	0.441	1,009,315	1.341	1,364,312	N/A	1,364,312	0.431	0.431
6/30/16-17	292,403	0.443	861,832	1.502	1,295,128	N/A	1,295,128	0.443	0.443
6/30/17-18	292,956	0.446	622,604	1.893	1,238,298	N/A	1,238,298	0.423	0.423
6/30/18-19	308,002	0.448	358,442	3.893	1,383,262	N/A	1,383,262	0.449	0.449
Total	9,589,573		48,384,839		52,847,293		52,847,293		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 2, Exhibit 2, Page 4, Column 11
(4) From Section 2, Exhibit 2, Page 2, Column 3
(5) From Section 2, Exhibit 2, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.445	0.445
6/30/85-86									0.858	0.858
6/30/86-87									0.921	0.921
6/30/87-88									1.034	1.034
6/30/88-89									1.417	1.417
6/30/89-90									1.435	1.435
6/30/90-91	267,732	2,951,496	1.102	1.194	1.316	1.156	1.521	0.326	1.095	1.095
6/30/91-92	261,442	2,728,476	1.044	1.189	1.240	1.150	1.426	0.329	1.029	1.029
6/30/92-93	259,992	1,780,983	0.685	1.189	0.815	1.144	0.932	0.331	0.675	0.674
6/30/93-94	257,062	1,291,014	0.502	1.178	0.592	1.138	0.674	0.335	0.495	0.496
6/30/94-95	255,854	943,860	0.369	1.170	0.432	1.133	0.489	0.340	0.367	0.367
6/30/95-96	255,539	1,023,047	0.400	1.155	0.463	1.127	0.521	0.346	0.397	0.397
6/30/96-97	270,071	901,187	0.334	1.137	0.379	1.122	0.425	0.353	0.335	0.335
6/30/97-98	245,367	796,281	0.325	1.135	0.368	1.116	0.411	0.355	0.327	0.327
6/30/98-99	251,453	650,460	0.259	1.135	0.294	1.110	0.326	0.357	0.267	0.268
6/30/99-00	255,641	892,852	0.349	1.135	0.396	1.105	0.438	0.359	0.345	0.350
6/30/00-01	263,918	1,629,375	0.617	1.109	0.685	1.099	0.753	0.369	0.580	0.593
6/30/01-02	267,598	1,045,498	0.391	1.101	0.430	1.094	0.471	0.374	0.381	0.389
6/30/02-03	274,465	905,073	0.330	1.073	0.354	1.088	0.385	0.385	0.335	0.335
6/30/03-04	272,384	978,749	0.359	1.046	0.376	1.083	0.407	0.397	0.357	0.363
6/30/04-05	273,647	1,106,729	0.404	1.036	0.419	1.078	0.451	0.403	0.400	0.403
6/30/05-06	285,139	1,330,899	0.467	1.032	0.482	1.072	0.517	0.407	0.404	0.407
6/30/06-07	298,516	1,278,967	0.428	1.032	0.442	1.067	0.472	0.409	0.408	0.409
6/30/07-08	314,231	1,501,396	0.478	1.032	0.493	1.062	0.524	0.411	0.411	0.411
6/30/08-09	302,998	1,314,195	0.434	1.027	0.445	1.056	0.470	0.415	0.416	0.415
6/30/09-10	297,252	1,474,440	0.496	1.000	0.496	1.051	0.521	0.428	0.430	0.428
6/30/10-11	292,432	1,145,337	0.392	1.000	0.392	1.046	0.410	0.430	0.433	0.430
6/30/11-12	295,908	1,458,748	0.493	1.000	0.493	1.041	0.513	0.432	0.437	0.432
6/30/12-13	301,541	1,358,118	0.450	1.000	0.450	1.036	0.466	0.435	0.440	0.435
6/30/13-14	309,910	1,244,884	0.402	1.000	0.402	1.030	0.414	0.437	0.443	0.437
6/30/14-15	316,552	1,332,036	0.421	1.000	0.421	1.025	0.431	0.439	0.446	0.439
6/30/15-16	316,565	1,353,373	0.428	1.000	0.428	1.020	0.436	0.441	0.450	0.441
6/30/16-17	292,403	1,294,554	0.443	1.000	0.443	1.015	0.449	0.443	0.453	0.443
6/30/17-18	292,956	1,178,545	0.402	1.000	0.402	1.010	0.406	0.446	0.457	0.446
6/30/18-19	308,002	1,395,257	0.453	1.000	0.453	1.005	0.455	0.448		0.448
Total	8,156,569	38,285,829								

Trend Last 4 (ex 18-19):	-1.0%	Avg 3 (ex 18-19):	0.431
Trend Last 8 (ex 18-19):	-0.5%	Avg 5 (ex 18-19):	0.427
Trend Last 12 (ex 18-19):	-1.1%	Avg 10 (ex 18-19):	0.452
Prior Selected Trend:	0.8%	Prior Sel Avg:	0.460
Selected Trend:	0.50%	Sel. Loss Cost:	0.450

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 2, Exhibit 2, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCIRB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.780	
(2)	Credibility	30%	
(3)	Average Pmt Trend Statewide	0.980	
(4)	Credibility Weighted Trend	0.920	
		(Low)	(High)
(5)	Selected Range	0.870	0.966
(6)	Incremental Paid for 2019	0	0
(7)	Estimated Reserve	0	0
(8)	Paid to Date (82 & Prior)	1,215,038	1,215,038
(9)	Est Ult Paid for 1982 & Prior	1,215,038	1,215,038

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	807	1,298
(11)	Projected Number of Years	3	3
(12)	Estimated Reserve	2,420	3,893
(13)	Paid to Date (82 & Prior)	1,215,038	1,215,038
(14)	Est Ult Paid for 1982 & Prior	1,217,458	1,218,931
(14a)	Paid Counts During Fiscal Year	0	3
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	1,216,248	1,216,984
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**1,216,248**	**1,216,984**
(18)	Implied Tail	1.001	1.002
(19)	Ult Loss Inc Lump Sums @ 6/18	1,223,561	1,233,466

NOTES:

(1) From Section 2, Exhibit 2, Page 6
(2) = (Average of Section 2, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 2, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 2, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	76,171	11.241			
1993	2	75,723	11.235	0.994		
1994	3	63,040	11.052	0.833		
1995	4	28,227	10.248	0.448		
1996	5	63,291	11.055	2.242		
1997	6	29,585	10.295	0.467		
1998	7	13,039	9.476	0.441		
1999	8	13,407	9.504	1.028		
2000	9	11,930	9.387	0.890	n =	27
2001	10	9,078	9.114	0.761	S(x) =	54,135
2002	11	5,110	8.539	0.563	S(x-sq) =	108,542,313
2003	12	6,295	8.748	1.232	S(xy) =	458,405
2004	13	4,115	8.322	0.654	S(y) =	229
2005	14	17,494	9.770	4.251	D =	44,226
2006	15	5,802	8.666	0.332	slope =	-0.216
2007	16	8,975	9.102	1.547	Avg Trend =	0.784
2008	17	3,912	8.272	0.436		
2009	18	2,186	7.690	0.559		
2010	19	4,246	8.354	1.943		
2011	20	1,195	7.086	0.281		
2012	21	179	5.189	0.150		
2013	22	179	5.189	1.000		
2014	23	179	5.189	1.000		
2015	24	632	6.449	3.527		
2016	25	1,473	7.295	2.330		
2017	26	99	4.593	0.067		
2018	27	2,321	7.750	23.502		
2019	28	0				
					Selected Trend:	**0.780**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2018: 23.502 = 2321 / 99

Commonwealth of Massachusetts Workers Compensation
Department of Developmental Services - Cluster 1
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
June-83	21,006	49,638	70,591	88,239	105,504	122,855	138,893	160,692	180,838	198,763	206,648	244,385	249,094	254,712	256,363	256,876	257,735	258,257	258,537	258,637	259,334	259,869	260,265	260,719	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969
June-84	130,216	307,707	437,592	546,990	654,018	741,928	857,012	959,232	1,050,170	1,118,632	1,160,913	1,192,447	1,199,268	1,203,920	1,225,075	1,249,653	1,268,798	1,290,858	1,296,673	1,300,275	1,316,793	1,333,199	1,342,906	1,349,107	1,358,330	1,363,288	1,375,051	1,401,444	1,403,198	1,404,636	1,410,461	1,413,497	1,414,165	1,414,337	1,418,938	1,421,790	
June-85	89,170	210,713	299,656	374,570	455,180	522,720	582,177	634,207	685,633	702,603	713,358	717,026	720,062	720,920	726,880	729,520	730,301	731,081	731,204	731,204	731,218	731,218	731,218	731,218	731,218	731,218	731,218	739,645	763,916	764,161	764,174	764,179	764,185	764,185			
June-86	189,273	447,261	636,052	765,617	939,707	1,103,818	1,243,019	1,358,130	1,444,684	1,485,929	1,499,042	1,514,132	1,520,647	1,537,037	1,547,606	1,553,176	1,564,852	1,567,432	1,573,496	1,575,982	1,582,467	1,586,081	1,593,552	1,596,723	1,600,637	1,602,166	1,602,166	1,602,166	1,602,166	1,602,166	1,602,166	1,602,166	1,602,166	1,602,166			
June-87	243,465	575,319	884,604	1,135,085	1,272,135	1,441,924	1,619,831	1,685,111	1,741,279	1,772,270	1,801,621	1,842,953	1,884,775	1,889,603	1,894,366	1,894,597	1,895,476	1,895,651	1,895,651	1,895,651	1,896,140	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353				
June-88	363,164	980,917	1,485,789	1,802,447	2,044,603	2,209,730	2,337,274	2,381,902	2,440,826	2,450,413	2,453,714	2,458,155	2,468,582	2,469,709	2,470,273	2,472,242	2,472,926	2,474,120	2,475,679	2,476,698	2,479,622	2,480,422	2,482,560	2,482,824	2,483,087	2,483,417	2,483,681	2,483,878	2,484,224	2,484,620	2,484,754	2,485,036					
June-89	524,148	1,718,544	2,367,574	2,805,123	3,095,247	3,298,078	3,424,849	3,485,100	3,510,635	3,573,650	3,625,589	3,649,159	3,663,581	3,699,511	3,725,869	3,746,061	3,765,157	3,783,602	3,796,379	3,809,734	3,820,868	3,838,465	3,852,950	3,867,441	3,882,545	3,902,335	3,923,798	3,945,246	3,991,672	4,007,382	4,016,111						
June-90	721,216	2,076,487	2,697,946	3,042,168	3,365,956	3,509,844	3,547,356	3,618,254	3,660,798	3,669,321	3,673,294	3,674,043	3,675,267	3,676,903	3,676,903	3,676,975	3,676,975	3,677,208	3,677,264	3,677,264	3,677,264	3,677,264	3,680,769	3,681,790	3,685,474	3,685,625	3,685,774	3,685,840	3,686,010	3,686,076							
June-91	573,775	1,832,452	2,336,684	2,570,536	2,690,503	2,737,602	2,767,093	2,783,177	2,796,096	2,807,853	2,815,389	2,817,526	2,821,013	2,824,311	2,824,746	2,835,316	2,844,386	2,852,912	2,862,970	2,871,036	2,880,572	2,890,850	2,897,227	2,902,044	2,903,974	2,909,098	2,916,555	2,922,015	2,925,692								
June-92	682,252	1,646,809	2,002,754	2,139,991	2,195,456	2,229,059	2,250,251	2,258,976	2,271,388	2,282,222	2,299,759	2,312,696	2,324,613	2,341,522	2,353,263	2,361,934	2,370,332	2,377,427	2,385,401	2,392,636	2,402,525	2,411,498	2,588,626	2,601,391	2,629,981	2,681,217	2,693,712	2,699,222									
June-93	530,227	1,313,078	1,537,374	1,593,966	1,619,013	1,650,226	1,662,183	1,669,637	1,672,913	1,676,324	1,679,743	1,683,745	1,688,008	1,694,444	1,700,344	1,735,033	1,740,584	1,747,278	1,750,189	1,752,832	1,755,026	1,755,793	1,758,341	1,758,372	1,758,372	1,758,372	1,758,372										
June-94	507,386	988,866	1,093,334	1,170,915	1,212,098	1,230,432	1,235,833	1,243,122	1,247,382	1,251,645	1,252,686	1,255,338	1,260,284	1,261,941	1,262,624	1,262,948	1,263,197	1,263,431	1,264,853	1,267,940	1,270,183	1,270,498	1,270,668	1,270,736	1,270,834	1,272,079											
June-95	419,212	715,818	815,621	863,086	890,307	917,113	922,985	923,881	924,606	926,605	926,605	926,605	926,605	926,605	926,779	927,514	927,514	927,514	927,514	928,160	928,160	928,160	928,160	928,160	928,160												
June-96	382,658	780,302	879,753	927,773	959,109	977,572	986,429	994,587	997,113	999,835	999,878	999,878	1,002,373	1,003,880	1,003,880	1,004,022	1,004,022	1,004,022	1,004,022	1,004,022	1,004,022	1,004,022	1,004,022	1,004,022													
June-97	375,777	680,288	796,380	819,630	848,942	854,522	862,163	870,431	872,306	876,115	878,979	880,535	881,313	882,123	882,572	882,572	882,572	882,663	882,663	882,663	882,663	882,663	882,663														
June-98	271,043	554,887	629,610	674,301	694,718	711,568	723,173	728,434	739,218	743,949	744,590	744,993	744,993	746,349	751,655	753,336	760,571	764,236	776,156	777,189	778,357	778,357															
June-99	200,054	434,499	509,933	556,932	596,752	611,737	618,749	622,442	625,193	627,351	628,383	630,351	632,095	633,627	633,750	634,493	634,493	634,493	634,549	634,549	634,549																
June-00	278,690	480,160	554,610	607,363	639,042	681,279	703,362	725,333	730,593	734,009	743,547	751,052	758,824	768,373	779,490	794,445	813,062	835,378	855,368	869,273																	
June-01	312,280	500,976	665,683	751,467	818,710	893,280	968,370	1,062,045	1,117,446	1,168,471	1,217,356	1,269,474	1,306,387	1,358,630	1,416,743	1,462,400	1,503,318	1,547,279	1,583,179																		
June-02	197,389	476,132	547,189	630,575	673,854	722,281	746,769	768,857	788,866	810,710	820,868	840,995	861,213	880,964	949,420	969,248	988,937	1,013,829																			
June-03	163,049	459,264	666,927	739,223	775,337	800,620	814,827	825,961	832,962	839,586	845,639	851,935	856,279	861,497	865,605	867,940	872,229																				
June-04	79,919	361,725	544,497	684,486	731,761	788,111	824,704	835,702	842,619	849,442	861,676	877,029	885,864	891,975	916,039	937,450																					
June-05	394,825	766,546	887,167	942,140	987,834	999,094	1,003,380	1,005,881	1,006,180	1,046,856	1,049,675	1,050,861	1,051,002	1,051,835	1,052,070																						
June-06	318,539	662,581	842,645	941,494	1,038,675	1,080,705	1,115,105	1,134,878	1,157,537	1,168,675	1,180,575	1,209,017	1,232,127	1,252,471																							
June-07	310,954	746,618	936,091	1,034,943	1,071,013	1,094,137	1,114,504	1,128,520	1,148,970	1,163,078	1,178,181	1,188,036	1,194,752																								
June-08	418,873	692,272	777,557	805,740	842,963	874,236	948,911	1,045,997	1,133,617	1,240,354	1,328,694	1,392,105																									
June-09	491,289	882,544	982,774	1,088,621	1,119,184	1,136,600	1,146,349	1,161,838	1,190,931	1,201,505	1,205,743																										
June-10	412,961	823,720	1,038,592	1,141,629	1,181,671	1,235,565	1,291,253	1,312,494	1,324,362	1,335,757																											
June-11	434,256	781,068	901,778	953,435	989,604	1,003,572	1,011,746	1,019,046	1,021,885																												
June-12	463,779	899,638	985,560	1,039,330	1,099,797	1,146,122	1,243,695	1,268,977																													
June-13	317,812	782,569	959,446	1,070,185	1,129,117	1,139,556	1,143,899																														
June-14	343,501	744,703	854,796	927,960	960,880	1,012,142																															
June-15	337,278	703,991	883,924	978,091	1,043,844																																
June-16	441,825	812,574	957,038	1,009,315																																	
June-17	435,827	746,274	861,832																																		
June-18	286,984	622,604																																			
June-19	358,442																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
June-83	2.363	1.422	1.250	1.196	1.164	1.131	1.157	1.125	1.099	1.040	1.183	1.019	1.023	1.006	1.002	1.003	1.002	1.001	1.000	1.003	1.002	1.002	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.363	1.422	1.250	1.196	1.134	1.155	1.119	1.095	1.065	1.038	1.027	1.006	1.004	1.018	1.020	1.015	1.017	1.005	1.003	1.013	1.012	1.007	1.005	1.007	1.004	1.009	1.019	1.001	1.001	1.004	1.002	1.000	1.000	1.003	1.002	
June-85	2.363	1.422	1.250	1.215	1.148	1.114	1.089	1.081	1.025	1.015	1.005	1.004	1.001	1.008	1.004	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.012	1.033	1.000	1.000	1.000	1.000	1.000	1.000		
June-86	2.363	1.422	1.204	1.227	1.175	1.126	1.093	1.064	1.029	1.009	1.010	1.004	1.011	1.007	1.004	1.008	1.002	1.004	1.002	1.004	1.002	1.005	1.002	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.363	1.538	1.283	1.121	1.133	1.123	1.040	1.033	1.018	1.017	1.023	1.023	1.003	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.701	1.515	1.213	1.134	1.081	1.058	1.019	1.025	1.004	1.001	1.002	1.004	1.000	1.000	1.001	1.000	1.000	1.001	1.000	1.001	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
June-89	3.279	1.378	1.185	1.103	1.066	1.038	1.018	1.007	1.018	1.015	1.007	1.004	1.010	1.007	1.005	1.005	1.005	1.003	1.004	1.003	1.005	1.004	1.004	1.004	1.005	1.006	1.005	1.012	1.004	1.002						
June-90	2.879	1.299	1.128	1.106	1.043	1.011	1.020	1.012	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.001	1.000	1.000	1.000	1.000	1.000							
June-91	3.194	1.275	1.100	1.047	1.018	1.011	1.006	1.005	1.004	1.003	1.001	1.001	1.001	1.000	1.004	1.003	1.003	1.004	1.003	1.003	1.004	1.002	1.002	1.001	1.002	1.003	1.002	1.001								
June-92	2.414	1.216	1.069	1.026	1.015	1.010	1.004	1.005	1.005	1.008	1.006	1.005	1.007	1.005	1.004	1.004	1.003	1.003	1.003	1.004	1.004	1.073	1.005	1.011	1.019	1.005	1.002									
June-93	2.476	1.171	1.037	1.016	1.019	1.007	1.004	1.002	1.002	1.002	1.002	1.003	1.004	1.003	1.020	1.003	1.004	1.002	1.002	1.001	1.000	1.001	1.000	1.000	1.000	1.000										
June-94	1.949	1.106	1.071	1.035	1.015	1.004	1.006	1.003	1.003	1.001	1.002	1.004	1.001	1.001	1.000	1.000	1.000	1.001	1.002	1.002	1.000	1.000	1.000	1.000	1.001											
June-95	1.708	1.139	1.058	1.032	1.030	1.006	1.001	1.001	1.002	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000												
June-96	2.039	1.127	1.055	1.034	1.019	1.009	1.008	1.003	1.003	1.000	1.000	1.002	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	1.810	1.171	1.029	1.036	1.007	1.009	1.010	1.002	1.004	1.003	1.002	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	2.047	1.135	1.071	1.030	1.024	1.016	1.007	1.015	1.006	1.001	1.001	1.000	1.002	1.007	1.002	1.010	1.005	1.016	1.001	1.002	1.000															
June-99	2.172	1.174	1.092	1.071	1.025	1.011	1.006	1.004	1.003	1.002	1.003	1.003	1.002	1.000	1.001	1.000	1.000	1.000	1.000	1.000																
June-00	1.723	1.155	1.095	1.052	1.066	1.032	1.031	1.007	1.005	1.013	1.010	1.010	1.013	1.014	1.019	1.023	1.027	1.024	1.016																	
June-01	1.604	1.329	1.129	1.089	1.091	1.084	1.097	1.052	1.046	1.042	1.043	1.029	1.040	1.043	1.032	1.028	1.029	1.023																		
June-02	2.412	1.149	1.152	1.069	1.072	1.034	1.030	1.026	1.028	1.013	1.025	1.024	1.023	1.078	1.021	1.020	1.025																			
June-03	2.817	1.452	1.108	1.049	1.033	1.018	1.014	1.008	1.008	1.007	1.007	1.005	1.006	1.005	1.003	1.005																				
June-04	4.526	1.505	1.257	1.069	1.077	1.046	1.013	1.008	1.008	1.014	1.018	1.010	1.007	1.027	1.023																					
June-05	1.941	1.157	1.062	1.049	1.011	1.004	1.002	1.000	1.040	1.003	1.001	1.000	1.001	1.000																						
June-06	2.080	1.272	1.117	1.103	1.040	1.032	1.018	1.020	1.010	1.010	1.024	1.019	1.017																							
June-07	2.401	1.254	1.106	1.035	1.022	1.019	1.013	1.018	1.012	1.013	1.008	1.006																								
June-08	1.653	1.123	1.036	1.046	1.037	1.085	1.102	1.084	1.094	1.071	1.048																									
June-09	1.796	1.114	1.108	1.028	1.016	1.009	1.014	1.025	1.009	1.004																										
June-10	1.995	1.261	1.099	1.035	1.046	1.045	1.016	1.009	1.009																											
June-11	1.799	1.155	1.057	1.038	1.014	1.008	1.007	1.003																												
June-12	1.940	1.096	1.055	1.058	1.042	1.085	1.020																													
June-13	2.462	1.226	1.115	1.055	1.009	1.004																														
June-14	2.168	1.148	1.086	1.035	1.053																															
June-15	2.087	1.256	1.107	1.067																																
June-16	1.839	1.178	1.055																																	
June-17	1.712	1.155																																		
June-18	2.169																																			

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs	2.267	1.255	1.120	1.076	1.055	1.043	1.033	1.026	1.020	1.013	1.018	1.007	1.007	1.010	1.008	1.006	1.006	1.005	1.002	1.002	1.002	1.006	1.001	1.002	1.003	1.002	1.004	1.005	1.001	1.001	1.000	1.000	1.000	1.001	1.001	1.000	
Latest 5	1.995	1.192	1.083	1.051	1.033	1.030	1.032	1.028	1.027	1.020	1.020	1.008	1.011	1.030	1.020	1.015	1.017	1.013	1.004	1.000	1.000	1.000	1.001	1.002	1.004	1.003	1.002	1.003	1.001	1.000	1.000	1.000					
Latest 3	1.907	1.196	1.082	1.053	1.035	1.032	1.015	1.012	1.037	1.029	1.027	1.008	1.008	1.011	1.016	1.018	1.027	1.016	1.006	1.001	1.000	1.000	1.000	1.000	1.007	1.002	1.001	1.004	1.001	1.001	1.000	1.000	1.000	1.001			
Volume Wtd																																					
All Yrs	2.231	1.242	1.112	1.070	1.047	1.036	1.025	1.020	1.015	1.011	1.011	1.006	1.006	1.008	1.007	1.005	1.005	1.004	1.002	1.002	1.002	1.008	1.002	1.002	1.003	1.002	1.003	1.004	1.001	1.001	1.000	1.000	1.000	1.002	1.002		
Latest 5	1.967	1.192	1.083	1.051	1.033	1.031	1.029	1.027	1.026	1.021	1.021	1.008	1.011	1.031	1.021	1.018	1.020	1.015	1.004	1.000	1.000	1.000	1.002	1.003	1.005	1.003	1.002	1.003	1.001	1.001	1.000						
Latest 3	1.873	1.194	1.081	1.053	1.034	1.033	1.015	1.013	1.035	1.030	1.028	1.009	1.009	1.010	1.016	1.020	1.028	1.019	1.007	1.001	1.000	1.000	1.000	1.000	1.009	1.003	1.001	1.005	1.002	1.001	1.000	1.000	1.000				
Dev Factor Sele	.																																				
Industry 1	1.968	1.147	1.054	1.025	1.017	1.010	1.012	1.012	1.010	1.009	1.010	1.009	1.009	1.009	1.008	1.008	1.007	1.007																			
Industry 2		1.281	1.080	1.034	1.020	1.017	1.009	1.011	1.009	1.009	1.006	1.007	1.009	1.008	1.008	1.012	1.007	1.006	1.007	1.006																	
Prior	2.068	1.260	1.122	1.044	1.038	1.036	1.033	1.026	1.016	1.013	1.009	1.008	1.007	1.011	1.007	1.006	1.005	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	
Selected	2.056	1.260	1.120	1.051	1.038	1.036	1.033	1.026	1.015	1.013	1.011	1.007	1.007	1.010	1.008	1.006	1.006	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
FacToUlt	3.893	1.893	1.502	1.341	1.276	1.230	1.187	1.150	1.121	1.104	1.090	1.079	1.070	1.063	1.052	1.044	1.038	1.031	1.029	1.027	1.025	1.023	1.021	1.019	1.017	1.015	1.013	1.011	1.009	1.008	1.007	1.006	1.005	1.004	1.003	1.002	1.001
Percent of Ult	25.7%	52.8%	66.6%	74.6%	78.4%	81.3%	84.2%	87.0%	89.2%	90.6%	91.7%	92.7%	93.4%	94.1%	95.1%	95.8%	96.4%	97.0%	97.2%	97.4%	97.6%	97.7%	97.9%	98.1%	98.3%	98.5%	98.7%	98.9%	99.1%	99.2%	99.3%	99.4%	99.5%	99.6%	99.7%	99.8%	99.9%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	1,223,561	1,233,466	1,216,248	1,216,984	(7,314)	-0.6%	(16,482)	-1.3%
6/30/82-83	261,000	264,000	261,000	264,000	0	0.0%	0	0.0%
6/30/83-84	1,422,000	1,451,000	1,424,000	1,453,000	2,000	0.1%	2,000	0.1%
6/30/84-85	767,000	782,000	766,000	782,000	(1,000)	-0.1%	0	0.0%
6/30/85-86	1,609,000	1,610,000	1,608,000	1,609,000	(1,000)	-0.1%	(1,000)	-0.1%
6/30/86-87	1,907,000	1,908,000	1,905,000	1,907,000	(2,000)	-0.1%	(1,000)	-0.1%
6/30/87-88	2,501,000	2,502,000	2,499,000	2,501,000	(2,000)	-0.1%	(1,000)	0.0%
6/30/88-89	4,037,000	4,087,530	4,043,000	4,096,434	6,000	0.1%	8,904	0.2%
6/30/89-90	3,717,000	3,720,000	3,715,000	3,718,000	(2,000)	-0.1%	(2,000)	-0.1%
6/30/90-91	2,922,480	2,953,000	2,948,049	2,951,000	25,569	0.9%	(2,000)	-0.1%
6/30/91-92	2,699,730	2,727,000	2,700,720	2,728,000	990	0.0%	1,000	0.0%
6/30/92-93	1,765,170	1,784,000	1,763,190	1,781,000	(1,980)	-0.1%	(3,000)	-0.2%
6/30/93-94	1,279,080	1,292,000	1,278,090	1,291,000	(990)	-0.1%	(1,000)	-0.1%
6/30/94-95	935,550	945,000	934,560	944,000	(990)	-0.1%	(1,000)	-0.1%
6/30/95-96	1,024,000	1,035,000	1,023,000	1,033,000	(1,000)	-0.1%	(2,000)	-0.2%
6/30/96-97	903,000	912,000	901,000	910,000	(2,000)	-0.2%	(2,000)	-0.2%
6/30/97-98	798,000	814,000	796,000	812,000	(2,000)	-0.3%	(2,000)	-0.2%
6/30/98-99	652,000	665,000	650,000	664,000	(2,000)	-0.3%	(1,000)	-0.2%
6/30/99-00	880,000	898,000	893,000	911,000	13,000	1.5%	13,000	1.4%
6/30/00-01	1,593,000	1,675,000	1,628,000	1,711,000	35,000	2.2%	36,000	2.1%
6/30/01-02	1,025,000	1,045,000	1,045,000	1,066,000	20,000	2.0%	21,000	2.0%
6/30/02-03	905,000	924,000	905,000	924,000	0	0.0%	0	0.0%
6/30/03-04	962,000	981,000	979,000	999,000	17,000	1.8%	18,000	1.8%
6/30/04-05	1,115,000	1,138,000	1,107,000	1,129,000	(8,000)	-0.7%	(9,000)	-0.8%
6/30/05-06	1,306,000	1,343,000	1,321,000	1,358,000	15,000	1.1%	15,000	1.1%
6/30/06-07	1,210,300	1,317,000	1,211,250	1,317,000	950	0.1%	0	0.0%
6/30/07-08	1,359,450	1,472,000	1,411,700	1,531,000	52,250	3.8%	59,000	4.0%
6/30/08-09	1,251,150	1,349,000	1,244,500	1,340,000	(6,650)	-0.5%	(9,000)	-0.7%
6/30/09-10	1,386,050	1,510,000	1,382,250	1,504,000	(3,800)	-0.3%	(6,000)	-0.4%
6/30/10-11	1,052,100	1,205,000	1,030,500	1,181,000	(21,600)	-2.1%	(24,000)	-2.0%
6/30/11-12	1,301,400	1,504,000	1,291,500	1,488,000	(9,900)	-0.8%	(16,000)	-1.1%
6/30/12-13	1,247,400	1,427,000	1,215,900	1,385,000	(31,500)	-2.5%	(42,000)	-2.9%
6/30/13-14	1,101,600	1,281,000	1,120,500	1,290,000	18,900	1.7%	9,000	0.7%
6/30/14-15	1,171,800	1,356,000	1,198,800	1,371,000	27,000	2.3%	15,000	1.1%
6/30/15-16	1,286,000	1,458,000	1,218,000	1,392,000	(68,000)	-5.3%	(66,000)	-4.5%
6/30/16-17	1,264,000	1,432,000	1,165,000	1,321,000	(99,000)	-7.8%	(111,000)	-7.8%
6/30/17-18	1,005,000	1,306,000	1,061,000	1,263,000	56,000	5.6%	(43,000)	-3.3%
6/30/18-19								
Total	52,845,821	55,305,996	52,860,757	55,142,418	14,935	0.0%	(163,578)	-0.3%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 2, Exhibit 2, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.1%	0.0%	0.0%	0.0%	1.000	1.000
444	99.9%	0.1%	0.1%	0.0%	0.0%	0.981	0.971
432	99.8%	0.1%	0.2%	0.0%	0.0%	0.964	0.947
420	99.7%	0.1%	0.3%	0.0%	0.0%	0.946	0.921
408	99.6%	0.1%	0.4%	0.0%	0.0%	0.928	0.896
396	99.5%	0.1%	0.5%	0.0%	0.0%	0.911	0.872
384	99.4%	0.1%	0.6%	0.0%	0.0%	0.894	0.848
372	99.3%	0.1%	0.7%	0.0%	0.0%	0.877	0.825
360	99.2%	0.1%	0.8%	0.0%	0.0%	0.861	0.803
348	99.1%	0.2%	0.9%	0.1%	0.0%	0.845	0.782
336	98.9%	0.2%	1.1%	0.1%	0.0%	0.844	0.781
324	98.7%	0.2%	1.3%	0.1%	0.0%	0.838	0.773
312	98.5%	0.2%	1.5%	0.1%	0.0%	0.829	0.762
300	98.3%	0.2%	1.7%	0.1%	0.0%	0.819	0.749
288	98.1%	0.2%	1.9%	0.1%	0.0%	0.808	0.734
276	97.9%	0.2%	2.1%	0.1%	0.1%	0.796	0.719
264	97.7%	0.2%	2.3%	0.1%	0.1%	0.784	0.704
252	97.6%	0.2%	2.4%	0.1%	0.1%	0.772	0.689
240	97.4%	0.2%	2.6%	0.1%	0.1%	0.760	0.673
228	97.2%	0.2%	2.8%	0.1%	0.1%	0.748	0.658
216	97.0%	0.6%	3.0%	0.3%	0.2%	0.736	0.643
204	96.4%	0.6%	3.6%	0.3%	0.2%	0.753	0.667
192	95.8%	0.7%	4.2%	0.4%	0.3%	0.760	0.677
180	95.1%	1.0%	4.9%	0.5%	0.4%	0.767	0.687
168	94.1%	0.7%	5.9%	0.4%	0.3%	0.777	0.701
156	93.4%	0.7%	6.6%	0.4%	0.3%	0.771	0.694
144	92.7%	1.0%	7.3%	0.6%	0.5%	0.765	0.685
132	91.7%	1.2%	8.3%	0.8%	0.6%	0.764	0.684
120	90.6%	1.4%	9.4%	0.9%	0.8%	0.765	0.685
108	89.2%	2.2%	10.8%	1.6%	1.4%	0.767	0.688
96	87.0%	2.8%	13.0%	2.1%	1.8%	0.779	0.704
84	84.2%	2.9%	15.8%	2.3%	2.0%	0.790	0.718
72	81.3%	2.9%	18.7%	2.4%	2.1%	0.794	0.723
60	78.4%	3.8%	21.6%	3.2%	2.9%	0.793	0.722
48	74.6%	8.0%	25.4%	7.0%	6.5%	0.795	0.724
36	66.6%	13.7%	33.4%	12.5%	11.9%	0.816	0.752
24	52.8%	27.1%	47.2%	25.6%	24.9%	0.842	0.786
12	25.7%	25.7%	74.3%	25.2%	25.0%	0.872	0.825
Total		100.0%					

NOTES:
(2) = 1 / Section 2, Exhibit 2, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	1,210	1,947		1,142	1,837
6/30/82-83	31	3,031	0.981	30	2,972
6/30/83-84	2,210	31,210	0.964	2,131	30,086
6/30/84-85	1,815	17,815	0.946	1,718	16,856
6/30/85-86	5,835	6,835	0.928	5,417	6,345
6/30/86-87	8,647	10,647	0.911	7,878	9,700
6/30/87-88	13,964	15,964	0.894	12,484	14,272
6/30/88-89	26,889	80,322	0.877	23,593	70,477
6/30/89-90	28,924	31,924	0.861	24,909	27,493
6/30/90-91	22,357	25,308	0.845	18,900	21,395
6/30/91-92	1,498	28,778	0.844	1,264	24,283
6/30/92-93	4,818	22,628	0.838	4,036	18,955
6/30/93-94	6,011	18,921	0.829	4,983	15,685
6/30/94-95	6,400	15,840	0.819	5,240	12,970
6/30/95-96	18,978	28,978	0.808	15,329	23,406
6/30/96-97	18,337	27,337	0.796	14,598	21,763
6/30/97-98	17,643	33,643	0.784	13,835	26,381
6/30/98-99	15,451	29,451	0.772	11,929	22,738
6/30/99-00	23,727	41,727	0.760	18,030	31,709
6/30/00-01	44,821	127,821	0.748	33,518	95,588
6/30/01-02	31,171	52,171	0.736	22,936	38,388
6/30/02-03	32,771	51,771	0.753	24,664	38,965
6/30/03-04	41,550	61,550	0.760	31,564	46,757
6/30/04-05	54,930	76,930	0.767	42,124	58,995
6/30/05-06	68,529	105,529	0.777	53,230	81,969
6/30/06-07	16,498	122,248	0.771	12,727	94,305
6/30/07-08	19,595	138,895	0.765	14,981	106,191
6/30/08-09	38,757	134,257	0.764	29,614	102,584
6/30/09-10	46,493	168,243	0.765	35,560	128,680
6/30/10-11	8,615	159,115	0.767	6,605	121,986
6/30/11-12	22,523	219,023	0.779	17,543	170,597
6/30/12-13	72,001	241,101	0.790	56,847	190,357
6/30/13-14	108,358	277,858	0.794	86,012	220,558
6/30/14-15	154,956	327,156	0.793	122,845	259,362
6/30/15-16	208,685	382,685	0.795	165,864	304,159
6/30/16-17	303,168	459,168	0.816	247,397	374,699
6/30/17-18	438,396	640,396	0.842	369,018	539,050
6/30/18-19	897,558	1,064,558	0.872	782,578	928,185
Total	2,834,121	5,282,782		2,343,074	4,300,699
			(7) Total Discount Factor:	0.827	0.814

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	1,210	1,947
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	403	649
(11) Discounted Value at 4%:	1,142	1,837

NOTES:
(2), (3) From Section 2, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 2, Exhibit 2, Page 9, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Developmental Services - Cluster 1
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	1,210	1,947		1,110	1,786
6/30/82-83	31	3,031	0.971	30	2,944
6/30/83-84	2,210	31,210	0.947	2,093	29,559
6/30/84-85	1,815	17,815	0.921	1,673	16,415
6/30/85-86	5,835	6,835	0.896	5,229	6,125
6/30/86-87	8,647	10,647	0.872	7,538	9,281
6/30/87-88	13,964	15,964	0.848	11,841	13,538
6/30/88-89	26,889	80,322	0.825	22,188	66,281
6/30/89-90	28,924	31,924	0.803	23,230	25,640
6/30/90-91	22,357	25,308	0.782	17,482	19,789
6/30/91-92	1,498	28,778	0.781	1,169	22,469
6/30/92-93	4,818	22,628	0.773	3,725	17,493
6/30/93-94	6,011	18,921	0.762	4,579	14,415
6/30/94-95	6,400	15,840	0.749	4,791	11,857
6/30/95-96	18,978	28,978	0.734	13,933	21,275
6/30/96-97	18,337	27,337	0.719	13,188	19,660
6/30/97-98	17,643	33,643	0.704	12,419	23,682
6/30/98-99	15,451	29,451	0.689	10,639	20,279
6/30/99-00	23,727	41,727	0.673	15,975	28,095
6/30/00-01	44,821	127,821	0.658	29,502	84,136
6/30/01-02	31,171	52,171	0.643	20,056	33,567
6/30/02-03	32,771	51,771	0.667	21,864	34,541
6/30/03-04	41,550	61,550	0.677	28,141	41,687
6/30/04-05	54,930	76,930	0.687	37,756	52,878
6/30/05-06	68,529	105,529	0.701	48,019	73,945
6/30/06-07	16,498	122,248	0.694	11,444	84,796
6/30/07-08	19,595	138,895	0.685	13,415	95,090
6/30/08-09	38,757	134,257	0.684	26,519	91,864
6/30/09-10	46,493	168,243	0.685	31,869	115,324
6/30/10-11	8,615	159,115	0.688	5,927	109,472
6/30/11-12	22,523	219,023	0.704	15,863	154,260
6/30/12-13	72,001	241,101	0.718	51,712	173,162
6/30/13-14	108,358	277,858	0.723	78,394	201,023
6/30/14-15	154,956	327,156	0.722	111,840	236,127
6/30/15-16	208,685	382,685	0.724	151,121	277,125
6/30/16-17	303,168	459,168	0.752	228,030	345,367
6/30/17-18	438,396	640,396	0.786	344,510	503,250
6/30/18-19	897,558	1,064,558	0.825	740,782	878,612
Total	2,834,121	5,282,782		2,169,600	3,956,808
			(7) Total Discount Factor:	0.766	0.749

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	1,210	1,947
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	403	649
(11) Discounted Value at 6%:	1,110	1,786

NOTES:
(2), (3) From Section 2, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 2, Exhibit 2, Page 9, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		20,876,550			22,358,975	22,813,342	1,482,424	1,936,792		
6/30/82-83		2,925,786	2,962,665		2,962,665	2,968,590	36,879	42,804		
6/30/83-84		2,655,007	2,707,154		2,680,082	2,707,154	25,076	52,147		
6/30/84-85	142,561	4,384,902	4,513,105	4,480,238	4,407,000	4,513,000	22,098	128,098	3.091	3.166
6/30/85-86	153,298	4,634,091	4,811,296	4,806,024	4,639,000	4,667,000	4,909	32,909	3.026	3.044
6/30/86-87	176,136	6,208,413	6,499,881	6,512,052	6,215,000	6,252,000	6,587	43,587	3.529	3.550
6/30/87-88	206,319	11,843,674	12,501,580	12,437,252	12,437,000	12,502,000	593,326	658,326	6.028	6.060
6/30/88-89	222,806	12,716,138	13,458,796	13,386,341	13,429,814	13,459,000	713,676	742,862	6.028	6.041
6/30/89-90	223,751	12,182,384	12,950,628	12,883,162	12,883,000	12,951,000	700,616	768,616	5.758	5.788
6/30/90-91	210,162	7,830,550	8,353,969	8,349,230	7,870,000	7,978,070	39,450	147,520	3.745	3.796
6/30/91-92	205,241	4,260,079	4,561,092	4,556,100	4,281,000	4,355,755	20,921	95,676	2.086	2.122
6/30/92-93	176,705	3,740,900	4,034,847	4,027,337	4,027,000	4,035,000	286,100	294,100	2.279	2.283
6/30/93-94	173,075	2,610,632	2,852,221	2,844,551	2,845,000	2,852,000	234,368	241,368	1.644	1.648
6/30/94-95	178,317	2,818,005	3,093,205	3,082,494	2,832,000	2,907,420	13,995	89,415	1.588	1.630
6/30/95-96	175,996	1,924,351	2,107,683	2,100,903	1,934,000	2,013,140	9,649	88,789	1.099	1.144
6/30/96-97	190,083	1,571,537	1,714,613	1,710,707	1,579,000	1,637,825	7,463	66,288	0.831	0.862
6/30/97-98	177,278	2,912,109	3,208,499	3,192,266	2,927,000	3,063,640	14,891	151,531	1.651	1.728
6/30/98-99	189,080	1,674,780	1,858,103	1,851,603	1,814,960	1,820,840	140,180	146,060	0.960	0.963
6/30/99-00	194,494	2,313,702	2,558,133	2,546,558	2,419,650	2,481,260	105,948	167,558	1.244	1.276
6/30/00-01	201,568	3,299,797	3,683,188	3,660,053	3,477,000	3,572,510	177,203	272,713	1.725	1.772
6/30/01-02	203,105	2,606,204	2,935,697	2,919,911	2,774,000	2,847,920	167,796	241,716	1.366	1.402
6/30/02-03	202,515	1,797,354	2,009,906	2,007,707	2,008,000	2,010,000	210,646	212,646	0.992	0.993
6/30/03-04	189,588	3,243,956	3,687,371	3,662,999	3,479,850	3,613,260	235,894	369,304	1.835	1.906
6/30/04-05	186,990	2,723,646	3,084,059	2,943,032	2,943,000	3,084,000	219,355	360,355	1.574	1.649
6/30/05-06	193,254	1,859,638	2,100,861	2,109,012	2,101,000	2,109,000	241,362	249,362	1.087	1.091
6/30/06-07	203,359	2,221,812	2,548,930	2,515,976	2,390,200	2,421,550	168,388	199,738	1.175	1.191
6/30/07-08	212,083	1,641,504	1,891,314	1,986,188	1,796,450	1,886,700	154,946	245,196	0.847	0.890
6/30/08-09	204,679	1,997,277	2,350,485	2,394,709	2,350,000	2,395,000	352,723	397,723	1.148	1.170
6/30/09-10	184,688	1,234,832	1,486,842	1,656,705	1,572,000	1,657,000	337,168	422,168	0.851	0.897
6/30/10-11	169,689	2,402,644	2,933,275	2,869,894	2,870,000	2,992,000	467,356	589,356	1.691	1.763
6/30/11-12	177,399	1,696,776	2,126,648	2,249,885	2,127,000	2,295,000	430,224	598,224	1.199	1.294
6/30/12-13	189,252	2,566,309	3,331,108	3,325,780	3,326,000	3,398,000	759,691	831,691	1.757	1.795
6/30/13-14	199,876	3,082,442	4,165,597	4,105,432	4,105,000	4,249,000	1,022,558	1,166,558	2.054	2.126
6/30/14-15	213,700	3,481,613	4,938,254	4,784,970	4,785,000	5,037,000	1,303,387	1,555,387	2.239	2.357
6/30/15-16	211,829	4,455,032	7,006,834	6,301,085	6,301,000	7,147,000	1,845,968	2,691,968	2.975	3.374
6/30/16-17	203,085	3,171,300	5,843,704	5,412,386	5,412,000	5,844,000	2,240,700	2,672,700	2.665	2.878
6/30/17-18	203,925	1,934,751	4,762,493	5,013,259	4,762,000	5,164,000	2,827,249	3,229,249	2.335	2.532
6/30/18-19	218,060	1,147,072	5,364,591	5,769,574	5,365,000	5,943,000	4,217,928	4,795,928	2.460	2.725
Total	6,763,947	156,647,548	160,998,623	154,455,376	178,486,646	183,643,976	21,839,098	26,996,428		
Tot 6/30/84-19	6,763,947	130,190,205	155,328,804	154,455,376	150,484,924	155,154,890	20,294,719	24,964,685	2.225	2.294

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) Sum of Section 3, Exhibit 1, Page 2, Column 3 and Section 3, Exhibit 1, Page 9, Column 8
(4) From Section 3, Exhibit 1, Page 2, Column 8
(5) From Section 3, Exhibit 1, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim	Average Age
All Prior Yrs		20,210,870							5	4		85
6/30/82-83		2,831,786	1.013	1.000	2,868,618	94,047	2,962,665		1	1	36,832	92
6/30/83-84		2,245,006	1.023	1.000	2,296,948	410,206	2,707,154		0	0		
6/30/84-85	142,561	3,833,819	1.033	1.000	3,961,746	551,359	4,513,105	3.166	1	1	127,927	77
6/30/85-86	153,298	4,048,163	1.044	1.000	4,225,075	586,221	4,811,296	3.139	0	0		
6/30/86-87	176,136	5,376,022	1.054	1.000	5,667,073	832,807	6,499,881	3.690	0	0		
6/30/87-88	206,319	10,158,652	1.065	1.000	10,815,715	1,685,865	12,501,580	6.059	1	1	657,063	66
6/30/88-89	222,806	10,740,496	1.069	1.000	11,482,166	1,976,630	13,458,796	6.041	3	3	247,223	81
6/30/89-90	223,751	10,144,744	1.076	1.000	10,911,969	2,038,659	12,950,628	5.788	2	2	383,612	78
6/30/90-91	210,162	6,165,086	1.085	1.000	6,687,673	1,666,297	8,353,969	3.975	0	0		
6/30/91-92	205,241	3,230,938	1.093	1.000	3,531,436	1,029,656	4,561,092	2.222	0	0		
6/30/92-93	176,705	2,946,821	1.100	1.000	3,240,371	794,476	4,034,847	2.283	1	1	293,550	67
6/30/93-94	173,075	2,252,048	1.107	1.000	2,493,279	358,943	2,852,221	1.648	1	1	241,230	68
6/30/94-95	178,317	2,341,581	1.117	1.000	2,616,065	477,139	3,093,205	1.735	0	0		
6/30/95-96	175,996	1,440,291	1.127	1.000	1,622,654	485,030	2,107,683	1.198	0	0		
6/30/96-97	190,083	1,057,037	1.134	1.000	1,198,824	515,789	1,714,613	0.902	0	0		
6/30/97-98	177,278	2,101,308	1.140	1.000	2,395,260	813,239	3,208,499	1.810	0	0		
6/30/98-99	189,080	1,254,530	1.145	1.000	1,436,378	421,725	1,858,103	0.983	0	0		
6/30/99-00	194,494	1,634,502	1.148	1.000	1,876,207	681,926	2,558,133	1.315	0	0		
6/30/00-01	201,568	2,503,297	1.151	1.000	2,882,286	800,902	3,683,188	1.827	0	0		
6/30/01-02	203,105	2,097,298	1.155	1.000	2,422,435	513,262	2,935,697	1.445	0	0		
6/30/02-03	202,515	1,300,354	1.159	1.000	1,507,135	502,770	2,009,906	0.992	1	2	103,391	48
6/30/03-04	189,588	2,662,956	1.163	1.000	3,097,841	589,529	3,687,371	1.945	0	0		
6/30/04-05	186,990	2,088,646	1.168	1.000	2,439,737	644,322	3,084,059	1.649	1	0		
6/30/05-06	193,254	1,356,888	1.172	1.000	1,590,730	510,130	2,100,861	1.087	0	1	233,842	55
6/30/06-07	203,359	1,791,061	1.178	1.000	2,109,639	439,292	2,548,930	1.253	0	0		
6/30/07-08	212,083	1,303,214	1.184	1.000	1,542,760	348,553	1,891,314	0.892	0	0		
6/30/08-09	204,679	1,670,277	1.202	1.000	2,008,373	342,112	2,350,485	1.148	1	1	338,096	51
6/30/09-10	184,688	1,061,332	1.226	1.000	1,301,510	185,332	1,486,842	0.805	0	1	240,179	61
6/30/10-11	169,689	2,028,513	1.245	1.000	2,524,514	408,761	2,933,275	1.729	4	2	248,000	59
6/30/11-12	177,399	1,513,476	1.266	1.000	1,915,463	211,184	2,126,648	1.199	1	1	401,988	53
6/30/12-13	189,252	2,257,309	1.299	1.000	2,932,559	398,549	3,331,108	1.760	4	4	168,812	58
6/30/13-14	199,876	2,643,526	1.348	1.000	3,564,639	600,958	4,165,597	2.084	6	5	184,223	59
6/30/14-15	213,700	3,124,113	1.408	1.000	4,397,198	541,056	4,938,254	2.311	11	11	115,735	55
6/30/15-16	211,829	4,013,031	1.541	1.000	6,183,168	823,666	7,006,834	3.308	25	18	120,563	56
6/30/16-17	203,085	3,028,300	1.766	1.000	5,348,868	494,837	5,843,704	2.877	58	25	92,823	50
6/30/17-18	203,925	1,894,751	2.280	1.000	4,319,925	442,567	4,762,493	2.335	212	58	41,813	47
6/30/18-19	218,060	1,147,072	4.383	1.000	5,027,770	336,821	5,364,591	2.460		199	19,501	45
Total	6,763,947	133,499,114			136,444,007	24,554,616	160,998,623		339	342		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 3, Exhibit 1, Page 7
(5) Based on information from the MA WCRIB
(6) = (3) x (4) x (5)
(7) From Section 3, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	142,561	2.065	3,833,819	1.033	3,928,879	551,359	4,480,238	3.143	2.756
6/30/85-86	153,298	2.674	4,048,163	1.044	4,219,804	586,221	4,806,024	3.135	2.753
6/30/86-87	176,136	3.352	5,376,022	1.054	5,679,245	832,807	6,512,052	3.697	3.224
6/30/87-88	206,319	4.729	10,158,652	1.065	10,751,388	1,685,865	12,437,252	6.028	5.211
6/30/88-89	222,806	4.650	10,740,496	1.069	11,409,711	1,976,630	13,386,341	6.008	5.121
6/30/89-90	223,751	4.448	10,144,744	1.076	10,844,503	2,038,659	12,883,162	5.758	4.847
6/30/90-91	210,162	3.153	6,165,086	1.085	6,682,933	1,666,297	8,349,230	3.973	3.180
6/30/91-92	205,241	1.692	3,230,938	1.093	3,526,445	1,029,656	4,556,100	2.220	1.718
6/30/92-93	176,705	1.787	2,946,821	1.100	3,232,861	794,476	4,027,337	2.279	1.830
6/30/93-94	173,075	1.395	2,252,048	1.107	2,485,609	358,943	2,844,551	1.644	1.436
6/30/94-95	178,317	1.410	2,341,581	1.117	2,605,354	477,139	3,082,494	1.729	1.461
6/30/95-96	175,996	0.888	1,440,291	1.127	1,615,873	485,030	2,100,903	1.194	0.918
6/30/96-97	190,083	0.613	1,057,037	1.134	1,194,918	515,789	1,710,707	0.900	0.629
6/30/97-98	177,278	1.277	2,101,308	1.140	2,379,027	813,239	3,192,266	1.801	1.342
6/30/98-99	189,080	0.733	1,254,530	1.145	1,429,878	421,725	1,851,603	0.979	0.756
6/30/99-00	194,494	0.918	1,634,502	1.148	1,864,632	681,926	2,546,558	1.309	0.959
6/30/00-01	201,568	1.343	2,503,297	1.151	2,859,152	800,902	3,660,053	1.816	1.418
6/30/01-02	203,105	1.135	2,097,298	1.155	2,406,648	513,262	2,919,911	1.438	1.185
6/30/02-03	202,515	0.736	1,300,354	1.159	1,504,936	502,770	2,007,707	0.991	0.743
6/30/03-04	189,588	1.542	2,662,956	1.163	3,073,470	589,529	3,662,999	1.932	1.621
6/30/04-05	186,990	0.781	2,088,646	1.168	2,298,710	644,322	2,943,032	1.574	1.229
6/30/05-06	193,254	0.852	1,356,888	1.172	1,598,881	510,130	2,109,012	1.091	0.827
6/30/06-07	203,359	0.930	1,791,061	1.178	2,076,684	439,292	2,515,976	1.237	1.021
6/30/07-08	212,083	1.016	1,303,214	1.184	1,637,635	348,553	1,986,188	0.937	0.772
6/30/08-09	204,679	1.110	1,670,277	1.202	2,052,598	342,112	2,394,709	1.170	1.003
6/30/09-10	184,688	1.203	1,061,332	1.226	1,471,373	185,332	1,656,705	0.897	0.797
6/30/10-11	169,689	1.298	2,028,513	1.245	2,461,133	408,761	2,869,894	1.691	1.450
6/30/11-12	177,399	1.411	1,513,476	1.266	2,038,700	211,184	2,249,885	1.268	1.149
6/30/12-13	189,252	1.537	2,257,309	1.299	2,927,231	398,549	3,325,780	1.757	1.547
6/30/13-14	199,876	1.667	2,643,526	1.348	3,504,474	600,958	4,105,432	2.054	1.753
6/30/14-15	213,700	1.810	3,124,113	1.408	4,243,913	541,056	4,784,970	2.239	1.986
6/30/15-16	211,829	1.970	4,013,031	1.541	5,477,419	823,666	6,301,085	2.975	2.586
6/30/16-17	203,085	2.144	3,028,300	1.766	4,917,549	494,837	5,412,386	2.665	2.421
6/30/17-18	203,925	2.337	1,894,751	2.280	4,570,691	442,567	5,013,259	2.458	2.241
6/30/18-19	218,060	2.546	1,147,072	4.383	5,432,753	336,821	5,769,574	2.646	2.491
Total	6,763,947		108,211,452		130,405,013	24,050,363	154,455,376		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 3, Exhibit 1, Page 4, Column 11
(4) From Section 3, Exhibit 1, Page 2, Column 3
(5) From Section 3, Exhibit 1, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) From Section 3, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									2.065	2.065
6/30/85-86									2.674	2.674
6/30/86-87									3.352	3.352
6/30/87-88									4.729	4.729
6/30/88-89									4.650	4.650
6/30/89-90									4.448	4.448
6/30/90-91	210,162	6,687,673	3.182	0.996	3.171	9.317	29.541	0.296	3.148	3.153
6/30/91-92	205,241	3,531,436	1.721	1.093	1.881	8.627	16.226	0.292	1.690	1.692
6/30/92-93	176,705	3,240,371	1.834	1.275	2.337	7.988	18.671	0.270	1.765	1.787
6/30/93-94	173,075	2,493,279	1.441	1.258	1.813	7.396	13.407	0.295	1.374	1.395
6/30/94-95	178,317	2,616,065	1.467	1.247	1.829	6.848	12.525	0.322	1.412	1.410
6/30/95-96	175,996	1,622,654	0.922	1.237	1.140	6.341	7.231	0.351	0.892	0.888
6/30/96-97	190,083	1,198,824	0.631	1.224	0.772	5.871	4.534	0.382	0.619	0.613
6/30/97-98	177,278	2,395,260	1.351	1.209	1.633	5.437	8.879	0.418	1.283	1.277
6/30/98-99	189,080	1,436,378	0.760	1.193	0.906	5.034	4.562	0.458	0.740	0.733
6/30/99-00	194,494	1,876,207	0.965	1.174	1.132	4.661	5.277	0.503	0.928	0.918
6/30/00-01	201,568	2,882,286	1.430	1.144	1.636	4.316	7.059	0.557	1.352	1.343
6/30/01-02	203,105	2,422,435	1.193	1.122	1.338	3.996	5.345	0.614	1.145	1.135
6/30/02-03	202,515	1,507,135	0.744	1.118	0.832	3.700	3.077	0.665	0.747	0.736
6/30/03-04	189,588	3,097,841	1.634	1.118	1.826	3.426	6.256	0.718	1.555	1.542
6/30/04-05	186,990	2,439,737	1.305	1.111	1.449	3.172	4.596	0.781	0.885	0.781
6/30/05-06	193,254	1,590,730	0.823	1.099	0.905	2.937	2.657	0.852	0.956	0.852
6/30/06-07	203,359	2,109,639	1.037	1.087	1.128	2.720	3.067	0.930	1.035	0.930
6/30/07-08	212,083	1,542,760	0.727	1.075	0.782	2.518	1.970	1.016	1.119	1.016
6/30/08-09	204,679	2,008,373	0.981	1.063	1.043	2.332	2.432	1.110	1.212	1.110
6/30/09-10	184,688	1,301,510	0.705	1.059	0.746	2.159	1.611	1.203	1.302	1.203
6/30/10-11	169,689	2,524,514	1.488	1.060	1.577	1.999	3.153	1.298	1.391	1.298
6/30/11-12	177,399	1,915,463	1.080	1.053	1.137	1.851	2.105	1.411	1.498	1.411
6/30/12-13	189,252	2,932,559	1.550	1.044	1.617	1.714	2.772	1.537	1.617	1.537
6/30/13-14	199,876	3,564,639	1.783	1.040	1.854	1.587	2.942	1.667	1.737	1.667
6/30/14-15	213,700	4,397,198	2.058	1.034	2.128	1.469	3.126	1.810	1.869	1.810
6/30/15-16	211,829	6,183,168	2.919	1.026	2.995	1.360	4.075	1.970	2.015	1.970
6/30/16-17	203,085	5,348,868	2.634	1.018	2.681	1.260	3.378	2.144	2.171	2.144
6/30/17-18	203,925	4,319,925	2.118	1.009	2.137	1.166	2.492	2.337	2.336	2.337
6/30/18-19	218,060	5,027,770	2.306	1.000	2.306	1.080	2.490	2.546		2.546
Total	5,639,077	84,214,697								

Trend Last 4 (ex 18-19):	-1.0%	Avg 3 (ex 18-19):	3.315
Trend Last 8 (ex 18-19):	10.5%	Avg 5 (ex 18-19):	3.203
Trend Last 12 (ex 18-19):	11.7%	Avg 10 (ex 18-19):	2.809
Prior Selected Trend:	7.0%	Prior Sel Avg:	2.500
Selected Trend:	8.0%	Sel. Loss Cost:	2.750

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 3, Exhibit 1, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCRIB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.950	
(2)	Credibility	41%	
(3)	Average Pmt Trend Statewide	0.950	
(4)	Credibility Weighted Trend	0.950	
		(Low)	(High)
(5)	Selected Range	0.920	0.950
(6)	Incremental Paid for 2019	149,342	149,342
(7)	Estimated Reserve	1,717,436	2,837,503
(8)	Paid to Date (82 & Prior)	20,210,870	20,210,870
(9)	Est Ult Paid for 1982 & Prior	21,928,306	23,048,373

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	178,107	212,158
(11)	Projected Number of Years	7	7
(12)	Estimated Reserve	1,246,747	1,485,105
(13)	Paid to Date (82 & Prior)	20,210,870	20,061,528
(14)	Est Ult Paid for 1982 & Prior	21,457,617	21,546,633
(14a)	Paid Counts During Fiscal Year	4	5
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	21,692,962	22,147,329
(16)	Lump Sum Ultimates	666,013	666,013
(17)	Ult Loss Including Lump Sums	**22,358,975**	**22,813,342**
(18)	Implied Tail	1.073	1.096
(19)	Ult Loss Inc Lump Sums @ 6/18	22,711,750	23,538,009

NOTES:

(1) From Section 3, Exhibit 1, Page 6
(2) = (Average of Section 3, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 3, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 3, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 3, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	750,775	13.529			
1993	2	716,997	13.483	0.955		
1994	3	790,631	13.581	1.103		
1995	4	675,209	13.423	0.854		
1996	5	721,864	13.490	1.069		
1997	6	762,764	13.545	1.057		
1998	7	718,856	13.485	0.942		
1999	8	630,481	13.354	0.877		
2000	9	625,893	13.347	0.993	n =	28
2001	10	614,002	13.328	0.981	S(x) =	56,154
2002	11	594,569	13.296	0.968	S(x-sq) =	112,618,674
2003	12	551,328	13.220	0.927	S(xy) =	731,598
2004	13	536,825	13.193	0.974	S(y) =	365
2005	14	518,060	13.158	0.965	D =	51,156
2006	15	465,230	13.050	0.898	slope =	-0.052
2007	16	463,442	13.046	0.996	Avg Trend =	0.948
2008	17	390,409	12.875	0.842		
2009	18	394,388	12.885	1.010		
2010	19	396,721	12.891	1.006		
2011	20	371,480	12.825	0.936		
2012	21	370,117	12.822	0.996		
2013	22	354,524	12.779	0.958		
2014	23	352,103	12.772	0.993		
2015	24	356,384	12.784	1.012		
2016	25	251,496	12.435	0.706		
2017	26	198,162	12.197	0.788		
2018	27	186,816	12.138	0.943		
2019	28	149,342	11.914	0.799		
					Selected Trend:	**0.950**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2019: 0.799 = 149342 / 186816

Commonwealth of Massachusetts Workers Compensation
Department of Mental Health - Cluster 2
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
June-83	79,308	192,487	287,043	366,841	453,896	544,549	640,359	749,442	914,819	1,077,281	1,197,004	1,318,238	1,411,761	1,487,347	1,551,200	1,663,300	1,725,578	1,794,915	1,844,320	1,889,378	1,935,146	1,980,854	2,027,803	2,076,694	2,127,762	2,181,186	2,236,941	2,293,398	2,349,618	2,407,755	2,467,791	2,528,627	2,590,871	2,655,332	2,721,515	2,789,944	2,831,786
June-84	140,777	341,678	509,522	651,169	805,697	966,187	1,136,616	1,274,005	1,376,021	1,469,295	1,531,586	1,571,197	1,574,113	1,632,297	1,648,271	1,715,119	1,788,667	1,866,433	1,948,603	2,027,969	2,039,380	2,061,132	2,116,425	2,146,711	2,178,653	2,211,990	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	
June-85	229,548	557,132	830,815	1,036,782	1,282,444	1,536,673	1,759,380	1,967,113	2,201,587	2,336,765	2,327,938	2,488,898	2,562,953	2,635,303	2,683,281	2,681,236	2,703,322	2,765,472	2,829,392	2,893,225	2,958,066	3,025,906	3,097,014	3,171,404	3,249,041	3,327,655	3,405,939	3,486,893	3,570,488	3,628,593	3,677,977	3,729,119	3,781,629	3,835,920	3,833,819		
June-86	424,946	1,031,378	1,515,527	1,911,756	2,265,456	2,545,075	2,747,857	2,913,298	3,035,997	3,203,939	3,246,126	3,354,664	3,430,712	3,506,894	3,646,690	3,769,482	3,845,436	3,884,426	3,884,426	3,901,838	3,936,022	3,971,963	4,009,622	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163			
June-87	556,509	1,350,692	1,993,369	2,579,183	3,116,291	3,554,448	3,811,881	4,007,455	4,213,271	4,383,210	4,532,492	4,672,974	4,887,827	5,019,452	5,138,398	5,229,397	5,303,153	5,343,074	5,369,509	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022				
June-88	996,188	2,332,317	3,514,867	4,556,262	5,500,101	6,017,634	6,366,291	6,722,900	7,030,156	7,360,513	7,651,811	7,905,775	8,097,655	8,296,173	8,504,343	8,714,431	8,884,786	9,012,909	9,145,701	9,284,112	9,391,001	9,490,888	9,559,720	9,628,264	9,699,144	9,772,337	9,846,507	9,922,648	10,001,236	10,073,519	10,113,632	10,158,652					
June-89	974,368	2,808,156	4,300,397	5,491,438	6,395,798	6,912,277	7,273,583	7,577,849	7,816,082	8,040,709	8,232,999	8,388,997	8,540,736	8,681,850	8,813,773	8,957,148	9,087,424	9,215,619	9,374,489	9,492,897	9,614,904	9,738,023	9,864,181	9,984,126	10,084,005	10,185,647	10,289,641	10,397,339	10,507,914	10,622,240	10,740,496						
June-90	1,353,410	3,008,842	4,338,167	5,277,757	5,970,429	6,408,269	6,735,493	6,970,610	7,237,879	7,548,184	7,808,304	7,989,794	8,127,173	8,265,835	8,400,915	8,532,029	8,676,814	8,783,514	8,912,207	9,013,337	9,115,739	9,217,710	9,323,158	9,432,048	9,542,392	9,655,288	9,772,206	9,892,249	10,016,363	10,144,744							
June-91	1,118,653	2,593,016	3,552,946	4,081,060	4,371,249	4,603,681	4,879,272	5,042,637	5,246,506	5,361,660	5,458,410	5,545,863	5,634,530	5,719,796	5,801,980	5,891,283	5,939,454	5,965,760	5,993,853	6,022,299	6,050,626	6,079,918	6,110,167	6,140,819	6,165,086	6,165,086	6,165,086	6,165,086	6,165,086								
June-92	779,443	1,600,490	2,051,414	2,363,890	2,560,991	2,732,954	2,816,302	2,946,286	2,972,351	3,048,807	3,074,042	3,100,183	3,111,601	3,122,928	3,137,949	3,150,571	3,201,317	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938									
June-93	508,042	1,139,423	1,618,359	1,905,411	2,126,599	2,257,595	2,393,075	2,425,099	2,385,748	2,412,183	2,438,986	2,465,788	2,494,233	2,522,478	2,551,473	2,581,602	2,612,495	2,644,362	2,676,330	2,710,104	2,745,340	2,778,023	2,810,764	2,844,272	2,877,843	2,912,020	2,946,821										
June-94	377,925	709,441	935,174	1,117,965	1,249,550	1,323,162	1,417,563	1,481,985	1,569,098	1,629,814	1,690,715	1,751,099	1,818,321	1,857,805	1,886,745	1,916,420	1,946,311	1,976,077	2,006,857	2,038,037	2,070,230	2,117,149	2,149,444	2,181,690	2,216,620	2,252,048											
June-95	574,439	1,025,079	1,426,023	1,674,484	1,757,816	1,829,216	1,892,841	1,966,438	2,053,313	2,075,609	2,139,480	2,201,203	2,270,427	2,322,083	2,335,644	2,336,631	2,340,671	2,340,974	2,341,126	2,341,429	2,341,429	2,341,581	2,341,581	2,341,581	2,341,581												
June-96	465,550	766,030	964,996	1,197,748	1,382,594	1,418,297	1,422,506	1,435,178	1,435,753	1,438,193	1,438,193	1,438,193	1,438,193	1,438,193	1,438,193	1,438,193	1,438,931	1,440,291	1,440,291	1,440,291	1,440,291	1,440,291	1,440,291	1,440,291													
June-97	368,317	714,320	867,272	851,009	922,681	963,841	1,008,538	1,037,840	1,056,559	1,056,947	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037														
June-98	492,131	922,570	1,176,288	1,346,558	1,538,911	1,686,620	1,733,801	1,756,573	1,858,553	1,897,738	1,938,454	2,001,913	2,059,542	2,101,308	2,101,308	2,101,308	2,101,308	2,101,308	2,101,308	2,101,308	2,101,308	2,101,308															
June-99	519,180	827,646	1,011,258	1,112,460	1,171,394	1,215,503	1,243,288	1,247,060	1,247,060	1,249,270	1,249,270	1,254,410	1,254,410	1,254,410	1,254,410	1,254,410	1,254,410	1,254,410	1,254,530	1,254,530	1,254,530																
June-00	421,812	853,733	1,204,737	1,330,009	1,450,814	1,536,528	1,585,725	1,622,250	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502																	
June-01	729,752	1,342,599	1,726,067	1,967,587	2,098,934	2,195,511	2,276,106	2,353,436	2,394,597	2,417,073	2,440,162	2,469,209	2,492,651	2,503,297	2,503,297	2,503,297	2,503,297	2,503,297	2,503,297																		
June-02	623,060	1,199,282	1,469,081	1,634,403	1,755,795	1,921,999	2,013,718	2,051,869	2,088,811	2,097,298	2,097,298	2,097,298	2,097,298	2,097,298	2,097,298	2,097,298	2,097,298	2,097,298																			
June-03	598,151	1,030,113	1,208,133	1,287,181	1,329,302	1,354,993	1,378,440	1,386,422	1,396,038	1,404,611	1,404,724	1,297,452	1,298,408	1,298,653	1,299,375	1,299,796	1,300,354																				
June-04	770,179	1,494,135	1,959,406	2,261,994	2,448,308	2,553,905	2,614,936	2,661,897	2,661,897	2,661,897	2,662,734	2,662,734	2,662,734	2,662,956	2,662,956	2,662,956																					
June-05	665,795	1,274,934	1,639,401	1,834,908	1,949,257	2,006,584	2,055,842	2,083,828	2,083,828	2,083,828	2,083,828	2,086,593	2,086,593	2,087,143	2,088,646	2,088,646																					
June-06	602,391	1,043,862	1,212,582	1,295,959	1,330,737	1,350,327	1,353,060	1,354,447	1,354,589	1,355,634	1,356,494	1,356,633	1,356,633	1,356,888																							
June-07	589,461	977,401	1,280,907	1,496,099	1,629,703	1,702,117	1,772,404	1,791,061	1,791,061	1,791,061	1,791,061	1,791,061	1,791,061																								
June-08	619,287	959,312	1,100,546	1,186,728	1,222,576	1,245,348	1,259,889	1,293,854	1,303,214	1,303,214	1,303,214	1,303,214																									
June-09	633,064	1,071,264	1,269,944	1,347,802	1,449,944	1,535,542	1,576,741	1,613,034	1,632,115	1,651,196	1,670,277																										
June-10	415,006	709,896	895,282	1,025,770	1,055,921	1,060,427	1,060,427	1,060,427	1,060,427	1,061,332																											
June-11	652,304	1,099,134	1,404,624	1,565,671	1,663,173	1,679,758	1,832,231	1,956,057	2,028,513																												
June-12	603,523	1,201,631	1,349,652	1,421,088	1,451,528	1,474,107	1,493,513	1,513,476																													
June-13	652,867	1,253,353	1,608,152	1,828,578	1,999,158	2,131,582	2,257,309																														
June-14	737,949	1,535,219	1,975,124	2,280,487	2,454,263	2,643,526																															
June-15	1,026,870	1,815,749	2,270,640	2,706,742	3,124,113																																
June-16	1,405,951	2,666,770	3,548,313	4,013,031																																	
June-17	1,172,336	2,323,528	3,028,300																																		
June-18	981,294	1,894,751																																			
June-19	1,147,072																																				

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
June-83	2.427	1.491	1.278	1.237	1.200	1.176	1.170	1.221	1.178	1.111	1.101	1.071	1.054	1.043	1.072	1.037	1.040	1.028	1.024	1.024	1.024	1.024	1.024	1.025	1.025	1.026	1.025	1.025	1.025	1.025	1.025	1.025	1.025	1.025	1.025	1.015
June-84	2.427	1.491	1.278	1.237	1.199	1.176	1.121	1.080	1.068	1.042	1.026	1.002	1.037	1.010	1.041	1.043	1.043	1.044	1.041	1.006	1.011	1.027	1.014	1.015	1.015	1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.427	1.491	1.248	1.237	1.198	1.145	1.118	1.119	1.061	0.996	1.069	1.030	1.028	1.018	0.999	1.008	1.023	1.023	1.023	1.022	1.023	1.023	1.024	1.024	1.024	1.024	1.024	1.024	1.016	1.014	1.014	1.014	1.014	0.999		
June-86	2.427	1.469	1.261	1.185	1.123	1.080	1.060	1.042	1.055	1.013	1.033	1.023	1.022	1.040	1.034	1.020	1.010	1.000	1.004	1.009	1.009	1.009	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.427	1.476	1.294	1.208	1.141	1.072	1.051	1.051	1.040	1.034	1.031	1.046	1.027	1.024	1.018	1.014	1.008	1.005	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.341	1.507	1.296	1.207	1.094	1.058	1.056	1.046	1.047	1.040	1.033	1.024	1.025	1.025	1.020	1.014	1.015	1.015	1.012	1.011	1.011	1.007	1.007	1.007	1.008	1.008	1.008	1.008	1.007	1.004	1.004					
June-89	2.882	1.531	1.277	1.165	1.081	1.052	1.042	1.031	1.029	1.024	1.019	1.018	1.017	1.015	1.016	1.015	1.014	1.017	1.013	1.013	1.013	1.013	1.012	1.010	1.010	1.010	1.010	1.011	1.011	1.011						
June-90	2.223	1.442	1.217	1.131	1.073	1.051	1.035	1.038	1.043	1.034	1.023	1.017	1.017	1.016	1.016	1.017	1.012	1.015	1.011	1.011	1.011	1.011	1.012	1.012	1.012	1.012	1.012	1.013	1.013							
June-91	2.318	1.370	1.149	1.071	1.053	1.060	1.033	1.040	1.022	1.018	1.016	1.016	1.015	1.014	1.015	1.008	1.004	1.005	1.005	1.005	1.005	1.005	1.005	1.004	1.000	1.000	1.000	1.000								
June-92	2.053	1.282	1.152	1.083	1.067	1.030	1.046	1.009	1.026	1.008	1.009	1.004	1.004	1.005	1.004	1.016	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
June-93	2.243	1.420	1.177	1.116	1.062	1.060	1.013	0.984	1.011	1.011	1.011	1.012	1.011	1.011	1.012	1.012	1.012	1.012	1.013	1.013	1.012	1.012	1.012	1.012	1.012	1.012										
June-94	1.877	1.318	1.195	1.118	1.059	1.071	1.045	1.059	1.039	1.037	1.036	1.038	1.022	1.016	1.016	1.016	1.015	1.016	1.016	1.016	1.023	1.015	1.015	1.016	1.016											
June-95	1.784	1.391	1.174	1.050	1.041	1.035	1.039	1.044	1.011	1.031	1.029	1.031	1.023	1.006	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	1.645	1.260	1.241	1.154	1.026	1.003	1.009	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	1.939	1.214	0.981	1.084	1.045	1.046	1.029	1.018	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	1.875	1.275	1.145	1.143	1.096	1.028	1.013	1.058	1.021	1.021	1.033	1.029	1.020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
June-99	1.594	1.222	1.100	1.053	1.038	1.023	1.003	1.000	1.002	1.000	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
June-00	2.024	1.411	1.104	1.091	1.059	1.032	1.023	1.008	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
June-01	1.840	1.286	1.140	1.067	1.046	1.037	1.034	1.017	1.009	1.010	1.012	1.009	1.004	1.000	1.000	1.000	1.000	1.000																		
June-02	1.925	1.225	1.113	1.074	1.095	1.048	1.019	1.018	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
June-03	1.722	1.173	1.065	1.033	1.019	1.017	1.006	1.007	1.006	1.000	0.924	1.001	1.000	1.001	1.000	1.000																				
June-04	1.940	1.311	1.154	1.082	1.043	1.024	1.018	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	1.915	1.286	1.119	1.062	1.029	1.025	1.014	1.000	1.000	1.001	1.000	1.000	1.001	1.000																						
June-06	1.733	1.162	1.069	1.027	1.015	1.002	1.001	1.000	1.001	1.001	1.000	1.000	1.000																							
June-07	1.658	1.311	1.168	1.089	1.044	1.041	1.011	1.000	1.000	1.000	1.000	1.000																								
June-08	1.549	1.147	1.078	1.030	1.019	1.012	1.027	1.007	1.000	1.000	1.000																									
June-09	1.692	1.185	1.061	1.076	1.059	1.027	1.023	1.012	1.012	1.012																										
June-10	1.711	1.261	1.146	1.029	1.004	1.000	1.000	1.000	1.001																											
June-11	1.685	1.278	1.115	1.062	1.010	1.091	1.068	1.037																												
June-12	1.991	1.123	1.053	1.021	1.016	1.013	1.013																													
June-13	1.920	1.283	1.137	1.093	1.066	1.059																														
June-14	2.080	1.287	1.155	1.076	1.077																															
June-15	1.768	1.251	1.192	1.154																																
June-16	1.897	1.331	1.131																																	
June-17	1.982	1.303																																		
June-18	1.931																																			

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*To Ult*
Simple Avg																																					
All Yrs	1.996	1.322	1.161	1.108	1.069	1.051	1.038	1.033	1.025	1.017	1.016	1.015	1.014	1.011	1.012	1.011	1.010	1.009	1.009	1.008	1.009	1.010	1.010	1.010	1.010	1.010	1.008	1.009	1.009	1.008	1.007	1.008	1.010	1.008	1.013	1.015	
Latest 5	1.932	1.291	1.134	1.081	1.035	1.038	1.026	1.011	1.003	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.005	1.005	1.006	1.008	1.007	1.006	1.006	1.006	1.006	1.004	1.008					
Latest 3	1.937	1.295	1.159	1.108	1.053	1.054	1.027	1.016	1.004	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.009	1.009	1.004	1.004	1.008	1.010	1.005	1.001	1.005	1.005	1.008			
Volume Wtd																																					
All Yrs	1.998	1.334	1.172	1.114	1.070	1.050	1.038	1.032	1.027	1.020	1.019	1.017	1.016	1.014	1.014	1.013	1.011	1.011	1.010	1.009	1.009	1.009	1.009	1.009	1.009	1.008	1.008	1.008	1.009	1.007	1.006	1.006	1.009	1.007	1.014		
Latest 5	1.922	1.296	1.139	1.091	1.042	1.043	1.030	1.013	1.003	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.007	1.005	1.006	1.008	1.008	1.008	1.008	1.008	1.006	1.004						
Latest 3	1.934	1.300	1.155	1.112	1.058	1.056	1.033	1.020	1.005	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.009	1.008	1.003	1.006	1.009	1.010	1.006	1.002	1.004	1.005				

Dev Factor Selection																																					
Industry 1	2.958	1.587	1.232	1.108	1.038	1.023	1.014	1.008	1.006	1.007	1.006	1.010	1.003	1.004	1.003	1.003	1.005	1.003																			
Industry 2		1.877	1.312	1.143	1.055	1.028	1.016	1.015	1.006	1.005	1.007	1.007	1.004	1.002	1.005	1.002	1.003	1.002	1.001	1.001																	
Prior	*1.888*	*1.269*	*1.139*	*1.080*	*1.043*	*1.028*	*1.026*	*1.017*	*1.015*	*1.020*	*1.016*	*1.005*	*1.005*	*1.004*	*1.004*	*1.004*	*1.004*	*1.003*	*1.003*	*1.004*	*1.005*	*1.007*	*1.009*	*1.009*	*1.007*	*1.006*	*1.008*	*1.009*	*1.007*	*1.004*	*1.007*	*1.010*	*1.010*	*1.010*	*1.010*	*1.013*	
Selected	1.922	1.291	1.146	1.095	1.044	1.038	1.026	1.017	1.015	1.020	1.016	1.005	1.005	1.004	1.004	1.004	1.003	1.003	1.003	1.003	1.004	1.005	1.007	1.008	1.009	1.007	1.006	1.008	1.008	1.006	1.004	1.010	1.010	1.010	1.010	1.010	1.013
FacToUlt	4.383	2.280	1.766	1.541	1.408	1.348	1.299	1.266	1.245	1.226	1.202	1.184	1.178	1.172	1.168	1.163	1.159	1.155	1.151	1.148	1.145	1.140	1.134	1.127	1.117	1.107	1.100	1.093	1.085	1.076	1.069	1.065	1.054	1.044	1.033	1.023	1.013
Percent of Ult	22.8%	43.9%	56.6%	64.9%	71.0%	74.2%	77.0%	79.0%	80.4%	81.5%	83.2%	84.5%	84.9%	85.3%	85.6%	86.0%	86.3%	86.6%	86.9%	87.1%	87.3%	87.7%	88.2%	88.8%	89.5%	90.3%	90.9%	91.5%	92.2%	93.0%	93.5%	93.9%	94.9%	95.8%	96.8%	97.7%	98.7%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	22,711,750	23,538,009	22,358,975	22,813,342	(352,776)	-1.6%	(724,667)	-3.1%
6/30/82-83	2,920,972	2,926,814	2,962,665	2,968,590	41,693	1.4%	41,777	1.4%
6/30/83-84	2,680,970	2,708,050	2,680,082	2,707,154	(888)	0.0%	(897)	0.0%
6/30/84-85	4,409,000	4,517,000	4,407,000	4,513,000	(2,000)	0.0%	(4,000)	-0.1%
6/30/85-86	4,639,000	4,668,000	4,639,000	4,667,000	0	0.0%	(1,000)	0.0%
6/30/86-87	6,215,000	6,254,000	6,215,000	6,252,000	0	0.0%	(2,000)	0.0%
6/30/87-88	12,366,000	12,422,000	12,437,000	12,502,000	71,000	0.6%	80,000	0.6%
6/30/88-89	13,274,396	13,298,000	13,429,814	13,459,000	155,418	1.2%	161,000	1.2%
6/30/89-90	12,736,000	12,790,000	12,883,000	12,951,000	147,000	1.2%	161,000	1.3%
6/30/90-91	7,870,000	7,967,565	7,870,000	7,978,070	0	0.0%	10,505	0.1%
6/30/91-92	4,281,000	4,350,025	4,281,000	4,355,755	0	0.0%	5,730	0.1%
6/30/92-93	3,986,000	3,993,000	4,027,000	4,035,000	41,000	1.0%	42,000	1.1%
6/30/93-94	2,803,000	2,810,000	2,845,000	2,852,000	42,000	1.5%	42,000	1.5%
6/30/94-95	2,832,000	2,905,540	2,832,000	2,907,420	0	0.0%	1,880	0.1%
6/30/95-96	1,934,000	2,012,185	1,934,000	2,013,140	0	0.0%	955	0.0%
6/30/96-97	1,579,000	1,636,870	1,579,000	1,637,825	0	0.0%	955	0.1%
6/30/97-98	2,927,000	3,064,595	2,927,000	3,063,640	0	0.0%	(955)	0.0%
6/30/98-99	1,815,940	1,819,860	1,814,960	1,820,840	(980)	-0.1%	980	0.1%
6/30/99-00	2,422,500	2,482,230	2,419,650	2,481,260	(2,850)	-0.1%	(970)	0.0%
6/30/00-01	3,482,700	3,575,420	3,477,000	3,572,510	(5,700)	-0.2%	(2,910)	-0.1%
6/30/01-02	2,779,700	2,850,830	2,774,000	2,847,920	(5,700)	-0.2%	(2,910)	-0.1%
6/30/02-03	2,013,000	2,014,000	2,008,000	2,010,000	(5,000)	-0.2%	(4,000)	-0.2%
6/30/03-04	3,487,450	3,619,140	3,479,850	3,613,260	(7,600)	-0.2%	(5,880)	-0.2%
6/30/04-05	2,974,000	3,088,000	2,943,000	3,084,000	(31,000)	-1.0%	(4,000)	-0.1%
6/30/05-06	2,108,000	2,146,000	2,101,000	2,109,000	(7,000)	-0.3%	(37,000)	-1.7%
6/30/06-07	2,431,050	2,432,950	2,390,200	2,421,550	(40,850)	-1.7%	(11,400)	-0.5%
6/30/07-08	1,823,050	1,952,250	1,796,450	1,886,700	(26,600)	-1.5%	(65,550)	-3.4%
6/30/08-09	2,372,000	2,456,000	2,350,000	2,395,000	(22,000)	-0.9%	(61,000)	-2.5%
6/30/09-10	1,613,000	1,718,000	1,572,000	1,657,000	(41,000)	-2.5%	(61,000)	-3.6%
6/30/10-11	2,822,000	2,917,000	2,870,000	2,992,000	48,000	1.7%	75,000	2.6%
6/30/11-12	2,179,000	2,403,000	2,127,000	2,295,000	(52,000)	-2.4%	(108,000)	-4.5%
6/30/12-13	3,229,000	3,365,000	3,326,000	3,398,000	97,000	3.0%	33,000	1.0%
6/30/13-14	3,880,000	3,993,000	4,105,000	4,249,000	225,000	5.8%	256,000	6.4%
6/30/14-15	4,563,000	4,703,000	4,785,000	5,037,000	222,000	4.9%	334,000	7.1%
6/30/15-16	6,039,000	6,961,000	6,301,000	7,147,000	262,000	4.3%	186,000	2.7%
6/30/16-17	5,462,000	5,982,000	5,412,000	5,844,000	(50,000)	-0.9%	(138,000)	-2.3%
6/30/17-18	4,653,000	5,368,000	4,762,000	5,164,000	109,000	2.3%	(204,000)	-3.8%
6/30/18-19								
Total	172,314,478	177,708,332	173,121,646	177,700,976	807,168	0.5%	(7,357)	0.0%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 3, Exhibit 1, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	20,210,870	1.085	21,920,145	0.0%	0.0%	0	665,680	665,680	3.0%	1.001	666,346	666,013	666,679
6/30/82-83	2,831,786	1.013	2,868,618	0.0%	0.0%	0	94,000	94,000	3.3%	1.001	94,094	94,047	94,141
6/30/83-84	2,245,006	1.023	2,296,948	0.0%	0.0%	0	410,001	410,001	17.8%	1.001	410,411	410,206	410,616
6/30/84-85	3,833,819	1.033	3,961,746	0.0%	0.0%	0	551,083	551,083	13.9%	1.001	551,634	551,359	551,910
6/30/85-86	4,048,163	1.044	4,225,075	0.0%	0.0%	0	585,928	585,928	13.9%	1.001	586,514	586,221	586,807
6/30/86-87	5,376,022	1.054	5,667,073	0.0%	0.0%	0	832,391	832,391	14.7%	1.001	833,223	832,807	833,640
6/30/87-88	10,158,652	1.065	10,815,715	0.0%	0.0%	0	1,685,022	1,685,022	15.6%	1.001	1,686,707	1,685,865	1,687,550
6/30/88-89	10,740,496	1.069	11,482,166	0.0%	0.0%	0	1,975,642	1,975,642	17.2%	1.001	1,977,618	1,976,630	1,978,605
6/30/89-90	10,144,744	1.076	10,911,969	0.0%	0.0%	0	2,037,640	2,037,640	18.7%	1.001	2,039,678	2,038,659	2,040,696
6/30/90-91	6,165,086	1.085	6,687,673	0.0%	0.0%	0	1,665,464	1,665,464	24.9%	1.001	1,667,129	1,666,297	1,667,962
6/30/91-92	3,230,938	1.093	3,531,436	0.0%	0.0%	0	1,029,141	1,029,141	29.1%	1.001	1,030,170	1,029,656	1,030,685
6/30/92-93	2,946,821	1.100	3,240,371	0.0%	0.0%	0	794,079	794,079	24.5%	1.001	794,873	794,476	795,668
6/30/93-94	2,252,048	1.107	2,493,279	0.0%	0.0%	0	358,584	358,584	14.4%	1.002	359,302	358,943	359,482
6/30/94-95	2,341,581	1.117	2,616,065	0.0%	0.0%	0	476,424	476,424	18.2%	1.003	477,855	477,139	477,856
6/30/95-96	1,440,291	1.127	1,622,654	0.0%	0.0%	0	484,060	484,060	29.8%	1.004	485,999	485,030	485,759
6/30/96-97	1,057,037	1.134	1,198,824	0.0%	0.0%	0	514,500	514,500	42.9%	1.005	517,078	515,789	516,564
6/30/97-98	2,101,308	1.140	2,395,260	0.0%	0.0%	0	810,801	810,801	33.9%	1.006	815,678	813,239	814,463
6/30/98-99	1,254,530	1.145	1,436,378	0.0%	0.0%	0	420,250	420,250	29.3%	1.007	423,201	421,725	422,360
6/30/99-00	1,634,502	1.148	1,876,207	0.0%	0.0%	0	679,200	679,200	36.2%	1.008	684,653	681,926	683,639
6/30/00-01	2,503,297	1.151	2,882,286	0.0%	0.0%	0	796,500	796,500	27.6%	1.011	805,303	800,902	804,127
6/30/01-02	2,097,298	1.155	2,422,435	0.0%	0.0%	0	508,906	508,906	21.0%	1.017	517,618	513,262	516,188
6/30/02-03	1,300,354	1.159	1,507,135	0.0%	0.0%	0	497,000	497,000	33.0%	1.023	508,541	502,770	505,338
6/30/03-04	2,662,956	1.163	3,097,841	0.0%	0.0%	0	581,000	581,000	18.8%	1.029	598,058	589,529	591,218
6/30/04-05	2,088,646	1.168	2,439,737	0.0%	0.0%	0	635,000	635,000	26.0%	1.029	653,644	644,322	645,834
6/30/05-06	1,356,888	1.172	1,590,730	0.0%	0.0%	0	502,750	502,750	31.6%	1.029	517,511	510,130	513,801
6/30/06-07	1,791,061	1.178	2,109,639	0.0%	0.0%	0	430,751	430,751	20.4%	1.040	447,832	439,292	445,020
6/30/07-08	1,303,214	1.184	1,542,760	0.0%	0.0%	0	338,290	338,290	21.9%	1.061	358,816	348,553	354,542
6/30/08-09	1,670,277	1.202	2,008,373	0.1%	0.1%	2,752	327,000	329,752	16.4%	1.084	354,472	342,112	349,718
6/30/09-10	1,061,332	1.226	1,301,510	0.2%	0.3%	4,386	173,500	177,886	13.7%	1.111	192,778	185,332	187,974
6/30/10-11	2,028,513	1.245	2,524,514	0.2%	0.5%	13,557	374,130	387,687	15.4%	1.149	429,834	408,761	372,708
6/30/11-12	1,513,476	1.266	1,915,463	0.4%	0.9%	17,948	183,300	201,248	10.5%	1.206	221,121	211,184	241,479
6/30/12-13	2,257,309	1.299	2,932,559	1.2%	2.1%	62,669	309,000	371,669	12.7%	1.377	425,429	398,549	384,213
6/30/13-14	2,643,526	1.348	3,564,639	1.3%	3.5%	123,379	438,916	562,295	15.8%	1.457	639,621	600,958	462,948
6/30/14-15	3,124,113	1.408	4,397,198	0.3%	3.7%	164,738	357,500	522,238	11.9%	1.566	559,874	541,056	518,315
6/30/15-16	4,013,031	1.541	6,183,168	2.0%	5.8%	357,731	442,001	799,732	12.9%	1.918	847,599	823,666	714,735
6/30/16-17	3,028,300	1.766	5,348,868	2.1%	7.9%	422,491	143,000	565,491	10.6%	2.966	424,183	494,837	758,871
6/30/17-18	1,894,751	2.280	4,319,925	3.0%	10.9%	470,584	40,000	510,584	11.8%	9.364	374,551	442,567	626,894
6/30/18-19	1,147,072	4.383	5,027,770	2.5%	13.4%	673,641	0	673,641	13.4%	40.210	0	336,821	
Total	133,499,114		158,364,152			2,313,875	23,148,434	25,462,310	16.1%		24,978,947	25,220,628	25,099,006

NOTES:
(2) From Section 3, Exhibit 1, Page 2, Column 3
(3) = (4) / (2)
(4) From Section 3, Exhibit 1, Page 2, Column 6
(5) From Section 3, Exhibit 1, Page 11
(6) Downward sum of (5)
(7) = (6) x (4)
(8) From Section 3, Exhibit 1, Page 10
(9) = (7) + (8)
(10) = (9) / (4)
(11) From Section 3, Exhibit 1, Page 12
(12) = (8) x (11)
(13) Selected based on (9) and (12)
(14) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts Workers Compensation
Department of Mental Health - Cluster 2
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456
All Prior Yrs	0	0	0	0	0	0	0	0	0	20,000	46,500	35,000	0	73,500	50,000	69,180	0	0	97,000	198,000	0	0	0	26,500	25,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	15,000	0	20,000	24,000	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	42,000	0	70,000	40,000	10,001	48,000	0	50,000	0	0	0	0	0	0	0	0	0	0	0	150,000	0	0	0	0	0	0	0	0	0	
Jun-85	0	0	0	25,000	0	28,000	0	31,500	45,000	116,583	190,000	25,000	0	0	0	54,500	35,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-86	0	0	22,500	27,000	52,500	10,000	24,428	133,500	166,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150,000	0	0	0	0	0	0	0	0	0	0			
Jun-87	0	0	14,910	16,000	12,500	60,000	255,275	85,000	106,206	0	27,500	25,000	30,000	90,000	70,000	0	0	40,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Jun-88	0	17,171	21,420	31,841	231,000	272,884	239,000	113,000	90,000	20,000	53,826	87,507	227,463	0	19,910	0	36,667	25,000	48,333	0	0	150,000	0	0	0	0	0	0	0	0	0	0					
Jun-89	0	79,840	44,000	108,000	417,491	668,500	334,500	165,000	6,500	16,500	57,811	0	0	52,500	0	0	0	0	20,550	4,450	0	0	0	0	0	0	0	0	0	0	0						
Jun-90	0	39,218	184,450	480,000	338,500	235,500	155,000	60,000	65,793	0	128,678	106,000	7,500	31,000	31,000	0	0	50,125	124,876	0	0	0	0	0	0	0	0	0	0	0							
Jun-91	0	23,609	651,500	370,355	182,000	135,000	97,000	6,000	0	75,000	90,000	0	0	0	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
Jun-92	0	341,000	83,230	201,910	88,000	23,000	125,000	55,000	75,000	0	0	0	0	0	0	0	0	37,000	1	0	0	0	0	0	0	0	0	0									
Jun-93	23,000	109,000	142,400	120,500	84,000	161,300	42,879	0	93,000	0	0	0	0	0	0	0	0	18,000	0	0	0	0	0	0	0	0	0										
Jun-94	5,000	85,000	44,300	28,284	37,000	0	46,000	63,000	0	0	0	0	0	25,000	25,000	0	0	0	0	0	0	0	0	0	0	0											
Jun-95	12,000	35,000	45,000	142,024	68,400	16,500	40,000	0	50,000	25,000	0	0	0	0	42,500	0	0	0	0	0	0	0	0	0	0												
Jun-96	0	90,000	144,500	10,000	77,560	27,000	0	100,000	0	15,000	20,000	0	0	0	0	0	0	0	0	0	0	0	0	0													
Jun-97	0	76,500	124,000	215,000	0	0	0	15,000	0	0	84,000	0	0	0	0	0	0	0	0	0	0	0	0														
Jun-98	53,300	122,501	318,000	16,000	33,091	127,909	20,000	20,000	0	0	0	0	50,000	50,000	0	0	0	0	0	0	0	0															
Jun-99	48,000	52,250	115,000	130,000	0	7,459	37,541	30,000	0	0	0	0	0	0	0	0	0	0	0	0	0																
Jun-00	20,500	255,500	125,500	82,000	65,200	27,500	62,000	26,000	15,000	0	0	0	0	0	0	0	0	0	0	0																	
Jun-01	45,000	221,500	170,000	132,500	67,500	77,500	12,500	20,000	50,000	0	0	0	0	0	0	0	0	0	0																		
Jun-02	0	75,000	68,000	62,100	52,950	32,000	144,721	35,000	20,135	19,000	0	0	0	0	0	0	0	0																			
Jun-03	20,000	30,000	107,000	142,500	137,500	0	0	0	0	60,000	0	0	0	0	0	0	0																				
Jun-04	0	28,000	54,000	106,000	132,000	215,000	0	46,000	0	0	0	0	0	0	0	0																					
Jun-05	0	50,787	151,713	171,500	107,000	25,000	39,000	90,000	0	0	0	0	0	0	0																						
Jun-06	0	18,000	261,750	170,500	32,500	20,000	0	0	0	0	0	0	0	0																							
Jun-07	10,000	58,500	66,250	51,001	95,000	0	0	150,000	0	0	0	0	0																								
Jun-08	17,730	170,000	22,500	34,500	40,000	0	31,000	0	22,560	0	0	0																									
Jun-09	35,000	85,000	124,500	25,000	0	0	0	37,500	20,000	0	0																										
Jun-10	0	30,000	6,000	110,000	25,000	0	0	0	0	2,500																											
Jun-11	8,500	28,530	28,000	116,100	0	0	35,000	110,000	48,000																												
Jun-12	0	5,500	125,300	0	50,000	0	0	2,500																													
Jun-13	0	75,000	64,765	52,235	75,000	0	42,000																														
Jun-14	0	7,850	167,150	131,416	0	132,500																															
Jun-15	0	12,500	205,000	55,000	85,000																																
Jun-16	0	76,001	161,500	204,500																																	
Jun-17	0	88,500	54,500																																		
Jun-18	15,000	25,000																																			
Jun-19	0																																				

Cumulative Lump Sum Payments

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444	456
All Prior Yrs	0	0	0	0	0	0	0	0	0	20,000	66,500	101,500	101,500	175,000	225,000	294,180	294,180	294,180	391,180	589,180	589,180	589,180	589,180	615,680	640,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680
Jun-83	0	0	0	0	0	0	0	15,000	15,000	35,000	59,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000		
Jun-84	0	0	0	0	0	0	0	42,000	42,000	112,000	152,000	162,001	210,001	210,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001			
Jun-85	0	0	0	25,000	25,000	53,000	53,000	84,500	129,500	246,083	436,083	461,083	461,083	461,083	461,083	515,583	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083			
Jun-86	0	0	22,500	49,500	102,000	112,000	136,428	269,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928				
Jun-87	0	0	14,910	30,910	43,410	103,410	358,685	443,685	549,891	549,891	577,391	602,391	632,391	722,391	792,391	792,391	792,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391					
Jun-88	0	17,171	38,591	70,432	301,432	574,316	813,316	926,316	1,016,316	1,036,316	1,090,142	1,177,649	1,405,112	1,405,112	1,425,022	1,425,022	1,461,689	1,486,689	1,535,022	1,535,022	1,535,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022						
Jun-89	0	79,840	123,840	231,840	649,331	1,317,831	1,652,331	1,817,331	1,823,831	1,840,331	1,898,142	1,898,142	1,898,142	1,950,642	1,950,642	1,950,642	1,950,642	1,950,642	1,971,192	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642							
Jun-90	0	39,218	223,668	703,668	1,042,168	1,277,668	1,432,668	1,492,668	1,558,461	1,558,461	1,687,139	1,793,139	1,800,639	1,831,639	1,862,639	1,862,639	1,862,639	1,912,764	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640								
Jun-91	0	23,609	675,109	1,045,464	1,227,464	1,362,464	1,459,464	1,465,464	1,465,464	1,540,464	1,630,464	1,630,464	1,630,464	1,630,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464								
Jun-92	0	341,000	424,230	626,140	714,140	737,140	862,140	917,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	1,029,140	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141									
Jun-93	23,000	132,000	274,400	394,900	478,900	640,200	683,079	683,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079										
Jun-94	5,000	90,000	134,300	162,584	199,584	199,584	245,584	308,584	308,584	308,584	308,584	308,584	308,584	333,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584											
Jun-95	12,000	47,000	92,000	234,024	302,424	318,924	358,924	358,924	408,924	433,924	433,924	433,924	433,924	433,924	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424												
Jun-96	0	90,000	234,500	244,500	322,060	349,060	349,060	449,060	449,060	464,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060													
Jun-97	0	76,500	200,500	415,500	415,500	415,500	415,500	430,500	430,500	430,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500														
Jun-98	53,300	175,801	493,801	509,801	542,892	670,801	690,801	710,801	710,801	710,801	710,801	710,801	760,801	810,801	810,801	810,801	810,801	810,801	810,801	810,801	810,801	810,801															
Jun-99	48,000	100,250	215,250	345,250	345,250	352,709	390,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250																
Jun-00	20,500	276,000	401,500	483,500	548,700	576,200	638,200	664,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200																	
Jun-01	45,000	266,500	436,500	569,000	636,500	714,000	726,500	746,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500																		
Jun-02	0	75,000	143,000	205,100	258,050	290,050	434,771	469,771	489,906	508,906	508,906	508,906	508,906	508,906	508,906	508,906	508,906	508,906																			
Jun-03	20,000	50,000	157,000	299,500	437,000	437,000	437,000	437,000	437,000	497,000	497,000	497,000	497,000	497,000	497,000	497,000	497,000																				
Jun-04	0	28,000	82,000	188,000	320,000	535,000	535,000	581,000	581,000	581,000	581,000	581,000	581,000	581,000	581,000	581,000																					
Jun-05	0	50,787	202,500	374,000	481,000	506,000	545,000	635,000	635,000	635,000	635,000	635,000	635,000	635,000	635,000																						
Jun-06	0	18,000	279,750	450,250	482,750	502,750	502,750	502,750	502,750	502,750	502,750	502,750	502,750	502,750																							
Jun-07	10,000	68,500	134,750	185,751	280,751	280,751	280,751	430,751	430,751	430,751	430,751	430,751	430,751																								
Jun-08	17,730	187,730	210,230	244,730	284,730	284,730	315,730	315,730	338,290	338,290	338,290	338,290																									
Jun-09	35,000	120,000	244,500	269,500	269,500	269,500	269,500	307,000	327,000	327,000	327,000																										
Jun-10	0	30,000	36,000	146,000	171,000	171,000	171,000	171,000	171,000	173,500																											
Jun-11	8,500	37,030	65,030	181,130	181,130	181,130	216,130	326,130	374,130																												
Jun-12	0	5,500	130,800	130,800	180,800	180,800	180,800	183,300																													
Jun-13	0	75,000	139,765	192,000	267,000	267,000	309,000																														
Jun-14	0	7,850	175,000	306,416	306,416	438,916																															
Jun-15	0	12,500	217,500	272,500	357,500																																
Jun-16	0	76,001	237,501	442,001																																	
Jun-17	0	88,500	143,000																																		
Jun-18	15,000	40,000																																			
Jun-19	0																																				

Commonwealth of Massachusetts Workers Compensation
Department of Mental Health - Cluster 2
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.002	0.000	0.003	0.002	0.003	0.000	0.000	0.004	0.009	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.007	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.000	0.030	0.017	0.004	0.021	0.000	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.006	0.000	0.007	0.000	0.008	0.011	0.029	0.048	0.006	0.000	0.000	0.000	0.014	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.005	0.006	0.012	0.002	0.006	0.032	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.000	0.003	0.003	0.002	0.011	0.045	0.015	0.019	0.000	0.005	0.004	0.005	0.016	0.012	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.002	0.002	0.003	0.021	0.025	0.022	0.010	0.008	0.002	0.005	0.008	0.021	0.000	0.002	0.000	0.003	0.002	0.004	0.000	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Jun-89	0.000	0.007	0.004	0.009	0.036	0.058	0.029	0.014	0.001	0.001	0.005	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.004	0.017	0.044	0.031	0.022	0.014	0.005	0.006	0.000	0.012	0.010	0.001	0.003	0.003	0.000	0.000	0.005	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.004	0.097	0.055	0.027	0.020	0.015	0.001	0.000	0.011	0.013	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-92	0.000	0.097	0.024	0.057	0.025	0.007	0.035	0.016	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.007	0.034	0.044	0.037	0.026	0.050	0.013	0.000	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-94	0.002	0.034	0.018	0.011	0.015	0.000	0.018	0.025	0.000	0.000	0.000	0.000	0.000	0.010	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.005	0.013	0.017	0.054	0.026	0.006	0.015	0.000	0.019	0.010	0.000	0.000	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.000	0.055	0.089	0.006	0.048	0.017	0.000	0.062	0.000	0.009	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000														
Jun-97	0.000	0.064	0.103	0.179	0.000	0.000	0.000	0.013	0.000	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
Jun-98	0.022	0.051	0.133	0.007	0.014	0.053	0.008	0.008	0.000	0.000	0.000	0.000	0.021	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.033	0.036	0.080	0.091	0.000	0.005	0.026	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																	
Jun-00	0.011	0.136	0.067	0.044	0.035	0.015	0.033	0.014	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-01	0.016	0.077	0.059	0.046	0.023	0.027	0.004	0.007	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-02	0.000	0.031	0.028	0.026	0.022	0.013	0.060	0.014	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.013	0.020	0.071	0.095	0.091	0.000	0.000	0.000	0.000	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000																					
Jun-04	0.000	0.009	0.017	0.034	0.043	0.069	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																						
Jun-05	0.000	0.021	0.062	0.070	0.044	0.010	0.016	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000																							
Jun-06	0.000	0.011	0.165	0.107	0.020	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
Jun-07	0.005	0.028	0.031	0.024	0.045	0.000	0.000	0.071	0.000	0.000	0.000	0.000	0.000																									
Jun-08	0.011	0.110	0.015	0.022	0.026	0.000	0.020	0.000	0.015	0.000	0.000	0.000																										
Jun-09	0.017	0.042	0.062	0.012	0.000	0.000	0.000	0.019	0.010	0.000	0.000																											
Jun-10	0.000	0.023	0.005	0.085	0.019	0.000	0.000	0.000	0.000	0.002																												
Jun-11	0.003	0.011	0.011	0.046	0.000	0.000	0.014	0.044	0.019																													
Jun-12	0.000	0.003	0.065	0.000	0.026	0.000	0.000	0.001																														
Jun-13	0.000	0.026	0.022	0.018	0.026	0.000	0.014																															
Jun-14	0.000	0.002	0.047	0.037	0.000	0.037																																
Jun-15	0.000	0.003	0.047	0.013	0.019																																	
Jun-16	0.000	0.012	0.026	0.033																																		
Jun-17	0.000	0.017	0.010																																			
Jun-18	0.003	0.006																																				
Jun-19	0.000																																					

Averages		12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456
Simple Avg																																						
All Yrs (ex P)	0.004	0.027	0.041	0.038	0.022	0.015	0.013	0.016	0.008	0.005	0.007	0.002	0.003	0.002	0.003	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Latest 5	0.001	0.008	0.030	0.020	0.014	0.007	0.006	0.013	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 3	0.001	0.012	0.028	0.027	0.015	0.012	0.009	0.015	0.010	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Olympic Avg																																						
All Yrs (ex P)	0.003	0.025	0.039	0.034	0.020	0.013	0.012	0.014	0.007	0.004	0.005	0.001	0.002	0.002	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Latest 10	0.000	0.013	0.030	0.026	0.017	0.003	0.006	0.014	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Latest 5	0.000	0.007	0.032	0.021	0.015	0.000	0.005	0.007	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						

Dev Factor Selection																																						
Prior	NA	0.026	0.033	0.023	0.020	0.003	0.013	0.012	0.004	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Selected	NA	0.025	0.030	0.021	0.020	0.003	0.013	0.012	0.004	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.134	0.109	0.079	0.058	0.037	0.035	0.021	0.009	0.005	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
Department of Mental Health - Cluster 2
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444	456
All Prior Yrs	0	0	0	0	0	0	0	0	0	20,000	66,500	101,500	101,500	175,000	225,000	294,180	294,180	294,180	391,180	589,180	589,180	589,180	589,180	615,680	640,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680
Jun-83	0	0	0	0	0	0	0	15,000	15,000	35,000	59,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	
Jun-84	0	0	0	0	0	0	0	42,000	42,000	112,000	152,000	162,001	210,001	210,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001		
Jun-85	0	0	0	25,000	25,000	53,000	53,000	84,500	129,500	246,083	436,083	461,083	461,083	461,083	461,083	515,583	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083			
Jun-86	0	0	22,500	49,500	102,000	112,000	136,428	269,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928				
Jun-87	0	0	14,910	30,910	43,410	103,410	358,685	443,685	549,891	549,891	577,391	602,391	632,391	722,391	792,391	792,391	792,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391					
Jun-88	0	17,171	38,591	70,432	301,432	574,316	813,316	926,316	1,016,316	1,036,316	1,090,142	1,177,649	1,405,112	1,405,112	1,425,022	1,425,022	1,461,689	1,486,689	1,535,022	1,535,022	1,535,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022						
Jun-89	0	79,840	123,840	231,840	649,331	1,317,831	1,652,331	1,817,331	1,823,831	1,840,331	1,898,142	1,898,142	1,898,142	1,950,642	1,950,642	1,950,642	1,950,642	1,950,642	1,971,192	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642							
Jun-90	0	39,218	223,668	703,668	1,042,168	1,277,668	1,432,668	1,492,668	1,558,461	1,558,461	1,687,139	1,793,139	1,800,639	1,831,639	1,862,639	1,862,639	1,862,639	1,912,764	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640								
Jun-91	0	23,609	675,109	1,045,464	1,227,464	1,362,464	1,459,464	1,465,464	1,465,464	1,540,464	1,630,464	1,630,464	1,630,464	1,630,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464										
Jun-92	0	341,000	424,230	626,140	714,140	737,140	862,140	917,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	1,029,140	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141										
Jun-93	23,000	132,000	274,400	394,900	478,900	640,200	683,079	683,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079											
Jun-94	5,000	90,000	134,300	162,584	199,584	199,584	245,584	308,584	308,584	308,584	308,584	308,584	308,584	333,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584												
Jun-95	12,000	47,000	92,000	234,024	302,424	318,924	358,924	358,924	408,924	433,924	433,924	433,924	433,924	433,924	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424													
Jun-96	0	90,000	234,500	244,500	322,060	349,060	349,060	449,060	449,060	464,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060														
Jun-97	0	76,500	200,500	415,500	415,500	415,500	415,500	430,500	430,500	430,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500															
Jun-98	53,300	175,801	493,801	509,801	542,892	670,801	690,801	710,801	710,801	710,801	710,801	710,801	760,801	810,801	810,801	810,801	810,801	810,801	810,801	810,801	810,801	810,801																
Jun-99	48,000	100,250	215,250	345,250	345,250	352,709	390,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250																	
Jun-00	20,500	276,000	401,500	483,500	548,700	576,200	638,200	664,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200																		
Jun-01	45,000	266,500	436,500	569,000	636,500	714,000	726,500	746,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500																			
Jun-02	0	75,000	143,000	205,100	258,050	290,050	434,771	469,771	489,906	508,906	508,906	508,906	508,906	508,906	508,906	508,906	508,906	508,906																				
Jun-03	20,000	50,000	157,000	299,500	437,000	437,000	437,000	437,000	437,000	497,000	497,000	497,000	497,000	497,000	497,000	497,000	497,000																					
Jun-04	0	28,000	82,000	188,000	320,000	535,000	535,000	581,000	581,000	581,000	581,000	581,000	581,000	581,000	581,000	581,000																						
Jun-05	0	50,787	202,500	374,000	481,000	506,000	545,000	635,000	635,000	635,000	635,000	635,000	635,000	635,000	635,000																							
Jun-06	0	18,000	279,750	450,250	482,750	502,750	502,750	502,750	502,750	502,750	502,750	502,750	502,750	502,750																								
Jun-07	10,000	68,500	134,750	185,751	280,751	280,751	280,751	430,751	430,751	430,751	430,751	430,751	430,751																									
Jun-08	17,730	187,730	210,230	244,730	284,730	284,730	315,730	315,730	338,290	338,290	338,290	338,290																										
Jun-09	35,000	120,000	244,500	269,500	269,500	269,500	269,500	307,000	327,000	327,000	327,000																											
Jun-10	0	30,000	36,000	146,000	171,000	171,000	171,000	171,000	171,000	173,500																												
Jun-11	8,500	37,030	65,030	181,130	181,130	181,130	216,130	326,130	374,130																													
Jun-12	0	5,500	130,800	130,800	180,800	180,800	180,800	183,300																														
Jun-13	0	75,000	139,765	192,000	267,000	267,000	309,000																															
Jun-14	0	7,850	175,000	306,416	306,416	438,916																																
Jun-15	0	12,500	217,500	272,500	357,500																																	
Jun-16	0	76,001	237,501	442,001																																		
Jun-17	0	88,500	143,000																																			
Jun-18	15,000	40,000																																				
Jun-19	0																																					

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
All Prior Yrs										3.325	1.526	1.000	1.724	1.286	1.307	1.000	1.000	1.330	1.506	1.000	1.000	1.000	1.045	1.041	1.039	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83								1.000	2.333	1.686	1.593	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84								1.000	2.667	1.357	1.066	1.296	1.000	1.238	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.577	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85				1.000	2.120	1.000	1.594	1.533	1.900	1.772	1.057	1.000	1.000	1.000	1.118	1.069	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86			2.200	2.061	1.098	1.218	1.979	1.615	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.344	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87			2.073	1.404	2.382	3.469	1.237	1.239	1.000	1.050	1.043	1.050	1.142	1.097	1.000	1.000	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-88		2.247	1.825	4.280	1.905	1.416	1.139	1.097	1.020	1.052	1.080	1.193	1.000	1.014	1.000	1.026	1.017	1.033	1.000	1.000	1.098	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-89		1.551	1.872	2.801	2.030	1.254	1.100	1.004	1.009	1.031	1.000	1.000	1.028	1.000	1.000	1.000	1.000	1.011	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90		5.703	3.146	1.481	1.226	1.121	1.042	1.044	1.000	1.083	1.063	1.004	1.017	1.017	1.000	1.000	1.027	1.065	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-91		28.595	1.549	1.174	1.110	1.071	1.004	1.000	1.051	1.058	1.000	1.000	1.000	1.021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-92		1.244	1.476	1.141	1.032	1.170	1.064	1.082	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.037	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93	5.739	2.079	1.439	1.213	1.337	1.067	1.000	1.136	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94	18.000	1.492	1.211	1.228	1.000	1.230	1.257	1.000	1.000	1.000	1.000	1.000	1.081	1.075	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95	3.917	1.957	2.544	1.292	1.055	1.125	1.000	1.139	1.061	1.000	1.000	1.000	1.000	1.098	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96		2.606	1.043	1.317	1.084	1.000	1.286	1.000	1.033	1.043	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
Jun-97		2.621	2.072	1.000	1.000	1.000	1.036	1.000	1.000	1.195	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
Jun-98	3.298	2.809	1.032	1.065	1.236	1.030	1.029	1.000	1.000	1.000	1.000	1.070	1.066	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99	2.089	2.147	1.604	1.000	1.022	1.106	1.077	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
Jun-00	13.463	1.455	1.204	1.135	1.050	1.108	1.041	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01	5.922	1.638	1.304	1.119	1.122	1.018	1.028	1.067	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																				
Jun-02		1.907	1.434	1.258	1.124	1.499	1.081	1.043	1.039	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03	2.500	3.140	1.908	1.459	1.000	1.000	1.000	1.000	1.137	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
Jun-04		2.929	2.293	1.702	1.672	1.000	1.086	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
Jun-05		3.987	1.847	1.286	1.052	1.077	1.165	1.000	1.000	1.000	1.000	1.000	1.000	1.000																								
Jun-06		15.542	1.609	1.072	1.041	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																									
Jun-07	6.850	1.967	1.378	1.511	1.000	1.000	1.534	1.000	1.000	1.000	1.000	1.000																										
Jun-08	10.588	1.120	1.164	1.163	1.000	1.109	1.000	1.071	1.000	1.000	1.000																											
Jun-09	3.429	2.038	1.102	1.000	1.000	1.000	1.139	1.065	1.000	1.000																												
Jun-10		1.200	4.056	1.171	1.000	1.000	1.000	1.000	1.015																													
Jun-11	4.357	1.756	2.785	1.000	1.000	1.193	1.509	1.147																														
Jun-12		23.782	1.000	1.382	1.000	1.000	1.014																															
Jun-13		1.864	1.374	1.391	1.000	1.157																																
Jun-14		22.293	1.751	1.000	1.432																																	
Jun-15		17.400	1.253	1.312																																		
Jun-16		3.125	1.861																																			
Jun-17		1.616																																				
Jun-18	2.667																																					

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
Simple Avg																																						
All Yrs (ex P)	6.371	5.460	1.755	1.401	1.238	1.188	1.159	1.079	1.152	1.086	1.035	1.025	1.014	1.024	1.005	1.005	1.008	1.006	1.000	1.000	1.006	1.000	1.025	1.000	1.000	1.052	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		9.259	1.448	1.217	1.086	1.070	1.132	1.057	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		7.380	1.622	1.234	1.144	1.117	1.174	1.071	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Volume Wtd																																						
All Yrs (ex P)		2.459	1.552	1.270	1.195	1.130	1.096	1.053	1.026	1.042	1.016	1.021	1.014	1.016	1.003	1.004	1.011	1.012	1.000	1.000	1.011	1.000	1.012	1.000	1.000	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		3.513	1.492	1.194	1.120	1.072	1.130	1.058	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		3.379	1.621	1.208	1.176	1.122	1.198	1.085	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				

Dev Factor Selection																																						
Prior	4.675	3.276	1.514	1.208	1.063	1.047	1.186	1.050	1.034	1.025	1.022	1.020	1.010	1.000	1.000	1.006	1.006	1.006	1.003	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.003	
Selected	4.294	3.157	1.547	1.224	1.075	1.058	1.141	1.050	1.034	1.025	1.022	1.020	1.010	1.000	1.000	1.006	1.006	1.006	1.003	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001
FacToUlt	40.210	9.364	2.966	1.918	1.566	1.457	1.377	1.206	1.149	1.111	1.084	1.061	1.040	1.029	1.029	1.029	1.023	1.017	1.011	1.008	1.007	1.006	1.005	1.004	1.003	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
Percent of Ult	2.5%	10.7%	33.7%	52.1%	63.9%	68.6%	72.6%	82.9%	87.0%	90.0%	92.2%	94.3%	96.2%	97.1%	97.1%	97.1%	97.7%	98.3%	98.9%	99.2%	99.3%	99.4%	99.5%	99.6%	99.7%	99.8%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	1.3%	0.0%	0.3%	0.1%	1.000	1.000
444	98.7%	1.0%	1.3%	0.2%	0.1%	0.981	0.971
432	97.7%	1.0%	2.3%	0.2%	0.1%	0.959	0.940
420	96.8%	1.0%	3.2%	0.2%	0.1%	0.940	0.912
408	95.8%	0.9%	4.2%	0.3%	0.1%	0.921	0.886
396	94.9%	0.9%	5.1%	0.3%	0.1%	0.903	0.861
384	93.9%	0.4%	6.1%	0.1%	0.1%	0.886	0.837
372	93.5%	0.6%	6.5%	0.2%	0.1%	0.859	0.800
360	93.0%	0.8%	7.0%	0.2%	0.1%	0.839	0.772
348	92.2%	0.7%	7.8%	0.2%	0.1%	0.824	0.753
336	91.5%	0.5%	8.5%	0.2%	0.1%	0.808	0.732
324	90.9%	0.6%	9.1%	0.2%	0.1%	0.789	0.707
312	90.3%	0.8%	9.7%	0.3%	0.2%	0.773	0.687
300	89.5%	0.7%	10.5%	0.3%	0.2%	0.762	0.673
288	88.8%	0.6%	11.2%	0.2%	0.1%	0.749	0.657
276	88.2%	0.4%	11.8%	0.2%	0.1%	0.733	0.638
264	87.7%	0.4%	12.3%	0.2%	0.1%	0.715	0.615
252	87.3%	0.2%	12.7%	0.1%	0.1%	0.696	0.592
240	87.1%	0.3%	12.9%	0.1%	0.1%	0.675	0.566
228	86.9%	0.3%	13.1%	0.1%	0.1%	0.656	0.542
216	86.6%	0.3%	13.4%	0.2%	0.1%	0.638	0.521
204	86.3%	0.3%	13.7%	0.2%	0.1%	0.621	0.502
192	86.0%	0.4%	14.0%	0.2%	0.1%	0.606	0.485
180	85.6%	0.3%	14.4%	0.2%	0.1%	0.592	0.470
168	85.3%	0.4%	14.7%	0.2%	0.2%	0.578	0.455
156	84.9%	0.4%	15.1%	0.3%	0.2%	0.567	0.443
144	84.5%	1.3%	15.5%	0.8%	0.7%	0.557	0.433
132	83.2%	1.6%	16.8%	1.1%	0.9%	0.570	0.452
120	81.5%	1.2%	18.5%	0.8%	0.7%	0.586	0.475
108	80.4%	1.3%	19.6%	1.0%	0.8%	0.589	0.480
96	79.0%	2.0%	21.0%	1.5%	1.3%	0.593	0.486
84	77.0%	2.8%	23.0%	2.2%	1.9%	0.606	0.504
72	74.2%	3.1%	25.8%	2.5%	2.3%	0.626	0.529
60	71.0%	6.1%	29.0%	5.2%	4.7%	0.643	0.550
48	64.9%	8.3%	35.1%	7.2%	6.8%	0.682	0.598
36	56.6%	12.8%	43.4%	11.6%	11.0%	0.718	0.642
24	43.9%	21.0%	56.1%	19.8%	19.3%	0.756	0.689
12	22.8%	22.8%	77.2%	22.4%	22.2%	0.796	0.737
Total		100.0%					

NOTES:
(2) = 1 / Section 3, Exhibit 1, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	1,482,424	1,936,792		1,296,506	1,693,889
6/30/82-83	36,879	42,804	0.981	36,163	41,973
6/30/83-84	25,076	52,147	0.959	24,052	50,018
6/30/84-85	22,098	128,098	0.940	20,767	120,380
6/30/85-86	4,909	32,909	0.921	4,523	30,317
6/30/86-87	6,587	43,587	0.903	5,950	39,372
6/30/87-88	593,326	658,326	0.886	525,613	583,194
6/30/88-89	713,676	742,862	0.859	613,378	638,462
6/30/89-90	700,616	768,616	0.839	587,777	644,825
6/30/90-91	39,450	147,520	0.824	32,511	121,572
6/30/91-92	20,921	95,676	0.808	16,899	77,285
6/30/92-93	286,100	294,100	0.789	225,757	232,070
6/30/93-94	234,368	241,368	0.773	181,134	186,544
6/30/94-95	13,995	89,415	0.762	10,659	68,101
6/30/95-96	9,649	88,789	0.749	7,225	66,487
6/30/96-97	7,463	66,288	0.733	5,470	48,588
6/30/97-98	14,891	151,531	0.715	10,644	108,314
6/30/98-99	140,180	146,060	0.696	97,606	101,700
6/30/99-00	105,948	167,558	0.675	71,502	113,082
6/30/00-01	177,203	272,713	0.656	116,182	178,802
6/30/01-02	167,796	241,716	0.638	106,978	154,105
6/30/02-03	210,646	212,646	0.621	130,814	132,056
6/30/03-04	235,894	369,304	0.606	142,910	223,732
6/30/04-05	219,355	360,355	0.592	129,915	213,424
6/30/05-06	241,362	249,362	0.578	139,542	144,168
6/30/06-07	168,388	199,738	0.567	95,506	113,287
6/30/07-08	154,946	245,196	0.557	86,352	136,649
6/30/08-09	352,723	397,723	0.570	201,194	226,862
6/30/09-10	337,168	422,168	0.586	197,712	247,555
6/30/10-11	467,356	589,356	0.589	275,343	347,220
6/30/11-12	430,224	598,224	0.593	255,085	354,695
6/30/12-13	759,691	831,691	0.606	460,726	504,392
6/30/13-14	1,022,558	1,166,558	0.626	640,558	730,763
6/30/14-15	1,303,387	1,555,387	0.643	838,064	1,000,097
6/30/15-16	1,845,968	2,691,968	0.682	1,258,393	1,835,110
6/30/16-17	2,240,700	2,672,700	0.718	1,607,874	1,917,867
6/30/17-18	2,827,249	3,229,249	0.756	2,137,410	2,441,323
6/30/18-19	4,217,928	4,795,928	0.796	3,357,849	3,817,989
Total	21,839,098	26,996,428		15,952,543	19,686,268
			(7) Total Discount Factor:	0.730	0.729

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	1,482,424	1,936,792
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	211,775	276,685
(11) Discounted Value at 4%:	1,296,506	1,693,889

NOTES:
(2), (3) From Section 3, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 3, Exhibit 1, Page 13, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	1,482,424	1,936,792		1,217,675	1,590,895
6/30/82-83	36,879	42,804	0.971	35,820	41,575
6/30/83-84	25,076	52,147	0.940	23,573	49,022
6/30/84-85	22,098	128,098	0.912	20,157	116,846
6/30/85-86	4,909	32,909	0.886	4,349	29,153
6/30/86-87	6,587	43,587	0.861	5,670	37,518
6/30/87-88	593,326	658,326	0.837	496,415	550,798
6/30/88-89	713,676	742,862	0.800	571,034	594,387
6/30/89-90	700,616	768,616	0.772	541,185	593,711
6/30/90-91	39,450	147,520	0.753	29,707	111,087
6/30/91-92	20,921	95,676	0.732	15,308	70,007
6/30/92-93	286,100	294,100	0.707	202,373	208,032
6/30/93-94	234,368	241,368	0.687	160,933	165,740
6/30/94-95	13,995	89,415	0.673	9,419	60,176
6/30/95-96	9,649	88,789	0.657	6,341	58,355
6/30/96-97	7,463	66,288	0.638	4,758	42,260
6/30/97-98	14,891	151,531	0.615	9,156	93,168
6/30/98-99	140,180	146,060	0.592	82,990	86,471
6/30/99-00	105,948	167,558	0.566	59,929	94,778
6/30/00-01	177,203	272,713	0.542	96,131	147,944
6/30/01-02	167,796	241,716	0.521	87,443	125,965
6/30/02-03	210,646	212,646	0.502	105,757	106,761
6/30/03-04	235,894	369,304	0.485	114,390	179,083
6/30/04-05	219,355	360,355	0.470	103,107	169,383
6/30/05-06	241,362	249,362	0.455	109,714	113,351
6/30/06-07	168,388	199,738	0.443	74,634	88,529
6/30/07-08	154,946	245,196	0.433	67,141	106,248
6/30/08-09	352,723	397,723	0.452	159,596	179,957
6/30/09-10	337,168	422,168	0.475	160,033	200,377
6/30/10-11	467,356	589,356	0.480	224,131	282,639
6/30/11-12	430,224	598,224	0.486	208,888	290,458
6/30/12-13	759,691	831,691	0.504	382,512	418,765
6/30/13-14	1,022,558	1,166,558	0.529	540,995	617,180
6/30/14-15	1,303,387	1,555,387	0.550	716,687	855,253
6/30/15-16	1,845,968	2,691,968	0.598	1,103,848	1,609,737
6/30/16-17	2,240,700	2,672,700	0.642	1,438,306	1,715,607
6/30/17-18	2,827,249	3,229,249	0.689	1,947,010	2,223,851
6/30/18-19	4,217,928	4,795,928	0.737	3,110,175	3,536,375
Total	21,839,098	26,996,428		14,247,289	17,561,442
			(7) Total Discount Factor:	0.652	0.651

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	1,482,424	1,936,792
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	211,775	276,685
(11) Discounted Value at 6%:	1,217,675	1,590,895

NOTES:
(2), (3) From Section 3, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 3, Exhibit 1, Page 13, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/19 - 20 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/19 - 06/30/20	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/19 - 06/30/20		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	23,175,628	23,630,760	21,692,565	1,483,063	1,938,195				141,875	156,063	9.6%	8.1%
6/30/82-83	3,103,563	3,110,897	3,066,083	37,480	44,815	98.7%	0.5%	37.8%	14,152	16,921	37.8%	37.8%
6/30/83-84	2,890,082	2,917,154	2,864,047	26,036	53,107	98.6%	0.5%	36.7%	9,552	19,484	36.7%	36.7%
6/30/84-85	4,907,000	5,018,000	4,882,098	24,902	135,902	98.4%	0.5%	30.9%	7,685	41,940	30.9%	30.9%
6/30/85-86	4,899,000	4,927,000	4,891,866	7,134	35,134	99.6%	0.3%	58.1%	4,146	20,419	58.1%	58.1%
6/30/86-87	6,924,000	6,961,000	6,911,248	12,752	49,752	99.5%	0.3%	55.5%	7,082	27,631	55.5%	55.5%
6/30/87-88	14,334,000	14,403,000	13,726,748	607,252	676,252	95.5%	0.5%	11.2%	67,980	75,705	11.2%	11.2%
6/30/88-89	15,508,814	15,558,790	14,773,751	735,063	785,039	95.1%	0.5%	10.2%	75,116	80,223	10.2%	10.2%
6/30/89-90	14,825,000	14,914,000	14,122,347	702,653	791,653	95.0%	0.5%	10.0%	69,919	78,776	10.0%	10.0%
6/30/90-91	9,639,000	9,764,760	9,578,099	60,901	186,661	98.7%	0.5%	39.2%	23,867	73,152	39.2%	39.2%
6/30/91-92	5,542,000	5,622,669	5,520,691	21,309	101,979	98.9%	0.5%	45.3%	9,649	46,175	45.3%	45.3%
6/30/92-93	5,213,000	5,233,870	4,907,269	305,731	326,601	93.9%	2.0%	33.0%	101,021	107,917	33.0%	33.0%
6/30/93-94	3,509,000	3,522,640	3,261,240	247,760	261,400	92.8%	2.0%	27.6%	68,433	72,200	27.6%	27.6%
6/30/94-95	3,705,000	3,790,160	3,672,116	32,884	118,044	98.0%	2.0%	99.3%	32,661	117,242	99.3%	99.3%
6/30/95-96	2,765,000	2,853,460	2,734,479	30,521	118,981	97.3%	2.0%	75.2%	22,940	89,429	75.2%	75.2%
6/30/96-97	2,175,000	2,240,795	2,150,995	24,005	89,800	97.4%	2.0%	77.6%	18,629	69,687	77.6%	77.6%
6/30/97-98	3,451,000	3,592,880	3,419,787	31,213	173,093	97.1%	2.0%	69.0%	21,523	119,355	69.0%	69.0%
6/30/98-99	2,744,960	2,752,840	2,573,981	170,979	178,859	93.6%	2.0%	31.4%	53,740	56,216	31.4%	31.4%
6/30/99-00	3,040,380	3,109,260	2,916,057	124,323	193,203	94.8%	2.0%	38.7%	48,156	74,837	38.7%	38.7%
6/30/00-01	4,257,120	4,362,510	4,053,774	203,346	308,736	94.1%	4.0%	67.3%	136,913	207,872	67.3%	67.3%
6/30/01-02	3,425,000	3,506,440	3,225,444	199,556	280,996	93.1%	4.0%	57.7%	115,135	162,123	57.7%	57.7%
6/30/02-03	2,878,210	2,899,810	2,630,606	247,604	269,204	91.1%	4.0%	44.7%	110,731	120,390	44.7%	44.7%
6/30/03-04	4,979,700	5,150,480	4,669,262	310,438	481,218	92.2%	4.0%	51.2%	158,897	246,310	51.2%	51.2%
6/30/04-05	3,913,000	4,090,000	3,656,995	256,005	433,005	91.4%	4.0%	46.5%	118,942	201,178	46.5%	46.5%
6/30/05-06	3,029,000	3,070,000	2,741,320	287,680	328,680	89.9%	4.0%	39.6%	113,866	130,094	39.6%	39.6%
6/30/06-07	3,120,200	3,162,550	2,893,235	226,965	269,315	92.1%	4.0%	50.6%	114,932	136,378	50.6%	50.6%
6/30/07-08	2,532,450	2,627,700	2,305,389	227,061	322,311	89.4%	4.0%	37.6%	85,310	121,096	37.6%	37.6%
6/30/08-09	3,296,000	3,372,000	2,861,931	434,069	510,069	85.8%	4.0%	28.3%	122,625	144,095	28.3%	28.3%
6/30/09-10	2,205,000	2,298,000	1,787,061	417,939	510,939	79.4%	4.0%	19.4%	81,043	99,077	19.4%	19.4%
6/30/10-11	3,793,000	3,956,000	3,228,352	564,648	727,648	83.3%	4.0%	24.0%	135,432	174,528	24.0%	24.0%
6/30/11-12	2,799,000	2,980,000	2,259,752	539,248	720,248	78.2%	4.0%	18.4%	98,970	132,190	18.4%	18.4%
6/30/12-13	4,044,000	4,141,000	3,147,851	896,149	993,149	76.9%	4.0%	17.3%	155,295	172,105	17.3%	17.3%
6/30/13-14	4,891,000	5,071,000	3,697,827	1,193,173	1,373,173	74.2%	4.0%	15.5%	185,266	213,214	15.5%	15.5%
6/30/14-15	5,981,000	6,270,000	4,418,104	1,562,896	1,851,896	72.1%	4.0%	14.4%	224,284	265,756	14.4%	14.4%
6/30/15-16	7,701,000	8,652,000	5,533,481	2,167,519	3,118,519	67.7%	4.5%	13.8%	298,460	429,410	13.8%	13.8%
6/30/16-17	6,843,000	7,421,000	4,206,811	2,636,189	3,214,189	59.0%	8.7%	21.2%	558,566	681,035	21.2%	21.2%
6/30/17-18	5,897,000	6,396,700	2,580,847	3,316,153	3,815,853	42.0%	17.0%	29.3%	971,664	1,118,081	29.3%	29.3%
6/30/18-19	6,549,000	7,343,700	1,465,152	5,083,848	5,878,548	21.1%	20.9%	26.5%	1,346,162	1,556,592	26.5%	26.5%
Total	214,485,107	220,694,825	189,028,660	25,456,447	31,666,166				5,930,618	7,654,895	23.3%	24.2%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)
(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)
(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)
(5) = (2) - (4)
(6) = (3) - (4)
(7) = (4) / Average of Columns (2), (3)
(8) = (7) - Prior Year's (7)
(9) = (8) / (1.00 - (7))
(10) = (5) * (9)
(11) = (6) * (9)
(12) = (10) / (5)
(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		816,015			816,653	817,418	639	1,404		
6/30/82-83		140,297	140,898		140,898	142,307	601	2,010		
6/30/83-84		209,040	210,146		210,000	210,000	960	960		
6/30/84-85	142,561	497,196	500,326	500,407	500,000	505,000	2,804	7,804	0.351	0.354
6/30/85-86	153,298	257,775	259,657	259,697	260,000	260,000	2,225	2,225	0.170	0.170
6/30/86-87	176,136	702,835	708,675	708,888	709,000	709,000	6,165	6,165	0.403	0.403
6/30/87-88	206,319	1,883,074	1,900,619	1,897,110	1,897,000	1,901,000	13,926	17,926	0.919	0.921
6/30/88-89	222,806	2,057,612	2,078,860	2,079,201	2,079,000	2,099,790	21,388	42,178	0.933	0.942
6/30/89-90	223,751	1,939,963	1,961,956	1,962,612	1,942,000	1,963,000	2,037	23,037	0.868	0.877
6/30/90-91	210,162	1,747,549	1,769,128	1,768,939	1,769,000	1,786,690	21,451	39,141	0.842	0.850
6/30/91-92	205,241	1,260,611	1,278,730	1,278,432	1,261,000	1,266,914	389	6,303	0.614	0.617
6/30/92-93	176,705	1,166,369	1,186,682	1,186,179	1,186,000	1,198,870	19,631	32,501	0.671	0.678
6/30/93-94	173,075	650,608	663,925	663,567	664,000	670,640	13,392	20,032	0.384	0.387
6/30/94-95	178,317	854,111	874,208	873,478	873,000	882,740	18,889	28,629	0.490	0.495
6/30/95-96	175,996	810,127	831,677	830,779	831,000	840,320	20,873	30,193	0.472	0.477
6/30/96-97	190,083	579,458	596,656	596,048	596,000	602,970	16,542	23,512	0.314	0.317
6/30/97-98	177,278	507,678	524,314	523,726	524,000	529,240	16,322	21,562	0.296	0.299
6/30/98-99	189,080	899,201	932,381	930,455	930,000	932,000	30,799	32,799	0.492	0.493
6/30/99-00	194,494	602,355	627,704	626,626	620,730	628,000	18,375	25,645	0.319	0.323
6/30/00-01	201,568	753,977	789,637	787,902	780,120	790,000	26,143	36,023	0.387	0.392
6/30/01-02	203,105	619,240	651,770	650,694	651,000	658,520	31,760	39,280	0.321	0.324
6/30/02-03	202,515	833,252	881,409	879,179	870,210	889,810	36,958	56,558	0.430	0.439
6/30/03-04	189,588	1,425,306	1,521,675	1,515,087	1,499,850	1,537,220	74,544	111,914	0.791	0.811
6/30/04-05	186,990	933,349	1,005,571	969,876	970,000	1,006,000	36,651	72,651	0.519	0.538
6/30/05-06	193,254	881,682	960,757	927,697	928,000	961,000	46,318	79,318	0.480	0.497
6/30/06-07	203,359	671,423	740,572	729,651	730,000	741,000	58,577	69,577	0.359	0.364
6/30/07-08	212,083	663,885	741,180	735,778	736,000	741,000	72,115	77,115	0.347	0.349
6/30/08-09	204,679	864,653	977,065	946,223	946,000	977,000	81,347	112,347	0.462	0.477
6/30/09-10	184,688	552,229	633,384	641,422	633,000	641,000	80,771	88,771	0.343	0.347
6/30/10-11	169,689	825,708	964,324	923,161	923,000	964,000	97,292	138,292	0.544	0.568
6/30/11-12	177,399	562,976	671,753	684,633	672,000	685,000	109,024	122,024	0.379	0.386
6/30/12-13	189,252	581,542	718,285	743,280	718,000	743,000	136,458	161,458	0.379	0.393
6/30/13-14	199,876	615,386	786,219	822,046	786,000	822,000	170,614	206,614	0.393	0.411
6/30/14-15	213,700	936,491	1,232,713	1,195,512	1,196,000	1,233,000	259,509	296,509	0.560	0.577
6/30/15-16	211,829	1,078,449	1,505,347	1,399,632	1,400,000	1,505,000	321,551	426,551	0.661	0.710
6/30/16-17	203,085	1,035,511	1,576,900	1,430,667	1,431,000	1,577,000	395,489	541,489	0.705	0.777
6/30/17-18	203,925	646,097	1,134,912	1,173,746	1,135,000	1,232,700	488,903	586,603	0.557	0.604
6/30/18-19	218,060	318,080	1,184,396	1,333,753	1,184,000	1,400,700	865,920	1,082,620	0.543	0.642
Total	6,763,947	32,381,112	35,724,411	35,176,082	35,998,461	37,050,850	3,617,350	4,669,738		
Tot 6/30/84-19	6,763,947	31,215,760	35,373,367	35,176,082	34,830,910	35,881,124	3,615,150	4,665,364	0.515	0.530

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 3, Exhibit 2, Page 2, Column 3
(4) From Section 3, Exhibit 2, Page 2, Column 8
(5) From Section 3, Exhibit 2, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim
All Prior Yrs		816,015							4	0	
6/30/82-83		140,297	1.004	1.000	140,898	N/A	140,898		1	0	
6/30/83-84		209,040	1.005	1.000	210,146	N/A	210,146		0	0	
6/30/84-85	142,561	497,196	1.006	1.000	500,326	N/A	500,326	0.351	2	1	3,130
6/30/85-86	153,298	257,775	1.007	1.000	259,657	N/A	259,657	0.169	0	0	
6/30/86-87	176,136	702,835	1.008	1.000	708,675	N/A	708,675	0.402	0	0	
6/30/87-88	206,319	1,883,074	1.009	1.000	1,900,619	N/A	1,900,619	0.921	1	2	8,772
6/30/88-89	222,806	2,057,612	1.010	1.000	2,078,860	N/A	2,078,860	0.933	3	2	10,624
6/30/89-90	223,751	1,939,963	1.011	1.000	1,961,956	N/A	1,961,956	0.877	0	0	
6/30/90-91	210,162	1,747,549	1.012	1.000	1,769,128	N/A	1,769,128	0.842	1	1	21,579
6/30/91-92	205,241	1,260,611	1.014	1.000	1,278,730	N/A	1,278,730	0.623	0	0	
6/30/92-93	176,705	1,166,369	1.017	1.000	1,186,682	N/A	1,186,682	0.672	2	2	10,157
6/30/93-94	173,075	650,608	1.020	1.000	663,925	N/A	663,925	0.384	1	1	13,317
6/30/94-95	178,317	854,111	1.024	1.000	874,208	N/A	874,208	0.490	1	1	20,097
6/30/95-96	175,996	810,127	1.027	1.000	831,677	N/A	831,677	0.473	1	1	21,550
6/30/96-97	190,083	579,458	1.030	1.000	596,656	N/A	596,656	0.314	2	2	8,599
6/30/97-98	177,278	507,678	1.033	1.000	524,314	N/A	524,314	0.296	1	1	16,636
6/30/98-99	189,080	899,201	1.037	1.000	932,381	N/A	932,381	0.493	1	1	33,181
6/30/99-00	194,494	602,355	1.042	1.000	627,704	N/A	627,704	0.323	0	0	
6/30/00-01	201,568	753,977	1.047	1.000	789,637	N/A	789,637	0.392	0	0	
6/30/01-02	203,105	619,240	1.053	1.000	651,770	N/A	651,770	0.321	0	0	
6/30/02-03	202,515	833,252	1.058	1.000	881,409	N/A	881,409	0.435	3	3	16,052
6/30/03-04	189,588	1,425,306	1.068	1.000	1,521,675	N/A	1,521,675	0.803	4	3	32,123
6/30/04-05	186,990	933,349	1.077	1.000	1,005,571	N/A	1,005,571	0.538	4	4	18,055
6/30/05-06	193,254	881,682	1.090	1.000	960,757	N/A	960,757	0.497	1	1	79,075
6/30/06-07	203,359	671,423	1.103	1.000	740,572	N/A	740,572	0.364	0	0	
6/30/07-08	212,083	663,885	1.116	1.000	741,180	N/A	741,180	0.349	0	0	
6/30/08-09	204,679	864,653	1.130	1.000	977,065	N/A	977,065	0.477	4	2	56,206
6/30/09-10	184,688	552,229	1.147	1.000	633,384	N/A	633,384	0.343	1	2	40,577
6/30/10-11	169,689	825,708	1.168	1.000	964,324	N/A	964,324	0.568	5	2	69,308
6/30/11-12	177,399	562,976	1.193	1.000	671,753	N/A	671,753	0.379	2	1	108,777
6/30/12-13	189,252	581,542	1.235	1.000	718,285	N/A	718,285	0.380	6	3	45,581
6/30/13-14	199,876	615,386	1.278	1.000	786,219	N/A	786,219	0.393	11	9	18,981
6/30/14-15	213,700	936,491	1.316	1.000	1,232,713	N/A	1,232,713	0.577	14	17	17,425
6/30/15-16	211,829	1,078,449	1.396	1.000	1,505,347	N/A	1,505,347	0.711	44	23	18,561
6/30/16-17	203,085	1,035,511	1.523	1.000	1,576,900	N/A	1,576,900	0.776	135	38	14,247
6/30/17-18	203,925	646,097	1.757	1.000	1,134,912	N/A	1,134,912	0.557	280	124	3,942
6/30/18-19	218,060	318,080	3.724	1.000	1,184,396	N/A	1,184,396	0.543		297	2,917
Total	6,763,947	32,381,112			35,724,411		35,724,411		535	544	

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 3, Exhibit 2, Page 7
(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.
(6) = (3) x (4) x (5)
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	142,561	0.360	497,196	1.006	500,407	N/A	500,407	0.351	0.351
6/30/85-86	153,298	0.173	257,775	1.007	259,697	N/A	259,697	0.169	0.169
6/30/86-87	176,136	0.417	702,835	1.008	708,888	N/A	708,888	0.402	0.402
6/30/87-88	206,319	0.737	1,883,074	1.009	1,897,110	N/A	1,897,110	0.920	0.920
6/30/88-89	222,806	0.948	2,057,612	1.010	2,079,201	N/A	2,079,201	0.933	0.933
6/30/89-90	223,751	0.903	1,939,963	1.011	1,962,612	N/A	1,962,612	0.877	0.877
6/30/90-91	210,162	0.834	1,747,549	1.012	1,768,939	N/A	1,768,939	0.842	0.842
6/30/91-92	205,241	0.613	1,260,611	1.014	1,278,432	N/A	1,278,432	0.623	0.623
6/30/92-93	176,705	0.655	1,166,369	1.017	1,186,179	N/A	1,186,179	0.671	0.671
6/30/93-94	173,075	0.373	650,608	1.020	663,567	N/A	663,567	0.383	0.383
6/30/94-95	178,317	0.472	854,111	1.024	873,478	N/A	873,478	0.490	0.490
6/30/95-96	175,996	0.453	810,127	1.027	830,779	N/A	830,779	0.472	0.472
6/30/96-97	190,083	0.303	579,458	1.030	596,048	N/A	596,048	0.314	0.314
6/30/97-98	177,278	0.285	507,678	1.033	523,726	N/A	523,726	0.295	0.295
6/30/98-99	189,080	0.464	899,201	1.037	930,455	N/A	930,455	0.492	0.492
6/30/99-00	194,494	0.309	602,355	1.042	626,626	N/A	626,626	0.322	0.322
6/30/00-01	201,568	0.373	753,977	1.047	787,902	N/A	787,902	0.391	0.391
6/30/01-02	203,105	0.310	619,240	1.053	650,694	N/A	650,694	0.320	0.320
6/30/02-03	202,515	0.415	833,252	1.058	879,179	N/A	879,179	0.434	0.434
6/30/03-04	189,588	0.748	1,425,306	1.068	1,515,087	N/A	1,515,087	0.799	0.799
6/30/04-05	186,990	0.272	933,349	1.077	969,876	N/A	969,876	0.519	0.519
6/30/05-06	193,254	0.289	881,682	1.090	927,697	N/A	927,697	0.480	0.480
6/30/06-07	203,359	0.307	671,423	1.103	729,651	N/A	729,651	0.359	0.359
6/30/07-08	212,083	0.325	663,885	1.116	735,778	N/A	735,778	0.347	0.347
6/30/08-09	204,679	0.346	864,653	1.130	946,223	N/A	946,223	0.462	0.462
6/30/09-10	184,688	0.377	552,229	1.147	641,422	N/A	641,422	0.347	0.347
6/30/10-11	169,689	0.400	825,708	1.168	923,161	N/A	923,161	0.544	0.544
6/30/11-12	177,399	0.424	562,976	1.193	684,633	N/A	684,633	0.386	0.386
6/30/12-13	189,252	0.449	581,542	1.235	743,280	N/A	743,280	0.393	0.393
6/30/13-14	199,876	0.476	615,386	1.278	822,046	N/A	822,046	0.411	0.411
6/30/14-15	213,700	0.504	936,491	1.316	1,195,512	N/A	1,195,512	0.559	0.559
6/30/15-16	211,829	0.535	1,078,449	1.396	1,399,632	N/A	1,399,632	0.661	0.661
6/30/16-17	203,085	0.567	1,035,511	1.523	1,430,667	N/A	1,430,667	0.704	0.704
6/30/17-18	203,925	0.601	646,097	1.757	1,173,746	N/A	1,173,746	0.576	0.576
6/30/18-19	218,060	0.637	318,080	3.724	1,333,753	N/A	1,333,753	0.612	0.612
Total	6,763,947		31,215,760		35,176,082		35,176,082		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 3, Exhibit 2, Page 4, Column 11
(4) From Section 3, Exhibit 2, Page 2, Column 3
(5) From Section 3, Exhibit 2, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.360	0.360
6/30/85-86									0.173	0.173
6/30/86-87									0.417	0.417
6/30/87-88									0.737	0.737
6/30/88-89									0.948	0.948
6/30/89-90									0.903	0.903
6/30/90-91	210,162	1,769,128	0.842	1.194	1.005	5.418	5.446	0.104	0.836	0.834
6/30/91-92	205,241	1,278,730	0.623	1.189	0.741	5.112	3.785	0.111	0.615	0.613
6/30/92-93	176,705	1,186,682	0.672	1.189	0.799	4.822	3.851	0.118	0.646	0.655
6/30/93-94	173,075	663,925	0.384	1.178	0.452	4.549	2.056	0.126	0.374	0.373
6/30/94-95	178,317	874,208	0.490	1.170	0.574	4.292	2.462	0.134	0.474	0.472
6/30/95-96	175,996	831,677	0.473	1.155	0.546	4.049	2.211	0.144	0.454	0.453
6/30/96-97	190,083	596,656	0.314	1.137	0.357	3.820	1.363	0.155	0.289	0.303
6/30/97-98	177,278	524,314	0.296	1.135	0.336	3.604	1.210	0.165	0.286	0.285
6/30/98-99	189,080	932,381	0.493	1.135	0.560	3.400	1.903	0.175	0.443	0.464
6/30/99-00	194,494	627,704	0.323	1.135	0.366	3.207	1.175	0.185	0.310	0.309
6/30/00-01	201,568	789,637	0.392	1.109	0.435	3.026	1.315	0.201	0.374	0.373
6/30/01-02	203,105	651,770	0.321	1.101	0.353	2.854	1.008	0.215	0.311	0.310
6/30/02-03	202,515	881,409	0.435	1.073	0.467	2.693	1.257	0.234	0.393	0.415
6/30/03-04	189,588	1,521,675	0.803	1.046	0.840	2.540	2.134	0.254	0.737	0.748
6/30/04-05	186,990	1,005,571	0.538	1.036	0.557	2.397	1.335	0.272	0.256	0.272
6/30/05-06	193,254	960,757	0.497	1.032	0.513	2.261	1.160	0.289	0.270	0.289
6/30/06-07	203,359	740,572	0.364	1.032	0.376	2.133	0.802	0.307	0.283	0.307
6/30/07-08	212,083	741,180	0.349	1.032	0.361	2.012	0.726	0.325	0.297	0.325
6/30/08-09	204,679	977,065	0.477	1.027	0.490	1.898	0.930	0.346	0.314	0.346
6/30/09-10	184,688	633,384	0.343	1.000	0.343	1.791	0.614	0.377	0.338	0.377
6/30/10-11	169,689	964,324	0.568	1.000	0.568	1.689	0.960	0.400	0.355	0.400
6/30/11-12	177,399	671,753	0.379	1.000	0.379	1.594	0.604	0.424	0.373	0.424
6/30/12-13	189,252	718,285	0.380	1.000	0.380	1.504	0.571	0.449	0.392	0.449
6/30/13-14	199,876	786,219	0.393	1.000	0.393	1.419	0.558	0.476	0.411	0.476
6/30/14-15	213,700	1,232,713	0.577	1.000	0.577	1.338	0.772	0.504	0.432	0.504
6/30/15-16	211,829	1,505,347	0.711	1.000	0.711	1.262	0.897	0.535	0.454	0.535
6/30/16-17	203,085	1,576,900	0.776	1.000	0.776	1.191	0.925	0.567	0.476	0.567
6/30/17-18	203,925	1,134,912	0.557	1.000	0.557	1.124	0.625	0.601	0.500	0.601
6/30/18-19	218,060	1,184,396	0.543	1.000	0.543	1.060	0.576	0.637		0.637
Total	5,639,077	27,963,273								

Trend Last 4 (ex 18-19):	-0.2%	Avg 3 (ex 18-19):	0.816
Trend Last 8 (ex 18-19):	7.0%	Avg 5 (ex 18-19):	0.755
Trend Last 12 (ex 18-19):	5.5%	Avg 10 (ex 18-19):	0.746
Prior Selected Trend:	5.0%	Prior Sel Avg:	0.525
Selected Trend:	6.0%	Sel. Loss Cost:	0.675

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 3, Exhibit 2, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCIRB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.900	
(2)	Credibility		30%	
(3)	Average Pmt Trend Statewide		0.980	
(4)	Credibility Weighted Trend		0.956	
		(Low)		(High)
(5)	Selected Range	0.947		0.966
(6)	Incremental Paid for 2019	0		0
(7)	Estimated Reserve	0		0
(8)	Paid to Date (82 & Prior)	816,015		816,015
(9)	Est Ult Paid for 1982 & Prior	816,015		816,015

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	426	936
(11)	Projected Number of Years	3	3
(12)	Estimated Reserve	1,278	2,808
(13)	Paid to Date (82 & Prior)	816,015	816,015
(14)	Est Ult Paid for 1982 & Prior	817,292	818,822
(14a)	Paid Counts During Fiscal Year	0	4
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	816,653	817,418
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**816,653**	**817,418**
(18)	Implied Tail	1.001	1.002
(19)	Ult Loss Inc Lump Sums @ 6/18	825,361	827,210

NOTES:

(1) From Section 3, Exhibit 2, Page 6
(2) = (Average of Section 3, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 3, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 3, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	51,889	10.857			
1993	2	26,449	10.183	0.510		
1994	3	19,386	9.872	0.733		
1995	4	14,214	9.562	0.733		
1996	5	30,374	10.321	2.137		
1997	6	29,871	10.305	0.983		
1998	7	19,565	9.881	0.655		
1999	8	34,912	10.461	1.784		
2000	9	33,563	10.421	0.961	n =	22
2001	10	21,898	9.994	0.652	S(x) =	44,061
2002	11	10,530	9.262	0.481	S(x-sq) =	88,245,191
2003	12	13,888	9.539	1.319	S(xy) =	422,356
2004	13	14,770	9.600	1.064	S(y) =	211
2005	14	16,486	9.710	1.116	D =	22,481
2006	15	16,533	9.713	1.003	slope =	-0.109
2007	16	15,051	9.619	0.910	Avg Trend =	0.891
2008	17	15,931	9.676	1.058		
2009	18	15,802	9.668	0.992		
2010	19	17,686	9.781	1.119		
2011	20	7,925	8.978	0.448		
2012	21	0				
2013	22	0				
2014	23	0				
2015	24	495	6.205			
2016	25	1,530	7.333	3.091		
2017	26	0				
2018	27	1,278	7.153			
2019	28	0				
					Selected Trend:	**0.900**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2016: 3.091 = 1530 / 495

Commonwealth of Massachusetts Workers Compensation
Department of Mental Health - Cluster 2
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
June-83	6,910	16,771	25,010	31,963	39,548	47,447	55,206	65,979	79,676	97,881	109,437	118,040	122,472	123,657	124,261	124,960	125,364	127,246	128,435	128,594	128,869	130,242	130,978	131,631	133,115	134,239	135,539	136,526	137,668	137,734	137,833	137,899	138,560	139,442	139,666	140,297	140,297
June-84	15,115	36,685	54,706	69,914	86,505	104,208	114,043	135,514	154,763	169,780	196,611	201,984	204,351	205,488	205,929	206,289	207,062	207,303	207,590	207,590	207,590	207,590	207,590	207,590	207,590	209,040	209,040	209,040	209,040	209,040	209,040	209,040	209,040	209,040	209,040	209,040	
June-85	45,034	109,301	162,993	208,305	264,045	295,679	375,978	436,398	457,324	469,156	478,993	481,392	482,690	484,957	486,098	486,337	486,602	486,918	487,378	488,092	488,848	489,022	489,458	490,407	490,672	490,804	491,592	491,855	492,053	492,119	492,382	492,808	494,011	496,801	497,196		
June-86	31,328	76,036	113,387	149,251	177,640	201,245	224,645	234,675	242,982	244,710	248,077	248,146	248,146	248,464	249,109	249,459	249,459	249,734	249,759	250,509	253,317	253,317	253,317	257,775	257,775	257,775	257,775	257,775	257,775	257,775	257,775	257,775	257,775	257,775			
June-87	76,748	186,273	283,696	389,472	457,883	509,794	575,159	621,158	638,516	650,997	655,971	660,694	667,637	681,728	687,346	690,455	693,082	696,366	698,158	699,573	700,478	701,229	701,978	702,712	702,835	702,835	702,835	702,835	702,835	702,835	702,835	702,835	702,835				
June-88	178,894	502,531	738,028	895,402	1,063,080	1,183,773	1,248,121	1,279,736	1,298,796	1,310,333	1,339,541	1,367,561	1,385,075	1,399,869	1,424,718	1,427,592	1,445,010	1,498,101	1,524,412	1,550,835	1,609,155	1,632,873	1,663,246	1,690,901	1,720,638	1,733,092	1,753,364	1,848,480	1,853,589	1,866,170	1,869,052	1,883,074					
June-89	179,890	786,968	1,088,315	1,330,240	1,584,004	1,681,826	1,741,013	1,807,955	1,845,172	1,876,501	1,906,158	1,945,202	1,962,565	1,969,371	1,973,430	1,978,126	1,981,710	1,986,429	2,002,120	2,035,745	2,040,920	2,043,319	2,045,069	2,046,563	2,047,864	2,049,094	2,050,041	2,052,689	2,053,852	2,055,705	2,057,612						
June-90	298,701	961,341	1,346,536	1,509,954	1,639,655	1,697,547	1,735,975	1,749,267	1,768,436	1,790,051	1,817,206	1,838,401	1,863,987	1,878,469	1,905,280	1,915,675	1,921,866	1,934,997	1,937,028	1,938,078	1,938,078	1,938,078	1,938,078	1,938,078	1,938,078	1,938,378	1,938,618	1,939,963	1,939,963	1,939,963							
June-91	336,650	1,034,501	1,248,801	1,338,322	1,397,546	1,497,111	1,506,640	1,518,859	1,530,350	1,582,638	1,604,133	1,610,563	1,618,558	1,622,507	1,624,821	1,627,667	1,633,766	1,732,296	1,736,277	1,737,397	1,738,820	1,740,878	1,741,982	1,744,875	1,746,213	1,746,723	1,747,281	1,747,508	1,747,549								
June-92	391,215	804,359	985,930	1,100,607	1,131,087	1,152,839	1,156,897	1,204,770	1,207,427	1,217,326	1,239,794	1,242,292	1,245,829	1,245,829	1,247,305	1,249,031	1,251,673	1,256,737	1,256,737	1,257,214	1,258,829	1,260,461	1,260,611	1,260,611	1,260,611	1,260,611	1,260,611	1,260,611									
June-93	258,020	628,980	745,922	854,118	902,554	912,950	924,291	930,378	935,510	938,871	941,935	946,379	956,312	969,261	977,539	988,688	1,003,269	1,015,451	1,027,786	1,045,649	1,059,121	1,078,986	1,097,266	1,117,124	1,132,491	1,146,543	1,166,369										
June-94	182,635	373,628	418,730	436,391	447,015	469,585	491,352	516,384	534,463	550,753	585,007	594,302	601,406	609,303	615,358	624,226	630,803	638,628	643,805	645,213	646,088	646,088	646,088	648,098	649,917	650,608											
June-95	212,717	409,284	509,019	570,032	608,100	631,875	651,359	673,340	687,056	708,855	725,773	748,542	771,912	790,063	800,522	812,267	823,958	831,209	836,947	844,533	849,477	852,296	852,794	853,498	854,111												
June-96	161,311	580,474	655,522	690,974	709,369	717,233	722,565	739,256	747,885	753,899	765,449	771,693	782,222	790,224	794,884	796,128	797,390	798,222	801,390	803,766	804,663	807,002	808,470	810,127													
June-97	135,202	301,857	352,150	378,182	408,711	433,559	446,704	473,023	486,546	493,154	499,117	502,144	505,108	509,796	517,517	522,815	524,946	533,925	536,788	541,805	545,274	549,243	579,458														
June-98	160,545	332,451	383,627	422,681	445,088	461,616	487,824	498,965	499,061	499,770	500,001	503,898	505,757	505,921	506,053	506,185	506,317	506,558	506,783	507,079	507,413	507,678															
June-99	177,752	299,718	340,747	360,722	405,072	439,482	477,272	520,347	561,026	584,273	585,114	588,553	606,906	637,239	655,001	683,204	721,085	759,098	807,305	852,119	899,201																
June-00	185,350	429,256	483,565	521,929	539,722	558,001	575,939	582,579	584,965	587,880	590,258	592,928	595,238	598,391	601,805	602,355	602,355	602,355	602,355	602,355																	
June-01	241,669	433,098	500,398	575,365	598,840	628,934	693,180	725,143	730,102	735,829	737,792	740,203	753,446	753,977	753,977	753,977	753,977	753,977	753,977																		
June-02	174,410	368,134	462,671	501,999	514,827	521,795	525,972	571,546	580,032	584,275	614,358	616,264	616,631	617,414	619,074	619,240	619,240	619,240																			
June-03	106,077	382,205	468,554	496,191	560,019	574,291	585,592	637,875	657,335	673,709	685,713	706,227	728,783	748,904	767,961	783,698	833,252																				
June-04	258,429	665,381	856,411	1,022,737	1,071,500	1,113,490	1,161,995	1,192,531	1,222,893	1,246,683	1,275,099	1,309,808	1,343,324	1,369,371	1,396,465	1,425,306																					
June-05	223,896	627,798	728,574	772,233	797,587	811,216	848,381	866,048	884,416	901,770	910,494	916,815	919,419	921,971	933,349																						
June-06	251,300	520,856	684,007	715,286	737,612	754,221	768,311	780,173	795,227	811,567	832,733	850,354	867,723	881,682																							
June-07	266,977	578,217	638,599	652,141	659,793	664,093	666,803	669,308	669,732	671,423	671,423	671,423	671,423																								
June-08	278,965	550,541	604,168	629,658	649,695	656,991	663,910	663,885	663,885	663,885	663,885	663,885																									
June-09	302,300	569,565	595,188	605,449	639,872	662,294	692,197	758,051	800,308	818,107	864,653																										
June-10	216,046	447,208	465,324	474,345	490,538	503,411	518,661	531,196	538,169	552,229																											
June-11	336,085	580,670	657,420	693,645	718,136	745,881	777,559	801,073	825,708																												
June-12	227,796	448,648	504,764	520,900	532,545	541,224	553,595	562,976																													
June-13	232,201	491,890	540,494	555,003	565,116	574,100	581,542																														
June-14	217,605	461,922	538,864	572,808	596,857	615,386																															
June-15	336,154	678,363	754,856	849,640	936,491																																
June-16	454,022	857,145	977,472	1,078,449																																	
June-17	447,474	885,439	1,035,511																																		
June-18	339,683	646,097																																			
June-19	318,080																																				

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
June-83	2.427	1.491	1.278	1.237	1.200	1.164	1.195	1.208	1.228	1.118	1.079	1.038	1.010	1.005	1.006	1.003	1.015	1.009	1.001	1.002	1.011	1.006	1.005	1.011	1.008	1.010	1.007	1.008	1.000	1.001	1.000	1.005	1.006	1.002	1.005	1.000
June-84	2.427	1.491	1.278	1.237	1.205	1.094	1.188	1.142	1.097	1.158	1.027	1.012	1.006	1.002	1.002	1.004	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.427	1.491	1.278	1.268	1.120	1.272	1.161	1.048	1.026	1.021	1.005	1.003	1.005	1.002	1.000	1.001	1.001	1.001	1.001	1.002	1.000	1.001	1.002	1.001	1.000	1.002	1.001	1.000	1.000	1.001	1.001	1.002	1.006	1.001		
June-86	2.427	1.491	1.316	1.190	1.133	1.116	1.045	1.035	1.007	1.014	1.000	1.000	1.001	1.003	1.001	1.000	1.001	1.000	1.003	1.011	1.000	1.000	1.018	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.427	1.523	1.373	1.176	1.113	1.128	1.080	1.028	1.020	1.008	1.007	1.011	1.021	1.008	1.005	1.004	1.005	1.003	1.002	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.809	1.469	1.213	1.187	1.114	1.054	1.025	1.015	1.009	1.022	1.021	1.013	1.011	1.018	1.002	1.012	1.037	1.018	1.017	1.038	1.015	1.019	1.017	1.018	1.007	1.012	1.054	1.003	1.007	1.002	1.008					
June-89	4.375	1.383	1.222	1.191	1.062	1.035	1.038	1.021	1.017	1.016	1.020	1.009	1.003	1.002	1.002	1.002	1.002	1.008	1.017	1.003	1.001	1.001	1.001	1.001	1.001	1.000	1.001	1.001	1.001	1.001						
June-90	3.218	1.401	1.121	1.086	1.035	1.023	1.008	1.011	1.012	1.015	1.012	1.014	1.008	1.014	1.005	1.003	1.007	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000							
June-91	3.073	1.207	1.072	1.044	1.071	1.006	1.008	1.008	1.034	1.014	1.004	1.005	1.002	1.001	1.002	1.004	1.060	1.002	1.001	1.001	1.001	1.001	1.002	1.001	1.000	1.000	1.000	1.000								
June-92	2.056	1.226	1.116	1.028	1.019	1.004	1.041	1.002	1.008	1.018	1.002	1.003	1.000	1.001	1.001	1.002	1.004	1.000	1.000	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000									
June-93	2.438	1.186	1.145	1.057	1.012	1.012	1.007	1.006	1.004	1.003	1.005	1.010	1.014	1.009	1.011	1.015	1.012	1.012	1.017	1.013	1.019	1.017	1.018	1.014	1.012	1.017										
June-94	2.046	1.121	1.042	1.024	1.050	1.046	1.051	1.035	1.030	1.062	1.016	1.012	1.013	1.010	1.014	1.011	1.012	1.008	1.002	1.001	1.000	1.000	1.003	1.003	1.001											
June-95	1.924	1.244	1.120	1.067	1.039	1.031	1.034	1.020	1.032	1.024	1.031	1.031	1.024	1.013	1.015	1.014	1.009	1.007	1.009	1.006	1.003	1.001	1.001	1.001												
June-96	3.598	1.129	1.054	1.027	1.011	1.007	1.023	1.012	1.008	1.015	1.008	1.014	1.010	1.006	1.002	1.002	1.001	1.004	1.003	1.001	1.003	1.002	1.002													
June-97	2.233	1.167	1.074	1.081	1.061	1.030	1.059	1.029	1.014	1.012	1.006	1.006	1.009	1.015	1.010	1.004	1.017	1.005	1.009	1.006	1.007	1.055														
June-98	2.071	1.154	1.102	1.053	1.037	1.057	1.023	1.000	1.001	1.000	1.008	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.001	1.001															
June-99	1.686	1.137	1.059	1.123	1.085	1.086	1.090	1.078	1.041	1.001	1.006	1.031	1.050	1.028	1.043	1.055	1.053	1.064	1.056	1.055																
June-00	2.316	1.127	1.079	1.034	1.034	1.032	1.012	1.004	1.005	1.004	1.005	1.004	1.005	1.006	1.001	1.000	1.000	1.000	1.000																	
June-01	1.792	1.155	1.150	1.041	1.050	1.102	1.046	1.007	1.008	1.003	1.003	1.018	1.001	1.000	1.000	1.000	1.000	1.000																		
June-02	2.111	1.257	1.085	1.026	1.014	1.008	1.087	1.015	1.007	1.051	1.003	1.001	1.001	1.003	1.000	1.000	1.000																			
June-03	3.603	1.226	1.059	1.129	1.025	1.020	1.089	1.031	1.025	1.018	1.030	1.032	1.028	1.025	1.020	1.063																				
June-04	2.575	1.287	1.194	1.048	1.039	1.044	1.026	1.025	1.019	1.023	1.027	1.026	1.019	1.020	1.021																					
June-05	2.804	1.161	1.060	1.033	1.017	1.046	1.021	1.021	1.020	1.010	1.007	1.003	1.003	1.012																						
June-06	2.073	1.313	1.046	1.031	1.023	1.019	1.015	1.019	1.021	1.026	1.021	1.020	1.016																							
June-07	2.166	1.104	1.021	1.012	1.007	1.004	1.004	1.001	1.003	1.000	1.000	1.000																								
June-08	1.974	1.097	1.042	1.032	1.011	1.011	1.000	1.000	1.000	1.000	1.000																									
June-09	1.884	1.045	1.017	1.057	1.035	1.045	1.095	1.056	1.022	1.057																										
June-10	2.070	1.041	1.019	1.034	1.026	1.030	1.024	1.013	1.026																											
June-11	1.728	1.132	1.055	1.035	1.039	1.042	1.030	1.031																												
June-12	1.970	1.125	1.032	1.022	1.016	1.023	1.017																													
June-13	2.118	1.099	1.027	1.018	1.016	1.013																														
June-14	2.123	1.167	1.063	1.042	1.031																															
June-15	2.018	1.113	1.126	1.102																																
June-16	1.888	1.140	1.103																																	
June-17	1.979	1.169																																		
June-18	1.902																																			

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*To Ult*
Simple Avg																																					
All Yrs	2.354	1.231	1.119	1.084	1.055	1.052	1.051	1.032	1.027	1.026	1.014	1.013	1.011	1.009	1.007	1.009	1.012	1.008	1.008	1.008	1.004	1.007	1.005	1.004	1.003	1.004	1.006	1.001	1.001	1.001	1.001	1.001	1.003	1.001	1.002	1.000	
Latest 5	1.982	1.138	1.070	1.044	1.026	1.031	1.033	1.020	1.014	1.019	1.011	1.016	1.013	1.012	1.008	1.024	1.011	1.014	1.014	1.014	1.003	1.015	1.005	1.004	1.003	1.004	1.011	1.001	1.002	1.001	1.002	1.001					
Latest 3	1.923	1.141	1.097	1.054	1.021	1.026	1.024	1.033	1.016	1.019	1.007	1.008	1.013	1.019	1.014	1.021	1.000	1.021	1.019	1.021	1.004	1.019	1.002	1.006	1.004	1.006	1.000	1.000	1.003	1.001	1.003	1.001	1.002	1.001			
Volume Wtd																																					
All Yrs	2.274	1.203	1.103	1.071	1.043	1.037	1.036	1.020	1.018	1.019	1.012	1.012	1.010	1.009	1.007	1.009	1.015	1.008	1.009	1.009	1.004	1.006	1.005	1.004	1.003	1.004	1.010	1.001	1.002	1.001	1.004	1.001	1.003	1.001	1.002		
Latest 5	1.966	1.140	1.079	1.049	1.026	1.032	1.035	1.022	1.014	1.020	1.013	1.017	1.014	1.013	1.011	1.025	1.012	1.016	1.016	1.016	1.003	1.013	1.005	1.003	1.002	1.003	1.011	1.001	1.002	1.001	1.004						
Latest 3	1.925	1.143	1.101	1.061	1.021	1.028	1.025	1.035	1.016	1.022	1.008	1.008	1.014	1.019	1.016	1.023	1.000	1.023	1.024	1.027	1.004	1.015	1.002	1.007	1.005	1.005	1.000	1.000	1.002	1.001	1.005	1.001	1.003				
Dev Factor Sele	.																																				
Industry 1	1.968	1.147	1.054	1.025	1.017	1.010	1.012	1.012	1.010	1.009	1.010	1.009	1.009	1.009	1.008	1.008	1.007	1.007																			
Industry 2		1.281	1.080	1.034	1.020	1.017	1.009	1.011	1.009	1.009	1.006	1.007	1.009	1.008	1.008	1.012	1.007	1.006	1.007	1.006																	
Prior	*2.145*	*1.153*	*1.084*	*1.043*	*1.032*	*1.034*	*1.034*	*1.019*	*1.018*	*1.015*	*1.013*	*1.013*	*1.011*	*1.011*	*1.010*	*1.007*	*1.005*	*1.005*	*1.005*	*1.005*	*1.004*	*1.003*	*1.003*	*1.003*	*1.003*	*1.003*	*1.003*	*1.002*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.005*	
Selected	2.120	1.153	1.091	1.060	1.030	1.034	1.035	1.022	1.018	1.015	1.012	1.012	1.012	1.011	1.009	1.009	1.005	1.005	1.005	1.005	1.004	1.003	1.003	1.003	1.003	1.003	1.003	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.004
FacToUlt	3.724	1.757	1.523	1.396	1.316	1.278	1.235	1.193	1.168	1.147	1.130	1.116	1.103	1.090	1.077	1.068	1.058	1.053	1.047	1.042	1.037	1.033	1.030	1.027	1.024	1.020	1.017	1.014	1.012	1.011	1.010	1.009	1.008	1.007	1.006	1.005	1.004
Percent of Ult	26.9%	56.9%	65.7%	71.6%	76.0%	78.3%	81.0%	83.8%	85.6%	87.2%	88.5%	89.6%	90.7%	91.8%	92.8%	93.7%	94.5%	95.0%	95.5%	96.0%	96.4%	96.8%	97.1%	97.4%	97.7%	98.0%	98.3%	98.6%	98.8%	98.9%	99.0%	99.1%	99.2%	99.3%	99.4%	99.5%	99.6%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	825,361	827,210	816,653	817,418	(8,708)	-1.1%	(9,792)	-1.2%
6/30/82-83	141,055	142,465	140,898	142,307	(156)	-0.1%	(158)	-0.1%
6/30/83-84	210,000	210,000	210,000	210,000	0	0.0%	0	0.0%
6/30/84-85	500,000	506,010	500,000	505,000	0	0.0%	(1,010)	-0.2%
6/30/85-86	260,000	260,000	260,000	260,000	0	0.0%	0	0.0%
6/30/86-87	709,000	710,000	709,000	709,000	0	0.0%	(1,000)	-0.1%
6/30/87-88	1,885,000	1,889,000	1,897,000	1,901,000	12,000	0.6%	12,000	0.6%
6/30/88-89	2,079,000	2,100,800	2,079,000	2,099,790	0	0.0%	(1,010)	0.0%
6/30/89-90	1,979,000	1,984,650	1,942,000	1,963,000	(37,000)	-1.9%	(21,650)	-1.1%
6/30/90-91	1,773,000	1,790,730	1,769,000	1,786,690	(4,000)	-0.2%	(4,040)	-0.2%
6/30/91-92	1,261,000	1,266,914	1,261,000	1,266,914	0	0.0%	0	0.0%
6/30/92-93	1,170,000	1,181,700	1,186,000	1,198,870	16,000	1.4%	17,170	1.5%
6/30/93-94	665,000	671,650	664,000	670,640	(1,000)	-0.2%	(1,010)	-0.2%
6/30/94-95	875,000	884,760	873,000	882,740	(2,000)	-0.2%	(2,020)	-0.2%
6/30/95-96	832,000	841,330	831,000	840,320	(1,000)	-0.1%	(1,010)	-0.1%
6/30/96-97	567,000	572,670	596,000	602,970	29,000	5.1%	30,300	5.3%
6/30/97-98	526,000	531,260	524,000	529,240	(2,000)	-0.4%	(2,020)	-0.4%
6/30/98-99	886,000	888,000	930,000	932,000	44,000	5.0%	44,000	5.0%
6/30/99-00	623,700	631,000	620,730	628,000	(2,970)	-0.5%	(3,000)	-0.5%
6/30/00-01	784,080	794,000	780,120	790,000	(3,960)	-0.5%	(4,000)	-0.5%
6/30/01-02	654,000	661,550	651,000	658,520	(3,000)	-0.5%	(3,030)	-0.5%
6/30/02-03	823,680	843,350	870,210	889,810	46,530	5.6%	46,460	5.5%
6/30/03-04	1,479,060	1,517,020	1,499,850	1,537,220	20,790	1.4%	20,200	1.3%
6/30/04-05	960,000	1,002,000	970,000	1,006,000	10,000	1.0%	4,000	0.4%
6/30/05-06	915,000	953,000	928,000	961,000	13,000	1.4%	8,000	0.8%
6/30/06-07	730,000	747,000	730,000	741,000	0	0.0%	(6,000)	-0.8%
6/30/07-08	735,000	748,000	736,000	741,000	1,000	0.1%	(7,000)	-0.9%
6/30/08-09	899,000	936,000	946,000	977,000	47,000	5.2%	41,000	4.4%
6/30/09-10	626,000	627,000	633,000	641,000	7,000	1.1%	14,000	2.2%
6/30/10-11	896,000	950,000	923,000	964,000	27,000	3.0%	14,000	1.5%
6/30/11-12	676,000	679,000	672,000	685,000	(4,000)	-0.6%	6,000	0.9%
6/30/12-13	728,000	731,000	718,000	743,000	(10,000)	-1.4%	12,000	1.6%
6/30/13-14	781,000	791,000	786,000	822,000	5,000	0.6%	31,000	3.9%
6/30/14-15	1,096,000	1,160,000	1,196,000	1,233,000	100,000	9.1%	73,000	6.3%
6/30/15-16	1,289,000	1,447,000	1,400,000	1,505,000	111,000	8.6%	58,000	4.0%
6/30/16-17	1,286,000	1,512,000	1,431,000	1,577,000	145,000	11.3%	65,000	4.3%
6/30/17-18	1,081,000	1,244,000	1,135,000	1,232,700	54,000	5.0%	(11,300)	-0.9%
6/30/18-19								
Total	34,205,936	35,233,070	34,814,461	35,650,150	608,526	1.8%	417,080	1.2%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 3, Exhibit 2, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.4%	0.0%	0.1%	0.0%	1.000	1.000
444	99.6%	0.1%	0.4%	0.0%	0.0%	0.981	0.971
432	99.5%	0.1%	0.5%	0.0%	0.0%	0.950	0.927
420	99.4%	0.1%	0.6%	0.0%	0.0%	0.924	0.890
408	99.3%	0.1%	0.7%	0.0%	0.0%	0.901	0.857
396	99.2%	0.1%	0.8%	0.0%	0.0%	0.880	0.828
384	99.1%	0.1%	0.9%	0.0%	0.0%	0.861	0.802
372	99.0%	0.1%	1.0%	0.0%	0.0%	0.842	0.777
360	98.9%	0.1%	1.1%	0.0%	0.0%	0.825	0.754
348	98.8%	0.2%	1.2%	0.1%	0.0%	0.809	0.733
336	98.6%	0.3%	1.4%	0.1%	0.1%	0.806	0.730
324	98.3%	0.3%	1.7%	0.1%	0.1%	0.810	0.737
312	98.0%	0.3%	2.0%	0.1%	0.1%	0.809	0.736
300	97.7%	0.3%	2.3%	0.1%	0.1%	0.803	0.730
288	97.4%	0.3%	2.6%	0.1%	0.1%	0.796	0.720
276	97.1%	0.3%	2.9%	0.1%	0.1%	0.787	0.709
264	96.8%	0.4%	3.2%	0.2%	0.1%	0.777	0.697
252	96.4%	0.5%	3.6%	0.2%	0.1%	0.773	0.691
240	96.0%	0.5%	4.0%	0.2%	0.2%	0.771	0.690
228	95.5%	0.5%	4.5%	0.2%	0.2%	0.767	0.685
216	95.0%	0.5%	5.0%	0.2%	0.2%	0.760	0.677
204	94.5%	0.9%	5.5%	0.5%	0.3%	0.753	0.667
192	93.7%	0.8%	6.3%	0.5%	0.3%	0.759	0.677
180	92.8%	1.0%	7.2%	0.6%	0.5%	0.760	0.678
168	91.8%	1.1%	8.2%	0.7%	0.5%	0.762	0.682
156	90.7%	1.1%	9.3%	0.7%	0.5%	0.762	0.682
144	89.6%	1.1%	10.4%	0.7%	0.6%	0.759	0.678
132	88.5%	1.3%	11.5%	0.9%	0.7%	0.753	0.670
120	87.2%	1.6%	12.8%	1.1%	0.9%	0.750	0.667
108	85.6%	1.8%	14.4%	1.3%	1.1%	0.750	0.666
96	83.8%	2.8%	16.2%	2.1%	1.8%	0.750	0.667
84	81.0%	2.7%	19.0%	2.1%	1.8%	0.760	0.680
72	78.3%	2.3%	21.7%	1.9%	1.7%	0.762	0.683
60	76.0%	4.3%	24.0%	3.6%	3.3%	0.756	0.675
48	71.6%	6.0%	28.4%	5.2%	4.9%	0.766	0.688
36	65.7%	8.7%	34.3%	7.9%	7.6%	0.779	0.705
24	56.9%	30.1%	43.1%	28.4%	27.6%	0.796	0.727
12	26.9%	26.9%	73.1%	26.3%	26.1%	0.854	0.803
Total		100.0%					

NOTES:
(2) = 1 / Section 3, Exhibit 2, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	639	1,404		603	1,324
6/30/82-83	601	2,010	0.981	590	1,971
6/30/83-84	960	960	0.950	912	912
6/30/84-85	2,804	7,804	0.924	2,591	7,212
6/30/85-86	2,225	2,225	0.901	2,005	2,005
6/30/86-87	6,165	6,165	0.880	5,426	5,426
6/30/87-88	13,926	17,926	0.861	11,988	15,431
6/30/88-89	21,388	42,178	0.842	18,019	35,534
6/30/89-90	2,037	23,037	0.825	1,681	19,008
6/30/90-91	21,451	39,141	0.809	17,344	31,647
6/30/91-92	389	6,303	0.806	313	5,078
6/30/92-93	19,631	32,501	0.810	15,905	26,332
6/30/93-94	13,392	20,032	0.809	10,829	16,197
6/30/94-95	18,889	28,629	0.803	15,175	23,000
6/30/95-96	20,873	30,193	0.796	16,613	24,031
6/30/96-97	16,542	23,512	0.787	13,020	18,506
6/30/97-98	16,322	21,562	0.777	12,687	16,760
6/30/98-99	30,799	32,799	0.773	23,798	25,343
6/30/99-00	18,375	25,645	0.771	14,171	19,777
6/30/00-01	26,143	36,023	0.767	20,046	27,622
6/30/01-02	31,760	39,280	0.760	24,152	29,871
6/30/02-03	36,958	56,558	0.753	27,821	42,576
6/30/03-04	74,544	111,914	0.759	56,585	84,952
6/30/04-05	36,651	72,651	0.760	27,837	55,180
6/30/05-06	46,318	79,318	0.762	35,303	60,455
6/30/06-07	58,577	69,577	0.762	44,650	53,034
6/30/07-08	72,115	77,115	0.759	54,724	58,518
6/30/08-09	81,347	112,347	0.753	61,264	84,611
6/30/09-10	80,771	88,771	0.750	60,605	66,608
6/30/10-11	97,292	138,292	0.750	72,932	103,666
6/30/11-12	109,024	122,024	0.750	81,764	91,514
6/30/12-13	136,458	161,458	0.760	103,693	122,691
6/30/13-14	170,614	206,614	0.762	129,942	157,360
6/30/14-15	259,509	296,509	0.756	196,215	224,190
6/30/15-16	321,551	426,551	0.766	246,219	326,620
6/30/16-17	395,489	541,489	0.779	307,999	421,701
6/30/17-18	488,903	586,603	0.796	389,092	466,846
6/30/18-19	865,920	1,082,620	0.854	739,302	924,315
Total	3,617,350	4,669,738		2,863,814	3,697,828
			(7) Total Discount Factor:	0.792	0.792

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	639	1,404
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	213	468
(11) Discounted Value at 4%:	603	1,324

NOTES:
(2), (3) From Section 3, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 3, Exhibit 2, Page 9, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Mental Health - Cluster 2
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	639	1,404		586	1,288
6/30/82-83	601	2,010	0.971	584	1,953
6/30/83-84	960	960	0.927	890	890
6/30/84-85	2,804	7,804	0.890	2,495	6,943
6/30/85-86	2,225	2,225	0.857	1,908	1,908
6/30/86-87	6,165	6,165	0.828	5,107	5,107
6/30/87-88	13,926	17,926	0.802	11,167	14,375
6/30/88-89	21,388	42,178	0.777	16,624	32,784
6/30/89-90	2,037	23,037	0.754	1,536	17,376
6/30/90-91	21,451	39,141	0.733	15,715	28,675
6/30/91-92	389	6,303	0.730	284	4,602
6/30/92-93	19,631	32,501	0.737	14,477	23,969
6/30/93-94	13,392	20,032	0.736	9,858	14,746
6/30/94-95	18,889	28,629	0.730	13,784	20,892
6/30/95-96	20,873	30,193	0.720	15,035	21,749
6/30/96-97	16,542	23,512	0.709	11,729	16,671
6/30/97-98	16,322	21,562	0.697	11,370	15,020
6/30/98-99	30,799	32,799	0.691	21,289	22,671
6/30/99-00	18,375	25,645	0.690	12,679	17,696
6/30/00-01	26,143	36,023	0.685	17,903	24,669
6/30/01-02	31,760	39,280	0.677	21,502	26,593
6/30/02-03	36,958	56,558	0.667	24,668	37,750
6/30/03-04	74,544	111,914	0.677	50,435	75,719
6/30/04-05	36,651	72,651	0.678	24,836	49,232
6/30/05-06	46,318	79,318	0.682	31,569	54,062
6/30/06-07	58,577	69,577	0.682	39,945	47,446
6/30/07-08	72,115	77,115	0.678	48,868	52,256
6/30/08-09	81,347	112,347	0.670	54,530	75,311
6/30/09-10	80,771	88,771	0.667	53,873	59,209
6/30/10-11	97,292	138,292	0.666	64,834	92,156
6/30/11-12	109,024	122,024	0.667	72,735	81,408
6/30/12-13	136,458	161,458	0.680	92,856	109,868
6/30/13-14	170,614	206,614	0.683	116,485	141,064
6/30/14-15	259,509	296,509	0.675	175,281	200,272
6/30/15-16	321,551	426,551	0.688	221,290	293,551
6/30/16-17	395,489	541,489	0.705	278,929	381,899
6/30/17-18	488,903	586,603	0.727	355,640	426,709
6/30/18-19	865,920	1,082,620	0.803	695,717	869,823
Total	3,617,350	4,669,738		2,609,015	3,368,310
			(7) Total Discount Factor:	0.721	0.721

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	639	1,404
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	213	468
(11) Discounted Value at 6%:	586	1,288

NOTES:
(2), (3) From Section 3, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 3, Exhibit 2, Page 9, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		4,411,876			5,077,940	5,413,706	666,064	1,001,829		
6/30/82-83		2,747,816	2,772,217		2,758,356	2,772,000	10,540	24,184		
6/30/83-84		1,405,260	1,489,911		1,475,011	1,490,000	69,751	84,740		
6/30/84-85	115,258	4,212,764	4,259,238	4,246,453	4,248,593	4,253,000	35,829	40,236	3.686	3.690
6/30/85-86	123,937	6,399,508	6,475,583	6,463,889	6,405,039	6,437,650	5,531	38,142	5.168	5.194
6/30/86-87	142,396	3,884,640	3,932,668	3,936,708	3,895,341	3,915,325	10,701	30,685	2.736	2.750
6/30/87-88	166,792	6,097,875	6,176,244	6,185,795	6,119,209	6,150,095	21,334	52,220	3.669	3.687
6/30/88-89	180,117	7,472,617	7,579,277	7,564,652	7,565,000	7,579,000	92,383	106,383	4.200	4.208
6/30/89-90	180,883	9,552,585	9,704,167	9,701,333	9,701,000	9,704,000	148,415	151,415	5.363	5.365
6/30/90-91	169,902	10,682,736	10,875,850	10,874,230	10,874,000	10,896,750	191,264	214,014	6.400	6.414
6/30/91-92	165,926	4,526,359	4,628,882	4,627,505	4,628,000	4,629,000	101,641	102,641	2.789	2.790
6/30/92-93	174,198	3,157,116	3,229,799	3,228,696	3,226,018	3,229,000	68,902	71,884	1.852	1.854
6/30/93-94	185,946	5,151,632	5,293,654	5,289,777	5,290,000	5,294,000	138,368	142,368	2.845	2.847
6/30/94-95	194,051	6,155,200	6,378,738	6,370,567	6,371,000	6,379,000	215,800	223,800	3.283	3.287
6/30/95-96	205,262	5,389,787	5,626,190	5,616,781	5,617,000	5,626,000	227,213	236,213	2.736	2.741
6/30/96-97	234,073	6,031,973	6,310,112	6,297,581	6,298,000	6,310,000	266,027	278,027	2.691	2.696
6/30/97-98	221,865	8,529,887	9,099,448	9,063,938	8,627,608	8,809,540	97,721	279,653	3.889	3.971
6/30/98-99	256,071	7,724,781	8,399,483	8,355,523	7,958,628	8,126,660	233,846	401,879	3.108	3.174
6/30/99-00	268,486	8,170,937	8,998,307	8,938,986	8,520,214	8,610,240	349,277	439,303	3.173	3.207
6/30/00-01	279,182	10,541,808	11,649,705	11,565,954	11,027,438	11,143,680	485,630	601,872	3.950	3.992
6/30/01-02	283,070	8,956,895	9,939,032	9,870,515	9,409,535	9,939,000	452,640	982,105	3.324	3.511
6/30/02-03	289,846	8,740,322	9,742,941	9,675,563	9,223,790	9,743,000	483,467	1,002,678	3.182	3.361
6/30/03-04	293,771	7,892,961	8,878,515	8,816,636	8,405,197	8,523,000	512,235	630,039	2.861	2.901
6/30/04-05	291,382	8,277,509	9,401,266	8,680,019	8,588,611	9,025,000	311,102	747,491	2.948	3.097
6/30/05-06	294,709	5,833,869	6,678,572	6,273,952	6,152,449	6,411,000	318,580	577,131	2.088	2.175
6/30/06-07	289,603	5,081,635	5,891,010	5,570,520	5,444,227	5,832,000	362,591	750,365	1.880	2.014
6/30/07-08	354,668	4,935,365	5,776,073	5,577,858	5,677,000	5,782,000	741,635	846,635	1.601	1.630
6/30/08-09	332,413	4,144,221	4,889,448	4,791,992	4,841,000	5,134,000	696,779	989,779	1.456	1.544
6/30/09-10	336,338	2,800,484	3,353,841	3,507,425	3,431,000	3,683,000	630,516	882,516	1.020	1.095
6/30/10-11	333,783	3,552,523	4,317,691	4,345,465	4,332,000	4,563,000	779,477	1,010,477	1.298	1.367
6/30/11-12	348,187	2,697,028	3,350,305	3,619,058	3,485,000	3,800,000	787,972	1,102,972	1.001	1.091
6/30/12-13	368,022	2,448,105	3,125,488	3,554,229	3,340,000	3,732,000	891,895	1,283,895	0.908	1.014
6/30/13-14	390,528	3,042,333	4,052,292	4,426,581	4,239,000	4,648,000	1,196,667	1,605,667	1.085	1.190
6/30/14-15	402,750	3,737,149	5,222,670	5,407,179	5,315,000	5,678,000	1,577,851	1,940,851	1.320	1.410
6/30/15-16	400,013	3,556,237	5,461,813	5,629,067	5,545,000	5,911,000	1,988,763	2,354,763	1.386	1.478
6/30/16-17	352,565	4,346,338	7,689,966	6,867,509	7,279,000	8,074,000	2,932,662	3,727,662	2.065	2.290
6/30/17-18	347,621	2,355,391	5,786,431	5,659,156	5,723,000	6,076,000	3,367,609	3,720,609	1.646	1.748
6/30/18-19	357,324	1,503,593	7,955,715	6,404,354	7,180,000	8,354,000	5,676,407	6,850,407	2.009	2.338
Total	9,330,938	206,149,118	234,392,542	227,005,446	233,294,203	241,676,646	27,145,085	35,527,528		
Tot 6/30/84-19	9,330,938	197,584,165	230,130,415	227,005,446	223,982,895	232,000,940	26,398,730	34,416,775	2.400	2.486

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) Sum of Section 4, Exhibit 1, Page 2, Column 3 and Section 4, Exhibit 1, Page 9, Column 8
(4) From Section 4, Exhibit 1, Page 2, Column 8
(5) From Section 4, Exhibit 1, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim	Average Age
All Prior Yrs		4,251,876							2	2		70
6/30/82-83		2,566,735	1.010	1.000	2,591,136	181,081	2,772,217		0	0		
6/30/83-84		1,386,759	1.011	1.050	1,471,410	18,501	1,489,911		0	0		
6/30/84-85	115,258	4,031,914	1.012	1.000	4,078,388	180,850	4,259,238	3.695	1	1	46,475	74
6/30/85-86	123,937	6,067,508	1.013	1.000	6,143,583	332,000	6,475,583	5.225	0	0		
6/30/86-87	142,396	3,544,280	1.014	1.000	3,592,308	340,360	3,932,668	2.762	0	0		
6/30/87-88	166,792	5,380,873	1.015	1.000	5,459,242	717,002	6,176,244	3.703	0	0		
6/30/88-89	180,117	6,846,416	1.016	1.000	6,953,076	626,201	7,579,277	4.208	1	1	106,659	62
6/30/89-90	180,883	8,607,685	1.018	1.000	8,759,267	944,900	9,704,167	5.365	1	1	151,581	76
6/30/90-91	169,902	9,345,968	1.021	1.000	9,539,082	1,336,768	10,875,850	6.401	3	3	64,371	70
6/30/91-92	165,926	4,143,108	1.025	1.000	4,245,631	383,251	4,628,882	2.790	2	1	102,523	83
6/30/92-93	174,198	2,519,814	1.029	1.000	2,592,497	637,302	3,229,799	1.854	0	0		
6/30/93-94	185,946	4,308,957	1.033	1.000	4,450,979	842,675	5,293,654	2.847	2	2	71,011	59
6/30/94-95	194,051	5,422,587	1.041	1.000	5,646,125	732,613	6,378,738	3.287	0	0		
6/30/95-96	205,262	4,737,785	1.050	1.000	4,972,558	653,632	5,626,190	2.741	0	0		
6/30/96-97	234,073	5,237,372	1.053	1.000	5,513,524	796,588	6,310,112	2.696	0	0		
6/30/97-98	221,865	8,098,169	1.070	1.000	8,666,651	432,797	9,099,448	4.101	2	2	284,241	56
6/30/98-99	256,071	7,548,728	1.089	1.000	8,222,990	176,493	8,399,483	3.280	1	1	674,261	75
6/30/99-00	268,486	7,894,835	1.105	1.000	8,721,515	276,792	8,998,307	3.352	0	0		
6/30/00-01	279,182	10,126,525	1.109	1.000	11,226,727	422,978	11,649,705	4.173	0	1	1,100,202	62
6/30/01-02	283,070	8,653,014	1.112	1.000	9,623,237	315,795	9,939,032	3.511	0	1	970,223	55
6/30/02-03	289,846	8,376,819	1.118	1.000	9,362,654	380,287	9,742,941	3.361	0	0		
6/30/03-04	293,771	7,558,530	1.128	1.000	8,524,515	354,001	8,878,515	3.022	0	1	965,984	65
6/30/04-05	291,382	7,982,459	1.138	1.000	9,081,078	320,188	9,401,266	3.226	2	0		
6/30/05-06	294,709	5,571,365	1.148	1.000	6,394,523	284,050	6,678,572	2.266	0	0		
6/30/06-07	289,603	4,874,632	1.158	1.000	5,644,495	246,514	5,891,010	2.034	1	2	384,931	56
6/30/07-08	354,668	4,736,863	1.169	1.000	5,535,212	240,861	5,776,073	1.629	1	1	798,349	59
6/30/08-09	332,413	3,964,204	1.178	1.000	4,669,475	219,973	4,889,448	1.471	5	3	235,090	44
6/30/09-10	336,338	2,699,983	1.194	1.000	3,222,542	131,299	3,353,841	0.997	4	3	174,186	58
6/30/10-11	333,783	3,336,741	1.216	1.000	4,059,058	258,633	4,317,691	1.294	0	1	722,317	47
6/30/11-12	348,187	2,527,925	1.244	1.000	3,144,857	205,448	3,350,305	0.962	4	1	616,932	47
6/30/12-13	368,022	2,302,792	1.279	1.000	2,944,891	180,597	3,125,488	0.849	2	2	321,050	51
6/30/13-14	390,528	2,879,452	1.332	1.000	3,835,782	216,510	4,052,292	1.038	9	3	318,777	47
6/30/14-15	402,750	3,580,649	1.394	1.000	4,991,237	231,433	5,222,670	1.297	14	13	108,507	49
6/30/15-16	400,013	3,496,861	1.505	1.000	5,263,359	198,454	5,461,813	1.365	23	15	117,767	48
6/30/16-17	352,565	4,028,338	1.767	1.000	7,116,560	573,406	7,689,966	2.181	57	26	118,778	43
6/30/17-18	347,621	2,345,387	2.354	1.000	5,521,308	265,122	5,786,431	1.665	142	51	62,273	43
6/30/18-19	357,324	1,503,593	5.016	1.000	7,542,693	413,022	7,955,715	2.226		143	42,231	40
Total	9,330,938	192,487,503			219,324,164	15,068,378	234,392,542		279	281		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 4, Exhibit 1, Page 7
(5) Based on information from the MA WCRIB
(6) = (3) x (4) x (5)
(7) From Section 4, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	115,258	2.565	4,031,914	1.012	4,065,603	180,850	4,246,453	3.684	3.527
6/30/85-86	123,937	4.195	6,067,508	1.013	6,131,889	332,000	6,463,889	5.215	4.948
6/30/86-87	142,396	2.735	3,544,280	1.014	3,596,348	340,360	3,936,708	2.765	2.526
6/30/87-88	166,792	3.672	5,380,873	1.015	5,468,793	717,002	6,185,795	3.709	3.279
6/30/88-89	180,117	3.331	6,846,416	1.016	6,938,451	626,201	7,564,652	4.200	3.852
6/30/89-90	180,883	4.752	8,607,685	1.018	8,756,433	944,900	9,701,333	5.363	4.841
6/30/90-91	169,902	5.567	9,345,968	1.021	9,537,462	1,336,768	10,874,230	6.400	5.614
6/30/91-92	165,926	2.524	4,143,108	1.025	4,244,254	383,251	4,627,505	2.789	2.558
6/30/92-93	174,198	1.466	2,519,814	1.029	2,591,394	637,302	3,228,696	1.853	1.488
6/30/93-94	185,946	2.328	4,308,957	1.033	4,447,102	842,675	5,289,777	2.845	2.392
6/30/94-95	194,051	2.803	5,422,587	1.041	5,637,954	732,613	6,370,567	3.283	2.905
6/30/95-96	205,262	2.325	4,737,785	1.050	4,963,149	653,632	5,616,781	2.736	2.418
6/30/96-97	234,073	2.249	5,237,372	1.053	5,500,994	796,588	6,297,581	2.690	2.350
6/30/97-98	221,865	3.662	8,098,169	1.070	8,631,141	432,797	9,063,938	4.085	3.890
6/30/98-99	256,071	3.002	7,548,728	1.089	8,179,030	176,493	8,355,523	3.263	3.194
6/30/99-00	268,486	3.015	7,894,835	1.105	8,662,194	276,792	8,938,986	3.329	3.226
6/30/00-01	279,182	3.715	10,126,525	1.109	11,142,976	422,978	11,565,954	4.143	3.991
6/30/01-02	283,070	3.160	8,653,014	1.112	9,554,720	315,795	9,870,515	3.487	3.375
6/30/02-03	289,846	3.009	8,376,819	1.118	9,295,276	380,287	9,675,563	3.338	3.207
6/30/03-04	293,771	2.716	7,558,530	1.128	8,462,635	354,001	8,816,636	3.001	2.881
6/30/04-05	291,382	1.071	7,982,459	1.138	8,359,831	320,188	8,680,019	2.979	2.869
6/30/05-06	294,709	1.103	5,571,365	1.148	5,989,902	284,050	6,273,952	2.129	2.032
6/30/06-07	289,603	1.138	4,874,632	1.158	5,324,006	246,514	5,570,520	1.924	1.838
6/30/07-08	354,668	1.173	4,736,863	1.169	5,336,997	240,861	5,577,858	1.573	1.505
6/30/08-09	332,413	1.211	3,964,204	1.178	4,572,019	219,973	4,791,992	1.442	1.375
6/30/09-10	336,338	1.240	2,699,983	1.194	3,376,127	131,299	3,507,425	1.043	1.004
6/30/10-11	333,783	1.263	3,336,741	1.216	4,086,832	258,633	4,345,465	1.302	1.224
6/30/11-12	348,187	1.297	2,527,925	1.244	3,413,610	205,448	3,619,058	1.039	0.980
6/30/12-13	368,022	1.335	2,302,792	1.279	3,373,632	180,597	3,554,229	0.966	0.917
6/30/13-14	390,528	1.367	2,879,452	1.332	4,210,070	216,510	4,426,581	1.133	1.078
6/30/14-15	402,750	1.401	3,580,649	1.394	5,175,745	231,433	5,407,179	1.343	1.285
6/30/15-16	400,013	1.440	3,496,861	1.505	5,430,613	198,454	5,629,067	1.407	1.358
6/30/16-17	352,565	1.481	4,028,338	1.767	6,294,103	573,406	6,867,509	1.948	1.785
6/30/17-18	347,621	1.525	2,345,387	2.354	5,394,034	265,122	5,659,156	1.628	1.552
6/30/18-19	357,324	1.569	1,503,593	5.016	5,991,332	413,022	6,404,354	1.792	1.677
Total	9,330,938		184,282,133		212,136,650	14,868,796	227,005,446		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 4, Exhibit 1, Page 4, Column 11
(4) From Section 4, Exhibit 1, Page 2, Column 3
(5) From Section 4, Exhibit 1, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) From Section 4, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									2.565	2.565
6/30/85-86									4.195	4.195
6/30/86-87									2.735	2.735
6/30/87-88									3.672	3.672
6/30/88-89									3.331	3.331
6/30/89-90									4.752	4.752
6/30/90-91	169,902	9,539,082	5.614	0.996	5.594	1.776	9.934	0.904	5.544	5.567
6/30/91-92	165,926	4,245,631	2.559	1.093	2.797	1.741	4.870	0.841	2.516	2.524
6/30/92-93	174,198	2,592,497	1.488	1.275	1.897	1.707	3.238	0.735	1.488	1.466
6/30/93-94	185,946	4,450,979	2.394	1.258	3.012	1.673	5.040	0.760	2.346	2.328
6/30/94-95	194,051	5,646,125	2.910	1.247	3.627	1.641	5.951	0.782	2.852	2.803
6/30/95-96	205,262	4,972,558	2.423	1.237	2.996	1.608	4.819	0.804	2.363	2.325
6/30/96-97	234,073	5,513,524	2.355	1.224	2.884	1.577	4.548	0.829	2.320	2.249
6/30/97-98	221,865	8,666,651	3.906	1.209	4.722	1.546	7.300	0.856	3.725	3.662
6/30/98-99	256,071	8,222,990	3.211	1.193	3.831	1.516	5.806	0.885	3.075	3.002
6/30/99-00	268,486	8,721,515	3.248	1.174	3.813	1.486	5.665	0.917	3.074	3.015
6/30/00-01	279,182	11,226,727	4.021	1.144	4.600	1.457	6.701	0.960	3.786	3.715
6/30/01-02	283,070	9,623,237	3.400	1.122	3.813	1.428	5.446	0.999	3.231	3.160
6/30/02-03	289,846	9,362,654	3.230	1.118	3.610	1.400	5.055	1.022	3.092	3.009
6/30/03-04	293,771	8,524,515	2.902	1.118	3.243	1.373	4.452	1.043	2.792	2.716
6/30/04-05	291,382	9,081,078	3.117	1.111	3.461	1.346	4.658	1.071	1.460	1.071
6/30/05-06	294,709	6,394,523	2.170	1.099	2.385	1.319	3.147	1.103	1.475	1.103
6/30/06-07	289,603	5,644,495	1.949	1.087	2.119	1.294	2.741	1.138	1.491	1.138
6/30/07-08	354,668	5,535,212	1.561	1.075	1.678	1.268	2.128	1.173	1.508	1.173
6/30/08-09	332,413	4,669,475	1.405	1.063	1.493	1.243	1.857	1.211	1.525	1.211
6/30/09-10	336,338	3,222,542	0.958	1.059	1.014	1.219	1.237	1.240	1.531	1.240
6/30/10-11	333,783	4,059,058	1.216	1.060	1.289	1.195	1.541	1.263	1.529	1.263
6/30/11-12	348,187	3,144,857	0.903	1.053	0.951	1.172	1.114	1.297	1.540	1.297
6/30/12-13	368,022	2,944,891	0.800	1.044	0.835	1.149	0.959	1.335	1.553	1.335
6/30/13-14	390,528	3,835,782	0.982	1.040	1.021	1.126	1.150	1.367	1.560	1.367
6/30/14-15	402,750	4,991,237	1.239	1.034	1.282	1.104	1.415	1.401	1.568	1.401
6/30/15-16	400,013	5,263,359	1.316	1.026	1.350	1.082	1.462	1.440	1.580	1.440
6/30/16-17	352,565	7,116,560	2.019	1.018	2.055	1.061	2.181	1.481	1.590	1.481
6/30/17-18	347,621	5,521,308	1.588	1.009	1.602	1.040	1.667	1.525	1.600	1.525
6/30/18-19	357,324	7,542,693	2.111	1.000	2.111	1.020	2.153	1.569		1.569
Total	8,421,554	180,275,755								

Trend Last 4 (ex 18-19):	11.5%	Avg 3 (ex 18-19):	1.770
Trend Last 8 (ex 18-19):	8.7%	Avg 5 (ex 18-19):	1.575
Trend Last 12 (ex 18-19):	-0.6%	Avg 10 (ex 18-19):	1.458
Prior Selected Trend:	0.0%	Prior Sel Avg:	1.600
Selected Trend:	2.0%	Sel. Loss Cost:	1.600

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 4, Exhibit 1, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCRIB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		1.000	
(2)	Credibility		19%	
(3)	Average Pmt Trend Statewide		0.950	
(4)	Credibility Weighted Trend		0.959	
		(Low)		(High)
(5)	Selected Range	0.940		0.969
(6)	Incremental Paid for 2019	108,941		108,941
(7)	Estimated Reserve	1,715,877		3,414,949
(8)	Paid to Date (82 & Prior)	4,251,876		4,251,876
(9)	Est Ult Paid for 1982 & Prior	5,967,754		7,666,825

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	105,375	102,132
(11)	Projected Number of Years	3	3
(12)	Estimated Reserve	316,126	306,397
(13)	Paid to Date (82 & Prior)	4,251,876	4,142,935
(14)	Est Ult Paid for 1982 & Prior	4,568,003	4,449,332
(14a)	Paid Counts During Fiscal Year	2	2

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	4,917,940	5,253,706
(16)	Lump Sum Ultimates	160,000	160,000
(17)	Ult Loss Including Lump Sums	**5,077,940**	**5,413,706**
(18)	Implied Tail	1.157	1.236
(19)	Ult Loss Inc Lump Sums @ 6/18	5,015,092	5,578,502

NOTES:

(1) From Section 4, Exhibit 1, Page 6
(2) = (Average of Section 4, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 4, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 4, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 4, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	188,569	12.147			
1993	2	151,483	11.928	0.803		
1994	3	104,509	11.557	0.690		
1995	4	93,428	11.445	0.894		
1996	5	94,858	11.460	1.015		
1997	6	35,075	10.465	0.370		
1998	7	103,538	11.548	2.952		
1999	8	96,697	11.479	0.934		
2000	9	73,478	11.205	0.760	n =	28
2001	10	66,717	11.108	0.908	S(x) =	56,154
2002	11	70,033	11.157	1.050	S(x-sq) =	112,618,674
2003	12	124,671	11.733	1.780	S(xy) =	647,428
2004	13	92,927	11.440	0.745	S(y) =	323
2005	14	283,599	12.555	3.052	D =	51,156
2006	15	99,838	11.511	0.352	slope =	0.001
2007	16	101,854	11.531	1.020	Avg Trend =	1.001
2008	17	110,209	11.610	1.082		
2009	18	118,086	11.679	1.071		
2010	19	114,911	11.652	0.973		
2011	20	108,994	11.599	0.949		
2012	21	88,958	11.396	0.816		
2013	22	98,227	11.495	1.104		
2014	23	94,260	11.454	0.960		
2015	24	95,801	11.470	1.016		
2016	25	99,212	11.505	1.036		
2017	26	101,864	11.531	1.027		
2018	27	105,321	11.565	1.034		
2019	28	108,941	11.599	1.098		
					Selected Trend:	**1.000**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2019: 1.098 = 108941 / 105321

Commonwealth of Massachusetts Workers Compensation
Department of Corrections - Cluster 3
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
June-83	160,888	374,220	534,542	675,661	811,997	954,058	1,116,909	1,304,184	1,471,217	1,635,013	1,757,490	1,859,844	1,949,141	2,029,453	2,148,093	2,178,681	2,205,456	2,235,374	2,318,345	2,353,359	2,388,924	2,424,404	2,461,295	2,499,289	2,538,974	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735
June-84	149,256	331,713	467,188	590,124	701,300	845,012	973,143	1,100,933	1,224,966	1,294,374	1,350,379	1,377,980	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759		
June-85	278,562	647,928	925,510	1,158,844	1,390,342	1,636,071	1,810,725	1,948,970	2,082,835	2,178,082	2,319,274	2,402,755	2,445,792	2,537,445	2,628,105	2,728,723	2,834,546	2,914,527	2,998,669	3,082,607	3,169,057	3,258,902	3,352,791	3,451,011	3,510,756	3,557,919	3,604,884	3,653,451	3,703,603	3,754,423	3,806,419	3,860,335	3,915,623	3,972,786	4,031,914		
June-86	597,558	1,389,906	1,985,364	2,475,336	2,928,617	3,253,763	3,464,240	3,764,813	3,935,847	4,097,154	4,211,904	4,374,071	4,479,419	4,611,691	4,746,846	4,891,689	5,026,555	5,162,645	5,288,465	5,417,172	5,551,316	5,691,506	5,810,912	5,922,767	6,004,210	6,066,309	6,067,508	6,067,508	6,067,508	6,067,508	6,067,508	6,067,508	6,067,508	6,067,508			
June-87	463,134	1,057,238	1,522,773	1,934,421	2,261,898	2,491,874	2,659,729	2,799,050	2,901,503	3,021,876	3,103,922	3,271,697	3,314,455	3,410,332	3,452,632	3,495,733	3,527,775	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280				
June-88	759,128	1,737,832	2,686,963	3,506,695	4,220,441	4,682,677	4,893,879	5,026,539	5,141,074	5,203,833	5,239,349	5,242,532	5,243,019	5,243,019	5,260,048	5,288,978	5,318,482	5,326,859	5,355,106	5,361,539	5,362,873	5,362,873	5,362,873	5,380,873	5,380,873	5,380,873	5,380,873	5,380,873	5,380,873	5,380,873	5,380,873	5,380,873					
June-89	680,636	1,738,554	2,435,784	3,057,497	3,492,498	3,784,686	4,070,002	4,251,487	4,490,766	4,687,032	4,846,109	4,998,762	5,152,745	5,318,978	5,453,186	5,596,167	5,742,890	5,832,925	5,929,581	6,031,181	6,137,243	6,244,608	6,352,619	6,475,512	6,535,663	6,603,324	6,662,320	6,723,416	6,786,146	6,838,754	6,846,416						
June-90	1,246,443	2,758,107	3,953,901	4,833,484	5,310,648	5,694,385	6,073,411	6,354,690	6,596,629	6,831,981	7,007,542	7,150,038	7,296,131	7,414,103	7,526,903	7,637,465	7,757,732	7,827,571	7,914,306	7,972,756	8,030,743	8,088,272	8,148,032	8,208,709	8,272,034	8,334,944	8,400,094	8,466,985	8,536,146	8,607,685							
June-91	1,000,517	2,462,230	3,477,661	4,227,150	4,729,807	5,106,814	5,363,266	5,600,518	5,854,394	6,102,795	6,340,515	6,600,177	6,839,938	7,070,212	7,325,430	7,572,623	7,805,418	8,019,651	8,226,001	8,354,608	8,448,679	8,541,379	8,674,427	8,786,248	8,901,535	9,018,207	9,134,303	9,255,233	9,345,968								
June-92	963,115	1,684,344	2,020,505	2,282,563	2,488,454	2,659,321	2,775,749	2,916,157	3,056,759	3,187,754	3,331,193	3,457,174	3,499,791	3,525,037	3,564,269	3,587,669	3,612,762	3,661,736	3,712,392	3,755,041	3,800,723	3,849,408	3,896,141	3,941,701	3,988,884	4,037,328	4,091,298	4,143,108									
June-93	801,947	1,527,666	1,907,058	2,209,630	2,348,676	2,429,818	2,460,521	2,483,853	2,505,893	2,512,506	2,512,506	2,515,387	2,517,666	2,518,289	2,518,289	2,518,289	2,518,289	2,518,289	2,518,289	2,518,289	2,519,814	2,519,814	2,519,814	2,519,814	2,519,814	2,519,814	2,519,814										
June-94	875,165	1,819,302	2,384,278	2,739,772	2,916,720	3,056,071	3,202,146	3,363,364	3,490,849	3,617,239	3,691,543	3,766,820	3,806,934	3,840,602	3,876,771	3,914,626	3,951,801	3,987,674	4,025,425	4,065,927	4,115,667	4,152,871	4,192,115	4,230,146	4,267,930	4,308,957											
June-95	1,066,149	2,306,245	2,941,602	3,493,104	3,941,201	4,297,491	4,665,184	4,944,044	5,062,779	5,143,804	5,226,875	5,309,969	5,385,490	5,413,698	5,413,698	5,413,698	5,415,952	5,416,002	5,416,002	5,417,339	5,417,339	5,419,968	5,422,587	5,422,587	5,422,587												
June-96	1,138,070	2,104,418	2,766,267	3,096,876	3,400,508	3,669,768	3,910,958	4,114,697	4,277,458	4,365,040	4,414,632	4,445,368	4,479,763	4,513,668	4,547,750	4,581,690	4,620,397	4,658,156	4,733,649	4,734,439	4,737,035	4,737,785	4,737,785	4,737,785													
June-97	1,262,694	2,691,990	3,329,480	3,919,297	4,322,162	4,636,666	4,943,217	5,112,087	5,158,225	5,193,663	5,222,438	5,229,461	5,229,461	5,232,465	5,232,465	5,232,660	5,233,422	5,235,361	5,236,556	5,237,372	5,237,372	5,237,372	5,237,372														
June-98	1,638,670	3,196,042	4,206,538	4,955,846	5,569,408	6,119,997	6,488,625	6,735,243	6,883,928	7,016,935	7,118,193	7,210,560	7,304,495	7,390,265	7,484,278	7,569,489	7,657,448	7,743,183	7,832,407	7,919,409	8,007,981	8,098,169															
June-99	1,336,118	2,975,082	4,075,622	4,979,874	5,739,985	6,193,457	6,542,142	6,776,193	6,959,053	7,099,219	7,215,948	7,278,599	7,305,413	7,335,907	7,367,640	7,401,488	7,430,895	7,459,988	7,489,039	7,518,614	7,548,728																
June-00	1,879,439	3,995,519	5,337,812	6,367,281	6,972,119	7,368,789	7,595,232	7,618,785	7,768,614	7,812,460	7,834,124	7,857,055	7,878,617	7,888,220	7,894,835	7,894,835	7,894,835	7,894,835	7,894,835	7,894,835																	
June-01	2,226,443	4,927,848	6,754,618	8,128,201	8,912,524	9,501,364	9,916,815	10,090,085	10,093,706	10,098,792	10,102,701	10,107,752	10,115,331	10,122,622	10,123,390	10,126,025	10,126,025	10,126,025	10,126,525																		
June-02	2,224,570	4,640,913	6,255,872	7,251,577	7,851,163	8,205,089	8,352,527	8,442,240	8,504,072	8,548,892	8,597,046	8,636,684	8,638,876	8,651,791	8,651,791	8,652,114	8,652,114	8,653,014																			
June-03	2,532,484	5,029,957	6,520,088	7,358,736	7,963,011	8,162,267	8,271,915	8,286,330	8,290,078	8,307,565	8,336,977	8,361,400	8,374,756	8,374,756	8,376,819	8,376,819	8,376,819																				
June-04	2,147,040	4,500,943	5,865,460	6,696,306	7,139,497	7,374,551	7,518,148	7,544,299	7,548,670	7,549,433	7,552,695	7,553,195	7,556,865	7,556,865	7,556,865	7,558,530																					
June-05	2,241,999	4,614,395	5,992,285	6,941,629	7,354,316	7,648,410	7,859,634	7,944,264	7,956,390	7,960,585	7,974,262	7,980,912	7,980,912	7,982,459	7,982,459																						
June-06	1,249,906	3,009,799	4,221,387	4,926,296	5,233,916	5,403,155	5,520,760	5,558,413	5,563,096	5,568,003	5,571,365	5,571,365	5,571,365	5,571,365																							
June-07	1,380,680	2,815,182	3,556,899	4,026,861	4,280,218	4,409,792	4,495,865	4,564,874	4,629,170	4,689,050	4,748,911	4,809,853	4,874,632																								
June-08	1,238,290	2,624,403	3,322,948	3,832,582	4,162,771	4,361,974	4,466,756	4,535,679	4,586,080	4,636,341	4,686,602	4,736,863																									
June-09	1,050,261	2,223,832	2,862,597	3,295,878	3,498,318	3,641,036	3,754,484	3,840,887	3,874,160	3,924,421	3,964,204																										
June-10	907,606	1,619,359	1,983,041	2,120,199	2,204,203	2,280,502	2,372,902	2,465,671	2,613,682	2,699,983																											
June-11	985,007	2,210,801	2,754,241	3,017,762	3,188,982	3,323,225	3,334,045	3,334,045	3,336,741																												
June-12	628,004	1,365,683	1,786,119	2,155,722	2,398,549	2,483,977	2,523,426	2,527,925																													
June-13	594,769	1,413,063	1,926,676	2,135,503	2,210,610	2,274,867	2,302,792																														
June-14	832,638	1,825,797	2,295,475	2,707,413	2,827,439	2,879,452																															
June-15	1,195,780	2,178,416	2,850,777	3,337,760	3,580,649																																
June-16	1,329,847	2,465,467	3,091,580	3,496,861																																	
June-17	1,489,465	3,082,019	4,028,338																																		
June-18	1,239,405	2,345,387																																			
June-19	1,503,593																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
June-83	2.326	1.428	1.264	1.202	1.175	1.171	1.168	1.128	1.111	1.075	1.058	1.048	1.041	1.058	1.014	1.012	1.014	1.037	1.015	1.015	1.015	1.015	1.015	1.016	1.011	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.222	1.408	1.263	1.188	1.205	1.152	1.131	1.113	1.057	1.043	1.020	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.326	1.428	1.252	1.200	1.177	1.107	1.076	1.069	1.046	1.065	1.036	1.018	1.037	1.036	1.038	1.039	1.028	1.029	1.028	1.028	1.028	1.029	1.029	1.017	1.013	1.013	1.013	1.014	1.014	1.014	1.014	1.014	1.015	1.015		
June-86	2.326	1.428	1.247	1.183	1.111	1.065	1.087	1.045	1.041	1.028	1.039	1.024	1.030	1.029	1.031	1.028	1.027	1.024	1.024	1.025	1.025	1.021	1.019	1.014	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.283	1.440	1.270	1.169	1.102	1.067	1.052	1.037	1.041	1.027	1.054	1.013	1.029	1.012	1.012	1.009	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.289	1.546	1.305	1.204	1.110	1.045	1.027	1.023	1.012	1.007	1.001	1.000	1.000	1.003	1.005	1.006	1.002	1.005	1.001	1.000	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
June-89	2.554	1.401	1.255	1.142	1.084	1.075	1.045	1.056	1.044	1.034	1.032	1.031	1.032	1.025	1.026	1.026	1.016	1.017	1.017	1.018	1.017	1.017	1.019	1.009	1.010	1.009	1.009	1.009	1.008	1.001						
June-90	2.213	1.434	1.222	1.099	1.072	1.067	1.046	1.038	1.036	1.026	1.020	1.020	1.016	1.015	1.015	1.016	1.009	1.011	1.007	1.007	1.007	1.007	1.007	1.008	1.008	1.008	1.008	1.008	1.008							
June-91	2.461	1.412	1.216	1.119	1.080	1.050	1.044	1.045	1.042	1.039	1.041	1.036	1.034	1.036	1.034	1.031	1.027	1.026	1.016	1.011	1.011	1.016	1.013	1.013	1.013	1.013	1.013	1.010								
June-92	1.749	1.200	1.130	1.090	1.069	1.044	1.051	1.048	1.043	1.045	1.038	1.012	1.007	1.011	1.007	1.007	1.014	1.014	1.011	1.012	1.013	1.012	1.012	1.012	1.012	1.013	1.013									
June-93	1.905	1.248	1.159	1.063	1.035	1.013	1.009	1.009	1.003	1.000	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	2.079	1.311	1.149	1.065	1.048	1.048	1.050	1.038	1.036	1.021	1.020	1.011	1.009	1.009	1.010	1.009	1.009	1.009	1.010	1.012	1.009	1.009	1.009	1.009	1.010											
June-95	2.163	1.275	1.187	1.128	1.090	1.086	1.060	1.024	1.016	1.016	1.016	1.014	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	1.849	1.315	1.120	1.098	1.079	1.066	1.052	1.040	1.020	1.011	1.007	1.008	1.008	1.008	1.007	1.008	1.008	1.016	1.000	1.001	1.000	1.000	1.000													
June-97	2.132	1.237	1.177	1.103	1.073	1.066	1.034	1.009	1.007	1.006	1.001	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	1.950	1.316	1.178	1.124	1.099	1.060	1.038	1.022	1.019	1.014	1.013	1.013	1.012	1.013	1.011	1.012	1.011	1.012	1.011	1.011	1.011															
June-99	2.227	1.370	1.222	1.153	1.079	1.056	1.036	1.027	1.020	1.016	1.009	1.004	1.004	1.004	1.005	1.004	1.004	1.004	1.004	1.004																
June-00	2.126	1.336	1.193	1.095	1.057	1.031	1.003	1.020	1.006	1.003	1.003	1.003	1.001	1.001	1.000	1.000	1.000	1.000	1.000																	
June-01	2.213	1.371	1.203	1.096	1.066	1.044	1.017	1.000	1.001	1.000	1.000	1.001	1.001	1.000	1.000	1.000	1.000	1.000																		
June-02	2.086	1.348	1.159	1.083	1.045	1.018	1.011	1.007	1.005	1.006	1.005	1.000	1.001	1.000	1.000	1.000	1.000																			
June-03	1.986	1.296	1.129	1.082	1.025	1.013	1.002	1.000	1.002	1.004	1.003	1.002	1.000	1.000	1.000	1.000																				
June-04	2.096	1.303	1.142	1.066	1.033	1.019	1.003	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	2.058	1.299	1.158	1.059	1.040	1.028	1.011	1.002	1.001	1.002	1.001	1.000	1.000	1.000																						
June-06	2.408	1.403	1.167	1.062	1.032	1.022	1.007	1.001	1.001	1.001	1.000	1.000	1.000																							
June-07	2.039	1.263	1.132	1.063	1.030	1.020	1.015	1.014	1.013	1.013	1.013	1.013																								
June-08	2.119	1.266	1.153	1.086	1.048	1.024	1.015	1.011	1.011	1.011	1.011																									
June-09	2.117	1.287	1.151	1.061	1.041	1.031	1.023	1.009	1.013	1.010																										
June-10	1.784	1.225	1.069	1.040	1.035	1.041	1.039	1.060	1.033																											
June-11	2.244	1.246	1.096	1.057	1.042	1.003	1.000	1.001																												
June-12	2.175	1.308	1.207	1.113	1.036	1.016	1.002																													
June-13	2.376	1.363	1.108	1.035	1.029	1.012																														
June-14	2.193	1.257	1.179	1.044	1.018																															
June-15	1.822	1.309	1.171	1.073																																
June-16	1.854	1.254	1.131																																	
June-17	2.069	1.307																																		
June-18	1.892																																			

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs	2.131	1.333	1.181	1.104	1.071	1.050	1.039	1.031	1.024	1.019	1.017	1.011	1.011	1.011	1.010	1.010	1.009	1.011	1.008	1.009	1.009	1.008	1.009	1.008	1.007	1.005	1.006	1.005	1.004	1.002	1.002	1.003	1.004	1.005	1.000	1.000	
Latest 5	1.966	1.298	1.159	1.064	1.032	1.021	1.016	1.019	1.014	1.007	1.005	1.003	1.000	1.000	1.000	1.001	1.003	1.003	1.003	1.003	1.004	1.002	1.004	1.007	1.008	1.009	1.009	1.005	1.003	1.003	1.003	1.003					
Latest 3	1.939	1.290	1.160	1.051	1.028	1.010	1.014	1.023	1.019	1.011	1.008	1.004	1.000	1.000	1.000	1.000	1.000	1.001	1.005	1.005	1.004	1.000	1.003	1.003	1.007	1.009	1.011	1.009	1.005	1.000	1.000	1.005	1.005	1.005			
Volume Wtd																																					
All Yrs	2.098	1.324	1.174	1.096	1.061	1.042	1.028	1.021	1.017	1.014	1.013	1.009	1.009	1.009	1.009	1.009	1.008	1.010	1.008	1.009	1.009	1.009	1.010	1.008	1.008	1.006	1.007	1.006	1.005	1.002	1.002	1.003	1.004	1.007	1.000		
Latest 5	1.954	1.294	1.158	1.064	1.032	1.020	1.015	1.016	1.012	1.006	1.004	1.002	1.000	1.000	1.000	1.001	1.003	1.003	1.004	1.004	1.005	1.002	1.004	1.008	1.010	1.010	1.009	1.007	1.004	1.002	1.003						
Latest 3	1.945	1.291	1.158	1.054	1.027	1.010	1.012	1.019	1.017	1.011	1.007	1.004	1.000	1.000	1.000	1.000	1.000	1.001	1.005	1.006	1.005	1.000	1.003	1.003	1.008	1.011	1.011	1.009	1.006	1.000	1.000	1.004	1.005				

Dev Factor Selection																																					
Industry 1	2.958	1.587	1.232	1.108	1.038	1.023	1.014	1.008	1.006	1.007	1.006	1.010	1.003	1.004	1.003	1.003	1.005	1.003																			
Industry 2		1.877	1.312	1.143	1.055	1.028	1.016	1.015	1.006	1.005	1.007	1.007	1.004	1.002	1.005	1.002	1.003	1.002	1.001	1.001																	
Prior	*2.138*	*1.333*	*1.175*	*1.077*	*1.049*	*1.042*	*1.028*	*1.023*	*1.016*	*1.012*	*1.006*	*1.009*	*1.009*	*1.009*	*1.009*	*1.010*	*1.005*	*1.006*	*1.004*	*1.014*	*1.018*	*1.017*	*1.003*	*1.008*	*1.008*	*1.004*	*1.004*	*1.004*	*1.003*	*1.002*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.011*	
Selected	2.131	1.333	1.174	1.080	1.046	1.042	1.028	1.023	1.019	1.013	1.008	1.009	1.009	1.009	1.009	1.009	1.005	1.003	1.004	1.014	1.018	1.017	1.003	1.008	1.008	1.004	1.004	1.004	1.003	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.010
FacToUlt	5.016	2.354	1.767	1.505	1.394	1.332	1.279	1.244	1.216	1.194	1.178	1.169	1.158	1.148	1.138	1.128	1.118	1.112	1.109	1.105	1.089	1.070	1.053	1.050	1.041	1.033	1.029	1.025	1.021	1.018	1.016	1.015	1.014	1.013	1.012	1.011	1.010
Percent of Ult	19.9%	42.5%	56.6%	66.4%	71.7%	75.1%	78.2%	80.4%	82.2%	83.8%	84.9%	85.6%	86.4%	87.1%	87.9%	88.7%	89.5%	89.9%	90.2%	90.5%	91.8%	93.4%	95.0%	95.3%	96.0%	96.8%	97.2%	97.6%	98.0%	98.3%	98.5%	98.6%	98.7%	98.8%	98.9%	99.0%	99.1%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	5,015,092	5,578,502	5,077,940	5,413,706	62,848	1.3%	(164,796)	-3.0%
6/30/82-83	2,761,458	2,775,000	2,758,356	2,772,000	(3,102)	-0.1%	(3,000)	-0.1%
6/30/83-84	1,476,764	1,492,000	1,475,011	1,490,000	(1,753)	-0.1%	(2,000)	-0.1%
6/30/84-85	4,155,575	4,198,000	4,248,593	4,253,000	93,018	2.2%	55,000	1.3%
6/30/85-86	6,411,752	6,444,615	6,405,039	6,437,650	(6,713)	-0.1%	(6,965)	-0.1%
6/30/86-87	3,899,766	3,919,305	3,895,341	3,915,325	(4,425)	-0.1%	(3,980)	-0.1%
6/30/87-88	6,126,052	6,157,060	6,119,209	6,150,095	(6,842)	-0.1%	(6,965)	-0.1%
6/30/88-89	7,570,000	7,587,000	7,565,000	7,579,000	(5,000)	-0.1%	(8,000)	-0.1%
6/30/89-90	9,657,000	9,659,000	9,701,000	9,704,000	44,000	0.5%	45,000	0.5%
6/30/90-91	10,821,000	10,843,644	10,874,000	10,896,750	53,000	0.5%	53,106	0.5%
6/30/91-92	4,592,000	4,593,000	4,628,000	4,629,000	36,000	0.8%	36,000	0.8%
6/30/92-93	3,175,700	3,224,795	3,226,018	3,229,000	50,318	1.6%	4,205	0.1%
6/30/93-94	5,284,000	5,287,000	5,290,000	5,294,000	6,000	0.1%	7,000	0.1%
6/30/94-95	6,419,000	6,427,000	6,371,000	6,379,000	(48,000)	-0.7%	(48,000)	-0.7%
6/30/95-96	5,635,000	5,642,000	5,617,000	5,626,000	(18,000)	-0.3%	(16,000)	-0.3%
6/30/96-97	6,391,000	6,403,000	6,298,000	6,310,000	(93,000)	-1.5%	(93,000)	-1.5%
6/30/97-98	8,681,986	8,864,830	8,627,608	8,809,540	(54,378)	-0.6%	(55,290)	-0.6%
6/30/98-99	8,040,277	8,209,110	7,958,628	8,126,660	(81,649)	-1.0%	(82,450)	-1.0%
6/30/99-00	8,563,533	8,653,440	8,520,214	8,610,240	(43,319)	-0.5%	(43,200)	-0.5%
6/30/00-01	11,110,397	11,227,200	11,027,438	11,143,680	(82,959)	-0.7%	(83,520)	-0.7%
6/30/01-02	9,497,057	10,027,000	9,409,535	9,939,000	(87,522)	-0.9%	(88,000)	-0.9%
6/30/02-03	9,351,538	9,875,000	9,223,790	9,743,000	(127,748)	-1.4%	(132,000)	-1.3%
6/30/03-04	8,522,793	8,639,000	8,405,197	8,523,000	(117,597)	-1.4%	(116,000)	-1.3%
6/30/04-05	8,746,918	9,157,000	8,588,611	9,025,000	(158,308)	-1.8%	(132,000)	-1.4%
6/30/05-06	6,296,137	6,508,000	6,152,449	6,411,000	(143,688)	-2.3%	(97,000)	-1.5%
6/30/06-07	5,513,966	5,845,000	5,444,227	5,832,000	(69,739)	-1.3%	(13,000)	-0.2%
6/30/07-08	5,775,000	5,796,000	5,677,000	5,782,000	(98,000)	-1.7%	(14,000)	-0.2%
6/30/08-09	4,956,000	5,236,000	4,841,000	5,134,000	(115,000)	-2.3%	(102,000)	-1.9%
6/30/09-10	3,489,000	3,848,000	3,431,000	3,683,000	(58,000)	-1.7%	(165,000)	-4.3%
6/30/10-11	4,506,000	4,830,000	4,332,000	4,563,000	(174,000)	-3.9%	(267,000)	-5.5%
6/30/11-12	3,670,000	4,098,000	3,485,000	3,800,000	(185,000)	-5.0%	(298,000)	-7.3%
6/30/12-13	3,557,000	4,087,000	3,340,000	3,732,000	(217,000)	-6.1%	(355,000)	-8.7%
6/30/13-14	4,487,000	5,032,000	4,239,000	4,648,000	(248,000)	-5.5%	(384,000)	-7.6%
6/30/14-15	5,439,000	5,938,000	5,315,000	5,678,000	(124,000)	-2.3%	(260,000)	-4.4%
6/30/15-16	5,893,000	6,381,000	5,545,000	5,911,000	(348,000)	-5.9%	(470,000)	-7.4%
6/30/16-17	7,410,000	8,285,000	7,279,000	8,074,000	(131,000)	-1.8%	(211,000)	-2.5%
6/30/17-18	6,324,000	6,931,000	5,723,000	6,076,000	(601,000)	-9.5%	(855,000)	-12.3%
6/30/18-19								
Total	229,221,762	237,698,501	226,114,203	233,322,646	(3,107,559)	-1.4%	(4,375,855)	-1.8%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 4, Exhibit 1, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	4,251,876	1.196	5,085,823	0.0%	0.0%	0	160,000	160,000	3.1%	1.000	160,000	160,000	160,000
6/30/82-83	2,566,735	1.010	2,591,136	0.0%	0.0%	0	181,081	181,081	7.0%	1.000	181,081	181,081	181,081
6/30/83-84	1,386,759	1.061	1,471,410	0.0%	0.0%	0	18,501	18,501	1.3%	1.000	18,501	18,501	18,501
6/30/84-85	4,031,914	1.012	4,078,388	0.0%	0.0%	0	180,850	180,850	4.4%	1.000	180,850	180,850	180,850
6/30/85-86	6,067,508	1.013	6,143,583	0.0%	0.0%	0	332,000	332,000	5.4%	1.000	332,000	332,000	332,000
6/30/86-87	3,544,280	1.014	3,592,308	0.0%	0.0%	0	340,360	340,360	9.5%	1.000	340,360	340,360	340,360
6/30/87-88	5,380,873	1.015	5,459,242	0.0%	0.0%	0	717,002	717,002	13.1%	1.000	717,002	717,002	717,002
6/30/88-89	6,846,416	1.016	6,953,076	0.0%	0.0%	0	626,201	626,201	9.0%	1.000	626,201	626,201	626,201
6/30/89-90	8,607,685	1.018	8,759,267	0.0%	0.0%	0	944,900	944,900	10.8%	1.000	944,900	944,900	944,900
6/30/90-91	9,345,968	1.021	9,539,082	0.0%	0.0%	0	1,336,768	1,336,768	14.0%	1.000	1,336,768	1,336,768	1,336,768
6/30/91-92	4,143,108	1.025	4,245,631	0.0%	0.0%	0	383,251	383,251	9.0%	1.000	383,251	383,251	383,251
6/30/92-93	2,519,814	1.029	2,592,497	0.0%	0.0%	0	637,302	637,302	24.6%	1.000	637,302	637,302	637,302
6/30/93-94	4,308,957	1.033	4,450,979	0.0%	0.0%	0	842,675	842,675	18.9%	1.000	842,675	842,675	842,675
6/30/94-95	5,422,587	1.041	5,646,125	0.0%	0.0%	0	732,613	732,613	13.0%	1.000	732,613	732,613	734,445
6/30/95-96	4,737,785	1.050	4,972,558	0.0%	0.0%	0	652,002	652,002	13.1%	1.005	655,262	653,632	653,631
6/30/96-97	5,237,372	1.053	5,513,524	0.0%	0.0%	0	794,601	794,601	14.4%	1.005	798,574	796,588	796,588
6/30/97-98	8,098,169	1.070	8,666,651	0.0%	0.0%	0	431,718	431,718	5.0%	1.005	433,877	432,797	432,797
6/30/98-99	7,548,728	1.089	8,222,990	0.0%	0.0%	0	176,053	176,053	2.1%	1.005	176,933	176,493	176,493
6/30/99-00	7,894,835	1.105	8,721,515	0.0%	0.0%	0	276,102	276,102	3.2%	1.005	277,483	276,792	281,865
6/30/00-01	10,126,525	1.109	11,226,727	0.1%	0.1%	11,227	415,283	426,510	3.8%	1.010	419,446	422,978	429,717
6/30/01-02	8,653,014	1.112	9,623,237	0.1%	0.2%	19,246	303,881	323,127	3.4%	1.015	308,462	315,795	320,732
6/30/02-03	8,376,819	1.118	9,362,654	0.1%	0.3%	28,088	363,503	391,591	4.2%	1.015	368,983	380,287	385,222
6/30/03-04	7,558,530	1.128	8,524,515	0.1%	0.4%	34,098	334,431	368,529	4.3%	1.015	339,473	354,001	358,803
6/30/04-05	7,982,459	1.138	9,081,078	0.1%	0.5%	45,405	295,050	340,456	3.7%	1.017	299,921	320,188	325,365
6/30/05-06	5,571,365	1.148	6,394,523	0.1%	0.6%	38,367	262,504	300,871	4.7%	1.018	267,229	284,050	289,284
6/30/06-07	4,874,632	1.158	5,644,495	0.1%	0.7%	39,511	207,003	246,514	4.4%	1.031	213,386	246,514	250,465
6/30/07-08	4,736,863	1.169	5,535,212	0.1%	0.8%	42,359	198,502	240,861	4.4%	1.041	206,629	240,861	246,333
6/30/08-09	3,964,204	1.178	4,669,475	0.1%	0.9%	39,956	180,017	219,973	4.7%	1.056	190,029	219,973	225,269
6/30/09-10	2,699,983	1.194	3,222,542	0.1%	1.0%	30,798	100,501	131,299	4.1%	1.064	106,935	131,299	134,295
6/30/10-11	3,336,741	1.216	4,059,058	0.1%	1.1%	42,851	215,782	258,633	6.4%	1.093	235,815	258,633	264,015
6/30/11-12	2,527,925	1.244	3,144,857	0.1%	1.2%	36,345	169,103	205,448	6.5%	1.108	187,297	205,448	207,999
6/30/12-13	2,302,792	1.279	2,944,891	0.0%	1.2%	35,284	145,313	180,597	6.1%	1.140	165,698	180,597	187,923
6/30/13-14	2,879,452	1.332	3,835,782	0.2%	1.4%	53,629	162,881	216,510	5.6%	1.200	195,494	216,510	226,244
6/30/14-15	3,580,649	1.394	4,991,237	0.1%	1.5%	74,933	156,500	231,433	4.6%	1.286	201,190	231,433	193,138
6/30/15-16	3,496,861	1.505	5,263,359	1.1%	2.6%	139,078	59,376	198,454	3.8%	1.820	108,089	198,454	235,097
6/30/16-17	4,028,338	1.767	7,116,560	0.9%	3.6%	255,406	318,000	573,406	8.1%	3.289	1,045,993	573,406	615,787
6/30/17-18	2,345,387	2.354	5,521,308	1.0%	4.6%	255,118	10,004	265,122	4.8%	11.903	119,082	265,122	347,134
6/30/18-19	1,503,593	5.016	7,542,693	0.9%	5.5%	413,022	0	413,022	5.5%	60.708	0	413,022	
Total	192,487,503		224,409,987			1,634,723	13,661,614	15,296,337	6.8%		14,754,784	15,228,378	15,019,531

NOTES:
(2) From Section 4, Exhibit 1, Page 2, Column 3
(3) = (4) / (2)
(4) From Section 4, Exhibit 1, Page 2, Column 6
(5) From Section 4, Exhibit 1, Page 11
(6) Downward sum of (5)
(7) = (6) x (4)
(8) From Section 4, Exhibit 1, Page 10
(9) = (7) + (8)
(10) = (9) / (4)
(11) From Section 4, Exhibit 1, Page 12
(12) = (8) x (11)
(13) Selected based on (9) and (12)
(14) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts Workers Compensation
Department of Corrections - Cluster 3
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0	0	0	0	0	0	0	0	15,000	0	0	0	57,500	26,000	0	60,000	0	0	0	0	0	0	1,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	17,500	0	35,000	41,581	41,000	46,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	0	18,500	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	11,000	0	0	20,000	0	69,000	0	42,000	0	38,850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	0	30,000	68,000	10,000	40,000	27,000	50,000	0	45,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48,000	2,000	12,000	0	0	0	0	0	0				
Jun-87	0	20,000	25,000	22,500	22,500	27,000	38,250	25,001	11,250	85,000	0	37,000	14,859	0	0	0	0	12,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	31,500	17,000	20,000	40,000	191,500	199,000	23,000	102,000	30,000	60,000	0	0	0	0	0	0	3,000	0	1	0	0	0	1	0	0	0	0	0	0	0	0						
Jun-89	0	5,000	70,500	4,500	125,000	86,200	157,000	70,000	30,000	49,500	0	0	0	0	0	18,500	0	0	0	0	0	0	0	10,000	0	1	0	0	0	0	0							
Jun-90	0	16,700	104,500	133,000	151,700	139,500	73,000	98,000	40,000	170,000	1,000	0	0	0	0	0	0	0	5,000	12,500	0	0	0	0	0	0	0	0	0	0								
Jun-91	0	19,996	27,700	321,471	173,500	181,000	68,000	0	40,000	40,000	1	0	0	0	0	100	0	0	10,000	0	0	0	60,000	0	158,000	237,000	0	0	0									
Jun-92	0	30,500	94,000	95,000	50,000	90,000	0	0	0	0	0	11,250	0	0	12,501	0	0	0	0	0	0	0	0	0	0	0	0	0										
Jun-93	0	122,600	116,000	160,700	27,000	80,001	119,000	0	0	0	12,000	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0											
Jun-94	52,000	162,000	181,925	221,000	101,000	77,500	7,500	7,500	0	15,750	0	4,500	6,000	0	0	0	6,000	0	0	0	0	0	0	0	0	0												
Jun-95	18,613	172,000	187,000	82,000	135,000	70,000	10,000	0	0	25,000	0	1,000	0	32,000	0	0	0	0	0	0	0	0	0	0	0													
Jun-96	0	35,000	32,000	335,000	0	0	0	0	12,000	15,000	23,000	0	0	0	0	0	0	0	71,725	32,069	32,069	64,138	0	1														
Jun-97	59,500	268,000	190,500	120,000	43,000	24,000	16,000	20,600	0	9,001	0	17,000	0	0	0	0	0	0	0	27,000	0	0	0															
Jun-98	56,500	160,501	125,715	0	10,000	29,000	20,800	12,201	9,000	8,001	0	0	0	0	0	0	0	0	0	0	0	0																
Jun-99	0	0	20,000	1	91,750	12,800	20,500	15,000	8,001	0	0	8,001	0	0	0	0	0	0	0	0	0																	
Jun-00	0	27,501	5,000	85,500	78,101	17,500	28,500	4,500	10,000	0	7,500	0	0	12,000	0	0	0	0	0	0																		
Jun-01	8,490	1	74,500	89,900	93,000	73,389	33,503	20,500	4,000	18,000	0	0	0	0	0	0	0	0	0																			
Jun-02	0	10,000	43,880	99,500	47,501	66,000	7,000	0	0	0	3,000	27,000	0	0	0	0	0	0																				
Jun-03	0	58,500	110,001	81,000	77,501	21,500	10,001	5,000	0	0	0	0	0	0	0	0	0																					
Jun-04	0	21,923	84,502	80,002	26,003	65,000	35,000	15,000	0	0	1,001	6,000	0	0	0	0																						
Jun-05	0	12,500	108,002	89,501	37,546	0	12,000	10,001	8,000	0	0	0	0	17,500	0																							
Jun-06	0	35,001	24,502	113,501	81,500	6,000	0	0	0	0	2,000	0	0	0																								
Jun-07	0	36,000	69,500	32,500	50,000	19,000	1	2	0	0	0	0	0																									
Jun-08	0	36,001	37,000	72,000	25,500	10,000	18,000	1	0	0	0	0																										
Jun-09	0	16,000	42,767	47,000	46,250	10,000	8,000	0	0	10,000	0																											
Jun-10	0	3,000	56,000	31,500	10,000	0	1	0	0	0																												
Jun-11	0	11,750	47,031	67,000	29,000	33,000	13,001	15,000	0																													
Jun-12	0	11,050	19,003	30,050	109,000	0	0	0																														
Jun-13	4,000	17,312	21,000	73,501	29,500	0	0																															
Jun-14	0	8,500	53,901	25,000	75,480	0																																
Jun-15	0	6,000	40,500	18,500	91,500																																	
Jun-16	0	16,000	19,500	23,876																																		
Jun-17	0	275,000	43,000																																			
Jun-18	0	10,004																																				
Jun-19	0																																					

Cumulative Lump Sum Payments

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*	*456*
All Prior Yrs	0	0	0	0	0	0	0	0	15,000	15,000	15,000	15,000	72,500	98,500	98,500	158,500	158,500	158,500	158,500	158,500	158,500	158,500	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
Jun-83	0	0	0	0	0	0	0	17,500	17,500	52,500	94,081	135,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081		
Jun-84	0	0	0	0	0	0	0	0	18,500	18,500	18,500	18,500	18,500	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501		
Jun-85	0	0	0	11,000	11,000	11,000	31,000	31,000	100,000	100,000	142,000	142,000	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850			
Jun-86	0	0	0	30,000	98,000	108,000	148,000	175,000	225,000	225,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	318,000	320,000	332,000	332,000	332,000	332,000	332,000	332,000	332,000				
Jun-87	0	20,000	45,000	67,500	90,000	117,000	155,250	180,251	191,501	276,501	276,501	313,501	328,360	328,360	328,360	328,360	328,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360						
Jun-88	0	31,500	48,500	68,500	108,500	300,000	499,000	522,000	624,000	654,000	714,000	714,000	714,000	714,000	714,000	714,000	714,000	717,000	717,000	717,001	717,001	717,001	717,001	717,002	717,002	717,002	717,002	717,002	717,002	717,002	717,002	717,002						
Jun-89	0	5,000	75,500	80,000	205,000	291,200	448,200	518,200	548,200	597,700	597,700	597,700	597,700	597,700	597,700	616,200	616,200	616,200	616,200	616,200	616,200	616,200	616,200	626,200	626,200	626,201	626,201	626,201	626,201	626,201	626,201							
Jun-90	0	16,700	121,200	254,200	405,900	545,400	618,400	716,400	756,400	926,400	927,400	927,400	927,400	927,400	927,400	927,400	927,400	927,400	932,400	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900									
Jun-91	0	19,996	47,696	369,167	542,667	723,667	791,667	791,667	831,667	871,667	871,668	871,668	871,668	871,668	871,668	871,768	871,768	871,768	881,768	881,768	881,768	881,768	941,768	941,768	1,099,768	1,336,768	1,336,768	1,336,768	1,336,768									
Jun-92	0	30,500	124,500	219,500	269,500	359,500	359,500	359,500	359,500	359,500	359,500	370,750	370,750	370,750	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251										
Jun-93	0	122,600	238,600	399,300	426,300	506,301	625,301	625,301	625,301	625,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,302	637,302	637,302	637,302											
Jun-94	52,000	214,000	395,925	616,925	717,925	795,425	802,925	810,425	810,425	826,175	826,175	830,675	836,675	836,675	836,675	836,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675												
Jun-95	18,613	190,613	377,613	459,613	594,613	664,613	674,613	674,613	674,613	699,613	699,613	700,613	700,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613													
Jun-96	0	35,000	67,000	402,000	402,000	402,000	402,000	402,000	414,000	429,000	452,000	452,000	452,000	452,000	452,000	452,000	452,000	452,000	523,725	555,794	587,863	652,001	652,001	652,002														
Jun-97	59,500	327,500	518,000	638,000	681,000	705,000	721,000	741,600	741,600	750,601	750,601	767,601	767,601	767,601	767,601	767,601	767,601	767,601	767,601	794,601	794,601	794,601	794,601															
Jun-98	56,500	217,001	342,716	342,716	352,716	381,716	402,516	414,717	423,717	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718																
Jun-99	0	0	20,000	20,001	111,751	124,551	145,051	160,051	168,052	168,052	168,052	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053																
Jun-00	0	27,501	32,501	118,001	196,102	213,602	242,102	246,602	256,602	256,602	264,102	264,102	264,102	276,102	276,102	276,102	276,102	276,102	276,102	276,102																		
Jun-01	8,490	8,491	82,991	172,891	265,891	339,280	372,783	393,283	397,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283																			
Jun-02	0	10,000	53,880	153,380	200,881	266,881	273,881	273,881	273,881	273,881	276,881	303,881	303,881	303,881	303,881	303,881	303,881	303,881																				
Jun-03	0	58,500	168,501	249,501	327,002	348,502	358,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503																					
Jun-04	0	21,923	106,425	186,427	212,430	277,430	312,430	327,430	327,430	327,430	328,431	334,431	334,431	334,431	334,431	334,431																						
Jun-05	0	12,500	120,502	210,003	247,549	247,549	259,549	269,550	277,550	277,550	277,550	277,550	277,550	295,050	295,050																							
Jun-06	0	35,001	59,503	173,004	254,504	260,504	260,504	260,504	260,504	260,504	262,504	262,504	262,504	262,504																								
Jun-07	0	36,000	105,500	138,000	188,000	207,000	207,001	207,003	207,003	207,003	207,003	207,003	207,003																									
Jun-08	0	36,001	73,001	145,001	170,501	180,501	198,501	198,502	198,502	198,502	198,502	198,502																										
Jun-09	0	16,000	58,767	105,767	152,017	162,017	170,017	170,017	170,017	180,017	180,017																											
Jun-10	0	3,000	59,000	90,500	100,500	100,500	100,501	100,501	100,501	100,501																												
Jun-11	0	11,750	58,781	125,781	154,781	187,781	200,782	215,782	215,782																													
Jun-12	0	11,050	30,053	60,103	169,103	169,103	169,103	169,103																														
Jun-13	4,000	21,312	42,312	115,813	145,313	145,313	145,313																															
Jun-14	0	8,500	62,401	87,401	162,881	162,881																																
Jun-15	0	6,000	46,500	65,000	156,500																																	
Jun-16	0	16,000	35,500	59,376																																		
Jun-17	0	275,000	318,000																																			
Jun-18	0	10,004																																				
Jun-19	0																																					

Commonwealth of Massachusetts Workers Compensation
Department of Corrections - Cluster 3
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.011	0.005	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.014	0.016	0.016	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.003	0.000	0.000	0.005	0.000	0.017	0.000	0.010	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.000	0.005	0.011	0.002	0.007	0.004	0.008	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.006	0.007	0.006	0.006	0.008	0.011	0.007	0.003	0.024	0.000	0.010	0.004	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.006	0.003	0.004	0.007	0.035	0.036	0.004	0.019	0.005	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Jun-89	0.000	0.001	0.010	0.001	0.018	0.012	0.023	0.010	0.004	0.007	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.002	0.012	0.015	0.017	0.016	0.008	0.011	0.005	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.002	0.003	0.034	0.018	0.019	0.007	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.006	0.000	0.017	0.025	0.000	0.000	0.000									
Jun-92	0.000	0.007	0.022	0.022	0.012	0.021	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.000	0.047	0.045	0.062	0.010	0.031	0.046	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-94	0.012	0.036	0.041	0.050	0.023	0.017	0.002	0.002	0.000	0.004	0.000	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.003	0.030	0.033	0.015	0.024	0.012	0.002	0.000	0.000	0.004	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.000	0.007	0.006	0.067	0.000	0.000	0.000	0.000	0.002	0.003	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.006	0.006	0.013	0.000	0.000														
Jun-97	0.011	0.049	0.035	0.022	0.008	0.004	0.003	0.004	0.000	0.002	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000															
Jun-98	0.007	0.019	0.015	0.000	0.001	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.000	0.000	0.002	0.000	0.011	0.002	0.002	0.002	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																	
Jun-00	0.000	0.003	0.001	0.010	0.009	0.002	0.003	0.001	0.001	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-01	0.001	0.000	0.007	0.008	0.008	0.007	0.003	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-02	0.000	0.001	0.005	0.010	0.005	0.007	0.001	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.000	0.006	0.012	0.009	0.008	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																					
Jun-04	0.000	0.003	0.010	0.009	0.003	0.008	0.004	0.002	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000																						
Jun-05	0.000	0.001	0.012	0.010	0.004	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.002	0.000																							
Jun-06	0.000	0.005	0.004	0.018	0.013	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
Jun-07	0.000	0.006	0.012	0.006	0.009	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000																									
Jun-08	0.000	0.007	0.007	0.013	0.005	0.002	0.003	0.000	0.000	0.000	0.000	0.000																										
Jun-09	0.000	0.003	0.009	0.010	0.010	0.002	0.002	0.000	0.000	0.002	0.000																											
Jun-10	0.000	0.001	0.017	0.010	0.003	0.000	0.000	0.000	0.000	0.000																												
Jun-11	0.000	0.003	0.012	0.017	0.007	0.008	0.003	0.004	0.000																													
Jun-12	0.000	0.004	0.006	0.010	0.035	0.000	0.000	0.000																														
Jun-13	0.001	0.006	0.007	0.025	0.010	0.000	0.000																															
Jun-14	0.000	0.002	0.014	0.007	0.020	0.000																																
Jun-15	0.000	0.001	0.008	0.004	0.018																																	
Jun-16	0.000	0.003	0.004	0.005																																		
Jun-17	0.000	0.039	0.006																																			
Jun-18	0.000	0.002																																				
Jun-19	0.000																																					

Averages		*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
Simple Avg																																						
All Yrs (ex P)	0.001	0.009	0.011	0.014	0.010	0.007	0.006	0.002	0.003	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Latest 5	0.000	0.009	0.008	0.010	0.018	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.003	0.000	0.000	0.003	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Latest 3	0.000	0.014	0.006	0.005	0.016	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Olympic Avg																																						
All Yrs (ex P)	0.001	0.008	0.010	0.013	0.010	0.006	0.004	0.002	0.002	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 10	0.000	0.003	0.009	0.009	0.011	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000										
Latest 5	0.000	0.002	0.007	0.007	0.016	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					

Dev Factor Selection																																						
Prior	*NA*	*0.009*	*0.010*	*0.011*	*0.009*	*0.002*	*0.002*	*0.000*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*		
Selected	NA	0.009	0.010	0.009	0.011	0.001	0.002	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.055	0.046	0.036	0.026	0.015	0.014	0.012	0.012	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
Department of Corrections - Cluster 3
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444	456
All Prior Yrs	0	0	0	0	0	0	0	0	15,000	15,000	15,000	15,000	72,500	98,500	98,500	158,500	158,500	158,500	158,500	158,500	158,500	158,500	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
Jun-83	0	0	0	0	0	0	0	17,500	17,500	52,500	94,081	135,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	
Jun-84	0	0	0	0	0	0	0	0	18,500	18,500	18,500	18,500	18,500	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501		
Jun-85	0	0	0	11,000	11,000	11,000	31,000	31,000	100,000	100,000	142,000	142,000	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850			
Jun-86	0	0	0	30,000	98,000	108,000	148,000	175,000	225,000	225,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	318,000	320,000	332,000	332,000	332,000	332,000	332,000	332,000	332,000				
Jun-87	0	20,000	45,000	67,500	90,000	117,000	155,250	180,251	191,501	276,501	276,501	313,501	328,360	328,360	328,360	328,360	328,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360					
Jun-88	0	31,500	48,500	68,500	108,500	300,000	499,000	522,000	624,000	654,000	714,000	714,000	714,000	714,000	714,000	714,000	714,000	717,000	717,000	717,001	717,001	717,001	717,001	717,002	717,002	717,002	717,002	717,002	717,002	717,002	717,002	717,002						
Jun-89	0	5,000	75,500	80,000	205,000	291,200	448,200	518,200	548,200	597,700	597,700	597,700	597,700	597,700	597,700	616,200	616,200	616,200	616,200	616,200	616,200	616,200	616,200	626,200	626,200	626,201	626,201	626,201	626,201	626,201	626,201							
Jun-90	0	16,700	121,200	254,200	405,900	545,400	618,400	716,400	756,400	926,400	927,400	927,400	927,400	927,400	927,400	927,400	927,400	927,400	932,400	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900								
Jun-91	0	19,996	47,696	369,167	542,667	723,667	791,667	791,667	831,667	871,667	871,668	871,668	871,668	871,668	871,668	871,768	871,768	871,768	881,768	881,768	881,768	881,768	941,768	941,768	1,099,768	1,336,768	1,336,768	1,336,768	1,336,768									
Jun-92	0	30,500	124,500	219,500	269,500	359,500	359,500	359,500	359,500	359,500	359,500	370,750	370,750	370,750	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251										
Jun-93	0	122,600	238,600	399,300	426,300	506,301	625,301	625,301	625,301	625,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,302	637,302	637,302	637,302											
Jun-94	52,000	214,000	395,925	616,925	717,925	795,425	802,925	810,425	810,425	826,175	826,175	830,675	836,675	836,675	836,675	836,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675												
Jun-95	18,613	190,613	377,613	459,613	594,613	664,613	674,613	674,613	674,613	699,613	699,613	700,613	700,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613													
Jun-96	0	35,000	67,000	402,000	402,000	402,000	402,000	402,000	414,000	429,000	452,000	452,000	452,000	452,000	452,000	452,000	452,000	452,000	523,725	555,794	587,863	652,001	652,001	652,002														
Jun-97	59,500	327,500	518,000	638,000	681,000	705,000	721,000	741,600	741,600	750,601	750,601	767,601	767,601	767,601	767,601	767,601	767,601	767,601	767,601	794,601	794,601	794,601	794,601															
Jun-98	56,500	217,001	342,716	342,716	352,716	381,716	402,516	414,717	423,717	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718																
Jun-99	0	0	20,000	20,001	111,751	124,551	145,051	160,051	168,052	168,052	168,052	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053																	
Jun-00	0	27,501	32,501	118,001	196,102	213,602	242,102	246,602	256,602	256,602	264,102	264,102	264,102	276,102	276,102	276,102	276,102	276,102	276,102	276,102																		
Jun-01	8,490	8,491	82,991	172,891	265,891	339,280	372,783	393,283	397,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283																			
Jun-02	0	10,000	53,880	153,380	200,881	266,881	273,881	273,881	273,881	273,881	276,881	303,881	303,881	303,881	303,881	303,881	303,881	303,881																				
Jun-03	0	58,500	168,501	249,501	327,002	348,502	358,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503																					
Jun-04	0	21,923	106,425	186,427	212,430	277,430	312,430	327,430	327,430	327,430	328,431	334,431	334,431	334,431	334,431	334,431																						
Jun-05	0	12,500	120,502	210,003	247,549	247,549	259,549	269,550	277,550	277,550	277,550	277,550	277,550	295,050	295,050																							
Jun-06	0	35,001	59,503	173,004	254,504	260,504	260,504	260,504	260,504	260,504	262,504	262,504	262,504	262,504																								
Jun-07	0	36,000	105,500	138,000	188,000	207,000	207,001	207,003	207,003	207,003	207,003	207,003	207,003																									
Jun-08	0	36,001	73,001	145,001	170,501	180,501	198,501	198,502	198,502	198,502	198,502	198,502																										
Jun-09	0	16,000	58,767	105,767	152,017	162,017	170,017	170,017	170,017	180,017	180,017																											
Jun-10	0	3,000	59,000	90,500	100,500	100,500	100,501	100,501	100,501	100,501																												
Jun-11	0	11,750	58,781	125,781	154,781	187,781	200,782	215,782	215,782																													
Jun-12	0	11,050	30,053	60,103	169,103	169,103	169,103	169,103																														
Jun-13	4,000	21,312	42,312	115,813	145,313	145,313	145,313																															
Jun-14	0	8,500	62,401	87,401	162,881	162,881																																
Jun-15	0	6,000	46,500	65,000	156,500																																	
Jun-16	0	16,000	35,500	59,376																																		
Jun-17	0	275,000	318,000																																			
Jun-18	0	10,004																																				
Jun-19	0																																					

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
All Prior Yrs									1.000	1.000	1.000	4.833	1.359	1.000	1.609	1.000	1.000	1.000	1.000	1.000	1.000	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83								1.000	3.000	1.792	1.436	1.341	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84									1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85				1.000	1.000	2.818	1.000	3.226	1.000	1.420	1.000	1.274	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86				3.267	1.102	1.370	1.182	1.286	1.000	1.200	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.178	1.006	1.038	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87		2.250	1.500	1.333	1.300	1.327	1.161	1.062	1.444	1.000	1.134	1.047	1.000	1.000	1.000	1.000	1.037	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-88		1.540	1.412	1.584	2.765	1.663	1.046	1.195	1.048	1.092	1.000	1.000	1.000	1.000	1.000	1.000	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-89		15.100	1.060	2.563	1.420	1.539	1.156	1.058	1.090	1.000	1.000	1.000	1.000	1.000	1.031	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.016	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90		7.257	2.097	1.597	1.344	1.134	1.158	1.056	1.225	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-91		2.385	7.740	1.470	1.334	1.094	1.000	1.051	1.048	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.011	1.000	1.000	1.000	1.068	1.000	1.168	1.215	1.000	1.000	1.000										
Jun-92		4.082	1.763	1.228	1.334	1.000	1.000	1.000	1.000	1.000	1.031	1.000	1.000	1.034	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93		1.946	1.674	1.068	1.188	1.235	1.000	1.000	1.000	1.019	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94	4.115	1.850	1.558	1.164	1.108	1.009	1.009	1.000	1.019	1.000	1.005	1.007	1.000	1.000	1.000	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95	10.241	1.981	1.217	1.294	1.118	1.015	1.000	1.000	1.037	1.000	1.001	1.000	1.046	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96		1.914	6.000	1.000	1.000	1.000	1.000	1.030	1.036	1.054	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.159	1.061	1.058	1.109	1.000	1.000											
Jun-97	5.504	1.582	1.232	1.067	1.035	1.023	1.029	1.000	1.012	1.000	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.035	1.000	1.000	1.000																
Jun-98	3.841	1.579	1.000	1.029	1.082	1.054	1.030	1.022	1.019	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99			1.000	5.587	1.115	1.165	1.103	1.050	1.000	1.000	1.048	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
Jun-00		1.182	3.631	1.662	1.089	1.133	1.019	1.041	1.000	1.029	1.000	1.000	1.045	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01	1.000	9.774	2.083	1.538	1.276	1.099	1.055	1.010	1.045	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																				
Jun-02		5.388	2.847	1.310	1.329	1.026	1.000	1.000	1.000	1.011	1.098	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03		2.880	1.481	1.311	1.066	1.029	1.014	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
Jun-04		4.854	1.752	1.139	1.306	1.126	1.048	1.000	1.000	1.003	1.018	1.000	1.000	1.000	1.000																							
Jun-05		9.640	1.743	1.179	1.000	1.048	1.039	1.030	1.000	1.000	1.000	1.000	1.063	1.000																								
Jun-06		1.700	2.907	1.471	1.024	1.000	1.000	1.000	1.000	1.008	1.000	1.000	1.000																									
Jun-07		2.931	1.308	1.362	1.101	1.000	1.000	1.000	1.000	1.000	1.000	1.000																										
Jun-08		2.028	1.986	1.176	1.059	1.100	1.000	1.000	1.000	1.000	1.000																											
Jun-09		3.673	1.800	1.437	1.066	1.049	1.000	1.000	1.059	1.000																												
Jun-10		19.667	1.534	1.110	1.000	1.000	1.000	1.000	1.000																													
Jun-11		5.003	2.140	1.231	1.213	1.069	1.075	1.000																														
Jun-12		2.720	2.000	2.814	1.000	1.000	1.000																															
Jun-13	5.328	1.985	2.737	1.255	1.000	1.000																																
Jun-14		7.341	1.401	1.864	1.000																																	
Jun-15		7.750	1.398	2.408																																		
Jun-16		2.219	1.673																																			
Jun-17		1.156																																				
Jun-18																																						

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
Simple Avg																																						
All Yrs (ex P)	5.005	4.512	2.122	1.630	1.192	1.177	1.040	1.111	1.110	1.060	1.031	1.027	1.006	1.001	1.001	1.000	1.002	1.009	1.006	1.003	1.007	1.005	1.001	1.013	1.033	1.001	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		4.090	1.842	1.914	1.043	1.024	1.015	1.000	1.012	1.002	1.004	1.000	1.013	1.000	1.000	1.000	1.000	1.000	1.019	1.012	1.022	1.000	1.000	1.034	1.043	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		3.708	1.490	1.842	1.000	1.023	1.025	1.000	1.020	1.000	1.000	1.000	1.021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.036	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Volume Wtd																																						
All Yrs (ex P)		2.134	1.723	1.315	1.168	1.104	1.039	1.040	1.049	1.022	1.014	1.010	1.006	1.001	1.002	1.001	1.002	1.009	1.008	1.004	1.007	1.007	1.001	1.023	1.046	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		1.544	1.789	1.737	1.045	1.027	1.018	1.000	1.011	1.002	1.005	1.000	1.011	1.000	1.000	1.000	1.000	1.000	1.027	1.012	1.019	1.000	1.000	1.045	1.061	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		1.347	1.467	1.733	1.000	1.026	1.032	1.000	1.021	1.000	1.000	1.000	1.020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.035	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						

Dev Factor Selection																																						
Prior	5.100	3.650	1.875	1.303	1.101	1.061	1.029	1.014	1.025	1.009	1.014	1.010	1.013	1.002	1.001	1.000	1.000	1.005	1.005	1.000	1.000	1.000	1.000	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Selected	5.100	3.619	1.807	1.416	1.071	1.053	1.030	1.013	1.027	1.008	1.014	1.010	1.013	1.001	1.001	1.000	1.000	1.005	1.005	1.000	1.000	1.000	1.000	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	60.708	11.903	3.289	1.820	1.286	1.200	1.140	1.108	1.093	1.064	1.056	1.041	1.031	1.018	1.017	1.015	1.015	1.015	1.010	1.005	1.005	1.005	1.005	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	1.6%	8.4%	30.4%	54.9%	77.8%	83.3%	87.7%	90.3%	91.5%	94.0%	94.7%	96.1%	97.0%	98.2%	98.4%	98.5%	98.5%	98.5%	99.0%	99.5%	99.5%	99.5%	99.5%	99.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.9%	0.0%	0.2%	0.1%	1.000	1.000
444	99.1%	0.1%	0.9%	0.0%	0.0%	0.981	0.971
432	99.0%	0.1%	1.0%	0.0%	0.0%	0.946	0.922
420	98.9%	0.1%	1.1%	0.0%	0.0%	0.916	0.878
408	98.8%	0.1%	1.2%	0.0%	0.0%	0.889	0.840
396	98.7%	0.1%	1.3%	0.0%	0.0%	0.864	0.806
384	98.6%	0.1%	1.4%	0.0%	0.0%	0.841	0.774
372	98.5%	0.2%	1.5%	0.1%	0.0%	0.820	0.746
360	98.3%	0.3%	1.7%	0.1%	0.1%	0.810	0.734
348	98.0%	0.4%	2.0%	0.1%	0.1%	0.808	0.733
336	97.6%	0.4%	2.4%	0.1%	0.1%	0.810	0.737
324	97.2%	0.4%	2.8%	0.1%	0.1%	0.807	0.733
312	96.8%	0.8%	3.2%	0.3%	0.2%	0.801	0.726
300	96.0%	0.8%	4.0%	0.3%	0.2%	0.811	0.740
288	95.3%	0.3%	4.7%	0.1%	0.1%	0.812	0.742
276	95.0%	1.6%	5.0%	0.6%	0.4%	0.792	0.716
264	93.4%	1.6%	6.6%	0.7%	0.5%	0.813	0.745
252	91.8%	1.3%	8.2%	0.6%	0.4%	0.822	0.757
240	90.5%	0.3%	9.5%	0.1%	0.1%	0.816	0.749
228	90.2%	0.3%	9.8%	0.1%	0.1%	0.791	0.715
216	89.9%	0.4%	10.1%	0.2%	0.2%	0.767	0.683
204	89.5%	0.8%	10.5%	0.4%	0.3%	0.748	0.658
192	88.7%	0.8%	11.3%	0.4%	0.3%	0.737	0.646
180	87.9%	0.8%	12.1%	0.4%	0.3%	0.726	0.632
168	87.1%	0.8%	12.9%	0.5%	0.3%	0.715	0.619
156	86.4%	0.8%	13.6%	0.5%	0.4%	0.704	0.606
144	85.6%	0.7%	14.4%	0.4%	0.3%	0.694	0.593
132	84.9%	1.1%	15.1%	0.7%	0.6%	0.681	0.578
120	83.8%	1.6%	16.2%	1.1%	0.9%	0.677	0.575
108	82.2%	1.8%	17.8%	1.3%	1.1%	0.680	0.580
96	80.4%	2.2%	19.6%	1.6%	1.4%	0.685	0.587
84	78.2%	3.1%	21.8%	2.4%	2.1%	0.691	0.595
72	75.1%	3.3%	24.9%	2.7%	2.4%	0.704	0.613
60	71.7%	5.3%	28.3%	4.4%	4.1%	0.712	0.625
48	66.4%	9.8%	33.6%	8.6%	8.0%	0.732	0.650
36	56.6%	14.1%	43.4%	12.8%	12.2%	0.766	0.694
24	42.5%	22.5%	57.5%	21.3%	20.7%	0.797	0.733
12	19.9%	19.9%	80.1%	19.5%	19.4%	0.826	0.770
Total		100.0%					

NOTES:
(2) = 1 / Section 4, Exhibit 1, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	666,064	1,001,829		628,452	945,257
6/30/82-83	10,540	24,184	0.981	10,335	23,714
6/30/83-84	69,751	84,740	0.946	66,016	80,202
6/30/84-85	35,829	40,236	0.916	32,825	36,863
6/30/85-86	5,531	38,142	0.889	4,916	33,904
6/30/86-87	10,701	30,685	0.864	9,246	26,511
6/30/87-88	21,334	52,220	0.841	17,943	43,919
6/30/88-89	92,383	106,383	0.820	75,728	87,205
6/30/89-90	148,415	151,415	0.810	120,223	122,653
6/30/90-91	191,264	214,014	0.808	154,575	172,961
6/30/91-92	101,641	102,641	0.810	82,328	83,138
6/30/92-93	68,902	71,884	0.807	55,591	57,997
6/30/93-94	138,368	142,368	0.801	110,782	113,985
6/30/94-95	215,800	223,800	0.811	174,957	181,443
6/30/95-96	227,213	236,213	0.812	184,498	191,807
6/30/96-97	266,027	278,027	0.792	210,756	220,263
6/30/97-98	97,721	279,653	0.813	79,496	227,497
6/30/98-99	233,846	401,879	0.822	192,197	330,301
6/30/99-00	349,277	439,303	0.816	284,995	358,453
6/30/00-01	485,630	601,872	0.791	384,133	476,080
6/30/01-02	452,640	982,105	0.767	347,055	753,015
6/30/02-03	483,467	1,002,678	0.748	361,432	749,586
6/30/03-04	512,235	630,039	0.737	377,704	464,568
6/30/04-05	311,102	747,491	0.726	225,922	542,829
6/30/05-06	318,580	577,131	0.715	227,869	412,802
6/30/06-07	362,591	750,365	0.704	255,340	528,413
6/30/07-08	741,635	846,635	0.694	514,410	587,240
6/30/08-09	696,779	989,779	0.681	474,559	674,114
6/30/09-10	630,516	882,516	0.677	426,993	597,651
6/30/10-11	779,477	1,010,477	0.680	530,359	687,533
6/30/11-12	787,972	1,102,972	0.685	539,402	755,034
6/30/12-13	891,895	1,283,895	0.691	615,894	886,588
6/30/13-14	1,196,667	1,605,667	0.704	842,102	1,129,918
6/30/14-15	1,577,851	1,940,851	0.712	1,124,137	1,382,756
6/30/15-16	1,988,763	2,354,763	0.732	1,455,225	1,723,036
6/30/16-17	2,932,662	3,727,662	0.766	2,247,430	2,856,674
6/30/17-18	3,367,609	3,720,609	0.797	2,683,047	2,964,289
6/30/18-19	5,676,407	6,850,407	0.826	4,691,418	5,661,702
Total	27,145,085	35,527,528		20,820,292	27,171,897
			(7) Total Discount Factor:	0.767	0.765

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	666,064	1,001,829
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	222,021	333,943
(11) Discounted Value at 4%:	628,452	945,257

NOTES:
(2), (3) From Section 4, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 4, Exhibit 1, Page 13, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	666,064	1,001,829		611,270	919,413
6/30/82-83	10,540	24,184	0.971	10,237	23,490
6/30/83-84	69,751	84,740	0.922	64,278	78,091
6/30/84-85	35,829	40,236	0.878	31,465	35,336
6/30/85-86	5,531	38,142	0.840	4,645	32,035
6/30/86-87	10,701	30,685	0.806	8,620	24,718
6/30/87-88	21,334	52,220	0.774	16,523	40,443
6/30/88-89	92,383	106,383	0.746	68,925	79,370
6/30/89-90	148,415	151,415	0.734	108,969	111,172
6/30/90-91	191,264	214,014	0.733	140,218	156,897
6/30/91-92	101,641	102,641	0.737	74,892	75,629
6/30/92-93	68,902	71,884	0.733	50,534	52,721
6/30/93-94	138,368	142,368	0.726	100,429	103,332
6/30/94-95	215,800	223,800	0.740	159,764	165,687
6/30/95-96	227,213	236,213	0.742	168,701	175,383
6/30/96-97	266,027	278,027	0.716	190,471	199,063
6/30/97-98	97,721	279,653	0.745	72,841	208,453
6/30/98-99	233,846	401,879	0.757	176,983	304,155
6/30/99-00	349,277	439,303	0.749	261,507	328,910
6/30/00-01	485,630	601,872	0.715	347,232	430,347
6/30/01-02	452,640	982,105	0.683	309,085	670,629
6/30/02-03	483,467	1,002,678	0.658	318,167	659,856
6/30/03-04	512,235	630,039	0.646	330,729	406,789
6/30/04-05	311,102	747,491	0.632	196,630	472,447
6/30/05-06	318,580	577,131	0.619	197,152	357,155
6/30/06-07	362,591	750,365	0.606	219,580	454,411
6/30/07-08	741,635	846,635	0.593	439,824	502,094
6/30/08-09	696,779	989,779	0.578	402,766	572,131
6/30/09-10	630,516	882,516	0.575	362,249	507,030
6/30/10-11	779,477	1,010,477	0.580	452,182	586,187
6/30/11-12	787,972	1,102,972	0.587	462,267	647,062
6/30/12-13	891,895	1,283,895	0.595	530,990	764,368
6/30/13-14	1,196,667	1,605,667	0.613	733,611	984,347
6/30/14-15	1,577,851	1,940,851	0.625	985,585	1,212,328
6/30/15-16	1,988,763	2,354,763	0.650	1,291,931	1,529,690
6/30/16-17	2,932,662	3,727,662	0.694	2,035,450	2,587,230
6/30/17-18	3,367,609	3,720,609	0.733	2,466,793	2,725,367
6/30/18-19	5,676,407	6,850,407	0.770	4,370,562	5,274,486
Total	27,145,085	35,527,528		18,774,056	24,458,250
			(7) Total Discount Factor:	0.692	0.688

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	666,064	1,001,829
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	222,021	333,943
(11) Discounted Value at 6%:	611,270	919,413

NOTES:
(2), (3) From Section 4, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 4, Exhibit 1, Page 13, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/19 - 20 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/19 - 06/30/20	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/19 - 06/30/20		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	6,671,335	7,251,960	5,673,893	997,443	1,578,067				108,941	119,835	10.9%	7.6%
6/30/82-83	2,923,105	2,939,692	2,912,565	10,540	27,127	99.4%	0.5%	77.8%	8,203	21,111	77.8%	77.8%
6/30/83-84	2,205,425	2,234,949	2,135,674	69,751	99,275	96.2%	0.5%	13.1%	9,162	13,040	13.1%	13.1%
6/30/84-85	4,814,593	4,823,000	4,775,716	38,877	47,284	99.1%	0.5%	55.9%	21,743	26,445	55.9%	55.9%
6/30/85-86	6,975,039	7,008,650	6,962,840	12,199	45,810	99.6%	0.3%	60.3%	7,352	27,608	60.3%	60.3%
6/30/86-87	4,553,341	4,574,325	4,532,327	21,014	41,998	99.3%	0.5%	72.4%	15,220	30,418	72.4%	72.4%
6/30/87-88	7,288,209	7,321,095	7,243,858	44,351	77,237	99.2%	0.5%	60.1%	26,645	46,402	60.1%	60.1%
6/30/88-89	8,874,000	8,889,000	8,751,677	122,323	137,323	98.5%	0.5%	34.2%	41,842	46,973	34.2%	34.2%
6/30/89-90	11,615,000	11,619,000	11,414,619	200,381	204,381	98.3%	0.5%	28.7%	57,511	58,659	28.7%	28.7%
6/30/90-91	13,575,000	13,733,850	13,300,111	274,889	433,739	97.4%	0.5%	19.3%	52,968	83,576	19.3%	19.3%
6/30/91-92	6,839,000	6,951,600	6,661,065	177,935	290,535	96.6%	0.5%	14.7%	26,190	42,763	14.7%	14.7%
6/30/92-93	4,639,018	4,643,000	4,516,464	122,554	126,536	97.3%	0.5%	18.6%	22,834	23,576	18.6%	18.6%
6/30/93-94	6,942,000	6,948,000	6,734,553	207,447	213,447	97.0%	0.5%	16.5%	34,230	35,220	16.5%	16.5%
6/30/94-95	7,776,000	7,786,000	7,496,263	279,737	289,737	96.3%	0.5%	13.7%	38,222	39,588	13.7%	13.7%
6/30/95-96	7,178,000	7,189,000	6,874,222	303,778	314,778	95.7%	0.5%	11.6%	35,279	36,556	11.6%	11.6%
6/30/96-97	8,234,000	8,250,000	7,864,827	369,173	385,173	95.4%	0.5%	10.9%	40,336	42,084	10.9%	10.9%
6/30/97-98	11,083,608	11,274,540	10,835,742	247,866	438,798	96.9%	0.5%	16.3%	40,353	71,437	16.3%	16.3%
6/30/98-99	10,033,628	10,209,660	9,640,639	392,989	569,021	95.2%	0.5%	10.5%	41,348	59,869	10.5%	10.5%
6/30/99-00	10,850,214	10,952,240	10,292,986	557,228	659,254	94.4%	1.0%	17.9%	99,869	118,155	17.9%	17.9%
6/30/00-01	14,304,438	14,443,680	13,494,893	809,545	948,787	93.9%	1.0%	16.3%	132,358	155,123	16.3%	16.3%
6/30/01-02	11,547,535	12,089,000	10,858,439	689,096	1,230,561	91.9%	1.0%	12.3%	84,848	151,518	12.3%	12.3%
6/30/02-03	11,810,790	12,348,000	11,021,347	789,442	1,326,653	91.2%	1.0%	11.4%	90,128	151,460	11.4%	11.4%
6/30/03-04	10,837,197	10,971,000	10,008,924	828,273	962,076	91.8%	1.0%	12.2%	100,892	117,190	12.2%	12.2%
6/30/04-05	11,426,611	12,041,250	10,986,770	439,840	1,054,480	93.6%	1.0%	15.7%	69,076	165,603	15.7%	15.7%
6/30/05-06	8,463,449	8,966,000	7,986,448	477,001	979,552	91.6%	1.0%	12.0%	57,079	117,215	12.0%	12.0%
6/30/06-07	7,371,227	7,955,020	6,831,891	539,336	1,123,129	89.2%	1.0%	9.2%	49,721	103,541	9.2%	9.2%
6/30/07-08	7,386,000	7,641,410	6,451,923	934,077	1,189,487	85.9%	2.0%	14.2%	132,200	168,348	14.2%	14.2%
6/30/08-09	6,613,000	7,174,150	5,725,055	887,945	1,449,095	83.0%	2.0%	11.8%	104,767	170,976	11.8%	11.8%
6/30/09-10	4,582,000	5,036,450	3,770,453	811,547	1,265,997	78.4%	2.0%	9.3%	75,145	117,224	9.3%	9.3%
6/30/10-11	5,698,000	6,109,650	4,685,800	1,012,200	1,423,850	79.4%	2.0%	9.7%	98,124	138,029	9.7%	9.7%
6/30/11-12	4,706,000	5,145,050	3,597,430	1,108,570	1,547,620	73.0%	3.0%	11.1%	123,341	172,190	11.1%	11.1%
6/30/12-13	4,498,000	5,072,850	3,275,963	1,222,037	1,796,887	68.5%	3.0%	9.5%	116,226	170,899	9.5%	9.5%
6/30/13-14	5,515,000	6,132,700	3,921,333	1,593,667	2,211,367	67.3%	4.0%	12.2%	195,137	270,771	12.2%	12.2%
6/30/14-15	7,023,000	7,571,150	4,910,302	2,112,698	2,660,848	67.3%	5.0%	15.3%	322,957	406,750	15.3%	15.3%
6/30/15-16	7,153,000	7,755,850	4,577,784	2,575,216	3,178,066	61.4%	5.0%	13.0%	333,666	411,776	13.0%	13.0%
6/30/16-17	9,268,000	10,315,750	5,559,136	3,708,864	4,756,614	56.8%	5.0%	11.6%	428,998	550,189	11.6%	11.6%
6/30/17-18	7,536,000	8,010,100	3,189,495	4,346,505	4,820,605	41.0%	15.7%	26.7%	1,160,219	1,286,771	26.7%	26.7%
6/30/18-19	9,157,000	10,841,000	1,974,301	7,182,699	8,866,699	19.7%	21.3%	26.5%	1,905,221	2,351,904	26.5%	26.5%
Total	297,966,761	310,219,620	261,447,729	36,519,032	48,771,891				6,308,349	8,120,797	17.3%	16.7%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)
(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)
(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)
(5) = (2) - (4)
(6) = (3) - (4)
(7) = (4) / Average of Columns (2), (3)
(8) = (7) - Prior Year's (7)
(9) = (8) / (1.00 - (7))
(10) = (5) * (9)
(11) = (6) * (9)
(12) = (10) / (5)
(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		1,262,016			1,593,395	1,838,254	331,379	576,238		
6/30/82-83		164,749	166,032		164,749	167,692	0	2,943		
6/30/83-84		730,414	737,573		730,414	744,949	0	14,535		
6/30/84-85	115,258	562,952	569,607	566,063	566,000	570,000	3,048	7,048	0.491	0.495
6/30/85-86	123,937	563,332	571,131	569,764	570,000	571,000	6,668	7,668	0.460	0.461
6/30/86-87	142,396	647,687	657,967	658,544	658,000	659,000	10,313	11,313	0.462	0.463
6/30/87-88	166,792	1,145,983	1,168,829	1,171,053	1,169,000	1,171,000	23,017	25,017	0.701	0.702
6/30/88-89	180,117	1,279,059	1,309,776	1,308,544	1,309,000	1,310,000	29,941	30,941	0.727	0.727
6/30/89-90	180,883	1,862,034	1,914,378	1,914,707	1,914,000	1,915,000	51,966	52,966	1.058	1.059
6/30/90-91	169,902	2,617,375	2,701,717	2,701,048	2,701,000	2,837,100	83,625	219,725	1.590	1.670
6/30/91-92	165,926	2,134,707	2,212,309	2,211,146	2,211,000	2,322,600	76,293	187,893	1.333	1.400
6/30/92-93	174,198	1,359,348	1,414,399	1,413,434	1,413,000	1,414,000	53,652	54,652	0.811	0.812
6/30/93-94	185,946	1,582,922	1,653,615	1,651,881	1,652,000	1,654,000	69,078	71,078	0.888	0.890
6/30/94-95	194,051	1,341,063	1,406,559	1,404,865	1,405,000	1,407,000	63,937	65,937	0.724	0.725
6/30/95-96	205,262	1,484,435	1,563,160	1,560,657	1,561,000	1,563,000	76,565	78,565	0.760	0.761
6/30/96-97	234,073	1,832,854	1,939,708	1,935,544	1,936,000	1,940,000	103,146	107,146	0.827	0.829
6/30/97-98	221,865	2,305,855	2,464,688	2,456,232	2,456,000	2,465,000	150,145	159,145	1.107	1.111
6/30/98-99	256,071	1,915,858	2,083,483	2,075,356	2,075,000	2,083,000	159,142	167,142	0.810	0.813
6/30/99-00	268,486	2,122,049	2,341,985	2,329,549	2,330,000	2,342,000	207,951	219,951	0.868	0.872
6/30/00-01	279,182	2,953,085	3,299,724	3,276,551	3,277,000	3,300,000	323,915	346,915	1.174	1.182
6/30/01-02	283,070	1,901,544	2,150,197	2,138,383	2,138,000	2,150,000	236,456	248,456	0.755	0.760
6/30/02-03	289,846	2,281,025	2,604,963	2,587,461	2,587,000	2,605,000	305,975	323,975	0.893	0.899
6/30/03-04	293,771	2,115,963	2,448,259	2,432,089	2,432,000	2,448,000	316,037	332,037	0.828	0.833
6/30/04-05	291,382	2,709,261	3,174,925	2,895,881	2,838,000	3,016,250	128,739	306,989	0.974	1.035
6/30/05-06	294,709	2,152,579	2,555,032	2,358,023	2,311,000	2,555,000	158,421	402,421	0.784	0.867
6/30/06-07	289,603	1,750,256	2,101,506	1,966,623	1,927,000	2,123,020	176,744	372,764	0.665	0.733
6/30/07-08	354,668	1,516,558	1,841,404	1,799,029	1,709,000	1,859,410	192,442	342,852	0.482	0.524
6/30/08-09	332,413	1,580,835	1,943,286	1,865,048	1,772,000	2,040,150	191,165	459,315	0.533	0.614
6/30/09-10	336,338	969,969	1,211,461	1,288,620	1,151,000	1,353,450	181,031	383,481	0.342	0.402
6/30/10-11	333,783	1,133,277	1,438,153	1,472,941	1,366,000	1,546,650	232,723	413,373	0.409	0.463
6/30/11-12	348,187	900,402	1,162,396	1,280,887	1,221,000	1,345,050	320,598	444,648	0.351	0.386
6/30/12-13	368,022	827,858	1,102,668	1,276,986	1,158,000	1,340,850	330,142	512,992	0.315	0.364
6/30/13-14	390,528	879,000	1,215,547	1,413,758	1,276,000	1,484,700	397,000	605,700	0.327	0.380
6/30/14-15	402,750	1,173,153	1,707,901	1,803,058	1,708,000	1,893,150	534,847	719,997	0.424	0.470
6/30/15-16	400,013	1,021,547	1,607,632	1,757,282	1,608,000	1,844,850	586,453	823,303	0.402	0.461
6/30/16-17	352,565	1,212,798	2,135,492	1,989,034	1,989,000	2,241,750	776,202	1,028,952	0.564	0.636
6/30/17-18	347,621	834,104	1,841,584	1,812,843	1,813,000	1,934,100	978,896	1,099,996	0.522	0.556
6/30/18-19	357,324	470,708	2,487,190	1,976,570	1,977,000	2,487,000	1,506,292	2,016,292	0.553	0.696
Total	9,330,938	55,298,612	64,906,237	63,319,454	64,672,558	68,542,975	9,373,946	13,244,363		
Tot 6/30/84-19	9,330,938	53,141,432	64,002,632	63,319,454	62,184,000	65,792,080	9,042,568	12,650,648	0.666	0.705

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 4, Exhibit 2, Page 2, Column 3
(4) From Section 4, Exhibit 2, Page 2, Column 8
(5) From Section 4, Exhibit 2, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim
All Prior Yrs		1,262,016							1	1	
6/30/82-83		164,749	1.008	1.000	166,032	N/A	166,032		0	0	
6/30/83-84		730,414	1.010	1.000	737,573	N/A	737,573		0	0	
6/30/84-85	115,258	562,952	1.012	1.000	569,607	N/A	569,607	0.494	1	1	6,655
6/30/85-86	123,937	563,332	1.014	1.000	571,131	N/A	571,131	0.461	0	0	
6/30/86-87	142,396	647,687	1.016	1.000	657,967	N/A	657,967	0.462	0	0	
6/30/87-88	166,792	1,145,983	1.020	1.000	1,168,829	N/A	1,168,829	0.701	0	0	
6/30/88-89	180,117	1,279,059	1.024	1.000	1,309,776	N/A	1,309,776	0.727	0	1	30,717
6/30/89-90	180,883	1,862,034	1.028	1.000	1,914,378	N/A	1,914,378	1.058	1	0	
6/30/90-91	169,902	2,617,375	1.032	1.000	2,701,717	N/A	2,701,717	1.590	6	4	21,085
6/30/91-92	165,926	2,134,707	1.036	1.000	2,212,309	N/A	2,212,309	1.333	3	2	38,801
6/30/92-93	174,198	1,359,348	1.040	1.000	1,414,399	N/A	1,414,399	0.812	0	0	
6/30/93-94	185,946	1,582,922	1.045	1.000	1,653,615	N/A	1,653,615	0.889	3	3	23,565
6/30/94-95	194,051	1,341,063	1.049	1.000	1,406,559	N/A	1,406,559	0.725	2	1	65,496
6/30/95-96	205,262	1,484,435	1.053	1.000	1,563,160	N/A	1,563,160	0.762	1	1	78,726
6/30/96-97	234,073	1,832,854	1.058	1.000	1,939,708	N/A	1,939,708	0.829	2	3	35,618
6/30/97-98	221,865	2,305,855	1.069	1.000	2,464,688	N/A	2,464,688	1.111	2	2	79,416
6/30/98-99	256,071	1,915,858	1.087	1.000	2,083,483	N/A	2,083,483	0.814	4	4	41,906
6/30/99-00	268,486	2,122,049	1.104	1.000	2,341,985	N/A	2,341,985	0.872	4	3	73,312
6/30/00-01	279,182	2,953,085	1.117	1.000	3,299,724	N/A	3,299,724	1.182	1	4	86,660
6/30/01-02	283,070	1,901,544	1.131	1.000	2,150,197	N/A	2,150,197	0.760	1	3	82,884
6/30/02-03	289,846	2,281,025	1.142	1.000	2,604,963	N/A	2,604,963	0.899	1	1	323,938
6/30/03-04	293,771	2,115,963	1.157	1.000	2,448,259	N/A	2,448,259	0.833	4	3	110,765
6/30/04-05	291,382	2,709,261	1.172	1.000	3,174,925	N/A	3,174,925	1.090	6	4	116,416
6/30/05-06	294,709	2,152,579	1.187	1.000	2,555,032	N/A	2,555,032	0.867	2	2	201,226
6/30/06-07	289,603	1,750,256	1.201	1.000	2,101,506	N/A	2,101,506	0.726	7	6	58,542
6/30/07-08	354,668	1,516,558	1.214	1.000	1,841,404	N/A	1,841,404	0.519	2	0	
6/30/08-09	332,413	1,580,835	1.229	1.000	1,943,286	N/A	1,943,286	0.585	7	7	51,779
6/30/09-10	336,338	969,969	1.249	1.000	1,211,461	N/A	1,211,461	0.360	9	7	34,499
6/30/10-11	333,783	1,133,277	1.269	1.000	1,438,153	N/A	1,438,153	0.431	5	3	101,625
6/30/11-12	348,187	900,402	1.291	1.000	1,162,396	N/A	1,162,396	0.334	4	4	65,499
6/30/12-13	368,022	827,858	1.332	1.000	1,102,668	N/A	1,102,668	0.300	3	1	274,810
6/30/13-14	390,528	879,000	1.383	1.000	1,215,547	N/A	1,215,547	0.311	10	7	48,078
6/30/14-15	402,750	1,173,153	1.456	1.000	1,707,901	N/A	1,707,901	0.424	17	10	53,475
6/30/15-16	400,013	1,021,547	1.574	1.000	1,607,632	N/A	1,607,632	0.402	41	20	29,304
6/30/16-17	352,565	1,212,798	1.761	1.000	2,135,492	N/A	2,135,492	0.606	144	51	18,092
6/30/17-18	347,621	834,104	2.208	1.000	1,841,584	N/A	1,841,584	0.530	213	131	7,691
6/30/18-19	357,324	470,708	5.284	1.000	2,487,190	N/A	2,487,190	0.696		201	10,032
Total	9,330,938	55,298,612			64,906,237		64,906,237		507	491	

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 4, Exhibit 2, Page 7
(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.
(6) = (3) x (4) x (5)
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	115,258	0.231	562,952	1.012	566,063	N/A	566,063	0.491	0.491
6/30/85-86	123,937	0.380	563,332	1.014	569,764	N/A	569,764	0.460	0.460
6/30/86-87	142,396	0.488	647,687	1.016	658,544	N/A	658,544	0.462	0.462
6/30/87-88	166,792	0.769	1,145,983	1.020	1,171,053	N/A	1,171,053	0.702	0.702
6/30/88-89	180,117	0.698	1,279,059	1.024	1,308,544	N/A	1,308,544	0.726	0.726
6/30/89-90	180,883	1.065	1,862,034	1.028	1,914,707	N/A	1,914,707	1.059	1.059
6/30/90-91	169,902	1.578	2,617,375	1.032	2,701,048	N/A	2,701,048	1.590	1.590
6/30/91-92	165,926	1.313	2,134,707	1.036	2,211,146	N/A	2,211,146	1.333	1.333
6/30/92-93	174,198	0.798	1,359,348	1.040	1,413,434	N/A	1,413,434	0.811	0.811
6/30/93-94	185,946	0.867	1,582,922	1.045	1,651,881	N/A	1,651,881	0.888	0.888
6/30/94-95	194,051	0.706	1,341,063	1.049	1,404,865	N/A	1,404,865	0.724	0.724
6/30/95-96	205,262	0.737	1,484,435	1.053	1,560,657	N/A	1,560,657	0.760	0.760
6/30/96-97	234,073	0.796	1,832,854	1.058	1,935,544	N/A	1,935,544	0.827	0.827
6/30/97-98	221,865	1.052	2,305,855	1.069	2,456,232	N/A	2,456,232	1.107	1.107
6/30/98-99	256,071	0.774	1,915,858	1.087	2,075,356	N/A	2,075,356	0.810	0.810
6/30/99-00	268,486	0.823	2,122,049	1.104	2,329,549	N/A	2,329,549	0.868	0.868
6/30/00-01	279,182	1.103	2,953,085	1.117	3,276,551	N/A	3,276,551	1.174	1.174
6/30/01-02	283,070	0.724	1,901,544	1.131	2,138,383	N/A	2,138,383	0.755	0.755
6/30/02-03	289,846	0.850	2,281,025	1.142	2,587,461	N/A	2,587,461	0.893	0.893
6/30/03-04	293,771	0.793	2,115,963	1.157	2,432,089	N/A	2,432,089	0.828	0.828
6/30/04-05	291,382	0.437	2,709,261	1.172	2,895,881	N/A	2,895,881	0.994	0.994
6/30/05-06	294,709	0.443	2,152,579	1.187	2,358,023	N/A	2,358,023	0.800	0.800
6/30/06-07	289,603	0.447	1,750,256	1.201	1,966,623	N/A	1,966,623	0.679	0.679
6/30/07-08	354,668	0.451	1,516,558	1.214	1,799,029	N/A	1,799,029	0.507	0.507
6/30/08-09	332,413	0.458	1,580,835	1.229	1,865,048	N/A	1,865,048	0.561	0.561
6/30/09-10	336,338	0.475	969,969	1.249	1,288,620	N/A	1,288,620	0.383	0.383
6/30/10-11	333,783	0.480	1,133,277	1.269	1,472,941	N/A	1,472,941	0.441	0.441
6/30/11-12	348,187	0.485	900,402	1.291	1,280,887	N/A	1,280,887	0.368	0.368
6/30/12-13	368,022	0.490	827,858	1.332	1,276,986	N/A	1,276,986	0.347	0.347
6/30/13-14	390,528	0.495	879,000	1.383	1,413,758	N/A	1,413,758	0.362	0.362
6/30/14-15	402,750	0.500	1,173,153	1.456	1,803,058	N/A	1,803,058	0.448	0.448
6/30/15-16	400,013	0.505	1,021,547	1.574	1,757,282	N/A	1,757,282	0.439	0.439
6/30/16-17	352,565	0.510	1,212,798	1.761	1,989,034	N/A	1,989,034	0.564	0.564
6/30/17-18	347,621	0.515	834,104	2.208	1,812,843	N/A	1,812,843	0.522	0.522
6/30/18-19	357,324	0.520	470,708	5.284	1,976,570	N/A	1,976,570	0.553	0.553
Total	9,330,938		53,141,432		63,319,454		63,319,454		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 4, Exhibit 2, Page 4, Column 11
(4) From Section 4, Exhibit 2, Page 2, Column 3
(5) From Section 4, Exhibit 2, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.231	0.231
6/30/85-86									0.380	0.380
6/30/86-87									0.488	0.488
6/30/87-88									0.769	0.769
6/30/88-89									0.698	0.698
6/30/89-90									1.065	1.065
6/30/90-91	169,902	2,701,717	1.590	1.194	1.899	1.335	2.534	0.330	1.579	1.578
6/30/91-92	165,926	2,212,309	1.333	1.189	1.585	1.321	2.094	0.334	1.311	1.313
6/30/92-93	174,198	1,414,399	0.812	1.189	0.966	1.308	1.263	0.337	0.800	0.798
6/30/93-94	185,946	1,653,615	0.889	1.178	1.048	1.295	1.357	0.344	0.860	0.867
6/30/94-95	194,051	1,406,559	0.725	1.170	0.848	1.282	1.088	0.350	0.708	0.706
6/30/95-96	205,262	1,563,160	0.762	1.155	0.880	1.270	1.117	0.358	0.739	0.737
6/30/96-97	234,073	1,939,708	0.829	1.137	0.942	1.257	1.184	0.367	0.804	0.796
6/30/97-98	221,865	2,464,688	1.111	1.135	1.261	1.245	1.569	0.372	1.053	1.052
6/30/98-99	256,071	2,083,483	0.814	1.135	0.923	1.232	1.138	0.375	0.785	0.774
6/30/99-00	268,486	2,341,985	0.872	1.135	0.990	1.220	1.208	0.379	0.830	0.823
6/30/00-01	279,182	3,299,724	1.182	1.109	1.311	1.208	1.584	0.392	1.118	1.103
6/30/01-02	283,070	2,150,197	0.760	1.101	0.836	1.196	1.000	0.399	0.727	0.724
6/30/02-03	289,846	2,604,963	0.899	1.073	0.964	1.184	1.142	0.413	0.864	0.850
6/30/03-04	293,771	2,448,259	0.833	1.046	0.872	1.173	1.023	0.428	0.802	0.793
6/30/04-05	291,382	3,174,925	1.090	1.036	1.128	1.161	1.310	0.437	0.462	0.437
6/30/05-06	294,709	2,555,032	0.867	1.032	0.895	1.149	1.028	0.443	0.468	0.443
6/30/06-07	289,603	2,101,506	0.726	1.032	0.749	1.138	0.852	0.447	0.473	0.447
6/30/07-08	354,668	1,841,404	0.519	1.032	0.536	1.127	0.604	0.451	0.478	0.451
6/30/08-09	332,413	1,943,286	0.585	1.027	0.600	1.116	0.670	0.458	0.485	0.458
6/30/09-10	336,338	1,211,461	0.360	1.000	0.360	1.105	0.398	0.475	0.503	0.475
6/30/10-11	333,783	1,438,153	0.431	1.000	0.431	1.094	0.471	0.480	0.508	0.480
6/30/11-12	348,187	1,162,396	0.334	1.000	0.334	1.083	0.362	0.485	0.513	0.485
6/30/12-13	368,022	1,102,668	0.300	1.000	0.300	1.072	0.321	0.490	0.518	0.490
6/30/13-14	390,528	1,215,547	0.311	1.000	0.311	1.062	0.330	0.495	0.523	0.495
6/30/14-15	402,750	1,707,901	0.424	1.000	0.424	1.051	0.446	0.500	0.529	0.500
6/30/15-16	400,013	1,607,632	0.402	1.000	0.402	1.041	0.418	0.505	0.534	0.505
6/30/16-17	352,565	2,135,492	0.606	1.000	0.606	1.030	0.624	0.510	0.539	0.510
6/30/17-18	347,621	1,841,584	0.530	1.000	0.530	1.020	0.540	0.515	0.545	0.515
6/30/18-19	357,324	2,487,190	0.696	1.000	0.696	1.010	0.703	0.520		0.520
Total	8,421,554	57,810,943								

Trend Last 4 (ex 18-19):	11.4%	Avg 3 (ex 18-19):	0.528
Trend Last 8 (ex 18-19):	6.9%	Avg 5 (ex 18-19):	0.472
Trend Last 12 (ex 18-19):	-2.0%	Avg 10 (ex 18-19):	0.458
Prior Selected Trend:	1.0%	Prior Sel Avg:	0.550
Selected Trend:	1.0%	Sel. Loss Cost:	0.525

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 4, Exhibit 2, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCIRB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		1.150	
(2)	Credibility		49%	
(3)	Average Pmt Trend Statewide		0.980	
(4)	Credibility Weighted Trend		1.063	
		(Low)		(High)
(5)	Selected Range	0.798		0.851
(6)	Incremental Paid for 2019	156,961		156,961
(7)	Estimated Reserve	618,179		894,164
(8)	Paid to Date (82 & Prior)	1,262,016		1,262,016
(9)	Est Ult Paid for 1982 & Prior	1,880,196		2,156,181

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	129,156	100,770
(11)	Projected Number of Years	2	2
(12)	Estimated Reserve	258,311	201,539
(13)	Paid to Date (82 & Prior)	1,262,016	1,105,055
(14)	Est Ult Paid for 1982 & Prior	1,520,328	1,306,594
(14a)	Paid Counts During Fiscal Year	1	1

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	1,593,395	1,838,254
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**1,593,395**	**1,838,254**
(18)	Implied Tail	1.263	1.457
(19)	Ult Loss Inc Lump Sums @ 6/18	1,596,942	1,789,484

NOTES:

(1) From Section 4, Exhibit 2, Page 6
(2) = (Average of Section 4, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 4, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 4, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	24,180	10.093			
1993	2	4,649	8.444	0.192		
1994	3	4,226	8.349	0.909		
1995	4	2,463	7.809	0.583		
1996	5	3,867	8.260	1.570		
1997	6	12,692	9.449	3.282		
1998	7	3,736	8.226	0.294		
1999	8	1,455	7.283	0.389		
2000	9	13,993	9.546	9.617	n =	28
2001	10	18,860	9.845	1.348	S(x) =	56,154
2002	11	1,907	7.553	0.101	S(x-sq) =	112,618,674
2003	12	725	6.586	0.380	S(xy) =	540,028
2004	13	1,808	7.500	2.494	S(y) =	269
2005	14	2,687	7.896	1.486	D =	51,156
2006	15	3,792	8.241	1.411	slope =	0.148
2007	16	10,343	9.244	2.728	Avg Trend =	1.148
2008	17	8,983	9.103	0.869		
2009	18	100,501	11.518	11.187		
2010	19	110,847	11.616	1.103		
2011	20	91,392	11.423	0.824		
2012	21	74,810	11.223	0.819		
2013	22	71,853	11.182	0.960		
2014	23	68,052	11.128	0.947		
2015	24	80,571	11.297	1.184		
2016	25	71,803	11.182	0.891		
2017	26	74,905	11.224	1.043		
2018	27	155,601	11.955	2.077		
2019	28	156,961	11.964	1.009		
					Selected Trend:	**1.150**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2019: 1.009 = 156961 / 155601

Commonwealth of Massachusetts Workers Compensation
Department of Corrections - Cluster 3
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
June-83	11,197	26,045	37,203	47,025	56,514	66,401	72,814	83,440	107,442	118,641	128,866	135,800	137,783	138,069	140,735	141,596	141,596	141,914	142,318	142,318	142,318	142,748	144,456	154,891	160,448	164,749	164,749	164,749	164,749	164,749	164,749	164,749	164,749	164,749	164,749	164,749	164,749
June-84	52,670	137,962	203,703	257,882	317,818	352,402	422,888	501,855	591,716	647,521	689,358	721,711	724,550	728,685	728,693	728,709	728,709	728,709	729,143	729,143	729,143	730,066	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	
June-85	24,581	57,175	81,670	103,231	128,616	150,557	165,276	184,340	192,621	201,787	208,269	211,465	217,592	220,213	229,343	238,016	247,437	257,231	266,584	280,985	298,608	318,573	337,983	352,978	369,873	394,344	415,317	434,308	451,747	470,326	495,794	521,039	546,412	561,119	562,952		
June-86	48,446	112,684	160,960	207,617	233,762	263,664	302,247	319,414	339,302	351,896	365,470	378,302	387,035	413,763	422,216	433,663	460,852	480,856	494,886	512,562	523,474	541,163	550,005	554,546	557,077	558,277	559,768	562,871	563,332	563,332	563,332	563,332	563,332	563,332			
June-87	77,936	181,278	229,911	293,653	369,221	440,930	473,706	485,578	509,980	540,282	563,925	581,583	602,759	614,805	618,094	621,890	624,842	627,889	633,482	636,887	638,336	639,623	640,749	642,212	643,694	648,271	647,521	647,687	647,687	647,687	647,687	647,687	647,687				
June-88	139,053	319,817	519,537	680,966	823,361	912,703	998,546	1,039,983	1,059,846	1,072,337	1,112,168	1,116,550	1,122,900	1,125,982	1,127,653	1,131,576	1,136,086	1,139,881	1,139,671	1,140,874	1,141,510	1,142,078	1,144,288	1,145,006	1,145,741	1,145,836	1,145,900	1,145,983	1,145,983	1,145,983	1,145,983	1,145,983					
June-89	131,654	415,398	576,800	731,889	811,584	895,533	936,684	955,349	999,849	1,017,126	1,032,040	1,060,186	1,074,102	1,089,934	1,108,376	1,126,235	1,147,403	1,157,458	1,164,985	1,178,930	1,193,712	1,206,048	1,216,929	1,227,147	1,246,391	1,260,610	1,269,507	1,273,848	1,274,184	1,274,184	1,279,059						
June-90	233,608	695,685	1,052,182	1,224,162	1,354,697	1,427,692	1,488,096	1,536,324	1,567,188	1,604,683	1,637,523	1,658,777	1,680,547	1,714,885	1,752,807	1,778,979	1,821,497	1,836,851	1,849,519	1,851,871	1,853,225	1,854,022	1,856,452	1,857,840	1,861,177	1,861,474	1,861,705	1,861,935	1,862,034	1,862,034							
June-91	236,602	942,522	1,192,208	1,419,689	1,530,020	1,581,521	1,621,661	1,644,367	1,676,462	1,699,513	1,748,257	1,799,332	1,845,064	1,889,995	1,951,997	2,058,075	2,109,105	2,138,832	2,230,499	2,269,406	2,337,283	2,427,731	2,454,390	2,467,892	2,474,842	2,480,194	2,556,786	2,613,928	2,617,375								
June-92	391,819	811,780	1,023,022	1,084,480	1,141,810	1,171,673	1,196,735	1,319,302	1,369,241	1,426,734	1,445,752	1,475,976	1,501,400	1,542,584	1,553,065	1,562,833	1,573,916	1,589,949	1,615,152	1,692,813	1,819,909	1,945,315	1,977,667	2,060,792	2,086,626	2,110,139	2,125,864	2,134,707									
June-93	344,830	901,476	1,061,794	1,155,998	1,198,560	1,220,287	1,266,026	1,272,695	1,293,165	1,297,361	1,300,910	1,301,951	1,307,475	1,311,803	1,319,110	1,321,122	1,322,034	1,323,404	1,323,509	1,323,675	1,327,602	1,358,187	1,359,273	1,359,273	1,359,348	1,359,348	1,359,348										
June-94	431,268	816,076	959,344	1,052,996	1,141,756	1,231,287	1,271,524	1,296,482	1,314,355	1,335,010	1,357,475	1,376,074	1,390,533	1,402,752	1,413,794	1,423,336	1,430,519	1,446,576	1,458,508	1,476,979	1,496,298	1,505,910	1,542,406	1,552,299	1,564,566	1,582,922											
June-95	351,310	722,998	906,028	985,528	1,057,961	1,106,846	1,136,019	1,186,110	1,209,822	1,232,732	1,266,835	1,285,546	1,294,524	1,301,613	1,305,920	1,312,490	1,318,475	1,323,435	1,325,511	1,329,061	1,329,847	1,333,586	1,337,649	1,340,065	1,341,063												
June-96	344,486	709,731	859,884	962,823	1,085,060	1,150,008	1,181,678	1,213,854	1,256,984	1,305,951	1,334,696	1,371,532	1,394,601	1,418,259	1,433,202	1,445,908	1,456,275	1,465,439	1,469,259	1,471,403	1,475,398	1,477,482	1,480,572	1,484,435													
June-97	404,402	880,944	1,029,045	1,129,661	1,192,806	1,242,248	1,291,581	1,332,755	1,404,699	1,468,293	1,534,845	1,608,334	1,629,854	1,671,824	1,708,017	1,745,451	1,758,270	1,766,104	1,811,375	1,823,449	1,828,896	1,832,642	1,832,854														
June-98	352,321	850,419	1,071,815	1,188,934	1,283,207	1,349,964	1,408,091	1,486,280	1,529,830	1,572,573	1,615,592	1,716,755	1,772,391	1,838,516	1,900,110	1,958,286	2,022,922	2,088,450	2,150,537	2,224,037	2,270,169	2,305,855															
June-99	335,840	780,685	1,009,719	1,120,546	1,237,603	1,345,867	1,452,103	1,561,531	1,613,648	1,654,503	1,683,574	1,743,457	1,791,004	1,820,118	1,838,665	1,854,418	1,895,185	1,899,790	1,906,892	1,910,565	1,915,858																
June-00	496,994	1,118,525	1,328,041	1,481,979	1,601,386	1,717,688	1,766,903	1,812,535	1,852,179	1,901,468	1,931,755	1,967,861	2,003,457	2,029,359	2,049,264	2,065,241	2,080,606	2,093,612	2,108,637	2,122,049																	
June-01	553,191	1,161,108	1,486,434	1,729,264	2,113,882	2,296,440	2,415,155	2,501,361	2,567,715	2,697,204	2,775,225	2,860,089	2,886,161	2,906,989	2,914,059	2,940,185	2,950,055	2,950,328	2,953,085																		
June-02	441,054	954,595	1,190,752	1,457,269	1,628,226	1,698,307	1,736,904	1,769,478	1,813,443	1,830,775	1,851,171	1,867,504	1,871,731	1,874,225	1,877,525	1,885,121	1,885,366	1,901,544																			
June-03	268,200	928,702	1,552,091	1,775,257	1,904,289	1,988,413	2,045,138	2,103,051	2,147,004	2,184,461	2,214,085	2,218,226	2,249,009	2,272,377	2,280,804	2,280,955	2,281,025																				
June-04	152,994	1,174,712	1,612,636	1,744,790	1,811,022	1,896,424	1,965,029	1,975,226	1,988,740	1,997,998	2,012,411	2,028,809	2,040,566	2,081,524	2,104,233	2,115,963																					
June-05	504,986	1,476,366	1,809,319	2,048,757	2,193,956	2,297,784	2,392,936	2,464,260	2,513,823	2,554,231	2,596,472	2,639,159	2,662,069	2,687,403	2,709,261																						
June-06	456,471	1,195,789	1,564,242	1,729,098	1,847,555	1,939,187	2,044,654	2,084,339	2,092,454	2,102,214	2,114,071	2,129,368	2,143,673	2,152,579																							
June-07	537,825	1,000,141	1,218,822	1,380,770	1,450,003	1,505,529	1,543,801	1,601,192	1,634,367	1,665,318	1,698,398	1,722,104	1,750,256																								
June-08	539,208	1,080,479	1,291,808	1,419,250	1,474,245	1,483,165	1,498,179	1,503,319	1,508,305	1,514,151	1,516,558	1,516,558																									
June-09	508,581	995,354	1,230,224	1,338,898	1,369,306	1,446,964	1,482,021	1,508,983	1,522,744	1,556,077	1,580,835																										
June-10	391,950	706,776	789,348	818,015	852,862	886,332	920,529	942,614	956,766	969,969																											
June-11	496,567	863,714	960,779	1,031,286	1,110,947	1,122,566	1,127,995	1,131,537	1,133,277																												
June-12	293,489	638,905	723,823	781,875	824,519	860,213	871,090	900,402																													
June-13	286,539	659,431	752,139	788,982	809,275	827,247	827,858																														
June-14	290,720	674,005	774,112	827,240	857,134	879,000																															
June-15	468,795	894,585	1,082,884	1,140,433	1,173,153																																
June-16	502,405	850,852	977,505	1,021,547																																	
June-17	474,788	1,005,971	1,212,798																																		
June-18	414,037	834,104																																			
June-19	470,708																																				

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
June-83	2.326	1.428	1.264	1.202	1.175	1.097	1.146	1.288	1.104	1.086	1.054	1.015	1.002	1.019	1.006	1.000	1.002	1.003	1.000	1.000	1.003	1.012	1.072	1.036	1.027	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.619	1.477	1.266	1.232	1.109	1.200	1.187	1.179	1.094	1.065	1.047	1.004	1.006	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-85	2.326	1.428	1.264	1.246	1.171	1.098	1.115	1.045	1.048	1.032	1.015	1.029	1.012	1.041	1.038	1.040	1.040	1.036	1.054	1.063	1.067	1.061	1.044	1.048	1.066	1.053	1.046	1.040	1.041	1.054	1.051	1.049	1.027	1.003			
June-86	2.326	1.428	1.290	1.126	1.128	1.146	1.057	1.062	1.037	1.039	1.035	1.023	1.069	1.020	1.027	1.063	1.043	1.029	1.036	1.021	1.034	1.016	1.008	1.005	1.002	1.003	1.006	1.001	1.000	1.000	1.000	1.000	1.000				
June-87	2.326	1.268	1.277	1.257	1.194	1.074	1.025	1.050	1.059	1.044	1.031	1.036	1.020	1.005	1.006	1.005	1.005	1.009	1.005	1.002	1.002	1.002	1.002	1.002	1.007	0.999	1.000	1.000	1.000	1.000	1.000	1.000					
June-88	2.300	1.624	1.311	1.209	1.109	1.094	1.041	1.019	1.012	1.037	1.004	1.006	1.003	1.001	1.003	1.004	1.003	1.000	1.001	1.001	1.000	1.002	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
June-89	3.155	1.389	1.269	1.109	1.103	1.046	1.020	1.047	1.017	1.015	1.027	1.013	1.015	1.017	1.016	1.019	1.009	1.007	1.012	1.013	1.010	1.009	1.008	1.016	1.011	1.007	1.003	1.000	1.000	1.004							
June-90	2.978	1.512	1.163	1.107	1.054	1.042	1.032	1.020	1.024	1.020	1.013	1.013	1.020	1.022	1.015	1.024	1.008	1.007	1.001	1.001	1.000	1.001	1.001	1.002	1.000	1.000	1.000	1.000	1.000								
June-91	3.984	1.265	1.191	1.078	1.034	1.025	1.014	1.020	1.014	1.029	1.029	1.025	1.024	1.033	1.054	1.025	1.014	1.043	1.017	1.030	1.039	1.011	1.006	1.003	1.002	1.031	1.022	1.001									
June-92	2.072	1.260	1.060	1.053	1.026	1.021	1.102	1.038	1.042	1.013	1.021	1.017	1.027	1.007	1.006	1.007	1.010	1.016	1.048	1.075	1.069	1.017	1.042	1.013	1.011	1.007	1.004										
June-93	2.614	1.178	1.089	1.037	1.018	1.037	1.005	1.016	1.003	1.003	1.001	1.004	1.003	1.006	1.002	1.001	1.001	1.000	1.000	1.003	1.023	1.001	1.000	1.000	1.000	1.000											
June-94	1.892	1.176	1.098	1.084	1.078	1.033	1.020	1.014	1.016	1.017	1.014	1.011	1.009	1.008	1.007	1.005	1.011	1.008	1.013	1.013	1.006	1.024	1.006	1.008	1.012												
June-95	2.058	1.253	1.088	1.073	1.046	1.026	1.044	1.020	1.019	1.028	1.015	1.007	1.005	1.003	1.005	1.005	1.004	1.002	1.003	1.001	1.003	1.003	1.002	1.001													
June-96	2.060	1.212	1.120	1.127	1.060	1.028	1.027	1.036	1.039	1.022	1.028	1.017	1.017	1.011	1.009	1.007	1.006	1.003	1.001	1.003	1.001	1.002	1.003														
June-97	2.178	1.168	1.098	1.056	1.041	1.040	1.032	1.054	1.045	1.045	1.048	1.013	1.026	1.022	1.022	1.007	1.004	1.026	1.007	1.003	1.002	1.000															
June-98	2.414	1.260	1.109	1.079	1.052	1.043	1.056	1.029	1.028	1.027	1.063	1.032	1.037	1.034	1.031	1.033	1.032	1.030	1.034	1.021	1.016																
June-99	2.325	1.293	1.110	1.104	1.087	1.079	1.075	1.033	1.025	1.018	1.036	1.027	1.016	1.010	1.009	1.022	1.002	1.004	1.002	1.003																	
June-00	2.251	1.187	1.116	1.081	1.073	1.029	1.026	1.022	1.027	1.016	1.019	1.018	1.013	1.010	1.008	1.007	1.006	1.007	1.006																		
June-01	2.099	1.280	1.163	1.222	1.086	1.052	1.036	1.027	1.050	1.029	1.031	1.009	1.007	1.002	1.009	1.003	1.000	1.001																			
June-02	2.164	1.247	1.224	1.117	1.043	1.023	1.019	1.025	1.010	1.011	1.009	1.002	1.001	1.002	1.004	1.000	1.009																				
June-03	3.463	1.671	1.144	1.073	1.044	1.029	1.028	1.021	1.017	1.014	1.002	1.014	1.010	1.004	1.000	1.000																					
June-04	7.678	1.373	1.082	1.038	1.047	1.036	1.005	1.007	1.005	1.007	1.008	1.006	1.020	1.011	1.006																						
June-05	2.924	1.226	1.132	1.071	1.047	1.041	1.030	1.020	1.016	1.017	1.016	1.009	1.010	1.008																							
June-06	2.620	1.308	1.105	1.069	1.050	1.054	1.019	1.004	1.005	1.006	1.007	1.007	1.004																								
June-07	1.860	1.219	1.133	1.050	1.038	1.025	1.037	1.021	1.019	1.020	1.014	1.016																									
June-08	2.004	1.196	1.099	1.039	1.006	1.010	1.003	1.003	1.004	1.002	1.000																										
June-09	1.957	1.236	1.088	1.023	1.057	1.024	1.018	1.009	1.022	1.016																											
June-10	1.803	1.117	1.036	1.043	1.039	1.039	1.024	1.015	1.014																												
June-11	1.739	1.112	1.073	1.077	1.010	1.005	1.003	1.002																													
June-12	2.177	1.133	1.080	1.055	1.043	1.013	1.034																														
June-13	2.301	1.141	1.049	1.026	1.022	1.001																															
June-14	2.318	1.149	1.069	1.036	1.026																																
June-15	1.908	1.210	1.053	1.029																																	
June-16	1.694	1.149	1.045																																		
June-17	2.119	1.206																																			
June-18	2.015																																				

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*To Ult*
Simple Avg																																					
All Yrs	2.474	1.279	1.140	1.098	1.066	1.049	1.043	1.039	1.029	1.025	1.023	1.015	1.016	1.013	1.013	1.013	1.011	1.012	1.013	1.015	1.017	1.011	1.014	1.010	1.012	1.009	1.008	1.005	1.005	1.008	1.008	1.010	1.007	1.001	1.000	1.000	
Latest 5	2.011	1.171	1.059	1.044	1.028	1.016	1.016	1.010	1.013	1.012	1.009	1.010	1.009	1.005	1.005	1.007	1.010	1.013	1.010	1.006	1.006	1.006	1.011	1.005	1.005	1.009	1.006	1.000	1.000	1.012	1.010	1.010					
Latest 3	1.942	1.188	1.056	1.030	1.030	1.006	1.020	1.009	1.013	1.012	1.007	1.011	1.011	1.008	1.003	1.001	1.005	1.004	1.014	1.009	1.006	1.002	1.004	1.003	1.008	1.013	1.009	1.001	1.000	1.001	1.000	1.016	1.009	1.001			
Volume Wtd																																					
All Yrs	2.300	1.254	1.119	1.081	1.053	1.038	1.032	1.024	1.023	1.020	1.020	1.014	1.014	1.011	1.012	1.011	1.009	1.012	1.012	1.015	1.017	1.008	1.009	1.006	1.007	1.010	1.008	1.002	1.003	1.006	1.007	1.010	1.007	1.001	1.000		
Latest 5	1.980	1.175	1.058	1.045	1.027	1.017	1.015	1.010	1.012	1.012	1.010	1.010	1.009	1.005	1.005	1.006	1.009	1.012	1.011	1.007	1.007	1.006	1.013	1.005	1.005	1.011	1.008	1.001	1.000	1.007	1.007						
Latest 3	1.934	1.190	1.055	1.030	1.030	1.006	1.019	1.008	1.013	1.013	1.007	1.010	1.011	1.008	1.003	1.001	1.004	1.004	1.015	1.010	1.007	1.002	1.004	1.003	1.008	1.016	1.010	1.001	1.000	1.002	1.000	1.015	1.008				
Dev Factor Sele	.																																				
Industry 1	1.968	1.147	1.054	1.025	1.017	1.010	1.012	1.012	1.010	1.009	1.010	1.009	1.009	1.009	1.008	1.008	1.007	1.007																			
Industry 2		1.281	1.080	1.034	1.020	1.017	1.009	1.011	1.009	1.009	1.006	1.007	1.009	1.008	1.008	1.012	1.007	1.006	1.007	1.006																	
Prior	*2.406*	*1.256*	*1.121*	*1.083*	*1.053*	*1.039*	*1.032*	*1.017*	*1.017*	*1.015*	*1.014*	*1.009*	*1.013*	*1.013*	*1.013*	*1.014*	*1.009*	*1.013*	*1.013*	*1.016*	*1.018*	*1.010*	*1.005*	*1.004*	*1.004*	*1.004*	*1.004*	*1.004*	*1.004*	*1.004*	*1.004*	*1.004*	*1.002*	*1.002*	*1.002*	*1.008*	
Selected	2.393	1.254	1.119	1.081	1.053	1.038	1.032	1.017	1.016	1.016	1.012	1.011	1.012	1.013	1.013	1.013	1.010	1.012	1.012	1.015	1.017	1.010	1.005	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.002	1.002	1.002	1.002	1.008
FacToUlt	5.284	2.208	1.761	1.574	1.456	1.383	1.332	1.291	1.269	1.249	1.229	1.214	1.201	1.187	1.172	1.157	1.142	1.131	1.117	1.104	1.087	1.069	1.058	1.053	1.049	1.045	1.040	1.036	1.032	1.028	1.024	1.020	1.016	1.014	1.012	1.010	1.008
Percent of Ult	18.9%	45.3%	56.8%	63.5%	68.7%	72.3%	75.1%	77.5%	78.8%	80.1%	81.3%	82.4%	83.3%	84.2%	85.3%	86.4%	87.6%	88.4%	89.5%	90.6%	92.0%	93.6%	94.5%	95.0%	95.3%	95.7%	96.1%	96.5%	96.9%	97.3%	97.7%	98.0%	98.4%	98.6%	98.8%	99.0%	99.2%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	1,596,942	1,789,484	1,593,395	1,838,254	(3,547)	-0.2%	48,770	2.7%
6/30/82-83	164,749	167,711	164,749	167,692	0	0.0%	(19)	0.0%
6/30/83-84	730,414	745,034	730,414	744,949	0	0.0%	(85)	0.0%
6/30/84-85	564,000	568,000	566,000	570,000	2,000	0.4%	2,000	0.4%
6/30/85-86	570,000	571,000	570,000	571,000	0	0.0%	0	0.0%
6/30/86-87	659,000	660,000	658,000	659,000	(1,000)	-0.2%	(1,000)	-0.2%
6/30/87-88	1,171,000	1,174,000	1,169,000	1,171,000	(2,000)	-0.2%	(3,000)	-0.3%
6/30/88-89	1,306,000	1,308,000	1,309,000	1,310,000	3,000	0.2%	2,000	0.2%
6/30/89-90	1,918,000	1,919,000	1,914,000	1,915,000	(4,000)	-0.2%	(4,000)	-0.2%
6/30/90-91	2,703,000	2,839,200	2,701,000	2,837,100	(2,000)	-0.1%	(2,100)	-0.1%
6/30/91-92	2,207,000	2,318,400	2,211,000	2,322,600	4,000	0.2%	4,200	0.2%
6/30/92-93	1,416,000	1,417,000	1,413,000	1,414,000	(3,000)	-0.2%	(3,000)	-0.2%
6/30/93-94	1,636,000	1,638,000	1,652,000	1,654,000	16,000	1.0%	16,000	1.0%
6/30/94-95	1,407,000	1,408,000	1,405,000	1,407,000	(2,000)	-0.1%	(1,000)	-0.1%
6/30/95-96	1,561,000	1,564,000	1,561,000	1,563,000	0	0.0%	(1,000)	-0.1%
6/30/96-97	1,951,000	1,955,000	1,936,000	1,940,000	(15,000)	-0.8%	(15,000)	-0.8%
6/30/97-98	2,455,000	2,465,000	2,456,000	2,465,000	1,000	0.0%	0	0.0%
6/30/98-99	2,098,000	2,107,000	2,075,000	2,083,000	(23,000)	-1.1%	(24,000)	-1.1%
6/30/99-00	2,343,000	2,356,000	2,330,000	2,342,000	(13,000)	-0.6%	(14,000)	-0.6%
6/30/00-01	3,315,000	3,341,000	3,277,000	3,300,000	(38,000)	-1.1%	(41,000)	-1.2%
6/30/01-02	2,142,000	2,154,000	2,138,000	2,150,000	(4,000)	-0.2%	(4,000)	-0.2%
6/30/02-03	2,624,000	2,642,000	2,587,000	2,605,000	(37,000)	-1.4%	(37,000)	-1.4%
6/30/03-04	2,453,000	2,470,000	2,432,000	2,448,000	(21,000)	-0.9%	(22,000)	-0.9%
6/30/04-05	2,960,000	3,196,000	2,838,000	3,016,250	(122,000)	-4.1%	(179,750)	-5.6%
6/30/05-06	2,330,000	2,581,000	2,311,000	2,555,000	(19,000)	-0.8%	(26,000)	-1.0%
6/30/06-07	1,926,000	2,197,650	1,927,000	2,123,020	1,000	0.1%	(74,630)	-3.4%
6/30/07-08	1,745,000	1,963,500	1,709,000	1,859,410	(36,000)	-2.1%	(104,090)	-5.3%
6/30/08-09	1,786,000	2,045,400	1,772,000	2,040,150	(14,000)	-0.8%	(5,250)	-0.3%
6/30/09-10	1,157,000	1,386,000	1,151,000	1,353,450	(6,000)	-0.5%	(32,550)	-2.3%
6/30/10-11	1,392,000	1,593,900	1,366,000	1,546,650	(26,000)	-1.9%	(47,250)	-3.0%
6/30/11-12	1,222,000	1,387,050	1,221,000	1,345,050	(1,000)	-0.1%	(42,000)	-3.0%
6/30/12-13	1,206,000	1,429,050	1,158,000	1,340,850	(48,000)	-4.0%	(88,200)	-6.2%
6/30/13-14	1,317,000	1,579,200	1,276,000	1,484,700	(41,000)	-3.1%	(94,500)	-6.0%
6/30/14-15	1,806,000	2,021,250	1,708,000	1,893,150	(98,000)	-5.4%	(128,100)	-6.3%
6/30/15-16	1,736,000	2,005,500	1,608,000	1,844,850	(128,000)	-7.4%	(160,650)	-8.0%
6/30/16-17	2,054,000	2,355,150	1,989,000	2,241,750	(65,000)	-3.2%	(113,400)	-4.8%
6/30/17-18	1,954,000	2,333,100	1,813,000	1,934,100	(141,000)	-7.2%	(399,000)	-17.1%
6/30/18-19								
Total	63,582,105	67,650,579	62,695,558	66,055,975	(886,547)	-1.4%	(1,594,604)	-2.4%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 4, Exhibit 2, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.8%	0.0%	0.2%	0.1%	1.000	1.000
444	99.2%	0.2%	0.8%	0.0%	0.0%	0.981	0.971
432	99.0%	0.2%	1.0%	0.0%	0.0%	0.951	0.928
420	98.8%	0.2%	1.2%	0.1%	0.0%	0.925	0.891
408	98.6%	0.2%	1.4%	0.1%	0.0%	0.903	0.860
396	98.4%	0.4%	1.6%	0.1%	0.1%	0.882	0.831
384	98.0%	0.4%	2.0%	0.1%	0.1%	0.875	0.822
372	97.7%	0.4%	2.3%	0.1%	0.1%	0.864	0.808
360	97.3%	0.4%	2.7%	0.1%	0.1%	0.852	0.792
348	96.9%	0.4%	3.1%	0.1%	0.1%	0.840	0.775
336	96.5%	0.4%	3.5%	0.1%	0.1%	0.826	0.757
324	96.1%	0.4%	3.9%	0.1%	0.1%	0.813	0.740
312	95.7%	0.4%	4.3%	0.1%	0.1%	0.800	0.723
300	95.3%	0.4%	4.7%	0.1%	0.1%	0.786	0.705
288	95.0%	0.5%	5.0%	0.2%	0.1%	0.773	0.689
276	94.5%	0.9%	5.5%	0.4%	0.3%	0.763	0.677
264	93.6%	1.6%	6.4%	0.7%	0.5%	0.770	0.687
252	92.0%	1.3%	8.0%	0.6%	0.4%	0.788	0.712
240	90.6%	1.1%	9.4%	0.5%	0.4%	0.790	0.715
228	89.5%	1.1%	10.5%	0.5%	0.4%	0.783	0.706
216	88.4%	0.9%	11.6%	0.4%	0.3%	0.774	0.694
204	87.6%	1.1%	12.4%	0.6%	0.4%	0.760	0.677
192	86.4%	1.1%	13.6%	0.6%	0.4%	0.752	0.666
180	85.3%	1.1%	14.7%	0.6%	0.5%	0.742	0.654
168	84.2%	1.0%	15.8%	0.6%	0.4%	0.732	0.642
156	83.3%	0.9%	16.7%	0.6%	0.4%	0.720	0.626
144	82.4%	1.0%	17.6%	0.6%	0.5%	0.707	0.611
132	81.3%	1.3%	18.7%	0.8%	0.7%	0.696	0.598
120	80.1%	1.3%	19.9%	0.9%	0.7%	0.690	0.590
108	78.8%	1.3%	21.2%	1.0%	0.8%	0.682	0.581
96	77.5%	2.4%	22.5%	1.8%	1.5%	0.675	0.574
84	75.1%	2.8%	24.9%	2.1%	1.9%	0.681	0.582
72	72.3%	3.6%	27.7%	2.9%	2.6%	0.687	0.591
60	68.7%	5.1%	31.3%	4.3%	4.0%	0.698	0.606
48	63.5%	6.8%	36.5%	5.9%	5.5%	0.715	0.628
36	56.8%	11.5%	43.2%	10.4%	9.9%	0.733	0.652
24	45.3%	26.4%	54.7%	24.9%	24.2%	0.763	0.690
12	18.9%	18.9%	81.1%	18.6%	18.4%	0.814	0.755
Total		100.0%					

NOTES:

(2) = 1 / Section 4, Exhibit 2, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	331,379	576,238		318,756	554,288
6/30/82-83	0	2,943	0.981	0	2,886
6/30/83-84	0	14,535	0.951	0	13,816
6/30/84-85	3,048	7,048	0.925	2,820	6,521
6/30/85-86	6,668	7,668	0.903	6,020	6,922
6/30/86-87	10,313	11,313	0.882	9,099	9,981
6/30/87-88	23,017	25,017	0.875	20,137	21,887
6/30/88-89	29,941	30,941	0.864	25,882	26,746
6/30/89-90	51,966	52,966	0.852	44,298	45,150
6/30/90-91	83,625	219,725	0.840	70,214	184,488
6/30/91-92	76,293	187,893	0.826	63,049	155,275
6/30/92-93	53,652	54,652	0.813	43,618	44,431
6/30/93-94	69,078	71,078	0.800	55,230	56,829
6/30/94-95	63,937	65,937	0.786	50,263	51,835
6/30/95-96	76,565	78,565	0.773	59,172	60,718
6/30/96-97	103,146	107,146	0.763	78,750	81,804
6/30/97-98	150,145	159,145	0.770	115,596	122,525
6/30/98-99	159,142	167,142	0.788	125,421	131,725
6/30/99-00	207,951	219,951	0.790	164,221	173,698
6/30/00-01	323,915	346,915	0.783	253,562	271,566
6/30/01-02	236,456	248,456	0.774	182,914	192,197
6/30/02-03	305,975	323,975	0.760	232,664	246,351
6/30/03-04	316,037	332,037	0.752	237,678	249,711
6/30/04-05	128,739	306,989	0.742	95,568	227,889
6/30/05-06	158,421	402,421	0.732	115,988	294,634
6/30/06-07	176,744	372,764	0.720	127,243	268,363
6/30/07-08	192,442	342,852	0.707	136,131	242,529
6/30/08-09	191,165	459,315	0.696	133,138	319,891
6/30/09-10	181,031	383,481	0.690	124,852	264,476
6/30/10-11	232,723	413,373	0.682	158,738	281,957
6/30/11-12	320,598	444,648	0.675	216,455	300,209
6/30/12-13	330,142	512,992	0.681	224,787	349,286
6/30/13-14	397,000	605,700	0.687	272,831	416,257
6/30/14-15	534,847	719,997	0.698	373,220	502,419
6/30/15-16	586,453	823,303	0.715	419,122	588,393
6/30/16-17	776,202	1,028,952	0.733	568,979	754,252
6/30/17-18	978,896	1,099,996	0.763	746,701	839,075
6/30/18-19	1,506,292	2,016,292	0.814	1,225,865	1,640,918
Total	9,373,946	13,244,363		7,098,979	10,001,897
			(7) Total Discount Factor:	0.757	0.755

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	331,379	576,238
(9) Projected Number of Years:	2	2
(10) Projected Paid Loss per Year:	165,689	288,119
(11) Discounted Value at 4%:	318,756	554,288

NOTES:
(2), (3) From Section 4, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 4, Exhibit 2, Page 9, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Department of Corrections - Cluster 3
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	331,379	576,238		312,887	544,082
6/30/82-83	0	2,943	0.971	0	2,858
6/30/83-84	0	14,535	0.928	0	13,481
6/30/84-85	3,048	7,048	0.891	2,717	6,282
6/30/85-86	6,668	7,668	0.860	5,732	6,592
6/30/86-87	10,313	11,313	0.831	8,573	9,404
6/30/87-88	23,017	25,017	0.822	18,914	20,557
6/30/88-89	29,941	30,941	0.808	24,188	24,996
6/30/89-90	51,966	52,966	0.792	41,152	41,944
6/30/90-91	83,625	219,725	0.775	64,801	170,266
6/30/91-92	76,293	187,893	0.757	57,791	142,325
6/30/92-93	53,652	54,652	0.740	39,700	40,440
6/30/93-94	69,078	71,078	0.723	49,912	51,357
6/30/94-95	63,937	65,937	0.705	45,099	46,510
6/30/95-96	76,565	78,565	0.689	52,716	54,093
6/30/96-97	103,146	107,146	0.677	69,843	72,552
6/30/97-98	150,145	159,145	0.687	103,160	109,344
6/30/98-99	159,142	167,142	0.712	113,386	119,086
6/30/99-00	207,951	219,951	0.715	148,687	157,267
6/30/00-01	323,915	346,915	0.706	228,688	244,926
6/30/01-02	236,456	248,456	0.694	164,101	172,429
6/30/02-03	305,975	323,975	0.677	207,114	219,298
6/30/03-04	316,037	332,037	0.666	210,627	221,290
6/30/04-05	128,739	306,989	0.654	84,233	200,860
6/30/05-06	158,421	402,421	0.642	101,647	258,205
6/30/06-07	176,744	372,764	0.626	110,711	233,497
6/30/07-08	192,442	342,852	0.611	117,567	209,456
6/30/08-09	191,165	459,315	0.598	114,266	274,549
6/30/09-10	181,031	383,481	0.590	106,829	226,297
6/30/10-11	232,723	413,373	0.581	135,317	240,356
6/30/11-12	320,598	444,648	0.574	183,918	255,082
6/30/12-13	330,142	512,992	0.582	192,250	298,729
6/30/13-14	397,000	605,700	0.591	234,823	358,268
6/30/14-15	534,847	719,997	0.606	324,031	436,202
6/30/15-16	586,453	823,303	0.628	368,277	517,012
6/30/16-17	776,202	1,028,952	0.652	505,792	670,490
6/30/17-18	978,896	1,099,996	0.690	675,132	758,654
6/30/18-19	1,506,292	2,016,292	0.755	1,137,141	1,522,154
Total	9,373,946	13,244,363		6,361,723	8,951,192
			(7) Total Discount Factor:	0.679	0.676

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	331,379	576,238
(9) Projected Number of Years:	2	2
(10) Projected Paid Loss per Year:	165,689	288,119
(11) Discounted Value at 6%:	312,887	544,082

NOTES:
(2), (3) From Section 4, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 4, Exhibit 2, Page 9, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		2,353,814			2,634,537	2,688,363	280,723	334,549		
6/30/82-83		134,406	135,012		138,000	140,000	3,594	5,594		
6/30/83-84		188,031	197,156		192,000	196,000	3,969	7,969		
6/30/84-85	176,924	1,942,197	1,958,386	1,955,423	1,955,000	1,958,000	12,803	15,803	1.105	1.107
6/30/85-86	188,662	1,624,227	1,639,141	1,636,551	1,657,000	1,690,000	32,773	65,773	0.878	0.896
6/30/86-87	212,277	2,536,801	2,564,257	2,558,615	2,559,000	2,564,000	22,199	27,199	1.206	1.208
6/30/87-88	243,118	2,413,960	2,445,704	2,441,967	2,442,000	2,446,000	28,040	32,040	1.004	1.006
6/30/88-89	248,990	2,054,002	2,087,011	2,083,108	2,083,000	2,087,000	28,998	32,998	0.837	0.838
6/30/89-90	250,404	522,038	532,033	536,124	533,000	543,000	10,962	20,962	0.213	0.217
6/30/90-91	235,170	2,484,849	2,537,759	2,537,356	2,510,000	2,535,000	25,151	50,151	1.067	1.078
6/30/91-92	235,607	2,595,641	2,654,988	2,654,058	2,622,000	2,648,000	26,359	52,359	1.113	1.124
6/30/92-93	241,161	450,365	458,358	458,340	455,000	473,000	4,635	22,635	0.189	0.196
6/30/93-94	254,321	710,933	728,001	727,688	719,000	747,000	8,067	36,067	0.283	0.294
6/30/94-95	256,665	761,806	781,452	780,978	770,000	800,000	8,194	38,194	0.300	0.312
6/30/95-96	265,739	591,722	609,139	608,802	598,000	622,000	6,278	30,278	0.225	0.234
6/30/96-97	296,336	512,528	532,276	531,946	518,000	539,000	5,473	26,473	0.175	0.182
6/30/97-98	296,982	463,804	478,859	478,997	469,000	487,000	5,196	23,196	0.158	0.164
6/30/98-99	299,530	670,684	695,612	695,128	678,000	705,000	7,316	34,316	0.226	0.235
6/30/99-00	323,627	1,216,150	1,275,757	1,272,303	1,229,000	1,277,000	12,850	60,850	0.380	0.395
6/30/00-01	338,348	1,457,179	1,534,230	1,529,489	1,529,000	1,534,000	71,821	76,821	0.452	0.453
6/30/01-02	329,555	775,348	815,041	814,093	814,000	815,000	38,652	39,652	0.247	0.247
6/30/02-03	329,179	901,243	948,339	946,924	947,000	948,000	45,757	46,757	0.288	0.288
6/30/03-04	344,547	268,295	285,025	286,943	285,000	287,000	16,705	18,705	0.083	0.083
6/30/04-05	325,530	624,705	671,216	669,231	669,000	671,000	44,295	46,295	0.206	0.206
6/30/05-06	403,750	353,027	383,087	411,308	383,000	411,000	29,973	57,973	0.095	0.102
6/30/06-07	420,219	442,769	479,332	506,140	479,000	506,000	36,231	63,231	0.114	0.120
6/30/07-08	425,998	519,052	565,148	586,132	565,000	586,000	45,948	66,948	0.133	0.138
6/30/08-09	420,566	896,558	982,141	969,596	970,000	982,000	73,442	85,442	0.231	0.233
6/30/09-10	433,206	636,168	697,459	717,379	697,000	717,000	60,832	80,832	0.161	0.166
6/30/10-11	444,673	1,033,495	1,163,909	1,130,020	1,130,000	1,164,000	96,505	130,505	0.254	0.262
6/30/11-12	467,753	959,557	1,092,328	1,076,665	1,077,000	1,092,000	117,443	132,443	0.230	0.233
6/30/12-13	495,398	631,662	741,915	762,871	742,000	763,000	110,338	131,338	0.150	0.154
6/30/13-14	518,391	496,066	565,517	670,654	566,000	671,000	69,934	174,934	0.109	0.129
6/30/14-15	539,631	887,346	1,203,404	1,178,285	1,178,000	1,323,300	290,654	435,954	0.218	0.245
6/30/15-16	585,875	908,616	1,424,466	1,355,987	1,356,000	1,566,400	447,384	657,784	0.231	0.267
6/30/16-17	594,787	855,741	1,522,198	1,472,985	1,473,000	1,674,200	617,259	818,459	0.248	0.281
6/30/17-18	607,484	432,151	1,124,392	1,211,682	1,124,000	1,212,000	691,849	779,849	0.185	0.200
6/30/18-19	656,644	235,059	1,347,332	1,441,292	1,347,000	1,441,000	1,111,941	1,205,941	0.205	0.219
Total	12,707,047	37,541,995	39,857,381	39,695,063	42,092,537	43,509,263	4,550,542	5,967,268		
Tot 6/30/84-19	12,707,047	34,865,744	39,525,213	39,695,063	39,128,000	40,484,900	4,262,256	5,619,156	0.308	0.319

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) Sum of Section 5, Exhibit 1, Page 2, Column 3 and Section 5, Exhibit 1, Page 9, Column 8
(4) From Section 5, Exhibit 1, Page 2, Column 8
(5) From Section 5, Exhibit 1, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim	Average Age
All Prior Yrs		2,265,774							1	1		83
6/30/82-83		134,406	1.005	1.000	135,012	0	135,012		0	0		
6/30/83-84		160,531	1.007	1.050	169,656	27,500	197,156		0	0		
6/30/84-85	176,924	1,898,197	1.009	1.000	1,914,386	44,000	1,958,386	1.107	0	0		
6/30/85-86	188,662	1,414,227	1.011	1.000	1,429,141	210,000	1,639,141	0.869	0	0		
6/30/86-87	212,277	2,184,801	1.013	1.000	2,212,257	352,000	2,564,257	1.208	0	0		
6/30/87-88	243,118	2,175,460	1.015	1.000	2,207,204	238,500	2,445,704	1.006	1	0		
6/30/88-89	248,990	1,986,002	1.017	1.000	2,019,011	68,000	2,087,011	0.838	1	1	33,010	69
6/30/89-90	250,404	471,448	1.019	1.000	480,243	51,791	532,033	0.212	0	0		
6/30/90-91	235,170	2,276,349	1.021	1.000	2,323,450	214,309	2,537,759	1.079	1	1	47,102	79
6/30/91-92	235,607	2,346,641	1.023	1.000	2,399,988	255,000	2,654,988	1.127	1	1	53,346	77
6/30/92-93	241,161	292,355	1.025	1.000	299,599	158,759	458,358	0.190	0	0		
6/30/93-94	254,321	580,633	1.027	1.000	596,211	131,791	728,001	0.286	0	0		
6/30/94-95	256,665	624,606	1.029	1.000	642,646	138,807	781,452	0.304	0	0		
6/30/95-96	265,739	475,722	1.034	1.000	491,909	117,230	609,139	0.229	0	0		
6/30/96-97	296,336	472,528	1.039	1.000	491,049	41,228	532,276	0.180	0	0		
6/30/97-98	296,982	320,304	1.044	1.000	334,523	144,336	478,859	0.161	0	0		
6/30/98-99	299,530	477,184	1.050	1.000	500,859	194,752	695,612	0.232	1	0		
6/30/99-00	323,627	1,036,650	1.055	1.000	1,093,523	182,234	1,275,757	0.394	0	0		
6/30/00-01	338,348	1,227,179	1.060	1.000	1,300,977	233,252	1,534,230	0.453	0	0		
6/30/01-02	329,555	582,848	1.065	1.000	620,988	194,052	815,041	0.247	0	0		
6/30/02-03	329,179	641,271	1.071	1.000	686,650	261,689	948,339	0.288	1	1	45,379	55
6/30/03-04	344,547	212,295	1.076	1.000	228,454	56,571	285,025	0.083	0	0		
6/30/04-05	325,530	457,755	1.097	1.000	502,175	169,040	671,216	0.206	0	0		
6/30/05-06	403,750	276,027	1.103	1.000	304,400	78,687	383,087	0.095	0	0		
6/30/06-07	420,219	324,328	1.103	1.000	357,666	121,666	479,332	0.114	0	0		
6/30/07-08	425,998	401,552	1.103	1.000	442,827	122,321	565,148	0.133	1	0		
6/30/08-09	420,566	733,058	1.103	1.000	808,408	173,733	982,141	0.234	0	0		
6/30/09-10	433,206	453,578	1.111	1.000	503,735	193,724	697,459	0.161	0	1	50,157	67
6/30/10-11	444,673	933,495	1.120	1.000	1,045,358	118,551	1,163,909	0.262	3	2	55,932	48
6/30/11-12	467,753	808,557	1.131	1.000	914,507	177,821	1,092,328	0.234	5	0		
6/30/12-13	495,398	592,864	1.154	1.000	684,325	57,591	741,915	0.150	2	2	45,730	58
6/30/13-14	518,391	247,039	1.216	1.000	300,372	265,146	565,517	0.109	1	1	53,333	62
6/30/14-15	539,631	809,710	1.300	1.000	1,052,327	151,077	1,203,404	0.223	5	4	60,654	58
6/30/15-16	585,875	863,615	1.459	1.000	1,260,049	164,416	1,424,466	0.243	8	6	66,072	60
6/30/16-17	594,787	695,741	1.718	1.000	1,195,151	327,047	1,522,198	0.256	16	7	71,344	60
6/30/17-18	607,484	432,151	2.229	1.000	963,473	160,919	1,124,392	0.185	76	13	40,871	50
6/30/18-19	656,644	235,059	4.749	1.000	1,116,247	231,085	1,347,332	0.205		49	17,983	48
Total	12,707,047	32,521,938			34,028,756	5,828,625	39,857,381		124	90		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 5, Exhibit 1, Page 7
(5) Based on information from the MA WCRIB
(6) = (3) x (4) x (5)
(7) From Section 5, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	176,924	0.884	1,898,197	1.009	1,911,423	44,000	1,955,423	1.105	1.080
6/30/85-86	188,662	0.626	1,414,227	1.011	1,426,551	210,000	1,636,551	0.867	0.756
6/30/86-87	212,277	0.828	2,184,801	1.013	2,206,615	352,000	2,558,615	1.205	1.039
6/30/87-88	243,118	0.801	2,175,460	1.015	2,203,467	238,500	2,441,967	1.004	0.906
6/30/88-89	248,990	0.715	1,986,002	1.017	2,015,108	68,000	2,083,108	0.837	0.809
6/30/89-90	250,404	0.281	471,448	1.019	484,334	51,791	536,124	0.214	0.193
6/30/90-91	235,170	0.980	2,276,349	1.021	2,323,047	214,309	2,537,356	1.079	0.988
6/30/91-92	235,607	1.001	2,346,641	1.023	2,399,059	255,000	2,654,058	1.126	1.018
6/30/92-93	241,161	0.124	292,355	1.025	299,581	158,759	458,340	0.190	0.124
6/30/93-94	254,321	0.230	580,633	1.027	595,898	131,791	727,688	0.286	0.234
6/30/94-95	256,665	0.244	624,606	1.029	642,172	138,807	780,978	0.304	0.250
6/30/95-96	265,739	0.181	475,722	1.034	491,573	117,230	608,802	0.229	0.185
6/30/96-97	296,336	0.163	472,528	1.039	490,718	41,228	531,946	0.180	0.166
6/30/97-98	296,982	0.114	320,304	1.044	334,661	144,336	478,997	0.161	0.113
6/30/98-99	299,530	0.164	477,184	1.050	500,376	194,752	695,128	0.232	0.167
6/30/99-00	323,627	0.317	1,036,650	1.055	1,090,069	182,234	1,272,303	0.393	0.337
6/30/00-01	338,348	0.360	1,227,179	1.060	1,296,236	233,252	1,529,489	0.452	0.383
6/30/01-02	329,555	0.184	582,848	1.065	620,041	194,052	814,093	0.247	0.188
6/30/02-03	329,179	0.202	641,271	1.071	685,235	261,689	946,924	0.288	0.208
6/30/03-04	344,547	0.074	212,295	1.076	230,372	56,571	286,943	0.083	0.067
6/30/04-05	325,530	0.147	457,755	1.097	500,191	169,040	669,231	0.206	0.154
6/30/05-06	403,750	0.150	276,027	1.103	332,621	78,687	411,308	0.102	0.082
6/30/06-07	420,219	0.154	324,328	1.103	384,474	121,666	506,140	0.120	0.091
6/30/07-08	425,998	0.157	401,552	1.103	463,811	122,321	586,132	0.138	0.109
6/30/08-09	420,566	0.160	733,058	1.103	795,863	173,733	969,596	0.231	0.189
6/30/09-10	433,206	0.162	453,578	1.111	523,654	193,724	717,379	0.166	0.121
6/30/10-11	444,673	0.164	933,495	1.120	1,011,470	118,551	1,130,020	0.254	0.227
6/30/11-12	467,753	0.167	808,557	1.131	898,844	177,821	1,076,665	0.230	0.192
6/30/12-13	495,398	0.170	592,864	1.154	705,280	57,591	762,871	0.154	0.142
6/30/13-14	518,391	0.172	247,039	1.216	405,509	265,146	670,654	0.129	0.078
6/30/14-15	539,631	0.175	809,710	1.300	1,027,207	151,077	1,178,285	0.218	0.190
6/30/15-16	585,875	0.178	863,615	1.459	1,191,570	164,416	1,355,987	0.231	0.203
6/30/16-17	594,787	0.181	695,741	1.718	1,145,939	327,047	1,472,985	0.248	0.193
6/30/17-18	607,484	0.185	432,151	2.229	1,050,762	160,919	1,211,682	0.199	0.173
6/30/18-19	656,644	0.188	235,059	4.749	1,210,207	231,085	1,441,292	0.219	0.184
Total	12,707,047		29,961,228		33,893,938	5,801,125	39,695,063		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 5, Exhibit 1, Page 4, Column 11
(4) From Section 5, Exhibit 1, Page 2, Column 3
(5) From Section 5, Exhibit 1, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) From Section 5, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.884	0.884
6/30/85-86									0.626	0.626
6/30/86-87									0.828	0.828
6/30/87-88									0.801	0.801
6/30/88-89									0.715	0.715
6/30/89-90									0.281	0.281
6/30/90-91	235,170	2,323,450	0.988	0.996	0.984	1.335	1.314	0.143	0.971	0.980
6/30/91-92	235,607	2,399,988	1.019	1.093	1.113	1.321	1.471	0.132	0.994	1.001
6/30/92-93	241,161	299,599	0.124	1.275	0.158	1.308	0.207	0.114	0.124	0.124
6/30/93-94	254,321	596,211	0.234	1.258	0.295	1.295	0.382	0.117	0.231	0.230
6/30/94-95	256,665	642,646	0.250	1.247	0.312	1.282	0.400	0.119	0.245	0.244
6/30/95-96	265,739	491,909	0.185	1.237	0.229	1.270	0.291	0.121	0.182	0.181
6/30/96-97	296,336	491,049	0.166	1.224	0.203	1.257	0.255	0.123	0.163	0.163
6/30/97-98	296,982	334,523	0.113	1.209	0.136	1.245	0.169	0.126	0.113	0.114
6/30/98-99	299,530	500,859	0.167	1.193	0.199	1.232	0.246	0.129	0.164	0.164
6/30/99-00	323,627	1,093,523	0.338	1.174	0.397	1.220	0.484	0.133	0.319	0.317
6/30/00-01	338,348	1,300,977	0.385	1.144	0.440	1.208	0.531	0.137	0.362	0.360
6/30/01-02	329,555	620,988	0.188	1.122	0.211	1.196	0.253	0.142	0.184	0.184
6/30/02-03	329,179	686,650	0.209	1.118	0.233	1.184	0.276	0.144	0.200	0.202
6/30/03-04	344,547	228,454	0.066	1.118	0.074	1.173	0.087	0.145	0.074	0.074
6/30/04-05	325,530	502,175	0.154	1.111	0.171	1.161	0.199	0.147	0.131	0.147
6/30/05-06	403,750	304,400	0.075	1.099	0.083	1.149	0.095	0.150	0.135	0.150
6/30/06-07	420,219	357,666	0.085	1.087	0.093	1.138	0.105	0.154	0.140	0.154
6/30/07-08	425,998	442,827	0.104	1.075	0.112	1.127	0.126	0.157	0.144	0.157
6/30/08-09	420,566	808,408	0.192	1.063	0.204	1.116	0.228	0.160	0.149	0.160
6/30/09-10	433,206	503,735	0.116	1.059	0.123	1.105	0.136	0.162	0.152	0.162
6/30/10-11	444,673	1,045,358	0.235	1.060	0.249	1.094	0.273	0.164	0.155	0.164
6/30/11-12	467,753	914,507	0.196	1.053	0.206	1.083	0.223	0.167	0.159	0.167
6/30/12-13	495,398	684,325	0.138	1.044	0.144	1.072	0.155	0.170	0.164	0.170
6/30/13-14	518,391	300,372	0.058	1.040	0.060	1.062	0.064	0.172	0.168	0.172
6/30/14-15	539,631	1,052,327	0.195	1.034	0.202	1.051	0.212	0.175	0.172	0.175
6/30/15-16	585,875	1,260,049	0.215	1.026	0.221	1.041	0.230	0.178	0.177	0.178
6/30/16-17	594,787	1,195,151	0.201	1.018	0.205	1.030	0.211	0.181	0.182	0.181
6/30/17-18	607,484	963,473	0.159	1.009	0.160	1.020	0.163	0.185	0.186	0.185
6/30/18-19	656,644	1,116,247	0.170	1.000	0.170	1.010	0.172	0.188		0.188
Total	11,386,672	23,461,846								

Trend Last 4 (ex 18-19):	-7.4%	Avg 3 (ex 18-19):	0.201
Trend Last 8 (ex 18-19):	-0.8%	Avg 5 (ex 18-19):	0.176
Trend Last 12 (ex 18-19):	3.5%	Avg 10 (ex 18-19):	0.189
Prior Selected Trend:	2.0%	Prior Sel Avg:	0.190
Selected Trend:	1.0%	Sel. Loss Cost:	0.190

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 5, Exhibit 1, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCRIB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.950	
(2)	Credibility		14%	
(3)	Average Pmt Trend Statewide		0.950	
(4)	Credibility Weighted Trend		0.950	
		(Low)		(High)
(5)	Selected Range	0.903		0.951
(6)	Incremental Paid for 2019	39,839		39,839
(7)	Estimated Reserve	368,770		772,380
(8)	Paid to Date (82 & Prior)	2,265,774		2,265,774
(9)	Est Ult Paid for 1982 & Prior	2,634,544		3,038,154

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	38,535	37,349
(11)	Projected Number of Years	5	5
(12)	Estimated Reserve	192,676	186,747
(13)	Paid to Date (82 & Prior)	2,265,774	2,225,935
(14)	Est Ult Paid for 1982 & Prior	2,458,450	2,412,681
(14a)	Paid Counts During Fiscal Year	1	1

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	2,546,497	2,600,323
(16)	Lump Sum Ultimates	88,040	88,040
(17)	Ult Loss Including Lump Sums	**2,634,537**	**2,688,363**
(18)	Implied Tail	1.124	1.148
(19)	Ult Loss Inc Lump Sums @ 6/18	2,600,496	2,703,565

NOTES:

(1) From Section 5, Exhibit 1, Page 6
(2) = (Average of Section 5, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 5, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 5, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 5, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	105,743	11.569			
1993	2	106,772	11.578	1.010		
1994	3	104,490	11.557	0.979		
1995	4	93,231	11.443	0.892		
1996	5	83,819	11.336	0.899		
1997	6	71,966	11.184	0.859		
1998	7	75,700	11.235	1.052		
1999	8	69,564	11.150	0.919		
2000	9	65,140	11.084	0.936	n =	28
2001	10	69,462	11.149	1.066	S(x) =	56,154
2002	11	72,621	11.193	1.045	S(x-sq) =	112,618,674
2003	12	73,534	11.206	1.013	S(xy) =	610,642
2004	13	73,411	11.204	0.998	S(y) =	305
2005	14	77,899	11.263	1.061	D =	51,156
2006	15	44,021	10.692	0.565	slope =	-0.048
2007	16	28,745	10.266	0.653	Avg Trend =	0.952
2008	17	31,541	10.359	1.097		
2009	18	31,382	10.354	0.995		
2010	19	34,140	10.438	1.088		
2011	20	31,644	10.362	0.927		
2012	21	32,723	10.396	1.034		
2013	22	33,791	10.428	1.033		
2014	23	34,242	10.441	1.013		
2015	24	35,034	10.464	1.023		
2016	25	36,282	10.499	1.036		
2017	26	37,251	10.525	1.027		
2018	27	38,515	10.559	1.034		
2019	28	39,839	10.593	1.034		
					Selected Trend:	**0.950**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2019: 1.034 = 39839 / 38515

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Amherst) - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
June-83	9,901	27,199	38,094	47,389	62,514	76,567	110,541	128,600	128,600	128,600	128,600	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406
June-84	12,002	32,972	46,180	57,447	75,782	92,840	110,643	140,015	147,985	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	
June-85	96,162	264,176	369,998	460,278	608,898	675,356	769,715	839,890	909,635	972,316	1,027,903	1,068,427	1,096,448	1,126,464	1,157,182	1,193,170	1,230,415	1,270,584	1,311,388	1,352,093	1,394,014	1,437,567	1,483,096	1,530,726	1,581,634	1,636,270	1,687,070	1,738,901	1,792,424	1,846,661	1,902,943	1,898,197	1,898,197	1,898,197	1,898,197		
June-86	62,242	170,991	239,486	289,205	386,115	436,793	545,340	637,721	703,230	742,718	771,694	801,514	833,158	865,475	902,795	941,906	984,064	1,026,987	1,069,806	1,113,907	1,159,474	1,207,370	1,257,125	1,309,416	1,362,366	1,414,227	1,414,227	1,414,227	1,414,227	1,414,227	1,414,227	1,414,227	1,414,227	1,414,227			
June-87	114,930	315,736	434,426	540,241	638,550	728,426	816,220	883,030	959,990	1,087,438	1,157,085	1,228,783	1,294,957	1,353,217	1,408,627	1,466,232	1,524,982	1,583,672	1,643,019	1,705,167	1,769,184	1,838,793	1,908,370	1,966,226	1,996,908	2,028,636	2,061,400	2,094,601	2,128,570	2,165,721	2,184,801	2,184,801	2,184,801				
June-88	145,512	388,262	580,167	742,458	913,661	1,023,389	1,122,499	1,187,899	1,243,915	1,301,898	1,363,345	1,426,364	1,496,845	1,538,376	1,582,716	1,627,788	1,673,942	1,720,105	1,757,371	1,788,805	1,821,696	1,856,017	1,892,584	1,933,305	1,969,091	2,006,043	2,043,490	2,081,803	2,121,480	2,163,997	2,175,460	2,175,460					
June-89	149,323	412,040	585,718	734,611	862,714	940,958	1,000,308	1,091,299	1,155,714	1,209,050	1,258,035	1,312,045	1,364,494	1,425,132	1,470,732	1,496,093	1,522,212	1,550,498	1,578,865	1,608,540	1,639,511	1,670,871	1,702,101	1,734,395	1,767,742	1,801,535	1,836,109	1,871,914	1,908,677	1,946,686	1,986,002						
June-90	147,842	316,313	418,270	483,765	493,004	500,207	470,618	470,618	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448							
June-91	221,834	616,722	912,374	1,121,784	1,264,030	1,316,233	1,389,392	1,447,121	1,486,680	1,550,949	1,590,832	1,657,948	1,707,507	1,756,977	1,801,084	1,841,720	1,882,581	1,912,600	1,943,013	1,973,183	2,003,226	2,034,294	2,066,375	2,098,884	2,132,145	2,166,591	2,201,958	2,238,524	2,276,349								
June-92	172,146	475,588	707,613	916,461	996,673	1,097,913	1,173,097	1,245,955	1,399,954	1,481,116	1,564,487	1,649,535	1,732,053	1,809,950	1,869,935	1,921,123	1,976,310	2,034,348	2,068,242	2,095,831	2,124,362	2,153,822	2,183,675	2,214,219	2,245,851	2,278,329	2,311,908	2,346,641									
June-93	81,038	222,727	276,572	310,192	330,479	348,662	351,823	276,708	276,708	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355										
June-94	106,895	214,659	321,406	344,959	362,159	373,504	398,819	422,133	440,603	460,274	479,091	498,642	518,380	538,584	559,634	580,633	580,633	580,633	580,633	580,633	580,633	580,633	580,633	580,633	580,633	580,633											
June-95	150,379	381,117	506,335	558,037	585,924	605,733	622,315	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606												
June-96	188,667	308,485	416,852	435,702	459,899	469,932	470,598	475,072	475,222	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722													
June-97	106,252	219,810	296,841	353,903	388,354	412,255	429,409	446,564	464,289	472,427	472,427	472,427	472,427	472,427	472,427	472,528	472,528	472,528	472,528	472,528	472,528	472,528	472,528														
June-98	89,150	206,061	269,266	292,631	307,643	318,681	318,681	318,681	319,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304															
June-99	79,713	235,741	363,483	410,110	440,701	457,432	467,619	476,062	476,685	476,775	476,815	476,815	476,815	477,169	477,169	477,169	477,169	477,169	477,169	477,169	477,184																
June-00	199,557	423,727	611,687	721,978	842,583	936,681	993,407	1,021,874	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650																	
June-01	195,155	433,892	620,127	728,970	802,692	874,675	926,705	967,811	1,019,057	1,061,416	1,087,275	1,114,014	1,141,100	1,168,374	1,195,971	1,224,026	1,227,179	1,227,179	1,227,179																		
June-02	134,258	318,384	436,848	510,454	554,485	576,982	577,623	579,568	581,568	581,568	582,625	582,625	582,625	582,625	582,848	582,848	582,848	582,848																			
June-03	110,118	229,192	295,970	379,354	446,784	478,317	500,756	523,384	546,666	569,968	589,299	629,649	629,649	629,649	631,034	633,761	641,271																				
June-04	119,754	192,578	206,484	211,562	212,295	212,295	212,295	212,295	212,295	212,295	212,295	212,295	212,295	212,295	212,295	212,295																					
June-05	118,177	251,133	297,710	349,273	395,191	448,261	457,017	457,755	457,755	457,755	457,755	457,755	457,755	457,755	457,755																						
June-06	109,288	227,014	271,354	276,027	276,027	276,027	276,027	276,027	276,027	276,027	276,027	276,027	276,027	276,027																							
June-07	130,909	212,144	272,353	307,382	318,762	324,328	324,328	324,328	324,328	324,328	324,328	324,328	324,328																								
June-08	136,833	207,607	263,568	288,690	304,525	321,451	336,306	358,096	372,992	387,848	401,552	401,552																									
June-09	157,647	372,637	490,926	555,124	656,285	711,812	727,480	727,480	733,058	733,058	733,058																										
June-10	84,674	225,140	286,244	344,751	390,834	422,920	446,862	452,751	452,751	453,578																											
June-11	203,344	361,140	445,050	584,777	786,089	854,141	910,279	932,795	933,495																												
June-12	198,403	427,078	566,988	683,266	722,953	754,568	808,557	808,557																													
June-13	283,404	453,488	474,086	499,184	521,030	564,083	592,864																														
June-14	158,266	231,996	273,338	249,706	249,734	247,039																															
June-15	292,324	484,207	612,308	740,167	809,710																																
June-16	271,286	532,156	715,829	863,615																																	
June-17	288,081	520,205	695,741																																		
June-18	268,137	432,151																																			
June-19	235,059																																				

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
June-83	2.747	1.401	1.244	1.319	1.225	1.444	1.163	1.000	1.000	1.000	1.045	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.747	1.401	1.244	1.319	1.225	1.192	1.265	1.057	1.085	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.747	1.401	1.244	1.323	1.109	1.140	1.091	1.083	1.069	1.057	1.039	1.026	1.027	1.027	1.031	1.031	1.033	1.032	1.031	1.031	1.031	1.032	1.032	1.033	1.035	1.031	1.031	1.031	1.030	1.030	0.998	1.000	1.000	1.000		
June-86	2.747	1.401	1.208	1.335	1.131	1.249	1.169	1.103	1.056	1.039	1.039	1.039	1.039	1.043	1.043	1.045	1.044	1.042	1.041	1.041	1.041	1.041	1.042	1.040	1.038	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.747	1.376	1.244	1.182	1.141	1.121	1.082	1.087	1.133	1.064	1.062	1.054	1.045	1.041	1.041	1.040	1.038	1.037	1.038	1.038	1.039	1.038	1.030	1.016	1.016	1.016	1.016	1.016	1.017	1.009	1.000	1.000				
June-88	2.668	1.494	1.280	1.231	1.120	1.097	1.058	1.047	1.047	1.047	1.046	1.049	1.028	1.029	1.028	1.028	1.028	1.022	1.018	1.018	1.019	1.020	1.022	1.019	1.019	1.019	1.019	1.019	1.020	1.005	1.000					
June-89	2.759	1.422	1.254	1.174	1.091	1.063	1.091	1.059	1.046	1.041	1.043	1.040	1.044	1.032	1.017	1.017	1.019	1.018	1.019	1.019	1.019	1.019	1.019	1.019	1.019	1.019	1.020	1.020	1.020	1.020						
June-90	2.140	1.322	1.157	1.019	1.015	0.941	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
June-91	2.780	1.479	1.230	1.127	1.041	1.056	1.042	1.027	1.043	1.026	1.042	1.030	1.029	1.025	1.023	1.022	1.016	1.016	1.016	1.015	1.016	1.016	1.016	1.016	1.016	1.016	1.017	1.017								
June-92	2.763	1.488	1.295	1.088	1.102	1.068	1.062	1.124	1.058	1.056	1.054	1.050	1.045	1.033	1.027	1.029	1.029	1.017	1.013	1.014	1.014	1.014	1.014	1.014	1.014	1.015	1.015									
June-93	2.748	1.242	1.122	1.065	1.055	1.009	0.786	1.000	1.057	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	2.008	1.497	1.073	1.050	1.031	1.068	1.058	1.044	1.045	1.041	1.041	1.040	1.039	1.039	1.038	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
June-95	2.534	1.329	1.102	1.050	1.034	1.027	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	1.635	1.351	1.045	1.056	1.022	1.001	1.010	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	2.069	1.350	1.192	1.097	1.062	1.042	1.040	1.040	1.018	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	2.311	1.307	1.087	1.051	1.036	1.000	1.000	1.002	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
June-99	2.957	1.542	1.128	1.075	1.038	1.022	1.018	1.001	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
June-00	2.123	1.444	1.180	1.167	1.112	1.061	1.029	1.014	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
June-01	2.223	1.429	1.176	1.101	1.090	1.059	1.044	1.053	1.042	1.024	1.025	1.024	1.024	1.024	1.023	1.003	1.000	1.000																		
June-02	2.371	1.372	1.168	1.086	1.041	1.001	1.003	1.003	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
June-03	2.081	1.291	1.282	1.178	1.071	1.047	1.045	1.044	1.043	1.034	1.068	1.000	1.000	1.002	1.004	1.012																				
June-04	1.608	1.072	1.025	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	2.125	1.185	1.173	1.131	1.134	1.020	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
June-06	2.077	1.195	1.017	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
June-07	1.621	1.284	1.129	1.037	1.017	1.000	1.000	1.000	1.000	1.000	1.000	1.000																								
June-08	1.517	1.270	1.095	1.055	1.056	1.046	1.065	1.042	1.040	1.035	1.000																									
June-09	2.364	1.317	1.131	1.182	1.085	1.022	1.000	1.008	1.000	1.000																										
June-10	2.659	1.271	1.204	1.134	1.082	1.057	1.013	1.000	1.002																											
June-11	1.776	1.232	1.314	1.344	1.087	1.066	1.025	1.001																												
June-12	2.153	1.328	1.205	1.058	1.044	1.072	1.000																													
June-13	1.600	1.045	1.053	1.044	1.083	1.051																														
June-14	1.466	1.178	0.914	1.000	0.989																															
June-15	1.656	1.265	1.209	1.094																																
June-16	1.962	1.345	1.206																																	
June-17	1.806	1.337																																		
June-18	1.612																																			

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*To Ult*
Simple Avg																																					
All Yrs	2.220	1.333	1.166	1.127	1.074	1.066	1.039	1.029	1.028	1.017	1.019	1.014	1.013	1.013	1.013	1.011	1.010	1.010	1.010	1.010	1.011	1.012	1.012	1.012	1.013	1.011	1.012	1.011	1.011	1.009	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.700	1.234	1.117	1.108	1.057	1.053	1.021	1.010	1.008	1.007	1.000	1.000	1.000	1.005	1.006	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.003	1.006	1.006	1.010	1.014	1.014	1.011	1.013	1.000	1.000					
Latest 3	1.793	1.316	1.110	1.046	1.039	1.063	1.013	1.003	1.014	1.012	1.000	1.000	1.000	1.001	1.001	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.010	1.011	1.012	1.013	1.011	1.000	1.000	1.000	1.000			
Volume Wtd																																					
All Yrs	2.103	1.340	1.177	1.125	1.073	1.058	1.038	1.038	1.035	1.026	1.029	1.024	1.022	1.021	1.019	1.018	1.017	1.016	1.016	1.018	1.019	1.019	1.019	1.018	1.019	1.016	1.016	1.017	1.017	1.013	0.999	1.000	1.000	1.000	1.000		
Latest 5	1.722	1.247	1.149	1.121	1.064	1.054	1.016	1.008	1.007	1.006	1.000	1.000	1.000	1.010	1.008	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.007	1.011	1.012	1.015	1.016	1.017	1.015	1.013	0.999						
Latest 3	1.794	1.317	1.157	1.061	1.048	1.064	1.013	1.003	1.010	1.009	1.000	1.000	1.000	1.001	1.002	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.010	1.015	1.014	1.016	1.018	1.011	1.000	1.000	1.000				

Dev Factor Selection																																					
Industry 1	2.958	1.587	1.232	1.108	1.038	1.023	1.014	1.008	1.006	1.007	1.006	1.010	1.003	1.004	1.003	1.003	1.005	1.003																			
Industry 2		1.877	1.312	1.143	1.055	1.028	1.016	1.015	1.006	1.005	1.007	1.007	1.004	1.002	1.005	1.002	1.003	1.002	1.001	1.001																	
Prior	*2.130*	*1.291*	*1.176*	*1.129*	*1.075*	*1.052*	*1.021*	*1.010*	*1.008*	*1.007*	*1.014*	*1.000*	*1.005*	*1.005*	*1.020*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.013*	
Selected	2.130	1.298	1.177	1.123	1.069	1.053	1.021	1.010	1.008	1.007	1.000	1.000	1.000	1.005	1.019	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.005
FacToUlt	4.749	2.229	1.718	1.459	1.300	1.216	1.154	1.131	1.120	1.111	1.103	1.103	1.103	1.103	1.097	1.076	1.071	1.065	1.060	1.055	1.050	1.044	1.039	1.034	1.029	1.027	1.025	1.023	1.021	1.019	1.017	1.015	1.013	1.011	1.009	1.007	1.005
Percent of Ult	21.1%	44.9%	58.2%	68.5%	76.9%	82.2%	86.6%	88.4%	89.3%	90.0%	90.7%	90.7%	90.7%	90.7%	91.2%	92.9%	93.4%	93.9%	94.3%	94.8%	95.3%	95.7%	96.2%	96.7%	97.2%	97.4%	97.6%	97.8%	98.0%	98.2%	98.4%	98.6%	98.8%	99.0%	99.2%	99.4%	99.6%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	2,600,496	2,703,565	2,634,537	2,688,363	34,041	1.3%	(15,202)	-0.6%
6/30/82-83	138,000	140,000	138,000	140,000	0	0.0%	0	0.0%
6/30/83-84	192,000	196,000	192,000	196,000	0	0.0%	0	0.0%
6/30/84-85	1,969,000	1,975,000	1,955,000	1,958,000	(14,000)	-0.7%	(17,000)	-0.9%
6/30/85-86	1,657,000	1,690,000	1,657,000	1,690,000	0	0.0%	0	0.0%
6/30/86-87	2,574,000	2,583,000	2,559,000	2,564,000	(15,000)	-0.6%	(19,000)	-0.7%
6/30/87-88	2,458,000	2,465,000	2,442,000	2,446,000	(16,000)	-0.7%	(19,000)	-0.8%
6/30/88-89	2,069,000	2,075,000	2,083,000	2,087,000	14,000	0.7%	12,000	0.6%
6/30/89-90	533,000	543,000	533,000	543,000	0	0.0%	0	0.0%
6/30/90-91	2,525,000	2,525,000	2,510,000	2,535,000	(15,000)	-0.6%	10,000	0.4%
6/30/91-92	2,645,000	2,647,000	2,622,000	2,648,000	(23,000)	-0.9%	1,000	0.0%
6/30/92-93	455,000	473,000	455,000	473,000	0	0.0%	0	0.0%
6/30/93-94	719,000	747,000	719,000	747,000	0	0.0%	0	0.0%
6/30/94-95	770,000	800,000	770,000	800,000	0	0.0%	0	0.0%
6/30/95-96	598,000	622,000	598,000	622,000	0	0.0%	0	0.0%
6/30/96-97	518,000	539,000	518,000	539,000	0	0.0%	0	0.0%
6/30/97-98	469,000	487,000	469,000	487,000	0	0.0%	0	0.0%
6/30/98-99	678,000	705,000	678,000	705,000	0	0.0%	0	0.0%
6/30/99-00	1,229,000	1,277,000	1,229,000	1,277,000	0	0.0%	0	0.0%
6/30/00-01	1,547,000	1,553,000	1,529,000	1,534,000	(18,000)	-1.2%	(19,000)	-1.2%
6/30/01-02	822,000	824,000	814,000	815,000	(8,000)	-1.0%	(9,000)	-1.1%
6/30/02-03	948,000	950,000	947,000	948,000	(1,000)	-0.1%	(2,000)	-0.2%
6/30/03-04	292,000	294,000	285,000	287,000	(7,000)	-2.4%	(7,000)	-2.4%
6/30/04-05	672,000	680,000	669,000	671,000	(3,000)	-0.4%	(9,000)	-1.3%
6/30/05-06	388,000	413,000	383,000	411,000	(5,000)	-1.3%	(2,000)	-0.5%
6/30/06-07	486,000	509,000	479,000	506,000	(7,000)	-1.4%	(3,000)	-0.6%
6/30/07-08	579,000	598,000	565,000	586,000	(14,000)	-2.4%	(12,000)	-2.0%
6/30/08-09	989,000	1,015,000	970,000	982,000	(19,000)	-1.9%	(33,000)	-3.3%
6/30/09-10	719,000	737,000	697,000	717,000	(22,000)	-3.1%	(20,000)	-2.7%
6/30/10-11	1,081,000	1,135,000	1,130,000	1,164,000	49,000	4.5%	29,000	2.6%
6/30/11-12	1,113,000	1,146,000	1,077,000	1,092,000	(36,000)	-3.2%	(54,000)	-4.7%
6/30/12-13	746,000	768,000	742,000	763,000	(4,000)	-0.5%	(5,000)	-0.7%
6/30/13-14	611,000	746,000	566,000	671,000	(45,000)	-7.4%	(75,000)	-10.1%
6/30/14-15	1,217,000	1,409,100	1,178,000	1,323,300	(39,000)	-3.2%	(85,800)	-6.1%
6/30/15-16	1,382,000	1,633,500	1,356,000	1,566,400	(26,000)	-1.9%	(67,100)	-4.1%
6/30/16-17	1,438,000	1,652,200	1,473,000	1,674,200	35,000	2.4%	22,000	1.3%
6/30/17-18	1,456,000	1,597,000	1,124,000	1,212,000	(332,000)	-22.8%	(385,000)	-24.1%
6/30/18-19								
Total	41,282,496	42,852,365	40,745,537	42,068,263	(536,959)	-1.3%	(784,102)	-1.8%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 5, Exhibit 1, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	2,265,774	1.136	2,573,410	0.0%	0.0%	0	88,040	88,040	3.4%	1.000	88,040	88,040	88,040
6/30/82-83	134,406	1.005	135,012	0.0%	0.0%	0	0	0	0.0%	1.000	0	0	0
6/30/83-84	160,531	1.057	169,656	0.0%	0.0%	0	27,500	27,500	16.2%	1.000	27,500	27,500	27,500
6/30/84-85	1,898,197	1.009	1,914,386	0.0%	0.0%	0	44,000	44,000	2.3%	1.000	44,000	44,000	44,000
6/30/85-86	1,414,227	1.011	1,429,141	0.0%	0.0%	0	210,000	210,000	14.7%	1.000	210,000	210,000	210,000
6/30/86-87	2,184,801	1.013	2,212,257	0.0%	0.0%	0	352,000	352,000	15.9%	1.000	352,000	352,000	352,000
6/30/87-88	2,175,460	1.015	2,207,204	0.0%	0.0%	0	238,500	238,500	10.8%	1.000	238,500	238,500	238,500
6/30/88-89	1,986,002	1.017	2,019,011	0.0%	0.0%	0	68,000	68,000	3.4%	1.000	68,000	68,000	78,511
6/30/89-90	471,448	1.019	480,243	0.5%	0.5%	2,401	50,590	52,991	11.0%	1.000	50,590	51,791	53,141
6/30/90-91	2,276,349	1.021	2,323,450	0.0%	0.5%	11,617	208,500	220,117	9.5%	1.000	208,500	214,309	220,636
6/30/91-92	2,346,641	1.023	2,399,988	0.0%	0.5%	12,000	249,000	261,000	10.9%	1.000	249,000	255,000	261,558
6/30/92-93	292,355	1.025	299,599	0.0%	0.5%	1,498	158,010	159,508	53.2%	1.000	158,010	158,759	159,601
6/30/93-94	580,633	1.027	596,211	0.0%	0.5%	2,981	130,300	133,281	22.4%	1.000	130,300	131,791	133,467
6/30/94-95	624,606	1.029	642,646	0.0%	0.5%	3,213	137,200	140,413	21.8%	1.000	137,200	138,807	140,624
6/30/95-96	475,722	1.034	491,909	0.0%	0.5%	2,460	116,000	118,460	24.1%	1.000	116,000	117,230	118,621
6/30/96-97	472,528	1.039	491,049	0.0%	0.5%	2,455	40,000	42,455	8.6%	1.000	40,000	41,228	42,616
6/30/97-98	320,304	1.044	334,523	0.0%	0.5%	1,673	143,500	145,173	43.4%	1.000	143,500	144,336	145,282
6/30/98-99	477,184	1.050	500,859	0.0%	0.5%	2,504	193,500	196,004	39.1%	1.000	193,500	194,752	196,168
6/30/99-00	1,036,650	1.055	1,093,523	0.0%	0.5%	5,468	179,500	184,968	16.9%	1.000	179,500	182,234	185,325
6/30/00-01	1,227,179	1.060	1,300,977	0.0%	0.5%	6,505	230,000	236,505	18.2%	1.000	230,000	233,252	236,931
6/30/01-02	582,848	1.065	620,988	0.0%	0.5%	3,105	192,500	195,605	31.5%	1.000	192,500	194,052	195,808
6/30/02-03	641,271	1.071	686,650	0.0%	0.5%	3,433	259,972	263,405	38.4%	1.000	259,972	261,689	263,587
6/30/03-04	212,295	1.076	228,454	0.0%	0.5%	1,142	56,000	57,142	25.0%	1.000	56,000	56,571	57,515
6/30/04-05	457,755	1.097	502,175	0.0%	0.5%	2,511	166,950	169,461	33.7%	1.010	168,620	169,040	171,558
6/30/05-06	276,027	1.103	304,400	0.1%	0.6%	1,826	77,000	78,826	25.9%	1.020	78,548	78,687	80,250
6/30/06-07	324,328	1.103	357,666	0.2%	0.8%	2,861	118,441	121,303	33.9%	1.030	122,030	121,666	123,837
6/30/07-08	401,552	1.103	442,827	0.3%	1.1%	4,871	117,500	122,371	27.6%	1.041	122,271	122,321	125,159
6/30/08-09	733,058	1.103	808,408	0.4%	1.5%	12,126	163,500	175,626	21.7%	1.051	171,840	173,733	179,617
6/30/09-10	453,578	1.111	503,735	0.5%	2.0%	10,075	182,591	192,666	38.2%	1.067	194,783	193,724	199,283
6/30/10-11	933,495	1.120	1,045,358	0.7%	2.7%	28,225	100,000	128,225	12.3%	1.089	108,877	118,551	53,190
6/30/11-12	808,557	1.131	914,507	0.7%	3.4%	31,093	151,000	182,093	19.9%	1.149	173,549	177,821	188,994
6/30/12-13	592,864	1.154	684,325	0.8%	4.2%	28,742	38,798	67,539	9.9%	1.228	47,642	57,591	44,054
6/30/13-14	247,039	1.216	300,372	1.2%	5.4%	16,118	249,027	265,146	88.3%	1.541	383,693	265,146	276,929
6/30/14-15	809,710	1.300	1,052,327	1.6%	7.0%	73,441	77,636	151,077	14.4%	1.878	145,768	151,077	163,067
6/30/15-16	863,615	1.459	1,260,049	2.5%	9.5%	119,415	45,001	164,416	13.0%	3.260	146,708	164,416	214,145
6/30/16-17	695,741	1.718	1,195,151	4.5%	14.0%	167,047	160,000	327,047	27.4%	5.849	935,858	327,047	309,568
6/30/17-18	432,151	2.229	963,473	2.7%	16.7%	160,919	0	160,919	16.7%	15.624	0	160,919	287,929
6/30/18-19	235,059	4.749	1,116,247	4.0%	20.7%	231,085	0	231,085	20.7%	15.624	0	231,085	
Total	32,521,938		36,602,166			952,811	5,020,056	5,972,867	16.3%		6,172,800	5,916,665	5,867,010

NOTES:
(2) From Section 5, Exhibit 1, Page 2, Column 3
(3) = (4) / (2)
(4) From Section 5, Exhibit 1, Page 2, Column 6
(5) From Section 5, Exhibit 1, Page 11
(6) Downward sum of (5)
(7) = (6) x (4)
(8) From Section 5, Exhibit 1, Page 10
(9) = (7) + (8)
(10) = (9) / (4)
(11) From Section 5, Exhibit 1, Page 12
(12) = (8) x (11)
(13) Selected based on (9) and (12)
(14) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Amherst) - Cluster 4
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0	0	0	0	0	0	0	0	7,000	0	0	0	0	0	54,000	0	0	0	0	0	0	0	0	0	27,040	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	0	0	16,500	0	0	0	0	0	27,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	0	0	0	0	0	0	50,000	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150,000	0	0	0	0	0	0	0	0				
Jun-87	0	0	0	0	0	10,000	37,500	0	10,000	0	0	0	19,000	46,500	0	0	0	0	0	0	0	0	0	135,000	0	0	0	0	0	0	94,000	0	0					
Jun-88	0	0	0	12,500	12,500	0	43,500	0	0	0	0	0	0	0	0	0	0	0	20,000	0	0	0	0	0	0	0	0	0	0	0	150,000	0						
Jun-89	0	0	0	0	14,000	0	0	9,000	45,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Jun-90	0	0	0	33,000	8,000	9,590	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
Jun-91	0	0	0	30,000	20,000	60,000	46,500	0	27,000	0	0	0	0	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Jun-92	0	5,000	0	100,500	0	0	0	27,500	0	0	0	0	0	36,000	0	0	0	0	80,000	0	0	0	0	0	0	0	0	0										
Jun-93	0	20,010	43,000	10,000	0	10,000	0	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Jun-94	0	0	0	0	0	0	0	0	0	10,300	0	0	0	0	0	120,000	0	0	0	0	0	0	0	0	0	0												
Jun-95	0	37,200	35,000	40,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Jun-96	0	0	16,000	0	25,000	37,500	37,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0														
Jun-97	0	0	0	0	0	0	0	0	0	40,000	0	0	0	0	0	0	0	0	0	0	0	0	0															
Jun-98	0	0	88,500	0	30,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																
Jun-99	0	40,000	93,500	27,500	0	22,500	0	0	0	10,000	0	0	0	0	0	0	0	0	0	0	0																	
Jun-00	0	0	23,000	27,500	75,000	0	24,000	0	30,000	0	0	0	0	0	0	0	0	0	0	0																		
Jun-01	0	17,500	72,500	50,000	0	30,000	0	0	0	0	0	0	0	0	0	0	60,000	0	0																			
Jun-02	0	24,000	18,000	52,500	63,000	35,000	0	0	0	0	0	0	0	0	0	0	0	0																				
Jun-03	0	9,000	26,500	32,000	30,000	92,472	0	0	0	0	70,000	0	0	0	0	0	0																					
Jun-04	0	6,000	0	0	50,000	0	0	0	0	0	0	0	0	0	0	0																						
Jun-05	0	24,450	18,500	0	35,000	12,000	65,000	12,000	0	0	0	0	0	0	0																							
Jun-06	0	35,000	28,000	14,000	0	0	0	0	0	0	0	0	0	0																								
Jun-07	0	0	0	60,000	40,000	15,000	3,441	0	0	0	0	0	0																									
Jun-08	0	0	17,500	45,000	0	0	0	0	0	0	55,000	0																										
Jun-09	0	62,500	30,000	0	0	40,000	31,000	0	0	0	0																											
Jun-10	0	62,591	25,000	0	30,000	0	0	65,000	0	0																												
Jun-11	0	0	0	0	20,000	10,000	0	0	70,000																													
Jun-12	0	0	51,000	35,000	0	65,000	0	0																														
Jun-13	0	0	3,798	15,000	0	0	20,000																															
Jun-14	0	234,027	0	0	15,000	0																																
Jun-15	0	30,000	12,636	0	35,000																																	
Jun-16	0	0	20,000	25,001																																		
Jun-17	0	95,000	65,000																																			
Jun-18	0	0																																				
Jun-19	0																																					

Cumulative Lump Sum Payments

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*	*456*
All Prior Yrs	0	0	0	0	0	0	0	0	7,000	7,000	7,000	7,000	7,000	7,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040
Jun-83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500			
Jun-85	0	0	0	0	0	16,500	16,500	16,500	16,500	16,500	16,500	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000			
Jun-86	0	0	0	0	0	0	0	0	50,000	50,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000				
Jun-87	0	0	0	0	0	10,000	47,500	47,500	57,500	57,500	57,500	57,500	76,500	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	258,000	258,000	258,000	258,000	258,000	258,000	258,000	352,000	352,000	352,000					
Jun-88	0	0	0	12,500	25,000	25,000	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	238,500	238,500						
Jun-89	0	0	0	0	14,000	14,000	14,000	23,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000							
Jun-90	0	0	0	33,000	41,000	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590								
Jun-91	0	0	0	30,000	50,000	110,000	156,500	156,500	183,500	183,500	183,500	183,500	183,500	183,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500									
Jun-92	0	5,000	5,000	105,500	105,500	105,500	105,500	133,000	133,000	133,000	133,000	133,000	133,000	169,000	169,000	169,000	169,000	169,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000										
Jun-93	0	20,010	63,010	73,010	73,010	83,010	83,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010											
Jun-94	0	0	0	0	0	0	0	0	0	10,300	10,300	10,300	10,300	10,300	10,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300												
Jun-95	0	37,200	72,200	112,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200													
Jun-96	0	0	16,000	16,000	41,000	78,500	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000														
Jun-97	0	0	0	0	0	0	0	0	0	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000															
Jun-98	0	0	88,500	88,500	118,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500																
Jun-99	0	40,000	133,500	161,000	161,000	183,500	183,500	183,500	183,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500																	
Jun-00	0	0	23,000	50,500	125,500	125,500	149,500	149,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500																		
Jun-01	0	17,500	90,000	140,000	140,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	230,000	230,000	230,000																	
Jun-02	0	24,000	42,000	94,500	157,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500																				
Jun-03	0	9,000	35,500	67,500	97,500	189,972	189,972	189,972	189,972	189,972	259,972	259,972	259,972	259,972	259,972	259,972	259,972																					
Jun-04	0	6,000	6,000	6,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000																						
Jun-05	0	24,450	42,950	42,950	77,950	89,950	154,950	166,950	166,950	166,950	166,950	166,950	166,950	166,950	166,950																							
Jun-06	0	35,000	63,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000																								
Jun-07	0	0	0	60,000	100,000	115,000	118,441	118,441	118,441	118,441	118,441	118,441	118,441																									
Jun-08	0	0	17,500	62,500	62,500	62,500	62,500	62,500	62,500	62,500	117,500	117,500																										
Jun-09	0	62,500	92,500	92,500	92,500	132,500	163,500	163,500	163,500	163,500	163,500																											
Jun-10	0	62,591	87,591	87,591	117,591	117,591	117,591	182,591	182,591	182,591																												
Jun-11	0	0	0	0	20,000	30,000	30,000	30,000	100,000																													
Jun-12	0	0	51,000	86,000	86,000	151,000	151,000	151,000																														
Jun-13	0	0	3,798	18,798	18,798	18,798	38,798																															
Jun-14	0	234,027	234,027	234,027	249,027	249,027																																
Jun-15	0	30,000	42,636	42,636	77,636																																	
Jun-16	0	0	20,000	45,001																																		
Jun-17	0	95,000	160,000																																			
Jun-18	0	0																																				
Jun-19	0																																					

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Amherst) - Cluster 4
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.162	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.000	0.000	0.000	0.000	0.005	0.017	0.000	0.005	0.000	0.000	0.000	0.009	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.000	0.000					
Jun-88	0.000	0.000	0.000	0.006	0.006	0.000	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.068	0.000						
Jun-89	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.004	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.000	0.000	0.069	0.017	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.000	0.000	0.013	0.009	0.026	0.020	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-92	0.000	0.002	0.000	0.042	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.000	0.067	0.144	0.033	0.000	0.033	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.000	0.000	0.000	0.000	0.000	0.201	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.000	0.058	0.054	0.062	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.000	0.000	0.033	0.000	0.051	0.076	0.076	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000														
Jun-97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.081	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
Jun-98	0.000	0.000	0.265	0.000	0.090	0.075	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.000	0.080	0.187	0.055	0.000	0.045	0.000	0.000	0.000	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																	
Jun-00	0.000	0.000	0.021	0.025	0.069	0.000	0.022	0.000	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-01	0.000	0.013	0.056	0.038	0.000	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000																			
Jun-02	0.000	0.039	0.029	0.085	0.101	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.000	0.013	0.039	0.047	0.044	0.135	0.000	0.000	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.000	0.000																					
Jun-04	0.000	0.026	0.000	0.000	0.219	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																						
Jun-05	0.000	0.049	0.037	0.000	0.070	0.024	0.129	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000																							
Jun-06	0.000	0.115	0.092	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
Jun-07	0.000	0.000	0.000	0.168	0.112	0.042	0.010	0.000	0.000	0.000	0.000	0.000	0.000																									
Jun-08	0.000	0.000	0.040	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.124	0.000																										
Jun-09	0.000	0.077	0.037	0.000	0.000	0.049	0.038	0.000	0.000	0.000	0.000																											
Jun-10	0.000	0.124	0.050	0.000	0.060	0.000	0.000	0.129	0.000	0.000																												
Jun-11	0.000	0.000	0.000	0.000	0.019	0.010	0.000	0.000	0.067																													
Jun-12	0.000	0.000	0.056	0.038	0.000	0.071	0.000	0.000																														
Jun-13	0.000	0.000	0.006	0.022	0.000	0.000	0.029																															
Jun-14	0.000	0.779	0.000	0.000	0.050	0.000																																
Jun-15	0.000	0.029	0.012	0.000	0.033																																	
Jun-16	0.000	0.000	0.016	0.020																																		
Jun-17	0.000	0.079	0.054																																			
Jun-18	0.000	0.000																																				
Jun-19	0.000																																					

Averages		*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
Simple Avg																																						
All Yrs (ex P)	0.000	0.043	0.035	0.026	0.030	0.022	0.012	0.014	0.006	0.004	0.009	0.001	0.000	0.002	0.000	0.009	0.010	0.000	0.002	0.000	0.000	0.000	0.000	0.004	0.000	0.009	0.000	0.000	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 5	0.000	0.177	0.018	0.016	0.020	0.016	0.014	0.026	0.013	0.000	0.025	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 3	0.000	0.026	0.027	0.007	0.028	0.024	0.010	0.043	0.022	0.000	0.041	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.000	0.000	0.000	0.000	0.000	0.000	
Olympic Avg																																						
All Yrs (ex P)	0.000	0.023	0.029	0.022	0.025	0.019	0.008	0.006	0.004	0.001	0.004	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000					
Latest 10	0.000	0.039	0.027	0.023	0.020	0.016	0.010	0.003	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Latest 5	0.000	0.036	0.011	0.014	0.017	0.003	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.000					

Dev Factor Selection																																						
Prior	*NA*	*0.040*	*0.027*	*0.045*	*0.024*	*0.025*	*0.011*	*0.008*	*0.007*	*0.007*	*0.005*	*0.004*	*0.003*	*0.002*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.011*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	
Selected	NA	0.040	0.027	0.045	0.025	0.016	0.012	0.008	0.007	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.207	0.167	0.140	0.095	0.070	0.054	0.042	0.034	0.027	0.020	0.015	0.011	0.008	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Amherst) - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444	456
All Prior Yrs	0	0	0	0	0	0	0	0	7,000	7,000	7,000	7,000	7,000	7,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040
Jun-83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500		
Jun-85	0	0	0	0	0	16,500	16,500	16,500	16,500	16,500	16,500	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000			
Jun-86	0	0	0	0	0	0	0	0	50,000	50,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000				
Jun-87	0	0	0	0	0	10,000	47,500	47,500	57,500	57,500	57,500	57,500	76,500	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	258,000	258,000	258,000	258,000	258,000	258,000	258,000	352,000	352,000	352,000					
Jun-88	0	0	0	12,500	25,000	25,000	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	238,500	238,500						
Jun-89	0	0	0	0	14,000	14,000	14,000	23,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000							
Jun-90	0	0	0	33,000	41,000	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590								
Jun-91	0	0	0	30,000	50,000	110,000	156,500	156,500	183,500	183,500	183,500	183,500	183,500	183,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500									
Jun-92	0	5,000	5,000	105,500	105,500	105,500	105,500	133,000	133,000	133,000	133,000	133,000	133,000	169,000	169,000	169,000	169,000	169,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000										
Jun-93	0	20,010	63,010	73,010	73,010	83,010	83,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010											
Jun-94	0	0	0	0	0	0	0	0	0	10,300	10,300	10,300	10,300	10,300	10,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300												
Jun-95	0	37,200	72,200	112,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200													
Jun-96	0	0	16,000	16,000	41,000	78,500	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000														
Jun-97	0	0	0	0	0	0	0	0	0	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000															
Jun-98	0	0	88,500	88,500	118,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500																
Jun-99	0	40,000	133,500	161,000	161,000	183,500	183,500	183,500	183,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500																	
Jun-00	0	0	23,000	50,500	125,500	125,500	149,500	149,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500																		
Jun-01	0	17,500	90,000	140,000	140,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	230,000	230,000	230,000																			
Jun-02	0	24,000	42,000	94,500	157,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500																				
Jun-03	0	9,000	35,500	67,500	97,500	189,972	189,972	189,972	189,972	189,972	259,972	259,972	259,972	259,972	259,972	259,972	259,972																					
Jun-04	0	6,000	6,000	6,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000																						
Jun-05	0	24,450	42,950	42,950	77,950	89,950	154,950	166,950	166,950	166,950	166,950	166,950	166,950	166,950	166,950																							
Jun-06	0	35,000	63,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000																								
Jun-07	0	0	0	60,000	100,000	115,000	118,441	118,441	118,441	118,441	118,441	118,441	118,441																									
Jun-08	0	0	17,500	62,500	62,500	62,500	62,500	62,500	62,500	62,500	117,500	117,500																										
Jun-09	0	62,500	92,500	92,500	92,500	132,500	163,500	163,500	163,500	163,500	163,500																											
Jun-10	0	62,591	87,591	87,591	117,591	117,591	117,591	182,591	182,591	182,591																												
Jun-11	0	0	0	0	20,000	30,000	30,000	30,000	100,000																													
Jun-12	0	0	51,000	86,000	86,000	151,000	151,000	151,000																														
Jun-13	0	0	3,798	18,798	18,798	18,798	38,798																															
Jun-14	0	234,027	234,027	234,027	249,027	249,027																																
Jun-15	0	30,000	42,636	42,636	77,636																																	
Jun-16	0	0	20,000	45,001																																		
Jun-17	0	95,000	160,000																																			
Jun-18	0	0																																				
Jun-19	0																																					

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
All Prior Yrs									1.000	1.000	1.000	1.000	1.000	8.714	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.443	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83																																						
Jun-84																	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85						1.000	1.000	1.000	1.000	1.000	2.667	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86									1.000	1.200	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	3.500	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87						4.750	1.000	1.211	1.000	1.000	1.000	1.330	1.608	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	2.098	1.000	1.000	1.000	1.000	1.000	1.000	1.364	1.000	1.000						
Jun-88				2.000	1.000	2.740	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.292	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	2.695	1.000							
Jun-89					1.000	1.000	1.643	2.957	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90				1.242	1.234	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-91				1.667	2.200	1.423	1.000	1.173	1.000	1.000	1.000	1.000	1.000	1.136	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-92		1.000	21.100	1.000	1.000	1.000	1.261	1.000	1.000	1.000	1.000	1.000	1.271	1.000	1.000	1.000	1.000	1.473	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93		3.149	1.159	1.000	1.137	1.000	1.904	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94										1.000	1.000	1.000	1.000	1.000	12.650	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95		1.941	1.554	1.223	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96			1.000	2.563	1.915	1.478	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
Jun-97										1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
Jun-98			1.000	1.339	1.211	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99		3.338	1.206	1.000	1.140	1.000	1.000	1.000	1.054	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
Jun-00			2.196	2.485	1.000	1.191	1.000	1.201	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01		5.143	1.556	1.000	1.214	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.353	1.000	1.000																				
Jun-02		1.750	2.250	1.667	1.222	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03		3.944	1.901	1.444	1.948	1.000	1.000	1.000	1.000	1.368	1.000	1.000	1.000	1.000	1.000	1.000																						
Jun-04		1.000	1.000	9.333	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
Jun-05		1.757	1.000	1.815	1.154	1.723	1.077	1.000	1.000	1.000	1.000	1.000	1.000	1.000																								
Jun-06		1.800	1.222	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																									
Jun-07				1.667	1.150	1.030	1.000	1.000	1.000	1.000	1.000	1.000																										
Jun-08			3.571	1.000	1.000	1.000	1.000	1.000	1.000	1.880	1.000																											
Jun-09		1.480	1.000	1.000	1.432	1.234	1.000	1.000	1.000	1.000																												
Jun-10		1.399	1.000	1.343	1.000	1.000	1.553	1.000	1.000																													
Jun-11					1.500	1.000	1.000	3.333																														
Jun-12			1.686	1.000	1.756	1.000	1.000																															
Jun-13			4.950	1.000	1.000	2.064																																
Jun-14		1.000	1.000	1.064	1.000																																	
Jun-15		1.421	1.000	1.821																																		
Jun-16			2.250																																			
Jun-17		1.684																																				
Jun-18																																						

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
Simple Avg																																						
All Yrs (ex P)		2.120	2.600	1.736	1.249	1.332	1.097	1.203	1.002	1.058	1.069	1.014	1.040	1.006	1.583	1.019	1.000	1.043	1.000	1.000	1.000	1.000	1.084	1.000	1.227	1.000	1.000	1.000	1.000	1.343	1.000	1.000	1.000	1.000	1.000	#DIV/0!		
Latest 5		1.368	2.177	1.221	1.251	1.260	1.111	1.467	1.000	1.176	1.000	1.000	1.000	1.000	1.000	1.071	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.412	1.000	1.000						
Latest 3		1.553	1.417	1.295	1.252	1.355	1.184	1.778	1.000	1.293	1.000	1.000	1.000	1.000	1.000	1.118	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.686	1.000	1.000	1.000	1.000				
Volume Wtd																																						
All Yrs (ex P)		1.979	1.496	1.294	1.219	1.124	1.068	1.083	1.021	1.048	1.010	1.007	1.032	1.010	1.049	1.035	1.000	1.047	1.000	1.000	1.000	1.000	1.092	1.000	1.112	1.000	1.000	1.000	1.000	1.351	1.000	1.000	1.000	1.000				
Latest 5		1.283	1.213	1.184	1.153	1.113	1.124	1.126	1.000	1.093	1.000	1.000	1.000	1.000	1.000	1.060	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.365	1.000	1.000						
Latest 3		1.781	1.084	1.169	1.184	1.100	1.218	1.186	1.000	1.160	1.000	1.000	1.000	1.000	1.000	1.096	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.589	1.000	1.000	1.000					

Dev Factor Selection																																						
Prior	1.000	2.671	1.794	1.733	1.246	1.250	1.072	1.028	1.022	1.015	1.010	1.010	1.010	1.010	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Selected	1.000	2.671	1.794	1.736	1.219	1.255	1.068	1.056	1.021	1.015	1.010	1.010	1.010	1.010	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	15.624	15.624	5.849	3.260	1.878	1.541	1.228	1.149	1.089	1.067	1.051	1.041	1.030	1.020	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	6.4%	6.4%	17.1%	30.7%	53.3%	64.9%	81.4%	87.0%	91.8%	93.7%	95.1%	96.1%	97.1%	98.0%	99.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.4%	0.0%	0.1%	0.1%	1.000	1.000
444	99.6%	0.2%	0.4%	0.0%	0.0%	0.981	0.971
432	99.4%	0.2%	0.6%	0.0%	0.0%	0.954	0.933
420	99.2%	0.2%	0.8%	0.1%	0.0%	0.932	0.902
408	99.0%	0.2%	1.0%	0.1%	0.0%	0.913	0.874
396	98.8%	0.2%	1.2%	0.1%	0.0%	0.894	0.848
384	98.6%	0.2%	1.4%	0.1%	0.0%	0.876	0.823
372	98.4%	0.2%	1.6%	0.1%	0.0%	0.859	0.800
360	98.2%	0.2%	1.8%	0.1%	0.0%	0.843	0.778
348	98.0%	0.2%	2.0%	0.1%	0.0%	0.827	0.757
336	97.8%	0.2%	2.2%	0.1%	0.0%	0.811	0.737
324	97.6%	0.2%	2.4%	0.1%	0.0%	0.796	0.717
312	97.4%	0.2%	2.6%	0.1%	0.0%	0.782	0.699
300	97.2%	0.5%	2.8%	0.2%	0.1%	0.767	0.681
288	96.7%	0.5%	3.3%	0.2%	0.1%	0.774	0.691
276	96.2%	0.5%	3.8%	0.2%	0.1%	0.774	0.692
264	95.7%	0.5%	4.3%	0.2%	0.1%	0.771	0.689
252	95.3%	0.5%	4.7%	0.2%	0.1%	0.765	0.682
240	94.8%	0.5%	5.2%	0.2%	0.2%	0.758	0.674
228	94.3%	0.5%	5.7%	0.2%	0.2%	0.750	0.663
216	93.9%	0.5%	6.1%	0.2%	0.2%	0.741	0.652
204	93.4%	0.5%	6.6%	0.2%	0.2%	0.731	0.640
192	92.9%	1.8%	7.1%	1.0%	0.7%	0.721	0.628
180	91.2%	0.5%	8.8%	0.3%	0.2%	0.751	0.669
168	90.7%	0.0%	9.3%	0.0%	0.0%	0.735	0.648
156	90.7%	0.0%	9.3%	0.0%	0.0%	0.707	0.611
144	90.7%	0.0%	9.3%	0.0%	0.0%	0.680	0.577
132	90.7%	0.6%	9.3%	0.4%	0.3%	0.654	0.544
120	90.0%	0.7%	10.0%	0.5%	0.4%	0.651	0.543
108	89.3%	0.9%	10.7%	0.6%	0.5%	0.651	0.544
96	88.4%	1.8%	11.6%	1.3%	1.1%	0.653	0.548
84	86.6%	4.4%	13.4%	3.4%	3.0%	0.675	0.577
72	82.2%	5.3%	17.8%	4.3%	3.8%	0.731	0.650
60	76.9%	8.4%	23.1%	7.0%	6.5%	0.767	0.696
48	68.5%	10.3%	31.5%	9.0%	8.4%	0.802	0.740
36	58.2%	13.4%	41.8%	12.1%	11.5%	0.823	0.766
24	44.9%	23.8%	55.1%	22.4%	21.8%	0.837	0.783
12	21.1%	21.1%	78.9%	20.6%	20.5%	0.858	0.809
Total		100.0%					

NOTES:
(2) = 1 / Section 5, Exhibit 1, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	280,723	334,549		254,944	303,828
6/30/82-83	3,594	5,594	0.981	3,524	5,485
6/30/83-84	3,969	7,969	0.954	3,788	7,606
6/30/84-85	12,803	15,803	0.932	11,939	14,736
6/30/85-86	32,773	65,773	0.913	29,907	60,020
6/30/86-87	22,199	27,199	0.894	19,842	24,312
6/30/87-88	28,040	32,040	0.876	24,565	28,069
6/30/88-89	28,998	32,998	0.859	24,910	28,346
6/30/89-90	10,962	20,962	0.843	9,236	17,661
6/30/90-91	25,151	50,151	0.827	20,791	41,456
6/30/91-92	26,359	52,359	0.811	21,381	42,472
6/30/92-93	4,635	22,635	0.796	3,690	18,021
6/30/93-94	8,067	36,067	0.782	6,305	28,188
6/30/94-95	8,194	38,194	0.767	6,288	29,309
6/30/95-96	6,278	30,278	0.774	4,856	23,421
6/30/96-97	5,473	26,473	0.774	4,236	20,489
6/30/97-98	5,196	23,196	0.771	4,005	17,880
6/30/98-99	7,316	34,316	0.765	5,599	26,262
6/30/99-00	12,850	60,850	0.758	9,743	46,135
6/30/00-01	71,821	76,821	0.750	53,861	57,611
6/30/01-02	38,652	39,652	0.741	28,638	29,379
6/30/02-03	45,757	46,757	0.731	33,465	34,197
6/30/03-04	16,705	18,705	0.721	12,052	13,495
6/30/04-05	44,295	46,295	0.751	33,273	34,776
6/30/05-06	29,973	57,973	0.735	22,044	42,636
6/30/06-07	36,231	63,231	0.707	25,621	44,715
6/30/07-08	45,948	66,948	0.680	31,244	45,523
6/30/08-09	73,442	85,442	0.654	48,018	55,864
6/30/09-10	60,832	80,832	0.651	39,611	52,634
6/30/10-11	96,505	130,505	0.651	62,802	84,927
6/30/11-12	117,443	132,443	0.653	76,669	86,461
6/30/12-13	110,338	131,338	0.675	74,445	88,613
6/30/13-14	69,934	174,934	0.731	51,108	127,842
6/30/14-15	290,654	435,954	0.767	222,806	334,189
6/30/15-16	447,384	657,784	0.802	358,868	527,641
6/30/16-17	617,259	818,459	0.823	508,008	673,597
6/30/17-18	691,849	779,849	0.837	579,214	652,887
6/30/18-19	1,111,941	1,205,941	0.858	953,960	1,034,604
Total	4,550,542	5,967,268		3,685,255	4,805,289
			(7) Total Discount Factor:	0.810	0.805

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	280,723	334,549
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	56,145	66,910
(11) Discounted Value at 4%:	254,944	303,828

NOTES:
(2), (3) From Section 5, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 5, Exhibit 1, Page 13, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	280,723	334,549		243,596	290,304
6/30/82-83	3,594	5,594	0.971	3,491	5,433
6/30/83-84	3,969	7,969	0.933	3,704	7,437
6/30/84-85	12,803	15,803	0.902	11,545	14,250
6/30/85-86	32,773	65,773	0.874	28,628	57,455
6/30/86-87	22,199	27,199	0.848	18,814	23,051
6/30/87-88	28,040	32,040	0.823	23,079	26,371
6/30/88-89	28,998	32,998	0.800	23,196	26,396
6/30/89-90	10,962	20,962	0.778	8,527	16,306
6/30/90-91	25,151	50,151	0.757	19,034	37,954
6/30/91-92	26,359	52,359	0.737	19,416	38,567
6/30/92-93	4,635	22,635	0.717	3,324	16,234
6/30/93-94	8,067	36,067	0.699	5,635	25,195
6/30/94-95	8,194	38,194	0.681	5,577	25,997
6/30/95-96	6,278	30,278	0.691	4,335	20,907
6/30/96-97	5,473	26,473	0.692	3,788	18,325
6/30/97-98	5,196	23,196	0.689	3,579	15,979
6/30/98-99	7,316	34,316	0.682	4,991	23,413
6/30/99-00	12,850	60,850	0.674	8,655	40,984
6/30/00-01	71,821	76,821	0.663	47,640	50,957
6/30/01-02	38,652	39,652	0.652	25,208	25,860
6/30/02-03	45,757	46,757	0.640	29,303	29,944
6/30/03-04	16,705	18,705	0.628	10,496	11,752
6/30/04-05	44,295	46,295	0.669	29,614	30,951
6/30/05-06	29,973	57,973	0.648	19,425	37,571
6/30/06-07	36,231	63,231	0.611	22,151	38,659
6/30/07-08	45,948	66,948	0.577	26,503	38,615
6/30/08-09	73,442	85,442	0.544	39,963	46,493
6/30/09-10	60,832	80,832	0.543	33,008	43,860
6/30/10-11	96,505	130,505	0.544	52,482	70,972
6/30/11-12	117,443	132,443	0.548	64,362	72,582
6/30/12-13	110,338	131,338	0.577	63,720	75,847
6/30/13-14	69,934	174,934	0.650	45,476	113,753
6/30/14-15	290,654	435,954	0.696	202,211	303,298
6/30/15-16	447,384	657,784	0.740	331,282	487,081
6/30/16-17	617,259	818,459	0.766	472,793	626,903
6/30/17-18	691,849	779,849	0.783	541,612	610,503
6/30/18-19	1,111,941	1,205,941	0.809	899,219	975,237
Total	4,550,542	5,967,268		3,399,383	4,421,396
			(7) Total Discount Factor:	0.747	0.741

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	280,723	334,549
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	56,145	66,910
(11) Discounted Value at 6%:	243,596	290,304

NOTES:
(2), (3) From Section 5, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 5, Exhibit 1, Page 13, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/19 - 20 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/19 - 06/30/20	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/19 - 06/30/20		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	5,269,073	5,376,726	4,707,628	561,446	669,098				37,847	41,632	6.7%	6.2%
6/30/82-83	276,000	280,000	268,812	7,188	11,188	96.7%	0.3%	9.1%	652	1,016	9.1%	9.1%
6/30/83-84	384,000	392,000	376,062	7,938	15,938	96.9%	0.3%	9.8%	774	1,554	9.8%	9.8%
6/30/84-85	3,910,000	3,916,000	3,884,393	25,607	31,607	99.3%	0.3%	41.0%	10,508	12,970	41.0%	41.0%
6/30/85-86	3,314,000	3,380,000	3,248,453	65,547	131,547	97.1%	0.5%	17.0%	11,131	22,339	17.0%	17.0%
6/30/86-87	5,118,000	5,128,000	5,073,602	44,398	54,398	99.0%	0.5%	51.9%	23,022	28,208	51.9%	51.9%
6/30/87-88	4,884,000	4,892,000	4,827,920	56,080	64,080	98.8%	0.5%	40.7%	22,813	26,067	40.7%	40.7%
6/30/88-89	4,166,000	4,174,000	4,108,004	57,996	65,996	98.5%	0.5%	33.6%	19,505	22,195	33.6%	33.6%
6/30/89-90	1,066,000	1,086,000	1,044,076	21,924	41,924	97.0%	0.5%	16.9%	3,695	7,065	16.9%	16.9%
6/30/90-91	5,020,000	5,070,000	4,969,697	50,303	100,303	98.5%	0.5%	33.5%	16,850	33,600	33.5%	33.5%
6/30/91-92	5,244,000	5,296,000	5,191,282	52,718	104,718	98.5%	0.5%	33.5%	17,647	35,053	33.5%	33.5%
6/30/92-93	910,000	946,000	900,730	9,270	45,270	97.1%	0.5%	17.0%	1,577	7,703	17.0%	17.0%
6/30/93-94	1,438,000	1,494,000	1,421,867	16,133	72,133	97.0%	0.5%	16.6%	2,680	11,980	16.6%	16.6%
6/30/94-95	1,540,000	1,600,000	1,523,612	16,388	76,388	97.0%	0.5%	16.9%	2,773	12,927	16.9%	16.9%
6/30/95-96	1,196,000	1,244,000	1,183,444	12,556	60,556	97.0%	0.5%	16.7%	2,095	10,105	16.7%	16.7%
6/30/96-97	1,036,000	1,078,000	1,025,055	10,945	52,945	97.0%	0.5%	16.5%	1,811	8,759	16.5%	16.5%
6/30/97-98	938,000	974,000	927,608	10,392	46,392	97.0%	0.5%	16.8%	1,750	7,810	16.8%	16.8%
6/30/98-99	1,356,000	1,410,000	1,341,369	14,631	68,631	97.0%	0.5%	16.6%	2,430	11,400	16.6%	16.6%
6/30/99-00	2,458,000	2,554,000	2,432,300	25,700	121,700	97.1%	0.5%	17.0%	4,369	20,691	17.0%	17.0%
6/30/00-01	3,058,000	3,068,000	2,914,358	143,642	153,642	95.1%	0.5%	10.3%	14,800	15,830	10.3%	10.3%
6/30/01-02	1,628,000	1,630,000	1,550,696	77,304	79,304	95.2%	0.5%	10.4%	8,041	8,249	10.4%	10.4%
6/30/02-03	1,894,000	1,896,000	1,802,486	91,514	93,514	95.1%	1.0%	20.5%	18,745	19,155	20.5%	20.5%
6/30/03-04	570,000	574,000	536,589	33,411	37,411	93.8%	1.0%	16.2%	5,397	6,043	16.2%	16.2%
6/30/04-05	1,338,000	1,342,000	1,249,410	88,590	92,590	93.2%	1.0%	14.8%	13,104	13,696	14.8%	14.8%
6/30/05-06	766,000	822,000	706,055	59,945	115,945	88.9%	2.0%	18.1%	10,824	20,936	18.1%	18.1%
6/30/06-07	958,000	1,012,000	885,539	72,461	126,461	89.9%	2.0%	19.8%	14,352	25,048	19.8%	19.8%
6/30/07-08	1,130,000	1,172,000	1,038,103	91,897	133,897	90.2%	2.0%	20.4%	18,738	27,302	20.4%	20.4%
6/30/08-09	1,940,000	1,964,000	1,793,116	146,884	170,884	91.9%	2.0%	24.6%	36,091	41,989	24.6%	24.6%
6/30/09-10	1,394,000	1,434,000	1,272,337	121,663	161,663	90.0%	2.0%	20.0%	24,287	32,273	20.0%	20.0%
6/30/10-11	2,260,000	2,328,000	2,066,989	193,011	261,011	90.1%	2.0%	20.2%	39,008	52,752	20.2%	20.2%
6/30/11-12	2,154,000	2,184,000	1,919,115	234,885	264,885	88.5%	3.0%	26.0%	61,164	68,976	26.0%	26.0%
6/30/12-13	1,484,000	1,526,000	1,263,324	220,676	262,676	83.9%	5.0%	31.1%	68,711	81,789	31.1%	31.1%
6/30/13-14	1,132,000	1,342,000	992,133	139,867	349,867	80.2%	5.0%	25.3%	35,328	88,372	25.3%	25.3%
6/30/14-15	2,356,000	2,646,600	1,774,693	581,307	871,907	71.0%	5.0%	17.2%	100,056	150,074	17.2%	17.2%
6/30/15-16	2,712,000	3,132,800	1,817,232	894,768	1,315,568	62.2%	5.0%	13.2%	118,302	173,938	13.2%	13.2%
6/30/16-17	2,946,000	3,348,400	1,711,481	1,234,519	1,636,919	54.4%	5.0%	11.0%	135,308	179,412	11.0%	11.0%
6/30/17-18	2,248,000	2,424,000	864,301	1,383,699	1,559,699	37.0%	7.5%	11.9%	164,724	185,676	11.9%	11.9%
6/30/18-19	2,694,000	2,882,000	470,117	2,223,883	2,411,883	16.9%	12.5%	15.0%	334,367	362,633	15.0%	15.0%
Total	84,185,073	87,018,526	75,083,990	9,101,084	11,934,537				1,405,278	1,877,215	15.4%	15.7%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)
(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)
(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)
(5) = (2) - (4)
(6) = (3) - (4)
(7) = (4) / Average of Columns (2), (3)
(8) = (7) - Prior Year's (7)
(9) = (8) / (1.00 - (7))
(10) = (5) * (9)
(11) = (6) * (9)
(12) = (10) / (5)
(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		111,896			129,243	147,677	17,346	35,781		
6/30/82-83		91,124	91,332		91,124	92,246	0	1,122		
6/30/83-84		32,907	33,015		32,907	34,006	0	1,099		
6/30/84-85	176,924	75,201	75,524	75,586	75,953	77,034	752	1,833	0.043	0.044
6/30/85-86	188,662	52,218	52,495	52,566	52,741	53,263	522	1,044	0.028	0.028
6/30/86-87	212,277	201,665	202,936	202,901	203,000	203,000	1,335	1,335	0.096	0.096
6/30/87-88	243,118	235,802	237,525	237,424	237,000	238,000	1,198	2,198	0.097	0.098
6/30/88-89	248,990	298,555	301,037	301,532	301,000	302,000	2,445	3,445	0.121	0.121
6/30/89-90	250,404	157,317	158,784	159,260	159,000	159,000	1,683	1,683	0.063	0.063
6/30/90-91	235,170	511,918	517,207	517,175	517,000	517,000	5,082	5,082	0.220	0.220
6/30/91-92	235,607	555,103	561,399	561,319	561,000	561,000	5,897	5,897	0.238	0.238
6/30/92-93	241,161	262,075	265,313	265,293	264,696	267,317	2,621	5,242	0.110	0.111
6/30/93-94	254,321	541,736	548,977	548,807	549,000	549,000	7,264	7,264	0.216	0.216
6/30/94-95	256,665	305,369	309,760	309,705	308,423	311,476	3,054	6,107	0.120	0.121
6/30/95-96	265,739	243,985	247,741	247,738	246,425	248,865	2,440	4,880	0.093	0.094
6/30/96-97	296,336	187,967	191,051	191,151	189,847	191,726	1,880	3,759	0.064	0.065
6/30/97-98	296,982	188,043	191,702	191,839	192,000	192,000	3,957	3,957	0.065	0.065
6/30/98-99	299,530	259,412	265,253	265,292	265,000	270,300	5,588	10,888	0.088	0.090
6/30/99-00	323,627	360,854	370,824	370,660	371,000	371,000	10,146	10,146	0.115	0.115
6/30/00-01	338,348	396,643	409,640	409,397	409,000	410,000	12,357	13,357	0.121	0.121
6/30/01-02	329,555	562,283	583,611	582,678	583,000	584,000	20,717	21,717	0.177	0.177
6/30/02-03	329,179	319,925	333,720	333,739	334,000	335,670	14,075	15,745	0.101	0.102
6/30/03-04	344,547	146,045	153,105	154,081	153,000	154,000	6,955	7,955	0.044	0.045
6/30/04-05	325,530	287,625	305,553	308,163	306,000	308,000	18,375	20,375	0.094	0.095
6/30/05-06	403,750	287,295	308,879	317,889	309,000	318,000	21,705	30,705	0.077	0.079
6/30/06-07	420,219	215,240	234,043	252,032	234,000	252,000	18,760	36,760	0.056	0.060
6/30/07-08	425,998	458,767	504,814	501,326	501,000	505,000	42,233	46,233	0.118	0.119
6/30/08-09	420,566	590,342	656,092	636,981	637,000	656,000	46,658	65,658	0.151	0.156
6/30/09-10	433,206	366,147	410,996	420,114	411,000	441,000	44,853	74,853	0.095	0.102
6/30/10-11	444,673	376,025	429,568	439,616	430,000	462,000	53,975	85,975	0.097	0.104
6/30/11-12	467,753	481,597	561,630	558,455	558,000	562,000	76,403	80,403	0.119	0.120
6/30/12-13	495,398	367,262	441,979	464,311	442,000	487,200	74,738	119,938	0.089	0.098
6/30/13-14	518,391	340,181	422,654	457,988	423,000	480,900	82,819	140,719	0.082	0.093
6/30/14-15	539,631	502,258	643,288	640,728	641,000	675,150	138,742	172,892	0.119	0.125
6/30/15-16	585,875	435,386	576,670	604,231	577,000	634,200	141,615	198,815	0.098	0.108
6/30/16-17	594,787	353,895	539,718	595,985	540,000	625,800	186,105	271,905	0.091	0.105
6/30/17-18	607,484	277,712	502,072	600,237	502,000	630,000	224,288	352,288	0.083	0.104
6/30/18-19	656,644	136,770	479,766	697,308	480,000	731,850	343,230	595,080	0.073	0.111
Total	12,707,047	11,574,545	13,119,673	13,473,507	13,216,357	14,038,679	1,641,812	2,464,134		
Tot 6/30/84-19	12,707,047	11,338,618	12,995,326	13,473,507	12,963,083	13,764,751	1,624,466	2,426,133	0.102	0.108

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 5, Exhibit 2, Page 2, Column 3
(4) From Section 5, Exhibit 2, Page 2, Column 8
(5) From Section 5, Exhibit 2, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim
All Prior Yrs		111,896							0	1	
6/30/82-83		91,124	1.002	1.000	91,332	N/A	91,332		0	0	
6/30/83-84		32,907	1.003	1.000	33,015	N/A	33,015		0	0	
6/30/84-85	176,924	75,201	1.004	1.000	75,524	N/A	75,524	0.043	0	0	
6/30/85-86	188,662	52,218	1.005	1.000	52,495	N/A	52,495	0.028	0	0	
6/30/86-87	212,277	201,665	1.006	1.000	202,936	N/A	202,936	0.096	1	0	
6/30/87-88	243,118	235,802	1.007	1.000	237,525	N/A	237,525	0.098	1	0	
6/30/88-89	248,990	298,555	1.008	1.000	301,037	N/A	301,037	0.121	1	0	
6/30/89-90	250,404	157,317	1.009	1.000	158,784	N/A	158,784	0.063	0	0	
6/30/90-91	235,170	511,918	1.010	1.000	517,207	N/A	517,207	0.220	1	0	
6/30/91-92	235,607	555,103	1.011	1.000	561,399	N/A	561,399	0.238	1	0	
6/30/92-93	241,161	262,075	1.012	1.000	265,313	N/A	265,313	0.110	0	0	
6/30/93-94	254,321	541,736	1.013	1.000	548,977	N/A	548,977	0.216	1	1	7,241
6/30/94-95	256,665	305,369	1.014	1.000	309,760	N/A	309,760	0.121	0	0	
6/30/95-96	265,739	243,985	1.015	1.000	247,741	N/A	247,741	0.093	0	0	
6/30/96-97	296,336	187,967	1.016	1.000	191,051	N/A	191,051	0.064	0	0	
6/30/97-98	296,982	188,043	1.019	1.000	191,702	N/A	191,702	0.065	0	0	
6/30/98-99	299,530	259,412	1.023	1.000	265,253	N/A	265,253	0.089	1	1	5,841
6/30/99-00	323,627	360,854	1.028	1.000	370,824	N/A	370,824	0.115	0	0	
6/30/00-01	338,348	396,643	1.033	1.000	409,640	N/A	409,640	0.121	0	0	
6/30/01-02	329,555	562,283	1.038	1.000	583,611	N/A	583,611	0.177	2	2	10,664
6/30/02-03	329,179	319,925	1.043	1.000	333,720	N/A	333,720	0.101	1	1	13,795
6/30/03-04	344,547	146,045	1.048	1.000	153,105	N/A	153,105	0.044	0	0	
6/30/04-05	325,530	287,625	1.062	1.000	305,553	N/A	305,553	0.094	0	0	
6/30/05-06	403,750	287,295	1.075	1.000	308,879	N/A	308,879	0.077	0	0	
6/30/06-07	420,219	215,240	1.087	1.000	234,043	N/A	234,043	0.056	1	1	18,803
6/30/07-08	425,998	458,767	1.100	1.000	504,814	N/A	504,814	0.119	2	1	46,047
6/30/08-09	420,566	590,342	1.111	1.000	656,092	N/A	656,092	0.156	3	2	32,875
6/30/09-10	433,206	366,147	1.122	1.000	410,996	N/A	410,996	0.095	3	3	14,950
6/30/10-11	444,673	376,025	1.142	1.000	429,568	N/A	429,568	0.097	3	2	26,771
6/30/11-12	467,753	481,597	1.166	1.000	561,630	N/A	561,630	0.120	4	3	26,678
6/30/12-13	495,398	367,262	1.203	1.000	441,979	N/A	441,979	0.089	3	1	74,717
6/30/13-14	518,391	340,181	1.242	1.000	422,654	N/A	422,654	0.082	3	0	
6/30/14-15	539,631	502,258	1.281	1.000	643,288	N/A	643,288	0.119	10	3	47,010
6/30/15-16	585,875	435,386	1.325	1.000	576,670	N/A	576,670	0.098	27	13	10,868
6/30/16-17	594,787	353,895	1.525	1.000	539,718	N/A	539,718	0.091	87	12	15,485
6/30/17-18	607,484	277,712	1.808	1.000	502,072	N/A	502,072	0.083	188	96	2,337
6/30/18-19	656,644	136,770	3.508	1.000	479,766	N/A	479,766	0.073		173	1,983
Total	12,707,047	11,574,545			13,119,673		13,119,673		344	316	

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 5, Exhibit 2, Page 7
(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.
(6) = (3) x (4) x (5)
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	176,924	0.051	75,201	1.004	75,586	N/A	75,586	0.043	0.043
6/30/85-86	188,662	0.035	52,218	1.005	52,566	N/A	52,566	0.028	0.028
6/30/86-87	212,277	0.093	201,665	1.006	202,901	N/A	202,901	0.096	0.096
6/30/87-88	243,118	0.092	235,802	1.007	237,424	N/A	237,424	0.098	0.098
6/30/88-89	248,990	0.145	298,555	1.008	301,532	N/A	301,532	0.121	0.121
6/30/89-90	250,404	0.084	157,317	1.009	159,260	N/A	159,260	0.064	0.064
6/30/90-91	235,170	0.219	511,918	1.010	517,175	N/A	517,175	0.220	0.220
6/30/91-92	235,607	0.235	555,103	1.011	561,319	N/A	561,319	0.238	0.238
6/30/92-93	241,161	0.109	262,075	1.012	265,293	N/A	265,293	0.110	0.110
6/30/93-94	254,321	0.211	541,736	1.013	548,807	N/A	548,807	0.216	0.216
6/30/94-95	256,665	0.119	305,369	1.014	309,705	N/A	309,705	0.121	0.121
6/30/95-96	265,739	0.093	243,985	1.015	247,738	N/A	247,738	0.093	0.093
6/30/96-97	296,336	0.067	187,967	1.016	191,151	N/A	191,151	0.065	0.065
6/30/97-98	296,982	0.067	188,043	1.019	191,839	N/A	191,839	0.065	0.065
6/30/98-99	299,530	0.089	259,412	1.023	265,292	N/A	265,292	0.089	0.089
6/30/99-00	323,627	0.113	360,854	1.028	370,660	N/A	370,660	0.115	0.115
6/30/00-01	338,348	0.119	396,643	1.033	409,397	N/A	409,397	0.121	0.121
6/30/01-02	329,555	0.169	562,283	1.038	582,678	N/A	582,678	0.177	0.177
6/30/02-03	329,179	0.102	319,925	1.043	333,739	N/A	333,739	0.101	0.101
6/30/03-04	344,547	0.051	146,045	1.048	154,081	N/A	154,081	0.045	0.045
6/30/04-05	325,530	0.108	287,625	1.062	308,163	N/A	308,163	0.095	0.095
6/30/05-06	403,750	0.108	287,295	1.075	317,889	N/A	317,889	0.079	0.079
6/30/06-07	420,219	0.109	215,240	1.087	252,032	N/A	252,032	0.060	0.060
6/30/07-08	425,998	0.110	458,767	1.100	501,326	N/A	501,326	0.118	0.118
6/30/08-09	420,566	0.111	590,342	1.111	636,981	N/A	636,981	0.151	0.151
6/30/09-10	433,206	0.114	366,147	1.122	420,114	N/A	420,114	0.097	0.097
6/30/10-11	444,673	0.115	376,025	1.142	439,616	N/A	439,616	0.099	0.099
6/30/11-12	467,753	0.115	481,597	1.166	558,455	N/A	558,455	0.119	0.119
6/30/12-13	495,398	0.116	367,262	1.203	464,311	N/A	464,311	0.094	0.094
6/30/13-14	518,391	0.116	340,181	1.242	457,988	N/A	457,988	0.088	0.088
6/30/14-15	539,631	0.117	502,258	1.281	640,728	N/A	640,728	0.119	0.119
6/30/15-16	585,875	0.118	435,386	1.325	604,231	N/A	604,231	0.103	0.103
6/30/16-17	594,787	0.118	353,895	1.525	595,985	N/A	595,985	0.100	0.100
6/30/17-18	607,484	0.119	277,712	1.808	600,237	N/A	600,237	0.099	0.099
6/30/18-19	656,644	0.119	136,770	3.508	697,308	N/A	697,308	0.106	0.106
Total	12,707,047		11,338,618		13,473,507		13,473,507		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 5, Exhibit 2, Page 4, Column 11
(4) From Section 5, Exhibit 2, Page 2, Column 3
(5) From Section 5, Exhibit 2, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.051	0.051
6/30/85-86									0.035	0.035
6/30/86-87									0.093	0.093
6/30/87-88									0.092	0.092
6/30/88-89									0.145	0.145
6/30/89-90									0.084	0.084
6/30/90-91	235,170	517,207	0.220	1.194	0.263	1.156	0.303	0.087	0.218	0.219
6/30/91-92	235,607	561,399	0.238	1.189	0.283	1.150	0.326	0.088	0.235	0.235
6/30/92-93	241,161	265,313	0.110	1.189	0.131	1.144	0.150	0.088	0.108	0.109
6/30/93-94	254,321	548,977	0.216	1.178	0.254	1.138	0.290	0.089	0.209	0.211
6/30/94-95	256,665	309,760	0.121	1.170	0.141	1.133	0.160	0.091	0.118	0.119
6/30/95-96	265,739	247,741	0.093	1.155	0.108	1.127	0.121	0.092	0.091	0.093
6/30/96-97	296,336	191,051	0.064	1.137	0.073	1.122	0.082	0.094	0.065	0.067
6/30/97-98	296,982	191,702	0.065	1.135	0.073	1.116	0.082	0.095	0.065	0.067
6/30/98-99	299,530	265,253	0.089	1.135	0.101	1.110	0.112	0.095	0.086	0.089
6/30/99-00	323,627	370,824	0.115	1.135	0.130	1.105	0.144	0.096	0.110	0.113
6/30/00-01	338,348	409,640	0.121	1.109	0.134	1.099	0.148	0.098	0.117	0.119
6/30/01-02	329,555	583,611	0.177	1.101	0.195	1.094	0.213	0.100	0.166	0.169
6/30/02-03	329,179	333,720	0.101	1.073	0.109	1.088	0.118	0.103	0.098	0.102
6/30/03-04	344,547	153,105	0.044	1.046	0.047	1.083	0.050	0.106	0.049	0.051
6/30/04-05	325,530	305,553	0.094	1.036	0.097	1.078	0.105	0.108	0.085	0.108
6/30/05-06	403,750	308,879	0.077	1.032	0.079	1.072	0.085	0.108	0.088	0.108
6/30/06-07	420,219	234,043	0.056	1.032	0.057	1.067	0.061	0.109	0.090	0.109
6/30/07-08	425,998	504,814	0.119	1.032	0.122	1.062	0.130	0.110	0.092	0.110
6/30/08-09	420,566	656,092	0.156	1.027	0.160	1.056	0.169	0.111	0.095	0.111
6/30/09-10	433,206	410,996	0.095	1.000	0.095	1.051	0.100	0.114	0.100	0.114
6/30/10-11	444,673	429,568	0.097	1.000	0.097	1.046	0.101	0.115	0.103	0.115
6/30/11-12	467,753	561,630	0.120	1.000	0.120	1.041	0.125	0.115	0.105	0.115
6/30/12-13	495,398	441,979	0.089	1.000	0.089	1.036	0.092	0.116	0.108	0.116
6/30/13-14	518,391	422,654	0.082	1.000	0.082	1.030	0.084	0.116	0.110	0.116
6/30/14-15	539,631	643,288	0.119	1.000	0.119	1.025	0.122	0.117	0.113	0.117
6/30/15-16	585,875	576,670	0.098	1.000	0.098	1.020	0.100	0.118	0.116	0.118
6/30/16-17	594,787	539,718	0.091	1.000	0.091	1.015	0.092	0.118	0.119	0.118
6/30/17-18	607,484	502,072	0.083	1.000	0.083	1.010	0.083	0.119	0.122	0.119
6/30/18-19	656,644	479,766	0.073	1.000	0.073	1.005	0.073	0.119		0.119
Total	11,386,672	11,967,026								

Trend Last 4 (ex 18-19):	-11.1%	Avg 3 (ex 18-19):	0.092
Trend Last 8 (ex 18-19):	-2.1%	Avg 5 (ex 18-19):	0.096
Trend Last 12 (ex 18-19):	-0.6%	Avg 10 (ex 18-19):	0.107
Prior Selected Trend:	2.5%	Prior Sel Avg:	0.125
Selected Trend:	0.5%	Sel. Loss Cost:	0.120

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 5, Exhibit 2, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCIRB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.950	
(2)	Credibility		10%	
(3)	Average Pmt Trend Statewide		0.980	
(4)	Credibility Weighted Trend		0.977	
		(Low)		(High)
(5)	Selected Range	0.957		0.978
(6)	Incremental Paid for 2019	1,581		1,581
(7)	Estimated Reserve	35,485		69,835
(8)	Paid to Date (82 & Prior)	111,896		111,896
(9)	Est Ult Paid for 1982 & Prior	147,382		181,732

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	863	394
(11)	Projected Number of Years	2	2
(12)	Estimated Reserve	1,726	788
(13)	Paid to Date (82 & Prior)	111,896	110,316
(14)	Est Ult Paid for 1982 & Prior	113,623	111,104
(14a)	Paid Counts During Fiscal Year	1	0

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	129,243	147,677
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**129,243**	**147,677**
(18)	Implied Tail	1.155	1.320
(19)	Ult Loss Inc Lump Sums @ 6/18	110,710	110,710

NOTES:

(1) From Section 5, Exhibit 2, Page 6
(2) = (Average of Section 5, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 5, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 5, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	9,975	9.208			
1993	2	1,394	7.240	0.140		
1994	3	30,337	10.320	21.763		
1995	4	-7,026		-0.232		
1996	5	2,087	7.643	-0.297		
1997	6	418	6.035	0.200		
1998	7	0				
1999	8	390	5.966			
2000	9	1,546	7.343	3.964	n =	17
2001	10	0			S(x) =	34,081
2002	11	0			S(x-sq) =	68,325,631
2003	12	0			S(xy) =	245,168
2004	13	1,400	7.244		S(y) =	122
2005	14	0			D =	21,166
2006	15	424	6.050		slope =	0
2007	16	284	5.649	0.670	Avg Trend =	0.941
2008	17	1,845	7.520	6.499		
2009	18	3,150	8.055	1.707		
2010	19	3,080	8.033	0.978		
2011	20	0				
2012	21	0				
2013	22	720	6.579			
2014	23	0				
2015	24	0				
2016	25	174	5.161			
2017	26	1,008	6.916	5.783		
2018	27	0				
2019	28	1,581				
					Selected Trend:	**0.950**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2017: 5.783 = 1008 / 174

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Amherst) - Cluster 4
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
June-83	7,015	19,272	26,992	33,578	44,296	54,254	69,123	86,430	87,691	89,009	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124
June-84	2,065	5,673	7,945	9,884	13,039	15,948	22,112	25,109	27,259	27,620	27,620	29,236	29,236	29,236	29,774	29,774	33,170	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	
June-85	5,341	14,673	20,551	25,565	32,019	36,080	42,108	45,751	51,440	65,690	69,695	65,951	67,047	67,047	67,068	67,485	69,103	70,526	70,577	71,427	71,777	71,777	71,777	73,027	73,027	73,027	74,065	74,065	74,065	74,201	75,051	75,201	75,201	75,201	75,201		
June-86	4,254	11,686	16,367	29,076	33,757	37,603	39,971	43,583	45,896	47,123	47,123	47,123	47,123	47,123	48,153	48,153	48,153	48,153	48,503	49,375	49,375	49,375	50,070	50,670	50,670	52,218	52,218	52,218	52,218	52,218	52,218	52,218	52,218	52,218			
June-87	17,332	47,614	74,474	96,432	115,240	124,178	130,253	135,326	138,193	142,828	144,778	146,075	148,983	150,159	151,984	152,431	153,300	154,154	156,424	159,661	167,912	175,836	182,412	189,688	194,323	195,870	195,870	196,094	196,321	200,006	201,656	201,665	201,665				
June-88	21,776	71,312	105,389	144,783	150,052	156,889	162,436	164,340	165,770	169,300	170,433	171,904	172,900	173,563	174,460	176,155	179,540	184,256	189,906	193,501	195,901	201,522	207,981	215,719	220,354	223,356	225,509	230,109	231,967	233,979	235,802	235,802					
June-89	31,748	113,449	180,690	213,618	227,584	232,537	247,318	252,055	260,621	266,739	270,947	278,041	284,182	288,891	291,536	292,751	293,625	293,975	294,069	294,094	295,364	295,364	296,430	296,430	296,430	296,430	296,430	296,430	297,380	298,555	298,555						
June-90	19,060	117,509	146,705	152,013	155,556	157,028	157,217	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317							
June-91	49,629	201,675	266,883	315,231	324,767	338,441	344,037	344,920	345,667	349,590	353,310	355,602	356,167	359,042	361,717	364,813	366,594	376,706	462,325	499,976	507,147	507,299	507,299	507,399	507,483	507,961	508,968	511,918	511,918								
June-92	93,121	216,421	309,712	382,754	413,527	441,551	469,869	498,257	502,052	506,299	508,720	511,219	517,091	518,976	521,249	523,045	528,030	532,841	536,465	544,719	549,635	550,127	550,346	551,403	551,403	553,253	555,103	555,103									
June-93	81,970	229,344	254,404	256,957	260,901	261,422	261,544	261,544	261,544	262,036	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075										
June-94	77,508	161,802	222,213	282,819	289,168	318,109	326,227	327,931	339,521	345,752	357,217	392,989	403,792	437,920	445,327	454,454	462,395	472,317	484,855	493,591	497,802	502,382	534,763	536,976	540,506	541,736											
June-95	86,716	239,689	284,148	295,763	301,706	303,344	303,490	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369												
June-96	81,054	187,654	205,831	215,693	219,869	225,627	237,068	241,239	242,923	243,938	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985													
June-97	61,666	103,895	129,694	181,008	185,516	187,189	187,267	187,617	187,617	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967														
June-98	40,014	98,284	119,324	134,344	139,107	141,779	147,819	148,338	149,621	183,281	184,542	185,346	186,264	187,193	188,013	188,043	188,043	188,043	188,043	188,043	188,043	188,043															
June-99	57,055	145,931	161,873	165,175	173,370	179,001	181,785	183,278	186,735	189,893	194,365	198,821	204,465	208,778	214,267	223,056	234,647	247,484	255,257	256,033	259,412																
June-00	78,904	144,101	178,359	211,117	245,711	260,589	272,440	284,728	298,320	311,888	326,984	344,501	356,294	360,812	360,854	360,854	360,854	360,854	360,854	360,854																	
June-01	78,435	185,081	235,180	264,482	271,555	289,614	313,258	334,076	349,005	361,767	371,025	374,808	383,719	389,538	393,015	396,630	396,643	396,643	396,643																		
June-02	42,493	107,557	182,137	222,791	235,866	244,961	262,574	293,121	350,090	378,624	404,630	431,685	458,566	489,061	520,323	536,271	555,820	562,283																			
June-03	25,041	124,452	162,035	187,240	223,402	231,574	235,669	238,598	245,618	250,270	253,237	278,177	288,992	297,086	305,180	313,391	319,925																				
June-04	58,014	123,410	131,529	133,995	134,242	145,534	145,992	146,045	146,045	146,045	146,045	146,045	146,045	146,045	146,045	146,045																					
June-05	90,145	204,953	256,853	271,491	281,203	284,263	285,428	287,625	287,625	287,625	287,625	287,625	287,625	287,625	287,625																						
June-06	104,747	269,295	283,925	286,559	286,907	286,907	287,115	287,115	287,115	287,295	287,295	287,295	287,295	287,295																							
June-07	90,114	168,280	184,018	193,167	200,918	206,920	207,690	208,341	209,581	212,260	213,725	214,870	215,240																								
June-08	174,365	329,758	353,009	367,373	382,156	389,416	393,780	428,915	439,771	457,987	458,453	458,767																									
June-09	175,201	332,994	476,353	502,636	515,594	547,517	553,032	564,035	568,971	571,863	590,342																										
June-10	71,728	205,753	256,446	286,005	301,536	322,879	343,231	353,434	360,460	366,147																											
June-11	188,496	302,104	334,423	349,891	353,820	364,981	367,695	372,561	376,025																												
June-12	156,195	356,432	391,171	447,380	449,827	460,179	477,927	481,597																													
June-13	144,944	280,644	335,988	348,994	358,760	363,432	367,262																														
June-14	132,938	226,821	336,151	339,610	340,181	340,181																															
June-15	218,511	402,056	463,526	491,979	502,258																																
June-16	182,684	360,160	399,651	435,386																																	
June-17	193,279	321,627	353,895																																		
June-18	153,865	277,712																																			
June-19	136,770																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
June-83	2.747	1.401	1.244	1.319	1.225	1.274	1.250	1.015	1.015	1.024	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.747	1.400	1.244	1.319	1.223	1.387	1.136	1.086	1.013	1.000	1.059	1.000	1.000	1.018	1.000	1.114	0.992	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.747	1.401	1.244	1.252	1.127	1.167	1.087	1.124	1.277	1.061	0.946	1.017	1.000	1.000	1.006	1.024	1.021	1.001	1.012	1.005	1.000	1.000	1.017	1.000	1.000	1.014	1.000	1.000	1.002	1.011	1.002	1.000	1.000	1.000		
June-86	2.747	1.401	1.777	1.161	1.114	1.063	1.090	1.053	1.027	1.000	1.000	1.000	1.000	1.022	1.000	1.000	1.000	1.007	1.018	1.000	1.000	1.014	1.012	1.000	1.031	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.747	1.564	1.295	1.195	1.078	1.049	1.039	1.021	1.034	1.014	1.009	1.020	1.008	1.012	1.003	1.006	1.006	1.015	1.021	1.052	1.047	1.037	1.040	1.024	1.008	1.000	1.001	1.001	1.019	1.008	1.000	1.000				
June-88	3.275	1.478	1.374	1.036	1.046	1.035	1.012	1.009	1.021	1.007	1.009	1.006	1.004	1.005	1.010	1.019	1.026	1.031	1.019	1.012	1.029	1.032	1.037	1.021	1.014	1.010	1.020	1.008	1.009	1.008	1.000					
June-89	3.573	1.593	1.182	1.065	1.022	1.064	1.019	1.034	1.023	1.016	1.026	1.022	1.017	1.009	1.004	1.003	1.001	1.000	1.000	1.004	1.000	1.004	1.000	1.000	1.000	1.000	1.000	1.003	1.004	1.000						
June-90	6.165	1.248	1.036	1.023	1.009	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
June-91	4.064	1.323	1.181	1.030	1.042	1.017	1.003	1.002	1.011	1.011	1.006	1.002	1.008	1.007	1.009	1.005	1.028	1.227	1.081	1.014	1.000	1.000	1.000	1.000	1.001	1.002	1.006	1.000								
June-92	2.324	1.431	1.236	1.080	1.068	1.064	1.060	1.008	1.008	1.005	1.005	1.011	1.004	1.004	1.003	1.010	1.009	1.007	1.015	1.009	1.001	1.000	1.002	1.000	1.003	1.003	1.000									
June-93	2.798	1.109	1.010	1.015	1.002	1.000	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	2.088	1.373	1.273	1.022	1.100	1.026	1.005	1.035	1.018	1.033	1.100	1.027	1.085	1.017	1.020	1.017	1.021	1.027	1.018	1.009	1.009	1.064	1.004	1.007	1.002											
June-95	2.764	1.185	1.041	1.020	1.005	1.000	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	2.315	1.097	1.048	1.019	1.026	1.051	1.018	1.007	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	1.685	1.248	1.396	1.025	1.009	1.000	1.002	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	2.456	1.214	1.126	1.035	1.019	1.043	1.004	1.009	1.225	1.007	1.004	1.005	1.005	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
June-99	2.558	1.109	1.020	1.050	1.032	1.016	1.008	1.019	1.017	1.024	1.023	1.028	1.021	1.026	1.041	1.052	1.055	1.031	1.003	1.013																
June-00	1.826	1.238	1.184	1.164	1.061	1.045	1.045	1.048	1.045	1.048	1.054	1.034	1.013	1.000	1.000	1.000	1.000	1.000	1.000																	
June-01	2.360	1.271	1.125	1.027	1.067	1.082	1.066	1.045	1.037	1.026	1.010	1.024	1.015	1.009	1.009	1.000	1.000	1.000																		
June-02	2.531	1.693	1.223	1.059	1.039	1.072	1.116	1.194	1.082	1.069	1.067	1.062	1.067	1.064	1.031	1.036	1.012																			
June-03	4.970	1.302	1.156	1.193	1.037	1.018	1.012	1.029	1.019	1.012	1.098	1.039	1.028	1.027	1.027	1.021																				
June-04	2.127	1.066	1.019	1.002	1.084	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	2.274	1.253	1.057	1.036	1.011	1.004	1.008	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
June-06	2.571	1.054	1.009	1.001	1.000	1.001	1.000	1.000	1.001	1.000	1.000	1.000	1.000																							
June-07	1.867	1.094	1.050	1.040	1.030	1.004	1.003	1.006	1.013	1.007	1.005	1.002																								
June-08	1.891	1.071	1.041	1.040	1.019	1.011	1.089	1.025	1.041	1.001	1.001																									
June-09	1.901	1.431	1.055	1.026	1.062	1.010	1.020	1.009	1.005	1.032																										
June-10	2.869	1.246	1.115	1.054	1.071	1.063	1.030	1.020	1.016																											
June-11	1.603	1.107	1.046	1.011	1.032	1.007	1.013	1.009																												
June-12	2.282	1.097	1.144	1.005	1.023	1.039	1.008																													
June-13	1.936	1.197	1.039	1.028	1.013	1.011																														
June-14	1.706	1.482	1.010	1.002	1.000																															
June-15	1.840	1.153	1.061	1.021																																
June-16	1.971	1.110	1.089																																	
June-17	1.664	1.100																																		
June-18	1.805																																			

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs	2.550	1.273	1.151	1.072	1.053	1.052	1.038	1.028	1.034	1.015	1.016	1.012	1.011	1.010	1.007	1.015	1.009	1.018	1.010	1.007	1.005	1.010	1.008	1.004	1.005	1.003	1.003	1.001	1.004	1.004	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.797	1.208	1.069	1.013	1.028	1.026	1.032	1.014	1.015	1.008	1.001	1.008	1.019	1.020	1.013	1.022	1.013	1.006	1.001	1.003	1.002	1.013	1.001	1.001	1.001	1.001	1.005	1.002	1.006	1.005	1.000	1.000					
Latest 3	1.813	1.121	1.054	1.017	1.012	1.019	1.017	1.013	1.021	1.013	1.002	1.001	1.000	1.009	1.019	1.019	1.004	1.010	1.001	1.004	1.000	1.000	1.001	1.002	1.002	1.002	1.002	1.001	1.004	1.005	1.000	1.000	1.000	1.000			
Volume Wtd																																					
All Yrs	2.166	1.220	1.104	1.041	1.038	1.031	1.029	1.023	1.025	1.016	1.020	1.016	1.017	1.012	1.010	1.012	1.010	1.026	1.015	1.008	1.005	1.013	1.006	1.004	1.003	1.002	1.004	1.002	1.006	1.004	1.000	1.000	1.000	1.000	1.000		
Latest 5	1.802	1.187	1.071	1.014	1.026	1.024	1.030	1.014	1.016	1.011	1.001	1.009	1.026	1.027	1.016	1.021	1.011	1.006	1.001	1.003	1.003	1.022	1.002	1.002	1.002	1.002	1.004	1.002	1.007	1.005	1.000						
Latest 3	1.811	1.123	1.056	1.017	1.013	1.020	1.016	1.012	1.020	1.016	1.002	1.000	1.000	1.011	1.025	1.021	1.005	1.008	1.001	1.005	1.000	1.000	1.002	1.003	1.002	1.002	1.002	1.001	1.005	1.005	1.000	1.000	1.000				

Dev Factor Sele	.																																				
Industry 1	1.968	1.147	1.054	1.025	1.017	1.010	1.012	1.012	1.010	1.009	1.010	1.009	1.009	1.009	1.008	1.008	1.007	1.007																			
Industry 2		1.281	1.080	1.034	1.020	1.017	1.009	1.011	1.009	1.009	1.006	1.007	1.009	1.008	1.008	1.012	1.007	1.006	1.007	1.006																	
Prior	1.940	1.211	1.153	1.035	1.039	1.039	1.031	1.020	1.016	1.010	1.010	1.012	1.012	1.013	1.022	1.005	1.005	1.005	1.005	1.005	1.003	1.003	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.002	
Selected	1.940	1.185	1.151	1.034	1.031	1.032	1.032	1.021	1.018	1.010	1.010	1.012	1.011	1.012	1.013	1.005	1.005	1.005	1.005	1.005	1.003	1.003	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.002
FacToUlt	3.508	1.808	1.525	1.325	1.281	1.242	1.203	1.166	1.142	1.122	1.111	1.100	1.087	1.075	1.062	1.048	1.043	1.038	1.033	1.028	1.023	1.019	1.016	1.015	1.014	1.013	1.012	1.011	1.010	1.009	1.008	1.007	1.006	1.005	1.004	1.003	1.002
Percent of Ult	28.5%	55.3%	65.6%	75.5%	78.1%	80.5%	83.1%	85.7%	87.5%	89.1%	90.0%	90.9%	92.0%	93.0%	94.1%	95.4%	95.9%	96.3%	96.8%	97.3%	97.8%	98.1%	98.4%	98.5%	98.6%	98.7%	98.8%	98.9%	99.0%	99.1%	99.2%	99.3%	99.4%	99.5%	99.6%	99.7%	99.8%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	110,710	110,710	129,243	147,677	18,533	16.7%	36,967	33.4%
6/30/82-83	91,124	92,256	91,124	92,246	0	0.0%	(11)	0.0%
6/30/83-84	32,907	34,010	32,907	34,006	0	0.0%	(4)	0.0%
6/30/84-85	75,953	77,043	75,953	77,034	0	0.0%	(9)	0.0%
6/30/85-86	52,741	53,263	52,741	53,263	0	0.0%	0	0.0%
6/30/86-87	203,000	203,000	203,000	203,000	0	0.0%	0	0.0%
6/30/87-88	237,000	238,000	237,000	238,000	0	0.0%	0	0.0%
6/30/88-89	301,000	302,000	301,000	302,000	0	0.0%	0	0.0%
6/30/89-90	159,000	159,000	159,000	159,000	0	0.0%	0	0.0%
6/30/90-91	517,000	517,000	517,000	517,000	0	0.0%	0	0.0%
6/30/91-92	561,000	561,000	561,000	561,000	0	0.0%	0	0.0%
6/30/92-93	264,696	267,317	264,696	267,317	0	0.0%	0	0.0%
6/30/93-94	548,000	548,000	549,000	549,000	1,000	0.2%	1,000	0.2%
6/30/94-95	308,423	311,476	308,423	311,476	0	0.0%	0	0.0%
6/30/95-96	246,425	248,865	246,425	248,865	0	0.0%	0	0.0%
6/30/96-97	189,847	191,726	189,847	191,726	0	0.0%	0	0.0%
6/30/97-98	192,000	192,000	192,000	192,000	0	0.0%	0	0.0%
6/30/98-99	263,000	268,260	265,000	270,300	2,000	0.8%	2,040	0.8%
6/30/99-00	372,000	372,000	371,000	371,000	(1,000)	-0.3%	(1,000)	-0.3%
6/30/00-01	411,000	411,000	409,000	410,000	(2,000)	-0.5%	(1,000)	-0.2%
6/30/01-02	578,000	579,000	583,000	584,000	5,000	0.9%	5,000	0.9%
6/30/02-03	328,000	328,000	334,000	335,670	6,000	1.8%	7,670	2.3%
6/30/03-04	156,000	157,000	153,000	154,000	(3,000)	-1.9%	(3,000)	-1.9%
6/30/04-05	309,000	312,000	306,000	308,000	(3,000)	-1.0%	(4,000)	-1.3%
6/30/05-06	315,000	318,000	309,000	318,000	(6,000)	-1.9%	0	0.0%
6/30/06-07	239,000	252,000	234,000	252,000	(5,000)	-2.1%	0	0.0%
6/30/07-08	501,000	514,000	501,000	505,000	0	0.0%	(9,000)	-1.8%
6/30/08-09	619,000	648,000	637,000	656,000	18,000	2.9%	8,000	1.2%
6/30/09-10	415,000	437,850	411,000	441,000	(4,000)	-1.0%	3,150	0.7%
6/30/10-11	437,000	462,000	430,000	462,000	(7,000)	-1.6%	0	0.0%
6/30/11-12	564,000	579,000	558,000	562,000	(6,000)	-1.1%	(17,000)	-2.9%
6/30/12-13	457,000	496,650	442,000	487,200	(15,000)	-3.3%	(9,450)	-1.9%
6/30/13-14	445,000	498,750	423,000	480,900	(22,000)	-4.9%	(17,850)	-3.6%
6/30/14-15	651,000	698,250	641,000	675,150	(10,000)	-1.5%	(23,100)	-3.3%
6/30/15-16	623,000	676,200	577,000	634,200	(46,000)	-7.4%	(42,000)	-6.2%
6/30/16-17	608,000	687,750	540,000	625,800	(68,000)	-11.2%	(61,950)	-9.0%
6/30/17-18	564,000	727,650	502,000	630,000	(62,000)	-11.0%	(97,650)	-13.4%
6/30/18-19								
Total	12,945,824	13,530,025	12,736,357	13,306,829	(209,467)	-1.6%	(223,196)	-1.6%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 5, Exhibit 2, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.2%	0.0%	0.1%	0.0%	1.000	1.000
444	99.8%	0.1%	0.2%	0.0%	0.0%	0.981	0.971
432	99.7%	0.1%	0.3%	0.0%	0.0%	0.954	0.933
420	99.6%	0.1%	0.4%	0.0%	0.0%	0.932	0.901
408	99.5%	0.1%	0.5%	0.0%	0.0%	0.912	0.873
396	99.4%	0.1%	0.6%	0.0%	0.0%	0.894	0.847
384	99.3%	0.1%	0.7%	0.0%	0.0%	0.876	0.823
372	99.2%	0.1%	0.8%	0.0%	0.0%	0.859	0.800
360	99.1%	0.1%	0.9%	0.0%	0.0%	0.842	0.778
348	99.0%	0.1%	1.0%	0.0%	0.0%	0.827	0.757
336	98.9%	0.1%	1.1%	0.0%	0.0%	0.811	0.737
324	98.8%	0.1%	1.2%	0.0%	0.0%	0.796	0.717
312	98.7%	0.1%	1.3%	0.0%	0.0%	0.782	0.699
300	98.6%	0.1%	1.4%	0.0%	0.0%	0.767	0.681
288	98.5%	0.1%	1.5%	0.0%	0.0%	0.754	0.664
276	98.4%	0.3%	1.6%	0.1%	0.1%	0.740	0.647
264	98.1%	0.3%	1.9%	0.1%	0.1%	0.753	0.666
252	97.8%	0.5%	2.2%	0.2%	0.1%	0.758	0.674
240	97.3%	0.5%	2.7%	0.2%	0.2%	0.775	0.697
228	96.8%	0.5%	3.2%	0.2%	0.2%	0.781	0.705
216	96.3%	0.5%	3.7%	0.2%	0.2%	0.781	0.706
204	95.9%	0.5%	4.1%	0.2%	0.2%	0.778	0.701
192	95.4%	1.3%	4.6%	0.7%	0.5%	0.772	0.693
180	94.1%	1.1%	5.9%	0.6%	0.5%	0.793	0.722
168	93.0%	1.0%	7.0%	0.6%	0.5%	0.798	0.728
156	92.0%	1.1%	8.0%	0.7%	0.5%	0.795	0.724
144	90.9%	0.9%	9.1%	0.6%	0.5%	0.790	0.717
132	90.0%	0.9%	10.0%	0.6%	0.5%	0.779	0.703
120	89.1%	1.6%	10.9%	1.1%	0.9%	0.768	0.688
108	87.5%	1.8%	12.5%	1.3%	1.1%	0.769	0.689
96	85.7%	2.7%	14.3%	2.0%	1.7%	0.770	0.691
84	83.1%	2.6%	16.9%	2.0%	1.8%	0.778	0.702
72	80.5%	2.4%	19.5%	1.9%	1.7%	0.779	0.703
60	78.1%	2.6%	21.9%	2.2%	2.0%	0.774	0.697
48	75.5%	9.9%	24.5%	8.7%	8.1%	0.769	0.691
36	65.6%	10.3%	34.4%	9.3%	8.9%	0.809	0.744
24	55.3%	26.8%	44.7%	25.3%	24.6%	0.825	0.764
12	28.5%	28.5%	71.5%	28.0%	27.7%	0.863	0.814
Total		100.0%					

NOTES:
(2) = 1 / Section 5, Exhibit 2, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	17,346	35,781		16,686	34,418
6/30/82-83	0	1,122	0.981	0	1,100
6/30/83-84	0	1,099	0.954	0	1,048
6/30/84-85	752	1,833	0.932	701	1,709
6/30/85-86	522	1,044	0.912	476	953
6/30/86-87	1,335	1,335	0.894	1,193	1,193
6/30/87-88	1,198	2,198	0.876	1,049	1,925
6/30/88-89	2,445	3,445	0.859	2,100	2,959
6/30/89-90	1,683	1,683	0.842	1,418	1,418
6/30/90-91	5,082	5,082	0.827	4,201	4,201
6/30/91-92	5,897	5,897	0.811	4,783	4,783
6/30/92-93	2,621	5,242	0.796	2,087	4,173
6/30/93-94	7,264	7,264	0.782	5,678	5,678
6/30/94-95	3,054	6,107	0.767	2,344	4,687
6/30/95-96	2,440	4,880	0.754	1,839	3,678
6/30/96-97	1,880	3,759	0.740	1,392	2,783
6/30/97-98	3,957	3,957	0.753	2,981	2,981
6/30/98-99	5,588	10,888	0.758	4,238	8,258
6/30/99-00	10,146	10,146	0.775	7,861	7,861
6/30/00-01	12,357	13,357	0.781	9,650	10,431
6/30/01-02	20,717	21,717	0.781	16,183	16,965
6/30/02-03	14,075	15,745	0.778	10,947	12,245
6/30/03-04	6,955	7,955	0.772	5,368	6,140
6/30/04-05	18,375	20,375	0.793	14,576	16,163
6/30/05-06	21,705	30,705	0.798	17,314	24,493
6/30/06-07	18,760	36,760	0.795	14,910	29,217
6/30/07-08	42,233	46,233	0.790	33,365	36,525
6/30/08-09	46,658	65,658	0.779	36,369	51,179
6/30/09-10	44,853	74,853	0.768	34,464	57,515
6/30/10-11	53,975	85,975	0.769	41,502	66,108
6/30/11-12	76,403	80,403	0.770	58,798	61,876
6/30/12-13	74,738	119,938	0.778	58,129	93,284
6/30/13-14	82,819	140,719	0.779	64,512	109,614
6/30/14-15	138,742	172,892	0.774	107,449	133,897
6/30/15-16	141,615	198,815	0.769	108,970	152,984
6/30/16-17	186,105	271,905	0.809	150,615	220,053
6/30/17-18	224,288	352,288	0.825	184,955	290,509
6/30/18-19	343,230	595,080	0.863	296,304	513,721
Total	1,641,812	2,464,134		1,325,406	1,998,722
			(7) Total Discount Factor:	0.807	0.811

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	17,346	35,781
(9) Projected Number of Years:	2	2
(10) Projected Paid Loss per Year:	8,673	17,890
(11) Discounted Value at 4%:	16,686	34,418

NOTES:
(2), (3) From Section 5, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 5, Exhibit 2, Page 9, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Amherst) - Cluster 4
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	17,346	35,781		16,378	33,784
6/30/82-83	0	1,122	0.971	0	1,089
6/30/83-84	0	1,099	0.933	0	1,025
6/30/84-85	752	1,833	0.901	678	1,652
6/30/85-86	522	1,044	0.873	456	912
6/30/86-87	1,335	1,335	0.847	1,131	1,131
6/30/87-88	1,198	2,198	0.823	986	1,809
6/30/88-89	2,445	3,445	0.800	1,955	2,755
6/30/89-90	1,683	1,683	0.778	1,309	1,309
6/30/90-91	5,082	5,082	0.757	3,846	3,846
6/30/91-92	5,897	5,897	0.737	4,343	4,343
6/30/92-93	2,621	5,242	0.717	1,880	3,759
6/30/93-94	7,264	7,264	0.699	5,075	5,075
6/30/94-95	3,054	6,107	0.681	2,079	4,158
6/30/95-96	2,440	4,880	0.664	1,619	3,238
6/30/96-97	1,880	3,759	0.647	1,216	2,433
6/30/97-98	3,957	3,957	0.666	2,636	2,636
6/30/98-99	5,588	10,888	0.674	3,767	7,340
6/30/99-00	10,146	10,146	0.697	7,068	7,068
6/30/00-01	12,357	13,357	0.705	8,713	9,418
6/30/01-02	20,717	21,717	0.706	14,617	15,323
6/30/02-03	14,075	15,745	0.701	9,868	11,038
6/30/03-04	6,955	7,955	0.693	4,823	5,516
6/30/04-05	18,375	20,375	0.722	13,269	14,713
6/30/05-06	21,705	30,705	0.728	15,796	22,346
6/30/06-07	18,760	36,760	0.724	13,575	26,600
6/30/07-08	42,233	46,233	0.717	30,284	33,152
6/30/08-09	46,658	65,658	0.703	32,798	46,154
6/30/09-10	44,853	74,853	0.688	30,873	51,523
6/30/10-11	53,975	85,975	0.689	37,213	59,275
6/30/11-12	76,403	80,403	0.691	52,766	55,528
6/30/12-13	74,738	119,938	0.702	52,448	84,167
6/30/13-14	82,819	140,719	0.703	58,252	98,977
6/30/14-15	138,742	172,892	0.697	96,756	120,572
6/30/15-16	141,615	198,815	0.691	97,837	137,355
6/30/16-17	186,105	271,905	0.744	138,446	202,273
6/30/17-18	224,288	352,288	0.764	171,280	269,028
6/30/18-19	343,230	595,080	0.814	279,557	484,687
Total	1,641,812	2,464,134		1,215,592	1,837,008
			(7) Total Discount Factor:	0.740	0.745

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	17,346	35,781
(9) Projected Number of Years:	2	2
(10) Projected Paid Loss per Year:	8,673	17,890
(11) Discounted Value at 6%:	16,378	33,784

NOTES:
(2), (3) From Section 5, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 5, Exhibit 2, Page 9, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		1,329,412			1,329,412	1,329,412	0	0		
6/30/82-83		306,340	306,477		306,340	313,999	0	7,659		
6/30/83-84		1,443,839	1,505,483		1,445,283	1,451,058	1,444	7,219		
6/30/84-85	116,303	852,745	853,169	853,329	853,598	857,009	853	4,264	0.734	0.737
6/30/85-86	123,981	2,517,941	2,519,167	2,519,444	2,519,000	2,519,000	1,059	1,059	2.032	2.032
6/30/86-87	139,388	3,380,019	3,381,575	3,381,545	3,382,000	3,396,919	1,981	16,900	2.426	2.437
6/30/87-88	159,499	3,025,877	3,027,205	3,027,151	3,027,000	3,041,006	1,123	15,129	1.898	1.907
6/30/88-89	180,644	2,623,646	2,624,784	2,625,229	2,626,270	2,636,764	2,624	13,118	1.454	1.460
6/30/89-90	142,494	3,243,583	3,245,017	3,245,580	3,246,827	3,259,801	3,244	16,218	2.279	2.288
6/30/90-91	143,694	1,101,823	1,102,273	1,102,269	1,102,925	1,107,332	1,102	5,509	0.768	0.771
6/30/91-92	155,170	1,518,304	1,520,058	1,520,029	1,519,822	1,525,896	1,518	7,592	0.979	0.983
6/30/92-93	163,283	638,167	639,409	639,385	638,805	641,358	638	3,191	0.391	0.393
6/30/93-94	177,184	1,938,969	1,942,801	1,942,668	1,943,000	1,987,443	4,031	48,474	1.097	1.122
6/30/94-95	188,391	521,127	521,812	521,804	521,648	523,733	521	2,606	0.277	0.278
6/30/95-96	201,751	491,723	493,631	493,619	496,640	501,557	4,917	9,834	0.246	0.249
6/30/96-97	231,872	422,390	424,045	424,196	426,614	430,838	4,224	8,448	0.184	0.186
6/30/97-98	232,237	545,727	555,829	555,499	551,184	556,642	5,457	10,915	0.237	0.240
6/30/98-99	232,075	631,601	641,142	641,064	637,917	644,233	6,316	12,632	0.275	0.278
6/30/99-00	211,819	687,583	708,738	707,670	694,459	701,335	6,876	13,752	0.328	0.331
6/30/00-01	215,099	737,973	761,158	760,181	745,353	752,733	7,380	14,759	0.347	0.350
6/30/01-02	227,797	341,709	354,925	355,052	345,126	348,543	3,417	6,834	0.152	0.153
6/30/02-03	242,008	1,105,988	1,159,913	1,156,065	1,156,000	1,218,000	50,012	112,012	0.478	0.503
6/30/03-04	276,758	962,971	997,225	995,572	996,000	997,000	33,029	34,029	0.360	0.360
6/30/04-05	260,378	201,102	209,314	220,042	209,000	220,000	7,898	18,898	0.080	0.084
6/30/05-06	317,741	778,823	815,384	806,486	806,000	815,000	27,177	36,177	0.254	0.256
6/30/06-07	325,922	368,698	393,089	407,269	393,000	407,000	24,302	38,302	0.121	0.125
6/30/07-08	354,130	1,180,035	1,254,374	1,231,854	1,232,000	1,254,000	51,965	73,965	0.348	0.354
6/30/08-09	362,309	532,460	576,044	582,638	576,000	583,000	43,540	50,540	0.159	0.161
6/30/09-10	383,298	529,870	575,904	588,040	576,000	588,000	46,130	58,130	0.150	0.153
6/30/10-11	394,924	695,094	782,177	764,354	764,000	813,280	68,906	118,186	0.193	0.206
6/30/11-12	381,943	952,864	1,090,664	1,040,237	1,040,000	1,091,000	87,136	138,136	0.272	0.286
6/30/12-13	384,763	406,699	468,904	497,162	469,000	497,000	62,301	90,301	0.122	0.129
6/30/13-14	364,582	657,315	783,779	760,857	761,000	784,000	103,685	126,685	0.209	0.215
6/30/14-15	370,543	336,783	429,351	445,608	429,000	446,000	92,217	109,217	0.116	0.120
6/30/15-16	382,602	451,654	653,900	634,341	634,000	654,000	182,346	202,346	0.166	0.171
6/30/16-17	395,324	156,875	291,099	404,934	291,000	405,000	134,125	248,125	0.074	0.102
6/30/17-18	398,722	169,427	456,074	542,292	456,000	542,000	286,573	372,573	0.114	0.136
6/30/18-19	410,826	98,685	574,071	635,736	574,000	636,000	475,315	537,315	0.140	0.155
Total	9,249,456	37,885,838	38,639,963	37,029,200	39,721,222	40,476,888	1,835,384	2,591,050		
Tot 6/30/84-19	9,249,456	34,806,247	36,828,002	37,029,200	36,640,187	37,382,420	1,833,940	2,576,172	0.396	0.404

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) Sum of Section 6, Exhibit 1, Page 2, Column 3 and Section 6, Exhibit 1, Page 9, Column 8
(4) From Section 6, Exhibit 1, Page 2, Column 8
(5) From Section 6, Exhibit 1, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim	Average Age
All Prior Yrs		1,242,912							0	0		
6/30/82-83		271,340	1.001	1.000	271,477	35,000	306,477		0	0		
6/30/83-84		1,219,902	1.001	1.050	1,281,546	223,937	1,505,483		0	0		
6/30/84-85	116,303	837,745	1.001	1.000	838,169	15,000	853,169	0.734	0	0		
6/30/85-86	123,981	2,421,446	1.001	1.000	2,422,672	96,495	2,519,167	2.032	0	0		
6/30/86-87	139,388	3,072,101	1.001	1.000	3,073,657	307,918	3,381,575	2.426	0	0		
6/30/87-88	159,499	2,621,395	1.001	1.000	2,622,723	404,482	3,027,205	1.898	0	0		
6/30/88-89	180,644	2,245,396	1.001	1.000	2,246,534	378,250	2,624,784	1.453	0	0		
6/30/89-90	142,494	2,830,333	1.001	1.000	2,831,767	413,250	3,245,017	2.277	0	0		
6/30/90-91	143,694	887,647	1.001	1.000	888,097	214,176	1,102,273	0.767	0	0		
6/30/91-92	155,170	1,163,553	1.002	1.000	1,165,307	354,751	1,520,058	0.980	0	0		
6/30/92-93	163,283	494,916	1.003	1.000	496,158	143,251	639,409	0.392	0	0		
6/30/93-94	177,184	1,527,717	1.003	1.000	1,531,549	411,252	1,942,801	1.096	1	1	3,833	76
6/30/94-95	188,391	273,127	1.003	1.000	273,812	248,000	521,812	0.277	0	0		
6/30/95-96	201,751	253,697	1.008	1.000	255,605	238,026	493,631	0.245	0	0		
6/30/96-97	231,872	113,590	1.015	1.000	115,245	308,800	424,045	0.183	0	0		
6/30/97-98	232,237	445,227	1.023	1.000	455,329	100,500	555,829	0.239	0	0		
6/30/98-99	232,075	289,851	1.033	1.000	299,392	341,750	641,142	0.276	0	0		
6/30/99-00	211,819	489,166	1.043	1.000	510,321	198,417	708,738	0.335	0	0		
6/30/00-01	215,099	431,926	1.054	1.000	455,111	306,047	761,158	0.354	0	0		
6/30/01-02	227,797	246,210	1.054	1.000	259,426	95,499	354,925	0.156	0	0		
6/30/02-03	242,008	1,004,572	1.054	1.000	1,058,497	101,416	1,159,913	0.479	1	1	53,924	57
6/30/03-04	276,758	635,971	1.054	1.000	670,225	327,000	997,225	0.360	0	0		
6/30/04-05	260,378	134,102	1.061	1.000	142,314	67,000	209,314	0.080	0	0		
6/30/05-06	317,741	498,323	1.073	1.000	534,884	280,500	815,384	0.257	0	0		
6/30/06-07	325,922	238,698	1.099	1.000	262,336	130,753	393,089	0.121	0	0		
6/30/07-08	354,130	620,035	1.110	1.000	688,251	566,123	1,254,374	0.354	1	0		
6/30/08-09	362,309	369,959	1.110	1.000	410,661	165,382	576,044	0.159	1	0		
6/30/09-10	383,298	350,870	1.119	1.000	392,554	183,349	575,904	0.150	1	0		
6/30/10-11	394,924	582,594	1.142	1.000	665,139	117,038	782,177	0.198	1	0		
6/30/11-12	381,943	712,364	1.179	1.000	839,877	250,787	1,090,664	0.286	2	1	127,512	60
6/30/12-13	384,763	286,699	1.194	1.000	342,412	126,492	468,904	0.122	0	0		
6/30/13-14	364,582	508,065	1.218	1.000	618,932	164,847	783,779	0.215	2	1	110,866	67
6/30/14-15	370,543	336,783	1.241	1.000	417,925	11,426	429,351	0.116	2	2	40,571	54
6/30/15-16	382,602	427,154	1.386	1.000	592,147	61,752	653,900	0.171	4	2	82,497	53
6/30/16-17	395,324	156,875	1.694	1.000	265,716	25,383	291,099	0.074	5	3	36,280	53
6/30/17-18	398,722	169,427	2.392	1.000	405,256	50,817	456,074	0.114	23	10	23,583	50
6/30/18-19	410,826	98,685	5.049	1.000	498,262	75,809	574,071	0.140	0	27	14,799	42
Total	9,249,456	30,510,370			31,099,285	7,540,678	38,639,963		44	48		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 6, Exhibit 1, Page 7
(5) Based on information from the MA WCRIB
(6) = (3) x (4) x (5)
(7) From Section 6, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	116,303	0.992	837,745	1.001	838,329	15,000	853,329	0.734	0.721
6/30/85-86	123,981	2.395	2,421,446	1.001	2,422,949	96,495	2,519,444	2.032	1.954
6/30/86-87	139,388	2.162	3,072,101	1.001	3,073,627	307,918	3,381,545	2.426	2.205
6/30/87-88	159,499	1.577	2,621,395	1.001	2,622,669	404,482	3,027,151	1.898	1.644
6/30/88-89	180,644	1.730	2,245,396	1.001	2,246,979	378,250	2,625,229	1.453	1.244
6/30/89-90	142,494	2.767	2,830,333	1.001	2,832,330	413,250	3,245,580	2.278	1.988
6/30/90-91	143,694	0.613	887,647	1.001	888,093	214,176	1,102,269	0.767	0.618
6/30/91-92	155,170	0.739	1,163,553	1.002	1,165,278	354,751	1,520,029	0.980	0.751
6/30/92-93	163,283	0.298	494,916	1.003	496,134	143,251	639,385	0.392	0.304
6/30/93-94	177,184	0.834	1,527,717	1.003	1,531,416	411,252	1,942,668	1.096	0.864
6/30/94-95	188,391	0.144	273,127	1.003	273,804	248,000	521,804	0.277	0.145
6/30/95-96	201,751	0.126	253,697	1.008	255,593	238,026	493,619	0.245	0.127
6/30/96-97	231,872	0.054	113,590	1.015	115,396	308,800	424,196	0.183	0.050
6/30/97-98	232,237	0.190	445,227	1.023	454,999	100,500	555,499	0.239	0.196
6/30/98-99	232,075	0.128	289,851	1.033	299,314	341,750	641,064	0.276	0.129
6/30/99-00	211,819	0.229	489,166	1.043	509,253	198,417	707,670	0.334	0.240
6/30/00-01	215,099	0.203	431,926	1.054	454,134	306,047	760,181	0.353	0.211
6/30/01-02	227,797	0.115	246,210	1.054	259,553	95,499	355,052	0.156	0.114
6/30/02-03	242,008	0.406	1,004,572	1.054	1,054,649	101,416	1,156,065	0.478	0.436
6/30/03-04	276,758	0.230	635,971	1.054	668,572	327,000	995,572	0.360	0.242
6/30/04-05	260,378	0.126	134,102	1.061	153,042	67,000	220,042	0.085	0.059
6/30/05-06	317,741	0.127	498,323	1.073	525,986	280,500	806,486	0.254	0.166
6/30/06-07	325,922	0.129	238,698	1.099	276,515	130,753	407,269	0.125	0.085
6/30/07-08	354,130	0.130	620,035	1.110	665,731	566,123	1,231,854	0.348	0.188
6/30/08-09	362,309	0.132	369,959	1.110	417,256	165,382	582,638	0.161	0.115
6/30/09-10	383,298	0.132	350,870	1.119	404,690	183,349	588,040	0.153	0.106
6/30/10-11	394,924	0.132	582,594	1.142	647,316	117,038	764,354	0.194	0.164
6/30/11-12	381,943	0.133	712,364	1.179	789,450	250,787	1,040,237	0.272	0.207
6/30/12-13	384,763	0.134	286,699	1.194	370,670	126,492	497,162	0.129	0.096
6/30/13-14	364,582	0.135	508,065	1.218	596,010	164,847	760,857	0.209	0.163
6/30/14-15	370,543	0.135	336,783	1.241	434,182	11,426	445,608	0.120	0.117
6/30/15-16	382,602	0.136	427,154	1.386	572,589	61,752	634,341	0.166	0.150
6/30/16-17	395,324	0.138	156,875	1.694	379,551	25,383	404,934	0.102	0.096
6/30/17-18	398,722	0.139	169,427	2.392	491,475	50,817	542,292	0.136	0.123
6/30/18-19	410,826	0.140	98,685	5.049	559,927	75,809	635,736	0.155	0.136
Total	9,249,456		27,776,216		29,747,459	7,281,741	37,029,200		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 6, Exhibit 1, Page 4, Column 11
(4) From Section 6, Exhibit 1, Page 2, Column 3
(5) From Section 6, Exhibit 1, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) From Section 6, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.992	0.992
6/30/85-86									2.395	2.395
6/30/86-87									2.162	2.162
6/30/87-88									1.577	1.577
6/30/88-89									1.730	1.730
6/30/89-90									2.767	2.767
6/30/90-91	143,694	888,097	0.618	0.996	0.616	1.000	0.616	0.141	0.614	0.613
6/30/91-92	155,170	1,165,307	0.751	1.093	0.821	1.000	0.821	0.128	0.739	0.739
6/30/92-93	163,283	496,158	0.304	1.275	0.387	1.000	0.387	0.110	0.298	0.298
6/30/93-94	177,184	1,531,549	0.864	1.258	1.088	1.000	1.088	0.111	0.823	0.834
6/30/94-95	188,391	273,812	0.145	1.247	0.181	1.000	0.181	0.112	0.144	0.144
6/30/95-96	201,751	255,605	0.127	1.237	0.157	1.000	0.157	0.113	0.127	0.126
6/30/96-97	231,872	115,245	0.050	1.224	0.061	1.000	0.061	0.114	0.055	0.054
6/30/97-98	232,237	455,329	0.196	1.209	0.237	1.000	0.237	0.116	0.192	0.190
6/30/98-99	232,075	299,392	0.129	1.193	0.154	1.000	0.154	0.117	0.129	0.128
6/30/99-00	211,819	510,321	0.241	1.174	0.283	1.000	0.283	0.119	0.231	0.229
6/30/00-01	215,099	455,111	0.212	1.144	0.242	1.000	0.242	0.122	0.203	0.203
6/30/01-02	227,797	259,426	0.114	1.122	0.128	1.000	0.128	0.125	0.115	0.115
6/30/02-03	242,008	1,058,497	0.437	1.118	0.489	1.000	0.489	0.125	0.406	0.406
6/30/03-04	276,758	670,225	0.242	1.118	0.271	1.000	0.271	0.125	0.232	0.230
6/30/04-05	260,378	142,314	0.055	1.111	0.061	1.000	0.061	0.126	0.128	0.126
6/30/05-06	317,741	534,884	0.168	1.099	0.185	1.000	0.185	0.127	0.129	0.127
6/30/06-07	325,922	262,336	0.080	1.087	0.088	1.000	0.088	0.129	0.130	0.129
6/30/07-08	354,130	688,251	0.194	1.075	0.209	1.000	0.209	0.130	0.132	0.130
6/30/08-09	362,309	410,661	0.113	1.063	0.120	1.000	0.120	0.132	0.133	0.132
6/30/09-10	383,298	392,554	0.102	1.059	0.108	1.000	0.108	0.132	0.134	0.132
6/30/10-11	394,924	665,139	0.168	1.060	0.179	1.000	0.179	0.132	0.134	0.132
6/30/11-12	381,943	839,877	0.220	1.053	0.232	1.000	0.232	0.133	0.135	0.133
6/30/12-13	384,763	342,412	0.089	1.044	0.093	1.000	0.093	0.134	0.136	0.134
6/30/13-14	364,582	618,932	0.170	1.040	0.176	1.000	0.176	0.135	0.136	0.135
6/30/14-15	370,543	417,925	0.113	1.034	0.117	1.000	0.117	0.135	0.137	0.135
6/30/15-16	382,602	592,147	0.155	1.026	0.159	1.000	0.159	0.136	0.138	0.136
6/30/16-17	395,324	265,716	0.067	1.018	0.068	1.000	0.068	0.138	0.139	0.138
6/30/17-18	398,722	405,256	0.102	1.009	0.103	1.000	0.103	0.139	0.140	0.139
6/30/18-19	410,826	498,262	0.121	1.000	0.121	1.000	0.121	0.140		0.140
Total	8,387,147	15,510,739								

Trend Last 4 (ex 18-19):	-11.6%	Avg 3 (ex 18-19):	0.110
Trend Last 8 (ex 18-19):	-9.9%	Avg 5 (ex 18-19):	0.125
Trend Last 12 (ex 18-19):	-2.4%	Avg 10 (ex 18-19):	0.135
Prior Selected Trend:	0.0%	Prior Sel Avg:	0.140
Selected Trend:	0.0%	Sel. Loss Cost:	0.140

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 6, Exhibit 1, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCRIB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.860	
(2)	Credibility		9%	
(3)	Average Pmt Trend Statewide		0.950	
(4)	Credibility Weighted Trend		0.942	
		(Low)		(High)
(5)	Selected Range	0.932		0.961
(6)	Incremental Paid for 2019	0		0
(7)	Estimated Reserve	0		0
(8)	Paid to Date (82 & Prior)	1,242,912		1,242,912
(9)	Est Ult Paid for 1982 & Prior	1,242,912		1,242,912

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	0	0
(11)	Projected Number of Years	1	1
(12)	Estimated Reserve	0	0
(13)	Paid to Date (82 & Prior)	1,242,912	1,242,912
(14)	Est Ult Paid for 1982 & Prior	1,242,912	1,242,912
(14a)	Paid Counts During Fiscal Year	0	0

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	1,242,912	1,242,912
(16)	Lump Sum Ultimates	86,500	86,500
(17)	Ult Loss Including Lump Sums	**1,329,412**	**1,329,412**
(18)	Implied Tail	1.000	1.000
(19)	Ult Loss Inc Lump Sums @ 6/18	1,329,412	1,329,412

NOTES:

(1) From Section 6, Exhibit 1, Page 6
(2) = (Average of Section 6, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 6, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 6, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 6, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	92,878	11.439			
1993	2	83,290	11.330	0.897		
1994	3	82,744	11.324	0.993		
1995	4	76,872	11.250	0.929		
1996	5	73,496	11.205	0.956		
1997	6	42,425	10.655	0.577		
1998	7	43,683	10.685	1.030		
1999	8	44,262	10.698	1.013		
2000	9	49,469	10.809	1.118	n =	12
2001	10	47,733	10.773	0.965	S(x) =	23,970
2002	11	28,782	10.268	0.603	S(x-sq) =	47,880,218
2003	12	12,543	9.437	0.436	S(xy) =	259,401
2004	13	0			S(y) =	130
2005	14	0			D =	1,716
2006	15	0			slope =	-0.137
2007	16	0			Avg Trend =	0.863
2008	17	0				
2009	18	0				
2010	19	0				
2011	20	0				
2012	21	0				
2013	22	0				
2014	23	0				
2015	24	0				
2016	25	0				
2017	26	0				
2018	27	0				
2019	28	0				
					Selected Trend:	**0.860**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2003: 0.436 = 12543 / 28782

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Medical Center) - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
June-83	20,333	51,116	80,072	103,773	130,398	141,779	176,965	199,729	221,812	232,715	258,415	258,415	263,521	253,827	259,034	264,240	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340
June-84	57,600	144,806	226,837	293,981	343,659	432,433	537,475	627,523	702,624	756,969	803,646	836,058	882,478	912,918	944,937	977,381	1,013,642	1,052,979	1,095,405	1,138,804	1,183,544	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	
June-85	63,759	160,290	251,092	325,415	403,737	509,752	570,921	613,784	663,935	693,110	702,075	726,654	753,001	779,914	809,196	840,064	837,165	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745		
June-86	154,113	387,438	606,915	783,976	961,962	1,132,149	1,274,833	1,393,763	1,502,381	1,636,065	1,751,114	1,854,218	1,962,657	2,114,127	2,191,041	2,271,411	2,297,923	2,325,043	2,352,163	2,379,342	2,408,086	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446			
June-87	166,736	419,172	641,668	854,284	1,072,274	1,249,198	1,388,337	1,542,716	1,758,390	1,875,672	1,986,394	2,093,920	2,135,258	2,199,362	2,260,862	2,284,043	2,302,892	2,321,741	2,340,539	2,359,336	2,708,676	2,762,266	2,818,196	2,874,830	2,931,224	2,989,542	3,049,764	3,072,101	3,072,101	3,072,101	3,072,101	3,072,101	3,072,101				
June-88	174,358	435,032	660,480	866,856	1,054,956	1,195,356	1,302,385	1,395,569	1,488,786	1,568,531	1,652,757	1,723,638	1,803,152	1,884,392	1,957,379	2,019,197	2,082,510	2,146,026	2,212,010	2,280,936	2,353,096	2,428,406	2,506,612	2,583,636	2,620,881	2,621,395	2,621,395	2,621,395	2,621,395	2,621,395	2,621,395						
June-89	244,759	583,650	955,229	1,207,778	1,405,394	1,580,598	1,710,863	1,867,443	1,974,910	2,078,269	2,163,384	2,208,386	2,233,112	2,239,652	2,239,652	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396						
June-90	351,648	811,854	1,353,747	1,739,540	2,053,362	2,300,598	2,503,649	2,605,537	2,726,706	2,654,988	2,740,214	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333							
June-91	156,076	357,539	517,757	630,387	728,239	832,901	871,395	947,686	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647								
June-92	261,100	669,245	900,334	1,044,793	1,152,142	1,241,017	1,237,974	1,112,699	1,137,295	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553									
June-93	206,631	396,390	480,534	554,071	597,393	614,181	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916										
June-94	247,518	643,612	941,958	1,088,319	1,200,112	1,123,946	1,143,130	1,179,142	1,181,321	1,181,499	1,181,499	1,246,051	1,265,620	1,286,180	1,304,675	1,323,640	1,345,114	1,364,136	1,383,838	1,403,763	1,423,826	1,444,130	1,464,767	1,485,375	1,506,355	1,527,717											
June-95	205,179	254,027	345,287	415,297	285,940	285,940	285,940	286,111	286,111	286,111	286,111	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127												
June-96	155,417	406,013	576,300	245,663	246,118	246,118	246,697	246,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697													
June-97	97,433	256,318	57,502	85,876	119,079	124,761	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590														
June-98	240,727	143,983	232,600	419,169	444,399	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227															
June-99	58,149	198,506	223,119	274,795	288,604	286,087	287,457	287,658	287,796	287,796	287,796	287,796	289,251	289,251	289,851	289,851	289,851	289,851	289,851	289,851	289,851																
June-00	139,725	319,021	396,283	425,910	459,317	480,109	487,559	487,559	487,559	487,559	487,559	487,559	489,166	489,166	489,166	489,166	489,166	489,166	489,166	489,166																	
June-01	103,272	231,200	298,053	357,230	397,007	413,694	429,139	431,926	431,926	431,926	431,926	431,926	431,926	431,926	431,926	431,926	431,926	431,926	431,926																		
June-02	111,843	169,158	211,386	237,447	244,070	244,070	244,070	244,070	246,210	246,210	246,210	246,210	246,210	246,210	246,210	246,210	246,210	246,210																			
June-03	103,346	214,476	266,732	299,619	422,566	501,970	559,245	599,400	671,238	720,943	771,432	822,132	873,438	930,527	982,602	1,003,703	1,004,572																				
June-04	158,939	366,873	493,674	593,313	624,409	635,971	635,971	635,971	635,971	635,971	635,971	635,971	635,971	635,971	635,971	635,971																					
June-05	66,383	103,442	111,589	111,589	111,589	111,589	111,589	125,745	134,102	134,102	134,102	134,102	134,102	134,102	134,102																						
June-06	148,922	299,710	423,237	498,323	498,323	498,323	498,323	498,323	498,323	498,323	498,323	498,323	498,323	498,323																							
June-07	129,667	222,028	238,698	238,698	238,698	238,698	238,698	238,698	238,698	238,698	238,698	238,698	238,698																								
June-08	199,585	456,548	645,562	768,096	799,003	692,172	609,450	614,827	614,827	614,857	620,035	620,035																									
June-09	126,394	222,250	303,425	345,595	337,031	345,960	348,059	348,059	358,262	369,959	369,959																										
June-10	173,596	323,966	367,986	373,360	374,510	374,510	349,231	350,070	350,870	350,870																											
June-11	204,108	361,900	447,595	503,639	528,963	548,763	568,457	582,594	582,594																												
June-12	169,232	317,366	416,322	526,284	584,656	637,971	676,716	712,364																													
June-13	159,666	227,306	265,791	285,810	286,699	286,699	286,699																														
June-14	86,121	261,428	375,084	466,071	507,849	508,065																															
June-15	49,642	100,069	188,369	257,327	336,783																																
June-16	101,585	204,682	320,856	427,154																																	
June-17	54,297	113,090	156,875																																		
June-18	64,657	169,427																																			
June-19	98,685																																				

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
June-83	2.514	1.566	1.296	1.257	1.087	1.248	1.129	1.111	1.049	1.110	1.000	1.020	0.963	1.021	1.020	1.027	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.514	1.566	1.296	1.169	1.258	1.243	1.168	1.120	1.077	1.062	1.040	1.056	1.034	1.035	1.034	1.037	1.039	1.040	1.040	1.039	1.031	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.514	1.566	1.296	1.241	1.263	1.120	1.075	1.082	1.044	1.013	1.035	1.036	1.036	1.038	1.038	0.997	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-86	2.514	1.566	1.292	1.227	1.177	1.126	1.093	1.078	1.089	1.070	1.059	1.058	1.077	1.036	1.037	1.012	1.012	1.012	1.012	1.012	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.514	1.531	1.331	1.255	1.165	1.111	1.111	1.140	1.067	1.059	1.054	1.020	1.030	1.028	1.010	1.008	1.008	1.008	1.008	1.148	1.020	1.020	1.020	1.020	1.020	1.020	1.007	1.000	1.000	1.000	1.000	1.000				
June-88	2.495	1.518	1.312	1.217	1.133	1.090	1.072	1.067	1.054	1.054	1.043	1.046	1.045	1.039	1.032	1.031	1.030	1.031	1.031	1.032	1.032	1.032	1.031	1.014	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
June-89	2.385	1.637	1.264	1.164	1.125	1.082	1.092	1.058	1.052	1.041	1.021	1.011	1.003	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
June-90	2.309	1.667	1.285	1.180	1.120	1.088	1.041	1.047	0.974	1.032	1.033	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
June-91	2.291	1.448	1.218	1.155	1.144	1.046	1.088	0.937	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
June-92	2.563	1.345	1.160	1.103	1.077	0.998	0.899	1.022	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
June-93	1.918	1.212	1.153	1.078	1.028	0.806	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	2.600	1.464	1.155	1.103	0.937	1.017	1.032	1.002	1.000	1.000	1.055	1.016	1.016	1.014	1.015	1.016	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014											
June-95	1.238	1.359	1.203	0.689	1.000	1.000	1.001	1.000	1.000	1.000	0.955	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	2.612	1.419	0.426	1.002	1.000	1.002	1.000	1.028	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	2.631	0.224	1.493	1.387	1.048	0.910	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	0.598	1.615	1.802	1.060	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
June-99	3.414	1.124	1.232	1.050	0.991	1.005	1.001	1.000	1.000	1.000	1.000	1.005	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000																
June-00	2.283	1.242	1.075	1.078	1.045	1.016	1.000	1.000	1.000	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
June-01	2.239	1.289	1.199	1.111	1.042	1.037	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
June-02	1.512	1.250	1.123	1.028	1.000	1.000	1.000	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
June-03	2.075	1.244	1.123	1.410	1.188	1.114	1.072	1.120	1.074	1.070	1.066	1.062	1.065	1.056	1.021	1.001																				
June-04	2.308	1.346	1.202	1.052	1.019	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	1.558	1.079	1.000	1.000	1.000	1.000	1.127	1.066	1.000	1.000	1.000	1.000	1.000	1.000																						
June-06	2.013	1.412	1.177	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
June-07	1.712	1.075	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																								
June-08	2.287	1.414	1.190	1.040	0.866	0.880	1.009	1.000	1.000	1.008	1.000																									
June-09	1.758	1.365	1.139	0.975	1.026	1.006	1.000	1.029	1.033	1.000																										
June-10	1.866	1.136	1.015	1.003	1.000	0.933	1.002	1.002	1.000																											
June-11	1.773	1.237	1.125	1.050	1.037	1.036	1.025	1.000																												
June-12	1.875	1.312	1.264	1.111	1.091	1.061	1.053																													
June-13	1.424	1.169	1.075	1.003	1.000	1.000																														
June-14	3.036	1.435	1.243	1.090	1.000																															
June-15	2.016	1.882	1.366	1.309																																
June-16	2.015	1.568	1.331																																	
June-17	2.083	1.387																																		
June-18	2.620																																			

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*To Ult*
Simple Avg																																					
All Yrs	2.169	1.362	1.202	1.109	1.058	1.031	1.036	1.032	1.019	1.019	1.014	1.013	1.011	1.012	1.010	1.006	1.005	1.006	1.006	1.014	1.006	1.004	1.005	1.004	1.003	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	2.354	1.488	1.256	1.113	1.026	1.007	1.018	1.006	1.007	1.002	1.000	1.012	1.013	1.011	1.004	1.000	1.000	1.000	1.000	1.000	1.003	1.003	1.003	1.003	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Latest 3	2.239	1.612	1.313	1.134	1.031	1.032	1.027	1.011	1.011	1.003	1.000	1.000	1.000	1.019	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.005	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Volume Wtd																																					
All Yrs	2.111	1.383	1.191	1.117	1.072	1.045	1.043	1.042	1.026	1.029	1.027	1.019	1.020	1.016	1.013	1.008	1.008	1.009	1.009	1.026	1.010	1.008	1.008	1.006	1.004	1.003	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5	2.382	1.442	1.253	1.101	1.032	1.016	1.022	1.005	1.006	1.003	1.000	1.022	1.024	1.022	1.008	1.000	1.000	1.000	1.000	1.000	1.008	1.008	1.006	1.005	1.003	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3	2.209	1.594	1.301	1.121	1.039	1.040	1.032	1.009	1.009	1.004	1.000	1.000	1.000	1.031	1.011	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.010	1.009	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				

Dev Factor Selection																																					
Industry 1	2.958	1.587	1.232	1.108	1.038	1.023	1.014	1.008	1.006	1.007	1.006	1.010	1.003	1.004	1.003	1.003	1.005	1.003																			
Industry 2		1.877	1.312	1.143	1.055	1.028	1.016	1.015	1.006	1.005	1.007	1.007	1.004	1.002	1.005	1.002	1.003	1.002	1.001	1.001																	
Prior	*2.049*	*1.410*	*1.196*	*1.114*	*1.019*	*1.020*	*1.013*	*1.033*	*1.020*	*1.008*	*1.013*	*1.010*	*1.025*	*1.012*	*1.007*	*1.000*	*1.000*	*1.000*	*1.010*	*1.010*	*1.010*	*1.008*	*1.007*	*1.005*	*1.000*	*1.000*	*1.001*	*1.001*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.001*	
Selected	2.111	1.412	1.222	1.117	1.019	1.020	1.013	1.033	1.020	1.008	1.000	1.010	1.024	1.011	1.007	1.000	1.000	1.000	1.010	1.010	1.010	1.008	1.007	1.005	1.000	1.000	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001
FacToUlt	5.049	2.392	1.694	1.386	1.241	1.218	1.194	1.179	1.142	1.119	1.110	1.110	1.099	1.073	1.061	1.054	1.054	1.054	1.054	1.043	1.033	1.023	1.015	1.008	1.003	1.003	1.003	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
Percent of Ult	19.8%	41.8%	59.0%	72.1%	80.6%	82.1%	83.7%	84.8%	87.6%	89.4%	90.1%	90.1%	91.0%	93.2%	94.2%	94.9%	94.9%	94.9%	94.9%	95.9%	96.8%	97.8%	98.6%	99.3%	99.7%	99.7%	99.7%	99.8%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	1,329,412	1,329,412	1,329,412	1,329,412	0	0.0%	0	0.0%
6/30/82-83	306,340	313,999	306,340	313,999	0	0.0%	0	0.0%
6/30/83-84	1,445,283	1,451,058	1,445,283	1,451,058	0	0.0%	0	0.0%
6/30/84-85	853,598	857,009	853,598	857,009	0	0.0%	0	0.0%
6/30/85-86	2,520,000	2,520,000	2,519,000	2,519,000	(1,000)	0.0%	(1,000)	0.0%
6/30/86-87	3,382,000	3,396,919	3,382,000	3,396,919	0	0.0%	0	0.0%
6/30/87-88	3,028,000	3,041,006	3,027,000	3,041,006	(1,000)	0.0%	0	0.0%
6/30/88-89	2,626,270	2,636,764	2,626,270	2,636,764	0	0.0%	0	0.0%
6/30/89-90	3,246,827	3,259,801	3,246,827	3,259,801	0	0.0%	0	0.0%
6/30/90-91	1,102,925	1,107,332	1,102,925	1,107,332	0	0.0%	0	0.0%
6/30/91-92	1,519,822	1,525,896	1,519,822	1,525,896	0	0.0%	0	0.0%
6/30/92-93	638,805	641,358	638,805	641,358	0	0.0%	0	0.0%
6/30/93-94	1,922,000	1,965,547	1,943,000	1,987,443	21,000	1.1%	21,896	1.1%
6/30/94-95	521,648	523,733	521,648	523,733	0	0.0%	0	0.0%
6/30/95-96	496,640	501,557	496,640	501,557	0	0.0%	0	0.0%
6/30/96-97	426,614	430,838	426,614	430,838	0	0.0%	0	0.0%
6/30/97-98	551,184	556,642	551,184	556,642	0	0.0%	0	0.0%
6/30/98-99	637,917	644,233	637,917	644,233	0	0.0%	0	0.0%
6/30/99-00	694,459	701,335	694,459	701,335	0	0.0%	0	0.0%
6/30/00-01	745,353	752,733	745,353	752,733	0	0.0%	0	0.0%
6/30/01-02	345,126	348,543	345,126	348,543	0	0.0%	0	0.0%
6/30/02-03	1,155,000	1,216,950	1,156,000	1,218,000	1,000	0.1%	1,050	0.1%
6/30/03-04	1,000,000	1,002,000	996,000	997,000	(4,000)	-0.4%	(5,000)	-0.5%
6/30/04-05	211,000	224,000	209,000	220,000	(2,000)	-0.9%	(4,000)	-1.8%
6/30/05-06	818,000	830,000	806,000	815,000	(12,000)	-1.5%	(15,000)	-1.8%
6/30/06-07	397,000	413,000	393,000	407,000	(4,000)	-1.0%	(6,000)	-1.5%
6/30/07-08	1,241,000	1,267,000	1,232,000	1,254,000	(9,000)	-0.7%	(13,000)	-1.0%
6/30/08-09	557,000	564,000	576,000	583,000	19,000	3.4%	19,000	3.4%
6/30/09-10	591,000	606,000	576,000	588,000	(15,000)	-2.5%	(18,000)	-3.0%
6/30/10-11	788,000	847,600	764,000	813,280	(24,000)	-3.0%	(34,320)	-4.0%
6/30/11-12	1,021,000	1,074,000	1,040,000	1,091,000	19,000	1.9%	17,000	1.6%
6/30/12-13	485,000	517,000	469,000	497,000	(16,000)	-3.3%	(20,000)	-3.9%
6/30/13-14	797,000	826,000	761,000	784,000	(36,000)	-4.5%	(42,000)	-5.1%
6/30/14-15	380,000	422,000	429,000	446,000	49,000	12.9%	24,000	5.7%
6/30/15-16	589,000	593,000	634,000	654,000	45,000	7.6%	61,000	10.3%
6/30/16-17	304,000	467,000	291,000	405,000	(13,000)	-4.3%	(62,000)	-13.3%
6/30/17-18	366,000	561,000	456,000	542,000	90,000	24.6%	(19,000)	-3.4%
6/30/18-19								
Total	39,040,222	39,936,262	39,147,222	39,840,888	107,000	0.3%	(95,374)	-0.2%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 6, Exhibit 1, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	1,242,912	1.000	1,242,912	0.0%	0.0%	0	86,500	86,500	7.0%	1.000	86,500	86,500	86,500
6/30/82-83	271,340	1.001	271,477	0.0%	0.0%	0	35,000	35,000	12.9%	1.000	35,000	35,000	35,000
6/30/83-84	1,219,902	1.051	1,281,546	0.0%	0.0%	0	223,937	223,937	17.5%	1.000	223,937	223,937	223,937
6/30/84-85	837,745	1.001	838,169	0.0%	0.0%	0	15,000	15,000	1.8%	1.000	15,000	15,000	15,000
6/30/85-86	2,421,446	1.001	2,422,672	0.0%	0.0%	0	96,495	96,495	4.0%	1.000	96,495	96,495	96,495
6/30/86-87	3,072,101	1.001	3,073,657	0.0%	0.0%	0	307,918	307,918	10.0%	1.000	307,918	307,918	307,918
6/30/87-88	2,621,395	1.001	2,622,723	0.0%	0.0%	0	404,482	404,482	15.4%	1.000	404,482	404,482	404,482
6/30/88-89	2,245,396	1.001	2,246,534	0.0%	0.0%	0	378,250	378,250	16.8%	1.000	378,250	378,250	378,250
6/30/89-90	2,830,333	1.001	2,831,767	0.0%	0.0%	0	413,250	413,250	14.6%	1.000	413,250	413,250	413,250
6/30/90-91	887,647	1.001	888,097	0.0%	0.0%	0	214,176	214,176	24.1%	1.000	214,176	214,176	214,176
6/30/91-92	1,163,553	1.002	1,165,307	0.0%	0.0%	0	354,751	354,751	30.4%	1.000	354,751	354,751	354,751
6/30/92-93	494,916	1.003	496,158	0.0%	0.0%	0	143,251	143,251	28.9%	1.000	143,251	143,251	143,251
6/30/93-94	1,527,717	1.003	1,531,549	0.0%	0.0%	0	411,252	411,252	26.9%	1.000	411,252	411,252	411,252
6/30/94-95	273,127	1.003	273,812	0.0%	0.0%	0	248,000	248,000	90.6%	1.000	248,000	248,000	248,000
6/30/95-96	253,697	1.008	255,605	0.0%	0.0%	0	238,026	238,026	93.1%	1.000	238,026	238,026	238,026
6/30/96-97	113,590	1.015	115,245	0.0%	0.0%	0	308,800	308,800	267.9%	1.000	308,800	308,800	308,800
6/30/97-98	445,227	1.023	455,329	0.0%	0.0%	0	100,500	100,500	22.1%	1.000	100,500	100,500	100,500
6/30/98-99	289,851	1.033	299,392	0.0%	0.0%	0	341,750	341,750	114.1%	1.000	341,750	341,750	341,750
6/30/99-00	489,166	1.043	510,321	0.0%	0.0%	0	198,417	198,417	38.9%	1.000	198,417	198,417	198,417
6/30/00-01	431,926	1.054	455,111	0.0%	0.0%	0	306,047	306,047	67.2%	1.000	306,047	306,047	306,047
6/30/01-02	246,210	1.054	259,426	0.0%	0.0%	0	95,499	95,499	36.8%	1.000	95,499	95,499	95,499
6/30/02-03	1,004,572	1.054	1,058,497	0.0%	0.0%	0	101,416	101,416	9.6%	1.000	101,416	101,416	101,416
6/30/03-04	635,971	1.054	670,225	0.0%	0.0%	0	327,000	327,000	48.8%	1.000	327,000	327,000	327,000
6/30/04-05	134,102	1.061	142,314	0.0%	0.0%	0	67,000	67,000	47.1%	1.000	67,000	67,000	67,000
6/30/05-06	498,323	1.073	534,884	0.0%	0.0%	0	280,500	280,500	52.4%	1.000	280,500	280,500	282,118
6/30/06-07	238,698	1.099	262,336	0.1%	0.1%	207	130,000	130,207	49.6%	1.010	131,300	130,753	131,497
6/30/07-08	620,035	1.110	688,251	0.1%	0.1%	991	560,000	560,991	81.5%	1.020	571,256	566,123	569,197
6/30/08-09	369,959	1.110	410,661	0.1%	0.2%	839	162,501	163,340	39.8%	1.030	167,425	165,382	136,977
6/30/09-10	350,870	1.119	392,554	0.2%	0.4%	1,431	179,000	180,431	46.0%	1.041	186,268	183,349	184,585
6/30/10-11	582,594	1.142	665,139	0.1%	0.5%	3,338	112,500	115,838	17.4%	1.051	118,239	117,038	118,358
6/30/11-12	712,364	1.179	839,877	0.2%	0.7%	5,779	240,500	246,279	29.3%	1.062	255,296	250,787	254,356
6/30/12-13	286,699	1.194	342,412	0.6%	1.3%	4,328	120,000	124,328	36.3%	1.072	128,656	126,492	130,972
6/30/13-14	508,065	1.218	618,932	0.9%	2.2%	13,548	149,250	162,798	26.3%	1.118	166,897	164,847	186,404
6/30/14-15	336,783	1.241	417,925	3.3%	5.5%	22,852	0	22,852	5.5%	1.264	0	11,426	18,973
6/30/15-16	427,154	1.386	592,147	5.0%	10.5%	62,250	24,500	86,750	14.7%	1.500	36,754	61,752	54,771
6/30/16-17	156,875	1.694	265,716	8.6%	19.1%	50,766	0	50,766	19.1%	2.733	0	25,383	36,737
6/30/17-18	169,427	2.392	405,256	6.0%	25.1%	101,635	0	101,635	25.1%	5.746	0	50,817	52,874
6/30/18-19	98,685	5.049	498,262	5.4%	30.4%	151,618	0	151,618	30.4%	5.746	0	75,809	
Total	30,510,370		32,342,197			419,580	7,375,468	7,795,048	24.1%		7,459,308	7,627,178	7,574,537

NOTES:
(2) From Section 6, Exhibit 1, Page 2, Column 3
(3) = (4) / (2)
(4) From Section 6, Exhibit 1, Page 2, Column 6
(5) From Section 6, Exhibit 1, Page 11
(6) Downward sum of (5)
(7) = (6) x (4)
(8) From Section 6, Exhibit 1, Page 10
(9) = (7) + (8)
(10) = (9) / (4)
(11) From Section 6, Exhibit 1, Page 12
(12) = (8) x (11)
(13) Selected based on (9) and (12)
(14) From Aon analysis as of June 30, 2016

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Medical Center) - Cluster 4
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	26,500	0	0	0	0	0	0	0	60,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	20,000	0	0	0	0	0	0	0	15,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	25,750	0	0	36,687	25,000	0	35,500	17,000	0	0	0	0	0	0	0	0	0	84,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	0	0	0	0	0	0	0	5,000	0	0	0	0	0	0	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	0	0	0	0	23,000	15,000	10,995	10,000	0	0	0	37,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Jun-87	0	0	8,323	0	0	43,000	9,000	5,000	0	30,000	38,424	25,671	112,500	36,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	0	0	0	10,482	6,500	21,000	46,000	29,000	0	45,000	32,500	0	0	40,000	0	0	0	0	0	0	0	0	58,000	58,000	58,000	0	0	0	0	0	0						
Jun-89	0	0	16,000	76,750	27,500	0	75,000	15,000	0	0	143,000	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Jun-90	0	0	47,500	50,000	3,000	72,500	51,250	50,500	77,200	51,300	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
Jun-91	0	6,300	28,000	0	88,376	13,000	30,000	41,500	7,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Jun-92	0	0	80,001	43,500	79,250	35,000	117,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
Jun-93	0	28,000	1	22,500	52,750	40,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Jun-94	0	68,500	118,500	39,375	92,877	79,500	0	0	12,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Jun-95	0	158,500	29,500	35,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Jun-96	0	25,000	162,356	22,670	0	0	0	0	28,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0														
Jun-97	15,000	113,800	110,000	0	70,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0															
Jun-98	1,500	62,500	15,000	0	21,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																
Jun-99	0	33,750	125,000	160,000	23,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																	
Jun-00	5,000	72,513	47,154	18,750	0	0	25,000	30,000	0	0	0	0	0	0	0	0	0	0	0	0																		
Jun-01	0	71,047	80,000	60,000	0	50,000	0	45,000	0	0	0	0	0	0	0	0	0	0	0																			
Jun-02	0	9,000	38,999	30,000	17,500	0	0	0	0	0	0	0	0	0	0	0	0	0																				
Jun-03	0	16,416	55,000	0	0	0	30,000	0	0	0	0	0	0	0	0	0	0																					
Jun-04	0	65,000	30,000	125,000	55,000	52,000	0	0	0	0	0	0	0	0	0	0																						
Jun-05	0	0	67,000	0	0	0	0	0	0	0	0	0	0	0	0																							
Jun-06	0	15,000	18,000	177,500	40,000	30,000	0	0	0	0	0	0	0	0																								
Jun-07	0	70,000	45,000	15,000	0	0	0	0	0	0	0	0	0																									
Jun-08	0	170,000	150,000	165,000	0	75,000	0	0	0	0	0	0																										
Jun-09	0	0	0	133,501	0	0	0	0	0	0	29,000																											
Jun-10	0	36,000	93,000	0	0	0	0	0	50,000	0																												
Jun-11	0	50,000	0	37,500	25,000	0	0	0	0																													
Jun-12	0	95,000	0	110,500	0	0	35,000	0																														
Jun-13	0	50,000	0	70,000	0	0	0																															
Jun-14	0	0	0	49,250	100,000	0																																
Jun-15	0	0	0	0	0																																	
Jun-16	0	0	0	24,500																																		
Jun-17	0	0	0																																			
Jun-18	0	0																																				
Jun-19	0																																					

Cumulative Lump Sum Payments

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*	*456*
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500
Jun-83	0	0	0	0	0	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	
Jun-84	0	0	0	0	25,750	25,750	25,750	62,437	87,437	87,437	122,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937		
Jun-85	0	0	0	0	0	0	0	0	0	0	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000			
Jun-86	0	0	0	0	0	0	23,000	38,000	48,995	58,995	58,995	58,995	58,995	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495				
Jun-87	0	0	8,323	8,323	8,323	51,323	60,323	65,323	65,323	95,323	133,747	159,418	271,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918					
Jun-88	0	0	0	0	10,482	16,982	37,982	83,982	112,982	112,982	157,982	190,482	190,482	190,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	288,482	346,482	404,482	404,482	404,482	404,482	404,482	404,482	404,482						
Jun-89	0	0	16,000	92,750	120,250	120,250	195,250	210,250	210,250	210,250	353,250	353,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250							
Jun-90	0	0	47,500	97,500	100,500	173,000	224,250	274,750	351,950	403,250	403,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250								
Jun-91	0	6,300	34,300	34,300	122,676	135,676	165,676	207,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176									
Jun-92	0	0	80,001	123,501	202,751	237,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751										
Jun-93	0	28,000	28,001	50,501	103,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251											
Jun-94	0	68,500	187,000	226,375	319,252	398,752	398,752	398,752	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252												
Jun-95	0	158,500	188,000	223,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000													
Jun-96	0	25,000	187,356	210,026	210,026	210,026	210,026	210,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026														
Jun-97	15,000	128,800	238,800	238,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800															
Jun-98	1,500	64,000	79,000	79,000	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500																
Jun-99	0	33,750	158,750	318,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750																	
Jun-00	5,000	77,513	124,667	143,417	143,417	143,417	168,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417																		
Jun-01	0	71,047	151,047	211,047	211,047	261,047	261,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047																			
Jun-02	0	9,000	47,999	77,999	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499																				
Jun-03	0	16,416	71,416	71,416	71,416	71,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416																					
Jun-04	0	65,000	95,000	220,000	275,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000																						
Jun-05	0	0	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000																							
Jun-06	0	15,000	33,000	210,500	250,500	280,500	280,500	280,500	280,500	280,500	280,500	280,500	280,500	280,500																								
Jun-07	0	70,000	115,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000																									
Jun-08	0	170,000	320,000	485,000	485,000	560,000	560,000	560,000	560,000	560,000	560,000	560,000																										
Jun-09	0	0	0	133,501	133,501	133,501	133,501	133,501	133,501	133,501	162,501																											
Jun-10	0	36,000	129,000	129,000	129,000	129,000	129,000	129,000	179,000	179,000																												
Jun-11	0	50,000	50,000	87,500	112,500	112,500	112,500	112,500	112,500																													
Jun-12	0	95,000	95,000	205,500	205,500	205,500	240,500	240,500																														
Jun-13	0	50,000	50,000	120,000	120,000	120,000	120,000																															
Jun-14	0	0	0	49,250	149,250	149,250																																
Jun-15	0	0	0	0	0																																	
Jun-16	0	0	0	24,500																																		
Jun-17	0	0	0																																			
Jun-18	0	0																																				
Jun-19	0																																					

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Medical Center) - Cluster 4
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.074	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.020	0.000	0.000	0.029	0.020	0.000	0.028	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.066	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.006	0.005	0.004	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-87	0.000	0.000	0.003	0.000	0.000	0.014	0.003	0.002	0.000	0.010	0.013	0.008	0.037	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.000	0.000	0.000	0.004	0.002	0.008	0.018	0.011	0.000	0.017	0.012	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022	0.022	0.000	0.000	0.000	0.000	0.000							
Jun-89	0.000	0.000	0.007	0.034	0.012	0.000	0.033	0.007	0.000	0.000	0.064	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000								
Jun-90	0.000	0.000	0.017	0.018	0.001	0.026	0.018	0.018	0.027	0.018	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-91	0.000	0.007	0.032	0.000	0.100	0.015	0.034	0.047	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-92	0.000	0.000	0.069	0.037	0.068	0.030	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-93	0.000	0.056	0.000	0.045	0.106	0.081	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-94	0.000	0.045	0.077	0.026	0.061	0.052	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-95	0.000	0.579	0.108	0.128	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000														
Jun-96	0.000	0.098	0.635	0.089	0.000	0.000	0.000	0.000	0.110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
Jun-97	0.130	0.987	0.954	0.000	0.607	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-98	0.003	0.137	0.033	0.000	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																	
Jun-99	0.000	0.113	0.418	0.534	0.077	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-00	0.010	0.142	0.092	0.037	0.000	0.000	0.049	0.059	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-01	0.000	0.156	0.176	0.132	0.000	0.110	0.000	0.099	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-02	0.000	0.035	0.150	0.116	0.067	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																					
Jun-03	0.000	0.016	0.052	0.000	0.000	0.000	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																						
Jun-04	0.000	0.097	0.045	0.187	0.082	0.078	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																						
Jun-05	0.000	0.000	0.471	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																							
Jun-06	0.000	0.028	0.034	0.332	0.075	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
Jun-07	0.000	0.267	0.172	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																									
Jun-08	0.000	0.247	0.218	0.240	0.000	0.109	0.000	0.000	0.000	0.000	0.000	0.000																										
Jun-09	0.000	0.000	0.000	0.325	0.000	0.000	0.000	0.000	0.000	0.000	0.071																											
Jun-10	0.000	0.092	0.237	0.000	0.000	0.000	0.000	0.000	0.127	0.000																												
Jun-11	0.000	0.075	0.000	0.056	0.038	0.000	0.000	0.000	0.000																													
Jun-12	0.000	0.113	0.000	0.132	0.000	0.000	0.042	0.000																														
Jun-13	0.000	0.146	0.000	0.204	0.000	0.000	0.000																															
Jun-14	0.000	0.000	0.000	0.080	0.162	0.000																																
Jun-15	0.000	0.000	0.000	0.000	0.000																																	
Jun-16	0.000	0.000	0.000	0.041																																		
Jun-17	0.000	0.000	0.000																																			
Jun-18	0.000	0.000																																				
Jun-19	0.000																																					

Averages		*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
Simple Avg																																						
All Yrs (ex P)	0.004	0.095	0.114	0.084	0.049	0.020	0.010	0.009	0.011	0.001	0.007	0.001	0.002	0.003	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.004	0.000	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Latest 5	0.000	0.000	0.000	0.091	0.040	0.000	0.008	0.000	0.025	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Latest 3	0.000	0.000	0.000	0.040	0.054	0.000	0.014	0.000	0.042	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Olympic Avg																																						
All Yrs (ex P)	0.000	0.072	0.092	0.072	0.033	0.018	0.008	0.007	0.007	0.001	0.005	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Latest 10	0.000	0.035	0.027	0.101	0.014	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Latest 5	0.000	0.000	0.000	0.084	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						

Dev Factor Selection																																						
Prior	*NA*	*0.063*	*0.071*	*0.098*	*0.050*	*0.033*	*0.009*	*0.006*	*0.002*	*0.001*	*0.002*	*0.001*	*0.001*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	
Selected	NA	0.054	0.060	0.086	0.050	0.033	0.009	0.006	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.304	0.251	0.191	0.105	0.055	0.022	0.013	0.007	0.005	0.004	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Medical Center) - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*	*456*
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500
Jun-83	0	0	0	0	0	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	
Jun-84	0	0	0	0	25,750	25,750	25,750	62,437	87,437	87,437	122,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937		
Jun-85	0	0	0	0	0	0	0	0	0	0	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000			
Jun-86	0	0	0	0	0	0	23,000	38,000	48,995	58,995	58,995	58,995	58,995	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495				
Jun-87	0	0	8,323	8,323	8,323	51,323	60,323	65,323	65,323	95,323	133,747	159,418	271,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918					
Jun-88	0	0	0	0	10,482	16,982	37,982	83,982	112,982	112,982	157,982	190,482	190,482	190,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	288,482	346,482	404,482	404,482	404,482	404,482	404,482	404,482	404,482						
Jun-89	0	0	16,000	92,750	120,250	120,250	195,250	210,250	210,250	210,250	353,250	353,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250							
Jun-90	0	0	47,500	97,500	100,500	173,000	224,250	274,750	351,950	403,250	403,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250								
Jun-91	0	6,300	34,300	34,300	122,676	135,676	165,676	207,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176									
Jun-92	0	0	80,001	123,501	202,751	237,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751										
Jun-93	0	28,000	28,001	50,501	103,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251											
Jun-94	0	68,500	187,000	226,375	319,252	398,752	398,752	398,752	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252												
Jun-95	0	158,500	188,000	223,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000													
Jun-96	0	25,000	187,356	210,026	210,026	210,026	210,026	210,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026														
Jun-97	15,000	128,800	238,800	238,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800															
Jun-98	1,500	64,000	79,000	79,000	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500																
Jun-99	0	33,750	158,750	318,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750																	
Jun-00	5,000	77,513	124,667	143,417	143,417	143,417	168,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417																		
Jun-01	0	71,047	151,047	211,047	211,047	261,047	261,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047																			
Jun-02	0	9,000	47,999	77,999	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499																				
Jun-03	0	16,416	71,416	71,416	71,416	71,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416																					
Jun-04	0	65,000	95,000	220,000	275,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000																							
Jun-05	0	0	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000																							
Jun-06	0	15,000	33,000	210,500	250,500	280,500	280,500	280,500	280,500	280,500	280,500	280,500	280,500	280,500																								
Jun-07	0	70,000	115,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000																									
Jun-08	0	170,000	320,000	485,000	485,000	560,000	560,000	560,000	560,000	560,000	560,000	560,000																										
Jun-09	0	0	0	133,501	133,501	133,501	133,501	133,501	133,501	133,501	162,501																											
Jun-10	0	36,000	129,000	129,000	129,000	129,000	129,000	129,000	179,000	179,000																												
Jun-11	0	50,000	50,000	87,500	112,500	112,500	112,500	112,500	112,500																													
Jun-12	0	95,000	95,000	205,500	205,500	205,500	240,500	240,500																														
Jun-13	0	50,000	50,000	120,000	120,000	120,000	120,000																															
Jun-14	0	0	0	49,250	149,250	149,250																																
Jun-15	0	0	0	0	0																																	
Jun-16	0	0	0	24,500																																		
Jun-17	0	0	0																																			
Jun-18	0	0																																				
Jun-19	0																																					

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*	*To Ult*
All Prior Yrs														1.000	1.000	1.000	1.000	1.000	1.000	1.000	3.264	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83						1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.750	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84					1.000	1.000	2.425	1.400	1.000	1.406	1.138	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.600	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85											1.000	1.000	1.000	1.000	1.000	1.000	1.000	3.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86							1.652	1.289	1.204	1.000	1.000	1.000	1.636	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87			1.000	1.000	6.166	1.175	1.083	1.000	1.459	1.403	1.192	1.706	1.132	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-88					1.620	2.237	2.211	1.345	1.000	1.398	1.206	1.000	1.000	1.210	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.252	1.201	1.167	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-89			5.797	1.296	1.000	1.624	1.077	1.000	1.000	1.680	1.000	1.071	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-90			2.053	1.031	1.721	1.296	1.225	1.281	1.146	1.000	1.025	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-91		5.444	1.000	3.577	1.106	1.221	1.250	1.034	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-92			1.544	1.642	1.173	1.492	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93		1.000	1.804	2.045	1.387	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94		2.730	1.211	1.410	1.249	1.000	1.000	1.031	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95		1.186	1.186	1.112	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96		7.494	1.121	1.000	1.000	1.000	1.000	1.133	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
Jun-97	8.587	1.854	1.000	1.293	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
Jun-98	42.667	1.234	1.000	1.272	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99		4.704	2.008	1.072	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
Jun-00	15.503	1.608	1.150	1.000	1.000	1.174	1.178	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01		2.126	1.397	1.000	1.237	1.000	1.172	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																				
Jun-02		5.333	1.625	1.224	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03		4.350	1.000	1.000	1.000	1.420	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
Jun-04		1.462	2.316	1.250	1.189	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
Jun-05			1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																								
Jun-06		2.200	6.379	1.190	1.120	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																									
Jun-07		1.643	1.130	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																										
Jun-08		1.882	1.516	1.000	1.155	1.000	1.000	1.000	1.000	1.000	1.000																											
Jun-09				1.000	1.000	1.000	1.000	1.000	1.000	1.217																												
Jun-10		3.583	1.000	1.000	1.000	1.000	1.000	1.388	1.000																													
Jun-11		1.000	1.750	1.286	1.000	1.000	1.000	1.000																														
Jun-12		1.000	2.163	1.000	1.000	1.170	1.000																															
Jun-13		1.000	2.400	1.000	1.000	1.000																																
Jun-14				3.030	1.000																																	
Jun-15																																						
Jun-16																																						
Jun-17																																						
Jun-18																																						

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*	*To Ult*
Simple Avg																																						
All Yrs (ex P)	22.252	2.642	1.822	1.323	1.280	1.131	1.147	1.068	1.030	1.081	1.022	1.031	1.063	1.009	1.000	1.000	1.000	1.105	1.000	1.000	1.038	1.000	1.018	1.015	1.014	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		1.000	2.282	1.579	1.000	1.034	1.000	1.078	1.000	1.043	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		#DIV/0!	#DIV/0!	2.015	1.000	1.057	1.000	1.129	1.000	1.072	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Volume Wtd																																						
All Yrs (ex P)		2.102	1.563	1.187	1.108	1.081	1.052	1.044	1.016	1.053	1.015	1.026	1.017	1.008	1.000	1.000	1.000	1.002	1.000	1.000	1.023	1.000	1.018	1.019	1.020	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		1.000	2.753	1.270	1.000	1.050	1.000	1.047	1.000	1.025	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3			#DIV/0!	1.591	1.000	1.080	1.000	1.133	1.000	1.035	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					

Dev Factor Selection																																						
Prior	*1.000*	*2.102*	*1.822*	*1.187*	*1.130*	*1.043*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.010*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Selected	1.000	2.102	1.822	1.187	1.130	1.043	1.010	1.010	1.010	1.010	1.010	1.010	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	5.746	5.746	2.733	1.500	1.264	1.118	1.072	1.062	1.051	1.041	1.030	1.020	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Percent of Ult	17.4%	17.4%	36.6%	66.7%	79.1%	89.4%	93.3%	94.2%	95.1%	96.1%	97.1%	98.0%	99.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.1%	0.0%	0.0%	0.0%	1.000	1.000
444	99.9%	0.0%	0.1%	0.0%	0.0%	0.981	0.971
432	99.9%	0.0%	0.1%	0.0%	0.0%	0.943	0.916
420	99.9%	0.0%	0.1%	0.0%	0.0%	0.907	0.864
408	99.9%	0.0%	0.1%	0.0%	0.0%	0.872	0.816
396	99.9%	0.0%	0.1%	0.0%	0.0%	0.838	0.769
384	99.9%	0.0%	0.1%	0.0%	0.0%	0.806	0.726
372	99.9%	0.0%	0.1%	0.0%	0.0%	0.775	0.685
360	99.9%	0.0%	0.1%	0.0%	0.0%	0.745	0.646
348	99.9%	0.1%	0.1%	0.0%	0.0%	0.717	0.609
336	99.8%	0.1%	0.2%	0.0%	0.0%	0.882	0.838
324	99.7%	0.0%	0.3%	0.0%	0.0%	0.901	0.863
312	99.7%	0.0%	0.3%	0.0%	0.0%	0.866	0.814
300	99.7%	0.5%	0.3%	0.2%	0.1%	0.833	0.768
288	99.3%	0.7%	0.7%	0.3%	0.2%	0.920	0.888
276	98.6%	0.8%	1.4%	0.3%	0.2%	0.931	0.902
264	97.8%	1.0%	2.2%	0.4%	0.3%	0.925	0.893
252	96.8%	1.0%	3.2%	0.4%	0.3%	0.917	0.882
240	95.9%	0.9%	4.1%	0.4%	0.3%	0.905	0.864
228	94.9%	0.0%	5.1%	0.0%	0.0%	0.891	0.844
216	94.9%	0.0%	5.1%	0.0%	0.0%	0.856	0.797
204	94.9%	0.0%	5.1%	0.0%	0.0%	0.823	0.751
192	94.9%	0.7%	5.1%	0.4%	0.3%	0.792	0.710
180	94.2%	1.1%	5.8%	0.6%	0.5%	0.787	0.704
168	93.2%	2.2%	6.8%	1.3%	1.0%	0.792	0.712
156	91.0%	0.9%	9.0%	0.6%	0.4%	0.814	0.744
144	90.1%	0.0%	9.9%	0.0%	0.0%	0.801	0.726
132	90.1%	0.7%	9.9%	0.5%	0.4%	0.770	0.685
120	89.4%	1.8%	10.6%	1.2%	1.0%	0.756	0.668
108	87.6%	2.8%	12.4%	2.0%	1.7%	0.764	0.680
96	84.8%	1.1%	15.2%	0.8%	0.7%	0.779	0.701
84	83.7%	1.6%	16.3%	1.3%	1.1%	0.765	0.682
72	82.1%	1.5%	17.9%	1.2%	1.1%	0.758	0.674
60	80.6%	8.4%	19.4%	7.1%	6.5%	0.748	0.662
48	72.1%	13.1%	27.9%	11.4%	10.7%	0.799	0.729
36	59.0%	17.2%	41.0%	15.6%	14.9%	0.836	0.779
24	41.8%	22.0%	58.2%	20.7%	20.2%	0.856	0.805
12	19.8%	19.8%	80.2%	19.4%	19.2%	0.866	0.817
Total		100.0%					

NOTES:
(2) = 1 / Section 6, Exhibit 1, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	0	7,659	0.981	0	7,510
6/30/83-84	1,444	7,219	0.943	1,361	6,807
6/30/84-85	853	4,264	0.907	773	3,866
6/30/85-86	1,059	1,059	0.872	924	924
6/30/86-87	1,981	16,900	0.838	1,661	14,166
6/30/87-88	1,123	15,129	0.806	905	12,194
6/30/88-89	2,624	13,118	0.775	2,033	10,166
6/30/89-90	3,244	16,218	0.745	2,417	12,085
6/30/90-91	1,102	5,509	0.717	789	3,947
6/30/91-92	1,518	7,592	0.882	1,340	6,699
6/30/92-93	638	3,191	0.901	575	2,875
6/30/93-94	4,031	48,474	0.866	3,493	42,003
6/30/94-95	521	2,606	0.833	434	2,171
6/30/95-96	4,917	9,834	0.920	4,526	9,052
6/30/96-97	4,224	8,448	0.931	3,932	7,864
6/30/97-98	5,457	10,915	0.925	5,049	10,099
6/30/98-99	6,316	12,632	0.917	5,794	11,587
6/30/99-00	6,876	13,752	0.905	6,221	12,442
6/30/00-01	7,380	14,759	0.891	6,572	13,145
6/30/01-02	3,417	6,834	0.856	2,926	5,852
6/30/02-03	50,012	112,012	0.823	41,180	92,231
6/30/03-04	33,029	34,029	0.792	26,170	26,963
6/30/04-05	7,898	18,898	0.787	6,214	14,870
6/30/05-06	27,177	36,177	0.792	21,511	28,635
6/30/06-07	24,302	38,302	0.814	19,783	31,180
6/30/07-08	51,965	73,965	0.801	41,610	59,226
6/30/08-09	43,540	50,540	0.770	33,523	38,912
6/30/09-10	46,130	58,130	0.756	34,889	43,964
6/30/10-11	68,906	118,186	0.764	52,631	90,271
6/30/11-12	87,136	138,136	0.779	67,911	107,659
6/30/12-13	62,301	90,301	0.765	47,652	69,068
6/30/13-14	103,685	126,685	0.758	78,584	96,016
6/30/14-15	92,217	109,217	0.748	69,002	81,722
6/30/15-16	182,346	202,346	0.799	145,629	161,602
6/30/16-17	134,125	248,125	0.836	112,118	207,413
6/30/17-18	286,573	372,573	0.856	245,342	318,969
6/30/18-19	475,315	537,315	0.866	411,802	465,517
Total	1,835,384	2,591,050		1,507,278	2,129,672
			(7) Total Discount Factor:	0.821	0.822

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	1	1
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 4%:	0	0

NOTES:
(2), (3) From Section 6, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 6, Exhibit 1, Page 13, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	0	7,659	0.971	0	7,439
6/30/83-84	1,444	7,219	0.916	1,323	6,615
6/30/84-85	853	4,264	0.864	737	3,686
6/30/85-86	1,059	1,059	0.816	864	864
6/30/86-87	1,981	16,900	0.769	1,524	13,002
6/30/87-88	1,123	15,129	0.726	815	10,981
6/30/88-89	2,624	13,118	0.685	1,796	8,982
6/30/89-90	3,244	16,218	0.646	2,095	10,476
6/30/90-91	1,102	5,509	0.609	671	3,357
6/30/91-92	1,518	7,592	0.838	1,272	6,361
6/30/92-93	638	3,191	0.863	550	2,752
6/30/93-94	4,031	48,474	0.814	3,280	39,445
6/30/94-95	521	2,606	0.768	400	2,000
6/30/95-96	4,917	9,834	0.888	4,369	8,738
6/30/96-97	4,224	8,448	0.902	3,810	7,621
6/30/97-98	5,457	10,915	0.893	4,876	9,751
6/30/98-99	6,316	12,632	0.882	5,570	11,140
6/30/99-00	6,876	13,752	0.864	5,942	11,884
6/30/00-01	7,380	14,759	0.844	6,231	12,462
6/30/01-02	3,417	6,834	0.797	2,722	5,444
6/30/02-03	50,012	112,012	0.751	37,581	84,171
6/30/03-04	33,029	34,029	0.710	23,443	24,152
6/30/04-05	7,898	18,898	0.704	5,560	13,305
6/30/05-06	27,177	36,177	0.712	19,352	25,760
6/30/06-07	24,302	38,302	0.744	18,082	28,499
6/30/07-08	51,965	73,965	0.726	37,749	53,730
6/30/08-09	43,540	50,540	0.685	29,839	34,636
6/30/09-10	46,130	58,130	0.668	30,821	38,839
6/30/10-11	68,906	118,186	0.680	46,825	80,313
6/30/11-12	87,136	138,136	0.701	61,115	96,885
6/30/12-13	62,301	90,301	0.682	42,514	61,620
6/30/13-14	103,685	126,685	0.674	69,861	85,357
6/30/14-15	92,217	109,217	0.662	61,013	72,261
6/30/15-16	182,346	202,346	0.729	133,006	147,595
6/30/16-17	134,125	248,125	0.779	104,439	193,208
6/30/17-18	286,573	372,573	0.805	230,599	299,802
6/30/18-19	475,315	537,315	0.817	388,493	439,168
Total	1,835,384	2,591,050		1,389,142	1,962,302
			(7) Total Discount Factor:	0.757	0.757

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	1	1
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 6%:	0	0

NOTES:
(2), (3) From Section 6, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 6, Exhibit 1, Page 13, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/19 - 20 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/19 - 06/30/20	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/19 - 06/30/20		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	1,455,812	1,455,812	1,455,812	0	0				0	0		
6/30/82-83	328,340	335,999	327,566	774	8,433	98.6%	0.5%	36.1%	279	3,042	36.1%	36.1%
6/30/83-84	1,496,283	1,502,058	1,494,800	1,483	7,258	99.7%	0.1%	17.2%	254	1,245	17.2%	17.2%
6/30/84-85	1,016,598	1,020,009	1,015,470	1,128	4,539	99.7%	0.1%	18.0%	203	816	18.0%	18.0%
6/30/85-86	2,735,000	2,735,000	2,733,296	1,704	1,704	99.9%	0.1%	80.2%	1,368	1,368	80.2%	80.2%
6/30/86-87	3,780,000	3,794,919	3,777,375	2,625	17,544	99.7%	0.1%	18.8%	493	3,295	18.8%	18.8%
6/30/87-88	3,375,000	3,389,006	3,373,806	1,194	15,200	99.8%	0.1%	20.6%	246	3,136	20.6%	20.6%
6/30/88-89	3,115,270	3,125,764	3,112,432	2,838	13,332	99.7%	0.1%	19.3%	548	2,573	19.3%	19.3%
6/30/89-90	3,800,827	3,813,801	3,797,545	3,282	16,256	99.7%	0.1%	19.5%	639	3,168	19.5%	19.5%
6/30/90-91	1,404,925	1,409,332	1,403,520	1,405	5,812	99.7%	0.1%	19.5%	274	1,133	19.5%	19.5%
6/30/91-92	2,189,822	2,195,896	2,187,492	2,330	8,404	99.8%	0.1%	20.4%	476	1,717	20.4%	20.4%
6/30/92-93	1,035,977	1,044,458	1,033,363	2,614	11,095	99.3%	0.3%	37.9%	992	4,209	37.9%	37.9%
6/30/93-94	2,653,000	2,711,165	2,648,500	4,500	62,665	98.7%	0.3%	20.0%	898	12,512	20.0%	20.0%
6/30/94-95	943,512	952,133	940,892	2,620	11,240	99.3%	0.3%	34.2%	896	3,843	34.2%	34.2%
6/30/95-96	881,507	892,217	874,675	6,832	17,542	98.6%	1.0%	72.8%	4,972	12,766	72.8%	72.8%
6/30/96-97	624,614	632,798	620,136	4,478	12,662	98.6%	1.0%	73.4%	3,285	9,289	73.4%	73.4%
6/30/97-98	1,050,184	1,065,622	1,043,830	6,355	21,792	98.7%	1.0%	75.2%	4,777	16,381	75.2%	75.2%
6/30/98-99	947,917	954,233	940,822	7,094	13,410	98.9%	1.0%	92.8%	6,581	12,440	92.8%	92.8%
6/30/99-00	880,459	887,335	872,750	7,710	14,585	98.7%	1.0%	79.3%	6,113	11,565	79.3%	79.3%
6/30/00-01	951,353	958,733	943,388	7,965	15,345	98.8%	1.0%	81.9%	6,527	12,574	81.9%	81.9%
6/30/01-02	578,126	586,203	573,127	4,999	13,076	98.4%	1.0%	64.4%	3,220	8,423	64.4%	64.4%
6/30/02-03	1,392,000	1,458,720	1,340,099	51,901	118,621	94.0%	2.0%	33.4%	17,353	39,661	33.4%	33.4%
6/30/03-04	1,298,000	1,302,020	1,259,443	38,557	42,577	96.9%	2.0%	64.1%	24,712	27,288	64.1%	64.1%
6/30/04-05	379,000	399,550	367,452	11,548	32,098	94.4%	2.0%	35.7%	4,120	11,451	35.7%	35.7%
6/30/05-06	1,201,000	1,232,900	1,167,222	33,778	65,678	95.9%	2.0%	48.9%	16,532	32,146	48.9%	48.9%
6/30/06-07	636,000	651,000	605,124	30,876	45,876	94.0%	2.0%	33.5%	10,355	15,385	33.5%	33.5%
6/30/07-08	1,754,000	1,808,400	1,693,151	60,849	115,249	95.1%	2.0%	40.5%	24,619	46,629	40.5%	40.5%
6/30/08-09	1,019,000	1,052,350	965,775	53,225	86,575	93.3%	2.0%	29.6%	15,772	25,655	29.6%	29.6%
6/30/09-10	879,000	907,200	821,577	57,423	85,623	92.0%	2.0%	25.0%	14,341	21,383	25.0%	25.0%
6/30/10-11	1,116,000	1,182,880	1,025,472	90,528	157,408	89.2%	2.0%	18.5%	16,788	29,190	18.5%	18.5%
6/30/11-12	1,363,000	1,431,200	1,253,325	109,675	177,875	89.7%	2.0%	19.4%	21,315	34,569	19.4%	19.4%
6/30/12-13	769,000	816,200	680,049	88,951	136,151	85.8%	2.0%	14.1%	12,528	19,176	14.1%	14.1%
6/30/13-14	1,233,000	1,296,400	1,095,773	137,227	200,627	86.6%	2.0%	15.0%	20,547	30,041	15.0%	15.0%
6/30/14-15	590,000	635,000	480,125	109,875	154,875	78.4%	5.0%	23.1%	25,420	35,830	23.1%	23.1%
6/30/15-16	950,000	990,000	723,062	226,938	266,938	74.5%	5.0%	19.6%	44,572	52,428	19.6%	19.6%
6/30/16-17	543,000	691,650	357,802	185,198	333,848	58.0%	10.0%	23.8%	44,053	79,412	23.8%	23.8%
6/30/17-18	679,000	819,200	325,689	353,311	493,511	43.5%	10.0%	17.7%	62,508	87,312	17.7%	17.7%
6/30/18-19	859,000	991,950	203,463	655,537	788,487	22.0%	20.0%	25.6%	168,053	202,137	25.6%	25.6%
Total	51,904,525	53,129,110	49,535,200	2,369,324	3,593,910				586,628	915,188	24.8%	25.5%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)
(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)
(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)
(5) = (2) - (4)
(6) = (3) - (4)
(7) = (4) / Average of Columns (2), (3)
(8) = (7) - Prior Year's (7)
(9) = (8) / (1.00 - (7))
(10) = (5) * (9)
(11) = (6) * (9)
(12) = (10) / (5)
(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		126,400			126,400	126,400	0	0		
6/30/82-83		21,226	21,232		22,000	22,000	774	774		
6/30/83-84		50,961	50,976		51,000	51,000	39	39		
6/30/84-85	116,303	162,725	162,771	162,790	163,000	163,000	275	275	0.140	0.140
6/30/85-86	123,981	215,355	215,417	215,440	216,000	216,000	645	645	0.174	0.174
6/30/86-87	139,388	397,356	397,470	397,509	398,000	398,000	644	644	0.286	0.286
6/30/87-88	159,499	347,929	348,028	348,057	348,000	348,000	71	71	0.218	0.218
6/30/88-89	180,644	488,786	488,926	488,966	489,000	489,000	214	214	0.271	0.271
6/30/89-90	142,494	553,962	554,120	554,192	554,000	554,000	38	38	0.389	0.389
6/30/90-91	143,694	301,697	301,783	301,783	302,000	302,000	303	303	0.210	0.210
6/30/91-92	155,170	669,188	669,379	669,376	670,000	670,000	812	812	0.432	0.432
6/30/92-93	163,283	395,196	395,309	395,307	397,172	403,100	1,976	7,904	0.243	0.247
6/30/93-94	177,184	709,532	709,734	709,728	710,000	723,722	468	14,191	0.401	0.408
6/30/94-95	188,391	419,765	419,885	419,881	421,864	428,400	2,099	8,635	0.224	0.227
6/30/95-96	201,751	382,952	383,061	383,058	384,867	390,660	1,915	7,708	0.191	0.194
6/30/96-97	231,872	197,746	197,803	197,802	198,000	201,960	254	4,214	0.085	0.087
6/30/97-98	232,237	498,103	498,743	498,711	499,000	508,980	897	10,877	0.215	0.219
6/30/98-99	232,075	309,222	309,929	309,903	310,000	310,000	778	778	0.134	0.134
6/30/99-00	211,819	185,166	185,775	185,770	186,000	186,000	834	834	0.088	0.088
6/30/00-01	215,099	205,415	206,296	206,283	206,000	206,000	585	585	0.096	0.096
6/30/01-02	227,797	231,419	232,644	232,620	233,000	237,660	1,581	6,241	0.102	0.104
6/30/02-03	242,008	234,111	235,926	235,901	236,000	240,720	1,889	6,609	0.098	0.099
6/30/03-04	276,758	296,472	301,868	301,754	302,000	305,020	5,528	8,548	0.109	0.110
6/30/04-05	260,378	166,350	170,145	171,398	170,000	179,550	3,650	13,200	0.065	0.069
6/30/05-06	317,741	388,400	397,657	394,851	395,000	417,900	6,600	29,500	0.124	0.132
6/30/06-07	325,922	236,426	242,513	243,560	243,000	244,000	6,574	7,574	0.075	0.075
6/30/07-08	354,130	513,116	528,217	521,945	522,000	554,400	8,884	41,284	0.147	0.157
6/30/08-09	362,309	433,315	447,194	443,173	443,000	469,350	9,685	36,035	0.122	0.130
6/30/09-10	383,298	291,707	302,554	304,075	303,000	319,200	11,293	27,493	0.079	0.083
6/30/10-11	394,924	330,378	351,879	352,096	352,000	369,600	21,622	39,222	0.089	0.094
6/30/11-12	381,943	300,461	322,771	324,221	323,000	340,200	22,539	39,739	0.085	0.089
6/30/12-13	384,763	273,350	299,639	303,732	300,000	319,200	26,650	45,850	0.078	0.083
6/30/13-14	364,582	438,458	488,102	471,831	472,000	512,400	33,542	73,942	0.129	0.141
6/30/14-15	370,543	143,342	161,308	180,485	161,000	189,000	17,658	45,658	0.043	0.051
6/30/15-16	382,602	271,408	315,810	319,821	316,000	336,000	44,592	64,592	0.083	0.088
6/30/16-17	395,324	200,928	252,168	273,225	252,000	286,650	51,072	85,722	0.064	0.073
6/30/17-18	398,722	156,262	222,932	263,580	223,000	277,200	66,738	120,938	0.056	0.070
6/30/18-19	410,826	104,778	284,919	338,550	285,000	355,950	180,222	251,172	0.069	0.087
Total	9,249,456	11,649,362	12,074,886	12,121,370	12,183,303	12,652,222	533,941	1,002,860		
Tot 6/30/84-19	9,249,456	11,450,775	12,002,679	12,121,370	11,983,903	12,452,822	533,128	1,002,047	0.130	0.135

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 6, Exhibit 2, Page 2, Column 3
(4) From Section 6, Exhibit 2, Page 2, Column 8
(5) From Section 6, Exhibit 2, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim
All Prior Yrs		126,400							0	0	
6/30/82-83		21,226	1.000	1.000	21,232	N/A	21,232		0	0	
6/30/83-84		50,961	1.000	1.000	50,976	N/A	50,976		0	0	
6/30/84-85	116,303	162,725	1.000	1.000	162,771	N/A	162,771	0.140	0	0	
6/30/85-86	123,981	215,355	1.000	1.000	215,417	N/A	215,417	0.174	0	0	
6/30/86-87	139,388	397,356	1.000	1.000	397,470	N/A	397,470	0.285	0	0	
6/30/87-88	159,499	347,929	1.000	1.000	348,028	N/A	348,028	0.218	0	0	
6/30/88-89	180,644	488,786	1.000	1.000	488,926	N/A	488,926	0.271	0	0	
6/30/89-90	142,494	553,962	1.000	1.000	554,120	N/A	554,120	0.389	0	0	
6/30/90-91	143,694	301,697	1.000	1.000	301,783	N/A	301,783	0.210	0	0	
6/30/91-92	155,170	669,188	1.000	1.000	669,379	N/A	669,379	0.431	0	0	
6/30/92-93	163,283	395,196	1.000	1.000	395,309	N/A	395,309	0.242	0	0	
6/30/93-94	177,184	709,532	1.000	1.000	709,734	N/A	709,734	0.401	1	1	203
6/30/94-95	188,391	419,765	1.000	1.000	419,885	N/A	419,885	0.223	1	1	120
6/30/95-96	201,751	382,952	1.000	1.000	383,061	N/A	383,061	0.190	0	0	
6/30/96-97	231,872	197,746	1.000	1.000	197,803	N/A	197,803	0.085	1	1	56
6/30/97-98	232,237	498,103	1.001	1.000	498,743	N/A	498,743	0.215	1	1	641
6/30/98-99	232,075	309,222	1.002	1.000	309,929	N/A	309,929	0.134	0	0	
6/30/99-00	211,819	185,166	1.003	1.000	185,775	N/A	185,775	0.088	0	0	
6/30/00-01	215,099	205,415	1.004	1.000	206,296	N/A	206,296	0.096	0	0	
6/30/01-02	227,797	231,419	1.005	1.000	232,644	N/A	232,644	0.102	1	1	1,226
6/30/02-03	242,008	234,111	1.008	1.000	235,926	N/A	235,926	0.097	1	1	1,815
6/30/03-04	276,758	296,472	1.018	1.000	301,868	N/A	301,868	0.109	0	0	
6/30/04-05	260,378	166,350	1.023	1.000	170,145	N/A	170,145	0.065	1	1	3,795
6/30/05-06	317,741	388,400	1.024	1.000	397,657	N/A	397,657	0.125	2	2	4,629
6/30/06-07	325,922	236,426	1.026	1.000	242,513	N/A	242,513	0.074	0	0	
6/30/07-08	354,130	513,116	1.029	1.000	528,217	N/A	528,217	0.149	1	1	15,101
6/30/08-09	362,309	433,315	1.032	1.000	447,194	N/A	447,194	0.123	2	2	6,939
6/30/09-10	383,298	291,707	1.037	1.000	302,554	N/A	302,554	0.079	1	1	10,848
6/30/10-11	394,924	330,378	1.065	1.000	351,879	N/A	351,879	0.089	0	0	
6/30/11-12	381,943	300,461	1.074	1.000	322,771	N/A	322,771	0.085	1	1	22,310
6/30/12-13	384,763	273,350	1.096	1.000	299,639	N/A	299,639	0.078	1	1	26,289
6/30/13-14	364,582	438,458	1.113	1.000	488,102	N/A	488,102	0.134	4	1	49,645
6/30/14-15	370,543	143,342	1.125	1.000	161,308	N/A	161,308	0.044	7	2	8,983
6/30/15-16	382,602	271,408	1.164	1.000	315,810	N/A	315,810	0.083	28	2	22,201
6/30/16-17	395,324	200,928	1.255	1.000	252,168	N/A	252,168	0.064	68	10	5,124
6/30/17-18	398,722	156,262	1.427	1.000	222,932	N/A	222,932	0.056	76	51	1,307
6/30/18-19	410,826	104,778	2.719	1.000	284,919	N/A	284,919	0.069		67	2,689
Total	9,249,456	11,649,362			12,074,886		12,074,886		198	148	

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 6, Exhibit 2, Page 7
(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.
(6) = (3) x (4) x (5)
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	116,303	0.195	162,725	1.000	162,790	N/A	162,790	0.140	0.140
6/30/85-86	123,981	0.239	215,355	1.000	215,440	N/A	215,440	0.174	0.174
6/30/86-87	139,388	0.383	397,356	1.000	397,509	N/A	397,509	0.285	0.285
6/30/87-88	159,499	0.281	347,929	1.000	348,057	N/A	348,057	0.218	0.218
6/30/88-89	180,644	0.349	488,786	1.000	488,966	N/A	488,966	0.271	0.271
6/30/89-90	142,494	0.565	553,962	1.000	554,192	N/A	554,192	0.389	0.389
6/30/90-91	143,694	0.209	301,697	1.000	301,783	N/A	301,783	0.210	0.210
6/30/91-92	155,170	0.424	669,188	1.000	669,376	N/A	669,376	0.431	0.431
6/30/92-93	163,283	0.237	395,196	1.000	395,307	N/A	395,307	0.242	0.242
6/30/93-94	177,184	0.388	709,532	1.000	709,728	N/A	709,728	0.401	0.401
6/30/94-95	188,391	0.216	419,765	1.000	419,881	N/A	419,881	0.223	0.223
6/30/95-96	201,751	0.183	382,952	1.000	383,058	N/A	383,058	0.190	0.190
6/30/96-97	231,872	0.085	197,746	1.000	197,802	N/A	197,802	0.085	0.085
6/30/97-98	232,237	0.204	498,103	1.001	498,711	N/A	498,711	0.215	0.215
6/30/98-99	232,075	0.129	309,222	1.002	309,903	N/A	309,903	0.134	0.134
6/30/99-00	211,819	0.087	185,166	1.003	185,770	N/A	185,770	0.088	0.088
6/30/00-01	215,099	0.094	205,415	1.004	206,283	N/A	206,283	0.096	0.096
6/30/01-02	227,797	0.100	231,419	1.005	232,620	N/A	232,620	0.102	0.102
6/30/02-03	242,008	0.096	234,111	1.008	235,901	N/A	235,901	0.097	0.097
6/30/03-04	276,758	0.107	296,472	1.018	301,754	N/A	301,754	0.109	0.109
6/30/04-05	260,378	0.087	166,350	1.023	171,398	N/A	171,398	0.066	0.066
6/30/05-06	317,741	0.087	388,400	1.024	394,851	N/A	394,851	0.124	0.124
6/30/06-07	325,922	0.087	236,426	1.026	243,560	N/A	243,560	0.075	0.075
6/30/07-08	354,130	0.087	513,116	1.029	521,945	N/A	521,945	0.147	0.147
6/30/08-09	362,309	0.088	433,315	1.032	443,173	N/A	443,173	0.122	0.122
6/30/09-10	383,298	0.090	291,707	1.037	304,075	N/A	304,075	0.079	0.079
6/30/10-11	394,924	0.090	330,378	1.065	352,096	N/A	352,096	0.089	0.089
6/30/11-12	381,943	0.090	300,461	1.074	324,221	N/A	324,221	0.085	0.085
6/30/12-13	384,763	0.090	273,350	1.096	303,732	N/A	303,732	0.079	0.079
6/30/13-14	364,582	0.090	438,458	1.113	471,831	N/A	471,831	0.129	0.129
6/30/14-15	370,543	0.090	143,342	1.125	180,485	N/A	180,485	0.049	0.049
6/30/15-16	382,602	0.090	271,408	1.164	319,821	N/A	319,821	0.084	0.084
6/30/16-17	395,324	0.090	200,928	1.255	273,225	N/A	273,225	0.069	0.069
6/30/17-18	398,722	0.090	156,262	1.427	263,580	N/A	263,580	0.066	0.066
6/30/18-19	410,826	0.090	104,778	2.719	338,550	N/A	338,550	0.082	0.082
Total	9,249,456		11,450,775		12,121,370		12,121,370		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 6, Exhibit 2, Page 4, Column 11
(4) From Section 6, Exhibit 2, Page 2, Column 3
(5) From Section 6, Exhibit 2, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.195	0.195
6/30/85-86									0.239	0.239
6/30/86-87									0.383	0.383
6/30/87-88									0.281	0.281
6/30/88-89									0.349	0.349
6/30/89-90									0.565	0.565
6/30/90-91	143,694	301,783	0.210	1.194	0.251	1.000	0.251	0.075	0.209	0.209
6/30/91-92	155,170	669,379	0.431	1.189	0.513	1.000	0.513	0.076	0.424	0.424
6/30/92-93	163,283	395,309	0.242	1.189	0.288	1.000	0.288	0.076	0.237	0.237
6/30/93-94	177,184	709,734	0.401	1.178	0.472	1.000	0.472	0.076	0.387	0.388
6/30/94-95	188,391	419,885	0.223	1.170	0.261	1.000	0.261	0.077	0.216	0.216
6/30/95-96	201,751	383,061	0.190	1.155	0.219	1.000	0.219	0.078	0.184	0.183
6/30/96-97	231,872	197,803	0.085	1.137	0.097	1.000	0.097	0.079	0.086	0.085
6/30/97-98	232,237	498,743	0.215	1.135	0.244	1.000	0.244	0.079	0.205	0.204
6/30/98-99	232,075	309,929	0.134	1.135	0.152	1.000	0.152	0.079	0.130	0.129
6/30/99-00	211,819	185,775	0.088	1.135	0.100	1.000	0.100	0.079	0.088	0.087
6/30/00-01	215,099	206,296	0.096	1.109	0.106	1.000	0.106	0.081	0.095	0.094
6/30/01-02	227,797	232,644	0.102	1.101	0.112	1.000	0.112	0.082	0.101	0.100
6/30/02-03	242,008	235,926	0.097	1.073	0.105	1.000	0.105	0.084	0.095	0.096
6/30/03-04	276,758	301,868	0.109	1.046	0.114	1.000	0.114	0.086	0.108	0.107
6/30/04-05	260,378	170,145	0.065	1.036	0.068	1.000	0.068	0.087	0.097	0.087
6/30/05-06	317,741	397,657	0.125	1.032	0.129	1.000	0.129	0.087	0.097	0.087
6/30/06-07	325,922	242,513	0.074	1.032	0.077	1.000	0.077	0.087	0.097	0.087
6/30/07-08	354,130	528,217	0.149	1.032	0.154	1.000	0.154	0.087	0.097	0.087
6/30/08-09	362,309	447,194	0.123	1.027	0.127	1.000	0.127	0.088	0.097	0.088
6/30/09-10	383,298	302,554	0.079	1.000	0.079	1.000	0.079	0.090	0.100	0.090
6/30/10-11	394,924	351,879	0.089	1.000	0.089	1.000	0.089	0.090	0.100	0.090
6/30/11-12	381,943	322,771	0.085	1.000	0.085	1.000	0.085	0.090	0.100	0.090
6/30/12-13	384,763	299,639	0.078	1.000	0.078	1.000	0.078	0.090	0.100	0.090
6/30/13-14	364,582	488,102	0.134	1.000	0.134	1.000	0.134	0.090	0.100	0.090
6/30/14-15	370,543	161,308	0.044	1.000	0.044	1.000	0.044	0.090	0.100	0.090
6/30/15-16	382,602	315,810	0.083	1.000	0.083	1.000	0.083	0.090	0.100	0.090
6/30/16-17	395,324	252,168	0.064	1.000	0.064	1.000	0.064	0.090	0.100	0.090
6/30/17-18	398,722	222,932	0.056	1.000	0.056	1.000	0.056	0.090	0.100	0.090
6/30/18-19	410,826	284,919	0.069	1.000	0.069	1.000	0.069	0.090		0.090
Total	8,387,147	9,835,947								

Trend Last 4 (ex 18-19):	5.1%	Avg 3 (ex 18-19):	0.067
Trend Last 8 (ex 18-19):	-6.5%	Avg 5 (ex 18-19):	0.076
Trend Last 12 (ex 18-19):	-5.5%	Avg 10 (ex 18-19):	0.084
Prior Selected Trend:	0.0%	Prior Sel Avg:	0.100
Selected Trend:	0.0%	Sel. Loss Cost:	0.090

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 6, Exhibit 2, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCIRB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.750	
(2)	Credibility		13%	
(3)	Average Pmt Trend Statewide		0.980	
(4)	Credibility Weighted Trend		0.949	
		(Low)		(High)
(5)	Selected Range	0.940		0.959
(6)	Incremental Paid for 2019	0		0
(7)	Estimated Reserve	0		0
(8)	Paid to Date (82 & Prior)	126,400		126,400
(9)	Est Ult Paid for 1982 & Prior	126,400		126,400

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	0	0
(11)	Projected Number of Years	1	1
(12)	Estimated Reserve	0	0
(13)	Paid to Date (82 & Prior)	126,400	126,400
(14)	Est Ult Paid for 1982 & Prior	126,400	126,400
(14a)	Paid Counts During Fiscal Year	0	0

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	126,400	126,400
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**126,400**	**126,400**
(18)	Implied Tail	1.000	1.000
(19)	Ult Loss Inc Lump Sums @ 6/18	126,400	126,400

NOTES:

(1) From Section 6, Exhibit 2, Page 6
(2) = (Average of Section 6, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 6, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 6, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	1,277	7.152			
1993	2	1,933	7.567	1.514		
1994	3	2,959	7.993	1.531		
1995	4	30,696	10.332	10.374		
1996	5	1,619	7.390	0.053		
1997	6	7,074	8.864	4.369		
1998	7	5,136	8.544	0.726		
1999	8	26,679	10.192	5.195		
2000	9	8,683	9.069	0.325	n =	12
2001	10	453	6.116	0.052	S(x) =	23,970
2002	11	573	6.351	1.265	S(x-sq) =	47,880,218
2003	12	16	2.773	0.028	S(xy) =	184,417
2004	13	0			S(y) =	92
2005	14	0			D =	1,716
2006	15	0			slope =	-0.246
2007	16	0			Avg Trend =	0.754
2008	17	0				
2009	18	0				
2010	19	0				
2011	20	0				
2012	21	0				
2013	22	0				
2014	23	0				
2015	24	0				
2016	25	0				
2017	26	0				
2018	27	0				
2019	28	0				
					Selected Trend:	**0.750**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2003: 0.028 = 16 / 573

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Medical Center) - Cluster 4
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
June-83	1,234	3,103	4,861	6,300	7,916	9,821	13,039	13,611	14,794	16,517	16,901	19,950	21,086	21,192	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226
June-84	2,119	5,327	8,344	10,814	13,588	16,986	18,288	23,404	25,737	31,059	49,301	49,301	49,616	49,616	49,616	49,911	50,261	50,611	50,611	50,611	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	
June-85	12,116	30,459	47,713	61,836	82,871	90,557	102,192	116,196	126,162	134,269	144,586	146,053	155,423	156,868	159,570	160,025	160,725	160,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725		
June-86	20,894	52,527	82,283	109,226	113,177	157,428	181,217	194,111	201,338	202,138	203,815	204,040	204,668	207,774	211,955	212,780	212,780	212,780	215,180	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355			
June-87	31,042	78,039	128,883	164,579	225,534	253,273	269,701	290,822	307,535	321,418	343,535	347,855	391,585	394,847	396,769	397,163	397,163	397,163	397,163	397,163	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356				
June-88	38,803	100,851	169,323	220,047	246,044	269,806	298,617	307,956	313,205	317,782	319,598	322,343	325,039	329,817	329,817	329,817	331,017	332,429	332,429	333,094	334,344	338,304	341,814	346,679	347,929	347,929	347,929	347,929	347,929	347,929	347,929	347,929					
June-89	23,530	123,605	224,861	257,852	314,169	363,076	415,231	428,349	431,502	433,102	439,481	459,235	462,320	479,638	484,373	488,387	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786						
June-90	50,815	273,859	359,066	409,059	478,183	534,786	577,745	596,162	604,078	543,745	548,041	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962							
June-91	100,348	235,116	278,654	299,094	305,642	311,577	324,200	331,771	300,441	301,585	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697								
June-92	214,704	524,294	598,233	667,108	699,896	707,764	731,353	668,555	669,244	669,244	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188									
June-93	170,873	375,060	420,253	430,949	444,131	448,308	394,918	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196										
June-94	300,512	596,595	667,456	713,591	730,452	676,827	679,845	681,410	682,760	684,108	684,108	684,335	686,279	687,551	690,014	691,979	693,434	694,829	694,829	694,829	694,829	698,854	701,213	705,470	708,161	709,532											
June-95	224,267	378,724	433,955	457,533	409,745	410,858	411,003	411,481	412,287	412,616	413,407	414,199	414,911	415,394	415,394	416,151	416,388	416,634	416,984	417,700	418,185	418,614	419,003	419,416	419,765												
June-96	167,356	393,930	501,689	378,074	378,587	378,666	378,667	379,037	379,508	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952													
June-97	130,080	273,734	170,451	178,673	186,292	189,102	189,531	190,062	190,753	191,531	192,270	193,209	194,029	194,724	195,455	195,912	196,119	196,392	196,765	197,155	197,391	197,598	197,746														
June-98	153,489	249,584	276,046	301,383	308,237	314,372	326,267	379,647	404,376	420,822	440,261	450,569	452,424	455,322	458,466	462,440	470,685	482,508	490,581	496,849	497,988	498,103															
June-99	74,009	144,825	187,509	205,821	213,634	225,729	262,895	277,050	296,551	301,615	304,333	305,562	306,665	306,876	308,775	309,222	309,222	309,222	309,222	309,222	309,222																
June-00	42,966	116,743	129,805	138,406	149,847	152,795	156,525	163,267	168,512	177,868	177,868	177,992	185,166	185,166	185,166	185,166	185,166	185,166	185,166	185,166																	
June-01	66,977	112,847	134,511	164,585	186,174	191,353	193,876	196,194	197,019	200,449	202,529	202,659	204,334	205,415	205,415	205,415	205,415	205,415	205,415																		
June-02	51,704	99,105	124,129	132,683	137,298	144,909	146,854	147,302	174,745	189,334	201,469	209,356	215,153	219,704	222,933	226,700	230,627	231,419																			
June-03	24,338	126,639	167,817	173,658	176,063	176,926	181,096	186,492	190,822	196,704	200,649	205,235	213,052	217,199	225,005	226,298	234,111																				
June-04	83,690	216,265	266,643	284,876	292,325	295,052	295,295	296,029	296,255	296,405	296,405	296,405	296,472	296,472	296,472	296,472																					
June-05	70,794	151,383	161,299	162,118	162,383	162,449	162,848	165,224	165,325	165,630	165,860	165,925	166,093	166,284	166,350																						
June-06	111,267	215,773	247,375	290,539	295,723	304,040	318,675	338,665	353,952	368,605	379,144	382,941	386,684	388,400																							
June-07	135,214	210,808	235,383	235,931	236,426	236,426	236,426	236,426	236,426	236,426	236,426	236,426	236,426																								
June-08	163,349	354,750	465,422	484,430	499,466	503,458	508,133	512,405	512,687	512,826	512,965	513,116																									
June-09	147,783	237,019	285,263	290,878	311,776	330,161	342,462	384,890	396,420	430,454	433,315																										
June-10	151,041	251,654	264,987	272,182	276,801	280,207	281,828	287,482	290,759	291,707																											
June-11	207,552	306,733	317,839	322,382	326,484	328,928	330,378	330,378	330,378																												
June-12	139,332	221,373	251,760	270,206	297,007	298,180	300,372	300,461																													
June-13	127,443	223,391	256,039	266,425	269,907	272,508	273,350																														
June-14	99,522	206,623	252,452	419,049	436,707	438,458																															
June-15	68,762	116,468	133,363	140,457	143,342																																
June-16	152,780	258,891	268,877	271,408																																	
June-17	95,466	186,703	200,928																																		
June-18	89,728	156,262																																			
June-19	104,778																																				

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
June-83	2.515	1.567	1.296	1.257	1.241	1.328	1.044	1.087	1.116	1.023	1.180	1.057	1.005	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.514	1.566	1.296	1.257	1.250	1.077	1.280	1.100	1.207	1.587	1.000	1.006	1.000	1.000	1.006	1.007	1.007	1.000	1.000	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-85	2.514	1.566	1.296	1.340	1.093	1.128	1.137	1.086	1.064	1.077	1.010	1.064	1.009	1.017	1.003	1.004	1.000	1.012	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-86	2.514	1.566	1.327	1.036	1.391	1.151	1.071	1.037	1.004	1.008	1.001	1.003	1.015	1.020	1.004	1.000	1.000	1.011	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-87	2.514	1.652	1.277	1.370	1.123	1.065	1.078	1.057	1.045	1.069	1.013	1.126	1.008	1.005	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
June-88	2.599	1.679	1.300	1.118	1.097	1.107	1.031	1.017	1.015	1.006	1.009	1.008	1.015	1.000	1.000	1.004	1.004	1.000	1.002	1.004	1.012	1.010	1.014	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
June-89	5.253	1.819	1.147	1.218	1.156	1.144	1.032	1.007	1.004	1.015	1.045	1.007	1.037	1.010	1.008	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
June-90	5.389	1.311	1.139	1.169	1.118	1.080	1.032	1.013	0.900	1.008	1.011	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
June-91	2.343	1.185	1.073	1.022	1.019	1.041	1.023	0.906	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
June-92	2.442	1.141	1.115	1.049	1.011	1.033	0.914	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-93	2.195	1.120	1.025	1.031	1.009	0.881	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
June-94	1.985	1.119	1.069	1.024	0.927	1.004	1.002	1.002	1.002	1.000	1.000	1.003	1.002	1.004	1.003	1.002	1.002	1.000	1.000	1.000	1.006	1.003	1.006	1.004	1.002												
June-95	1.689	1.146	1.054	0.896	1.003	1.000	1.001	1.002	1.001	1.002	1.002	1.002	1.001	1.000	1.002	1.001	1.001	1.001	1.002	1.001	1.001	1.001	1.001	1.001													
June-96	2.354	1.274	0.754	1.001	1.000	1.000	1.001	1.001	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-97	2.104	0.623	1.048	1.043	1.015	1.002	1.003	1.004	1.004	1.004	1.005	1.004	1.004	1.004	1.002	1.001	1.001	1.002	1.002	1.001	1.001	1.001															
June-98	1.626	1.106	1.092	1.023	1.020	1.038	1.164	1.065	1.041	1.046	1.023	1.004	1.006	1.007	1.009	1.018	1.025	1.017	1.013	1.002	1.000																
June-99	1.957	1.295	1.098	1.038	1.057	1.165	1.054	1.070	1.017	1.009	1.004	1.004	1.001	1.006	1.001	1.000	1.000	1.000	1.000	1.000																	
June-00	2.717	1.112	1.066	1.083	1.020	1.024	1.043	1.032	1.056	1.000	1.001	1.040	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
June-01	1.685	1.192	1.224	1.131	1.028	1.013	1.012	1.004	1.017	1.010	1.001	1.008	1.005	1.000	1.000	1.000	1.000	1.000																			
June-02	1.917	1.252	1.069	1.035	1.055	1.013	1.003	1.186	1.083	1.064	1.039	1.028	1.021	1.015	1.017	1.017	1.003																				
June-03	5.203	1.325	1.035	1.014	1.005	1.024	1.030	1.023	1.031	1.020	1.023	1.038	1.019	1.036	1.006	1.035																					
June-04	2.584	1.233	1.068	1.026	1.009	1.001	1.002	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000																						
June-05	2.138	1.066	1.005	1.002	1.000	1.002	1.015	1.001	1.002	1.001	1.000	1.001	1.001	1.000																							
June-06	1.939	1.146	1.174	1.018	1.028	1.048	1.063	1.045	1.041	1.029	1.010	1.010	1.004																								
June-07	1.559	1.117	1.002	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																									
June-08	2.172	1.312	1.041	1.031	1.008	1.009	1.008	1.001	1.000	1.000	1.000																										
June-09	1.604	1.204	1.020	1.072	1.059	1.037	1.124	1.030	1.086	1.007																											
June-10	1.666	1.053	1.027	1.017	1.012	1.006	1.020	1.011	1.003																												
June-11	1.478	1.036	1.014	1.013	1.007	1.004	1.000	1.000																													
June-12	1.589	1.137	1.073	1.099	1.004	1.007	1.000																														
June-13	1.753	1.146	1.041	1.013	1.010	1.003																															
June-14	2.076	1.222	1.660	1.042	1.004																																
June-15	1.694	1.145	1.053	1.021																																	
June-16	1.695	1.039	1.009																																		
June-17	1.956	1.076																																			
June-18	1.742																																				

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*To Ult*
Simple Avg																																					
All Yrs	2.324	1.244	1.117	1.076	1.056	1.046	1.040	1.027	1.027	1.037	1.015	1.017	1.006	1.005	1.003	1.004	1.002	1.002	1.001	1.001	1.001	1.001	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.832	1.126	1.167	1.038	1.007	1.012	1.031	1.008	1.026	1.007	1.002	1.010	1.009	1.010	1.005	1.010	1.006	1.004	1.003	1.001	1.002	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Latest 3	1.797	1.087	1.241	1.025	1.006	1.005	1.007	1.014	1.030	1.002	1.003	1.004	1.002	1.012	1.008	1.017	1.001	1.000	1.004	1.001	1.000	1.001	1.002	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Volume Wtd																																					
All Yrs	2.031	1.170	1.079	1.049	1.028	1.029	1.022	1.016	1.010	1.014	1.008	1.012	1.006	1.005	1.003	1.004	1.002	1.002	1.001	1.001	1.002	1.001	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5	1.827	1.121	1.176	1.039	1.007	1.012	1.030	1.009	1.028	1.008	1.003	1.009	1.008	1.010	1.004	1.010	1.009	1.006	1.004	1.001	1.002	1.001	1.002	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3	1.781	1.073	1.269	1.029	1.006	1.005	1.006	1.015	1.029	1.003	1.003	1.005	1.002	1.012	1.007	1.018	1.001	1.000	1.006	1.001	1.000	1.001	1.003	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Dev Factor Sele	.																																				
Industry 1	1.968	1.147	1.054	1.025	1.017	1.010	1.012	1.012	1.010	1.009	1.010	1.009	1.009	1.009	1.008	1.008	1.007	1.007																			
Industry 2		1.281	1.080	1.034	1.020	1.017	1.009	1.011	1.009	1.009	1.006	1.007	1.009	1.008	1.008	1.012	1.007	1.006	1.007	1.006																	
Prior	*1.906*	*1.144*	*1.081*	*1.037*	*1.013*	*1.016*	*1.020*	*1.017*	*1.028*	*1.005*	*1.007*	*1.004*	*1.007*	*1.001*	*1.005*	*1.007*	*1.002*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Selected	1.906	1.137	1.079	1.034	1.011	1.016	1.020	1.009	1.027	1.005	1.003	1.004	1.002	1.001	1.005	1.010	1.002	1.001	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	2.719	1.427	1.255	1.164	1.125	1.113	1.096	1.074	1.065	1.037	1.032	1.029	1.026	1.024	1.023	1.018	1.008	1.005	1.004	1.003	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	36.8%	70.1%	79.7%	85.9%	88.9%	89.8%	91.2%	93.1%	93.9%	96.4%	96.9%	97.1%	97.5%	97.7%	97.8%	98.2%	99.2%	99.5%	99.6%	99.7%	99.8%	99.9%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	126,400	126,400	126,400	126,400	0	0.0%	0	0.0%
6/30/82-83	22,000	22,000	22,000	22,000	0	0.0%	0	0.0%
6/30/83-84	51,000	51,000	51,000	51,000	0	0.0%	0	0.0%
6/30/84-85	163,000	163,000	163,000	163,000	0	0.0%	0	0.0%
6/30/85-86	216,000	216,000	216,000	216,000	0	0.0%	0	0.0%
6/30/86-87	398,000	398,000	398,000	398,000	0	0.0%	0	0.0%
6/30/87-88	348,000	348,000	348,000	348,000	0	0.0%	0	0.0%
6/30/88-89	489,000	489,000	489,000	489,000	0	0.0%	0	0.0%
6/30/89-90	554,000	554,000	554,000	554,000	0	0.0%	0	0.0%
6/30/90-91	302,000	302,000	302,000	302,000	0	0.0%	0	0.0%
6/30/91-92	670,000	670,000	670,000	670,000	0	0.0%	0	0.0%
6/30/92-93	397,172	403,100	397,172	403,100	0	0.0%	0	0.0%
6/30/93-94	709,000	722,325	710,000	723,722	1,000	0.1%	1,398	0.2%
6/30/94-95	421,513	428,400	421,864	428,400	351	0.1%	0	0.0%
6/30/95-96	384,867	390,660	384,867	390,660	0	0.0%	0	0.0%
6/30/96-97	198,000	201,960	198,000	201,960	0	0.0%	0	0.0%
6/30/97-98	499,000	508,980	499,000	508,980	0	0.0%	0	0.0%
6/30/98-99	310,000	310,000	310,000	310,000	0	0.0%	0	0.0%
6/30/99-00	186,000	186,000	186,000	186,000	0	0.0%	0	0.0%
6/30/00-01	207,000	207,000	206,000	206,000	(1,000)	-0.5%	(1,000)	-0.5%
6/30/01-02	232,000	236,640	233,000	237,660	1,000	0.4%	1,020	0.4%
6/30/02-03	230,000	234,600	236,000	240,720	6,000	2.6%	6,120	2.6%
6/30/03-04	302,000	305,020	302,000	305,020	0	0.0%	0	0.0%
6/30/04-05	170,000	179,550	170,000	179,550	0	0.0%	0	0.0%
6/30/05-06	395,000	416,850	395,000	417,900	0	0.0%	1,050	0.3%
6/30/06-07	244,000	246,000	243,000	244,000	(1,000)	-0.4%	(2,000)	-0.8%
6/30/07-08	526,000	559,650	522,000	554,400	(4,000)	-0.8%	(5,250)	-0.9%
6/30/08-09	445,000	471,450	443,000	469,350	(2,000)	-0.4%	(2,100)	-0.4%
6/30/09-10	312,000	332,850	303,000	319,200	(9,000)	-2.9%	(13,650)	-4.1%
6/30/10-11	360,000	381,150	352,000	369,600	(8,000)	-2.2%	(11,550)	-3.0%
6/30/11-12	334,000	355,950	323,000	340,200	(11,000)	-3.3%	(15,750)	-4.4%
6/30/12-13	308,000	332,850	300,000	319,200	(8,000)	-2.6%	(13,650)	-4.1%
6/30/13-14	483,000	526,050	472,000	512,400	(11,000)	-2.3%	(13,650)	-2.6%
6/30/14-15	167,000	208,950	161,000	189,000	(6,000)	-3.6%	(19,950)	-9.5%
6/30/15-16	345,000	371,700	316,000	336,000	(29,000)	-8.4%	(35,700)	-9.6%
6/30/16-17	274,000	328,650	252,000	286,650	(22,000)	-8.0%	(42,000)	-12.8%
6/30/17-18	251,000	363,300	223,000	277,200	(28,000)	-11.2%	(86,100)	-23.7%
6/30/18-19								
Total	12,029,951	12,549,034	11,898,303	12,296,272	(131,649)	-1.1%	(252,762)	-2.0%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 6, Exhibit 2, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
444	100.0%	0.0%	0.0%	0.0%	0.0%	0.981	0.971
432	100.0%	0.0%	0.0%	0.0%	0.0%	0.943	0.916
420	100.0%	0.0%	0.0%	0.0%	0.0%	0.907	0.864
408	100.0%	0.0%	0.0%	0.0%	0.0%	0.872	0.816
396	100.0%	0.0%	0.0%	0.0%	0.0%	0.838	0.769
384	100.0%	0.0%	0.0%	0.0%	0.0%	0.806	0.726
372	100.0%	0.0%	0.0%	0.0%	0.0%	0.775	0.685
360	100.0%	0.0%	0.0%	0.0%	0.0%	0.745	0.646
348	100.0%	0.0%	0.0%	0.0%	0.0%	0.717	0.609
336	100.0%	0.0%	0.0%	0.0%	0.0%	0.689	0.575
324	100.0%	0.0%	0.0%	0.0%	0.0%	0.662	0.542
312	100.0%	0.0%	0.0%	0.0%	0.0%	0.637	0.512
300	100.0%	0.0%	0.0%	0.0%	0.0%	0.612	0.483
288	100.0%	0.0%	0.0%	0.0%	0.0%	0.589	0.455
276	100.0%	0.1%	0.0%	0.0%	0.0%	0.566	0.430
264	99.9%	0.1%	0.1%	0.0%	0.0%	0.884	0.845
252	99.8%	0.1%	0.2%	0.0%	0.0%	0.907	0.874
240	99.7%	0.1%	0.3%	0.0%	0.0%	0.905	0.869
228	99.6%	0.1%	0.4%	0.0%	0.0%	0.896	0.855
216	99.5%	0.2%	0.5%	0.1%	0.1%	0.884	0.838
204	99.2%	1.0%	0.8%	0.5%	0.4%	0.891	0.847
192	98.2%	0.4%	1.8%	0.2%	0.2%	0.927	0.897
180	97.8%	0.1%	2.2%	0.1%	0.0%	0.909	0.871
168	97.7%	0.2%	2.3%	0.1%	0.1%	0.879	0.828
156	97.5%	0.3%	2.5%	0.2%	0.2%	0.855	0.795
144	97.1%	0.2%	2.9%	0.2%	0.1%	0.841	0.777
132	96.9%	0.5%	3.1%	0.3%	0.3%	0.822	0.752
120	96.4%	2.5%	3.6%	1.7%	1.5%	0.816	0.745
108	93.9%	0.8%	6.1%	0.6%	0.5%	0.866	0.813
96	93.1%	1.9%	6.9%	1.4%	1.2%	0.850	0.791
84	91.2%	1.4%	8.8%	1.1%	1.0%	0.852	0.794
72	89.8%	1.0%	10.2%	0.8%	0.7%	0.841	0.780
60	88.9%	2.9%	11.1%	2.4%	2.2%	0.824	0.756
48	85.9%	6.3%	14.1%	5.5%	5.1%	0.831	0.767
36	79.7%	9.6%	20.3%	8.7%	8.3%	0.855	0.800
24	70.1%	33.3%	29.9%	31.4%	30.5%	0.873	0.824
12	36.8%	36.8%	63.2%	36.1%	35.7%	0.914	0.880
Total		100.0%					

NOTES:
(2) = 1 / Section 6, Exhibit 2, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	774	774	0.981	759	759
6/30/83-84	39	39	0.943	37	37
6/30/84-85	275	275	0.907	249	249
6/30/85-86	645	645	0.872	562	562
6/30/86-87	644	644	0.838	539	539
6/30/87-88	71	71	0.806	57	57
6/30/88-89	214	214	0.775	166	166
6/30/89-90	38	38	0.745	28	28
6/30/90-91	303	303	0.717	217	217
6/30/91-92	812	812	0.689	559	559
6/30/92-93	1,976	7,904	0.662	1,309	5,236
6/30/93-94	468	14,191	0.637	298	9,039
6/30/94-95	2,099	8,635	0.612	1,285	5,289
6/30/95-96	1,915	7,708	0.589	1,128	4,539
6/30/96-97	254	4,214	0.566	144	2,386
6/30/97-98	897	10,877	0.884	793	9,611
6/30/98-99	778	778	0.907	706	706
6/30/99-00	834	834	0.905	755	755
6/30/00-01	585	585	0.896	525	525
6/30/01-02	1,581	6,241	0.884	1,398	5,517
6/30/02-03	1,889	6,609	0.891	1,683	5,889
6/30/03-04	5,528	8,548	0.927	5,127	7,927
6/30/04-05	3,650	13,200	0.909	3,319	12,003
6/30/05-06	6,600	29,500	0.879	5,800	25,925
6/30/06-07	6,574	7,574	0.855	5,619	6,474
6/30/07-08	8,884	41,284	0.841	7,474	34,733
6/30/08-09	9,685	36,035	0.822	7,965	29,637
6/30/09-10	11,293	27,493	0.816	9,219	22,444
6/30/10-11	21,622	39,222	0.866	18,720	33,958
6/30/11-12	22,539	39,739	0.850	19,151	33,765
6/30/12-13	26,650	45,850	0.852	22,698	39,050
6/30/13-14	33,542	73,942	0.841	28,214	62,196
6/30/14-15	17,658	45,658	0.824	14,545	37,609
6/30/15-16	44,592	64,592	0.831	37,065	53,690
6/30/16-17	51,072	85,722	0.855	43,673	73,302
6/30/17-18	66,738	120,938	0.873	58,261	105,577
6/30/18-19	180,222	251,172	0.914	164,687	229,522
Total	533,941	1,002,860		464,735	860,477
			(7) Total Discount Factor:	0.870	0.858

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	1	1
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 4%:	0	0

NOTES:
(2), (3) From Section 6, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 6, Exhibit 2, Page 9, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

University of Massachusetts (Medical Center) - Cluster 4
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
Accident Year	Undiscounted Outstanding Losses (Low)	Undiscounted Outstanding Losses (High)	Discount Factor at 6.0%	Discounted Outstanding Losses (Low)	Discounted Outstanding Losses (High)
All Prior Yrs	0	0		0	0
6/30/82-83	774	774	0.971	752	752
6/30/83-84	39	39	0.916	36	36
6/30/84-85	275	275	0.864	238	238
6/30/85-86	645	645	0.816	526	526
6/30/86-87	644	644	0.769	495	495
6/30/87-88	71	71	0.726	52	52
6/30/88-89	214	214	0.685	147	147
6/30/89-90	38	38	0.646	25	25
6/30/90-91	303	303	0.609	185	185
6/30/91-92	812	812	0.575	467	467
6/30/92-93	1,976	7,904	0.542	1,072	4,287
6/30/93-94	468	14,191	0.512	240	7,261
6/30/94-95	2,099	8,635	0.483	1,013	4,168
6/30/95-96	1,915	7,708	0.455	872	3,510
6/30/96-97	254	4,214	0.430	109	1,810
6/30/97-98	897	10,877	0.845	759	9,196
6/30/98-99	778	778	0.874	680	680
6/30/99-00	834	834	0.869	724	724
6/30/00-01	585	585	0.855	501	501
6/30/01-02	1,581	6,241	0.838	1,325	5,228
6/30/02-03	1,889	6,609	0.847	1,600	5,600
6/30/03-04	5,528	8,548	0.897	4,961	7,670
6/30/04-05	3,650	13,200	0.871	3,180	11,500
6/30/05-06	6,600	29,500	0.828	5,467	24,433
6/30/06-07	6,574	7,574	0.795	5,227	6,022
6/30/07-08	8,884	41,284	0.777	6,904	32,082
6/30/08-09	9,685	36,035	0.752	7,282	27,093
6/30/09-10	11,293	27,493	0.745	8,408	20,470
6/30/10-11	21,622	39,222	0.813	17,589	31,907
6/30/11-12	22,539	39,739	0.791	17,831	31,437
6/30/12-13	26,650	45,850	0.794	21,162	36,407
6/30/13-14	33,542	73,942	0.780	26,151	57,648
6/30/14-15	17,658	45,658	0.756	13,349	34,516
6/30/15-16	44,592	64,592	0.767	34,194	49,530
6/30/16-17	51,072	85,722	0.800	40,847	68,559
6/30/17-18	66,738	120,938	0.824	54,992	99,652
6/30/18-19	180,222	251,172	0.880	158,515	220,919
Total	533,941	1,002,860		437,870	805,732
			(7) Total Discount Factor:	0.820	0.803

	Discount Calculation for All Prior Years (Low)	Discount Calculation for All Prior Years (High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	1	1
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 6%:	0	0

NOTES:
(2), (3) From Section 6, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 6, Exhibit 2, Page 9, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		3,019,826			3,022,846	3,034,925	3,020	15,099		
6/30/82-83		743,272	743,635		758,137	773,003	14,865	29,731		
6/30/83-84		917,731	918,155		936,086	954,440	18,355	36,709		
6/30/84-85	357,749	1,492,038	1,492,744	1,493,100	1,521,879	1,551,720	29,841	59,682	0.425	0.434
6/30/85-86	380,112	1,868,907	1,869,836	1,870,156	1,906,285	1,943,663	37,378	74,756	0.502	0.511
6/30/86-87	423,770	2,969,372	2,970,815	2,970,752	2,971,000	2,971,000	1,628	1,628	0.701	0.701
6/30/87-88	480,405	4,397,996	4,400,075	4,400,046	4,400,000	4,419,986	2,004	21,990	0.916	0.920
6/30/88-89	495,261	1,515,210	1,515,870	1,516,256	1,516,000	1,522,786	790	7,576	0.306	0.307
6/30/89-90	502,691	3,850,424	3,852,106	3,851,997	3,852,000	3,869,676	1,576	19,252	0.766	0.770
6/30/90-91	482,143	1,393,607	1,394,195	1,394,192	1,394,000	1,414,511	393	20,904	0.289	0.293
6/30/91-92	492,539	1,393,717	1,395,432	1,395,411	1,395,000	1,463,403	1,283	69,686	0.283	0.297
6/30/92-93	524,541	1,147,496	1,153,923	1,153,816	1,170,446	1,204,871	22,950	57,375	0.223	0.230
6/30/93-94	584,853	1,221,597	1,229,589	1,229,424	1,229,000	1,282,677	7,403	61,080	0.210	0.219
6/30/94-95	587,701	1,817,354	1,829,705	1,829,316	1,829,000	1,908,222	11,646	90,868	0.311	0.325
6/30/95-96	614,868	1,269,047	1,286,898	1,286,700	1,294,428	1,332,499	25,381	63,452	0.211	0.217
6/30/96-97	700,686	1,178,539	1,195,120	1,194,946	1,195,000	1,254,750	16,461	76,211	0.171	0.179
6/30/97-98	684,415	2,427,744	2,460,458	2,459,107	2,459,000	2,460,000	31,256	32,256	0.359	0.359
6/30/98-99	707,796	1,527,690	1,551,451	1,550,757	1,551,000	1,567,000	23,310	39,310	0.219	0.221
6/30/99-00	760,477	1,182,336	1,206,962	1,206,964	1,207,000	1,219,000	24,664	36,664	0.159	0.160
6/30/00-01	811,600	1,747,218	1,797,308	1,795,781	1,796,000	1,797,000	48,782	49,782	0.221	0.221
6/30/01-02	835,038	2,593,253	2,708,435	2,703,067	2,703,000	2,708,000	109,747	114,747	0.324	0.324
6/30/02-03	825,340	1,403,134	1,490,343	1,489,155	1,489,000	1,505,000	85,866	101,866	0.180	0.182
6/30/03-04	849,216	1,490,601	1,606,574	1,605,467	1,605,000	1,623,000	114,399	132,399	0.189	0.191
6/30/04-05	992,508	1,023,563	1,127,848	1,175,562	1,128,000	1,187,000	104,437	163,437	0.114	0.120
6/30/05-06	962,878	1,584,207	1,794,513	1,775,119	1,775,000	1,884,000	190,793	299,793	0.184	0.196
6/30/06-07	1,032,930	968,708	1,115,844	1,211,014	1,116,000	1,211,000	147,292	242,292	0.108	0.117
6/30/07-08	1,063,597	2,647,185	3,037,520	2,947,172	2,947,000	3,038,000	299,815	390,815	0.277	0.286
6/30/08-09	1,073,805	2,011,610	2,405,684	2,349,190	2,231,550	2,406,000	219,940	394,390	0.208	0.224
6/30/09-10	1,084,749	3,372,561	4,116,420	3,789,290	3,599,550	4,116,000	226,989	743,439	0.332	0.379
6/30/10-11	1,134,164	2,443,141	3,043,791	2,949,761	2,802,500	3,044,000	359,359	600,859	0.247	0.268
6/30/11-12	1,202,674	2,318,484	3,045,145	2,943,980	2,796,800	3,045,000	478,316	726,516	0.233	0.253
6/30/12-13	1,284,741	1,968,419	2,741,047	2,787,945	2,603,950	2,788,000	635,531	819,581	0.203	0.217
6/30/13-14	1,346,902	2,120,012	3,200,446	3,170,856	3,012,450	3,264,000	892,438	1,143,988	0.224	0.242
6/30/14-15	1,404,093	1,805,203	2,946,165	3,084,121	2,946,000	3,238,000	1,140,797	1,432,797	0.210	0.231
6/30/15-16	1,454,612	2,026,691	3,767,711	3,642,626	3,643,000	3,768,000	1,616,309	1,741,309	0.250	0.259
6/30/16-17	1,461,588	1,661,705	3,682,619	3,791,706	3,609,340	3,830,000	1,947,635	2,168,295	0.247	0.262
6/30/17-18	1,457,740	1,261,395	4,246,394	4,026,573	3,825,650	4,331,000	2,564,255	3,069,605	0.262	0.297
6/30/18-19	1,500,205	419,549	3,131,475	3,872,879	3,068,380	3,912,000	2,648,831	3,492,451	0.205	0.261
Total	30,558,386	70,200,544	83,472,253	81,914,202	84,306,277	88,843,132	14,105,733	18,642,588		
Tot 6/30/84-19	30,558,386	65,519,715	81,810,463	81,914,202	79,589,208	84,080,764	14,069,493	18,561,049	0.260	0.275

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) Sum of Section 7, Exhibit 1, Page 2, Column 3 and Section 7, Exhibit 1, Page 9, Column 8
(4) From Section 7, Exhibit 1, Page 2, Column 8
(5) From Section 7, Exhibit 1, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim	Average Age
All Prior Yrs		3,004,076							0	0		
6/30/82-83		716,272	1.001	1.000	716,635	27,000	743,635		0	0		
6/30/83-84		837,731	1.001	1.000	838,155	80,000	918,155		0	0		
6/30/84-85	357,749	1,393,062	1.001	1.000	1,393,768	98,976	1,492,744	0.417	0	0		
6/30/85-86	380,112	1,833,907	1.001	1.000	1,834,836	35,000	1,869,836	0.492	0	0		
6/30/86-87	423,770	2,847,872	1.001	1.000	2,849,315	121,500	2,970,815	0.701	1	1	1,443	92
6/30/87-88	480,405	4,103,153	1.001	1.000	4,105,232	294,843	4,400,075	0.916	0	0		
6/30/88-89	495,261	1,302,910	1.001	1.000	1,303,570	212,300	1,515,870	0.306	0	0		
6/30/89-90	502,691	3,320,712	1.001	1.000	3,322,394	529,712	3,852,106	0.766	0	0		
6/30/90-91	482,143	1,160,107	1.001	1.000	1,160,695	233,500	1,394,195	0.289	0	0		
6/30/91-92	492,539	1,137,534	1.002	1.000	1,139,249	256,183	1,395,432	0.283	0	0		
6/30/92-93	524,541	986,496	1.007	1.000	992,923	161,000	1,153,923	0.220	0	0		
6/30/93-94	584,853	1,062,597	1.008	1.000	1,070,589	159,000	1,229,589	0.210	1	1	7,992	59
6/30/94-95	587,701	1,448,149	1.009	1.000	1,460,500	369,205	1,829,705	0.311	1	1	12,351	81
6/30/95-96	614,868	927,586	1.010	1.000	936,433	350,466	1,286,898	0.209	0	0		
6/30/96-97	700,686	923,657	1.011	1.000	933,399	261,721	1,195,120	0.171	0	0		
6/30/97-98	684,415	2,162,744	1.012	1.000	2,187,740	272,719	2,460,458	0.359	2	2	12,498	85
6/30/98-99	707,796	1,322,440	1.014	1.000	1,340,399	211,051	1,551,451	0.219	1	1	17,959	72
6/30/99-00	760,477	844,236	1.019	1.000	859,980	346,982	1,206,962	0.159	0	0		
6/30/00-01	811,600	1,473,716	1.029	1.000	1,516,211	281,098	1,797,308	0.221	1	1	42,494	68
6/30/01-02	835,038	2,150,003	1.047	1.000	2,250,595	457,840	2,708,435	0.324	1	1	100,593	74
6/30/02-03	825,340	1,180,634	1.068	1.000	1,260,336	230,007	1,490,343	0.181	1	1	79,702	68
6/30/03-04	849,216	1,167,101	1.089	1.000	1,271,461	335,113	1,606,574	0.189	0	0		
6/30/04-05	992,508	825,463	1.117	1.000	922,282	205,566	1,127,848	0.114	0	0		
6/30/05-06	962,878	1,338,534	1.150	1.000	1,538,924	255,589	1,794,513	0.186	1	1	200,390	69
6/30/06-07	1,032,930	783,708	1.178	1.000	923,316	192,528	1,115,844	0.108	0	0		
6/30/07-08	1,063,597	1,865,935	1.192	1.000	2,224,897	812,622	3,037,520	0.286	1	1	358,962	76
6/30/08-09	1,073,805	1,681,610	1.225	1.000	2,059,449	346,235	2,405,684	0.224	4	2	188,920	61
6/30/09-10	1,084,749	2,707,061	1.261	1.000	3,412,375	704,046	4,116,420	0.379	6	4	176,328	65
6/30/10-11	1,134,164	1,811,958	1.307	1.000	2,368,154	675,637	3,043,791	0.268	4	3	185,399	61
6/30/11-12	1,202,674	1,883,222	1.354	1.000	2,550,332	494,813	3,045,145	0.253	2	2	333,555	75
6/30/12-13	1,284,741	1,578,972	1.421	1.000	2,243,659	497,388	2,741,047	0.213	4	4	166,172	60
6/30/13-14	1,346,902	1,775,011	1.516	1.000	2,691,001	509,445	3,200,446	0.238	7	5	183,198	50
6/30/14-15	1,404,093	1,507,703	1.627	1.000	2,453,016	493,150	2,946,165	0.210	8	7	135,045	58
6/30/15-16	1,454,612	1,847,511	1.789	1.000	3,306,037	461,674	3,767,711	0.259	19	17	85,796	60
6/30/16-17	1,461,588	1,378,705	2.138	1.000	2,948,224	734,394	3,682,619	0.252	37	19	82,606	55
6/30/17-18	1,457,740	1,261,395	2.860	1.000	3,607,434	638,960	4,246,394	0.291	118	47	49,916	53
6/30/18-19	1,500,205	416,549	6.275	1.000	2,613,657	517,819	3,131,475	0.209		74	29,691	50
Total	30,558,386	59,970,033			70,607,171	12,865,083	83,472,253		220	195		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 7, Exhibit 1, Page 7
(5) Based on information from the MA WCRIB
(6) = (3) x (4) x (5)
(7) From Section 7, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	357,749	0.586	1,393,062	1.001	1,394,124	98,976	1,493,100	0.417	0.390
6/30/85-86	380,112	0.649	1,833,907	1.001	1,835,156	35,000	1,870,156	0.492	0.483
6/30/86-87	423,770	0.643	2,847,872	1.001	2,849,252	121,500	2,970,752	0.701	0.672
6/30/87-88	480,405	0.843	4,103,153	1.001	4,105,203	294,843	4,400,046	0.916	0.855
6/30/88-89	495,261	0.417	1,302,910	1.001	1,303,956	212,300	1,516,256	0.306	0.263
6/30/89-90	502,691	0.618	3,320,712	1.001	3,322,285	529,712	3,851,997	0.766	0.661
6/30/90-91	482,143	0.239	1,160,107	1.001	1,160,692	233,500	1,394,192	0.289	0.241
6/30/91-92	492,539	0.229	1,137,534	1.002	1,139,228	256,183	1,395,411	0.283	0.231
6/30/92-93	524,541	0.186	986,496	1.007	992,816	161,000	1,153,816	0.220	0.189
6/30/93-94	584,853	0.179	1,062,597	1.008	1,070,424	159,000	1,229,424	0.210	0.183
6/30/94-95	587,701	0.241	1,448,149	1.009	1,460,111	369,205	1,829,316	0.311	0.248
6/30/95-96	614,868	0.149	927,586	1.010	936,235	350,466	1,286,700	0.209	0.152
6/30/96-97	700,686	0.131	923,657	1.011	933,225	261,721	1,194,946	0.171	0.133
6/30/97-98	684,415	0.302	2,162,744	1.012	2,186,388	272,719	2,459,107	0.359	0.319
6/30/98-99	707,796	0.182	1,322,440	1.014	1,339,706	211,051	1,550,757	0.219	0.189
6/30/99-00	760,477	0.113	844,236	1.019	859,981	346,982	1,206,964	0.159	0.113
6/30/00-01	811,600	0.180	1,473,716	1.029	1,514,683	281,098	1,795,781	0.221	0.187
6/30/01-02	835,038	0.255	2,150,003	1.047	2,245,227	457,840	2,703,067	0.324	0.269
6/30/02-03	825,340	0.150	1,180,634	1.068	1,259,148	230,007	1,489,155	0.180	0.153
6/30/03-04	849,216	0.148	1,167,101	1.089	1,270,353	335,113	1,605,467	0.189	0.150
6/30/04-05	992,508	0.139	825,463	1.117	969,995	205,566	1,175,562	0.118	0.098
6/30/05-06	962,878	0.144	1,338,534	1.150	1,519,530	255,589	1,775,119	0.184	0.158
6/30/06-07	1,032,930	0.150	783,708	1.178	1,018,486	192,528	1,211,014	0.117	0.099
6/30/07-08	1,063,597	0.157	1,865,935	1.192	2,134,550	812,622	2,947,172	0.277	0.201
6/30/08-09	1,073,805	0.163	1,681,610	1.225	2,002,954	346,235	2,349,190	0.219	0.187
6/30/09-10	1,084,749	0.169	2,707,061	1.261	3,085,244	704,046	3,789,290	0.349	0.284
6/30/10-11	1,134,164	0.174	1,811,958	1.307	2,274,124	675,637	2,949,761	0.260	0.201
6/30/11-12	1,202,674	0.180	1,883,222	1.354	2,449,167	494,813	2,943,980	0.245	0.204
6/30/12-13	1,284,741	0.187	1,578,972	1.421	2,290,556	497,388	2,787,945	0.217	0.178
6/30/13-14	1,346,902	0.193	1,775,011	1.516	2,661,410	509,445	3,170,856	0.235	0.198
6/30/14-15	1,404,093	0.200	1,507,703	1.627	2,590,972	493,150	3,084,121	0.220	0.185
6/30/15-16	1,454,612	0.208	1,847,511	1.789	3,180,952	461,674	3,642,626	0.250	0.219
6/30/16-17	1,461,588	0.216	1,378,705	2.138	3,057,311	734,394	3,791,706	0.259	0.209
6/30/17-18	1,457,740	0.224	1,261,395	2.860	3,387,613	638,960	4,026,573	0.276	0.232
6/30/18-19	1,500,205	0.233	416,549	6.275	3,355,061	517,819	3,872,879	0.258	0.224
Total	30,558,386		55,411,954		69,156,120	12,758,083	81,914,202		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 7, Exhibit 1, Page 4, Column 11
(4) From Section 7, Exhibit 1, Page 2, Column 3
(5) From Section 7, Exhibit 1, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) From Section 7, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.586	0.586
6/30/85-86									0.649	0.649
6/30/86-87									0.643	0.643
6/30/87-88									0.843	0.843
6/30/88-89									0.417	0.417
6/30/89-90									0.618	0.618
6/30/90-91	482,143	1,160,695	0.241	0.996	0.240	2.357	0.565	0.102	0.240	0.239
6/30/91-92	492,539	1,139,249	0.231	1.093	0.253	2.288	0.578	0.096	0.230	0.229
6/30/92-93	524,541	992,923	0.189	1.275	0.241	2.221	0.536	0.085	0.187	0.186
6/30/93-94	584,853	1,070,589	0.183	1.258	0.230	2.157	0.497	0.088	0.177	0.179
6/30/94-95	587,701	1,460,500	0.249	1.247	0.310	2.094	0.649	0.092	0.235	0.241
6/30/95-96	614,868	936,433	0.152	1.237	0.188	2.033	0.383	0.095	0.150	0.149
6/30/96-97	700,686	933,399	0.133	1.224	0.163	1.974	0.322	0.099	0.132	0.131
6/30/97-98	684,415	2,187,740	0.320	1.209	0.386	1.916	0.740	0.104	0.294	0.302
6/30/98-99	707,796	1,340,399	0.189	1.193	0.226	1.860	0.420	0.108	0.180	0.182
6/30/99-00	760,477	859,980	0.113	1.174	0.133	1.806	0.240	0.113	0.116	0.113
6/30/00-01	811,600	1,516,211	0.187	1.144	0.214	1.754	0.375	0.120	0.182	0.180
6/30/01-02	835,038	2,250,595	0.270	1.122	0.302	1.702	0.515	0.126	0.256	0.255
6/30/02-03	825,340	1,260,336	0.153	1.118	0.171	1.653	0.282	0.130	0.156	0.150
6/30/03-04	849,216	1,271,461	0.150	1.118	0.167	1.605	0.268	0.134	0.155	0.148
6/30/04-05	992,508	922,282	0.093	1.111	0.103	1.558	0.161	0.139	0.152	0.139
6/30/05-06	962,878	1,538,924	0.160	1.099	0.176	1.513	0.266	0.144	0.157	0.144
6/30/06-07	1,032,930	923,316	0.089	1.087	0.097	1.469	0.143	0.150	0.162	0.150
6/30/07-08	1,063,597	2,224,897	0.209	1.075	0.225	1.426	0.321	0.157	0.167	0.157
6/30/08-09	1,073,805	2,059,449	0.192	1.063	0.204	1.384	0.282	0.163	0.172	0.163
6/30/09-10	1,084,749	3,412,375	0.315	1.059	0.333	1.344	0.448	0.169	0.176	0.169
6/30/10-11	1,134,164	2,368,154	0.209	1.060	0.221	1.305	0.289	0.174	0.179	0.174
6/30/11-12	1,202,674	2,550,332	0.212	1.053	0.223	1.267	0.283	0.180	0.184	0.180
6/30/12-13	1,284,741	2,243,659	0.175	1.044	0.182	1.230	0.224	0.187	0.190	0.187
6/30/13-14	1,346,902	2,691,001	0.200	1.040	0.208	1.194	0.248	0.193	0.194	0.193
6/30/14-15	1,404,093	2,453,016	0.175	1.034	0.181	1.159	0.209	0.200	0.199	0.200
6/30/15-16	1,454,612	3,306,037	0.227	1.026	0.233	1.126	0.263	0.208	0.205	0.208
6/30/16-17	1,461,588	2,948,224	0.202	1.018	0.205	1.093	0.224	0.216	0.210	0.216
6/30/17-18	1,457,740	3,607,434	0.247	1.009	0.250	1.061	0.265	0.224	0.216	0.224
6/30/18-19	1,500,205	2,613,657	0.174	1.000	0.174	1.030	0.179	0.233		0.233
Total	27,918,398	54,243,265								

Trend Last 4 (ex 18-19):	8.8%	Avg 3 (ex 18-19):	0.251
Trend Last 8 (ex 18-19):	1.2%	Avg 5 (ex 18-19):	0.242
Trend Last 12 (ex 18-19):	2.5%	Avg 10 (ex 18-19):	0.273
Prior Selected Trend:	2.0%	Prior Sel Avg:	0.220
Selected Trend:	3.0%	Sel. Loss Cost:	0.240

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 7, Exhibit 1, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCRIB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.950	
(2)	Credibility		16%	
(3)	Average Pmt Trend Statewide		0.950	
(4)	Credibility Weighted Trend		0.950	
		(Low)		(High)
(5)	Selected Range	0.945		0.960
(6)	Incremental Paid for 2019	0		0
(7)	Estimated Reserve	0		0
(8)	Paid to Date (82 & Prior)	3,004,076		3,004,076
(9)	Est Ult Paid for 1982 & Prior	3,004,076		3,004,076

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	0	0
(11)	Projected Number of Years	4	4
(12)	Estimated Reserve	0	0
(13)	Paid to Date (82 & Prior)	3,004,076	3,004,076
(14)	Est Ult Paid for 1982 & Prior	3,004,076	3,004,076
(14a)	Paid Counts During Fiscal Year	0	0

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	3,004,076	3,004,076
(16)	Lump Sum Ultimates	15,750	15,750
(17)	Ult Loss Including Lump Sums	**3,019,826**	**3,019,826**
(18)	Implied Tail	1.000	1.000
(19)	Ult Loss Inc Lump Sums @ 6/18	3,019,826	3,019,826

NOTES:

(1) From Section 7, Exhibit 1, Page 6
(2) = (Average of Section 7, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 7, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 7, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 7, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	96,383	11.476			
1993	2	98,686	11.500	1.024		
1994	3	90,507	11.413	0.917		
1995	4	91,599	11.425	1.012		
1996	5	82,524	11.321	0.901		
1997	6	95,179	11.464	1.153		
1998	7	100,117	11.514	1.052		
1999	8	101,445	11.527	1.013		
2000	9	91,541	11.425	0.902	n =	23
2001	10	95,087	11.463	1.039	S(x) =	46,069
2002	11	101,860	11.531	1.071	S(x-sq) =	92,277,219
2003	12	103,466	11.547	1.016	S(xy) =	519,929
2004	13	103,217	11.545	0.998	S(y) =	260
2005	14	106,270	11.574	1.030	D =	23,276
2006	15	111,087	11.618	1.045	slope =	-0.045
2007	16	115,666	11.658	1.041	Avg Trend =	0.955
2008	17	120,810	11.702	1.044		
2009	18	85,560	11.357	0.708		
2010	19	71,175	11.173	0.832		
2011	20	70,876	11.169	0.996		
2012	21	42,013	10.646	0.593		
2013	22	45,160	10.718	1.075		
2014	23	6,860	8.833	0.152		
2015	24	0				
2016	25	0				
2017	26	0				
2018	27	0				
2019	28	0				
					Selected Trend:	**0.950**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2014: 0.152 = 6860 / 45160

Commonwealth of Massachusetts Workers Compensation
Massachusetts Colleges & Universities - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
June-83	54,010	142,576	208,148	264,888	314,931	357,219	371,053	469,928	488,830	527,760	553,935	571,859	597,183	632,418	652,652	668,547	668,547	676,026	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272
June-84	99,917	266,707	383,604	485,764	576,711	646,670	708,919	756,240	783,256	798,348	807,607	799,910	809,636	819,761	830,411	841,202	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	
June-85	145,363	376,000	561,409	702,017	806,337	944,094	1,041,045	1,113,616	1,165,340	1,204,638	1,251,307	1,274,495	1,298,633	1,324,024	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062		
June-86	146,844	393,892	560,427	714,824	852,275	1,013,300	1,126,822	1,223,737	1,303,796	1,350,669	1,397,048	1,447,454	1,502,391	1,555,201	1,632,671	1,697,735	1,756,102	1,781,294	1,805,911	1,830,855	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907			
June-87	205,350	542,065	782,031	964,915	1,140,809	1,261,213	1,366,787	1,443,695	1,510,844	1,568,560	1,627,834	1,689,585	1,754,007	1,801,170	1,862,691	1,928,482	1,995,204	2,043,636	2,086,293	2,127,530	2,170,638	2,215,734	2,269,157	2,341,746	2,389,183	2,436,751	2,486,729	2,537,563	2,590,111	2,644,957	2,708,228	2,776,870	2,847,872				
June-88	264,730	647,871	957,840	1,332,415	1,600,031	1,789,064	2,016,553	2,143,780	2,273,154	2,384,070	2,485,765	2,581,511	2,687,118	2,803,766	2,927,359	3,052,144	3,156,171	3,229,466	3,302,225	3,377,918	3,456,925	3,541,131	3,624,626	3,707,957	3,794,835	3,883,619	3,973,595	4,049,675	4,101,999	4,103,153	4,103,153	4,103,153					
June-89	203,700	458,930	663,759	873,071	1,047,827	1,143,271	1,198,464	1,232,178	1,250,874	1,282,165	1,292,717	1,298,047	1,302,239	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910						
June-90	251,034	593,345	877,389	1,070,415	1,170,169	1,310,507	1,405,772	1,541,316	1,646,975	1,785,002	1,902,032	2,022,921	2,130,629	2,240,435	2,354,155	2,465,796	2,583,494	2,694,389	2,807,976	2,928,761	3,000,834	3,057,656	3,117,154	3,198,892	3,277,762	3,320,712	3,320,712	3,320,712	3,320,712	3,320,712							
June-91	210,725	476,992	661,310	747,971	826,820	877,501	964,982	1,043,288	1,062,987	1,078,493	1,092,473	1,107,416	1,121,900	1,136,365	1,154,741	1,159,007	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107								
June-92	230,185	473,793	612,524	709,857	752,262	788,923	831,701	862,151	886,987	914,044	968,299	997,727	1,032,093	1,067,423	1,093,472	1,120,923	1,133,758	1,133,853	1,135,353	1,135,353	1,135,353	1,136,695	1,136,695	1,136,799	1,137,283	1,137,534	1,137,534	1,137,534									
June-93	250,714	541,198	609,220	695,349	761,795	896,967	969,498	986,209	986,209	986,209	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496										
June-94	142,078	335,638	434,332	540,452	602,360	665,759	700,338	683,894	702,764	722,297	742,006	760,225	779,419	799,569	819,773	841,452	863,666	885,787	907,933	930,019	952,106	974,192	996,338	1,018,425	1,040,511	1,062,597											
June-95	115,982	327,962	450,743	510,570	656,919	704,734	751,757	811,410	863,231	899,192	899,252	902,615	916,017	958,344	1,001,523	1,046,791	1,090,356	1,133,473	1,179,286	1,223,263	1,267,764	1,313,000	1,358,170	1,404,158	1,448,149												
June-96	206,256	426,449	543,267	632,734	711,202	763,750	825,421	867,895	906,744	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586													
June-97	184,229	328,446	444,786	555,024	612,566	653,987	680,550	699,551	720,522	739,692	759,525	784,015	805,205	826,592	851,586	873,746	896,010	918,427	923,657	923,657	923,657	923,657	923,657														
June-98	204,733	326,969	438,428	556,503	656,266	750,818	946,526	1,035,878	1,116,871	1,200,899	1,288,861	1,378,390	1,471,075	1,560,882	1,640,371	1,713,867	1,786,522	1,860,045	1,934,781	2,009,408	2,085,383	2,162,744															
June-99	178,965	393,824	642,327	727,290	775,010	801,143	828,610	857,804	888,093	943,651	979,256	1,011,764	1,044,136	1,077,612	1,111,519	1,145,659	1,180,206	1,215,323	1,250,390	1,286,089	1,322,440																
June-00	277,497	570,937	719,211	779,101	816,241	839,009	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236																	
June-01	211,269	540,991	786,054	907,942	982,546	1,034,355	1,086,105	1,123,788	1,153,822	1,184,076	1,214,203	1,245,356	1,276,910	1,308,682	1,340,850	1,373,532	1,406,664	1,439,888	1,473,716																		
June-02	189,348	645,495	949,546	1,190,744	1,315,603	1,438,839	1,509,596	1,578,992	1,633,082	1,686,943	1,742,639	1,799,055	1,855,859	1,913,344	1,971,775	2,030,119	2,089,520	2,150,003																			
June-03	291,166	554,149	689,280	758,177	839,325	895,935	923,456	950,915	977,016	1,004,005	1,031,413	1,059,708	1,087,564	1,115,879	1,144,152	1,172,937	1,180,634																				
June-04	217,692	487,010	658,712	817,060	1,008,366	1,101,139	1,150,675	1,163,453	1,163,453	1,163,453	1,163,453	1,167,101	1,167,101	1,167,101	1,167,101	1,167,101																					
June-05	230,521	418,799	624,539	726,139	780,814	805,681	824,654	825,393	825,463	825,463	825,463	825,463	825,463	825,463	825,463																						
June-06	295,643	638,840	855,565	960,239	1,005,254	1,031,933	1,059,134	1,097,733	1,118,317	1,164,085	1,206,474	1,273,089	1,306,981	1,338,534																							
June-07	271,385	517,910	631,652	710,911	719,279	741,612	769,416	783,708	783,708	783,708	783,708	783,708	783,708																								
June-08	266,597	683,370	951,226	1,163,168	1,327,356	1,479,040	1,567,518	1,628,952	1,687,167	1,743,580	1,803,467	1,865,935																									
June-09	286,738	569,698	809,591	1,006,874	1,150,080	1,267,290	1,367,159	1,453,260	1,515,587	1,628,227	1,681,610																										
June-10	418,176	997,028	1,315,276	1,658,156	1,884,889	2,102,819	2,299,652	2,447,833	2,579,668	2,707,061																											
June-11	441,106	954,293	1,366,571	1,466,786	1,533,060	1,599,427	1,689,571	1,770,369	1,811,958																												
June-12	412,473	870,425	1,295,826	1,604,006	1,727,037	1,778,724	1,830,824	1,883,222																													
June-13	360,464	710,865	979,073	1,207,494	1,361,567	1,482,689	1,578,972																														
June-14	466,274	972,487	1,248,894	1,467,060	1,636,242	1,775,011																															
June-15	513,416	935,315	1,168,489	1,350,939	1,507,703																																
June-16	552,170	1,131,899	1,487,788	1,847,511																																	
June-17	423,610	977,257	1,378,705																																		
June-18	619,145	1,261,395																																			
June-19	416,549																																				

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
June-83	2.640	1.460	1.273	1.189	1.134	1.039	1.266	1.040	1.080	1.050	1.032	1.044	1.059	1.032	1.024	1.000	1.011	1.060	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.669	1.438	1.266	1.187	1.121	1.096	1.067	1.036	1.019	1.012	0.990	1.012	1.013	1.013	1.013	0.996	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.587	1.493	1.250	1.149	1.171	1.103	1.070	1.046	1.034	1.039	1.019	1.019	1.020	1.052	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-86	2.682	1.423	1.275	1.192	1.189	1.112	1.086	1.065	1.036	1.034	1.036	1.038	1.035	1.050	1.040	1.034	1.014	1.014	1.014	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.640	1.443	1.234	1.182	1.106	1.084	1.056	1.047	1.038	1.038	1.038	1.038	1.027	1.034	1.035	1.035	1.024	1.021	1.020	1.020	1.021	1.024	1.032	1.020	1.020	1.021	1.020	1.021	1.021	1.024	1.025	1.026				
June-88	2.447	1.478	1.391	1.201	1.118	1.127	1.063	1.060	1.049	1.043	1.039	1.041	1.043	1.044	1.043	1.034	1.023	1.023	1.023	1.023	1.024	1.024	1.023	1.023	1.023	1.023	1.019	1.013	1.000	1.000	1.000					
June-89	2.253	1.446	1.315	1.200	1.091	1.048	1.028	1.015	1.025	1.008	1.004	1.003	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
June-90	2.364	1.479	1.220	1.093	1.120	1.073	1.096	1.069	1.084	1.066	1.064	1.053	1.052	1.051	1.047	1.048	1.043	1.042	1.043	1.025	1.019	1.019	1.026	1.025	1.013	1.000	1.000	1.000	1.000							
June-91	2.264	1.386	1.131	1.105	1.061	1.100	1.081	1.019	1.015	1.013	1.014	1.013	1.013	1.016	1.004	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
June-92	2.058	1.293	1.159	1.060	1.049	1.054	1.037	1.029	1.031	1.059	1.030	1.034	1.034	1.024	1.025	1.011	1.000	1.001	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000									
June-93	2.159	1.126	1.141	1.096	1.177	1.081	1.017	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	2.362	1.294	1.244	1.115	1.105	1.052	0.977	1.028	1.028	1.027	1.025	1.025	1.026	1.025	1.026	1.026	1.026	1.025	1.024	1.024	1.023	1.023	1.022	1.022	1.021											
June-95	2.828	1.374	1.133	1.287	1.073	1.067	1.079	1.064	1.042	1.000	1.004	1.015	1.046	1.045	1.045	1.042	1.040	1.040	1.037	1.036	1.036	1.034	1.034	1.031												
June-96	2.068	1.274	1.165	1.124	1.074	1.081	1.051	1.045	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	1.783	1.354	1.248	1.104	1.068	1.041	1.028	1.030	1.027	1.027	1.032	1.027	1.027	1.030	1.026	1.025	1.025	1.006	1.000	1.000	1.000	1.000														
June-98	1.597	1.341	1.269	1.179	1.144	1.261	1.094	1.078	1.075	1.073	1.069	1.067	1.061	1.051	1.045	1.042	1.041	1.040	1.039	1.038	1.037															
June-99	2.201	1.631	1.132	1.066	1.034	1.034	1.035	1.035	1.063	1.038	1.033	1.032	1.032	1.031	1.031	1.030	1.030	1.029	1.029	1.028																
June-00	2.057	1.260	1.083	1.048	1.028	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
June-01	2.561	1.453	1.155	1.082	1.053	1.050	1.035	1.027	1.026	1.025	1.026	1.025	1.025	1.025	1.024	1.024	1.024	1.023																		
June-02	3.409	1.471	1.254	1.105	1.094	1.049	1.046	1.034	1.033	1.033	1.032	1.032	1.031	1.031	1.030	1.029	1.029																			
June-03	1.903	1.244	1.100	1.107	1.067	1.031	1.030	1.027	1.028	1.027	1.027	1.026	1.026	1.025	1.025	1.007																				
June-04	2.237	1.353	1.240	1.234	1.092	1.045	1.011	1.000	1.000	1.000	1.003	1.000	1.000	1.000	1.000																					
June-05	1.817	1.491	1.163	1.075	1.032	1.024	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
June-06	2.161	1.339	1.122	1.047	1.027	1.026	1.036	1.019	1.041	1.036	1.055	1.027	1.024																							
June-07	1.908	1.220	1.125	1.012	1.031	1.037	1.019	1.000	1.000	1.000	1.000	1.000																								
June-08	2.563	1.392	1.223	1.141	1.114	1.060	1.039	1.036	1.033	1.034	1.035																									
June-09	1.987	1.421	1.244	1.142	1.102	1.079	1.063	1.043	1.074	1.033																										
June-10	2.384	1.319	1.261	1.137	1.116	1.094	1.064	1.054	1.049																											
June-11	2.163	1.432	1.073	1.045	1.043	1.056	1.048	1.023																												
June-12	2.110	1.489	1.238	1.077	1.030	1.029	1.029																													
June-13	1.972	1.377	1.233	1.128	1.089	1.065																														
June-14	2.086	1.284	1.175	1.115	1.085																															
June-15	1.822	1.249	1.156	1.116																																
June-16	2.050	1.314	1.242																																	
June-17	2.307	1.411																																		
June-18	2.037																																			

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*To Ult*
Simple Avg																																					
All Yrs	2.254	1.379	1.204	1.125	1.089	1.068	1.052	1.033	1.034	1.027	1.023	1.023	1.025	1.025	1.022	1.018	1.016	1.017	1.013	1.012	1.010	1.008	1.010	1.009	1.006	1.004	1.004	1.004	1.003	1.003	1.004	1.005	1.000	1.000	1.000	1.000	
Latest 5	2.060	1.327	1.209	1.096	1.073	1.065	1.049	1.031	1.040	1.021	1.019	1.011	1.016	1.016	1.016	1.018	1.025	1.020	1.013	1.020	1.019	1.011	1.011	1.011	1.007	1.000	1.004	1.007	1.004	1.005	1.005	1.005					
Latest 3	2.131	1.325	1.191	1.120	1.068	1.050	1.047	1.040	1.052	1.022	1.030	1.009	1.008	1.008	1.018	1.020	1.018	1.017	1.022	1.022	1.012	1.011	1.019	1.018	1.007	1.000	1.000	1.000	1.000	1.008	1.008	1.009	1.000	1.000			
Volume Wtd																																					
All Yrs	2.184	1.372	1.202	1.121	1.087	1.069	1.050	1.036	1.037	1.029	1.027	1.026	1.027	1.029	1.026	1.023	1.020	1.019	1.017	1.015	1.014	1.012	1.014	1.013	1.010	1.007	1.007	1.006	1.003	1.005	1.006	1.009	1.000	1.000	1.000		
Latest 5	2.050	1.325	1.210	1.094	1.073	1.065	1.049	1.036	1.045	1.025	1.023	1.012	1.019	1.019	1.019	1.021	1.028	1.024	1.019	1.025	1.024	1.013	1.013	1.012	1.009	1.000	1.007	1.008	1.004	1.006	1.006						
Latest 3	2.113	1.325	1.195	1.119	1.066	1.049	1.048	1.042	1.051	1.027	1.034	1.012	1.010	1.009	1.020	1.022	1.022	1.020	1.027	1.027	1.020	1.014	1.021	1.019	1.007	1.000	1.000	1.000	1.000	1.008	1.008	1.012	1.000				

Dev Factor Selection																																					
Industry 1	2.958	1.587	1.232	1.108	1.038	1.023	1.014	1.008	1.006	1.007	1.006	1.010	1.003	1.004	1.003	1.003	1.005	1.003																			
Industry 2		1.877	1.312	1.143	1.055	1.028	1.016	1.015	1.006	1.005	1.007	1.007	1.004	1.002	1.005	1.002	1.003	1.002	1.001	1.001																	
Prior	*2.194*	*1.337*	*1.195*	*1.100*	*1.075*	*1.067*	*1.051*	*1.037*	*1.036*	*1.029*	*1.027*	*1.019*	*1.025*	*1.030*	*1.027*	*1.028*	*1.019*	*1.023*	*1.010*	*1.005*	*1.002*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.005*	*1.001*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.001*	
Selected	2.194	1.337	1.195	1.100	1.073	1.067	1.049	1.036	1.037	1.029	1.027	1.012	1.025	1.029	1.026	1.021	1.020	1.017	1.010	1.005	1.002	1.001	1.001	1.001	1.001	1.001	1.005	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001
FacToUlt	6.275	2.860	2.138	1.789	1.627	1.516	1.421	1.354	1.307	1.261	1.225	1.192	1.178	1.150	1.117	1.089	1.068	1.047	1.029	1.019	1.014	1.012	1.011	1.010	1.009	1.008	1.007	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
Percent of Ult	15.9%	35.0%	46.8%	55.9%	61.5%	66.0%	70.4%	73.8%	76.5%	79.3%	81.7%	83.9%	84.9%	87.0%	89.5%	91.8%	93.7%	95.5%	97.2%	98.2%	98.7%	98.9%	99.0%	99.1%	99.2%	99.3%	99.4%	99.8%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	3,022,846	3,034,925	3,022,846	3,034,925	0	0.0%	0	0.0%
6/30/82-83	758,137	773,003	758,137	773,003	0	0.0%	0	0.0%
6/30/83-84	936,086	954,440	936,086	954,440	0	0.0%	0	0.0%
6/30/84-85	1,521,879	1,551,720	1,521,879	1,551,720	0	0.0%	0	0.0%
6/30/85-86	1,906,285	1,943,663	1,906,285	1,943,663	0	0.0%	0	0.0%
6/30/86-87	2,900,000	3,039,000	2,971,000	2,971,000	71,000	2.4%	(68,000)	-2.2%
6/30/87-88	4,401,000	4,419,986	4,400,000	4,419,986	(1,000)	0.0%	0	0.0%
6/30/88-89	1,516,000	1,522,786	1,516,000	1,522,786	0	0.0%	0	0.0%
6/30/89-90	3,853,000	3,869,676	3,852,000	3,869,676	(1,000)	0.0%	0	0.0%
6/30/90-91	1,396,000	1,414,511	1,394,000	1,414,511	(2,000)	-0.1%	0	0.0%
6/30/91-92	1,401,000	1,463,403	1,395,000	1,463,403	(6,000)	-0.4%	0	0.0%
6/30/92-93	1,170,446	1,204,871	1,170,446	1,204,871	0	0.0%	0	0.0%
6/30/93-94	1,208,000	1,259,486	1,229,000	1,282,677	21,000	1.7%	23,190	1.8%
6/30/94-95	1,797,000	1,862,031	1,829,000	1,908,222	32,000	1.8%	46,191	2.5%
6/30/95-96	1,294,428	1,332,499	1,294,428	1,332,499	0	0.0%	0	0.0%
6/30/96-97	1,196,000	1,255,800	1,195,000	1,254,750	(1,000)	-0.1%	(1,050)	-0.1%
6/30/97-98	2,385,000	2,387,000	2,459,000	2,460,000	74,000	3.1%	73,000	3.1%
6/30/98-99	1,521,000	1,537,000	1,551,000	1,567,000	30,000	2.0%	30,000	2.0%
6/30/99-00	1,216,000	1,228,000	1,207,000	1,219,000	(9,000)	-0.7%	(9,000)	-0.7%
6/30/00-01	1,796,000	1,798,000	1,796,000	1,797,000	0	0.0%	(1,000)	-0.1%
6/30/01-02	2,693,000	2,700,000	2,703,000	2,708,000	10,000	0.4%	8,000	0.3%
6/30/02-03	1,472,000	1,488,000	1,489,000	1,505,000	17,000	1.2%	17,000	1.1%
6/30/03-04	1,656,000	1,674,000	1,605,000	1,623,000	(51,000)	-3.1%	(51,000)	-3.0%
6/30/04-05	1,169,000	1,259,000	1,128,000	1,187,000	(41,000)	-3.5%	(72,000)	-5.7%
6/30/05-06	1,809,000	1,909,000	1,775,000	1,884,000	(34,000)	-1.9%	(25,000)	-1.3%
6/30/06-07	1,148,000	1,276,000	1,116,000	1,211,000	(32,000)	-2.8%	(65,000)	-5.1%
6/30/07-08	2,977,000	3,073,000	2,947,000	3,038,000	(30,000)	-1.0%	(35,000)	-1.1%
6/30/08-09	2,270,500	2,446,000	2,231,550	2,406,000	(38,950)	-1.7%	(40,000)	-1.6%
6/30/09-10	3,566,300	4,136,000	3,599,550	4,116,000	33,250	0.9%	(20,000)	-0.5%
6/30/10-11	2,839,550	3,103,000	2,802,500	3,044,000	(37,050)	-1.3%	(59,000)	-1.9%
6/30/11-12	2,885,150	3,175,000	2,796,800	3,045,000	(88,350)	-3.1%	(130,000)	-4.1%
6/30/12-13	2,692,300	2,883,000	2,603,950	2,788,000	(88,350)	-3.3%	(95,000)	-3.3%
6/30/13-14	3,018,150	3,285,000	3,012,450	3,264,000	(5,700)	-0.2%	(21,000)	-0.6%
6/30/14-15	2,998,000	3,302,000	2,946,000	3,238,000	(52,000)	-1.7%	(64,000)	-1.9%
6/30/15-16	3,647,000	3,798,000	3,643,000	3,768,000	(4,000)	-0.1%	(30,000)	-0.8%
6/30/16-17	3,498,000	3,637,000	3,609,340	3,830,000	111,340	3.2%	193,000	5.3%
6/30/17-18	4,088,000	4,790,000	3,825,650	4,331,000	(262,350)	-6.4%	(459,000)	-9.6%
6/30/18-19								
Total	81,623,057	85,785,801	81,237,897	84,931,132	(385,160)	-0.5%	(854,669)	-1.0%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 7, Exhibit 1, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	3,004,076	1.000	3,004,076	0.0%	0.0%	0	15,750	15,750	0.5%	1.000	15,750	15,750	15,750
6/30/82-83	716,272	1.001	716,635	0.0%	0.0%	0	27,000	27,000	3.8%	1.000	27,000	27,000	27,000
6/30/83-84	837,731	1.001	838,155	0.0%	0.0%	0	80,000	80,000	9.5%	1.000	80,000	80,000	80,000
6/30/84-85	1,393,062	1.001	1,393,768	0.0%	0.0%	0	98,976	98,976	7.1%	1.000	98,976	98,976	98,976
6/30/85-86	1,833,907	1.001	1,834,836	0.0%	0.0%	0	35,000	35,000	1.9%	1.000	35,000	35,000	35,000
6/30/86-87	2,847,872	1.001	2,849,315	0.0%	0.0%	0	121,500	121,500	4.3%	1.000	121,500	121,500	121,500
6/30/87-88	4,103,153	1.001	4,105,232	0.0%	0.0%	0	294,843	294,843	7.2%	1.000	294,843	294,843	294,843
6/30/88-89	1,302,910	1.001	1,303,570	0.0%	0.0%	0	212,300	212,300	16.3%	1.000	212,300	212,300	212,300
6/30/89-90	3,320,712	1.001	3,322,394	0.0%	0.0%	0	529,712	529,712	15.9%	1.000	529,712	529,712	529,712
6/30/90-91	1,160,107	1.001	1,160,695	0.0%	0.0%	0	233,500	233,500	20.1%	1.000	233,500	233,500	233,500
6/30/91-92	1,137,534	1.002	1,139,249	0.0%	0.0%	0	256,183	256,183	22.5%	1.000	256,183	256,183	256,183
6/30/92-93	986,496	1.007	992,923	0.0%	0.0%	0	161,000	161,000	16.2%	1.000	161,000	161,000	161,000
6/30/93-94	1,062,597	1.008	1,070,589	0.0%	0.0%	0	159,000	159,000	14.9%	1.000	159,000	159,000	159,000
6/30/94-95	1,448,149	1.009	1,460,500	0.0%	0.0%	0	369,205	369,205	25.3%	1.000	369,205	369,205	379,144
6/30/95-96	927,586	1.010	936,433	0.1%	0.1%	936	341,461	342,397	36.6%	1.050	358,534	350,466	350,466
6/30/96-97	923,657	1.011	933,399	0.0%	0.1%	933	254,882	255,815	27.4%	1.050	267,626	261,721	261,721
6/30/97-98	2,162,744	1.012	2,187,740	0.0%	0.1%	2,188	265,000	267,188	12.2%	1.050	278,250	272,719	272,682
6/30/98-99	1,322,440	1.014	1,340,399	0.0%	0.1%	1,340	205,250	206,590	15.4%	1.050	215,513	211,051	211,036
6/30/99-00	844,236	1.019	859,980	0.0%	0.1%	860	338,100	338,960	39.4%	1.050	355,005	346,982	346,987
6/30/00-01	1,473,716	1.029	1,516,211	0.0%	0.1%	1,516	273,502	275,018	18.1%	1.050	287,177	281,098	282,650
6/30/01-02	2,150,003	1.047	2,250,595	0.0%	0.1%	2,251	443,250	445,501	19.8%	1.061	470,179	457,840	458,203
6/30/02-03	1,180,634	1.068	1,260,336	0.0%	0.1%	1,260	222,500	223,760	17.8%	1.062	236,254	230,007	179,360
6/30/03-04	1,167,101	1.089	1,271,461	0.1%	0.2%	2,543	323,500	326,043	25.6%	1.064	344,184	335,113	335,605
6/30/04-05	825,463	1.117	922,282	0.0%	0.2%	1,845	198,100	199,945	21.7%	1.066	211,188	205,566	205,877
6/30/05-06	1,338,534	1.150	1,538,924	0.0%	0.2%	3,078	245,673	248,751	16.2%	1.068	262,427	255,589	256,080
6/30/06-07	783,708	1.178	923,316	0.0%	0.2%	1,847	185,000	186,847	20.2%	1.071	198,209	192,528	192,913
6/30/07-08	1,865,935	1.192	2,224,897	0.0%	0.2%	4,450	781,250	785,700	35.3%	1.075	839,544	812,622	817,972
6/30/08-09	1,681,610	1.225	2,059,449	0.0%	0.2%	4,119	330,000	334,119	16.2%	1.086	358,352	346,235	350,244
6/30/09-10	2,707,061	1.261	3,412,375	0.1%	0.3%	11,243	665,500	676,743	19.8%	1.099	731,348	704,046	697,119
6/30/10-11	1,811,958	1.307	2,368,154	0.3%	0.6%	15,316	631,183	646,499	27.3%	1.117	704,776	675,637	656,142
6/30/11-12	1,883,222	1.354	2,550,332	0.8%	1.4%	36,075	435,262	471,337	18.5%	1.191	518,290	494,813	515,998
6/30/12-13	1,578,972	1.421	2,243,659	2.5%	3.9%	87,455	389,447	476,902	21.3%	1.330	517,874	497,388	537,126
6/30/13-14	1,775,011	1.516	2,691,001	1.0%	4.9%	131,070	345,001	476,071	17.7%	1.573	542,820	509,445	495,989
6/30/14-15	1,507,703	1.627	2,453,016	1.4%	6.3%	153,830	297,500	451,330	18.4%	1.798	534,969	493,150	524,294
6/30/15-16	1,847,511	1.789	3,306,037	3.4%	9.7%	321,050	179,180	500,230	15.1%	2.361	423,117	461,674	541,720
6/30/16-17	1,378,705	2.138	2,948,224	4.4%	14.1%	414,631	283,000	697,631	23.7%	3.764	1,065,266	734,394	637,589
6/30/17-18	1,261,395	2.860	3,607,434	4.6%	18.6%	672,589	0	672,589	18.6%	10.164	0	638,960	813,846
6/30/18-19	416,549	6.275	2,613,657	2.0%	20.6%	538,549	3,000	541,549	20.7%	22.315	66,944	517,819	
Total	59,970,033		73,611,247			2,410,974	10,230,510	12,641,484	17.2%		12,381,815	12,880,833	12,545,528

NOTES:
(2) From Section 7, Exhibit 1, Page 2, Column 3
(3) = (4) / (2)
(4) From Section 7, Exhibit 1, Page 2, Column 6
(5) From Section 7, Exhibit 1, Page 11
(6) Downward sum of (5)
(7) = (6) x (4)
(8) From Section 7, Exhibit 1, Page 10
(9) = (7) + (8)
(10) = (9) / (4)
(11) From Section 7, Exhibit 1, Page 12
(12) = (8) x (11)
(13) Selected based on (9) and (12)
(14) From Aon analysis as of June 30, 2016

Commonwealth of Massachusetts Workers Compensation
Massachusetts Colleges & Universities - Cluster 4
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	2,750	13,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	0	12,000	0	0	0	0	0	15,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	46,500	16,000	0	0	17,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	19,976	0	5,000	0	7,500	15,000	51,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	0	0	0	0	0	0	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Jun-87	0	0	0	0	0	27,500	0	20,000	30,000	0	0	0	0	44,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	0	22,500	0	37,000	30,000	82,000	43,343	15,000	31,000	0	0	0	0	0	0	0	17,000	17,000	0	0	0	0	0	0	0	0	0	0	0	0	0						
Jun-89	0	33,000	0	6,800	0	67,500	0	30,000	0	0	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Jun-90	0	0	25,211	30,000	35,001	76,500	30,000	0	53,000	0	0	0	0	0	0	0	0	0	0	0	33,333	33,333	33,333	0	180,000	0	0	0	0	0								
Jun-91	0	0	48,000	32,500	0	0	0	73,000	0	0	0	0	0	0	0	25,000	30,000	25,000	0	0	0	0	0	0	0	0	0	0	0									
Jun-92	0	0	15,000	89,500	0	0	0	12,000	0	20,000	9,683	0	0	0	0	0	75,000	35,000	0	0	0	0	0	0	0	0	0	0										
Jun-93	0	62,500	18,000	31,500	37,000	0	0	12,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Jun-94	3,000	0	25,000	15,000	16,000	65,000	0	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Jun-95	0	105,500	102,500	54,800	40,405	22,500	0	0	20,625	22,875	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Jun-96	22,500	97,000	10,000	15,500	70,461	20,000	0	0	40,000	66,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0														
Jun-97	0	49,500	113,000	12,382	20,000	30,000	0	0	0	0	0	0	0	0	0	0	0	0	30,000	0	0	0	0															
Jun-98	0	80,000	90,000	25,000	25,000	0	0	40,000	0	0	0	0	5,000	0	0	0	0	0	0	0	0	0																
Jun-99	0	6,250	10,000	92,000	65,000	0	0	0	0	0	32,000	0	0	0	0	0	0	0	0	0	0																	
Jun-00	0	95,000	136,850	12,000	44,250	20,000	30,000	0	0	0	0	0	0	0	0	0	0	0	0	0																		
Jun-01	27,500	2,500	62,500	74,001	47,000	0	10,001	50,000	0	0	0	0	0	0	0	0	0	0	0																			
Jun-02	48,000	18,250	64,500	112,500	75,000	105,000	20,000	0	0	0	0	0	0	0	0	0	0	0																				
Jun-03	0	52,500	30,000	45,000	0	35,000	0	10,000	0	0	0	0	0	0	0	0	50,000																					
Jun-04	0	7,000	0	22,000	87,500	32,000	100,000	75,000	0	0	0	0	0	0	0	0																						
Jun-05	0	15,000	38,600	45,000	49,500	20,000	30,000	0	0	0	0	0	0	0	0																							
Jun-06	0	30,000	20,000	75,000	75,673	0	0	0	0	0	0	45,000	0	0																								
Jun-07	0	40,000	75,000	35,000	0	0	20,000	15,000	0	0	0	0	0																									
Jun-08	0	33,000	183,500	27,500	74,750	82,500	168,333	128,333	83,333	0	0	0																										
Jun-09	0	35,000	30,000	60,000	70,000	0	55,000	80,000	0	0	0																											
Jun-10	0	71,500	174,000	140,000	40,000	122,000	8,000	47,500	46,250	16,250																												
Jun-11	0	25,000	293,500	146,183	92,500	9,000	20,000	0	45,000																													
Jun-12	0	0	17,500	222,000	160,762	0	0	35,000																														
Jun-13	72,000	0	130,000	102,447	40,000	20,000	25,000																															
Jun-14	87,000	10,000	75,000	18,750	96,250	58,001																																
Jun-15	0	0	142,500	115,000	40,000																																	
Jun-16	0	17,000	59,430	102,750																																		
Jun-17	0	85,000	198,000																																			
Jun-18	0	0																																				
Jun-19	3,000																																					

Cumulative Lump Sum Payments

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444	456
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	2,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750
Jun-83	0	0	0	0	0	0	0	0	12,000	12,000	12,000	12,000	12,000	12,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	
Jun-84	0	0	0	0	0	0	0	46,500	62,500	62,500	62,500	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000		
Jun-85	0	0	0	19,976	19,976	24,976	24,976	32,476	47,476	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976			
Jun-86	0	0	0	0	0	0	0	0	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000					
Jun-87	0	0	0	0	0	27,500	27,500	47,500	77,500	77,500	77,500	77,500	77,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500						
Jun-88	0	0	22,500	22,500	59,500	89,500	171,500	214,843	229,843	260,843	260,843	260,843	260,843	260,843	260,843	260,843	260,843	277,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843							
Jun-89	0	33,000	33,000	39,800	39,800	107,300	107,300	137,300	137,300	137,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300								
Jun-90	0	0	25,211	55,211	90,212	166,712	196,712	196,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	283,045	316,379	349,712	349,712	529,712	529,712	529,712	529,712	529,712	529,712								
Jun-91	0	0	48,000	80,500	80,500	80,500	80,500	153,500	153,500	153,500	153,500	153,500	153,500	153,500	153,500	178,500	208,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500									
Jun-92	0	0	15,000	104,500	104,500	104,500	104,500	116,500	116,500	136,500	146,183	146,183	146,183	146,183	146,183	146,183	221,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183									
Jun-93	0	62,500	80,500	112,000	149,000	149,000	149,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000											
Jun-94	3,000	3,000	28,000	43,000	59,000	124,000	124,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000												
Jun-95	0	105,500	208,000	262,800	303,205	325,705	325,705	325,705	346,330	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205													
Jun-96	22,500	119,500	129,500	145,000	215,461	235,461	235,461	235,461	275,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461														
Jun-97	0	49,500	162,500	174,882	194,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	254,882	254,882	254,882	254,882	254,882															
Jun-98	0	80,000	170,000	195,000	220,000	220,000	220,000	260,000	260,000	260,000	260,000	260,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000																
Jun-99	0	6,250	16,250	108,250	173,250	173,250	173,250	173,250	173,250	173,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250																	
Jun-00	0	95,000	231,850	243,850	288,100	308,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100																		
Jun-01	27,500	30,000	92,500	166,501	213,501	213,501	223,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502																			
Jun-02	48,000	66,250	130,750	243,250	318,250	423,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250																				
Jun-03	0	52,500	82,500	127,500	127,500	162,500	162,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500	222,500																					
Jun-04	0	7,000	7,000	29,000	116,500	148,500	248,500	323,500	323,500	323,500	323,500	323,500	323,500	323,500	323,500	323,500																						
Jun-05	0	15,000	53,600	98,600	148,100	168,100	198,100	198,100	198,100	198,100	198,100	198,100	198,100	198,100	198,100																							
Jun-06	0	30,000	50,000	125,000	200,673	200,673	200,673	200,673	200,673	200,673	200,673	245,673	245,673	245,673																								
Jun-07	0	40,000	115,000	150,000	150,000	150,000	170,000	185,000	185,000	185,000	185,000	185,000	185,000																									
Jun-08	0	33,000	216,500	244,000	318,750	401,250	569,583	697,917	781,250	781,250	781,250	781,250																										
Jun-09	0	35,000	65,000	125,000	195,000	195,000	250,000	330,000	330,000	330,000	330,000																											
Jun-10	0	71,500	245,500	385,500	425,500	547,500	555,500	603,000	649,250	665,500																												
Jun-11	0	25,000	318,500	464,683	557,183	566,183	586,183	586,183	631,183																													
Jun-12	0	0	17,500	239,500	400,262	400,262	400,262	435,262																														
Jun-13	72,000	72,000	202,000	304,447	344,447	364,447	389,447																															
Jun-14	87,000	97,000	172,000	190,750	287,000	345,001																																
Jun-15	0	0	142,500	257,500	297,500																																	
Jun-16	0	17,000	76,430	179,180																																		
Jun-17	0	85,000	283,000																																			
Jun-18	0	0																																				
Jun-19	3,000																																					

Commonwealth of Massachusetts Workers Compensation
Massachusetts Colleges & Universities - Cluster 4
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.019	0.000	0.000	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.014	0.000	0.004	0.000	0.005	0.011	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.007	0.011	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.000	0.005	0.000	0.009	0.007	0.020	0.011	0.004	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Jun-89	0.000	0.025	0.000	0.005	0.000	0.052	0.000	0.023	0.000	0.000	0.058	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.000	0.008	0.009	0.011	0.023	0.009	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010	0.010	0.000	0.054	0.000	0.000	0.000	0.000									
Jun-91	0.000	0.000	0.041	0.028	0.000	0.000	0.000	0.063	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.026	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-92	0.000	0.000	0.013	0.079	0.000	0.000	0.000	0.011	0.000	0.018	0.008	0.000	0.000	0.000	0.000	0.000	0.066	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.000	0.063	0.018	0.032	0.037	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-94	0.003	0.000	0.023	0.014	0.015	0.061	0.000	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.000	0.072	0.070	0.038	0.028	0.015	0.000	0.000	0.014	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.024	0.104	0.011	0.017	0.075	0.021	0.000	0.000	0.043	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000														
Jun-97	0.000	0.053	0.121	0.013	0.021	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.032	0.000	0.000	0.000	0.000															
Jun-98	0.000	0.037	0.041	0.011	0.011	0.000	0.000	0.018	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.000	0.005	0.007	0.069	0.048	0.000	0.000	0.000	0.000	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																	
Jun-00	0.000	0.110	0.159	0.014	0.051	0.023	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-01	0.018	0.002	0.041	0.049	0.031	0.000	0.007	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-02	0.021	0.008	0.029	0.050	0.033	0.047	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.000	0.042	0.024	0.036	0.000	0.028	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.040																						
Jun-04	0.000	0.006	0.000	0.017	0.069	0.025	0.079	0.059	0.000	0.000	0.000	0.000	0.000	0.000	0.000																							
Jun-05	0.000	0.016	0.042	0.049	0.054	0.022	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																							
Jun-06	0.000	0.019	0.013	0.049	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.029	0.000	0.000																								
Jun-07	0.000	0.043	0.081	0.038	0.000	0.000	0.022	0.016	0.000	0.000	0.000	0.000	0.000																									
Jun-08	0.000	0.015	0.082	0.012	0.034	0.037	0.076	0.058	0.037	0.000	0.000	0.000																										
Jun-09	0.000	0.017	0.015	0.029	0.034	0.000	0.027	0.039	0.000	0.000	0.000																											
Jun-10	0.000	0.021	0.051	0.041	0.012	0.036	0.002	0.014	0.014	0.005																												
Jun-11	0.000	0.011	0.124	0.062	0.039	0.004	0.008	0.000	0.019																													
Jun-12	0.000	0.000	0.007	0.087	0.063	0.000	0.000	0.014																														
Jun-13	0.032	0.000	0.058	0.046	0.018	0.009	0.011																															
Jun-14	0.032	0.004	0.028	0.007	0.036	0.022																																
Jun-15	0.000	0.000	0.058	0.047	0.016																																	
Jun-16	0.000	0.005	0.018	0.031																																		
Jun-17	0.000	0.029	0.067																																			
Jun-18	0.000	0.000																																				
Jun-19	0.001																																					

Averages		*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
Simple Avg																																						
All Yrs (ex P)	0.004	0.020	0.036	0.029	0.024	0.015	0.011	0.016	0.008	0.005	0.003	0.002	0.000	0.001	0.001	0.001	0.006	0.003	0.002	0.000	0.001	0.001	0.001	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Latest 5	0.000	0.008	0.046	0.044	0.034	0.014	0.010	0.025	0.014	0.001	0.000	0.006	0.000	0.000	0.000	0.000	0.008	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Latest 3	0.000	0.011	0.048	0.028	0.023	0.010	0.007	0.009	0.011	0.002	0.000	0.010	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Olympic Avg																																						
All Yrs (ex P)	0.003	0.018	0.033	0.028	0.023	0.014	0.009	0.015	0.007	0.003	0.001	0.001	0.000	0.000	0.000	0.000	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 10	0.004	0.007	0.047	0.038	0.030	0.011	0.022	0.019	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Latest 5	0.000	0.003	0.048	0.041	0.031	0.011	0.007	0.022	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					

Dev Factor Selection																																						
Prior	*NA*	*0.020*	*0.033*	*0.048*	*0.033*	*0.010*	*0.022*	*0.025*	*0.007*	*0.003*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*		
Selected	NA	0.020	0.046	0.044	0.034	0.014	0.010	0.025	0.008	0.003	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
FacToUlt	NA	0.206	0.186	0.141	0.097	0.063	0.049	0.039	0.014	0.006	0.003	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

Commonwealth of Massachusetts Workers Compensation
Massachusetts Colleges & Universities - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444	456
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	2,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750
Jun-83	0	0	0	0	0	0	0	0	12,000	12,000	12,000	12,000	12,000	12,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	
Jun-84	0	0	0	0	0	0	0	46,500	62,500	62,500	62,500	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000		
Jun-85	0	0	0	19,976	19,976	24,976	24,976	32,476	47,476	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976			
Jun-86	0	0	0	0	0	0	0	0	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000				
Jun-87	0	0	0	0	0	27,500	27,500	47,500	77,500	77,500	77,500	77,500	77,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500					
Jun-88	0	0	22,500	22,500	59,500	89,500	171,500	214,843	229,843	260,843	260,843	260,843	260,843	260,843	260,843	260,843	260,843	277,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843						
Jun-89	0	33,000	33,000	39,800	39,800	107,300	107,300	137,300	137,300	137,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300							
Jun-90	0	0	25,211	55,211	90,212	166,712	196,712	196,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	283,045	316,379	349,712	349,712	529,712	529,712	529,712	529,712	529,712	529,712								
Jun-91	0	0	48,000	80,500	80,500	80,500	80,500	153,500	153,500	153,500	153,500	153,500	153,500	153,500	153,500	178,500	208,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500									
Jun-92	0	0	15,000	104,500	104,500	104,500	104,500	116,500	116,500	136,500	146,183	146,183	146,183	146,183	146,183	146,183	221,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183										
Jun-93	0	62,500	80,500	112,000	149,000	149,000	149,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000											
Jun-94	3,000	3,000	28,000	43,000	59,000	124,000	124,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000												
Jun-95	0	105,500	208,000	262,800	303,205	325,705	325,705	325,705	346,330	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205													
Jun-96	22,500	119,500	129,500	145,000	215,461	235,461	235,461	235,461	275,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461														
Jun-97	0	49,500	162,500	174,882	194,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	254,882	254,882	254,882	254,882	254,882															
Jun-98	0	80,000	170,000	195,000	220,000	220,000	220,000	260,000	260,000	260,000	260,000	260,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000																
Jun-99	0	6,250	16,250	108,250	173,250	173,250	173,250	173,250	173,250	173,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250																	
Jun-00	0	95,000	231,850	243,850	288,100	308,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100																		
Jun-01	27,500	30,000	92,500	166,501	213,501	213,501	223,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502																			
Jun-02	48,000	66,250	130,750	243,250	318,250	423,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250																				
Jun-03	0	52,500	82,500	127,500	127,500	162,500	162,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500	222,500																					
Jun-04	0	7,000	7,000	29,000	116,500	148,500	248,500	323,500	323,500	323,500	323,500	323,500	323,500	323,500	323,500	323,500																						
Jun-05	0	15,000	53,600	98,600	148,100	168,100	198,100	198,100	198,100	198,100	198,100	198,100	198,100	198,100	198,100																							
Jun-06	0	30,000	50,000	125,000	200,673	200,673	200,673	200,673	200,673	200,673	200,673	245,673	245,673	245,673																								
Jun-07	0	40,000	115,000	150,000	150,000	150,000	170,000	185,000	185,000	185,000	185,000	185,000	185,000																									
Jun-08	0	33,000	216,500	244,000	318,750	401,250	569,583	697,917	781,250	781,250	781,250	781,250																										
Jun-09	0	35,000	65,000	125,000	195,000	195,000	250,000	330,000	330,000	330,000	330,000																											
Jun-10	0	71,500	245,500	385,500	425,500	547,500	555,500	603,000	649,250	665,500																												
Jun-11	0	25,000	318,500	464,683	557,183	566,183	586,183	586,183	631,183																													
Jun-12	0	0	17,500	239,500	400,262	400,262	400,262	435,262																														
Jun-13	72,000	72,000	202,000	304,447	344,447	364,447	389,447																															
Jun-14	87,000	97,000	172,000	190,750	287,000	345,001																																
Jun-15	0	0	142,500	257,500	297,500																																	
Jun-16	0	17,000	76,430	179,180																																		
Jun-17	0	85,000	283,000																																			
Jun-18	0	0																																				
Jun-19	3,000																																					

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
All Prior Yrs														5.727	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83									1.000	1.000	1.000	1.000	1.000	2.250	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84								1.344	1.000	1.000	1.280	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85				1.000	1.250	1.000	1.300	1.462	2.085	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86									1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87					1.000	1.727	1.632		1.000	1.000	1.000	1.000	1.568	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-88			1.000	2.644	1.504	1.916	1.253	1.070	1.135	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.065	1.061	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-89		1.000	1.206	1.000	2.696	1.000	1.280	1.000	1.000	1.546	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90			2.190	1.634	1.848	1.180	1.000	1.269	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.133	1.118	1.105	1.000	1.515	1.000	1.000	1.000	1.000	1.000									
Jun-91			1.677	1.000	1.000	1.000	1.907	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.163	1.168	1.120	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-92			6.967	1.000	1.000	1.000	1.115	1.000	1.172	1.071	1.000	1.000	1.000	1.000	1.000	1.513	1.158	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93		1.288	1.391	1.330	1.000	1.000	1.081	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94	1.000	9.333	1.536	1.372	2.102	1.000	1.282	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95		1.972	1.263	1.154	1.074	1.000	1.000	1.063	1.066	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96	5.311	1.084	1.120	1.486	1.093	1.000	1.000	1.170	1.240	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
Jun-97		3.283	1.076	1.114	1.154	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.133	1.000	1.000	1.000	1.000																
Jun-98		2.125	1.147	1.128	1.000	1.000	1.182	1.000	1.000	1.000	1.000	1.019	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99		2.600	6.662	1.600	1.000	1.000	1.000	1.000	1.000	1.185	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
Jun-00		2.441	1.052	1.181	1.069	1.097	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01	1.091	3.083	1.800	1.282	1.000	1.047	1.224	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																				
Jun-02	1.380	1.974	1.860	1.308	1.330	1.047	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03		1.571	1.545	1.000	1.275	1.000	1.062	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.290																						
Jun-04		1.000	4.143	4.017	1.275	1.673	1.302	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
Jun-05		3.573	1.840	1.502	1.135	1.178	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																								
Jun-06		1.667	2.500	1.605	1.000	1.000	1.000	1.000	1.000	1.000	1.224	1.000	1.000																									
Jun-07		2.875	1.304	1.000	1.000	1.133	1.088	1.000	1.000	1.000	1.000	1.000																										
Jun-08		6.561	1.127	1.306	1.259	1.420	1.225	1.119	1.000	1.000	1.000																											
Jun-09		1.857	1.923	1.560	1.000	1.282	1.320	1.000	1.000	1.000																												
Jun-10		3.434	1.570	1.104	1.287	1.015	1.086	1.077	1.025																													
Jun-11		12.740	1.459	1.199	1.016	1.035	1.000	1.077																														
Jun-12			13.686	1.671	1.000	1.000	1.087																															
Jun-13	1.000	2.806	1.507	1.131	1.058	1.069																																
Jun-14	1.115	1.773	1.109	1.505	1.202																																	
Jun-15			1.807	1.155																																		
Jun-16		4.496	2.344																																			
Jun-17		3.329																																				
Jun-18																																						

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
Simple Avg																																						
All Yrs (ex P)	1.816	3.244	2.407	1.414	1.237	1.110	1.167	1.085	1.061	1.030	1.019	1.001	1.024	1.054	1.007	1.046	1.017	1.010	1.000	1.008	1.007	1.007	1.000	1.040	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		3.101	4.091	1.332	1.113	1.080	1.144	1.055	1.005	1.000	1.045	1.000	1.000	1.000	1.000	1.058	1.000	1.027	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		3.913	1.753	1.264	1.087	1.035	1.058	1.051	1.008	1.000	1.075	1.000	1.000	1.000	1.000	1.097	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Volume Wtd																																						
All Yrs (ex P)		2.796	1.564	1.281	1.146	1.095	1.117	1.060	1.031	1.019	1.011	1.001	1.009	1.003	1.005	1.036	1.018	1.012	1.000	1.010	1.010	1.011	1.000	1.075	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		3.232	1.919	1.295	1.104	1.052	1.123	1.073	1.008	1.000	1.027	1.000	1.000	1.000	1.000	1.035	1.000	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		4.921	1.605	1.234	1.076	1.034	1.054	1.060	1.009	1.000	1.039	1.000	1.000	1.000	1.000	1.056	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					

Dev Factor Selection																																						
Prior	2.196	2.604	1.583	1.372	1.143	1.183	1.119	1.061	1.011	1.012	1.012	1.003	1.003	1.002	1.002	1.002	1.001	1.011	1.000	1.000	1.000	1.000	1.000	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Selected	2.196	2.700	1.594	1.313	1.143	1.183	1.117	1.066	1.016	1.012	1.011	1.003	1.003	1.002	1.002	1.002	1.001	1.010	1.000	1.000	1.000	1.000	1.000	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	22.315	10.164	3.764	2.361	1.798	1.573	1.330	1.191	1.117	1.099	1.086	1.075	1.071	1.068	1.066	1.064	1.062	1.061	1.050	1.050	1.050	1.050	1.050	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	4.5%	9.8%	26.6%	42.3%	55.6%	63.6%	75.2%	84.0%	89.6%	91.0%	92.1%	93.1%	93.3%	93.6%	93.8%	94.0%	94.2%	94.3%	95.2%	95.2%	95.2%	95.2%	95.2%	95.2%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.1%	0.0%	0.0%	0.0%	1.000	1.000
444	99.9%	0.0%	0.1%	0.0%	0.0%	0.981	0.971
432	99.9%	0.0%	0.1%	0.0%	0.0%	0.943	0.916
420	99.9%	0.0%	0.1%	0.0%	0.0%	0.907	0.864
408	99.9%	0.0%	0.1%	0.0%	0.0%	0.872	0.816
396	99.9%	0.0%	0.1%	0.0%	0.0%	0.838	0.769
384	99.9%	0.0%	0.1%	0.0%	0.0%	0.806	0.726
372	99.9%	0.0%	0.1%	0.0%	0.0%	0.775	0.685
360	99.9%	0.0%	0.1%	0.0%	0.0%	0.745	0.646
348	99.9%	0.1%	0.1%	0.0%	0.0%	0.717	0.609
336	99.8%	0.5%	0.2%	0.2%	0.1%	0.882	0.838
324	99.4%	0.1%	0.6%	0.0%	0.0%	0.950	0.929
312	99.3%	0.1%	0.7%	0.0%	0.0%	0.922	0.889
300	99.2%	0.1%	0.8%	0.0%	0.0%	0.898	0.854
288	99.1%	0.1%	0.9%	0.0%	0.0%	0.876	0.823
276	99.0%	0.1%	1.0%	0.0%	0.0%	0.855	0.795
264	98.9%	0.2%	1.1%	0.1%	0.1%	0.836	0.769
252	98.7%	0.5%	1.3%	0.2%	0.1%	0.830	0.762
240	98.2%	1.0%	1.8%	0.5%	0.3%	0.847	0.787
228	97.2%	1.7%	2.8%	0.8%	0.6%	0.872	0.822
216	95.5%	1.9%	4.5%	0.9%	0.7%	0.891	0.848
204	93.7%	1.9%	6.3%	1.0%	0.7%	0.893	0.850
192	91.8%	2.3%	8.2%	1.2%	0.9%	0.887	0.841
180	89.5%	2.5%	10.5%	1.4%	1.1%	0.881	0.832
168	87.0%	2.1%	13.0%	1.2%	1.0%	0.873	0.821
156	84.9%	1.0%	15.1%	0.6%	0.5%	0.859	0.802
144	83.9%	2.2%	16.1%	1.4%	1.1%	0.835	0.770
132	81.7%	2.3%	18.3%	1.5%	1.3%	0.825	0.756
120	79.3%	2.8%	20.7%	1.9%	1.6%	0.814	0.742
108	76.5%	2.7%	23.5%	1.9%	1.6%	0.806	0.733
96	73.8%	3.5%	26.2%	2.6%	2.2%	0.796	0.720
84	70.4%	4.4%	29.6%	3.4%	3.0%	0.791	0.713
72	66.0%	4.5%	34.0%	3.6%	3.3%	0.789	0.712
60	61.5%	5.6%	38.5%	4.7%	4.3%	0.785	0.706
48	55.9%	9.1%	44.1%	7.9%	7.4%	0.783	0.705
36	46.8%	11.8%	53.2%	10.7%	10.2%	0.792	0.717
24	35.0%	19.0%	65.0%	17.9%	17.4%	0.801	0.730
12	15.9%	15.9%	84.1%	15.6%	15.5%	0.818	0.753
Total		100.0%					

NOTES:
(2) = 1 / Section 7, Exhibit 1, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	3,020	15,099		2,795	13,976
6/30/82-83	14,865	29,731	0.981	14,577	29,154
6/30/83-84	18,355	36,709	0.943	17,306	34,612
6/30/84-85	29,841	59,682	0.907	27,054	54,107
6/30/85-86	37,378	74,756	0.872	32,584	65,167
6/30/86-87	1,628	1,628	0.838	1,364	1,364
6/30/87-88	2,004	21,990	0.806	1,615	17,723
6/30/88-89	790	7,576	0.775	612	5,871
6/30/89-90	1,576	19,252	0.745	1,175	14,346
6/30/90-91	393	20,904	0.717	281	14,978
6/30/91-92	1,283	69,686	0.882	1,132	61,494
6/30/92-93	22,950	57,375	0.950	21,799	54,499
6/30/93-94	7,403	61,080	0.922	6,828	56,333
6/30/94-95	11,646	90,868	0.898	10,455	81,581
6/30/95-96	25,381	63,452	0.876	22,223	55,557
6/30/96-97	16,461	76,211	0.855	14,075	65,164
6/30/97-98	31,256	32,256	0.836	26,126	26,962
6/30/98-99	23,310	39,310	0.830	19,342	32,618
6/30/99-00	24,664	36,664	0.847	20,887	31,049
6/30/00-01	48,782	49,782	0.872	42,535	43,407
6/30/01-02	109,747	114,747	0.891	97,833	102,290
6/30/02-03	85,866	101,866	0.893	76,707	91,001
6/30/03-04	114,399	132,399	0.887	101,460	117,424
6/30/04-05	104,437	163,437	0.881	91,973	143,932
6/30/05-06	190,793	299,793	0.873	166,508	261,635
6/30/06-07	147,292	242,292	0.859	126,492	208,076
6/30/07-08	299,815	390,815	0.835	250,489	326,518
6/30/08-09	219,940	394,390	0.825	181,390	325,262
6/30/09-10	226,989	743,439	0.814	184,787	605,219
6/30/10-11	359,359	600,859	0.806	289,822	484,591
6/30/11-12	478,316	726,516	0.796	380,942	578,614
6/30/12-13	635,531	819,581	0.791	502,661	648,232
6/30/13-14	892,438	1,143,988	0.789	704,176	902,661
6/30/14-15	1,140,797	1,432,797	0.785	895,065	1,124,167
6/30/15-16	1,616,309	1,741,309	0.783	1,265,612	1,363,490
6/30/16-17	1,947,635	2,168,295	0.792	1,542,348	1,717,090
6/30/17-18	2,564,255	3,069,605	0.801	2,054,485	2,459,372
6/30/18-19	2,648,831	3,492,451	0.818	2,166,658	2,856,712
Total	14,105,733	18,642,588		11,364,172	15,076,247
			(7) Total Discount Factor:	0.806	0.809

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	3,020	15,099
(9) Projected Number of Years:	4	4
(10) Projected Paid Loss per Year:	755	3,775
(11) Discounted Value at 4%:	2,795	13,976

NOTES:
(2), (3) From Section 7, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 7, Exhibit 1, Page 13, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	3,020	15,099		2,694	13,472
6/30/82-83	14,865	29,731	0.971	14,439	28,877
6/30/83-84	18,355	36,709	0.916	16,818	33,637
6/30/84-85	29,841	59,682	0.864	25,796	51,591
6/30/85-86	37,378	74,756	0.816	30,482	60,965
6/30/86-87	1,628	1,628	0.769	1,252	1,252
6/30/87-88	2,004	21,990	0.726	1,455	15,960
6/30/88-89	790	7,576	0.685	541	5,187
6/30/89-90	1,576	19,252	0.646	1,018	12,436
6/30/90-91	393	20,904	0.609	239	12,739
6/30/91-92	1,283	69,686	0.838	1,075	58,390
6/30/92-93	22,950	57,375	0.929	21,326	53,315
6/30/93-94	7,403	61,080	0.889	6,583	54,314
6/30/94-95	11,646	90,868	0.854	9,950	77,639
6/30/95-96	25,381	63,452	0.823	20,898	52,245
6/30/96-97	16,461	76,211	0.795	13,090	60,604
6/30/97-98	31,256	32,256	0.769	24,046	24,816
6/30/98-99	23,310	39,310	0.762	17,761	29,952
6/30/99-00	24,664	36,664	0.787	19,398	28,836
6/30/00-01	48,782	49,782	0.822	40,074	40,896
6/30/01-02	109,747	114,747	0.848	93,089	97,330
6/30/02-03	85,866	101,866	0.850	73,017	86,623
6/30/03-04	114,399	132,399	0.841	96,214	111,352
6/30/04-05	104,437	163,437	0.832	86,915	136,016
6/30/05-06	190,793	299,793	0.821	156,679	246,190
6/30/06-07	147,292	242,292	0.802	118,128	194,318
6/30/07-08	299,815	390,815	0.770	230,885	300,964
6/30/08-09	219,940	394,390	0.756	166,281	298,169
6/30/09-10	226,989	743,439	0.742	168,478	551,802
6/30/10-11	359,359	600,859	0.733	263,314	440,268
6/30/11-12	478,316	726,516	0.720	344,317	522,984
6/30/12-13	635,531	819,581	0.713	453,327	584,610
6/30/13-14	892,438	1,143,988	0.712	635,073	814,080
6/30/14-15	1,140,797	1,432,797	0.706	805,796	1,012,048
6/30/15-16	1,616,309	1,741,309	0.705	1,139,388	1,227,504
6/30/16-17	1,947,635	2,168,295	0.717	1,397,408	1,555,729
6/30/17-18	2,564,255	3,069,605	0.730	1,872,635	2,241,684
6/30/18-19	2,648,831	3,492,451	0.753	1,994,200	2,629,327
Total	14,105,733	18,642,588		10,364,079	13,768,127
			(7) Total Discount Factor:	0.735	0.739

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	3,020	15,099
(9) Projected Number of Years:	4	4
(10) Projected Paid Loss per Year:	755	3,775
(11) Discounted Value at 6%:	2,694	13,472

NOTES:
(2), (3) From Section 7, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 7, Exhibit 1, Page 13, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/19 - 20 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/19 - 06/30/20	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/19 - 06/30/20		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior yrs	3,361,301	3,373,380	3,358,281	3,020	15,099				0	0	0.0%	0.0%
6/30/82-83	811,448	826,578	796,317	15,131	30,261	97.2%	0.1%	2.9%	437	874	2.9%	2.9%
6/30/83-84	963,997	982,491	945,504	18,493	36,987	97.1%	0.1%	2.8%	519	1,038	2.8%	2.8%
6/30/84-85	1,635,334	1,665,739	1,604,929	30,405	60,810	97.2%	0.1%	2.9%	880	1,761	2.9%	2.9%
6/30/85-86	2,291,785	2,329,932	2,253,254	38,531	76,678	97.5%	0.1%	3.2%	1,237	2,461	3.2%	3.2%
6/30/86-87	3,211,000	3,211,736	3,208,911	2,089	2,825	99.9%	0.1%	104.6%	2,184	2,954	104.6%	104.6%
6/30/87-88	5,072,000	5,091,986	5,069,952	2,048	22,033	99.8%	0.1%	33.8%	691	7,440	33.8%	33.8%
6/30/88-89	1,943,000	1,949,786	1,941,224	1,776	8,562	99.7%	0.1%	30.1%	535	2,579	30.1%	30.1%
6/30/89-90	4,400,000	4,417,676	4,397,880	2,120	19,796	99.8%	0.1%	32.2%	682	6,372	32.2%	32.2%
6/30/90-91	1,867,000	1,887,511	1,866,079	921	21,432	99.4%	0.2%	33.6%	309	7,200	33.6%	33.6%
6/30/91-92	2,209,213	2,281,666	2,203,879	5,334	77,787	98.1%	0.7%	37.8%	2,017	29,419	37.8%	37.8%
6/30/92-93	1,679,326	1,716,282	1,653,844	25,482	62,438	97.4%	0.7%	27.0%	6,889	16,880	27.0%	27.0%
6/30/93-94	1,951,434	2,010,128	1,938,298	13,137	71,830	97.9%	0.7%	32.6%	4,287	23,443	32.6%	32.6%
6/30/94-95	2,406,366	2,489,597	2,390,138	16,228	99,459	97.6%	0.7%	29.6%	4,807	29,464	29.6%	29.6%
6/30/95-96	1,879,180	1,920,160	1,850,889	28,290	69,271	97.4%	1.0%	38.9%	11,017	26,976	38.9%	38.9%
6/30/96-97	2,052,265	2,117,290	2,023,122	29,143	94,168	97.0%	1.5%	50.7%	14,781	47,762	50.7%	50.7%
6/30/97-98	2,903,000	2,908,440	2,860,293	42,707	48,147	98.4%	1.5%	95.9%	40,976	46,196	95.9%	95.9%
6/30/98-99	1,926,000	1,945,750	1,891,536	34,464	54,214	97.7%	2.0%	87.3%	30,094	47,341	87.3%	87.3%
6/30/99-00	1,711,000	1,723,000	1,668,934	42,066	54,066	97.2%	2.0%	71.4%	30,053	38,627	71.4%	71.4%
6/30/00-01	2,385,000	2,386,000	2,312,030	72,970	73,970	96.9%	2.0%	64.9%	47,385	48,035	64.9%	64.9%
6/30/01-02	3,265,000	3,275,620	3,127,474	137,526	148,146	95.6%	3.0%	68.7%	94,462	101,757	68.7%	68.7%
6/30/02-03	2,146,580	2,177,000	2,035,541	111,039	141,459	94.2%	3.0%	51.4%	57,040	72,667	51.4%	51.4%
6/30/03-04	2,331,180	2,364,000	2,181,691	149,489	182,309	92.9%	3.0%	42.5%	63,461	77,394	42.5%	42.5%
6/30/04-05	1,828,700	1,907,000	1,683,526	145,174	223,474	90.1%	3.0%	30.4%	44,134	67,937	30.4%	30.4%
6/30/05-06	2,632,500	2,769,000	2,393,029	239,471	375,971	88.6%	3.0%	26.3%	63,052	98,993	26.3%	26.3%
6/30/06-07	1,854,920	1,973,000	1,651,123	203,797	321,877	86.3%	3.0%	21.8%	44,521	70,317	21.8%	21.8%
6/30/07-08	3,944,640	4,074,000	3,570,917	373,723	503,083	89.1%	3.0%	27.4%	102,534	138,025	27.4%	27.4%
6/30/08-09	3,348,750	3,578,000	3,051,582	297,168	526,418	88.1%	3.0%	25.2%	74,980	132,823	25.2%	25.2%
6/30/09-10	4,740,270	5,311,000	4,425,969	314,301	885,031	88.1%	2.0%	16.8%	52,681	148,344	16.8%	16.8%
6/30/10-11	4,062,780	4,375,000	3,598,938	463,842	776,062	85.3%	4.0%	27.2%	126,261	211,250	27.2%	27.2%
6/30/11-12	3,797,380	4,071,000	3,196,106	601,274	874,894	81.2%	5.0%	26.7%	160,248	233,171	26.7%	26.7%
6/30/12-13	3,530,590	3,757,000	2,749,568	781,022	1,007,432	75.5%	5.0%	20.4%	159,125	205,254	20.4%	20.4%
6/30/13-14	4,176,690	4,455,000	3,087,287	1,089,403	1,367,713	71.5%	5.0%	17.6%	191,350	240,234	17.6%	17.6%
6/30/14-15	4,072,020	4,417,870	2,713,848	1,358,172	1,704,022	63.9%	5.0%	13.9%	188,276	236,219	13.9%	13.9%
6/30/15-16	4,944,440	5,102,640	3,044,885	1,899,555	2,057,755	60.6%	5.0%	12.7%	241,136	261,218	12.7%	12.7%
6/30/16-17	4,665,780	4,989,770	2,436,821	2,228,959	2,552,949	50.5%	10.1%	20.5%	456,248	522,566	20.5%	20.5%
6/30/17-18	5,271,150	5,890,760	2,196,543	3,074,607	3,694,217	39.4%	11.1%	18.3%	563,650	677,240	18.3%	18.3%
6/30/18-19	4,138,380	5,238,130	725,734	3,412,646	4,512,396	15.5%	23.9%	28.3%	964,116	1,274,809	28.3%	28.3%
Total	111,411,398	116,960,920	94,105,877	17,305,521	22,855,043				3,847,059	5,157,038	22.2%	22.6%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)
(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)
(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)
(5) = (2) - (4)
(6) = (3) - (4)
(7) = (4) / Average of Columns (2), (3)
(8) = (7) - Prior Year's (7)
(9) = (8) / (1.00 - (7))
(10) = (5) * (9)
(11) = (6) * (9)
(12) = (10) / (5)
(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		338,455			338,455	338,455	0	0		
6/30/82-83		53,045	53,060		53,310	53,575	265	530		
6/30/83-84		27,773	27,781		27,912	28,051	139	278		
6/30/84-85	357,749	112,891	112,923	112,941	113,455	114,020	564	1,129	0.032	0.032
6/30/85-86	380,112	384,347	384,457	384,494	385,500	386,269	1,153	1,922	0.101	0.102
6/30/86-87	423,770	239,538	239,607	239,638	240,000	240,736	462	1,198	0.057	0.057
6/30/87-88	480,405	671,957	672,149	672,193	672,000	672,000	43	43	0.140	0.140
6/30/88-89	495,261	426,014	426,136	426,185	427,000	427,000	986	986	0.086	0.086
6/30/89-90	502,691	547,456	547,613	547,673	548,000	548,000	544	544	0.109	0.109
6/30/90-91	482,143	472,472	472,607	472,606	473,000	473,000	528	528	0.098	0.098
6/30/91-92	492,539	810,162	810,393	810,390	814,213	818,263	4,051	8,102	0.165	0.166
6/30/92-93	524,541	506,348	506,493	506,491	508,880	511,411	2,532	5,063	0.097	0.097
6/30/93-94	584,853	716,701	717,347	717,334	722,434	727,451	5,734	10,751	0.124	0.124
6/30/94-95	587,701	572,784	573,300	573,291	577,366	581,375	4,582	8,592	0.098	0.099
6/30/95-96	614,868	581,842	585,550	585,478	584,752	587,661	2,909	5,818	0.095	0.096
6/30/96-97	700,686	844,583	853,669	853,380	857,265	862,540	12,682	17,957	0.122	0.123
6/30/97-98	684,415	432,549	443,780	443,814	444,000	448,440	11,451	15,891	0.065	0.066
6/30/98-99	707,796	363,847	375,056	375,340	375,000	378,750	11,153	14,903	0.053	0.054
6/30/99-00	760,477	486,598	503,861	503,922	504,000	504,000	17,402	17,402	0.066	0.066
6/30/00-01	811,600	564,812	589,175	589,118	589,000	589,000	24,188	24,188	0.073	0.073
6/30/01-02	835,038	534,221	561,632	561,832	562,000	567,620	27,779	33,399	0.067	0.068
6/30/02-03	825,340	632,406	671,504	671,187	657,580	672,000	25,174	39,594	0.080	0.081
6/30/03-04	849,216	691,090	741,153	740,588	726,180	741,000	35,090	49,910	0.086	0.087
6/30/04-05	992,508	659,963	714,849	720,178	700,700	720,000	40,737	60,037	0.071	0.073
6/30/05-06	962,878	808,822	884,850	875,077	857,500	885,000	48,678	76,178	0.089	0.092
6/30/06-07	1,032,930	682,415	754,026	761,762	738,920	762,000	56,505	79,585	0.072	0.074
6/30/07-08	1,063,597	923,731	1,035,976	1,017,872	997,640	1,036,000	73,909	112,269	0.094	0.097
6/30/08-09	1,073,805	1,039,973	1,172,174	1,140,431	1,117,200	1,172,000	77,227	132,027	0.104	0.109
6/30/09-10	1,084,749	1,053,408	1,195,478	1,164,275	1,140,720	1,195,000	87,312	141,592	0.105	0.110
6/30/10-11	1,134,164	1,155,797	1,331,351	1,285,702	1,260,280	1,331,000	104,483	175,203	0.111	0.117
6/30/11-12	1,202,674	877,621	1,021,032	1,025,820	1,000,580	1,026,000	122,959	148,379	0.083	0.085
6/30/12-13	1,284,741	781,148	935,661	969,138	926,640	969,000	145,492	187,852	0.072	0.075
6/30/13-14	1,346,902	967,275	1,187,569	1,190,877	1,164,240	1,191,000	196,965	223,725	0.086	0.088
6/30/14-15	1,404,093	908,646	1,149,054	1,174,181	1,126,020	1,179,870	217,374	271,224	0.080	0.084
6/30/15-16	1,454,612	1,018,194	1,327,825	1,327,857	1,301,440	1,334,640	283,246	316,446	0.089	0.092
6/30/16-17	1,461,588	775,115	1,078,043	1,153,808	1,056,440	1,159,770	281,325	384,655	0.072	0.079
6/30/17-18	1,457,740	935,148	1,552,225	1,474,839	1,445,500	1,559,760	510,352	624,612	0.099	0.107
6/30/18-19	1,500,205	306,185	1,069,673	1,313,358	1,070,000	1,326,130	763,815	1,019,945	0.071	0.088
Total	30,558,386	23,905,333	27,279,030	27,383,069	27,105,122	28,117,788	3,199,788	4,212,455		
Tot 6/30/84-19	30,558,386	23,486,061	27,198,189	27,383,069	26,685,445	27,697,707	3,199,384	4,211,647	0.087	0.091

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 7, Exhibit 2, Page 2, Column 3
(4) From Section 7, Exhibit 2, Page 2, Column 8
(5) From Section 7, Exhibit 2, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim
All Prior Yrs		338,455							0	0	
6/30/82-83		53,045	1.000	1.000	53,060	N/A	53,060		0	0	
6/30/83-84		27,773	1.000	1.000	27,781	N/A	27,781		0	0	
6/30/84-85	357,749	112,891	1.000	1.000	112,923	N/A	112,923	0.032	0	0	
6/30/85-86	380,112	384,347	1.000	1.000	384,457	N/A	384,457	0.101	0	0	
6/30/86-87	423,770	239,538	1.000	1.000	239,607	N/A	239,607	0.057	0	1	68
6/30/87-88	480,405	671,957	1.000	1.000	672,149	N/A	672,149	0.140	0	0	
6/30/88-89	495,261	426,014	1.000	1.000	426,136	N/A	426,136	0.086	0	0	
6/30/89-90	502,691	547,456	1.000	1.000	547,613	N/A	547,613	0.109	0	0	
6/30/90-91	482,143	472,472	1.000	1.000	472,607	N/A	472,607	0.098	0	0	
6/30/91-92	492,539	810,162	1.000	1.000	810,393	N/A	810,393	0.165	1	1	231
6/30/92-93	524,541	506,348	1.000	1.000	506,493	N/A	506,493	0.097	0	0	
6/30/93-94	584,853	716,701	1.001	1.000	717,347	N/A	717,347	0.123	2	2	323
6/30/94-95	587,701	572,784	1.001	1.000	573,300	N/A	573,300	0.098	1	1	516
6/30/95-96	614,868	581,842	1.006	1.000	585,550	N/A	585,550	0.095	0	0	
6/30/96-97	700,686	844,583	1.011	1.000	853,669	N/A	853,669	0.122	2	2	4,543
6/30/97-98	684,415	432,549	1.026	1.000	443,780	N/A	443,780	0.065	0	0	
6/30/98-99	707,796	363,847	1.031	1.000	375,056	N/A	375,056	0.053	2	1	11,209
6/30/99-00	760,477	486,598	1.035	1.000	503,861	N/A	503,861	0.066	0	0	
6/30/00-01	811,600	564,812	1.043	1.000	589,175	N/A	589,175	0.073	0	0	
6/30/01-02	835,038	534,221	1.051	1.000	561,632	N/A	561,632	0.067	0	1	27,411
6/30/02-03	825,340	632,406	1.062	1.000	671,504	N/A	671,504	0.081	1	1	39,098
6/30/03-04	849,216	691,090	1.072	1.000	741,153	N/A	741,153	0.087	0	0	
6/30/04-05	992,508	659,963	1.083	1.000	714,849	N/A	714,849	0.072	1	1	54,887
6/30/05-06	962,878	808,822	1.094	1.000	884,850	N/A	884,850	0.092	3	2	38,014
6/30/06-07	1,032,930	682,415	1.105	1.000	754,026	N/A	754,026	0.073	1	1	71,611
6/30/07-08	1,063,597	923,731	1.122	1.000	1,035,976	N/A	1,035,976	0.097	3	2	56,122
6/30/08-09	1,073,805	1,039,973	1.127	1.000	1,172,174	N/A	1,172,174	0.109	6	5	26,440
6/30/09-10	1,084,749	1,053,408	1.135	1.000	1,195,478	N/A	1,195,478	0.110	8	5	28,414
6/30/10-11	1,134,164	1,155,797	1.152	1.000	1,331,351	N/A	1,331,351	0.117	7	5	35,111
6/30/11-12	1,202,674	877,621	1.163	1.000	1,021,032	N/A	1,021,032	0.085	6	5	28,682
6/30/12-13	1,284,741	781,148	1.198	1.000	935,661	N/A	935,661	0.073	12	3	51,504
6/30/13-14	1,346,902	967,275	1.228	1.000	1,187,569	N/A	1,187,569	0.088	14	10	22,029
6/30/14-15	1,404,093	908,646	1.265	1.000	1,149,054	N/A	1,149,054	0.082	17	7	34,344
6/30/15-16	1,454,612	1,018,194	1.304	1.000	1,327,825	N/A	1,327,825	0.091	48	20	15,482
6/30/16-17	1,461,588	775,115	1.391	1.000	1,078,043	N/A	1,078,043	0.074	140	35	8,655
6/30/17-18	1,457,740	935,148	1.660	1.000	1,552,225	N/A	1,552,225	0.106	277	158	3,906
6/30/18-19	1,500,205	306,185	3.494	1.000	1,069,673	N/A	1,069,673	0.071		217	3,518
Total	30,558,386	23,905,333			27,279,030		27,279,030		552	486	

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 7, Exhibit 2, Page 7
(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.
(6) = (3) x (4) x (5)
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	357,749	0.049	112,891	1.000	112,941	N/A	112,941	0.032	0.032
6/30/85-86	380,112	0.135	384,347	1.000	384,494	N/A	384,494	0.101	0.101
6/30/86-87	423,770	0.082	239,538	1.000	239,638	N/A	239,638	0.057	0.057
6/30/87-88	480,405	0.172	671,957	1.000	672,193	N/A	672,193	0.140	0.140
6/30/88-89	495,261	0.121	426,014	1.000	426,185	N/A	426,185	0.086	0.086
6/30/89-90	502,691	0.151	547,456	1.000	547,673	N/A	547,673	0.109	0.109
6/30/90-91	482,143	0.098	472,472	1.000	472,606	N/A	472,606	0.098	0.098
6/30/91-92	492,539	0.162	810,162	1.000	810,390	N/A	810,390	0.165	0.165
6/30/92-93	524,541	0.095	506,348	1.000	506,491	N/A	506,491	0.097	0.097
6/30/93-94	584,853	0.120	716,701	1.001	717,334	N/A	717,334	0.123	0.123
6/30/94-95	587,701	0.096	572,784	1.001	573,291	N/A	573,291	0.098	0.098
6/30/95-96	614,868	0.093	581,842	1.006	585,478	N/A	585,478	0.095	0.095
6/30/96-97	700,686	0.118	844,583	1.011	853,380	N/A	853,380	0.122	0.122
6/30/97-98	684,415	0.065	432,549	1.026	443,814	N/A	443,814	0.065	0.065
6/30/98-99	707,796	0.054	363,847	1.031	375,340	N/A	375,340	0.053	0.053
6/30/99-00	760,477	0.066	486,598	1.035	503,922	N/A	503,922	0.066	0.066
6/30/00-01	811,600	0.072	564,812	1.043	589,118	N/A	589,118	0.073	0.073
6/30/01-02	835,038	0.068	534,221	1.051	561,832	N/A	561,832	0.067	0.067
6/30/02-03	825,340	0.081	632,406	1.062	671,187	N/A	671,187	0.081	0.081
6/30/03-04	849,216	0.086	691,090	1.072	740,588	N/A	740,588	0.087	0.087
6/30/04-05	992,508	0.079	659,963	1.083	720,178	N/A	720,178	0.073	0.073
6/30/05-06	962,878	0.080	808,822	1.094	875,077	N/A	875,077	0.091	0.091
6/30/06-07	1,032,930	0.081	682,415	1.105	761,762	N/A	761,762	0.074	0.074
6/30/07-08	1,063,597	0.082	923,731	1.122	1,017,872	N/A	1,017,872	0.096	0.096
6/30/08-09	1,073,805	0.083	1,039,973	1.127	1,140,431	N/A	1,140,431	0.106	0.106
6/30/09-10	1,084,749	0.086	1,053,408	1.135	1,164,275	N/A	1,164,275	0.107	0.107
6/30/10-11	1,134,164	0.087	1,155,797	1.152	1,285,702	N/A	1,285,702	0.113	0.113
6/30/11-12	1,202,674	0.088	877,621	1.163	1,025,820	N/A	1,025,820	0.085	0.085
6/30/12-13	1,284,741	0.089	781,148	1.198	969,138	N/A	969,138	0.075	0.075
6/30/13-14	1,346,902	0.089	967,275	1.228	1,190,877	N/A	1,190,877	0.088	0.088
6/30/14-15	1,404,093	0.090	908,646	1.265	1,174,181	N/A	1,174,181	0.084	0.084
6/30/15-16	1,454,612	0.091	1,018,194	1.304	1,327,857	N/A	1,327,857	0.091	0.091
6/30/16-17	1,461,588	0.092	775,115	1.391	1,153,808	N/A	1,153,808	0.079	0.079
6/30/17-18	1,457,740	0.093	935,148	1.660	1,474,839	N/A	1,474,839	0.101	0.101
6/30/18-19	1,500,205	0.094	306,185	3.494	1,313,358	N/A	1,313,358	0.088	0.088
Total	30,558,386		23,486,061		27,383,069		27,383,069		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 7, Exhibit 2, Page 4, Column 11
(4) From Section 7, Exhibit 2, Page 2, Column 3
(5) From Section 7, Exhibit 2, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.049	0.049
6/30/85-86									0.135	0.135
6/30/86-87									0.082	0.082
6/30/87-88									0.172	0.172
6/30/88-89									0.121	0.121
6/30/89-90									0.151	0.151
6/30/90-91	482,143	472,607	0.098	1.194	0.117	1.335	0.156	0.060	0.098	0.098
6/30/91-92	492,539	810,393	0.165	1.189	0.196	1.321	0.258	0.060	0.162	0.162
6/30/92-93	524,541	506,493	0.097	1.189	0.115	1.308	0.150	0.061	0.096	0.095
6/30/93-94	584,853	717,347	0.123	1.178	0.145	1.295	0.187	0.062	0.117	0.120
6/30/94-95	587,701	573,300	0.098	1.170	0.114	1.282	0.146	0.063	0.097	0.096
6/30/95-96	614,868	585,550	0.095	1.155	0.110	1.270	0.140	0.065	0.095	0.093
6/30/96-97	700,686	853,669	0.122	1.137	0.138	1.257	0.174	0.066	0.118	0.118
6/30/97-98	684,415	443,780	0.065	1.135	0.074	1.245	0.092	0.067	0.066	0.065
6/30/98-99	707,796	375,056	0.053	1.135	0.060	1.232	0.074	0.068	0.055	0.054
6/30/99-00	760,477	503,861	0.066	1.135	0.075	1.220	0.092	0.069	0.068	0.066
6/30/00-01	811,600	589,175	0.073	1.109	0.081	1.208	0.097	0.071	0.074	0.072
6/30/01-02	835,038	561,632	0.067	1.101	0.074	1.196	0.089	0.072	0.069	0.068
6/30/02-03	825,340	671,504	0.081	1.073	0.087	1.184	0.103	0.075	0.082	0.081
6/30/03-04	849,216	741,153	0.087	1.046	0.091	1.173	0.107	0.077	0.088	0.086
6/30/04-05	992,508	714,849	0.072	1.036	0.075	1.161	0.087	0.079	0.087	0.079
6/30/05-06	962,878	884,850	0.092	1.032	0.095	1.149	0.109	0.080	0.087	0.080
6/30/06-07	1,032,930	754,026	0.073	1.032	0.075	1.138	0.086	0.081	0.087	0.081
6/30/07-08	1,063,597	1,035,976	0.097	1.032	0.101	1.127	0.113	0.082	0.087	0.082
6/30/08-09	1,073,805	1,172,174	0.109	1.027	0.112	1.116	0.125	0.083	0.088	0.083
6/30/09-10	1,084,749	1,195,478	0.110	1.000	0.110	1.105	0.122	0.086	0.090	0.086
6/30/10-11	1,134,164	1,331,351	0.117	1.000	0.117	1.094	0.128	0.087	0.090	0.087
6/30/11-12	1,202,674	1,021,032	0.085	1.000	0.085	1.083	0.092	0.088	0.090	0.088
6/30/12-13	1,284,741	935,661	0.073	1.000	0.073	1.072	0.078	0.089	0.090	0.089
6/30/13-14	1,346,902	1,187,569	0.088	1.000	0.088	1.062	0.094	0.089	0.090	0.089
6/30/14-15	1,404,093	1,149,054	0.082	1.000	0.082	1.051	0.086	0.090	0.090	0.090
6/30/15-16	1,454,612	1,327,825	0.091	1.000	0.091	1.041	0.095	0.091	0.090	0.091
6/30/16-17	1,461,588	1,078,043	0.074	1.000	0.074	1.030	0.076	0.092	0.090	0.092
6/30/17-18	1,457,740	1,552,225	0.106	1.000	0.106	1.020	0.109	0.093	0.090	0.093
6/30/18-19	1,500,205	1,069,673	0.071	1.000	0.071	1.010	0.072	0.094		0.094
Total	27,918,398	24,815,304								

Trend Last 4 (ex 18-19):	5.9%	Avg 3 (ex 18-19):	0.093
Trend Last 8 (ex 18-19):	-0.9%	Avg 5 (ex 18-19):	0.092
Trend Last 12 (ex 18-19):	-1.0%	Avg 10 (ex 18-19):	0.100
Prior Selected Trend:	0.0%	Prior Sel Avg:	0.090
Selected Trend:	1.0%	Sel. Loss Cost:	0.095

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 7, Exhibit 2, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCIRB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.970	
(2)	Credibility		21%	
(3)	Average Pmt Trend Statewide		0.980	
(4)	Credibility Weighted Trend		0.978	
		(Low)		(High)
(5)	Selected Range	0.968		0.988
(6)	Incremental Paid for 2019	0		0
(7)	Estimated Reserve	0		0
(8)	Paid to Date (82 & Prior)	338,455		338,455
(9)	Est Ult Paid for 1982 & Prior	338,455		338,455

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	0	0
(11)	Projected Number of Years	3	3
(12)	Estimated Reserve	0	0
(13)	Paid to Date (82 & Prior)	338,455	338,455
(14)	Est Ult Paid for 1982 & Prior	338,455	338,455
(14a)	Paid Counts During Fiscal Year	0	0

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	338,455	338,455
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**338,455**	**338,455**
(18)	Implied Tail	1.000	1.000
(19)	Ult Loss Inc Lump Sums @ 6/18	338,455	338,455

NOTES:

(1) From Section 7, Exhibit 2, Page 6
(2) = (Average of Section 7, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 7, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 7, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	31,197	10.348			
1993	2	17,697	9.781	0.567		
1994	3	8,752	9.077	0.495		
1995	4	6,932	8.844	0.792		
1996	5	3,727	8.223	0.538		
1997	6	2,222	7.706	0.596		
1998	7	9,087	9.115	4.090		
1999	8	5,853	8.675	0.644		
2000	9	12,069	9.398	2.062	n =	22
2001	10	7,279	8.893	0.603	S(x) =	44,055
2002	11	8,308	9.025	1.141	S(x-sq) =	88,221,023
2003	12	8,142	9.005	0.980	S(xy) =	395,139
2004	13	19,519	9.879	2.397	S(y) =	197
2005	14	7,873	8.971	0.403	D =	19,481
2006	15	11,471	9.348	1.457	slope =	-0.032
2007	16	10,042	9.215	0.875	Avg Trend =	0.968
2008	17	8,213	9.014	0.818		
2009	18	9,432	9.152	1.148		
2010	19	7,136	8.873	0.757		
2011	20	10,399	9.249	1.457		
2012	21	3,318	8.107	0.319		
2013	22	1,702	7.440	0.513		
2014	23	0				
2015	24	0				
2016	25	0				
2017	26	0				
2018	27	0				
2019	28	0				
					Selected Trend:	**0.970**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2013: 0.513 = 1702 / 3318

Commonwealth of Massachusetts Workers Compensation
Massachusetts Colleges & Universities - Cluster 4
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
June-83	5,425	13,479	21,113	27,654	30,220	32,596	38,756	40,003	49,390	49,452	49,902	49,902	49,902	52,680	52,680	52,680	52,680	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045
June-84	3,642	9,520	14,025	17,952	20,550	23,119	24,788	27,281	27,458	27,458	27,458	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	
June-85	13,476	35,975	51,552	65,364	72,959	79,579	86,331	95,092	106,398	110,557	111,969	111,969	112,255	112,573	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891		
June-86	33,919	90,663	130,143	159,111	250,739	286,799	294,926	297,883	299,398	302,212	307,822	320,541	325,361	342,239	344,332	347,860	364,047	376,849	380,765	383,694	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347			
June-87	33,322	88,558	133,068	167,433	202,414	217,655	221,836	226,928	230,316	231,634	233,141	233,163	235,329	236,440	236,440	236,440	236,440	237,211	237,211	237,211	237,211	237,211	238,056	238,056	238,056	238,056	238,056	238,056	238,056	239,258	239,258	239,258	239,538				
June-88	59,518	204,414	290,147	350,533	381,836	423,661	513,908	554,667	558,927	578,241	580,791	582,947	585,666	587,383	588,760	590,429	611,904	620,480	621,465	623,581	623,951	627,240	627,525	631,767	636,396	638,704	641,961	665,538	671,957	671,957	671,957	671,957					
June-89	62,198	211,475	294,554	322,576	356,178	387,366	391,897	394,643	397,103	398,291	400,332	413,505	414,824	415,958	415,958	424,869	425,154	425,154	425,154	425,154	425,154	425,154	425,840	425,973	426,014	426,014	426,014	426,014	426,014	426,014	426,014						
June-90	50,219	295,860	408,825	438,277	465,544	487,856	501,254	508,956	511,410	519,157	521,054	521,523	523,073	526,415	531,243	532,370	532,613	534,177	535,910	537,636	540,156	540,156	541,381	543,131	547,456	547,456	547,456	547,456	547,456	547,456							
June-91	73,392	311,241	360,552	400,955	419,114	437,552	445,905	451,717	456,911	463,872	466,034	467,206	468,330	470,247	472,258	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472								
June-92	221,188	477,478	560,364	598,339	631,891	641,232	646,926	650,216	653,117	658,289	666,600	671,991	681,366	690,612	701,403	710,623	719,185	728,531	738,270	747,976	759,027	768,431	778,806	790,246	800,553	806,429	807,773	810,162									
June-93	150,073	407,193	449,884	478,264	489,794	496,554	498,030	498,889	501,701	503,184	504,152	505,509	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348										
June-94	156,060	302,215	335,354	369,121	403,159	421,734	441,218	452,877	461,708	470,189	479,925	489,958	504,404	513,367	522,984	528,697	539,677	552,169	567,707	583,321	603,468	622,024	645,934	667,090	694,392	716,701											
June-95	109,792	244,835	298,417	304,966	313,919	317,775	323,966	336,940	345,737	404,548	417,872	419,186	507,915	517,682	526,590	533,675	537,590	548,842	549,714	552,788	553,266	561,548	569,946	571,816	572,784												
June-96	187,362	423,531	463,708	493,442	512,072	523,060	559,979	563,249	572,255	575,372	578,197	581,714	581,842	581,842	581,842	581,842	581,842	581,842	581,842	581,842	581,842	581,842	581,842	581,842													
June-97	169,255	306,866	359,926	403,511	440,040	450,988	458,674	483,346	503,475	519,848	535,734	556,260	578,975	602,453	632,460	672,797	707,292	751,693	784,391	804,120	816,637	826,538	844,583														
June-98	130,372	302,957	339,295	363,480	383,927	388,726	391,919	417,459	417,733	418,585	421,666	427,310	427,449	428,766	428,839	429,419	429,419	431,949	431,949	432,549	432,549	432,549															
June-99	97,937	205,527	246,679	296,667	310,533	318,692	324,215	326,063	327,858	331,461	334,241	334,867	336,644	336,644	338,914	356,188	359,425	359,425	359,555	362,292	363,847																
June-00	149,711	324,594	408,387	446,980	464,695	474,595	478,979	480,612	480,853	482,147	483,486	483,486	483,486	485,189	486,598	486,598	486,598	486,598	486,598	486,598																	
June-01	146,796	329,001	398,588	483,338	524,021	540,381	553,789	559,032	562,148	562,831	562,932	563,168	564,300	564,300	564,300	564,530	564,812	564,812	564,812																		
June-02	113,531	244,127	383,389	485,433	511,686	522,029	525,064	528,876	530,895	532,387	533,222	533,611	533,769	533,801	533,801	533,801	533,801	534,221																			
June-03	68,006	374,633	451,946	472,102	486,597	492,733	520,395	535,451	548,996	558,702	571,378	580,801	592,448	598,138	629,209	630,096	632,406																				
June-04	226,665	540,314	613,339	657,569	676,213	687,448	689,931	690,265	690,426	690,599	690,599	690,599	690,884	691,090	691,090	691,090																					
June-05	267,264	502,730	569,792	616,429	634,553	643,543	651,061	654,330	656,278	658,062	658,406	659,359	659,643	659,795	659,963																						
June-06	266,086	533,067	604,845	688,237	700,485	712,078	725,521	746,165	766,110	772,551	782,793	794,068	800,226	808,822																							
June-07	237,774	472,669	580,019	596,123	625,421	633,211	640,381	648,441	650,946	666,396	670,898	682,244	682,415																								
June-08	254,702	609,536	722,745	829,701	850,544	872,814	886,112	897,837	903,732	908,296	914,081	923,731																									
June-09	295,106	650,179	756,525	816,761	864,784	890,799	963,239	1,000,628	1,014,297	1,032,270	1,039,973																										
June-10	419,730	775,749	865,851	909,378	969,822	1,003,582	1,022,429	1,035,175	1,047,067	1,053,408																											
June-11	454,614	843,137	950,680	997,564	1,027,642	1,049,028	1,062,683	1,136,338	1,155,797																												
June-12	330,317	676,973	804,310	841,448	851,396	859,087	871,073	877,621																													
June-13	291,036	557,666	662,793	737,262	766,215	779,506	781,148																														
June-14	380,527	800,583	898,971	931,664	953,555	967,275																															
June-15	425,720	650,664	818,632	862,923	908,646																																
June-16	452,409	811,805	959,161	1,018,194																																	
June-17	304,508	653,025	775,115																																		
June-18	500,150	935,148																																			
June-19	306,185																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
June-83	2.485	1.566	1.310	1.093	1.079	1.189	1.032	1.235	1.001	1.009	1.000	1.000	1.056	1.000	1.000	1.000	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.614	1.473	1.280	1.145	1.125	1.072	1.101	1.006	1.000	1.000	1.011	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-85	2.670	1.433	1.268	1.116	1.091	1.085	1.101	1.119	1.039	1.013	1.000	1.003	1.003	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-86	2.673	1.435	1.223	1.576	1.144	1.028	1.010	1.005	1.009	1.019	1.041	1.015	1.052	1.006	1.010	1.047	1.035	1.010	1.008	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-87	2.658	1.503	1.258	1.209	1.075	1.019	1.023	1.015	1.006	1.007	1.000	1.009	1.005	1.000	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.000	1.000	1.001					
June-88	3.434	1.419	1.208	1.089	1.110	1.213	1.079	1.008	1.035	1.004	1.004	1.005	1.003	1.002	1.003	1.036	1.014	1.002	1.003	1.001	1.005	1.000	1.007	1.007	1.004	1.005	1.037	1.010	1.000	1.000	1.000						
June-89	3.400	1.393	1.095	1.104	1.088	1.012	1.007	1.006	1.003	1.005	1.033	1.003	1.003	1.000	1.021	1.001	1.000	1.000	1.000	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
June-90	5.891	1.382	1.072	1.062	1.048	1.027	1.015	1.005	1.015	1.004	1.001	1.003	1.006	1.009	1.002	1.000	1.003	1.003	1.003	1.005	1.000	1.002	1.003	1.008	1.000	1.000	1.000	1.000	1.000								
June-91	4.241	1.158	1.112	1.045	1.044	1.019	1.013	1.011	1.015	1.005	1.003	1.002	1.004	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
June-92	2.159	1.174	1.068	1.056	1.015	1.009	1.005	1.004	1.008	1.013	1.008	1.014	1.014	1.016	1.013	1.012	1.013	1.013	1.013	1.015	1.012	1.014	1.015	1.013	1.007	1.002	1.003										
June-93	2.713	1.105	1.063	1.024	1.014	1.003	1.002	1.006	1.003	1.002	1.003	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
June-94	1.937	1.110	1.101	1.092	1.046	1.046	1.026	1.019	1.018	1.021	1.021	1.029	1.018	1.019	1.011	1.021	1.023	1.028	1.028	1.035	1.031	1.038	1.033	1.041	1.032												
June-95	2.230	1.219	1.022	1.029	1.012	1.019	1.040	1.026	1.170	1.033	1.003	1.212	1.019	1.017	1.013	1.007	1.021	1.002	1.006	1.001	1.015	1.015	1.003	1.002													
June-96	2.260	1.095	1.064	1.038	1.021	1.071	1.006	1.016	1.005	1.005	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-97	1.813	1.173	1.121	1.091	1.025	1.017	1.054	1.042	1.033	1.031	1.038	1.041	1.041	1.050	1.064	1.051	1.063	1.043	1.025	1.016	1.012	1.022															
June-98	2.324	1.120	1.071	1.056	1.012	1.008	1.065	1.001	1.002	1.007	1.013	1.000	1.003	1.000	1.001	1.000	1.006	1.000	1.001	1.000	1.000																
June-99	2.099	1.200	1.203	1.047	1.026	1.017	1.006	1.006	1.011	1.008	1.002	1.005	1.000	1.007	1.051	1.009	1.000	1.000	1.008	1.004																	
June-00	2.168	1.258	1.095	1.040	1.021	1.009	1.003	1.001	1.003	1.003	1.000	1.000	1.004	1.003	1.000	1.000	1.000	1.000	1.000																		
June-01	2.241	1.212	1.213	1.084	1.031	1.025	1.009	1.006	1.001	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000																			
June-02	2.150	1.570	1.266	1.054	1.020	1.006	1.007	1.004	1.003	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.001																				
June-03	5.509	1.206	1.045	1.031	1.013	1.056	1.029	1.025	1.018	1.023	1.016	1.020	1.010	1.052	1.001	1.004																					
June-04	2.384	1.135	1.072	1.028	1.017	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
June-05	1.881	1.133	1.082	1.029	1.014	1.012	1.005	1.003	1.003	1.001	1.001	1.000	1.000	1.000																							
June-06	2.003	1.135	1.138	1.018	1.017	1.019	1.028	1.027	1.008	1.013	1.014	1.008	1.011																								
June-07	1.988	1.227	1.028	1.049	1.012	1.011	1.013	1.004	1.024	1.007	1.017	1.000																									
June-08	2.393	1.186	1.148	1.025	1.026	1.015	1.013	1.007	1.005	1.006	1.011																										
June-09	2.203	1.164	1.080	1.059	1.030	1.081	1.039	1.014	1.018	1.007																											
June-10	1.848	1.116	1.050	1.066	1.035	1.019	1.012	1.011	1.006																												
June-11	1.855	1.128	1.049	1.030	1.021	1.013	1.069	1.017																													
June-12	2.049	1.188	1.046	1.012	1.009	1.014	1.008																														
June-13	1.916	1.189	1.112	1.039	1.017	1.002																															
June-14	2.104	1.123	1.036	1.023	1.014																																
June-15	1.528	1.258	1.054	1.053																																	
June-16	1.794	1.182	1.062																																		
June-17	2.145	1.187																																			
June-18	1.870																																				

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs	2.490	1.244	1.121	1.076	1.040	1.037	1.027	1.022	1.017	1.009	1.010	1.015	1.010	1.008	1.009	1.009	1.009	1.005	1.005	1.005	1.005	1.006	1.004	1.005	1.004	1.001	1.004	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.888	1.188	1.062	1.032	1.019	1.026	1.028	1.011	1.012	1.007	1.009	1.006	1.004	1.010	1.000	1.003	1.001	1.009	1.007	1.004	1.012	1.015	1.010	1.011	1.008	1.000	1.008	1.002	1.001	1.000	1.000	1.000					
Latest 3	1.936	1.209	1.051	1.039	1.014	1.010	1.030	1.014	1.010	1.007	1.014	1.003	1.004	1.017	1.000	1.001	1.000	1.000	1.003	1.007	1.004	1.012	1.012	1.014	1.013	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Volume Wtd																																					
All Yrs	2.131	1.189	1.089	1.052	1.028	1.027	1.023	1.012	1.015	1.009	1.010	1.015	1.009	1.010	1.010	1.011	1.012	1.008	1.007	1.007	1.007	1.009	1.007	1.009	1.006	1.001	1.007	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5	1.867	1.185	1.060	1.031	1.020	1.026	1.030	1.011	1.012	1.007	1.009	1.005	1.004	1.010	1.000	1.002	1.001	1.013	1.009	1.005	1.012	1.016	1.011	1.013	1.009	1.000	1.009	1.003	1.001	1.000	1.000						
Latest 3	1.909	1.207	1.051	1.038	1.013	1.010	1.031	1.014	1.010	1.007	1.014	1.003	1.004	1.016	1.000	1.001	1.000	1.000	1.003	1.009	1.005	1.013	1.013	1.016	1.014	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000				
Dev Factor Sele	.																																				
Industry 1	1.968	1.147	1.054	1.025	1.017	1.010	1.012	1.012	1.010	1.009	1.010	1.009	1.009	1.009	1.008	1.008	1.007	1.007																			
Industry 2		1.281	1.080	1.034	1.020	1.017	1.009	1.011	1.009	1.009	1.006	1.007	1.009	1.008	1.008	1.012	1.007	1.006	1.007	1.006																	
Prior	2.076	1.186	1.070	1.034	1.030	1.025	1.031	1.010	1.015	1.005	1.005	1.015	1.010	1.010	1.010	1.010	1.010	1.008	1.008	1.005	1.005	1.013	1.005	1.006	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Selected	2.105	1.193	1.066	1.031	1.030	1.025	1.030	1.010	1.015	1.007	1.005	1.015	1.010	1.010	1.010	1.010	1.010	1.008	1.007	1.005	1.005	1.015	1.004	1.005	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	3.494	1.660	1.391	1.304	1.265	1.228	1.198	1.163	1.152	1.135	1.127	1.122	1.105	1.094	1.083	1.072	1.062	1.051	1.043	1.035	1.031	1.026	1.011	1.006	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Percent of Ult	28.6%	60.2%	71.9%	76.7%	79.1%	81.5%	83.5%	86.0%	86.8%	88.1%	88.7%	89.2%	90.5%	91.4%	92.3%	93.2%	94.2%	95.1%	95.9%	96.6%	97.0%	97.5%	98.9%	99.4%	99.9%	99.9%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	338,455	338,455	338,455	338,455	0	0.0%	0	0.0%
6/30/82-83	53,310	53,575	53,310	53,575	0	0.0%	0	0.0%
6/30/83-84	27,912	28,051	27,912	28,051	0	0.0%	0	0.0%
6/30/84-85	113,455	114,020	113,455	114,020	0	0.0%	0	0.0%
6/30/85-86	386,269	386,269	385,500	386,269	(769)	-0.2%	0	0.0%
6/30/86-87	240,000	240,455	240,000	240,736	0	0.0%	281	0.1%
6/30/87-88	672,000	672,000	672,000	672,000	0	0.0%	0	0.0%
6/30/88-89	427,000	427,000	427,000	427,000	0	0.0%	0	0.0%
6/30/89-90	548,000	548,000	548,000	548,000	0	0.0%	0	0.0%
6/30/90-91	473,000	473,000	473,000	473,000	0	0.0%	0	0.0%
6/30/91-92	808,000	808,000	814,213	818,263	6,213	0.8%	10,263	1.3%
6/30/92-93	508,880	511,411	508,880	511,411	0	0.0%	0	0.0%
6/30/93-94	699,947	704,808	722,434	727,451	22,488	3.2%	22,644	3.2%
6/30/94-95	576,391	580,394	577,366	581,375	975	0.2%	982	0.2%
6/30/95-96	584,752	587,661	584,752	587,661	0	0.0%	0	0.0%
6/30/96-97	851,235	855,470	857,265	862,540	6,030	0.7%	7,070	0.8%
6/30/97-98	446,000	450,460	444,000	448,440	(2,000)	-0.4%	(2,020)	-0.4%
6/30/98-99	375,000	379,760	375,000	378,750	0	0.0%	(1,010)	-0.3%
6/30/99-00	508,000	508,000	504,000	504,000	(4,000)	-0.8%	(4,000)	-0.8%
6/30/00-01	594,000	594,000	589,000	589,000	(5,000)	-0.8%	(5,000)	-0.8%
6/30/01-02	567,000	568,000	562,000	567,620	(5,000)	-0.9%	(380)	-0.1%
6/30/02-03	662,480	676,000	657,580	672,000	(4,900)	-0.7%	(4,000)	-0.6%
6/30/03-04	734,020	749,000	726,180	741,000	(7,840)	-1.1%	(8,000)	-1.1%
6/30/04-05	707,560	734,000	700,700	720,000	(6,860)	-1.0%	(14,000)	-1.9%
6/30/05-06	862,400	885,000	857,500	885,000	(4,900)	-0.6%	0	0.0%
6/30/06-07	750,680	780,000	738,920	762,000	(11,760)	-1.6%	(18,000)	-2.3%
6/30/07-08	998,620	1,031,000	997,640	1,036,000	(980)	-0.1%	5,000	0.5%
6/30/08-09	1,120,140	1,170,000	1,117,200	1,172,000	(2,940)	-0.3%	2,000	0.2%
6/30/09-10	1,151,500	1,205,000	1,140,720	1,195,000	(10,780)	-0.9%	(10,000)	-0.8%
6/30/10-11	1,253,420	1,321,000	1,260,280	1,331,000	6,860	0.5%	10,000	0.8%
6/30/11-12	1,023,120	1,051,000	1,000,580	1,026,000	(22,540)	-2.2%	(25,000)	-2.4%
6/30/12-13	948,420	995,000	926,640	969,000	(21,780)	-2.3%	(26,000)	-2.6%
6/30/13-14	1,182,860	1,208,000	1,164,240	1,191,000	(18,620)	-1.6%	(17,000)	-1.4%
6/30/14-15	1,130,000	1,161,000	1,126,020	1,179,870	(3,980)	-0.4%	18,870	1.6%
6/30/15-16	1,334,000	1,344,000	1,301,440	1,334,640	(32,560)	-2.4%	(9,360)	-0.7%
6/30/16-17	1,085,000	1,188,770	1,056,440	1,159,770	(28,560)	-2.6%	(29,000)	-2.4%
6/30/17-18	1,432,000	1,725,000	1,445,500	1,559,760	13,500	0.9%	(165,240)	-9.6%
6/30/18-19								
Total	26,174,825	27,052,558	26,035,122	26,791,658	(139,704)	-0.5%	(260,900)	-1.0%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 7, Exhibit 2, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
444	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
432	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
420	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
408	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
396	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
384	100.0%	0.0%	0.0%	0.0%	0.0%	0.806	0.726
372	100.0%	0.0%	0.0%	0.0%	0.0%	0.775	0.685
360	100.0%	0.0%	0.0%	0.0%	0.0%	0.745	0.646
348	100.0%	0.0%	0.0%	0.0%	0.0%	0.717	0.609
336	100.0%	0.0%	0.0%	0.0%	0.0%	0.689	0.575
324	100.0%	0.1%	0.0%	0.0%	0.0%	0.662	0.542
312	99.9%	0.0%	0.1%	0.0%	0.0%	0.872	0.825
300	99.9%	0.5%	0.1%	0.2%	0.1%	0.838	0.779
288	99.4%	0.4%	0.6%	0.2%	0.1%	0.956	0.938
276	98.9%	1.5%	1.1%	0.6%	0.4%	0.944	0.920
264	97.5%	0.5%	2.5%	0.2%	0.1%	0.950	0.928
252	97.0%	0.4%	3.0%	0.2%	0.1%	0.924	0.890
240	96.6%	0.7%	3.4%	0.3%	0.2%	0.900	0.856
228	95.9%	0.7%	4.1%	0.4%	0.3%	0.885	0.836
216	95.1%	0.9%	4.9%	0.5%	0.3%	0.871	0.816
204	94.2%	0.9%	5.8%	0.5%	0.4%	0.861	0.803
192	93.2%	0.9%	6.8%	0.5%	0.4%	0.849	0.787
180	92.3%	0.9%	7.7%	0.5%	0.4%	0.836	0.770
168	91.4%	0.9%	8.6%	0.5%	0.4%	0.822	0.752
156	90.5%	1.3%	9.5%	0.8%	0.6%	0.809	0.735
144	89.2%	0.4%	10.8%	0.3%	0.2%	0.803	0.727
132	88.7%	0.6%	11.3%	0.4%	0.3%	0.780	0.697
120	88.1%	1.3%	11.9%	0.9%	0.7%	0.762	0.674
108	86.8%	0.9%	13.2%	0.6%	0.5%	0.757	0.669
96	86.0%	2.5%	14.0%	1.8%	1.6%	0.743	0.652
84	83.5%	2.0%	16.5%	1.6%	1.4%	0.755	0.668
72	81.5%	2.4%	18.5%	1.9%	1.7%	0.754	0.668
60	79.1%	2.4%	20.9%	2.0%	1.8%	0.754	0.669
48	76.7%	4.8%	23.3%	4.2%	3.9%	0.751	0.666
36	71.9%	11.7%	28.1%	10.6%	10.1%	0.766	0.687
24	60.2%	31.6%	39.8%	29.8%	29.0%	0.808	0.743
12	28.6%	28.6%	71.4%	28.1%	27.8%	0.867	0.820
Total		100.0%					

NOTES:
(2) = 1 / Section 7, Exhibit 2, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	265	530	1.000	265	530
6/30/83-84	139	278	1.000	139	278
6/30/84-85	564	1,129	1.000	564	1,129
6/30/85-86	1,153	1,922	1.000	1,153	1,922
6/30/86-87	462	1,198	1.000	462	1,198
6/30/87-88	43	43	0.806	35	35
6/30/88-89	986	986	0.775	764	764
6/30/89-90	544	544	0.745	405	405
6/30/90-91	528	528	0.717	378	378
6/30/91-92	4,051	8,102	0.689	2,791	5,582
6/30/92-93	2,532	5,063	0.662	1,677	3,354
6/30/93-94	5,734	10,751	0.872	4,997	9,370
6/30/94-95	4,582	8,592	0.838	3,840	7,200
6/30/95-96	2,909	5,818	0.956	2,780	5,561
6/30/96-97	12,682	17,957	0.944	11,971	16,950
6/30/97-98	11,451	15,891	0.950	10,877	15,095
6/30/98-99	11,153	14,903	0.924	10,302	13,766
6/30/99-00	17,402	17,402	0.900	15,661	15,661
6/30/00-01	24,188	24,188	0.885	21,409	21,409
6/30/01-02	27,779	33,399	0.871	24,191	29,085
6/30/02-03	25,174	39,594	0.861	21,662	34,071
6/30/03-04	35,090	49,910	0.849	29,776	42,352
6/30/04-05	40,737	60,037	0.836	34,045	50,174
6/30/05-06	48,678	76,178	0.822	40,033	62,649
6/30/06-07	56,505	79,585	0.809	45,705	64,374
6/30/07-08	73,909	112,269	0.803	59,333	90,128
6/30/08-09	77,227	132,027	0.780	60,247	102,997
6/30/09-10	87,312	141,592	0.762	66,519	107,873
6/30/10-11	104,483	175,203	0.757	79,099	132,638
6/30/11-12	122,959	148,379	0.743	91,407	110,304
6/30/12-13	145,492	187,852	0.755	109,777	141,739
6/30/13-14	196,965	223,725	0.754	148,414	168,578
6/30/14-15	217,374	271,224	0.754	163,804	204,383
6/30/15-16	283,246	316,446	0.751	212,685	237,614
6/30/16-17	281,325	384,655	0.766	215,495	294,646
6/30/17-18	510,352	624,612	0.808	412,407	504,738
6/30/18-19	763,815	1,019,945	0.867	662,375	884,489
Total	3,199,788	4,212,455		2,567,445	3,383,418
			(7) Total Discount Factor:	0.802	0.803

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 4%:	0	0

NOTES:
(2), (3) From Section 7, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 7, Exhibit 2, Page 9, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

Massachusetts Colleges & Universities - Cluster 4
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	265	530	1.000	265	530
6/30/83-84	139	278	1.000	139	278
6/30/84-85	564	1,129	1.000	564	1,129
6/30/85-86	1,153	1,922	1.000	1,153	1,922
6/30/86-87	462	1,198	1.000	462	1,198
6/30/87-88	43	43	0.726	32	32
6/30/88-89	986	986	0.685	675	675
6/30/89-90	544	544	0.646	351	351
6/30/90-91	528	528	0.609	322	322
6/30/91-92	4,051	8,102	0.575	2,329	4,658
6/30/92-93	2,532	5,063	0.542	1,373	2,746
6/30/93-94	5,734	10,751	0.825	4,733	8,874
6/30/94-95	4,582	8,592	0.779	3,568	6,691
6/30/95-96	2,909	5,818	0.938	2,728	5,456
6/30/96-97	12,682	17,957	0.920	11,664	16,515
6/30/97-98	11,451	15,891	0.928	10,623	14,742
6/30/98-99	11,153	14,903	0.890	9,925	13,263
6/30/99-00	17,402	17,402	0.856	14,902	14,902
6/30/00-01	24,188	24,188	0.836	20,219	20,219
6/30/01-02	27,779	33,399	0.816	22,681	27,270
6/30/02-03	25,174	39,594	0.803	20,209	31,786
6/30/03-04	35,090	49,910	0.787	27,612	39,273
6/30/04-05	40,737	60,037	0.770	31,362	46,221
6/30/05-06	48,678	76,178	0.752	36,623	57,313
6/30/06-07	56,505	79,585	0.735	41,514	58,471
6/30/07-08	73,909	112,269	0.727	53,764	81,669
6/30/08-09	77,227	132,027	0.697	53,864	92,086
6/30/09-10	87,312	141,592	0.674	58,845	95,428
6/30/10-11	104,483	175,203	0.669	69,894	117,201
6/30/11-12	122,959	148,379	0.652	80,157	96,728
6/30/12-13	145,492	187,852	0.668	97,225	125,532
6/30/13-14	196,965	223,725	0.668	131,541	149,413
6/30/14-15	217,374	271,224	0.669	145,365	181,376
6/30/15-16	283,246	316,446	0.666	188,602	210,709
6/30/16-17	281,325	384,655	0.687	193,144	264,085
6/30/17-18	510,352	624,612	0.743	378,965	463,810
6/30/18-19	763,815	1,019,945	0.820	626,694	836,844
Total	3,199,788	4,212,455		2,344,089	3,089,715
			(7) Total Discount Factor:	0.733	0.733

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 6%:	0	0

NOTES:
(2), (3) From Section 7, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 7, Exhibit 2, Page 9, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		45,731,885			48,350,821	49,849,073	2,618,936	4,117,188		
6/30/82-83		5,610,779	5,697,324		5,640,351	5,697,000	29,572	86,221		
6/30/83-84		8,169,685	8,346,004		8,262,544	8,429,000	92,859	259,315		
6/30/84-85	732,729	16,978,247	17,382,427	17,244,033	17,244,000	17,382,000	265,753	403,753	2.353	2.372
6/30/85-86	787,208	20,473,899	20,996,926	20,824,484	20,824,000	20,997,000	350,101	523,101	2.645	2.667
6/30/86-87	902,483	21,593,900	22,179,097	21,996,701	21,997,000	22,179,000	403,100	585,100	2.437	2.458
6/30/87-88	1,366,586	29,072,556	29,970,940	29,806,123	29,806,000	30,570,000	733,444	1,497,444	2.181	2.237
6/30/88-89	1,486,478	26,696,792	27,640,515	27,394,090	27,394,000	28,193,000	697,208	1,496,208	1.843	1.897
6/30/89-90	1,494,463	25,552,987	26,649,022	26,490,938	26,491,000	27,182,000	938,013	1,629,013	1.773	1.819
6/30/90-91	1,405,560	21,841,390	22,959,012	22,853,907	22,854,000	23,418,000	1,012,610	1,576,610	1.626	1.666
6/30/91-92	1,364,510	13,562,294	14,430,627	14,357,623	14,358,000	15,152,000	795,706	1,589,706	1.052	1.110
6/30/92-93	1,347,359	10,099,940	10,861,332	10,802,072	10,802,000	10,861,000	702,060	761,060	0.802	0.806
6/30/93-94	1,424,410	11,307,450	12,369,800	12,242,503	12,243,000	12,617,000	935,550	1,309,550	0.860	0.886
6/30/94-95	1,497,829	9,906,165	10,840,776	10,811,987	10,812,000	11,383,000	905,835	1,476,835	0.722	0.760
6/30/95-96	1,582,635	10,373,485	11,541,374	11,498,542	11,499,000	12,118,000	1,125,515	1,744,515	0.727	0.766
6/30/96-97	1,979,748	10,466,281	11,733,354	11,692,019	11,692,000	12,320,000	1,225,719	1,853,719	0.591	0.622
6/30/97-98	1,917,994	8,958,647	10,064,451	10,038,130	10,038,000	10,568,000	1,079,353	1,609,353	0.523	0.551
6/30/98-99	2,081,524	9,491,674	10,861,091	10,825,220	10,825,000	11,404,000	1,333,326	1,912,326	0.520	0.548
6/30/99-00	2,207,243	11,066,635	12,889,070	12,823,918	12,824,000	13,534,000	1,757,365	2,467,365	0.581	0.613
6/30/00-01	2,201,008	10,263,499	12,167,508	12,111,459	12,111,000	12,776,000	1,847,501	2,512,501	0.550	0.580
6/30/01-02	2,292,592	10,436,840	12,447,345	12,405,652	12,406,000	13,070,000	1,969,160	2,633,160	0.541	0.570
6/30/02-03	2,260,534	10,374,736	12,519,125	12,477,925	12,478,000	13,145,000	2,103,264	2,770,264	0.552	0.581
6/30/03-04	2,255,942	9,484,642	11,606,791	11,584,733	11,585,000	12,187,000	2,100,358	2,702,358	0.514	0.540
6/30/04-05	2,309,083	11,111,459	13,688,437	13,302,435	13,302,000	13,688,000	2,190,541	2,576,541	0.576	0.593
6/30/05-06	2,480,693	10,204,383	12,725,493	12,845,943	12,725,000	12,846,000	2,520,617	2,641,617	0.513	0.518
6/30/06-07	2,612,577	9,310,037	11,908,340	12,399,613	11,908,000	12,400,000	2,597,963	3,089,963	0.456	0.475
6/30/07-08	2,783,717	13,408,197	17,506,109	17,172,883	16,829,000	17,523,506	3,420,803	4,115,309	0.605	0.630
6/30/08-09	2,750,907	13,385,900	17,828,104	17,590,741	17,415,090	17,845,828	4,029,190	4,459,928	0.633	0.649
6/30/09-10	2,806,048	13,159,112	17,887,109	17,960,937	17,708,130	17,978,961	4,549,018	4,819,849	0.631	0.641
6/30/10-11	2,942,638	15,223,617	21,344,318	20,841,336	20,632,590	21,365,344	5,408,973	6,141,727	0.701	0.726
6/30/11-12	3,006,849	15,989,893	23,129,052	22,448,853	22,449,000	23,152,129	6,459,107	7,162,236	0.747	0.770
6/30/12-13	3,138,905	12,700,148	19,141,552	20,256,312	19,142,000	20,256,000	6,441,853	7,555,853	0.610	0.645
6/30/13-14	3,311,947	15,372,746	24,598,028	24,829,632	23,614,080	24,830,000	8,241,334	9,457,254	0.713	0.750
6/30/14-15	3,511,622	15,668,864	27,282,270	27,590,210	26,463,540	27,590,000	10,794,676	11,921,136	0.754	0.786
6/30/15-16	3,491,558	15,392,788	30,500,522	30,053,584	29,152,380	30,501,000	13,759,592	15,108,212	0.835	0.874
6/30/16-17	3,338,327	11,445,364	28,031,404	28,319,382	27,190,070	28,319,000	15,744,706	16,873,636	0.814	0.848
6/30/17-18	3,401,479	8,946,138	31,166,335	30,993,622	30,064,180	31,166,000	21,118,042	22,219,862	0.884	0.916
6/30/18-19	3,573,725	3,704,302	30,172,280	34,110,736	29,266,840	34,111,000	25,562,538	30,406,698	0.819	0.954
Total	78,048,908	542,537,355	663,063,264	650,998,280	700,398,616	728,603,841	157,861,262	186,066,487		
Tot 6/30/84-19	78,048,908	483,025,005	649,019,936	650,998,280	638,144,900	664,628,768	155,119,895	181,603,763	0.818	0.852

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) Sum of Section 8, Exhibit 1, Page 2, Column 3 and Section 8, Exhibit 1, Page 9, Column 8
(4) From Section 8, Exhibit 1, Page 2, Column 8
(5) From Section 8, Exhibit 1, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim	Average Age
All Prior Yrs		44,071,671							7	6		80
6/30/82-83		5,567,029	1.016	1.000	5,653,355	43,969	5,697,324		0	0		
6/30/83-84		7,686,135	1.018	1.005	7,860,036	485,968	8,346,004		1	1	173,902	72
6/30/84-85	732,729	16,231,743	1.020	1.005	16,632,190	750,237	17,382,427	2.372	1	1	400,447	
6/30/85-86	787,208	19,367,365	1.022	1.005	19,884,860	1,112,066	20,996,926	2.667	3	3	172,498	82
6/30/86-87	902,483	20,074,036	1.024	1.005	20,651,634	1,527,463	22,179,097	2.458	6	5	115,520	77
6/30/87-88	1,366,586	27,001,152	1.028	1.005	27,889,179	2,081,761	29,970,940	2.193	7	6	148,004	73
6/30/88-89	1,486,478	23,770,559	1.034	1.005	24,699,651	2,940,864	27,640,515	1.859	5	5	185,818	70
6/30/89-90	1,494,463	22,837,362	1.042	1.005	23,919,819	2,729,203	26,649,022	1.783	7	6	180,409	69
6/30/90-91	1,405,560	19,343,788	1.052	1.005	20,448,922	2,510,090	22,959,012	1.633	4	4	276,283	82
6/30/91-92	1,364,510	12,180,558	1.065	1.005	13,041,983	1,388,644	14,430,627	1.058	4	4	215,356	73
6/30/92-93	1,347,359	8,842,067	1.080	1.005	9,596,535	1,264,798	10,861,332	0.806	3	1	754,467	80
6/30/93-94	1,424,410	10,000,928	1.094	1.010	11,055,426	1,314,375	12,369,800	0.868	6	6	175,750	76
6/30/94-95	1,497,829	8,373,947	1.110	1.000	9,297,022	1,543,753	10,840,776	0.724	2	2	461,538	75
6/30/95-96	1,582,635	9,027,803	1.128	1.000	10,183,512	1,357,862	11,541,374	0.729	2	2	577,855	85
6/30/96-97	1,979,748	8,557,462	1.145	1.000	9,799,444	1,933,911	11,733,354	0.593	3	3	413,994	70
6/30/97-98	1,917,994	6,556,452	1.163	1.000	7,623,089	2,441,362	10,064,451	0.525	1	1	1,066,637	76
6/30/98-99	2,081,524	7,343,610	1.180	1.000	8,667,570	2,193,521	10,861,091	0.522	6	4	330,990	56
6/30/99-00	2,207,243	9,048,086	1.195	1.000	10,813,580	2,075,490	12,889,070	0.584	4	3	588,498	73
6/30/00-01	2,201,008	8,661,070	1.212	1.000	10,498,134	1,669,374	12,167,508	0.553	5	6	306,177	63
6/30/01-02	2,292,592	8,431,421	1.227	1.000	10,348,912	2,098,433	12,447,345	0.543	3	2	958,745	52
6/30/02-03	2,260,534	8,436,342	1.243	1.000	10,484,188	2,034,937	12,519,125	0.554	4	3	682,615	51
6/30/03-04	2,255,942	7,782,878	1.260	1.000	9,804,007	1,802,784	11,606,791	0.514	6	4	505,282	60
6/30/04-05	2,309,083	8,749,258	1.278	1.000	11,177,839	2,510,598	13,688,437	0.593	5	4	607,145	60
6/30/05-06	2,480,693	7,786,383	1.303	1.000	10,145,517	2,579,976	12,725,493	0.513	2	4	589,784	62
6/30/06-07	2,612,577	7,435,948	1.328	1.000	9,877,265	2,031,075	11,908,340	0.456	4	3	813,772	59
6/30/07-08	2,783,717	10,769,549	1.358	1.000	14,621,269	2,884,839	17,506,109	0.629	8	6	641,953	62
6/30/08-09	2,750,907	10,640,281	1.391	1.000	14,798,546	3,029,558	17,828,104	0.648	6	4	1,039,566	60
6/30/09-10	2,806,048	10,296,898	1.426	1.000	14,686,016	3,201,093	17,887,109	0.637	4	5	877,824	54
6/30/10-11	2,942,638	12,221,441	1.467	1.000	17,923,800	3,420,519	21,344,318	0.725	14	9	633,595	56
6/30/11-12	3,006,849	12,965,823	1.510	1.000	19,580,618	3,548,435	23,129,052	0.769	23	16	413,425	58
6/30/12-13	3,138,905	10,379,197	1.566	1.000	16,250,988	2,890,564	19,141,552	0.610	22	19	309,042	56
6/30/13-14	3,311,947	12,673,994	1.642	1.000	20,813,116	3,784,912	24,598,028	0.743	47	33	246,640	57
6/30/14-15	3,511,622	13,160,624	1.757	1.000	23,129,257	4,153,012	27,282,270	0.777	73	49	203,441	52
6/30/15-16	3,491,558	13,434,586	1.927	1.000	25,893,205	4,607,317	30,500,522	0.874	125	91	136,908	52
6/30/16-17	3,338,327	10,840,564	2.272	1.000	24,627,960	3,403,444	28,031,404	0.840	217	96	143,619	49
6/30/17-18	3,401,479	8,732,069	3.124	1.000	27,274,806	3,891,529	31,166,335	0.916	510	237	78,239	47
6/30/18-19	3,573,725	3,704,302	6.833	1.000	25,309,822	4,862,457	30,172,280	0.844		428	50,480	44
Total	78,048,908	472,984,384			574,963,070	88,100,194	663,063,264		1,150	1,082		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 8, Exhibit 1, Page 7
(5) Based on information from the MA WCRIB
(6) = (3) x (4) x (5)
(7) From Section 8, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	732,729	1.863	16,231,743	1.020	16,493,797	750,237	17,244,033	2.353	2.251
6/30/85-86	787,208	2.072	19,367,365	1.022	19,712,418	1,112,066	20,824,484	2.645	2.504
6/30/86-87	902,483	1.895	20,074,036	1.024	20,469,238	1,527,463	21,996,701	2.437	2.268
6/30/87-88	1,366,586	1.960	27,001,152	1.028	27,724,362	2,081,761	29,806,123	2.181	2.029
6/30/88-89	1,486,478	1.400	23,770,559	1.034	24,453,226	2,940,864	27,394,090	1.843	1.645
6/30/89-90	1,494,463	1.528	22,837,362	1.042	23,761,735	2,729,203	26,490,938	1.773	1.590
6/30/90-91	1,405,560	1.443	19,343,788	1.052	20,343,817	2,510,090	22,853,907	1.626	1.447
6/30/91-92	1,364,510	0.941	12,180,558	1.065	12,968,979	1,388,644	14,357,623	1.052	0.950
6/30/92-93	1,347,359	0.697	8,842,067	1.080	9,537,274	1,264,798	10,802,072	0.802	0.708
6/30/93-94	1,424,410	0.754	10,000,928	1.094	10,928,129	1,314,375	12,242,503	0.859	0.767
6/30/94-95	1,497,829	0.601	8,373,947	1.110	9,268,234	1,543,753	10,811,987	0.722	0.619
6/30/95-96	1,582,635	0.620	9,027,803	1.128	10,140,680	1,357,862	11,498,542	0.727	0.641
6/30/96-97	1,979,748	0.479	8,557,462	1.145	9,758,108	1,933,911	11,692,019	0.591	0.493
6/30/97-98	1,917,994	0.388	6,556,452	1.163	7,596,768	2,441,362	10,038,130	0.523	0.396
6/30/98-99	2,081,524	0.405	7,343,610	1.180	8,631,700	2,193,521	10,825,220	0.520	0.415
6/30/99-00	2,207,243	0.472	9,048,086	1.195	10,748,428	2,075,490	12,823,918	0.581	0.487
6/30/00-01	2,201,008	0.462	8,661,070	1.212	10,442,085	1,669,374	12,111,459	0.550	0.474
6/30/01-02	2,292,592	0.442	8,431,421	1.227	10,307,219	2,098,433	12,405,652	0.541	0.450
6/30/02-03	2,260,534	0.454	8,436,342	1.243	10,442,988	2,034,937	12,477,925	0.552	0.462
6/30/03-04	2,255,942	0.430	7,782,878	1.260	9,781,948	1,802,784	11,584,733	0.514	0.434
6/30/04-05	2,309,083	0.407	8,749,258	1.278	10,791,837	2,510,598	13,302,435	0.576	0.467
6/30/05-06	2,480,693	0.430	7,786,383	1.303	10,265,967	2,579,976	12,845,943	0.518	0.414
6/30/06-07	2,612,577	0.454	7,435,948	1.328	10,368,537	2,031,075	12,399,613	0.475	0.397
6/30/07-08	2,783,717	0.480	10,769,549	1.358	14,288,044	2,884,839	17,172,883	0.617	0.513
6/30/08-09	2,750,907	0.507	10,640,281	1.391	14,561,183	3,029,558	17,590,741	0.639	0.529
6/30/09-10	2,806,048	0.532	10,296,898	1.426	14,759,844	3,201,093	17,960,937	0.640	0.526
6/30/10-11	2,942,638	0.555	12,221,441	1.467	17,420,818	3,420,519	20,841,336	0.708	0.592
6/30/11-12	3,006,849	0.584	12,965,823	1.510	18,900,418	3,548,435	22,448,853	0.747	0.629
6/30/12-13	3,138,905	0.616	10,379,197	1.566	17,365,748	2,890,564	20,256,312	0.645	0.553
6/30/13-14	3,311,947	0.646	12,673,994	1.642	21,044,720	3,784,912	24,829,632	0.750	0.635
6/30/14-15	3,511,622	0.679	13,160,624	1.757	23,437,197	4,153,012	27,590,210	0.786	0.667
6/30/15-16	3,491,558	0.715	13,434,586	1.927	25,446,267	4,607,317	30,053,584	0.861	0.729
6/30/16-17	3,338,327	0.753	10,840,564	2.272	24,915,938	3,403,444	28,319,382	0.848	0.746
6/30/17-18	3,401,479	0.794	8,732,069	3.124	27,102,093	3,891,529	30,993,622	0.911	0.797
6/30/18-19	3,573,725	0.837	3,704,302	6.833	29,248,278	4,862,457	34,110,736	0.954	0.818
Total	78,048,908		415,659,548		563,428,023	87,570,257	650,998,280		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 8, Exhibit 1, Page 4, Column 11
(4) From Section 8, Exhibit 1, Page 2, Column 3
(5) From Section 8, Exhibit 1, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) From Section 8, Exhibit 1, Page 9, Column 13
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									1.863	1.863
6/30/85-86									2.072	2.072
6/30/86-87									1.895	1.895
6/30/87-88									1.960	1.960
6/30/88-89									1.400	1.400
6/30/89-90									1.528	1.528
6/30/90-91	1,405,560	20,448,922	1.455	0.996	1.450	3.584	5.195	0.245	1.451	1.443
6/30/91-92	1,364,510	13,041,983	0.956	1.093	1.045	3.430	3.583	0.233	0.944	0.941
6/30/92-93	1,347,359	9,596,535	0.712	1.275	0.908	3.282	2.980	0.209	0.705	0.697
6/30/93-94	1,424,410	11,055,426	0.776	1.258	0.977	3.141	3.067	0.221	0.752	0.754
6/30/94-95	1,497,829	9,297,022	0.621	1.247	0.774	3.005	2.326	0.234	0.606	0.601
6/30/95-96	1,582,635	10,183,512	0.643	1.237	0.796	2.876	2.289	0.246	0.624	0.620
6/30/96-97	1,979,748	9,799,444	0.495	1.224	0.606	2.752	1.668	0.260	0.482	0.479
6/30/97-98	1,917,994	7,623,089	0.397	1.209	0.480	2.634	1.265	0.275	0.391	0.388
6/30/98-99	2,081,524	8,667,570	0.416	1.193	0.497	2.520	1.252	0.291	0.408	0.405
6/30/99-00	2,207,243	10,813,580	0.490	1.174	0.575	2.412	1.387	0.309	0.476	0.472
6/30/00-01	2,201,008	10,498,134	0.477	1.144	0.546	2.308	1.259	0.331	0.466	0.462
6/30/01-02	2,292,592	10,348,912	0.451	1.122	0.506	2.208	1.118	0.353	0.449	0.442
6/30/02-03	2,260,534	10,484,188	0.464	1.118	0.518	2.113	1.095	0.370	0.460	0.454
6/30/03-04	2,255,942	9,804,007	0.435	1.118	0.486	2.022	0.982	0.387	0.435	0.430
6/30/04-05	2,309,083	11,177,839	0.484	1.111	0.538	1.935	1.040	0.407	0.392	0.407
6/30/05-06	2,480,693	10,145,517	0.409	1.099	0.450	1.852	0.832	0.430	0.416	0.430
6/30/06-07	2,612,577	9,877,265	0.378	1.087	0.411	1.772	0.728	0.454	0.441	0.454
6/30/07-08	2,783,717	14,621,269	0.525	1.075	0.565	1.696	0.958	0.480	0.468	0.480
6/30/08-09	2,750,907	14,798,546	0.538	1.063	0.572	1.623	0.928	0.507	0.497	0.507
6/30/09-10	2,806,048	14,686,016	0.523	1.059	0.554	1.553	0.861	0.532	0.524	0.532
6/30/10-11	2,942,638	17,923,800	0.609	1.060	0.646	1.486	0.960	0.555	0.550	0.555
6/30/11-12	3,006,849	19,580,618	0.651	1.053	0.686	1.422	0.975	0.584	0.581	0.584
6/30/12-13	3,138,905	16,250,988	0.518	1.044	0.540	1.361	0.735	0.616	0.616	0.616
6/30/13-14	3,311,947	20,813,116	0.628	1.040	0.653	1.302	0.851	0.646	0.649	0.646
6/30/14-15	3,511,622	23,129,257	0.659	1.034	0.681	1.246	0.849	0.679	0.685	0.679
6/30/15-16	3,491,558	25,893,205	0.742	1.026	0.761	1.193	0.908	0.715	0.725	0.715
6/30/16-17	3,338,327	24,627,960	0.738	1.018	0.751	1.141	0.857	0.753	0.766	0.753
6/30/17-18	3,401,479	27,274,806	0.802	1.009	0.809	1.092	0.883	0.794	0.810	0.794
6/30/18-19	3,573,725	25,309,822	0.708	1.000	0.708	1.045	0.740	0.837		0.837
Total	71,278,962	427,772,346								

Trend Last 4 (ex 18-19):	5.2%	Avg 3 (ex 18-19):	0.883
Trend Last 8 (ex 18-19):	3.8%	Avg 5 (ex 18-19):	0.869
Trend Last 12 (ex 18-19):	4.6%	Avg 10 (ex 18-19):	0.881
Prior Selected Trend:	5.0%	Prior Sel Avg:	0.850
Selected Trend:	4.5%	Sel. Loss Cost:	0.875

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 8, Exhibit 1, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCRIB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.940	
(2)	Credibility		57%	
(3)	Average Pmt Trend Statewide		0.950	
(4)	Credibility Weighted Trend		0.944	
		(Low)		(High)
(5)	Selected Range	0.941		0.965
(6)	Incremental Paid for 2019	250,487		250,487
(7)	Estimated Reserve	4,026,588		6,906,290
(8)	Paid to Date (82 & Prior)	44,071,671		44,071,671
(9)	Est Ult Paid for 1982 & Prior	48,098,260		50,977,962

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	305,521	382,990
(11)	Projected Number of Years	7	7
(12)	Estimated Reserve	2,138,650	2,680,932
(13)	Paid to Date (82 & Prior)	44,071,671	43,821,184
(14)	Est Ult Paid for 1982 & Prior	46,210,322	46,502,116
(14a)	Paid Counts During Fiscal Year	6	7

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	46,682,306	48,180,558
(16)	Lump Sum Ultimates	1,668,515	1,668,515
(17)	Ult Loss Including Lump Sums	**48,350,821**	**49,849,073**
(18)	Implied Tail	1.059	1.093
(19)	Ult Loss Inc Lump Sums @ 6/18	48,982,800	51,826,222

NOTES:

(1) From Section 8, Exhibit 1, Page 6
(2) = (Average of Section 8, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 8, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 8, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 8, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	1,836,769	14.424			
1993	2	1,798,132	14.402	0.979		
1994	3	1,805,622	14.406	1.004		
1995	4	1,547,567	14.252	0.857		
1996	5	1,421,249	14.167	0.918		
1997	6	1,347,840	14.114	0.948		
1998	7	1,296,821	14.075	0.962		
1999	8	1,188,256	13.988	0.916		
2000	9	1,366,125	14.127	1.150	n =	28
2001	10	1,385,608	14.142	1.014	S(x) =	56,154
2002	11	1,127,515	13.936	0.814	S(x-sq) =	112,618,674
2003	12	1,046,115	13.861	0.928	S(xy) =	768,054
2004	13	1,007,259	13.823	0.963	S(y) =	383
2005	14	889,985	13.699	0.884	D =	51,156
2006	15	854,725	13.659	0.960	slope =	-0.062
2007	16	901,012	13.711	1.054	Avg Trend =	0.938
2008	17	757,677	13.538	0.841		
2009	18	716,898	13.483	0.946		
2010	19	794,268	13.585	1.108		
2011	20	682,924	13.434	0.860		
2012	21	659,520	13.399	0.966		
2013	22	610,950	13.323	0.926		
2014	23	572,165	13.257	0.937		
2015	24	586,996	13.283	1.026		
2016	25	482,894	13.088	0.823		
2017	26	362,696	12.801	0.751		
2018	27	303,381	12.623	0.836		
2019	28	250,487	12.431	0.691		
					Selected Trend:	**0.940**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2019: 0.691 = 250487 / 303381

Commonwealth of Massachusetts Workers Compensation
All Other - Clusters 5-17 & 95
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
June-83	231,024	575,253	850,794	1,079,038	1,313,630	1,547,045	1,752,282	2,008,011	2,253,139	2,495,680	2,697,289	2,900,500	3,128,719	3,307,827	3,431,589	3,539,243	3,710,205	3,863,378	3,993,953	4,130,963	4,277,923	4,408,084	4,548,681	4,684,745	4,831,991	4,987,790	5,125,598	5,253,262	5,365,011	5,438,336	5,513,211	5,568,431	5,567,029	5,567,029	5,567,029	5,567,029	5,567,029
June-84	474,232	1,177,837	1,738,838	2,206,285	2,688,699	3,194,391	3,593,923	3,979,171	4,253,324	4,483,497	4,692,563	4,887,962	5,105,946	5,268,212	5,510,171	5,713,715	5,953,029	6,114,581	6,330,589	6,551,091	6,749,135	6,911,821	7,056,179	7,158,846	7,234,716	7,305,169	7,339,786	7,374,258	7,408,772	7,445,202	7,482,504	7,520,670	7,560,195	7,600,776	7,642,735	7,686,135	
June-85	977,090	2,372,578	3,464,586	4,349,747	5,275,439	6,134,761	6,920,369	7,655,499	8,408,427	8,983,219	9,607,477	10,145,930	10,640,204	11,178,862	11,641,664	12,100,236	12,599,733	13,016,766	13,426,358	13,778,892	14,131,892	14,427,029	14,710,082	14,949,032	15,141,235	15,309,397	15,476,853	15,650,018	15,828,834	15,902,384	15,963,360	16,026,507	16,092,726	16,161,795	16,231,743		
June-86	1,346,949	3,307,907	4,829,702	6,090,487	7,340,375	8,352,083	9,113,471	9,830,455	10,384,747	11,054,823	11,652,485	12,298,057	12,995,823	13,464,328	13,904,681	14,437,279	14,899,857	15,315,399	15,687,156	16,043,093	16,396,498	16,749,018	17,081,069	17,430,688	17,722,515	17,979,439	18,192,658	18,367,288	18,528,274	18,693,051	18,865,007	19,041,560	19,224,102	19,367,365			
June-87	1,601,233	3,880,011	5,503,885	7,082,566	8,405,662	9,270,533	9,956,299	10,556,456	11,085,673	11,623,420	12,106,294	12,632,595	13,327,657	13,820,597	14,335,672	14,795,690	15,267,959	15,661,703	15,953,801	16,321,920	16,607,046	16,861,857	17,127,747	17,450,228	17,735,296	18,028,041	18,331,993	18,621,372	18,914,419	19,217,565	19,527,567	19,814,955	20,074,036				
June-88	2,137,513	5,007,777	7,745,041	10,041,912	12,075,717	13,478,064	14,314,633	15,200,521	15,990,897	16,687,795	17,326,343	17,991,163	18,710,472	19,340,236	19,962,128	20,594,429	21,200,720	21,738,131	22,267,656	22,756,365	23,248,699	23,645,371	23,973,193	24,351,090	24,721,300	25,061,227	25,402,296	25,751,197	26,108,153	26,409,112	26,729,296	27,001,152					
June-89	1,712,857	5,080,303	7,663,780	9,679,037	11,203,387	12,173,513	13,105,806	13,862,567	14,433,962	15,035,025	15,605,979	16,156,892	16,752,699	17,314,807	17,864,824	18,333,675	18,761,144	19,180,530	19,588,446	20,011,654	20,402,670	20,798,618	21,197,603	21,577,022	21,928,411	22,287,434	22,650,460	22,992,900	23,294,273	23,537,672	23,770,559						
June-90	2,296,897	5,721,042	8,298,538	10,219,139	11,305,744	12,281,818	13,134,163	13,878,235	14,556,408	15,345,419	15,898,180	16,435,568	16,919,598	17,383,167	17,777,202	18,153,288	18,514,019	18,829,999	19,129,560	19,445,117	19,770,540	20,083,209	20,405,842	20,740,230	21,078,475	21,425,424	21,783,413	22,151,866	22,514,365	22,837,362							
June-91	1,963,238	4,739,981	6,742,583	8,047,589	9,308,882	10,318,373	10,933,284	11,411,152	12,022,048	12,546,665	13,141,453	13,738,283	14,329,913	14,888,135	15,354,127	15,837,750	16,311,134	16,689,475	17,129,945	17,375,269	17,615,173	17,862,598	18,129,844	18,364,459	18,577,053	18,761,226	18,948,944	19,143,029	19,343,788								
June-92	1,567,027	3,199,073	4,248,177	5,126,895	5,548,304	5,823,625	6,278,092	6,617,495	6,955,659	7,247,236	7,617,889	7,987,140	8,298,781	8,572,496	8,940,354	9,365,337	9,715,209	10,024,920	10,338,595	10,607,880	10,865,629	11,121,672	11,298,499	11,478,454	11,664,168	11,843,558	12,009,744	12,180,558									
June-93	1,093,248	2,645,187	3,492,766	4,149,352	4,610,531	4,966,351	5,148,147	5,423,620	5,783,566	6,064,338	6,275,882	6,484,665	6,664,357	6,833,263	7,010,090	7,177,333	7,331,914	7,520,747	7,748,152	7,957,233	8,148,509	8,300,461	8,427,178	8,541,121	8,721,600	8,791,819	8,842,067										
June-94	1,108,341	2,442,329	3,499,107	4,117,213	4,786,813	5,345,023	5,784,388	6,350,297	6,596,878	6,855,808	7,108,040	7,401,172	7,629,538	7,841,336	8,036,532	8,208,058	8,388,758	8,566,268	8,735,517	8,920,103	9,094,927	9,272,603	9,452,424	9,631,985	9,814,793	10,000,928											
June-95	1,320,706	2,682,119	3,617,627	4,377,145	4,799,858	5,146,590	5,470,951	5,690,639	5,928,230	6,125,266	6,322,277	6,510,106	6,695,050	6,862,701	7,023,885	7,185,394	7,342,550	7,524,723	7,689,350	7,855,113	7,982,201	8,105,050	8,207,710	8,290,079	8,373,947												
June-96	1,108,821	2,267,039	3,245,140	3,817,977	4,427,598	4,928,644	5,324,160	5,709,230	6,066,925	6,359,154	6,633,555	6,919,769	7,184,823	7,415,770	7,649,372	7,874,542	8,065,046	8,199,310	8,329,411	8,584,454	8,752,873	8,842,875	8,934,504	9,027,803													
June-97	1,085,126	2,350,834	3,458,998	4,440,774	5,289,243	5,991,102	6,443,225	6,730,818	6,877,491	7,036,406	7,147,793	7,354,650	7,473,882	7,593,508	7,713,847	7,874,055	7,998,711	8,115,077	8,205,201	8,300,591	8,386,898	8,470,482	8,557,462														
June-98	760,353	2,208,225	3,319,672	3,933,784	4,535,498	4,913,580	5,187,189	5,377,292	5,538,593	5,683,480	5,803,895	5,909,062	5,992,596	6,108,804	6,223,326	6,269,462	6,315,915	6,362,921	6,410,703	6,458,417	6,506,992	6,556,452															
June-99	1,160,394	2,519,810	3,441,432	4,263,196	4,763,871	5,080,496	5,423,838	5,694,351	5,858,839	6,093,043	6,235,873	6,377,337	6,494,424	6,587,838	6,682,288	6,778,115	6,925,083	7,070,436	7,202,887	7,277,152	7,343,610																
June-00	1,478,087	3,369,760	4,601,283	5,433,894	6,170,827	6,679,071	7,051,320	7,313,676	7,476,289	7,629,742	7,749,526	7,893,815	8,042,197	8,192,773	8,347,186	8,503,330	8,663,410	8,825,026	8,949,196	9,048,086																	
June-01	1,609,875	3,605,278	4,700,879	5,525,999	6,126,399	6,527,511	6,768,096	7,002,422	7,073,145	7,226,294	7,426,582	7,654,033	7,849,861	8,020,910	8,190,421	8,343,041	8,462,386	8,560,385	8,661,070																		
June-02	1,821,131	4,134,238	5,441,659	6,321,376	6,748,539	7,056,349	7,305,019	7,488,627	7,707,068	7,893,060	8,009,207	8,123,218	8,235,728	8,305,377	8,337,160	8,368,599	8,400,043	8,431,421																			
June-03	2,185,619	4,646,586	6,055,662	6,651,765	7,013,996	7,231,292	7,459,850	7,624,463	7,742,363	7,842,222	7,917,384	8,045,457	8,162,493	8,243,468	8,319,058	8,355,976	8,436,342																				
June-04	1,753,076	3,756,461	4,930,176	5,714,500	6,081,077	6,318,306	6,512,915	6,733,332	6,893,294	7,027,971	7,170,376	7,302,807	7,438,524	7,571,596	7,689,498	7,782,878																					
June-05	1,819,778	3,933,297	5,289,170	6,002,168	6,318,763	6,666,265	7,108,767	7,449,646	7,676,782	7,893,608	8,127,072	8,305,978	8,437,198	8,584,628	8,749,258																						
June-06	1,788,326	3,829,026	4,910,437	5,443,647	5,995,523	6,675,753	7,041,075	7,199,757	7,277,714	7,519,741	7,637,818	7,685,159	7,730,889	7,786,383																							
June-07	1,734,963	3,632,388	4,091,097	4,999,633	5,805,615	6,226,124	6,546,082	6,722,055	6,991,701	7,150,792	7,262,766	7,349,434	7,435,948																								
June-08	2,020,827	4,505,431	6,126,330	7,479,871	8,430,592	9,094,716	9,567,218	9,850,781	10,074,097	10,300,314	10,537,637	10,769,549																									
June-09	1,952,179	4,646,609	6,562,837	7,998,181	8,997,984	9,939,858	10,332,984	10,514,184	10,522,712	10,573,730	10,640,281																										
June-10	2,633,117	5,635,921	7,589,725	8,649,349	9,377,427	9,682,440	9,913,357	10,053,526	10,173,489	10,296,898																											
June-11	3,051,305	6,236,233	8,335,371	9,693,865	10,723,507	11,281,886	11,720,021	11,983,128	12,221,441																												
June-12	3,091,255	6,520,051	8,927,094	10,508,623	11,447,181	12,143,610	12,599,871	12,965,823																													
June-13	3,164,952	6,219,894	8,032,100	9,109,069	9,525,823	10,032,096	10,379,197																														
June-14	3,352,283	7,306,365	9,677,378	10,985,528	11,937,152	12,673,994																															
June-15	3,469,231	7,330,865	10,059,402	11,997,955	13,160,624																																
June-16	3,743,094	8,120,540	11,329,296	13,434,586																																	
June-17	3,508,611	7,778,444	10,840,564																																		
June-18	4,074,884	8,732,069																																			
June-19	3,704,302																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
June-83	2.490	1.479	1.268	1.217	1.178	1.133	1.146	1.122	1.108	1.081	1.075	1.079	1.057	1.037	1.031	1.048	1.041	1.034	1.034	1.036	1.030	1.032	1.030	1.031	1.032	1.028	1.025	1.021	1.014	1.014	1.010	1.000	1.000	1.000	1.000	1.000
June-84	2.484	1.476	1.269	1.219	1.188	1.125	1.107	1.069	1.054	1.047	1.042	1.045	1.032	1.046	1.037	1.042	1.027	1.035	1.035	1.030	1.024	1.021	1.015	1.011	1.010	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.006	1.006	
June-85	2.428	1.460	1.255	1.213	1.163	1.128	1.106	1.098	1.068	1.069	1.056	1.049	1.051	1.041	1.039	1.041	1.033	1.031	1.026	1.026	1.021	1.020	1.016	1.013	1.011	1.011	1.011	1.011	1.005	1.004	1.004	1.004	1.004	1.004		
June-86	2.456	1.460	1.261	1.205	1.138	1.091	1.079	1.056	1.065	1.054	1.055	1.057	1.036	1.033	1.038	1.032	1.028	1.024	1.023	1.022	1.021	1.020	1.020	1.017	1.014	1.012	1.010	1.009	1.009	1.009	1.009	1.010	1.007			
June-87	2.423	1.419	1.287	1.187	1.103	1.074	1.060	1.050	1.049	1.042	1.043	1.055	1.037	1.037	1.032	1.032	1.026	1.019	1.023	1.017	1.015	1.016	1.019	1.016	1.017	1.017	1.016	1.016	1.016	1.016	1.015	1.013				
June-88	2.343	1.547	1.297	1.203	1.116	1.062	1.062	1.052	1.044	1.038	1.038	1.040	1.034	1.032	1.032	1.029	1.025	1.024	1.022	1.022	1.017	1.014	1.016	1.015	1.014	1.014	1.014	1.014	1.012	1.012	1.010					
June-89	2.966	1.509	1.263	1.157	1.087	1.077	1.058	1.041	1.042	1.038	1.035	1.037	1.034	1.032	1.026	1.023	1.022	1.021	1.022	1.020	1.019	1.019	1.018	1.016	1.016	1.016	1.015	1.013	1.010	1.010						
June-90	2.491	1.451	1.231	1.106	1.086	1.069	1.057	1.049	1.054	1.036	1.034	1.029	1.027	1.023	1.021	1.020	1.017	1.016	1.016	1.017	1.016	1.016	1.016	1.016	1.016	1.017	1.017	1.016	1.014							
June-91	2.414	1.422	1.194	1.157	1.108	1.060	1.044	1.054	1.044	1.047	1.045	1.043	1.039	1.031	1.031	1.030	1.023	1.026	1.014	1.014	1.014	1.015	1.013	1.012	1.010	1.010	1.010	1.010								
June-92	2.041	1.328	1.207	1.082	1.050	1.078	1.054	1.051	1.042	1.051	1.048	1.039	1.033	1.043	1.048	1.037	1.032	1.031	1.026	1.024	1.024	1.016	1.016	1.016	1.015	1.014	1.014									
June-93	2.420	1.320	1.188	1.111	1.077	1.037	1.054	1.066	1.049	1.035	1.033	1.028	1.025	1.026	1.024	1.022	1.026	1.030	1.027	1.024	1.019	1.015	1.014	1.021	1.008	1.006										
June-94	2.204	1.433	1.177	1.163	1.117	1.082	1.098	1.039	1.039	1.037	1.041	1.031	1.028	1.025	1.021	1.022	1.021	1.020	1.021	1.020	1.020	1.019	1.019	1.019	1.019	1.017	1.016	1.016	1.016	1.016	1.015	1.013				
June-95	2.031	1.349	1.210	1.097	1.072	1.063	1.040	1.042	1.033	1.032	1.030	1.028	1.025	1.023	1.023	1.022	1.025	1.022	1.022	1.016	1.015	1.013	1.010	1.010												
June-96	2.045	1.431	1.177	1.160	1.113	1.080	1.072	1.063	1.048	1.043	1.043	1.038	1.032	1.032	1.029	1.024	1.017	1.016	1.031	1.020	1.010	1.010	1.010													
June-97	2.166	1.471	1.284	1.191	1.133	1.075	1.045	1.022	1.023	1.016	1.029	1.016	1.016	1.016	1.021	1.016	1.015	1.011	1.012	1.010	1.010	1.010														
June-98	2.904	1.503	1.185	1.153	1.083	1.056	1.037	1.030	1.026	1.021	1.018	1.014	1.019	1.019	1.007	1.007	1.007	1.008	1.007	1.008	1.008															
June-99	2.172	1.366	1.239	1.117	1.066	1.068	1.050	1.029	1.040	1.023	1.023	1.018	1.014	1.014	1.014	1.022	1.021	1.019	1.010	1.009																
June-00	2.280	1.365	1.181	1.136	1.082	1.056	1.037	1.022	1.021	1.016	1.019	1.019	1.019	1.019	1.019	1.019	1.019	1.014	1.011																	
June-01	2.239	1.304	1.176	1.109	1.065	1.037	1.035	1.010	1.022	1.028	1.031	1.026	1.022	1.021	1.019	1.014	1.012	1.012																		
June-02	2.270	1.316	1.162	1.068	1.046	1.035	1.025	1.029	1.024	1.015	1.014	1.014	1.008	1.004	1.004	1.004	1.004																			
June-03	2.126	1.303	1.098	1.054	1.031	1.032	1.022	1.015	1.013	1.010	1.016	1.015	1.010	1.009	1.004	1.010																				
June-04	2.143	1.312	1.159	1.064	1.039	1.031	1.034	1.024	1.020	1.020	1.018	1.019	1.018	1.016	1.012																					
June-05	2.161	1.345	1.135	1.053	1.055	1.066	1.048	1.030	1.028	1.030	1.022	1.016	1.017	1.019																						
June-06	2.141	1.282	1.109	1.101	1.113	1.055	1.023	1.011	1.033	1.016	1.006	1.006	1.007																							
June-07	2.094	1.126	1.222	1.161	1.072	1.051	1.027	1.040	1.023	1.016	1.012	1.012																								
June-08	2.229	1.360	1.221	1.127	1.079	1.052	1.030	1.023	1.022	1.023	1.022																									
June-09	2.380	1.412	1.219	1.125	1.105	1.040	1.018	1.001	1.005	1.006																										
June-10	2.140	1.347	1.140	1.084	1.033	1.024	1.014	1.012	1.012																											
June-11	2.044	1.337	1.163	1.106	1.052	1.039	1.022	1.020																												
June-12	2.109	1.369	1.177	1.089	1.061	1.038	1.029																													
June-13	1.965	1.291	1.134	1.046	1.053	1.035																														
June-14	2.180	1.325	1.135	1.087	1.062																															
June-15	2.113	1.372	1.193	1.097																																
June-16	2.169	1.395	1.186																																	
June-17	2.217	1.394																																		
June-18	2.143																																			

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs	2.267	1.382	1.200	1.129	1.088	1.063	1.051	1.040	1.037	1.033	1.033	1.031	1.027	1.026	1.024	1.025	1.022	1.022	1.021	1.020	1.018	1.017	1.017	1.016	1.015	1.013	1.014	1.013	1.011	1.010	1.009	1.006	1.004	1.003	1.003	1.000	
Latest 5	2.164	1.355	1.165	1.085	1.052	1.035	1.023	1.019	1.019	1.018	1.016	1.013	1.012	1.014	1.012	1.014	1.012	1.013	1.014	1.013	1.013	1.014	1.014	1.016	1.014	1.013	1.014	1.014	1.012	1.010	1.009	1.006					
Latest 3	2.176	1.387	1.171	1.076	1.059	1.037	1.022	1.011	1.013	1.015	1.013	1.011	1.014	1.015	1.007	1.009	1.011	1.015	1.010	1.009	1.009	1.011	1.013	1.017	1.014	1.010	1.014	1.013	1.012	1.013	1.011	1.009	1.006	1.003			
Volume Wtd																																					
All Yrs	2.224	1.375	1.194	1.121	1.082	1.058	1.047	1.038	1.036	1.033	1.033	1.032	1.028	1.027	1.026	1.025	1.022	1.022	1.021	1.019	1.017	1.017	1.016	1.016	1.015	1.014	1.013	1.013	1.011	1.010	1.009	1.008	1.005	1.004	1.003		
Latest 5	2.164	1.359	1.167	1.086	1.053	1.035	1.023	1.018	1.018	1.018	1.017	1.013	1.012	1.014	1.012	1.013	1.012	1.013	1.015	1.013	1.013	1.014	1.014	1.015	1.014	1.014	1.014	1.014	1.012	1.011	1.009						
Latest 3	2.175	1.387	1.172	1.079	1.059	1.037	1.022	1.011	1.013	1.015	1.014	1.011	1.014	1.015	1.007	1.009	1.011	1.015	1.010	1.009	1.009	1.011	1.013	1.017	1.014	1.010	1.014	1.013	1.012	1.012	1.011	1.009	1.006				

Dev Factor Selection																																					
Industry 1	2.958	1.587	1.232	1.108	1.038	1.023	1.014	1.008	1.006	1.007	1.006	1.010	1.003	1.004	1.003	1.003	1.005	1.003																			
Industry 2		1.877	1.312	1.143	1.055	1.028	1.016	1.015	1.006	1.005	1.007	1.007	1.004	1.002	1.005	1.002	1.003	1.002	1.001	1.001																	
Prior	2.189	1.356	1.172	1.095	1.075	1.051	1.037	1.029	1.030	1.027	1.024	1.023	1.021	1.020	1.015	1.013	1.015	1.013	1.016	1.015	1.017	1.016	1.016	1.017	1.013	1.014	1.014	1.013	1.009	1.008	1.006	1.004	1.002	1.002	1.002	1.021	
Selected	2.187	1.375	1.179	1.097	1.070	1.049	1.037	1.030	1.028	1.025	1.024	1.022	1.019	1.020	1.014	1.014	1.012	1.013	1.014	1.013	1.015	1.015	1.015	1.016	1.014	1.013	1.014	1.013	1.009	1.008	1.006	1.004	1.002	1.002	1.002	1.002	1.016
FacToUlt	6.833	3.124	2.272	1.927	1.757	1.642	1.566	1.510	1.467	1.426	1.391	1.358	1.328	1.303	1.278	1.260	1.243	1.227	1.212	1.195	1.180	1.163	1.145	1.128	1.110	1.094	1.080	1.065	1.052	1.042	1.034	1.028	1.024	1.022	1.020	1.018	1.016
Percent of Ult	14.6%	32.0%	44.0%	51.9%	56.9%	60.9%	63.9%	66.2%	68.2%	70.1%	71.9%	73.7%	75.3%	76.7%	78.3%	79.4%	80.5%	81.5%	82.5%	83.7%	84.7%	86.0%	87.3%	88.7%	90.1%	91.4%	92.6%	93.9%	95.1%	96.0%	96.7%	97.3%	97.7%	97.9%	98.1%	98.3%	98.5%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	48,982,800	51,826,222	48,350,821	49,849,073	(631,978)	-1.3%	(1,977,149)	-3.8%
6/30/82-83	5,611,827	5,669,000	5,640,351	5,697,000	28,524	0.5%	28,000	0.5%
6/30/83-84	8,174,920	8,759,000	8,262,544	8,429,000	87,624	1.1%	(330,000)	-3.8%
6/30/84-85	17,242,000	17,396,000	17,244,000	17,382,000	2,000	0.0%	(14,000)	-0.1%
6/30/85-86	20,763,000	20,951,000	20,824,000	20,997,000	61,000	0.3%	46,000	0.2%
6/30/86-87	21,856,000	22,058,000	21,997,000	22,179,000	141,000	0.6%	121,000	0.5%
6/30/87-88	29,771,000	30,542,000	29,806,000	30,570,000	35,000	0.1%	28,000	0.1%
6/30/88-89	27,383,000	28,225,000	27,394,000	28,193,000	11,000	0.0%	(32,000)	-0.1%
6/30/89-90	26,437,000	27,136,000	26,491,000	27,182,000	54,000	0.2%	46,000	0.2%
6/30/90-91	22,970,000	23,539,000	22,854,000	23,418,000	(116,000)	-0.5%	(121,000)	-0.5%
6/30/91-92	14,392,000	15,191,000	14,358,000	15,152,000	(34,000)	-0.2%	(39,000)	-0.3%
6/30/92-93	10,897,000	10,960,000	10,802,000	10,861,000	(95,000)	-0.9%	(99,000)	-0.9%
6/30/93-94	12,222,000	12,600,000	12,243,000	12,617,000	21,000	0.2%	17,000	0.1%
6/30/94-95	10,896,000	11,479,000	10,812,000	11,383,000	(84,000)	-0.8%	(96,000)	-0.8%
6/30/95-96	11,587,000	12,221,000	11,499,000	12,118,000	(88,000)	-0.8%	(103,000)	-0.8%
6/30/96-97	11,790,000	12,434,000	11,692,000	12,320,000	(98,000)	-0.8%	(114,000)	-0.9%
6/30/97-98	10,144,000	10,689,000	10,038,000	10,568,000	(106,000)	-1.0%	(121,000)	-1.1%
6/30/98-99	10,902,000	11,497,000	10,825,000	11,404,000	(77,000)	-0.7%	(93,000)	-0.8%
6/30/99-00	12,894,000	13,627,000	12,824,000	13,534,000	(70,000)	-0.5%	(93,000)	-0.7%
6/30/00-01	12,238,000	12,926,000	12,111,000	12,776,000	(127,000)	-1.0%	(150,000)	-1.2%
6/30/01-02	12,625,000	13,319,000	12,406,000	13,070,000	(219,000)	-1.7%	(249,000)	-1.9%
6/30/02-03	12,549,000	13,237,000	12,478,000	13,145,000	(71,000)	-0.6%	(92,000)	-0.7%
6/30/03-04	11,739,000	12,365,000	11,585,000	12,187,000	(154,000)	-1.3%	(178,000)	-1.4%
6/30/04-05	13,307,000	13,867,000	13,302,000	13,688,000	(5,000)	0.0%	(179,000)	-1.3%
6/30/05-06	12,981,000	13,014,000	12,725,000	12,846,000	(256,000)	-2.0%	(168,000)	-1.3%
6/30/06-07	12,187,000	12,567,000	11,908,000	12,400,000	(279,000)	-2.3%	(167,000)	-1.3%
6/30/07-08	16,922,000	17,828,811	16,829,000	17,523,506	(93,000)	-0.5%	(305,305)	-1.7%
6/30/08-09	17,631,900	18,349,331	17,415,090	17,845,828	(216,810)	-1.2%	(503,503)	-2.7%
6/30/09-10	18,110,070	18,480,462	17,708,130	17,978,961	(401,940)	-2.2%	(501,501)	-2.7%
6/30/10-11	20,922,660	21,952,931	20,632,590	21,365,344	(290,070)	-1.4%	(587,587)	-2.7%
6/30/11-12	22,778,000	23,790,767	22,449,000	23,152,129	(329,000)	-1.4%	(638,638)	-2.7%
6/30/12-13	19,781,000	20,788,000	19,142,000	20,256,000	(639,000)	-3.2%	(532,000)	-2.6%
6/30/13-14	24,315,840	25,346,000	23,614,080	24,830,000	(701,760)	-2.9%	(516,000)	-2.0%
6/30/14-15	27,247,300	28,264,000	26,463,540	27,590,000	(783,760)	-2.9%	(674,000)	-2.4%
6/30/15-16	29,621,860	31,059,000	29,152,380	30,501,000	(469,480)	-1.6%	(558,000)	-1.8%
6/30/16-17	26,796,250	28,420,000	27,190,070	28,319,000	393,820	1.5%	(101,000)	-0.4%
6/30/17-18	32,205,740	33,291,000	30,064,180	31,166,000	(2,141,560)	-6.6%	(2,125,000)	-6.4%
6/30/18-19								
Total	678,874,167	705,664,524	671,131,776	694,492,841	(7,742,390)	-1.1%	(11,171,683)	-1.6%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 8, Exhibit 1, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95

Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	44,071,671	1.076	47,431,432	0.0%	0.0%	0	1,660,214	1,660,214	3.5%	1.010	1,676,816	1,668,515	1,668,515
6/30/82-83	5,567,029	1.016	5,653,355	0.0%	0.0%	0	43,750	43,750	0.8%	1.010	44,188	43,969	43,969
6/30/83-84	7,686,135	1.023	7,860,036	0.0%	0.0%	0	483,550	483,550	6.2%	1.010	488,386	485,968	485,968
6/30/84-85	16,231,743	1.025	16,632,190	0.0%	0.0%	0	746,504	746,504	4.5%	1.010	753,969	750,237	750,237
6/30/85-86	19,367,365	1.027	19,884,860	0.0%	0.0%	0	1,106,534	1,106,534	5.6%	1.010	1,117,599	1,112,066	1,112,066
6/30/86-87	20,074,036	1.029	20,651,634	0.0%	0.0%	0	1,519,864	1,519,864	7.4%	1.010	1,535,063	1,527,463	1,527,463
6/30/87-88	27,001,152	1.033	27,889,179	0.0%	0.0%	0	2,071,404	2,071,404	7.4%	1.010	2,092,118	2,081,761	2,081,761
6/30/88-89	23,770,559	1.039	24,699,651	0.0%	0.0%	0	2,926,233	2,926,233	11.8%	1.010	2,955,495	2,940,864	2,940,864
6/30/89-90	22,837,362	1.047	23,919,819	0.0%	0.0%	0	2,715,625	2,715,625	11.4%	1.010	2,742,781	2,729,203	2,729,203
6/30/90-91	19,343,788	1.057	20,448,922	0.0%	0.0%	0	2,497,602	2,497,602	12.2%	1.010	2,522,578	2,510,090	2,510,090
6/30/91-92	12,180,558	1.071	13,041,983	0.0%	0.0%	0	1,381,736	1,381,736	10.6%	1.010	1,395,553	1,388,644	1,389,342
6/30/92-93	8,842,067	1.085	9,596,535	0.0%	0.0%	0	1,257,873	1,257,873	13.1%	1.011	1,271,722	1,264,798	1,249,840
6/30/93-94	10,000,928	1.105	11,055,426	0.0%	0.0%	0	1,306,522	1,306,522	11.8%	1.012	1,322,228	1,314,375	1,316,358
6/30/94-95	8,373,947	1.110	9,297,022	0.0%	0.0%	0	1,532,218	1,532,218	16.5%	1.015	1,555,289	1,543,753	1,546,086
6/30/95-96	9,027,803	1.128	10,183,512	0.0%	0.0%	0	1,345,682	1,345,682	13.2%	1.018	1,370,042	1,357,862	1,365,054
6/30/96-97	8,557,462	1.145	9,799,444	0.1%	0.1%	9,799	1,908,819	1,918,618	19.6%	1.021	1,949,203	1,933,911	1,943,782
6/30/97-98	6,556,452	1.163	7,623,089	0.1%	0.2%	15,246	2,402,195	2,417,441	31.7%	1.026	2,465,282	2,441,362	2,450,370
6/30/98-99	7,343,610	1.180	8,667,570	0.1%	0.3%	23,478	2,148,064	2,171,542	25.1%	1.031	2,215,500	2,193,521	2,178,128
6/30/99-00	9,048,086	1.195	10,813,580	0.1%	0.4%	40,105	2,018,548	2,058,653	19.0%	1.037	2,092,328	2,075,490	2,015,364
6/30/00-01	8,661,070	1.212	10,498,134	0.1%	0.5%	50,406	1,602,429	1,652,835	15.7%	1.052	1,685,914	1,669,374	1,683,591
6/30/01-02	8,431,421	1.227	10,348,912	0.1%	0.6%	60,038	2,005,419	2,065,457	20.0%	1.063	2,131,409	2,098,433	2,104,396
6/30/02-03	8,436,342	1.243	10,484,188	0.1%	0.7%	71,307	1,938,393	2,009,701	19.2%	1.063	2,060,173	2,034,937	1,942,897
6/30/03-04	7,782,878	1.260	9,804,007	0.1%	0.8%	76,485	1,701,764	1,778,249	18.1%	1.074	1,827,319	1,802,784	1,812,630
6/30/04-05	8,749,258	1.278	11,177,839	0.2%	1.0%	109,559	2,362,201	2,471,760	22.1%	1.079	2,549,436	2,510,598	2,521,365
6/30/05-06	7,786,383	1.303	10,145,517	0.2%	1.2%	119,732	2,418,000	2,537,732	25.0%	1.084	2,622,221	2,579,976	2,578,693
6/30/06-07	7,435,948	1.328	9,877,265	0.2%	1.4%	135,044	1,874,089	2,009,133	20.3%	1.095	2,053,017	2,031,075	2,041,247
6/30/07-08	10,769,549	1.358	14,621,269	0.2%	1.6%	227,618	2,638,648	2,866,266	19.6%	1.100	2,903,412	2,884,839	2,914,603
6/30/08-09	10,640,281	1.391	14,798,546	0.2%	1.8%	259,975	2,745,619	3,005,594	20.3%	1.112	3,053,522	3,029,558	2,973,757
6/30/09-10	10,296,898	1.426	14,686,016	0.1%	1.9%	278,746	2,862,214	3,140,960	21.4%	1.139	3,261,226	3,201,093	3,237,603
6/30/10-11	12,221,441	1.467	17,923,800	0.2%	2.1%	377,114	3,002,176	3,379,290	18.9%	1.153	3,461,748	3,420,519	3,475,829
6/30/11-12	12,965,823	1.510	19,580,618	0.4%	2.6%	499,391	3,024,071	3,523,461	18.0%	1.182	3,573,408	3,548,435	3,644,071
6/30/12-13	10,379,197	1.566	16,250,988	1.1%	3.7%	597,661	2,320,950	2,918,612	18.0%	1.233	2,862,515	2,890,564	2,941,990
6/30/13-14	12,673,994	1.642	20,813,116	1.6%	5.3%	1,102,336	2,698,752	3,801,088	18.3%	1.396	3,768,736	3,784,912	3,807,374
6/30/14-15	13,160,624	1.757	23,129,257	1.8%	7.1%	1,644,647	2,508,240	4,152,887	18.0%	1.656	4,153,138	4,153,012	4,378,269
6/30/15-16	13,434,586	1.927	25,893,205	3.2%	10.3%	2,663,838	1,958,201	4,622,039	17.9%	2.345	4,592,595	4,607,317	4,827,034
6/30/16-17	10,840,564	2.272	24,627,960	4.1%	14.3%	3,534,024	604,800	4,138,824	16.8%	4.411	2,668,064	3,403,444	3,207,536
6/30/17-18	8,732,069	3.124	27,274,806	3.4%	17.7%	4,833,203	214,068	5,047,272	18.5%	12.780	2,735,787	3,891,529	5,293,394
6/30/18-19	3,704,302	6.833	25,309,822	1.5%	19.2%	4,862,457	0	4,862,457	19.2%	56.092	0	4,862,457	86,690,743
Total	472,984,384		622,394,503			21,592,211	69,552,971	91,145,183	14.6%		83,529,777	89,768,709	173,381,485

NOTES:

(2) From Section 8, Exhibit 1, Page 2, Column 3

(3) = (4) / (2)

(4) From Section 8, Exhibit 1, Page 2, Column 6

(5) From Section 8, Exhibit 1, Page 11

(6) Downward sum of (5)

(7) = (6) x (4)

(8) From Section 8, Exhibit 1, Page 10

(9) = (7) + (8)

(10) = (9) / (4)

(11) From Section 8, Exhibit 1, Page 12

(12) = (8) x (11)

(13) Selected based on (9) and (12)

(14) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts Workers Compensation
All Other - Clusters 5-17 & 95
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0	0	0	0	0	0	0	22,500	0	0	137,500	40,000	80,500	250,234	367,000	139,604	85,000	0	57,500	55,001	30,000	12,250	84,000	140,000	66,000	0	78,125	0	0	7,500	7,500	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	0	0	0	35,000	7,750	1,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	91,600	53,250	15,000	55,000	59,700	57,000	0	57,000	0	0	0	85,000	0	0	0	0	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	30,000	3,000	52,500	34,554	34,000	58,000	215,750	30,200	92,500	50,000	40,000	0	49,000	32,000	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	12,000	40,559	73,500	32,500	75,000	175,399	179,500	0	92,000	20,000	50,000	0	0	0	0	30,000	55,000	64,000	16,000	45,000	58,275	87,801	0	0	0	0	0	0	0	0	0	0				
Jun-87	0	25,000	130,000	100,666	150,501	60,866	192,525	168,500	91,501	59,806	28,000	0	12,500	65,000	50,000	164,999	50,000	80,000	80,000	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	49,000	40,808	39,958	205,752	408,847	243,000	223,039	268,000	62,000	75,000	30,000	61,000	0	0	0	155,000	20,000	0	100,000	90,000	0	0	0	0	0	0	0	0	0	0	0						
Jun-89	0	69,855	143,500	275,776	374,100	341,500	255,000	238,502	222,500	170,500	146,000	30,000	123,000	40,000	25,000	0	63,500	185,000	50,000	110,000	62,500	0	0	0	0	0	0	0	0	0	0							
Jun-90	0	114,301	281,968	342,440	535,751	231,565	150,800	494,500	46,300	140,000	0	157,000	0	15,000	0	25,000	106,000	60,000	0	15,000	0	0	0	0	0	0	0	0	0	0								
Jun-91	3,500	73,750	373,500	399,501	281,850	319,500	203,500	25,001	143,000	0	10,000	54,000	0	0	10,000	153,000	72,500	255,000	120,000	0	0	0	0	0	0	0	0	0	0									
Jun-92	12,000	110,012	182,635	135,586	76,000	151,001	0	112,000	76,500	98,000	105,000	20,000	13,500	86,268	20,867	20,867	86,500	35,000	0	0	0	0	0	0	0	40,000	0	0										
Jun-93	6,000	137,948	181,424	231,001	158,000	58,000	49,000	16,000	77,000	85,000	0	55,000	0	0	0	0	50,000	40,000	35,000	35,000	0	0	13,500	0	0	14,500	15,500											
Jun-94	9,500	273,155	204,001	189,365	168,500	29,001	28,000	96,000	0	14,000	0	230,000	65,000	0	0	0	0	0	0	0	0	0	0	0	0	0												
Jun-95	185,350	223,402	371,000	281,000	90,965	116,600	17,000	0	0	62,000	58,400	34,000	0	80,000	0	12,500	0	0	0	0	0	1	0	0	0													
Jun-96	6,000	246,050	463,500	224,701	104,430	25,501	3,000	40,000	0	1	35,000	62,500	0	18,400	16,600	0	0	0	0	0	99,999	0	0	0														
Jun-97	23,365	498,701	322,500	317,501	204,000	108,251	0	105,000	106,501	60,000	83,000	0	0	0	40,000	40,000	0	0	0	0	0	0	0															
Jun-98	287,037	356,948	285,460	504,000	281,500	83,000	69,535	88,965	20,000	0	10,000	202,750	75,000	69,000	69,000	0	0	0	0	0	0	0																
Jun-99	203,500	124,500	487,181	242,900	185,982	168,001	201,000	120,000	65,000	170,000	20,000	65,000	0	0	0	45,000	0	0	0	25,000	25,000																	
Jun-00	97,731	486,478	307,037	269,800	93,500	190,999	184,884	110,118	53,001	76,000	24,000	0	0	0	0	0	0	0	45,000	80,000																		
Jun-01	10,000	182,428	335,500	71,500	244,500	251,000	145,000	220,000	80,000	0	0	0	62,500	0	0	0	1	0	0																			
Jun-02	0	114,545	362,081	283,539	440,001	286,251	109,000	265,000	25,001	50,000	50,000	15,000	0	5,000	1	0	0	0																				
Jun-03	0	77,201	596,801	430,835	218,160	255,001	75,000	65,000	6,000	6,000	7,500	60,000	1	1	0	45,894	95,000																					
Jun-04	47,500	25,277	294,987	520,000	358,000	189,000	27,000	100,000	100,000	0	0	0	0	0	40,000	0																						
Jun-05	6,157	60,866	417,500	949,001	378,677	150,000	105,000	105,000	150,000	0	0	20,000	0	20,000	0																							
Jun-06	0	159,500	370,000	715,000	208,000	359,500	359,500	89,000	0	0	140,000	0	0	17,500																								
Jun-07	26,000	238,583	574,002	426,500	153,002	153,002	120,000	90,000	28,000	65,000	0	0	0																									
Jun-08	0	282,500	346,648	610,000	610,000	174,962	459,538	62,000	43,000	0	50,000	0																										
Jun-09	250,000	140,000	501,500	501,500	370,926	384,000	186,001	207,691	50,000	55,001	99,000																											
Jun-10	0	385,501	385,501	536,711	679,197	380,304	405,000	50,000	40,000	0																												
Jun-11	307,191	319,191	604,218	357,283	873,292	282,000	214,001	15,000	30,000																													
Jun-12	0	294,800	409,461	1,071,604	420,200	532,901	194,104	101,000																														
Jun-13	37,000	127,500	406,096	801,278	615,076	98,000	236,000																															
Jun-14	15,000	6,251	1,012,351	775,950	490,000	399,200																																
Jun-15	0	319,341	896,354	661,545	631,000																																	
Jun-16	21,500	94,701	983,000	859,000																																		
Jun-17	2,200	154,600	448,000																																			
Jun-18	6,368	207,700																																				
Jun-19	0																																					

Cumulative Lump Sum Payments

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*	*456*
All Prior Yrs	0	0	0	0	0	0	0	22,500	22,500	22,500	160,000	200,000	280,500	530,734	897,734	1,037,338	1,122,338	1,122,338	1,179,838	1,234,839	1,264,839	1,277,089	1,361,089	1,501,089	1,567,089	1,567,089	1,645,214	1,645,214	1,645,214	1,652,714	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214
Jun-83	0	0	0	0	0	0	0	0	0	0	35,000	42,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	
Jun-84	0	0	0	0	0	0	91,600	144,850	159,850	214,850	274,550	331,550	331,550	388,550	388,550	388,550	388,550	473,550	473,550	473,550	473,550	473,550	473,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550		
Jun-85	0	0	0	30,000	33,000	85,500	120,054	154,054	212,054	427,804	458,004	550,504	600,504	640,504	640,504	689,504	721,504	721,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504			
Jun-86	0	0	12,000	52,559	126,059	158,559	233,559	408,958	588,458	588,458	680,458	700,458	750,458	750,458	750,458	750,458	750,458	780,458	835,458	899,458	915,458	960,458	1,018,733	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534				
Jun-87	0	25,000	155,000	255,666	406,167	467,033	659,558	828,058	919,559	979,365	1,007,365	1,007,365	1,019,865	1,084,865	1,134,865	1,299,864	1,349,864	1,429,864	1,509,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864					
Jun-88	0	49,000	89,808	129,766	335,518	744,365	987,365	1,210,404	1,478,404	1,540,404	1,615,404	1,645,404	1,706,404	1,706,404	1,706,404	1,706,404	1,861,404	1,881,404	1,881,404	1,981,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404						
Jun-89	0	69,855	213,355	489,131	863,231	1,204,731	1,459,731	1,698,233	1,920,733	2,091,233	2,237,233	2,267,233	2,390,233	2,430,233	2,455,233	2,455,233	2,518,733	2,703,733	2,753,733	2,863,733	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233							
Jun-90	0	114,301	396,269	738,709	1,274,460	1,506,025	1,656,825	2,151,325	2,197,625	2,337,625	2,337,625	2,494,625	2,494,625	2,509,625	2,509,625	2,534,625	2,640,625	2,700,625	2,700,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625								
Jun-91	3,500	77,250	450,750	850,251	1,132,101	1,451,601	1,655,101	1,680,102	1,823,102	1,823,102	1,833,102	1,887,102	1,887,102	1,887,102	1,897,102	2,050,102	2,122,602	2,377,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602							
Jun-92	12,000	122,012	304,647	440,233	516,233	667,234	667,234	779,234	855,734	953,734	1,058,734	1,078,734	1,092,234	1,178,502	1,199,369	1,220,236	1,306,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,381,736	1,381,736	1,381,736									
Jun-93	6,000	143,948	325,372	556,373	714,373	772,373	821,373	837,373	914,373	999,373	999,373	1,054,373	1,054,373	1,054,373	1,054,373	1,054,373	1,104,373	1,144,373	1,179,373	1,214,373	1,214,373	1,214,373	1,227,873	1,227,873	1,227,873	1,242,373	1,257,873										
Jun-94	9,500	282,655	486,656	676,021	844,521	873,522	901,522	997,522	997,522	1,011,522	1,011,522	1,241,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522											
Jun-95	185,350	408,752	779,752	1,060,752	1,151,717	1,268,317	1,285,317	1,285,317	1,285,317	1,347,317	1,405,717	1,439,717	1,439,717	1,519,717	1,519,717	1,532,217	1,532,217	1,532,217	1,532,217	1,532,217	1,532,217	1,532,218	1,532,218	1,532,218	1,532,218												
Jun-96	6,000	252,050	715,550	940,251	1,044,681	1,070,182	1,073,182	1,113,182	1,113,182	1,113,183	1,148,183	1,210,683	1,210,683	1,229,083	1,245,683	1,245,683	1,245,683	1,245,683	1,245,683	1,245,683	1,345,682	1,345,682	1,345,682	1,345,682													
Jun-97	23,365	522,066	844,566	1,162,067	1,366,067	1,474,318	1,474,318	1,579,318	1,685,819	1,745,819	1,828,819	1,828,819	1,828,819	1,828,819	1,868,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819														
Jun-98	287,037	643,985	929,445	1,433,445	1,714,945	1,797,945	1,867,480	1,956,445	1,976,445	1,976,445	1,986,445	2,189,195	2,264,195	2,333,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195															
Jun-99	203,500	328,000	815,181	1,058,081	1,244,063	1,412,064	1,613,064	1,733,064	1,798,064	1,968,064	1,988,064	2,053,064	2,053,064	2,053,064	2,053,064	2,098,064	2,098,064	2,098,064	2,098,064	2,123,064	2,148,064																
Jun-00	97,731	584,209	891,246	1,161,046	1,254,546	1,445,545	1,630,429	1,740,547	1,793,548	1,869,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,938,548	2,018,548																	
Jun-01	10,000	192,428	527,928	599,428	843,928	1,094,928	1,239,928	1,459,928	1,539,928	1,539,928	1,539,928	1,539,928	1,602,428	1,602,428	1,602,428	1,602,428	1,602,429	1,602,429	1,602,429																		
Jun-02	0	114,545	476,626	760,165	1,200,166	1,486,417	1,595,417	1,860,417	1,885,418	1,935,418	1,985,418	2,000,418	2,000,418	2,005,418	2,005,419	2,005,419	2,005,419	2,005,419																			
Jun-03	0	77,201	674,002	1,104,837	1,322,997	1,577,998	1,652,998	1,717,998	1,723,998	1,729,998	1,737,498	1,797,498	1,797,499	1,797,500	1,797,500	1,843,393	1,938,393																				
Jun-04	47,500	72,777	367,764	887,764	1,245,764	1,434,764	1,461,764	1,561,764	1,661,764	1,661,764	1,661,764	1,661,764	1,661,764	1,661,764	1,701,764	1,701,764																					
Jun-05	6,157	67,023	484,523	1,433,524	1,812,201	1,962,201	2,067,201	2,172,201	2,322,201	2,322,201	2,322,201	2,342,201	2,342,201	2,362,201	2,362,201																						
Jun-06	0	159,500	529,500	1,244,500	1,452,500	1,812,000	2,171,500	2,260,500	2,260,500	2,260,500	2,400,500	2,400,500	2,400,500	2,418,000																							
Jun-07	26,000	264,583	838,585	1,265,085	1,418,087	1,571,089	1,691,089	1,781,089	1,809,089	1,874,089	1,874,089	1,874,089	1,874,089																								
Jun-08	0	282,500	629,148	1,239,148	1,849,148	2,024,110	2,483,648	2,545,648	2,588,648	2,588,648	2,638,648	2,638,648																									
Jun-09	250,000	390,000	891,500	1,393,000	1,763,926	2,147,926	2,333,927	2,541,618	2,591,618	2,646,619	2,745,619																										
Jun-10	0	385,501	771,002	1,307,713	1,986,910	2,367,214	2,772,214	2,822,214	2,862,214	2,862,214																											
Jun-11	307,191	626,381	1,230,599	1,587,882	2,461,175	2,743,175	2,957,176	2,972,176	3,002,176																												
Jun-12	0	294,800	704,261	1,775,865	2,196,065	2,728,967	2,923,071	3,024,071																													
Jun-13	37,000	164,500	570,596	1,371,874	1,986,950	2,084,950	2,320,950																														
Jun-14	15,000	21,251	1,033,602	1,809,552	2,299,552	2,698,752																															
Jun-15	0	319,341	1,215,695	1,877,240	2,508,240																																
Jun-16	21,500	116,201	1,099,201	1,958,201																																	
Jun-17	2,200	156,800	604,800																																		
Jun-18	6,368	214,068																																			
Jun-19	0																																				

Commonwealth of Massachusetts Workers Compensation
All Other - Clusters 5-17 & 95
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.001	0.002	0.005	0.008	0.003	0.002	0.000	0.001	0.001	0.001	0.000	0.002	0.003	0.001	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.007	0.002	0.007	0.008	0.007	0.000	0.007	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.002	0.000	0.003	0.002	0.002	0.003	0.013	0.002	0.006	0.003	0.002	0.000	0.003	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.001	0.002	0.004	0.002	0.004	0.009	0.009	0.000	0.005	0.001	0.003	0.000	0.000	0.000	0.000	0.002	0.003	0.003	0.001	0.002	0.003	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.001	0.006	0.005	0.007	0.003	0.009	0.008	0.004	0.003	0.001	0.000	0.001	0.003	0.002	0.008	0.002	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.002	0.001	0.001	0.007	0.015	0.009	0.008	0.010	0.002	0.003	0.001	0.002	0.000	0.000	0.000	0.006	0.001	0.000	0.004	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Jun-89	0.000	0.003	0.006	0.011	0.015	0.014	0.010	0.010	0.009	0.007	0.006	0.001	0.005	0.002	0.001	0.000	0.003	0.007	0.002	0.004	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000								
Jun-90	0.000	0.005	0.012	0.014	0.022	0.010	0.006	0.021	0.002	0.006	0.000	0.007	0.000	0.001	0.000	0.001	0.004	0.003	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-91	0.000	0.004	0.018	0.020	0.014	0.016	0.010	0.001	0.007	0.000	0.000	0.003	0.000	0.000	0.000	0.007	0.004	0.012	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-92	0.001	0.008	0.014	0.010	0.006	0.012	0.000	0.009	0.006	0.008	0.008	0.002	0.001	0.007	0.002	0.002	0.007	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000										
Jun-93	0.001	0.014	0.019	0.024	0.016	0.006	0.005	0.002	0.008	0.009	0.000	0.006	0.000	0.000	0.000	0.000	0.005	0.004	0.004	0.004	0.000	0.000	0.001	0.000	0.000	0.002	0.002											
Jun-94	0.001	0.025	0.018	0.017	0.015	0.003	0.003	0.009	0.000	0.001	0.000	0.021	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.020	0.024	0.040	0.030	0.010	0.013	0.002	0.000	0.000	0.007	0.006	0.004	0.000	0.009	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.001	0.024	0.046	0.022	0.010	0.003	0.000	0.004	0.000	0.000	0.003	0.006	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000														
Jun-97	0.002	0.051	0.033	0.032	0.021	0.011	0.000	0.011	0.011	0.006	0.008	0.000	0.000	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
Jun-98	0.038	0.047	0.037	0.066	0.037	0.011	0.009	0.012	0.003	0.000	0.001	0.027	0.010	0.009	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.023	0.014	0.056	0.028	0.021	0.019	0.023	0.014	0.007	0.020	0.002	0.007	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.003	0.003																	
Jun-00	0.009	0.045	0.028	0.025	0.009	0.018	0.017	0.010	0.005	0.007	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007																		
Jun-01	0.001	0.017	0.032	0.007	0.023	0.024	0.014	0.021	0.008	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-02	0.000	0.011	0.035	0.027	0.043	0.028	0.011	0.026	0.002	0.005	0.005	0.001	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.000	0.007	0.057	0.041	0.021	0.024	0.007	0.006	0.001	0.001	0.001	0.006	0.000	0.000	0.000	0.004	0.009																					
Jun-04	0.005	0.003	0.030	0.053	0.037	0.019	0.003	0.010	0.010	0.000	0.000	0.000	0.000	0.000	0.004	0.000																						
Jun-05	0.001	0.005	0.037	0.085	0.034	0.013	0.009	0.009	0.013	0.000	0.000	0.002	0.000	0.002	0.000																							
Jun-06	0.000	0.016	0.036	0.070	0.021	0.035	0.035	0.009	0.000	0.000	0.014	0.000	0.000	0.002																								
Jun-07	0.003	0.024	0.058	0.043	0.015	0.015	0.012	0.009	0.003	0.007	0.000	0.000	0.000																									
Jun-08	0.000	0.019	0.024	0.042	0.042	0.012	0.031	0.004	0.003	0.000	0.003	0.000																										
Jun-09	0.017	0.009	0.034	0.034	0.025	0.026	0.013	0.014	0.003	0.004	0.007																											
Jun-10	0.000	0.026	0.026	0.037	0.046	0.026	0.028	0.003	0.003	0.000																												
Jun-11	0.017	0.018	0.034	0.020	0.049	0.016	0.012	0.001	0.002																													
Jun-12	0.000	0.015	0.021	0.055	0.021	0.027	0.010	0.005																														
Jun-13	0.002	0.008	0.025	0.049	0.038	0.006	0.015																															
Jun-14	0.001	0.000	0.049	0.037	0.024	0.019																																
Jun-15	0.000	0.014	0.039	0.029	0.027																																	
Jun-16	0.001	0.004	0.038	0.033																																		
Jun-17	0.000	0.006	0.018																																			
Jun-18	0.000	0.008																																				
Jun-19	0.000																																					

Averages		*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*444-456*
Simple Avg																																						
All Yrs (ex P)	0.004	0.013	0.027	0.029	0.021	0.014	0.010	0.008	0.005	0.004	0.003	0.004	0.001	0.002	0.001	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Latest 5	0.000	0.006	0.034	0.041	0.032	0.019	0.015	0.006	0.003	0.002	0.005	0.000	0.000	0.001	0.001	0.001	0.002	0.000	0.001	0.002	0.003	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 3	0.000	0.006	0.032	0.033	0.030	0.017	0.012	0.003	0.003	0.001	0.003	0.000	0.000	0.001	0.001	0.001	0.003	0.000	0.001	0.003	0.001	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Olympic Avg																																						
All Yrs (ex P)	0.003	0.013	0.026	0.028	0.020	0.014	0.010	0.008	0.004	0.004	0.003	0.003	0.001	0.002	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Latest 10	0.001	0.010	0.030	0.038	0.030	0.019	0.016	0.007	0.003	0.001	0.002	0.001	0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Latest 5	0.000	0.006	0.034	0.040	0.030	0.020	0.013	0.004	0.003	0.001	0.003	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000						
Dev Factor Selection																																						
Prior	*NA*	*0.015*	*0.033*	*0.037*	*0.034*	*0.018*	*0.015*	*0.011*	*0.005*	*0.002*	*0.001*	*0.002*	*0.002*	*0.002*	*0.002*	*0.002*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	
Selected	NA	0.015	0.034	0.041	0.032	0.018	0.016	0.011	0.004	0.002	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.192	0.177	0.143	0.103	0.071	0.053	0.037	0.026	0.021	0.019	0.018	0.016	0.014	0.012	0.010	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
All Other - Clusters 5-17 & 95
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444	456
All Prior Yrs	0	0	0	0	0	0	0	22,500	22,500	22,500	160,000	200,000	280,500	530,734	897,734	1,037,338	1,122,338	1,122,338	1,179,838	1,234,839	1,264,839	1,277,089	1,361,089	1,501,089	1,567,089	1,567,089	1,645,214	1,645,214	1,645,214	1,652,714	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214
Jun-83	0	0	0	0	0	0	0	0	0	0	35,000	42,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	
Jun-84	0	0	0	0	0	0	91,600	144,850	159,850	214,850	274,550	331,550	331,550	388,550	388,550	388,550	388,550	473,550	473,550	473,550	473,550	473,550	473,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550			
Jun-85	0	0	0	30,000	33,000	85,500	120,054	154,054	212,054	427,804	458,004	550,504	600,504	640,504	640,504	689,504	721,504	721,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504				
Jun-86	0	0	12,000	52,559	126,059	158,559	233,559	408,958	588,458	588,458	680,458	700,458	750,458	750,458	750,458	750,458	750,458	780,458	835,458	899,458	915,458	960,458	1,018,733	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534				
Jun-87	0	25,000	155,000	255,666	406,167	467,033	659,558	828,058	919,559	979,365	1,007,365	1,007,365	1,019,865	1,084,865	1,134,865	1,299,864	1,349,864	1,429,864	1,509,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864					
Jun-88	0	49,000	89,808	129,766	335,518	744,365	987,365	1,210,404	1,478,404	1,540,404	1,615,404	1,645,404	1,706,404	1,706,404	1,706,404	1,706,404	1,861,404	1,881,404	1,881,404	1,981,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404						
Jun-89	0	69,855	213,355	489,131	863,231	1,204,731	1,459,731	1,698,233	1,920,733	2,091,233	2,237,233	2,267,233	2,390,233	2,430,233	2,455,233	2,455,233	2,518,733	2,703,733	2,753,733	2,863,733	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233							
Jun-90	0	114,301	396,269	738,709	1,274,460	1,506,025	1,656,825	2,151,325	2,197,625	2,337,625	2,337,625	2,494,625	2,494,625	2,509,625	2,509,625	2,534,625	2,640,625	2,700,625	2,700,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625								
Jun-91	3,500	77,250	450,750	850,251	1,132,101	1,451,601	1,655,101	1,680,102	1,823,102	1,823,102	1,833,102	1,887,102	1,887,102	1,887,102	1,897,102	2,050,102	2,122,602	2,377,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602								
Jun-92	12,000	122,012	304,647	440,233	516,233	667,234	667,234	779,234	855,734	953,734	1,058,734	1,078,734	1,092,234	1,178,502	1,199,369	1,220,236	1,306,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,381,736	1,381,736	1,381,736									
Jun-93	6,000	143,948	325,372	556,373	714,373	772,373	821,373	837,373	914,373	999,373	999,373	1,054,373	1,054,373	1,054,373	1,054,373	1,054,373	1,104,373	1,144,373	1,179,373	1,214,373	1,214,373	1,214,373	1,227,873	1,227,873	1,227,873	1,242,373	1,257,873										
Jun-94	9,500	282,655	486,656	676,021	844,521	873,522	901,522	997,522	997,522	1,011,522	1,011,522	1,241,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522											
Jun-95	185,350	408,752	779,752	1,060,752	1,151,717	1,268,317	1,285,317	1,285,317	1,285,317	1,347,317	1,405,717	1,439,717	1,439,717	1,519,717	1,519,717	1,532,217	1,532,217	1,532,217	1,532,217	1,532,217	1,532,217	1,532,218	1,532,218	1,532,218	1,532,218												
Jun-96	6,000	252,050	715,550	940,251	1,044,681	1,070,182	1,073,182	1,113,182	1,113,182	1,113,183	1,148,183	1,210,683	1,210,683	1,229,083	1,245,683	1,245,683	1,245,683	1,245,683	1,245,683	1,245,683	1,345,682	1,345,682	1,345,682	1,345,682													
Jun-97	23,365	522,066	844,566	1,162,067	1,366,067	1,474,318	1,474,318	1,579,318	1,685,819	1,745,819	1,828,819	1,828,819	1,828,819	1,828,819	1,868,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819														
Jun-98	287,037	643,985	929,445	1,433,445	1,714,945	1,797,945	1,867,480	1,956,445	1,976,445	1,976,445	1,986,445	2,189,195	2,264,195	2,333,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195															
Jun-99	203,500	328,000	815,181	1,058,081	1,244,063	1,412,064	1,613,064	1,733,064	1,798,064	1,968,064	1,988,064	2,053,064	2,053,064	2,053,064	2,053,064	2,098,064	2,098,064	2,098,064	2,098,064	2,123,064	2,148,064																
Jun-00	97,731	584,209	891,246	1,161,046	1,254,546	1,445,545	1,630,429	1,740,547	1,793,548	1,869,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,938,548	2,018,548																	
Jun-01	10,000	192,428	527,928	599,428	843,928	1,094,928	1,239,928	1,459,928	1,539,928	1,539,928	1,539,928	1,539,928	1,602,428	1,602,428	1,602,428	1,602,428	1,602,429	1,602,429	1,602,429																		
Jun-02	0	114,545	476,626	760,165	1,200,166	1,486,417	1,595,417	1,860,417	1,885,418	1,935,418	1,985,418	2,000,418	2,000,418	2,005,418	2,005,419	2,005,419	2,005,419	2,005,419																			
Jun-03	0	77,201	674,002	1,104,837	1,322,997	1,577,998	1,652,998	1,717,998	1,723,998	1,729,998	1,737,498	1,797,498	1,797,499	1,797,500	1,797,500	1,843,393	1,938,393																				
Jun-04	47,500	72,777	367,764	887,764	1,245,764	1,434,764	1,461,764	1,561,764	1,661,764	1,661,764	1,661,764	1,661,764	1,661,764	1,661,764	1,701,764	1,701,764																					
Jun-05	6,157	67,023	484,523	1,433,524	1,812,201	1,962,201	2,067,201	2,172,201	2,322,201	2,322,201	2,322,201	2,342,201	2,342,201	2,362,201	2,362,201																						
Jun-06	0	159,500	529,500	1,244,500	1,452,500	1,812,000	2,171,500	2,260,500	2,260,500	2,260,500	2,400,500	2,400,500	2,400,500	2,418,000																							
Jun-07	26,000	264,583	838,585	1,265,085	1,418,087	1,571,089	1,691,089	1,781,089	1,809,089	1,874,089	1,874,089	1,874,089	1,874,089																								
Jun-08	0	282,500	629,148	1,239,148	1,849,148	2,024,110	2,483,648	2,545,648	2,588,648	2,588,648	2,638,648	2,638,648																									
Jun-09	250,000	390,000	891,500	1,393,000	1,763,926	2,147,926	2,333,927	2,541,618	2,591,618	2,646,619	2,745,619																										
Jun-10	0	385,501	771,002	1,307,713	1,986,910	2,367,214	2,772,214	2,822,214	2,862,214	2,862,214																											
Jun-11	307,191	626,381	1,230,599	1,587,882	2,461,175	2,743,175	2,957,176	2,972,176	3,002,176																												
Jun-12	0	294,800	704,261	1,775,865	2,196,065	2,728,967	2,923,071	3,024,071																													
Jun-13	37,000	164,500	570,596	1,371,874	1,986,950	2,084,950	2,320,950																														
Jun-14	15,000	21,251	1,033,602	1,809,552	2,299,552	2,698,752																															
Jun-15	0	319,341	1,215,695	1,877,240	2,508,240																																
Jun-16	21,500	116,201	1,099,201	1,958,201																																	
Jun-17	2,200	156,800	604,800																																		
Jun-18	6,368	214,068																																			
Jun-19	0																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
All Prior Yrs								1.000	1.000	7.111	1.250	1.403	1.892	1.691	1.156	1.082	1.000	1.051	1.047	1.024	1.010	1.066	1.103	1.044	1.000	1.050	1.000	1.000	1.005	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83											1.221	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84							1.581	1.104	1.344	1.278	1.208	1.000	1.172	1.000	1.000	1.000	1.219	1.000	1.000	1.000	1.000	1.000	1.021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85				1.100	2.591	1.404	1.283	1.376	2.017	1.071	1.202	1.091	1.067	1.000	1.077	1.046	1.000	1.035	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86			4.380	2.398	1.258	1.473	1.751	1.439	1.000	1.156	1.029	1.071	1.000	1.000	1.000	1.000	1.040	1.070	1.077	1.018	1.049	1.061	1.086	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87		6.200	1.649	1.589	1.150	1.412	1.255	1.111	1.065	1.029	1.000	1.012	1.064	1.046	1.145	1.038	1.059	1.056	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-88		1.833	1.445	2.586	2.219	1.326	1.226	1.221	1.042	1.049	1.019	1.037	1.000	1.000	1.000	1.091	1.011	1.000	1.053	1.045	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-89		3.054	2.293	1.765	1.396	1.212	1.163	1.131	1.089	1.070	1.013	1.054	1.017	1.010	1.000	1.026	1.073	1.018	1.040	1.022	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90		3.467	1.864	1.725	1.182	1.100	1.298	1.022	1.064	1.000	1.067	1.000	1.006	1.000	1.010	1.042	1.023	1.000	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-91	22.071	5.835	1.886	1.331	1.282	1.140	1.015	1.085	1.000	1.005	1.029	1.000	1.000	1.005	1.081	1.035	1.120	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-92	10.168	2.497	1.445	1.173	1.293	1.000	1.168	1.098	1.115	1.110	1.019	1.013	1.079	1.018	1.017	1.071	1.027	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.030	1.000	1.000											
Jun-93	23.991	2.260	1.710	1.284	1.081	1.063	1.019	1.092	1.093	1.000	1.055	1.000	1.000	1.000	1.000	1.047	1.036	1.031	1.030	1.000	1.000	1.011	1.000	1.000	1.012	1.012												
Jun-94	29.753	1.722	1.389	1.249	1.034	1.032	1.106	1.000	1.014	1.000	1.227	1.052	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95	2.205	1.908	1.360	1.086	1.101	1.013	1.000	1.000	1.048	1.043	1.024	1.000	1.056	1.000	1.008	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96	42.008	2.839	1.314	1.111	1.024	1.003	1.037	1.000	1.000	1.031	1.054	1.000	1.015	1.014	1.000	1.000	1.000	1.000	1.000	1.080	1.000	1.000	1.000															
Jun-97	22.344	1.618	1.376	1.176	1.079	1.000	1.071	1.067	1.036	1.048	1.000	1.000	1.000	1.022	1.021	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
Jun-98	2.244	1.443	1.542	1.196	1.048	1.039	1.048	1.010	1.000	1.005	1.102	1.034	1.030	1.030	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99	1.612	2.485	1.298	1.176	1.135	1.142	1.074	1.038	1.095	1.010	1.033	1.000	1.000	1.000	1.022	1.000	1.000	1.000	1.012	1.012																		
Jun-00	5.978	1.526	1.303	1.081	1.152	1.128	1.068	1.030	1.042	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.024	1.041																			
Jun-01	19.243	2.744	1.135	1.408	1.297	1.132	1.177	1.055	1.000	1.000	1.000	1.041	1.000	1.000	1.000	1.000	1.000	1.000																				
Jun-02		4.161	1.595	1.579	1.239	1.073	1.166	1.013	1.027	1.026	1.008	1.000	1.002	1.000	1.000	1.000	1.000																					
Jun-03		8.730	1.639	1.197	1.193	1.048	1.039	1.003	1.003	1.004	1.035	1.000	1.000	1.000	1.026	1.052																						
Jun-04	1.532	5.053	2.414	1.403	1.152	1.019	1.068	1.064	1.000	1.000	1.000	1.000	1.000	1.024	1.000																							
Jun-05	10.886	7.229	2.959	1.264	1.083	1.054	1.051	1.069	1.000	1.000	1.009	1.000	1.009	1.000																								
Jun-06		3.320	2.350	1.167	1.248	1.198	1.041	1.000	1.000	1.062	1.000	1.000	1.007																									
Jun-07	10.176	3.169	1.509	1.121	1.108	1.076	1.053	1.016	1.036	1.000	1.000	1.000																										
Jun-08		2.227	1.970	1.492	1.095	1.227	1.025	1.017	1.000	1.019	1.000																											
Jun-09	1.560	2.286	1.563	1.266	1.218	1.087	1.089	1.020	1.021	1.037																												
Jun-10		2.000	1.696	1.519	1.191	1.171	1.018	1.014	1.000																													
Jun-11	2.039	1.965	1.290	1.550	1.115	1.078	1.005	1.010																														
Jun-12		2.389	2.522	1.237	1.243	1.071	1.035																															
Jun-13	4.446	3.469	2.404	1.448	1.049	1.113																																
Jun-14	1.417	48.638	1.751	1.271	1.174																																	
Jun-15		3.807	1.544	1.336																																		
Jun-16	5.405	9.459	1.781																																			
Jun-17	71.273	3.857																																				
Jun-18	33.614																																					

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	444-456	To Ult
Simple Avg																																						
All Yrs (ex P)	15.427	4.942	1.819	1.396	1.248	1.132	1.136	1.075	1.080	1.041	1.052	1.017	1.022	1.007	1.018	1.021	1.030	1.015	1.015	1.010	1.003	1.005	1.008	1.000	1.003	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5	27.927	13.846	2.000	1.368	1.154	1.104	1.034	1.015	1.011	1.024	1.002	1.000	1.004	1.005	1.005	1.010	1.000	1.005	1.011	1.018	1.000	1.002	1.000	1.000	1.008	1.002	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3	36.764	5.708	1.692	1.352	1.155	1.087	1.019	1.015	1.007	1.019	1.000	1.000	1.005	1.008	1.009	1.017	1.000	1.008	1.018	1.004	1.000	1.000	1.000	1.000	1.014	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Volume Wtd																																						
All Yrs (ex P)	4.826	2.737	1.678	1.315	1.166	1.107	1.080	1.045	1.034	1.028	1.030	1.013	1.014	1.008	1.017	1.022	1.026	1.014	1.015	1.011	1.002	1.003	1.005	1.000	1.003	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5	18.365	5.814	1.902	1.360	1.155	1.102	1.032	1.015	1.010	1.025	1.002	1.000	1.004	1.004	1.005	1.010	1.000	1.005	1.011	1.014	1.000	1.002	1.000	1.000	1.006	1.001	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3	16.199	4.929	1.686	1.343	1.159	1.085	1.019	1.014	1.007	1.021	1.000	1.000	1.006	1.007	1.008	1.017	1.000	1.008	1.016	1.004	1.000	1.000	1.000	1.000	1.014	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000					

Dev Factor Selection																																						
Prior	4.389	2.897	1.881	1.416	1.183	1.133	1.050	1.026	1.012	1.024	1.015	1.005	1.010	1.005	1.009	1.000	1.000	1.010	1.015	1.005	1.005	1.005	1.003	1.003	1.003	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.010	
Selected	4.389	2.897	1.881	1.416	1.186	1.132	1.044	1.025	1.012	1.025	1.011	1.004	1.010	1.005	1.005	1.010	1.000	1.010	1.015	1.005	1.005	1.005	1.003	1.003	1.003	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.010
FacToUlt	56.092	12.780	4.411	2.345	1.656	1.396	1.233	1.182	1.153	1.139	1.112	1.100	1.095	1.084	1.079	1.074	1.063	1.063	1.052	1.037	1.031	1.026	1.021	1.018	1.015	1.012	1.011	1.010	1.010	1.010	1.010	1.010	1.010	1.010	1.010	1.010	1.010	1.010
Percent of Ult	1.8%	7.8%	22.7%	42.6%	60.4%	71.6%	81.1%	84.6%	86.7%	87.8%	89.9%	90.9%	91.3%	92.2%	92.7%	93.1%	94.1%	94.1%	95.0%	96.5%	97.0%	97.4%	97.9%	98.2%	98.5%	98.8%	98.9%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	1.5%	0.0%	0.4%	0.2%	1.000	1.000
444	98.5%	0.2%	1.5%	0.0%	0.0%	0.981	0.971
432	98.3%	0.2%	1.7%	0.0%	0.0%	0.947	0.923
420	98.1%	0.2%	1.9%	0.1%	0.0%	0.918	0.881
408	97.9%	0.2%	2.1%	0.1%	0.0%	0.892	0.844
396	97.7%	0.4%	2.3%	0.1%	0.1%	0.868	0.811
384	97.3%	0.6%	2.7%	0.2%	0.1%	0.855	0.795
372	96.7%	0.8%	3.3%	0.2%	0.1%	0.851	0.789
360	96.0%	0.9%	4.0%	0.3%	0.2%	0.849	0.787
348	95.1%	1.2%	4.9%	0.4%	0.2%	0.846	0.784
336	93.9%	1.3%	6.1%	0.4%	0.3%	0.846	0.785
324	92.6%	1.2%	7.4%	0.4%	0.3%	0.842	0.780
312	91.4%	1.3%	8.6%	0.5%	0.3%	0.834	0.769
300	90.1%	1.4%	9.9%	0.5%	0.3%	0.825	0.758
288	88.7%	1.3%	11.3%	0.5%	0.3%	0.817	0.747
276	87.3%	1.3%	12.7%	0.5%	0.4%	0.806	0.733
264	86.0%	1.3%	14.0%	0.6%	0.4%	0.794	0.718
252	84.7%	1.1%	15.3%	0.5%	0.3%	0.782	0.702
240	83.7%	1.2%	16.3%	0.5%	0.4%	0.767	0.682
228	82.5%	1.0%	17.5%	0.5%	0.4%	0.753	0.665
216	81.5%	1.0%	18.5%	0.5%	0.4%	0.739	0.647
204	80.5%	1.1%	19.5%	0.6%	0.4%	0.724	0.629
192	79.4%	1.1%	20.6%	0.6%	0.5%	0.711	0.613
180	78.3%	1.5%	21.7%	0.9%	0.7%	0.699	0.598
168	76.7%	1.5%	23.3%	0.9%	0.7%	0.692	0.591
156	75.3%	1.6%	24.7%	1.0%	0.8%	0.684	0.582
144	73.7%	1.8%	26.3%	1.1%	0.9%	0.678	0.575
132	71.9%	1.8%	28.1%	1.2%	1.0%	0.672	0.570
120	70.1%	1.9%	29.9%	1.3%	1.1%	0.667	0.563
108	68.2%	2.0%	31.8%	1.4%	1.2%	0.662	0.558
96	66.2%	2.3%	33.8%	1.8%	1.5%	0.656	0.552
84	63.9%	3.0%	36.1%	2.3%	2.0%	0.654	0.550
72	60.9%	4.0%	39.1%	3.2%	2.9%	0.655	0.554
60	56.9%	5.0%	43.1%	4.2%	3.9%	0.663	0.564
48	51.9%	7.9%	48.1%	6.9%	6.4%	0.673	0.578
36	44.0%	12.0%	56.0%	10.9%	10.4%	0.694	0.605
24	32.0%	17.4%	68.0%	16.4%	15.9%	0.723	0.641
12	14.6%	14.6%	85.4%	14.4%	14.2%	0.753	0.680
Total		100.0%					

NOTES:
(2) = 1 / Section 8, Exhibit 1, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	2,618,936	4,117,188		2,290,482	3,600,831
6/30/82-83	29,572	86,221	0.981	28,997	84,546
6/30/83-84	92,859	259,315	0.947	87,953	245,615
6/30/84-85	265,753	403,753	0.918	243,928	370,594
6/30/85-86	350,101	523,101	0.892	312,165	466,419
6/30/86-87	403,100	585,100	0.868	349,797	507,730
6/30/87-88	733,444	1,497,444	0.855	627,435	1,281,009
6/30/88-89	697,208	1,496,208	0.851	592,986	1,272,548
6/30/89-90	938,013	1,629,013	0.849	796,064	1,382,496
6/30/90-91	1,012,610	1,576,610	0.846	856,169	1,333,035
6/30/91-92	795,706	1,589,706	0.846	673,115	1,344,787
6/30/92-93	702,060	761,060	0.842	591,086	640,760
6/30/93-94	935,550	1,309,550	0.834	780,215	1,092,118
6/30/94-95	905,835	1,476,835	0.825	747,492	1,218,679
6/30/95-96	1,125,515	1,744,515	0.817	919,404	1,425,048
6/30/96-97	1,225,719	1,853,719	0.806	987,754	1,493,833
6/30/97-98	1,079,353	1,609,353	0.794	857,268	1,278,217
6/30/98-99	1,333,326	1,912,326	0.782	1,042,538	1,495,263
6/30/99-00	1,757,365	2,467,365	0.767	1,347,144	1,891,409
6/30/00-01	1,847,501	2,512,501	0.753	1,391,906	1,892,916
6/30/01-02	1,969,160	2,633,160	0.739	1,454,530	1,944,997
6/30/02-03	2,103,264	2,770,264	0.724	1,523,068	2,006,072
6/30/03-04	2,100,358	2,702,358	0.711	1,493,821	1,921,977
6/30/04-05	2,190,541	2,576,541	0.699	1,531,288	1,801,120
6/30/05-06	2,520,617	2,641,617	0.692	1,745,283	1,829,064
6/30/06-07	2,597,963	3,089,963	0.684	1,778,080	2,114,811
6/30/07-08	3,420,803	4,115,309	0.678	2,319,317	2,790,195
6/30/08-09	4,029,190	4,459,928	0.672	2,709,485	2,999,141
6/30/09-10	4,549,018	4,819,849	0.667	3,032,249	3,212,778
6/30/10-11	5,408,973	6,141,727	0.662	3,578,137	4,062,867
6/30/11-12	6,459,107	7,162,236	0.656	4,238,103	4,699,457
6/30/12-13	6,441,853	7,555,853	0.654	4,210,689	4,938,851
6/30/13-14	8,241,334	9,457,254	0.655	5,400,376	6,197,144
6/30/14-15	10,794,676	11,921,136	0.663	7,152,085	7,898,428
6/30/15-16	13,759,592	15,108,212	0.673	9,258,584	10,166,047
6/30/16-17	15,744,706	16,873,636	0.694	10,924,939	11,708,281
6/30/17-18	21,118,042	22,219,862	0.723	15,258,177	16,054,262
6/30/18-19	25,562,538	30,406,698	0.753	19,246,697	22,893,991
Total	157,861,262	186,066,487		112,378,810	133,557,337
			(7) Total Discount Factor:	0.712	0.718

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	2,618,936	4,117,188
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	374,134	588,170
(11) Discounted Value at 4%:	2,290,482	3,600,831

NOTES:
(2), (3) From Section 8, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 8, Exhibit 1, Page 13, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	2,618,936	4,117,188		2,151,214	3,381,889
6/30/82-83	29,572	86,221	0.971	28,722	83,745
6/30/83-84	92,859	259,315	0.923	85,670	239,238
6/30/84-85	265,753	403,753	0.881	234,040	355,573
6/30/85-86	350,101	523,101	0.844	295,422	441,403
6/30/86-87	403,100	585,100	0.811	326,862	474,441
6/30/87-88	733,444	1,497,444	0.795	582,877	1,190,036
6/30/88-89	697,208	1,496,208	0.789	550,043	1,180,393
6/30/89-90	938,013	1,629,013	0.787	738,513	1,282,549
6/30/90-91	1,012,610	1,576,610	0.784	793,573	1,235,575
6/30/91-92	795,706	1,589,706	0.785	624,574	1,247,808
6/30/92-93	702,060	761,060	0.780	547,528	593,541
6/30/93-94	935,550	1,309,550	0.769	719,782	1,007,525
6/30/94-95	905,835	1,476,835	0.758	686,474	1,119,199
6/30/95-96	1,125,515	1,744,515	0.747	840,779	1,303,183
6/30/96-97	1,225,719	1,853,719	0.733	897,966	1,358,041
6/30/97-98	1,079,353	1,609,353	0.718	774,466	1,154,755
6/30/98-99	1,333,326	1,912,326	0.702	935,505	1,341,750
6/30/99-00	1,757,365	2,467,365	0.682	1,198,254	1,682,366
6/30/00-01	1,847,501	2,512,501	0.665	1,229,009	1,671,386
6/30/01-02	1,969,160	2,633,160	0.647	1,273,399	1,702,788
6/30/02-03	2,103,264	2,770,264	0.629	1,322,194	1,741,497
6/30/03-04	2,100,358	2,702,358	0.613	1,287,348	1,656,326
6/30/04-05	2,190,541	2,576,541	0.598	1,310,671	1,541,627
6/30/05-06	2,520,617	2,641,617	0.591	1,490,104	1,561,635
6/30/06-07	2,597,963	3,089,963	0.582	1,512,518	1,798,957
6/30/07-08	3,420,803	4,115,309	0.575	1,967,993	2,367,543
6/30/08-09	4,029,190	4,459,928	0.570	2,294,691	2,540,003
6/30/09-10	4,549,018	4,819,849	0.563	2,562,161	2,714,702
6/30/10-11	5,408,973	6,141,727	0.558	3,018,284	3,427,171
6/30/11-12	6,459,107	7,162,236	0.552	3,567,639	3,956,007
6/30/12-13	6,441,853	7,555,853	0.550	3,545,296	4,158,389
6/30/13-14	8,241,334	9,457,254	0.554	4,562,242	5,235,352
6/30/14-15	10,794,676	11,921,136	0.564	6,086,656	6,721,818
6/30/15-16	13,759,592	15,108,212	0.578	7,949,463	8,728,614
6/30/16-17	15,744,706	16,873,636	0.605	9,524,579	10,207,512
6/30/17-18	21,118,042	22,219,862	0.641	13,545,479	14,252,206
6/30/18-19	25,562,538	30,406,698	0.680	17,373,846	20,666,230
Total	157,861,262	186,066,487		98,435,834	117,322,771
			(7) Total Discount Factor:	0.624	0.631

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	2,618,936	4,117,188
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	374,134	588,170
(11) Discounted Value at 6%:	2,151,214	3,381,889

NOTES:
(2), (3) From Section 8, Exhibit 1, Page 1, Columns 8, 9
(4) From Section 8, Exhibit 1, Page 13, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/19 - 20 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/19 - 06/30/20	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/19 - 06/30/20		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	51,415,678	52,926,294	48,790,108	2,625,569	4,136,186				235,458	259,004	9.0%	6.3%
6/30/82-83	6,152,491	6,216,478	6,122,919	29,572	93,559	99.0%	0.3%	25.1%	7,426	23,496	25.1%	25.1%
6/30/83-84	9,065,544	9,239,827	8,967,463	98,081	272,364	98.0%	1.5%	74.1%	72,699	201,881	74.1%	74.1%
6/30/84-85	18,367,956	18,526,626	18,102,204	265,753	424,422	98.1%	1.5%	80.2%	213,095	340,324	80.2%	80.2%
6/30/85-86	22,727,435	22,929,130	22,367,205	360,230	561,925	98.0%	1.5%	74.3%	267,529	417,320	74.3%	74.3%
6/30/86-87	23,739,245	23,947,510	23,323,959	415,286	623,551	97.8%	1.5%	68.9%	285,949	429,352	68.9%	68.9%
6/30/87-88	33,073,580	33,888,860	32,307,120	766,460	1,581,740	96.5%	1.5%	42.8%	327,851	676,585	42.8%	42.8%
6/30/88-89	31,041,000	31,879,500	30,278,255	762,745	1,601,245	96.2%	1.5%	39.9%	304,521	639,287	39.9%	39.9%
6/30/89-90	30,448,000	31,182,610	29,427,244	1,020,756	1,755,366	95.5%	1.5%	33.3%	339,916	584,544	33.3%	33.3%
6/30/90-91	26,452,000	27,051,980	25,353,228	1,098,772	1,698,752	94.8%	0.7%	13.9%	152,182	235,281	13.9%	13.9%
6/30/91-92	17,225,000	18,047,670	16,352,583	872,417	1,695,087	92.7%	2.1%	28.2%	245,747	477,480	28.2%	28.2%
6/30/92-93	13,397,000	13,481,950	12,619,194	777,806	862,756	93.9%	1.5%	24.6%	191,153	212,031	24.6%	24.6%
6/30/93-94	15,328,000	15,734,870	14,288,939	1,039,061	1,445,931	92.0%	1.5%	18.8%	194,827	271,116	18.8%	18.8%
6/30/94-95	13,513,000	14,112,020	12,503,019	1,009,981	1,609,001	90.5%	1.5%	15.8%	159,799	254,576	15.8%	15.8%
6/30/95-96	13,687,000	14,327,880	12,465,680	1,221,320	1,862,200	89.0%	1.5%	13.6%	166,442	253,781	13.6%	13.6%
6/30/96-97	14,609,000	15,267,180	13,242,408	1,366,592	2,024,772	88.6%	0.3%	3.0%	41,495	61,480	3.0%	3.0%
6/30/97-98	12,189,000	12,745,560	10,995,719	1,193,281	1,749,841	88.2%	0.5%	3.8%	45,694	67,007	3.8%	3.8%
6/30/98-99	13,651,000	14,261,290	12,151,759	1,499,241	2,109,531	87.1%	1.1%	8.7%	130,523	183,654	8.7%	8.7%
6/30/99-00	16,342,000	17,123,380	14,351,103	1,990,897	2,772,277	85.8%	1.3%	9.2%	182,424	254,022	9.2%	9.2%
6/30/00-01	15,637,000	16,374,560	13,530,123	2,106,877	2,844,437	84.5%	1.2%	8.0%	168,107	226,956	8.0%	8.0%
6/30/01-02	15,668,000	16,404,380	13,420,136	2,247,864	2,984,244	83.7%	2.0%	12.3%	275,584	365,863	12.3%	12.3%
6/30/02-03	16,169,000	16,913,900	13,706,567	2,462,433	3,207,333	82.9%	0.8%	4.8%	118,483	154,325	4.8%	4.8%
6/30/03-04	15,227,000	15,907,960	12,716,409	2,510,591	3,191,551	81.7%	1.2%	6.4%	161,241	204,975	6.4%	6.4%
6/30/04-05	18,402,000	19,054,000	15,645,670	2,756,330	3,408,330	83.5%	1.5%	9.1%	251,209	310,631	9.1%	9.1%
6/30/05-06	16,925,000	17,205,000	13,752,175	3,172,825	3,452,825	80.6%	2.0%	10.3%	326,877	355,723	10.3%	10.3%
6/30/06-07	17,908,000	18,774,000	14,486,983	3,421,017	4,287,017	79.0%	1.6%	7.6%	260,509	326,455	7.6%	7.6%
6/30/07-08	21,829,000	22,731,506	17,479,855	4,349,145	5,251,651	78.5%	0.5%	2.5%	107,470	129,772	2.5%	2.5%
6/30/08-09	22,915,090	23,538,828	17,835,928	5,079,162	5,702,900	76.8%	1.7%	7.2%	364,293	409,029	7.2%	7.2%
6/30/09-10	23,308,130	23,803,961	17,624,325	5,683,805	6,179,636	74.8%	2.0%	7.8%	444,902	483,713	7.8%	7.8%
6/30/10-11	27,032,590	28,099,344	20,336,516	6,696,074	7,762,828	73.8%	1.0%	4.0%	266,733	309,226	4.0%	4.0%
6/30/11-12	28,949,000	29,884,129	20,986,793	7,962,207	8,897,336	71.3%	2.4%	8.5%	675,326	754,640	8.5%	8.5%
6/30/12-13	24,842,000	26,304,000	16,984,881	7,857,119	9,319,119	66.4%	4.9%	14.7%	1,152,551	1,367,010	14.7%	14.7%
6/30/13-14	30,414,080	32,096,000	20,305,708	10,108,372	11,790,292	65.0%	1.4%	4.1%	418,232	487,821	4.1%	4.1%
6/30/14-15	33,563,540	35,196,000	20,581,209	12,982,331	14,614,791	59.9%	5.1%	12.7%	1,650,779	1,858,356	12.7%	12.7%
6/30/15-16	36,752,380	38,654,000	20,503,455	16,248,925	18,150,545	54.4%	5.5%	12.0%	1,953,015	2,181,578	12.0%	12.0%
6/30/16-17	34,590,070	36,394,000	16,014,173	18,575,897	20,379,827	45.1%	9.3%	16.9%	3,134,625	3,439,032	16.9%	16.9%
6/30/17-18	37,664,180	39,511,000	12,758,522	24,905,658	26,752,478	33.1%	12.1%	18.0%	4,486,054	4,818,706	18.0%	18.0%
6/30/18-19	37,166,840	42,534,000	5,284,963	31,881,877	37,249,037	13.3%	19.8%	22.8%	7,278,452	8,503,744	22.8%	22.8%
Total	857,386,829	892,271,183	667,964,500	189,422,329	224,306,683				27,059,172	32,529,776	14.3%	14.5%

NOTES:
(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)
(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)
(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)
(5) = (2) - (4)
(6) = (3) - (4)
(7) = (4) / Average of Columns (2), (3)
(8) = (7) - Prior Year's (7)
(9) = (8) / (1.00 - (7))
(10) = (5) * (9)
(11) = (6) * (9)
(12) = (10) / (5)
(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Indemnity

Allocation of Outstanding Reserve to MassDOT Agencies

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
		Aon	Aon	Outstanding	Outstanding	MassDOT Allocation - Method 1					MassDOT Allocation - Method 2					MassDOT Allocation - Method 3					MassDOT	MassDOT	All Other	All Other
Accident		Selected Ult	Selected Ult	Losses	Losses	Paid Counts	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Paid	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Payroll	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Outstanding	Outstanding	Outstanding	Outstanding
Year	Paid Loss	(Low)	(High)	(Low)	(High)	7/1/18-19	7/1/18-19	Paid Counts	(Low)	(High)	7/1/18-19	7/1/18-19	Total Paid	(Low)	(High)	($000)	($000)	Total Payroll	(Low)	(High)	(Low)	(High)	(Low)	(High)
All Prior Yrs	45,731,885	48,350,821	49,849,073	2,618,936	4,117,188	6					250,487								170,339	267,787	56,780	89,262	2,562,156	4,027,926
6/30/82-83	5,610,779	5,640,351	5,697,000	29,572	86,221	0					0								1,923	5,608	641	1,869	28,930	84,351
6/30/83-84	8,169,685	8,262,544	8,429,000	92,859	259,315	1					43,400								6,040	16,866	2,013	5,622	90,846	253,693
6/30/84-85	16,978,247	17,244,000	17,382,000	265,753	403,753	1	1	100.0%	265,753	403,753	69,948	69,948	100.0%	265,753	403,753				17,285	26,261	100,108	152,091	165,645	251,662
6/30/85-86	20,473,899	20,824,000	20,997,000	350,101	523,101	3	1	33.3%	116,700	174,367	143,263	71,002	49.6%	173,513	259,254				22,771	34,023	104,328	155,881	245,773	367,220
6/30/86-87	21,593,900	21,997,000	22,179,000	403,100	585,100	5					259,080								26,218	38,056	8,739	12,685	394,361	572,415
6/30/87-88	29,072,556	29,806,000	30,570,000	733,444	1,497,444	6	1	16.7%	122,241	249,574	271,856	53,624	19.7%	144,673	295,373				47,704	97,396	104,873	214,114	628,571	1,283,330
6/30/88-89	26,696,792	27,394,000	28,193,000	697,208	1,496,208	5	1	20.0%	139,442	299,242	232,887	23,574	10.1%	70,573	151,451				45,347	97,315	85,121	182,669	612,087	1,313,539
6/30/89-90	25,552,987	26,491,000	27,182,000	938,013	1,629,013	6	1	16.7%	156,335	271,502	322,997	61,905	19.2%	179,777	312,212				61,009	105,953	132,374	229,889	805,639	1,399,124
6/30/90-91	21,841,390	22,854,000	23,418,000	1,012,610	1,576,610	4	1	25.0%	253,152	394,152	200,759	44,102	22.0%	222,449	346,348				65,861	102,545	180,488	281,015	832,122	1,295,595
6/30/91-92	13,562,294	14,358,000	15,152,000	795,706	1,589,706	4					170,814								51,754	103,396	17,251	34,465	778,455	1,555,241
6/30/92-93	10,099,940	10,802,000	10,861,000	702,060	761,060	1					65,748								45,663	49,500	15,221	16,500	686,839	744,560
6/30/93-94	11,307,450	12,243,000	12,617,000	935,550	1,309,550	6	2	33.3%	311,850	436,517	186,135	43,807	23.5%	220,180	308,200				60,849	85,175	140,515	196,688	795,035	1,112,862
6/30/94-95	9,906,165	10,812,000	11,383,000	905,835	1,476,835	2					83,868								58,917	96,055	19,639	32,018	886,196	1,444,816
6/30/95-96	10,373,485	11,499,000	12,118,000	1,125,515	1,744,515	2					93,299								73,205	113,465	24,402	37,822	1,101,114	1,706,694
6/30/96-97	10,466,281	11,692,000	12,320,000	1,225,719	1,853,719	3					86,980								79,722	120,568	26,574	40,189	1,199,145	1,813,530
6/30/97-98	8,958,647	10,038,000	10,568,000	1,079,353	1,609,353	1					49,461					1,917,994	137,500	7.2%	77,378	115,373	77,378	115,373	1,001,975	1,493,979
6/30/98-99	9,491,674	10,825,000	11,404,000	1,333,326	1,912,326	4					91,457					2,081,524	136,688	6.6%	87,556	125,577	43,778	62,789	1,289,548	1,849,538
6/30/99-00	11,066,635	12,824,000	13,534,000	1,757,365	2,467,365	3	1	33.3%	585,788	822,455	178,890	1,225	0.7%	12,038	16,901	2,207,243	137,892	6.2%	109,787	154,143	109,787	154,143	1,647,578	2,313,222
6/30/00-01	10,263,499	12,111,000	12,776,000	1,847,501	2,512,501	6	1	16.7%	307,917	418,750	100,685	22,741	22.6%	417,283	567,483	2,201,008	145,149	6.6%	121,836	165,690	282,345	383,974	1,565,155	2,128,526
6/30/01-02	10,436,840	12,406,000	13,070,000	1,969,160	2,633,160	2					31,378					2,292,592	140,223	6.1%	120,441	161,054	60,220	80,527	1,908,940	2,552,633
6/30/02-03	10,374,736	12,478,000	13,145,000	2,103,264	2,770,264	3					175,366					2,260,534	140,250	6.2%	130,493	171,875	130,493	171,875	1,972,772	2,598,389
6/30/03-04	9,484,642	11,585,000	12,187,000	2,100,358	2,702,358	4					93,381					2,255,942	137,408	6.1%	127,931	164,598	127,931	164,598	1,972,427	2,537,759
6/30/04-05	11,111,459	13,302,000	13,688,000	2,190,541	2,576,541	4					164,630					2,309,083	145,033	6.3%	137,587	161,832	45,862	53,944	2,144,678	2,522,597
6/30/05-06	10,204,383	12,725,000	12,846,000	2,520,617	2,641,617	4					72,994					2,480,693	156,390	6.3%	158,907	166,536	79,454	83,268	2,441,164	2,558,350
6/30/06-07	9,310,037	11,908,000	12,400,000	2,597,963	3,089,963	3	1	33.3%	865,988	1,029,988	86,513	327	0.4%	9,827	11,688	2,612,577	157,146	6.0%	156,267	185,860	107,453	127,803	2,490,510	2,962,161
6/30/07-08	13,408,197	16,829,000	17,523,506	3,420,803	4,115,309	6	1	16.7%	570,134	685,885	231,912	52,944	22.8%	780,948	939,500	2,783,717	168,663	6.1%	207,263	249,342	328,220	394,857	3,092,583	3,720,452
6/30/08-09	13,385,900	17,415,090	17,845,828	4,029,190	4,459,928	4					165,551					2,750,907	180,456	6.6%	264,309	292,565	264,309	292,565	3,764,881	4,167,363
6/30/09-10	13,159,112	17,708,130	17,978,961	4,549,018	4,819,849	5					123,409					2,806,048	203,138	7.2%	329,316	348,922	164,658	174,461	4,384,360	4,645,388
6/30/10-11	15,223,617	20,632,590	21,365,344	5,408,973	6,141,727	9					268,313					2,942,638	196,775	6.7%	361,699	410,698	144,679	164,279	5,264,294	5,977,448
6/30/11-12	15,989,893	22,449,000	23,152,129	6,459,107	7,162,236	16	2	12.5%	807,388	895,279	466,952	21,588	4.6%	298,622	331,130	3,006,849	207,250	6.9%	445,201	493,665	371,912	412,398	6,087,195	6,749,838
6/30/12-13	12,700,148	19,142,000	20,256,000	6,441,853	7,555,853	19	1	5.3%	339,045	397,676	583,101	-8,697	-1.5%	-96,077	-112,692	3,138,905	218,884	7.0%	449,208	526,890	339,045	397,676	6,102,808	7,158,176
6/30/13-14	15,372,746	23,614,080	24,830,000	8,241,334	9,457,254	33	4	12.1%	998,950	1,146,334	1,136,042	44,189	3.9%	320,565	367,861	3,311,947	231,765	7.0%	576,716	661,804	660,761	758,249	7,580,573	8,699,005
6/30/14-15	15,668,864	26,463,540	27,590,000	10,794,676	11,921,136	49	4	8.2%	881,198	973,154	1,793,669	209,067	11.7%	1,258,211	1,389,509	3,511,622	252,444	7.2%	776,009	856,988	873,907	965,102	9,920,769	10,956,034
6/30/15-16	15,392,788	29,152,380	30,501,000	13,759,592	15,108,212	91	8	8.8%	1,209,634	1,328,194	2,964,290	266,420	9.0%	1,236,664	1,357,874	3,491,558	239,716	6.9%	944,678	1,037,269	1,062,092	1,166,191	12,697,500	13,942,021
6/30/16-17	11,445,364	27,190,070	28,319,000	15,744,706	16,873,636	96	11	11.5%	1,804,081	1,933,437	3,510,121	266,402	7.6%	1,194,949	1,280,629	3,338,327	202,091	6.1%	953,133	1,021,474	1,033,738	1,107,859	14,710,968	15,765,776
6/30/17-18	8,946,138	30,064,180	31,166,000	21,118,042	22,219,862	237	18	7.6%	1,603,902	1,687,584	4,864,885	377,122	7.8%	1,637,055	1,722,468	3,401,479	204,258	6.0%	1,268,133	1,334,297	1,385,581	1,457,873	19,732,461	20,761,989
6/30/18-19	3,704,302	29,266,840	34,111,000	25,562,538	30,406,698	428	38	8.9%	2,269,571	2,699,660	3,704,302	479,766	13.0%	3,310,751	3,938,146	3,573,725	213,686	6.0%	1,528,479	1,818,129	1,528,479	1,818,129	24,034,059	28,588,569
Total	542,537,355	700,398,616	728,603,841	157,861,262	186,066,487	1,082	98	9.1%	13,609,070	16,247,505	23,338,825	2,101,057	9.0%	11,657,756	13,887,087						10,241,150	12,190,716	147,620,112	173,875,771

Sel. FY97 & Prior	6.50%

NOTES:

(2), (7), (8), (12), (13), (17). (18) Provided by Commonwealth of Massachusetts
(3) From Section 8, Exhibit 1, Page 1, Column 6
(4) From Section 8, Exhibit 1, Page 1, Column 7
(5) = (3) - (2)
(6) = (4) - (2)
(9) = (8) / (7)
(10) = (9) * (5)
(11) = (9) * (6)
(14) = (13) / (12)
(15) = (14) * (5)
(16) = (14) * (6)
(19) = (18) / (17)
(20) = (19) * (5)
(21) = (19) * (6)
(22) Selected judgementally based on (10), (15), (20)
(23) Selected judgementally based on (11), (16). (21)
(24) = (5) - (22)
(25) = (6) - (23)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2018

All Other - Clusters 5-17 & 95
Indemnity

Allocation of Outstanding Reserve to MassDOT Agencies

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
						MassDOT Allocation - Method 1					**MassDOT Allocation - Method 2**					**MassDOT Allocation - Method 3**								
Accident		Aon	Aon	Outstanding	Outstanding																MassDOT	MassDOT	All Other	All Other
		Selected Ult	Selected Ult	Losses	Losses	Paid Counts	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Paid	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Payroll	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Outstanding	Outstanding	Outstanding	Outstanding
Year	Paid Loss	(Low)	(High)	(Low)	(High)	7/1/17-18	7/1/17-18	Paid Counts	(Low)	(High)	7/1/17-18	7/1/17-18	Total Paid	(Low)	(High)	($000)	($000)	Total Payroll	(Low)	(High)	(Low)	(High)	(Low)	(High)
All Prior Yrs	45,481,398	48,982,800	51,826,222	3,501,401	6,344,824	7					303,381								228,518	414,094	76,173	138,031	3,425,229	6,206,793
6/30/82-83	5,610,779	5,611,827	5,669,000	1,048	58,221	0					0								68	3,800	23	1,267	1,025	56,954
6/30/83-84	8,126,285	8,174,920	8,759,000	48,636	632,715	1					41,958								3,174	41,294	1,058	13,765	47,578	618,951
6/30/84-85	16,908,299	17,242,000	17,396,000	333,701	487,701	1	1	100.0%	333,701	487,701	69,068	69,068	100.0%	333,701	487,701				21,779	31,830	125,753	183,787	207,948	303,914
6/30/85-86	20,330,636	20,763,000	20,951,000	432,364	620,364	3	1	33.3%	144,121	206,788	182,542	68,642	37.6%	162,584	233,278				28,218	40,488	111,641	160,185	320,723	460,179
6/30/86-87	21,334,819	21,856,000	22,058,000	521,181	723,181	6	1	16.7%	86,863	120,530	287,388	36,201	12.6%	65,650	91,095				34,015	47,198	62,176	86,274	459,005	636,906
6/30/87-88	28,800,700	29,771,000	30,542,000	970,300	1,741,300	7	1	14.3%	138,614	248,757	320,183	51,841	16.2%	157,102	281,935				63,326	113,646	119,681	214,779	850,619	1,526,521
6/30/88-89	26,463,905	27,383,000	28,225,000	919,095	1,761,095	5	1	20.0%	183,819	352,219	243,399	39,678	16.3%	149,827	287,086				59,985	114,938	131,210	251,414	787,885	1,509,681
6/30/89-90	25,229,990	26,437,000	27,136,000	1,207,010	1,906,010	7	1	14.3%	172,430	272,287	362,499	59,847	16.5%	199,272	314,673				78,775	124,395	150,159	237,119	1,056,851	1,668,891
6/30/90-91	21,640,631	22,970,000	23,539,000	1,329,369	1,898,369	4	1	25.0%	332,342	474,592	194,085	42,636	22.0%	292,034	417,031				86,761	123,897	237,046	338,507	1,092,323	1,559,862
6/30/91-92	13,391,479	14,392,000	15,191,000	1,000,521	1,799,521	4					166,185								65,299	117,445	21,766	39,148	978,755	1,760,372
6/30/92-93	10,034,192	10,897,000	10,960,000	862,808	925,808	3					84,719								56,311	60,423	18,770	20,141	844,037	905,667
6/30/93-94	11,121,315	12,222,000	12,600,000	1,100,685	1,478,685	6	2	33.3%	366,895	492,895	182,807	43,024	23.5%	259,045	348,007				71,836	96,506	165,440	222,256	935,245	1,256,429
6/30/94-95	9,822,297	10,896,000	11,479,000	1,073,703	1,656,703	2					82,369								70,075	108,124	23,358	36,041	1,050,344	1,620,661
6/30/95-96	10,280,186	11,587,000	12,221,000	1,306,814	1,940,814	2					91,628								85,289	126,667	28,430	42,222	1,278,384	1,898,592
6/30/96-97	10,379,301	11,790,000	12,434,000	1,410,699	2,054,699	3					83,584								92,069	134,100	30,690	44,700	1,380,009	2,009,999
6/30/97-98	8,909,187	10,144,000	10,689,000	1,234,813	1,779,813	1					48,575					1,917,994	137,500	7.2%	88,523	127,594	88,523	127,594	1,146,290	1,652,220
6/30/98-99	9,400,216	10,902,000	11,497,000	1,501,784	2,096,784	6					99,266					2,081,524	136,688	6.6%	98,618	137,690	49,309	68,845	1,452,475	2,027,939
6/30/99-00	10,887,745	12,894,000	13,627,000	2,006,255	2,739,255	4	1	25.0%	501,564	684,814	169,170	1,095	0.6%	12,987	17,733	2,207,243	137,892	6.2%	125,336	171,129	125,336	171,129	1,880,919	2,568,127
6/30/00-01	10,162,814	12,238,000	12,926,000	2,075,186	2,763,186	5	1	20.0%	415,037	552,637	97,999	22,334	22.8%	472,942	629,740	2,201,008	145,149	6.6%	136,851	182,222	341,610	454,866	1,733,576	2,308,319
6/30/01-02	10,405,462	12,625,000	13,319,000	2,219,538	2,913,538	3					31,445					2,292,592	140,223	6.1%	135,755	178,203	67,877	89,101	2,151,660	2,824,437
6/30/02-03	10,199,369	12,549,000	13,237,000	2,349,631	3,037,631	4					82,811					2,260,534	140,250	6.2%	145,778	188,463	145,778	188,463	2,203,853	2,849,167
6/30/03-04	9,391,262	11,739,000	12,365,000	2,347,738	2,973,738	6					157,902					2,255,942	137,408	6.1%	142,999	181,128	142,999	181,128	2,204,739	2,792,610
6/30/04-05	10,946,829	13,307,000	13,867,000	2,360,171	2,920,171	5					167,430					2,309,083	145,033	6.3%	148,242	183,415	49,414	61,138	2,310,757	2,859,032
6/30/05-06	10,131,389	12,981,000	13,014,000	2,849,611	2,882,611	2					45,730					2,480,693	156,390	6.3%	179,648	181,728	89,824	90,864	2,759,787	2,791,747
6/30/06-07	9,223,523	12,187,000	12,567,000	2,963,477	3,343,477	4	1	25.0%	740,869	835,869	86,668	585	0.7%	20,015	22,582	2,612,577	157,146	6.0%	178,252	201,109	125,506	141,600	2,837,970	3,201,877
6/30/07-08	13,176,285	16,922,000	17,828,811	3,745,715	4,652,526	8	1	12.5%	468,214	581,566	287,323	51,995	18.1%	677,837	841,937	2,783,717	168,663	6.1%	226,949	281,892	307,371	381,783	3,438,344	4,270,742
6/30/08-09	13,220,349	17,631,900	18,349,331	4,411,551	5,128,982	6	2	33.3%	1,470,517	1,709,661	106,020	3,459	3.3%	143,937	167,345	2,750,907	180,456	6.6%	289,392	336,454	289,392	336,454	4,122,159	4,792,528
6/30/09-10	13,035,703	18,110,070	18,480,462	5,074,367	5,444,759	4					159,962					2,806,048	203,138	7.2%	367,347	394,161	183,674	197,081	4,890,694	5,247,679
6/30/10-11	14,955,303	20,922,660	21,952,931	5,967,357	6,997,628	14					278,107					2,942,638	196,775	6.7%	399,038	467,932	159,615	187,173	5,807,741	6,810,455
6/30/11-12	15,522,941	22,778,000	23,790,767	7,255,059	8,267,826	23	3	13.0%	946,312	1,078,412	650,365	33,348	5.1%	372,008	423,939	3,006,849	207,250	6.9%	500,063	569,869	436,036	496,904	6,819,023	7,770,922
6/30/12-13	12,117,046	19,781,000	20,788,000	7,663,954	8,670,954	22					604,273	38,000	6.3%	481,952	545,277	3,138,905	218,884	7.0%	534,428	604,649	267,214	302,325	7,396,739	8,368,629
6/30/13-14	14,236,704	24,315,840	25,346,000	10,079,136	11,109,296	47	6	12.8%	1,286,698	1,418,208	1,441,624	122,338	8.5%	855,327	942,748	3,311,947	231,765	7.0%	705,322	777,411	888,168	978,945	9,190,968	10,130,351
6/30/14-15	13,875,194	27,247,300	28,264,000	13,372,106	14,388,806	73	6	8.2%	1,099,077	1,182,642	2,600,098	288,298	11.1%	1,482,694	1,595,426	3,511,622	252,444	7.2%	961,295	1,034,384	1,071,159	1,152,600	12,300,947	13,236,205
6/30/15-16	12,428,497	29,621,860	31,059,000	17,193,363	18,630,503	125	10	8.0%	1,375,469	1,490,440	4,191,756	223,129	5.3%	915,209	991,708	3,491,558	239,716	6.9%	1,180,427	1,279,095	1,168,731	1,266,422	16,024,632	17,364,081
6/30/16-17	7,935,244	26,796,250	28,420,000	18,861,006	20,484,756	217	25	11.5%	2,172,927	2,359,995	4,424,433	554,309	12.5%	2,362,976	2,566,405	3,338,327	202,091	6.1%	1,141,783	1,240,080	1,141,783	1,240,080	17,719,223	19,244,677
6/30/17-18	4,081,252	32,205,740	33,291,000	28,124,488	29,209,748	510	36	7.1%	1,985,258	2,061,865	4,081,252	262,580	6.4%	1,809,479	1,879,302	3,396,596	202,091	5.9%	1,673,356	1,737,927	1,673,356	1,737,927	26,451,132	27,471,821
Total	519,198,530	678,874,167	705,664,524	159,675,637	186,465,994	1,150	101	8.8%	14,220,729	16,611,878	22,508,006	2,012,408	8.9%	11,226,579	13,084,948						10,116,048	11,882,058	149,559,588	174,583,937

Sel. FY97 & Prior	6.53%

NOTES:

(2), (7), (8), (12), (13), (17). (18) Provided by Commonwealth of Massachusetts
(3) From Prior Analysis - Section 8, Exhibit 2, Page 1, Column 6
(4) From Prior Analysis - Section 8, Exhibit 2, Page 1, Column 7
(5) = (3) - (2)
(6) = (4) - (2)
(9) = (8) / (7)
(10) = (9) * (5)
(11) = (9) * (6)

(14) = (13) / (12)
(15) = (14) * (5)
(16) = (14) * (6)
(19) = (18) / (17)
(20) = (19) * (5)
(21) = (19) * (6)

(22) Selected judgementally based on (10), (15), (20)
(23) Selected judgementally based on (11), (16). (21)
(24) = (5) - (22)
(25) = (6) - (23)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		3,058,223			3,064,856	3,077,220	6,634	18,998		
6/30/82-83		512,140	514,335		512,140	519,478	0	7,338		
6/30/83-84		797,778	802,799		803,000	810,827	5,222	13,049		
6/30/84-85	732,729	1,123,956	1,133,293	1,133,554	1,123,956	1,144,626	0	20,669	0.153	0.156
6/30/85-86	787,208	1,893,306	1,912,851	1,913,013	1,903,435	1,932,130	10,129	38,824	0.242	0.245
6/30/86-87	902,483	1,730,059	1,751,415	1,750,968	1,742,245	1,768,510	12,186	38,451	0.193	0.196
6/30/87-88	1,366,586	3,234,564	3,284,315	3,285,696	3,267,580	3,318,860	33,016	84,296	0.239	0.243
6/30/88-89	1,486,478	3,581,462	3,647,459	3,650,047	3,647,000	3,686,500	65,538	105,038	0.245	0.248
6/30/89-90	1,494,463	3,874,257	3,957,486	3,961,003	3,957,000	4,000,610	82,743	126,353	0.265	0.268
6/30/90-91	1,405,560	3,511,838	3,598,043	3,597,667	3,598,000	3,633,980	86,162	122,142	0.256	0.259
6/30/91-92	1,364,510	2,790,289	2,867,359	2,866,892	2,867,000	2,895,670	76,711	105,381	0.210	0.212
6/30/92-93	1,347,359	2,519,254	2,595,140	2,594,611	2,595,000	2,620,950	75,746	101,696	0.193	0.195
6/30/93-94	1,424,410	2,981,489	3,086,655	3,085,374	3,085,000	3,117,870	103,511	136,381	0.217	0.219
6/30/94-95	1,497,829	2,596,854	2,701,895	2,701,106	2,701,000	2,729,020	104,146	132,166	0.180	0.182
6/30/95-96	1,582,635	2,092,195	2,187,707	2,188,476	2,188,000	2,209,880	95,805	117,685	0.138	0.140
6/30/96-97	1,979,748	2,776,128	2,917,376	2,918,288	2,917,000	2,947,180	140,872	171,052	0.147	0.149
6/30/97-98	1,917,994	2,037,072	2,151,421	2,155,551	2,151,000	2,177,560	113,928	140,488	0.112	0.114
6/30/98-99	2,081,524	2,660,086	2,826,264	2,829,420	2,826,000	2,857,290	165,914	197,204	0.136	0.137
6/30/99-00	2,207,243	3,284,468	3,517,569	3,518,551	3,518,000	3,589,380	233,532	304,912	0.159	0.163
6/30/00-01	2,201,008	3,266,624	3,526,447	3,528,298	3,526,000	3,598,560	259,376	331,936	0.160	0.163
6/30/01-02	2,292,592	2,983,296	3,262,298	3,268,645	3,262,000	3,334,380	278,704	351,084	0.142	0.145
6/30/02-03	2,260,534	3,331,832	3,691,299	3,695,197	3,691,000	3,768,900	359,168	437,068	0.163	0.167
6/30/03-04	2,255,942	3,231,766	3,641,539	3,648,145	3,642,000	3,720,960	410,234	489,194	0.161	0.165
6/30/04-05	2,309,083	4,534,211	5,260,532	5,144,119	5,100,000	5,366,000	565,789	831,789	0.221	0.232
6/30/05-06	2,480,693	3,547,792	4,177,843	4,273,138	4,200,000	4,359,000	652,208	811,208	0.169	0.176
6/30/06-07	2,612,577	5,176,947	6,248,726	6,054,459	6,000,000	6,374,000	823,053	1,197,053	0.230	0.244
6/30/07-08	2,783,717	4,071,658	5,012,903	5,105,443	5,000,000	5,208,000	928,342	1,136,342	0.180	0.187
6/30/08-09	2,750,907	4,450,028	5,527,562	5,526,980	5,500,000	5,693,000	1,049,972	1,242,972	0.200	0.207
6/30/09-10	2,806,048	4,465,213	5,607,126	5,655,089	5,600,000	5,825,000	1,134,787	1,359,787	0.200	0.208
6/30/10-11	2,942,638	5,112,900	6,537,569	6,461,459	6,400,000	6,734,000	1,287,100	1,621,100	0.217	0.229
6/30/11-12	3,006,849	4,996,900	6,536,301	6,501,040	6,500,000	6,732,000	1,503,100	1,735,100	0.216	0.224
6/30/12-13	3,138,905	4,284,733	5,735,568	5,988,060	5,700,000	6,048,000	1,415,267	1,763,267	0.182	0.193
6/30/13-14	3,311,947	4,932,962	6,821,945	6,919,985	6,800,000	7,266,000	1,867,038	2,333,038	0.205	0.219
6/30/14-15	3,511,622	4,912,345	7,051,594	7,243,670	7,100,000	7,606,000	2,187,655	2,693,655	0.202	0.217
6/30/15-16	3,491,558	5,110,667	7,764,569	7,748,389	7,600,000	8,153,000	2,489,333	3,042,333	0.218	0.234
6/30/16-17	3,338,327	4,568,808	7,690,602	7,593,886	7,400,000	8,075,000	2,831,192	3,506,192	0.222	0.242
6/30/17-18	3,401,479	3,812,384	7,947,925	7,802,922	7,600,000	8,345,000	3,787,616	4,532,616	0.223	0.245
6/30/18-19	3,573,725	1,580,661	7,581,957	8,022,225	7,900,000	8,423,000	6,319,339	6,842,339	0.221	0.236
Total	78,048,908	125,427,145	155,077,686	154,331,364	156,988,212	163,667,342	31,561,067	38,240,196		
Tot 6/30/84-19	78,048,908	121,059,005	153,760,552	154,331,364	152,608,216	159,259,816	31,549,212	38,200,811	0.196	0.204

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 8, Exhibit 2, Page 2, Column 3
(4) From Section 8, Exhibit 2, Page 2, Column 8
(5) From Section 8, Exhibit 2, Page 3, Column 8
(6), (7) Selected based on (3), (4), and (5)
(8) = (6) - (3)
(9) = (7) - (3)
(10) = (6) / (2) / 10
(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/17-18	Paid Counts 7/1/18-19	Average Outstanding Claim
All Prior Yrs		3,058,223							3	2	
6/30/82-83		512,140	1.004	1.000	514,335	N/A	514,335		0	0	
6/30/83-84		797,778	1.006	1.000	802,799	N/A	802,799		1	0	
6/30/84-85	732,729	1,123,956	1.008	1.000	1,133,293	N/A	1,133,293	0.155	0	0	
6/30/85-86	787,208	1,893,306	1.010	1.000	1,912,851	N/A	1,912,851	0.243	1	1	19,545
6/30/86-87	902,483	1,730,059	1.012	1.000	1,751,415	N/A	1,751,415	0.194	2	1	21,356
6/30/87-88	1,366,586	3,234,564	1.015	1.000	3,284,315	N/A	3,284,315	0.240	4	5	9,950
6/30/88-89	1,486,478	3,581,462	1.018	1.000	3,647,459	N/A	3,647,459	0.245	3	1	65,996
6/30/89-90	1,494,463	3,874,257	1.021	1.000	3,957,486	N/A	3,957,486	0.265	5	4	20,807
6/30/90-91	1,405,560	3,511,838	1.025	1.000	3,598,043	N/A	3,598,043	0.256	5	5	17,241
6/30/91-92	1,364,510	2,790,289	1.028	1.000	2,867,359	N/A	2,867,359	0.210	3	3	25,690
6/30/92-93	1,347,359	2,519,254	1.030	1.000	2,595,140	N/A	2,595,140	0.193	3	3	25,295
6/30/93-94	1,424,410	2,981,489	1.035	1.000	3,086,655	N/A	3,086,655	0.217	5	6	17,528
6/30/94-95	1,497,829	2,596,854	1.040	1.000	2,701,895	N/A	2,701,895	0.180	8	8	13,130
6/30/95-96	1,582,635	2,092,195	1.046	1.000	2,187,707	N/A	2,187,707	0.138	2	2	47,756
6/30/96-97	1,979,748	2,776,128	1.051	1.000	2,917,376	N/A	2,917,376	0.147	4	4	35,312
6/30/97-98	1,917,994	2,037,072	1.056	1.000	2,151,421	N/A	2,151,421	0.112	3	3	38,116
6/30/98-99	2,081,524	2,660,086	1.062	1.000	2,826,264	N/A	2,826,264	0.136	6	8	20,772
6/30/99-00	2,207,243	3,284,468	1.071	1.000	3,517,569	N/A	3,517,569	0.159	13	10	23,310
6/30/00-01	2,201,008	3,266,624	1.080	1.000	3,526,447	N/A	3,526,447	0.160	9	7	37,118
6/30/01-02	2,292,592	2,983,296	1.094	1.000	3,262,298	N/A	3,262,298	0.142	12	11	25,364
6/30/02-03	2,260,534	3,331,832	1.108	1.000	3,691,299	N/A	3,691,299	0.163	11	7	51,352
6/30/03-04	2,255,942	3,231,766	1.127	1.000	3,641,539	N/A	3,641,539	0.161	16	15	27,318
6/30/04-05	2,309,083	4,534,211	1.160	1.000	5,260,532	N/A	5,260,532	0.228	10	9	80,702
6/30/05-06	2,480,693	3,547,792	1.178	1.000	4,177,843	N/A	4,177,843	0.168	14	18	35,003
6/30/06-07	2,612,577	5,176,947	1.207	1.000	6,248,726	N/A	6,248,726	0.239	18	13	82,445
6/30/07-08	2,783,717	4,071,658	1.231	1.000	5,012,903	N/A	5,012,903	0.180	14	12	78,437
6/30/08-09	2,750,907	4,450,028	1.242	1.000	5,527,562	N/A	5,527,562	0.201	17	17	63,384
6/30/09-10	2,806,048	4,465,213	1.256	1.000	5,607,126	N/A	5,607,126	0.200	21	16	71,370
6/30/10-11	2,942,638	5,112,900	1.279	1.000	6,537,569	N/A	6,537,569	0.222	32	26	54,795
6/30/11-12	3,006,849	4,996,900	1.308	1.000	6,536,301	N/A	6,536,301	0.217	41	30	51,313
6/30/12-13	3,138,905	4,284,733	1.339	1.000	5,735,568	N/A	5,735,568	0.183	41	30	48,361
6/30/13-14	3,311,947	4,932,962	1.383	1.000	6,821,945	N/A	6,821,945	0.206	65	46	41,065
6/30/14-15	3,511,622	4,912,345	1.435	1.000	7,051,594	N/A	7,051,594	0.201	103	68	31,460
6/30/15-16	3,491,558	5,110,667	1.519	1.000	7,764,569	N/A	7,764,569	0.222	215	118	22,491
6/30/16-17	3,338,327	4,568,808	1.683	1.000	7,690,602	N/A	7,690,602	0.230	636	164	19,035
6/30/17-18	3,401,479	3,812,384	2.085	1.000	7,947,925	N/A	7,947,925	0.234	942	628	6,585
6/30/18-19	3,573,725	1,580,661	4.797	1.000	7,581,957	N/A	7,581,957	0.212		870	6,898
Total	78,048,908	125,427,145			155,077,686		155,077,686		2,288	2,171	

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3), (4) From Section 8, Exhibit 2, Page 7
(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.
(6) = (3) x (4) x (5)
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10), (11) Provided by Commonwealth of Massachusetts
(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	732,729	0.159	1,123,956	1.008	1,133,554	N/A	1,133,554	0.155	0.155
6/30/85-86	787,208	0.245	1,893,306	1.010	1,913,013	N/A	1,913,013	0.243	0.243
6/30/86-87	902,483	0.190	1,730,059	1.012	1,750,968	N/A	1,750,968	0.194	0.194
6/30/87-88	1,366,586	0.247	3,234,564	1.015	3,285,696	N/A	3,285,696	0.240	0.240
6/30/88-89	1,486,478	0.255	3,581,462	1.018	3,650,047	N/A	3,650,047	0.246	0.246
6/30/89-90	1,494,463	0.276	3,874,257	1.021	3,961,003	N/A	3,961,003	0.265	0.265
6/30/90-91	1,405,560	0.255	3,511,838	1.025	3,597,667	N/A	3,597,667	0.256	0.256
6/30/91-92	1,364,510	0.209	2,790,289	1.028	2,866,892	N/A	2,866,892	0.210	0.210
6/30/92-93	1,347,359	0.191	2,519,254	1.030	2,594,611	N/A	2,594,611	0.193	0.193
6/30/93-94	1,424,410	0.214	2,981,489	1.035	3,085,374	N/A	3,085,374	0.217	0.217
6/30/94-95	1,497,829	0.179	2,596,854	1.040	2,701,106	N/A	2,701,106	0.180	0.180
6/30/95-96	1,582,635	0.139	2,092,195	1.046	2,188,476	N/A	2,188,476	0.138	0.138
6/30/96-97	1,979,748	0.148	2,776,128	1.051	2,918,288	N/A	2,918,288	0.147	0.147
6/30/97-98	1,917,994	0.116	2,037,072	1.056	2,155,551	N/A	2,155,551	0.112	0.112
6/30/98-99	2,081,524	0.138	2,660,086	1.062	2,829,420	N/A	2,829,420	0.136	0.136
6/30/99-00	2,207,243	0.160	3,284,468	1.071	3,518,551	N/A	3,518,551	0.159	0.159
6/30/00-01	2,201,008	0.161	3,266,624	1.080	3,528,298	N/A	3,528,298	0.160	0.160
6/30/01-02	2,292,592	0.146	2,983,296	1.094	3,268,645	N/A	3,268,645	0.143	0.143
6/30/02-03	2,260,534	0.165	3,331,832	1.108	3,695,197	N/A	3,695,197	0.163	0.163
6/30/03-04	2,255,942	0.164	3,231,766	1.127	3,648,145	N/A	3,648,145	0.162	0.162
6/30/04-05	2,309,083	0.191	4,534,211	1.160	5,144,119	N/A	5,144,119	0.223	0.223
6/30/05-06	2,480,693	0.194	3,547,792	1.178	4,273,138	N/A	4,273,138	0.172	0.172
6/30/06-07	2,612,577	0.196	5,176,947	1.207	6,054,459	N/A	6,054,459	0.232	0.232
6/30/07-08	2,783,717	0.198	4,071,658	1.231	5,105,443	N/A	5,105,443	0.183	0.183
6/30/08-09	2,750,907	0.201	4,450,028	1.242	5,526,980	N/A	5,526,980	0.201	0.201
6/30/09-10	2,806,048	0.208	4,465,213	1.256	5,655,089	N/A	5,655,089	0.202	0.202
6/30/10-11	2,942,638	0.210	5,112,900	1.279	6,461,459	N/A	6,461,459	0.220	0.220
6/30/11-12	3,006,849	0.212	4,996,900	1.308	6,501,040	N/A	6,501,040	0.216	0.216
6/30/12-13	3,138,905	0.215	4,284,733	1.339	5,988,060	N/A	5,988,060	0.191	0.191
6/30/13-14	3,311,947	0.217	4,932,962	1.383	6,919,985	N/A	6,919,985	0.209	0.209
6/30/14-15	3,511,622	0.219	4,912,345	1.435	7,243,670	N/A	7,243,670	0.206	0.206
6/30/15-16	3,491,558	0.221	5,110,667	1.519	7,748,389	N/A	7,748,389	0.222	0.222
6/30/16-17	3,338,327	0.223	4,568,808	1.683	7,593,886	N/A	7,593,886	0.227	0.227
6/30/17-18	3,401,479	0.225	3,812,384	2.085	7,802,922	N/A	7,802,922	0.229	0.229
6/30/18-19	3,573,725	0.228	1,580,661	4.797	8,022,225	N/A	8,022,225	0.224	0.224
Total	78,048,908		121,059,005		154,331,364		154,331,364		

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 8, Exhibit 2, Page 4, Column 11
(4) From Section 8, Exhibit 2, Page 2, Column 3
(5) From Section 8, Exhibit 2, Page 2, Column 4
(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]
(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)
(8) = (6) + (7)
(9) = (8) / (2) / 10
(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.159	0.159
6/30/85-86									0.245	0.245
6/30/86-87									0.190	0.190
6/30/87-88									0.247	0.247
6/30/88-89									0.255	0.255
6/30/89-90									0.276	0.276
6/30/90-91	1,405,560	3,598,043	0.256	1.194	0.306	1.335	0.408	0.144	0.255	0.255
6/30/91-92	1,364,510	2,867,359	0.210	1.189	0.250	1.321	0.330	0.146	0.209	0.209
6/30/92-93	1,347,359	2,595,140	0.193	1.189	0.229	1.308	0.300	0.148	0.191	0.191
6/30/93-94	1,424,410	3,086,655	0.217	1.178	0.255	1.295	0.331	0.151	0.213	0.214
6/30/94-95	1,497,829	2,701,895	0.180	1.170	0.211	1.282	0.271	0.153	0.178	0.179
6/30/95-96	1,582,635	2,187,707	0.138	1.155	0.160	1.270	0.203	0.157	0.139	0.139
6/30/96-97	1,979,748	2,917,376	0.147	1.137	0.168	1.257	0.211	0.161	0.148	0.148
6/30/97-98	1,917,994	2,151,421	0.112	1.135	0.127	1.245	0.158	0.163	0.116	0.116
6/30/98-99	2,081,524	2,826,264	0.136	1.135	0.154	1.232	0.190	0.164	0.137	0.138
6/30/99-00	2,207,243	3,517,569	0.159	1.135	0.181	1.220	0.221	0.166	0.156	0.160
6/30/00-01	2,201,008	3,526,447	0.160	1.109	0.178	1.208	0.215	0.172	0.158	0.161
6/30/01-02	2,292,592	3,262,298	0.142	1.101	0.157	1.196	0.187	0.175	0.144	0.146
6/30/02-03	2,260,534	3,691,299	0.163	1.073	0.175	1.184	0.207	0.181	0.164	0.165
6/30/03-04	2,255,942	3,641,539	0.161	1.046	0.169	1.173	0.198	0.187	0.164	0.164
6/30/04-05	2,309,083	5,260,532	0.228	1.036	0.236	1.161	0.274	0.191	0.185	0.191
6/30/05-06	2,480,693	4,177,843	0.168	1.032	0.174	1.149	0.200	0.194	0.187	0.194
6/30/06-07	2,612,577	6,248,726	0.239	1.032	0.247	1.138	0.281	0.196	0.189	0.196
6/30/07-08	2,783,717	5,012,903	0.180	1.032	0.186	1.127	0.209	0.198	0.191	0.198
6/30/08-09	2,750,907	5,527,562	0.201	1.027	0.206	1.116	0.230	0.201	0.194	0.201
6/30/09-10	2,806,048	5,607,126	0.200	1.000	0.200	1.105	0.221	0.208	0.201	0.208
6/30/10-11	2,942,638	6,537,569	0.222	1.000	0.222	1.094	0.243	0.210	0.203	0.210
6/30/11-12	3,006,849	6,536,301	0.217	1.000	0.217	1.083	0.235	0.212	0.205	0.212
6/30/12-13	3,138,905	5,735,568	0.183	1.000	0.183	1.072	0.196	0.215	0.207	0.215
6/30/13-14	3,311,947	6,821,945	0.206	1.000	0.206	1.062	0.219	0.217	0.209	0.217
6/30/14-15	3,511,622	7,051,594	0.201	1.000	0.201	1.051	0.211	0.219	0.211	0.219
6/30/15-16	3,491,558	7,764,569	0.222	1.000	0.222	1.041	0.231	0.221	0.214	0.221
6/30/16-17	3,338,327	7,690,602	0.230	1.000	0.230	1.030	0.237	0.223	0.216	0.223
6/30/17-18	3,401,479	7,947,925	0.234	1.000	0.234	1.020	0.238	0.225	0.218	0.225
6/30/18-19	3,573,725	7,581,957	0.212	1.000	0.212	1.010	0.214	0.228		0.228
Total	71,278,962	138,073,733								

Trend Last 4 (ex 18-19):	5.0%	Avg 3 (ex 18-19):	0.236
Trend Last 8 (ex 18-19):	1.4%	Avg 5 (ex 18-19):	0.227
Trend Last 12 (ex 18-19):	0.5%	Avg 10 (ex 18-19):	0.226
Prior Selected Trend:	1.0%	Prior Sel Avg:	0.220
Selected Trend:	1.0%	Sel. Loss Cost:	0.230

NOTES:
(2) Provided by Commonwealth of Massachusetts
(3) From Section 8, Exhibit 2, Page 2, Column 6
(4) = (3) / (2) / 10
(5) Based on information from the MA WCIRB
(6) = (4) x (5)
(7) Based on Selected Trend from (6)
(8) = (6) x (7)
(9) = Sel. Loss Cost / [(5) * (7)]
(10) From prior Aon analysis as of June 30, 2018
(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.900	
(2)	Credibility		54%	
(3)	Average Pmt Trend Statewide		0.980	
(4)	Credibility Weighted Trend		0.937	
		(Low)		(High)
(5)	Selected Range	0.843		0.956
(6)	Incremental Paid for 2019	371		371
(7)	Estimated Reserve	1,998		8,012
(8)	Paid to Date (82 & Prior)	3,058,223		3,058,223
(9)	Est Ult Paid for 1982 & Prior	3,060,220		3,066,235

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	2,254	6,071
(11)	Projected Number of Years	5	5
(12)	Estimated Reserve	11,269	30,354
(13)	Paid to Date (82 & Prior)	3,058,223	3,057,851
(14)	Est Ult Paid for 1982 & Prior	3,069,492	3,088,206
(14a)	Paid Counts During Fiscal Year	2	3
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	3,064,856	3,077,220
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**3,064,856**	**3,077,220**
(18)	Implied Tail	1.002	1.006
(19)	Ult Loss Inc Lump Sums @ 6/18	3,087,426	3,135,570

NOTES:

(1) From Section 8, Exhibit 2, Page 6
(2) = (Average of Section 8, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 8, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 8, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2018

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	206,798	12.239			
1993	2	153,285	11.940	0.741		
1994	3	146,363	11.894	0.955		
1995	4	120,472	11.699	0.823		
1996	5	130,279	11.777	1.081		
1997	6	37,349	10.528	0.287		
1998	7	24,406	10.103	0.653		
1999	8	85,275	11.354	3.494		
2000	9	30,381	10.322	0.356	n =	28
2001	10	26,076	10.169	0.858	S(x) =	56,154
2002	11	28,013	10.240	1.074	S(x-sq) =	112,618,674
2003	12	24,232	10.095	0.865	S(xy) =	577,417
2004	13	32,198	10.380	1.329	S(y) =	288
2005	14	42,136	10.649	1.309	D =	51,156
2006	15	33,882	10.431	0.804	slope =	-0.119
2007	16	22,266	10.011	0.657	Avg Trend =	0.881
2008	17	32,986	10.404	1.481		
2009	18	25,370	10.141	0.769		
2010	19	25,142	10.132	0.991		
2011	20	28,691	10.264	1.141		
2012	21	24,383	10.102	0.850		
2013	22	32,108	10.377	1.317		
2014	23	47,672	10.772	1.485		
2015	24	38,942	10.570	0.817		
2016	25	11,822	9.378	0.304		
2017	26	3,150	8.055	0.266		
2018	27	3,240	8.083	1.028		
2019	28	371	5.917	0.115		
					Selected Trend:	**0.900**

NOTES:
(3) 2019 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2018
(4) LN [(3)]
(5) Eg. 2019: 0.115 = 371 / 3240

Commonwealth of Massachusetts Workers Compensation
All Other - Clusters 5-17 & 95
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
June-83	27,370	65,800	95,928	121,026	146,374	172,082	195,518	223,519	270,937	291,319	312,256	316,614	336,461	401,393	453,214	453,179	457,283	457,468	457,468	457,468	458,118	472,628	476,174	480,561	485,930	491,063	495,741	498,237	501,473	504,586	508,182	512,140	512,140	512,140	512,140	512,140	512,140
June-84	73,019	172,377	253,637	324,243	391,630	438,262	505,877	586,886	610,938	636,458	664,679	683,784	693,120	716,886	724,043	734,862	745,334	749,852	758,667	762,583	783,107	784,865	788,687	788,743	790,813	790,813	790,813	790,813	790,813	790,813	790,813	790,813	790,813	795,278	797,778	797,778	
June-85	91,462	222,608	324,021	409,170	488,686	592,053	702,853	747,423	785,283	911,116	929,832	957,391	968,422	980,992	1,009,751	1,031,712	1,051,061	1,066,218	1,077,726	1,088,791	1,096,356	1,103,232	1,110,832	1,116,052	1,122,649	1,123,312	1,123,581	1,123,581	1,123,821	1,123,821	1,123,821	1,123,956	1,123,956	1,123,956			
June-86	197,516	482,005	708,037	875,864	1,053,127	1,211,316	1,370,683	1,467,692	1,572,492	1,608,200	1,631,069	1,655,833	1,672,723	1,699,156	1,716,974	1,724,323	1,731,547	1,743,355	1,755,277	1,764,089	1,780,012	1,796,528	1,802,048	1,808,935	1,832,489	1,867,039	1,872,692	1,877,988	1,882,106	1,887,118	1,891,823	1,892,840	1,893,204	1,893,306			
June-87	199,777	488,687	761,278	928,992	1,116,174	1,247,272	1,326,215	1,394,678	1,416,827	1,433,554	1,451,102	1,461,072	1,470,676	1,482,961	1,498,691	1,507,156	1,517,732	1,527,729	1,533,186	1,539,237	1,545,443	1,554,224	1,564,621	1,590,009	1,608,659	1,628,722	1,648,308	1,667,330	1,680,369	1,698,600	1,716,165	1,724,666	1,730,059				
June-88	390,619	1,150,212	1,830,796	2,204,311	2,429,489	2,580,235	2,679,602	2,758,965	2,816,870	2,872,713	2,895,135	2,917,336	2,938,306	2,953,260	2,965,159	2,980,478	3,005,909	3,019,968	3,040,247	3,060,774	3,075,967	3,084,408	3,098,971	3,111,109	3,123,843	3,135,852	3,148,456	3,164,976	3,184,694	3,200,620	3,213,256	3,234,564					
June-89	348,632	1,379,611	1,965,598	2,380,914	2,616,790	2,882,836	2,988,159	3,078,524	3,143,724	3,188,707	3,222,672	3,251,157	3,271,467	3,290,603	3,312,237	3,338,112	3,358,373	3,385,594	3,459,727	3,477,288	3,487,596	3,504,078	3,526,921	3,535,629	3,542,709	3,552,709	3,555,290	3,559,769	3,573,237	3,580,657	3,581,462						
June-90	597,392	1,787,214	2,367,627	2,727,013	2,917,488	3,052,042	3,170,650	3,294,118	3,385,084	3,460,338	3,498,784	3,525,521	3,559,539	3,594,665	3,616,129	3,673,092	3,699,660	3,720,191	3,743,464	3,756,545	3,772,853	3,783,930	3,792,543	3,806,458	3,820,503	3,839,007	3,851,508	3,861,755	3,867,795	3,874,257							
June-91	708,625	1,924,338	2,444,979	2,785,515	2,902,296	3,018,419	3,064,528	3,074,954	3,092,506	3,113,710	3,131,050	3,142,716	3,165,865	3,200,123	3,230,691	3,265,408	3,303,782	3,334,465	3,363,420	3,385,556	3,405,270	3,425,312	3,448,838	3,464,204	3,476,999	3,488,529	3,497,516	3,505,736	3,511,838								
June-92	588,418	1,588,370	1,986,839	2,229,495	2,290,208	2,325,875	2,375,312	2,430,547	2,462,691	2,497,761	2,542,769	2,553,772	2,574,534	2,586,268	2,593,937	2,607,986	2,617,238	2,623,319	2,642,357	2,693,544	2,703,064	2,761,452	2,777,670	2,779,948	2,784,822	2,786,796	2,789,160	2,790,289									
June-93	415,674	1,315,738	1,611,871	1,719,235	1,836,642	1,871,759	1,907,504	1,930,526	1,977,226	2,009,894	2,048,320	2,106,226	2,144,269	2,190,485	2,240,879	2,296,700	2,349,467	2,390,884	2,414,691	2,428,953	2,450,534	2,469,958	2,483,916	2,492,925	2,498,702	2,512,155	2,519,254										
June-94	598,740	1,383,736	1,705,173	1,941,862	2,012,247	2,200,199	2,290,696	2,346,328	2,406,956	2,509,745	2,549,583	2,601,202	2,677,455	2,727,826	2,785,899	2,804,943	2,822,448	2,841,619	2,860,084	2,875,638	2,893,152	2,905,592	2,927,997	2,943,707	2,962,553	2,981,489											
June-95	625,005	1,262,191	1,500,916	1,627,990	1,716,166	1,770,565	1,843,652	1,919,317	2,018,626	2,068,939	2,105,461	2,177,442	2,207,352	2,235,130	2,265,454	2,289,441	2,313,135	2,411,441	2,435,367	2,459,756	2,489,028	2,513,597	2,542,669	2,570,487	2,596,854												
June-96	442,026	1,106,672	1,298,637	1,506,086	1,588,152	1,626,688	1,672,734	1,723,992	1,784,200	1,838,291	1,904,595	1,938,999	1,973,969	1,990,646	2,023,635	2,041,150	2,054,604	2,061,273	2,065,137	2,075,119	2,079,457	2,083,737	2,087,948	2,092,195													
June-97	490,343	1,177,901	1,656,955	1,851,037	1,939,610	2,054,998	2,100,197	2,157,406	2,207,438	2,247,927	2,302,138	2,315,796	2,338,520	2,350,446	2,367,170	2,457,338	2,600,718	2,743,595	2,748,674	2,758,408	2,763,943	2,770,748	2,776,128														
June-98	326,869	974,658	1,226,365	1,350,342	1,476,983	1,551,929	1,637,433	1,716,707	1,747,491	1,769,878	1,797,150	1,821,161	1,842,103	1,916,231	1,958,225	1,973,933	1,982,909	2,010,395	2,020,135	2,025,376	2,030,306	2,037,072															
June-99	484,930	1,204,187	1,456,433	1,645,438	1,757,364	1,866,452	1,932,933	2,065,834	2,135,187	2,187,567	2,264,558	2,353,171	2,390,481	2,459,300	2,488,986	2,506,545	2,552,168	2,570,732	2,592,302	2,615,954	2,660,086																
June-00	687,002	1,407,750	1,709,714	1,905,283	2,094,421	2,260,264	2,375,651	2,506,812	2,566,510	2,618,716	2,644,619	2,679,121	2,756,324	2,834,813	2,909,495	3,010,320	3,057,706	3,114,564	3,186,632	3,284,468																	
June-01	555,924	1,355,841	1,668,220	1,965,335	2,137,275	2,265,629	2,333,456	2,389,586	2,477,500	2,581,034	2,640,810	2,693,375	2,747,068	2,824,207	2,893,237	3,047,261	3,122,934	3,182,178	3,266,624																		
June-02	456,844	1,259,496	1,683,493	1,908,166	2,029,871	2,101,432	2,140,880	2,212,890	2,279,178	2,337,107	2,491,961	2,573,704	2,652,321	2,714,782	2,788,520	2,860,506	2,939,983	2,983,296																			
June-03	314,443	1,423,035	2,006,147	2,291,763	2,403,958	2,513,521	2,608,269	2,678,105	2,752,202	2,844,031	2,880,263	2,981,766	3,064,242	3,166,021	3,234,764	3,289,330	3,331,832																				
June-04	598,148	1,733,246	2,216,316	2,434,141	2,548,142	2,669,710	2,729,591	2,840,027	2,905,967	2,953,758	3,003,620	3,047,300	3,076,253	3,140,203	3,175,883	3,231,766																					
June-05	744,557	2,314,627	3,030,458	3,409,706	3,640,720	3,806,314	3,993,880	4,101,306	4,226,019	4,303,783	4,353,333	4,401,412	4,435,668	4,481,807	4,534,211																						
June-06	971,841	2,207,952	2,611,952	2,837,745	3,016,501	3,153,780	3,240,647	3,314,422	3,376,156	3,410,796	3,444,369	3,469,314	3,515,073	3,547,792																							
June-07	1,118,370	3,111,007	3,990,645	4,226,540	4,465,130	4,612,091	4,787,482	4,860,001	4,924,584	4,996,891	5,070,176	5,100,951	5,176,947																								
June-08	1,399,818	2,842,788	3,291,021	3,540,051	3,665,019	3,833,245	3,900,241	3,955,805	3,989,261	4,012,733	4,048,757	4,071,658																									
June-09	1,326,874	2,783,994	3,440,192	3,757,225	3,955,223	4,076,333	4,189,281	4,222,784	4,377,822	4,407,183	4,450,028																										
June-10	1,396,833	3,068,894	3,532,579	3,829,758	4,051,519	4,138,029	4,249,098	4,308,361	4,342,050	4,465,213																											
June-11	1,591,468	3,339,318	3,962,771	4,360,928	4,611,079	4,788,257	4,948,871	5,039,589	5,112,900																												
June-12	1,578,463	3,469,608	4,122,296	4,485,953	4,743,217	4,835,420	4,914,674	4,996,900																													
June-13	1,503,155	3,061,873	3,660,432	3,906,111	4,088,215	4,176,679	4,284,733																														
June-14	1,466,358	3,390,257	4,222,870	4,548,827	4,770,478	4,932,962																															
June-15	1,879,802	3,553,784	4,190,765	4,739,997	4,912,345																																
June-16	2,006,652	3,783,256	4,707,647	5,110,667																																	
June-17	1,780,241	3,788,337	4,568,808																																		
June-18	1,793,068	3,812,384																																			
June-19	1,580,661																																				

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
June-83	2.404	1.458	1.262	1.209	1.176	1.136	1.143	1.212	1.075	1.072	1.014	1.063	1.193	1.129	1.000	1.009	1.000	1.000	1.000	1.001	1.032	1.008	1.009	1.011	1.011	1.010	1.005	1.006	1.006	1.007	1.008	1.000	1.000	1.000	1.000	1.000
June-84	2.361	1.471	1.278	1.208	1.119	1.154	1.160	1.041	1.042	1.044	1.029	1.014	1.034	1.010	1.015	1.014	1.006	1.012	1.005	1.027	1.002	1.005	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.006	1.003	1.000	
June-85	2.434	1.456	1.263	1.194	1.212	1.187	1.063	1.051	1.160	1.021	1.030	1.012	1.013	1.029	1.022	1.019	1.014	1.011	1.010	1.007	1.006	1.007	1.005	1.006	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-86	2.440	1.469	1.237	1.202	1.150	1.132	1.071	1.071	1.023	1.014	1.015	1.010	1.016	1.010	1.004	1.004	1.007	1.007	1.005	1.009	1.009	1.003	1.004	1.013	1.019	1.003	1.003	1.002	1.003	1.002	1.001	1.000	1.000			
June-87	2.446	1.558	1.220	1.201	1.117	1.063	1.052	1.016	1.012	1.012	1.007	1.007	1.008	1.011	1.006	1.007	1.007	1.004	1.004	1.004	1.006	1.007	1.016	1.012	1.012	1.012	1.012	1.008	1.011	1.010	1.005	1.003				
June-88	2.945	1.592	1.204	1.102	1.062	1.039	1.030	1.021	1.020	1.008	1.008	1.007	1.005	1.004	1.005	1.009	1.005	1.007	1.007	1.005	1.003	1.005	1.004	1.004	1.004	1.004	1.005	1.006	1.005	1.004	1.007					
June-89	3.957	1.425	1.211	1.099	1.102	1.037	1.030	1.021	1.014	1.011	1.009	1.006	1.006	1.007	1.008	1.006	1.008	1.022	1.005	1.003	1.005	1.007	1.002	1.002	1.003	1.001	1.001	1.004	1.002	1.000						
June-90	2.992	1.325	1.152	1.070	1.046	1.039	1.039	1.028	1.022	1.011	1.008	1.010	1.010	1.006	1.016	1.007	1.006	1.006	1.003	1.004	1.003	1.002	1.004	1.004	1.005	1.003	1.003	1.002	1.002							
June-91	2.716	1.271	1.139	1.042	1.040	1.015	1.003	1.006	1.007	1.006	1.004	1.007	1.011	1.010	1.011	1.012	1.009	1.009	1.007	1.006	1.006	1.007	1.004	1.004	1.003	1.003	1.002	1.002								
June-92	2.699	1.251	1.122	1.027	1.016	1.021	1.023	1.013	1.014	1.018	1.004	1.008	1.005	1.003	1.005	1.004	1.002	1.007	1.019	1.004	1.022	1.006	1.001	1.002	1.001	1.001	1.000									
June-93	3.165	1.225	1.067	1.068	1.019	1.019	1.012	1.024	1.017	1.019	1.028	1.018	1.022	1.023	1.025	1.023	1.018	1.010	1.006	1.009	1.008	1.006	1.004	1.002	1.005	1.003										
June-94	2.311	1.232	1.139	1.036	1.093	1.041	1.024	1.026	1.043	1.016	1.020	1.029	1.019	1.021	1.007	1.006	1.007	1.006	1.005	1.006	1.004	1.008	1.005	1.006	1.006											
June-95	2.019	1.189	1.085	1.054	1.032	1.041	1.041	1.052	1.025	1.018	1.034	1.014	1.013	1.014	1.011	1.010	1.042	1.010	1.010	1.012	1.010	1.012	1.011	1.010												
June-96	2.504	1.173	1.160	1.054	1.024	1.028	1.031	1.035	1.030	1.036	1.018	1.018	1.008	1.017	1.009	1.007	1.003	1.002	1.005	1.002	1.002	1.002	1.002													
June-97	2.402	1.407	1.117	1.048	1.059	1.022	1.027	1.023	1.018	1.024	1.006	1.010	1.005	1.007	1.038	1.058	1.055	1.002	1.004	1.002	1.002	1.002														
June-98	2.982	1.258	1.101	1.094	1.051	1.055	1.048	1.018	1.013	1.015	1.013	1.011	1.040	1.022	1.008	1.005	1.014	1.005	1.003	1.002	1.003															
June-99	2.483	1.209	1.130	1.068	1.062	1.036	1.069	1.034	1.025	1.035	1.039	1.016	1.029	1.012	1.007	1.018	1.007	1.008	1.009	1.017																
June-00	2.049	1.215	1.114	1.099	1.079	1.051	1.055	1.024	1.020	1.010	1.013	1.029	1.028	1.026	1.035	1.016	1.019	1.023	1.031																	
June-01	2.439	1.230	1.178	1.087	1.060	1.030	1.024	1.037	1.042	1.023	1.020	1.020	1.028	1.024	1.053	1.025	1.019	1.027																		
June-02	2.757	1.337	1.133	1.064	1.035	1.019	1.034	1.030	1.025	1.066	1.033	1.031	1.024	1.027	1.026	1.028	1.015																			
June-03	4.526	1.410	1.142	1.049	1.046	1.038	1.027	1.028	1.033	1.013	1.035	1.028	1.033	1.022	1.017	1.013																				
June-04	2.898	1.279	1.098	1.047	1.048	1.022	1.040	1.023	1.016	1.017	1.015	1.010	1.021	1.011	1.018																					
June-05	3.109	1.309	1.125	1.068	1.045	1.049	1.027	1.030	1.018	1.012	1.011	1.008	1.010	1.012																						
June-06	2.272	1.183	1.086	1.063	1.046	1.028	1.023	1.019	1.010	1.010	1.007	1.013	1.009																							
June-07	2.782	1.283	1.059	1.056	1.033	1.038	1.015	1.013	1.015	1.015	1.006	1.015																								
June-08	2.031	1.158	1.076	1.035	1.046	1.017	1.014	1.008	1.006	1.009	1.006																									
June-09	2.098	1.236	1.092	1.053	1.031	1.028	1.008	1.037	1.007	1.010																										
June-10	2.197	1.151	1.084	1.058	1.021	1.027	1.014	1.008	1.028																											
June-11	2.098	1.187	1.100	1.057	1.038	1.034	1.018	1.015																												
June-12	2.198	1.188	1.088	1.057	1.019	1.016	1.017																													
June-13	2.037	1.195	1.067	1.047	1.022	1.026																														
June-14	2.312	1.246	1.077	1.049	1.034																															
June-15	1.891	1.179	1.131	1.036																																
June-16	1.885	1.244	1.086																																	
June-17	2.128	1.206																																		
June-18	2.126																																			

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*	*To Ult*
Simple Avg																																					
All Yrs	2.530	1.292	1.136	1.082	1.062	1.048	1.039	1.033	1.028	1.021	1.017	1.016	1.025	1.020	1.016	1.014	1.013	1.009	1.008	1.007	1.008	1.006	1.005	1.006	1.006	1.004	1.003	1.003	1.004	1.003	1.003	1.001	1.001	1.001	1.000	1.000	
Latest 5	2.068	1.214	1.090	1.049	1.027	1.026	1.014	1.016	1.013	1.011	1.009	1.015	1.019	1.019	1.030	1.020	1.015	1.013	1.010	1.007	1.004	1.006	1.005	1.005	1.004	1.002	1.002	1.004	1.004	1.003	1.002	1.001					
Latest 3	2.047	1.210	1.098	1.044	1.025	1.025	1.016	1.020	1.014	1.011	1.006	1.012	1.013	1.015	1.020	1.022	1.017	1.019	1.014	1.007	1.003	1.005	1.006	1.006	1.004	1.002	1.002	1.002	1.003	1.005	1.004	1.001	1.002	1.001			
Volume Wtd																																					
All Yrs	2.331	1.247	1.112	1.062	1.046	1.035	1.028	1.024	1.021	1.017	1.015	1.015	1.017	1.015	1.017	1.014	1.014	1.010	1.008	1.006	1.006	1.005	1.005	1.005	1.005	1.003	1.003	1.003	1.003	1.003	1.004	1.001	1.001	1.001	1.000		
Latest 5	2.053	1.215	1.090	1.049	1.027	1.026	1.014	1.016	1.013	1.011	1.009	1.014	1.018	1.018	1.029	1.020	1.015	1.014	1.012	1.007	1.004	1.006	1.005	1.005	1.004	1.002	1.002	1.004	1.004	1.003	1.004						
Latest 3	2.040	1.210	1.097	1.044	1.025	1.025	1.016	1.019	1.014	1.011	1.006	1.012	1.013	1.015	1.020	1.021	1.017	1.020	1.016	1.007	1.003	1.005	1.006	1.006	1.004	1.002	1.002	1.002	1.003	1.004	1.005	1.001	1.001				
Dev Factor Sele	.																																				
Industry 1	1.968	1.147	1.054	1.025	1.017	1.010	1.012	1.012	1.010	1.009	1.010	1.009	1.009	1.009	1.008	1.008	1.007	1.007																			
Industry 2		1.281	1.080	1.034	1.020	1.017	1.009	1.011	1.009	1.009	1.006	1.007	1.009	1.008	1.008	1.012	1.007	1.006	1.007	1.006																	
Prior	*2.301*	*1.243*	*1.107*	*1.063*	*1.039*	*1.033*	*1.023*	*1.023*	*1.016*	*1.012*	*1.015*	*1.020*	*1.025*	*1.015*	*1.028*	*1.016*	*1.013*	*1.008*	*1.008*	*1.008*	*1.006*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.003*	*1.003*	*1.003*	*1.003*	*1.003*	*1.003*	*1.002*	*1.002*	*1.002*	*1.004*	
Selected	2.301	1.239	1.108	1.058	1.038	1.033	1.023	1.023	1.018	1.011	1.009	1.020	1.025	1.015	1.030	1.017	1.013	1.013	1.008	1.008	1.006	1.005	1.005	1.005	1.005	1.005	1.002	1.003	1.003	1.003	1.003	1.003	1.002	1.002	1.002	1.002	1.004
FacToUlt	4.797	2.085	1.683	1.519	1.435	1.383	1.339	1.308	1.279	1.256	1.242	1.231	1.207	1.178	1.160	1.127	1.108	1.094	1.080	1.071	1.062	1.056	1.051	1.046	1.040	1.035	1.030	1.028	1.025	1.021	1.018	1.015	1.012	1.010	1.008	1.006	1.004
Percent of Ult	20.8%	48.0%	59.4%	65.8%	69.7%	72.3%	74.7%	76.4%	78.2%	79.6%	80.5%	81.2%	82.8%	84.9%	86.2%	88.7%	90.3%	91.4%	92.6%	93.4%	94.1%	94.7%	95.2%	95.6%	96.1%	96.6%	97.1%	97.3%	97.6%	97.9%	98.2%	98.5%	98.8%	99.0%	99.2%	99.4%	99.6%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/18		As of 6/19		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	3,087,426	3,135,570	3,064,856	3,077,220	(22,569)	-0.7%	(58,349)	-1.9%
6/30/82-83	512,140	519,538	512,140	519,478	0	0.0%	(60)	0.0%
6/30/83-84	803,000	810,920	803,000	810,827	0	0.0%	(93)	0.0%
6/30/84-85	1,123,956	1,144,757	1,123,956	1,144,626	0	0.0%	(131)	0.0%
6/30/85-86	1,903,435	1,932,130	1,903,435	1,932,130	0	0.0%	0	0.0%
6/30/86-87	1,738,265	1,765,480	1,742,245	1,768,510	3,980	0.2%	3,030	0.2%
6/30/87-88	3,249,670	3,300,680	3,267,580	3,318,860	17,910	0.6%	18,180	0.6%
6/30/88-89	3,651,000	3,689,530	3,647,000	3,686,500	(4,000)	-0.1%	(3,030)	-0.1%
6/30/89-90	3,955,000	3,998,590	3,957,000	4,000,610	2,000	0.1%	2,020	0.1%
6/30/90-91	3,595,000	3,631,960	3,598,000	3,633,980	3,000	0.1%	2,020	0.1%
6/30/91-92	2,869,000	2,898,700	2,867,000	2,895,670	(2,000)	-0.1%	(3,030)	-0.1%
6/30/92-93	2,597,000	2,622,970	2,595,000	2,620,950	(2,000)	-0.1%	(2,020)	-0.1%
6/30/93-94	3,077,000	3,108,780	3,085,000	3,117,870	8,000	0.3%	9,090	0.3%
6/30/94-95	2,683,000	2,710,840	2,701,000	2,729,020	18,000	0.7%	18,180	0.7%
6/30/95-96	2,191,000	2,213,920	2,188,000	2,209,880	(3,000)	-0.1%	(4,040)	-0.2%
6/30/96-97	2,923,000	2,952,230	2,917,000	2,947,180	(6,000)	-0.2%	(5,050)	-0.2%
6/30/97-98	2,154,000	2,179,580	2,151,000	2,177,560	(3,000)	-0.1%	(2,020)	-0.1%
6/30/98-99	2,798,000	2,829,010	2,826,000	2,857,290	28,000	1.0%	28,280	1.0%
6/30/99-00	3,436,000	3,504,720	3,518,000	3,589,380	82,000	2.4%	84,660	2.4%
6/30/00-01	3,458,000	3,529,200	3,526,000	3,598,560	68,000	2.0%	69,360	2.0%
6/30/01-02	3,237,000	3,307,860	3,262,000	3,334,380	25,000	0.8%	26,520	0.8%
6/30/02-03	3,680,000	3,756,660	3,691,000	3,768,900	11,000	0.3%	12,240	0.3%
6/30/03-04	3,651,000	3,730,140	3,642,000	3,720,960	(9,000)	-0.2%	(9,180)	-0.2%
6/30/04-05	5,100,000	5,335,000	5,100,000	5,366,000	0	0.0%	31,000	0.6%
6/30/05-06	4,200,000	4,363,000	4,200,000	4,359,000	0	0.0%	(4,000)	-0.1%
6/30/06-07	6,000,000	6,348,000	6,000,000	6,374,000	0	0.0%	26,000	0.4%
6/30/07-08	5,000,000	5,173,000	5,000,000	5,208,000	0	0.0%	35,000	0.7%
6/30/08-09	5,500,000	5,690,000	5,500,000	5,693,000	0	0.0%	3,000	0.1%
6/30/09-10	5,500,000	5,721,000	5,600,000	5,825,000	100,000	1.8%	104,000	1.8%
6/30/10-11	6,400,000	6,762,000	6,400,000	6,734,000	0	0.0%	(28,000)	-0.4%
6/30/11-12	6,400,000	6,743,000	6,500,000	6,732,000	100,000	1.6%	(11,000)	-0.2%
6/30/12-13	5,700,000	6,013,000	5,700,000	6,048,000	0	0.0%	35,000	0.6%
6/30/13-14	6,700,000	7,194,000	6,800,000	7,266,000	100,000	1.5%	72,000	1.0%
6/30/14-15	7,100,000	7,638,000	7,100,000	7,606,000	0	0.0%	(32,000)	-0.4%
6/30/15-16	7,600,000	8,311,000	7,600,000	8,153,000	0	0.0%	(158,000)	-1.9%
6/30/16-17	7,400,000	8,311,000	7,400,000	8,075,000	0	0.0%	(236,000)	-2.8%
6/30/17-18	7,500,000	9,050,000	7,600,000	8,345,000	100,000	1.3%	(705,000)	-7.8%
6/30/18-19								
Total	148,472,892	155,925,765	149,088,212	155,244,342	615,321	0.4%	(681,423)	-0.4%

NOTES:
(2), (3) From prior Aon analysis as of June 30, 2018
(4), (5) From Section 8, Exhibit 2, Page 1, Columns 6, 7
(6) = (4) - (2)
(7) = (4) / (2) - 1
(8) = (5) - (3)
(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
456	100.0%	0.4%	0.0%	0.1%	0.0%	1.000	1.000
444	99.6%	0.2%	0.4%	0.0%	0.0%	0.981	0.971
432	99.4%	0.2%	0.6%	0.0%	0.0%	0.955	0.934
420	99.2%	0.2%	0.8%	0.1%	0.0%	0.933	0.903
408	99.0%	0.2%	1.0%	0.1%	0.0%	0.913	0.875
396	98.8%	0.3%	1.2%	0.1%	0.0%	0.895	0.849
384	98.5%	0.3%	1.5%	0.1%	0.0%	0.884	0.834
372	98.2%	0.3%	1.8%	0.1%	0.0%	0.871	0.817
360	97.9%	0.3%	2.1%	0.1%	0.1%	0.858	0.799
348	97.6%	0.3%	2.4%	0.1%	0.1%	0.844	0.780
336	97.3%	0.2%	2.7%	0.1%	0.0%	0.830	0.762
324	97.1%	0.5%	2.9%	0.2%	0.1%	0.812	0.739
312	96.6%	0.5%	3.4%	0.2%	0.1%	0.810	0.736
300	96.1%	0.5%	3.9%	0.2%	0.1%	0.803	0.728
288	95.6%	0.5%	4.4%	0.2%	0.1%	0.795	0.718
276	95.2%	0.5%	4.8%	0.2%	0.1%	0.786	0.707
264	94.7%	0.6%	5.3%	0.2%	0.2%	0.776	0.694
252	94.1%	0.7%	5.9%	0.3%	0.2%	0.768	0.685
240	93.4%	0.7%	6.6%	0.3%	0.2%	0.766	0.683
228	92.6%	1.2%	7.4%	0.6%	0.4%	0.761	0.677
216	91.4%	1.2%	8.6%	0.6%	0.4%	0.766	0.685
204	90.3%	1.5%	9.7%	0.8%	0.6%	0.767	0.686
192	88.7%	2.6%	11.3%	1.4%	1.0%	0.770	0.690
180	86.2%	1.3%	13.8%	0.7%	0.5%	0.785	0.711
168	84.9%	2.1%	15.1%	1.2%	0.9%	0.774	0.696
156	82.8%	1.6%	17.2%	1.0%	0.8%	0.772	0.694
144	81.2%	0.7%	18.8%	0.5%	0.4%	0.763	0.682
132	80.5%	0.9%	19.5%	0.6%	0.5%	0.743	0.656
120	79.6%	1.4%	20.4%	1.0%	0.8%	0.726	0.634
108	78.2%	1.8%	21.8%	1.3%	1.1%	0.716	0.622
96	76.4%	1.7%	23.6%	1.3%	1.1%	0.711	0.616
84	74.7%	2.4%	25.3%	1.9%	1.6%	0.704	0.608
72	72.3%	2.6%	27.7%	2.1%	1.9%	0.703	0.608
60	69.7%	3.8%	30.3%	3.2%	3.0%	0.703	0.608
48	65.8%	6.4%	34.2%	5.6%	5.2%	0.710	0.618
36	59.4%	11.4%	40.6%	10.4%	9.9%	0.730	0.645
24	48.0%	27.1%	52.0%	25.6%	24.8%	0.763	0.688
12	20.8%	20.8%	79.2%	20.4%	20.2%	0.818	0.759
Total		100.0%					

NOTES:
(2) = 1 / Section 8, Exhibit 2, Page 2, Column 4
(3) Incremental % based on (2)
(4) = 1 - (2)
(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}
(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}
(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	6,634	18,998		6,024	17,253
6/30/82-83	0	7,338	0.981	0	7,196
6/30/83-84	5,222	13,049	0.955	4,986	12,460
6/30/84-85	0	20,669	0.933	0	19,288
6/30/85-86	10,129	38,824	0.913	9,252	35,462
6/30/86-87	12,186	38,451	0.895	10,904	34,408
6/30/87-88	33,016	84,296	0.884	29,182	74,507
6/30/88-89	65,538	105,038	0.871	57,094	91,504
6/30/89-90	82,743	126,353	0.858	70,961	108,361
6/30/90-91	86,162	122,142	0.844	72,694	103,049
6/30/91-92	76,711	105,381	0.830	63,641	87,427
6/30/92-93	75,746	101,696	0.812	61,544	82,628
6/30/93-94	103,511	136,381	0.810	83,792	110,401
6/30/94-95	104,146	132,166	0.803	83,667	106,178
6/30/95-96	95,805	117,685	0.795	76,190	93,590
6/30/96-97	140,872	171,052	0.786	110,710	134,429
6/30/97-98	113,928	140,488	0.776	88,374	108,976
6/30/98-99	165,914	197,204	0.768	127,490	151,533
6/30/99-00	233,532	304,912	0.766	178,909	233,593
6/30/00-01	259,376	331,936	0.761	197,430	252,660
6/30/01-02	278,704	351,084	0.766	213,581	269,049
6/30/02-03	359,168	437,068	0.767	275,318	335,032
6/30/03-04	410,234	489,194	0.770	315,813	376,599
6/30/04-05	565,789	831,789	0.785	443,970	652,698
6/30/05-06	652,208	811,208	0.774	504,552	627,555
6/30/06-07	823,053	1,197,053	0.772	635,758	924,650
6/30/07-08	928,342	1,136,342	0.763	708,610	867,378
6/30/08-09	1,049,972	1,242,972	0.743	780,156	923,560
6/30/09-10	1,134,787	1,359,787	0.726	823,670	986,983
6/30/10-11	1,287,100	1,621,100	0.716	922,111	1,161,397
6/30/11-12	1,503,100	1,735,100	0.711	1,068,199	1,233,073
6/30/12-13	1,415,267	1,763,267	0.704	996,097	1,241,027
6/30/13-14	1,867,038	2,333,038	0.703	1,312,575	1,640,185
6/30/14-15	2,187,655	2,693,655	0.703	1,536,971	1,892,469
6/30/15-16	2,489,333	3,042,333	0.710	1,767,020	2,159,560
6/30/16-17	2,831,192	3,506,192	0.730	2,065,693	2,558,187
6/30/17-18	3,787,616	4,532,616	0.763	2,889,599	3,457,965
6/30/18-19	6,319,339	6,842,339	0.818	5,170,470	5,598,387
Total	31,561,067	38,240,196		23,763,008	28,770,658
			(7) Total Discount Factor:	0.753	0.752

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	6,634	18,998
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	1,327	3,800
(11) Discounted Value at 4%:	6,024	17,253

NOTES:
(2), (3) From Section 8, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 8, Exhibit 2, Page 9, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	6,634	18,998		5,756	16,485
6/30/82-83	0	7,338	0.971	0	7,127
6/30/83-84	5,222	13,049	0.934	4,876	12,185
6/30/84-85	0	20,669	0.903	0	18,658
6/30/85-86	10,129	38,824	0.875	8,861	33,962
6/30/86-87	12,186	38,451	0.849	10,345	32,641
6/30/87-88	33,016	84,296	0.834	27,539	70,312
6/30/88-89	65,538	105,038	0.817	53,539	85,807
6/30/89-90	82,743	126,353	0.799	66,086	100,916
6/30/90-91	86,162	122,142	0.780	67,215	95,283
6/30/91-92	76,711	105,381	0.762	58,415	80,248
6/30/92-93	75,746	101,696	0.739	55,964	75,137
6/30/93-94	103,511	136,381	0.736	76,173	100,362
6/30/94-95	104,146	132,166	0.728	75,869	96,281
6/30/95-96	95,805	117,685	0.718	68,822	84,540
6/30/96-97	140,872	171,052	0.707	99,533	120,857
6/30/97-98	113,928	140,488	0.694	79,032	97,457
6/30/98-99	165,914	197,204	0.685	113,629	135,058
6/30/99-00	233,532	304,912	0.683	159,445	208,180
6/30/00-01	259,376	331,936	0.677	175,602	224,726
6/30/01-02	278,704	351,084	0.685	190,844	240,407
6/30/02-03	359,168	437,068	0.686	246,250	299,659
6/30/03-04	410,234	489,194	0.690	283,256	337,776
6/30/04-05	565,789	831,789	0.711	402,033	591,045
6/30/05-06	652,208	811,208	0.696	453,786	564,413
6/30/06-07	823,053	1,197,053	0.694	571,538	831,248
6/30/07-08	928,342	1,136,342	0.682	633,556	775,508
6/30/08-09	1,049,972	1,242,972	0.656	688,657	815,242
6/30/09-10	1,134,787	1,359,787	0.634	719,276	861,890
6/30/10-11	1,287,100	1,621,100	0.622	801,097	1,008,980
6/30/11-12	1,503,100	1,735,100	0.616	925,716	1,068,598
6/30/12-13	1,415,267	1,763,267	0.608	860,363	1,071,917
6/30/13-14	1,867,038	2,333,038	0.608	1,134,976	1,418,259
6/30/14-15	2,187,655	2,693,655	0.608	1,330,543	1,638,295
6/30/15-16	2,489,333	3,042,333	0.618	1,539,571	1,881,583
6/30/16-17	2,831,192	3,506,192	0.645	1,825,347	2,260,538
6/30/17-18	3,787,616	4,532,616	0.688	2,606,102	3,118,706
6/30/18-19	6,319,339	6,842,339	0.759	4,799,513	5,196,730
Total	31,561,067	38,240,196		21,219,124	25,677,015
			(7) Total Discount Factor:	0.672	0.671

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	6,634	18,998
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	1,327	3,800
(11) Discounted Value at 6%:	5,756	16,485

NOTES:
(2), (3) From Section 8, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 8, Exhibit 2, Page 9, Column 8
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2019

All Other - Clusters 5-17 & 95
Medical

Allocation of Outstanding Reserve to MassDOT Agencies

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
		Aon	Aon	Outstanding	Outstanding	**MassDOT Allocation - Method 1**					**MassDOT Allocation - Method 2**					**MassDOT Allocation - Method 3**					MassDOT	MassDOT	All Other	All Other
Accident		Selected Ult	Selected Ult	Losses	Losses	Paid Counts	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Paid	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Payroll	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Outstanding	Outstanding	Outstanding	Outstanding
Year	Paid Loss	(Low)	(High)	(Low)	(High)	7/1/18-19	7/1/18-19	Paid Counts	(Low)	(High)	7/1/18-19	7/1/18-19	Total Paid	(Low)	(High)	($000)	($000)	Total Payroll	(Low)	(High)	(Low)	(High)	(Low)	(High)
All Prior Yrs	3,058,223	3,064,856	3,077,220	6,634	18,998	2					371								431	1,236	431	1,236	6,202	17,762
6/30/82-83	512,140	512,140	519,478	0	7,338	0					0								0	477	0	477	0	6,861
6/30/83-84	797,778	803,000	810,827	5,222	13,049	0					0								340	849	113	283	5,109	12,766
6/30/84-85	1,123,956	1,123,956	1,144,626	0	20,669	0					0								0	1,344	0	448	0	20,221
6/30/85-86	1,893,306	1,903,435	1,932,130	10,129	38,824	1					101								659	2,525	220	842	9,910	37,982
6/30/86-87	1,730,059	1,742,245	1,768,510	12,186	38,451	1					5,393								793	2,501	264	834	11,921	37,617
6/30/87-88	3,234,564	3,267,580	3,318,860	33,016	84,296	5					21,308								2,147	5,483	716	1,828	32,301	82,469
6/30/88-89	3,581,462	3,647,000	3,686,500	65,538	105,038	1					805								4,263	6,832	1,421	2,277	64,117	102,760
6/30/89-90	3,874,257	3,957,000	4,000,610	82,743	126,353	4					6,462								5,382	8,218	1,794	2,739	80,949	123,614
6/30/90-91	3,511,838	3,598,000	3,633,980	86,162	122,142	5					6,101								5,604	7,944	1,868	2,648	84,294	119,494
6/30/91-92	2,790,289	2,867,000	2,895,670	76,711	105,381	3					1,130								4,989	6,854	1,663	2,285	75,047	103,096
6/30/92-93	2,519,254	2,595,000	2,620,950	75,746	101,696	3					7,099								4,927	6,614	1,642	2,205	74,104	99,491
6/30/93-94	2,981,489	3,085,000	3,117,870	103,511	136,381	6	2	33.3%	34,504	45,460	18,936	5,369	28.4%	29,349	38,669				6,732	8,870	6,732	8,870	96,778	127,510
6/30/94-95	2,596,854	2,701,000	2,729,020	104,146	132,166	8	1	12.5%	13,018	16,521	26,367	3,099	11.8%	12,240	15,534				6,774	8,596	10,677	13,550	93,469	118,616
6/30/95-96	2,092,195	2,188,000	2,209,880	95,805	117,685	2					4,247								6,231	7,654	2,077	2,551	93,728	115,133
6/30/96-97	2,776,128	2,917,000	2,947,180	140,872	171,052	4					5,380								9,163	11,125	4,581	5,563	136,291	165,490
6/30/97-98	2,037,072	2,151,000	2,177,560	113,928	140,488	3					6,766					1,917,994	137,500	7.2%	8,167	10,072	8,167	10,072	105,761	130,417
6/30/98-99	2,660,086	2,826,000	2,857,290	165,914	197,204	8					44,132					2,081,524	136,688	6.6%	10,895	12,950	5,448	6,475	160,467	190,729
6/30/99-00	3,284,468	3,518,000	3,589,380	233,532	304,912	10	2	20.0%	46,706	60,982	97,836	18,487	18.9%	44,128	57,616	2,207,243	137,892	6.2%	14,589	19,049	14,589	19,049	218,943	285,863
6/30/00-01	3,266,624	3,526,000	3,598,560	259,376	331,936	7	2	28.6%	74,107	94,839	84,446	2,055	2.4%	6,313	8,078	2,201,008	145,149	6.6%	17,105	21,890	18,642	23,857	240,734	308,079
6/30/01-02	2,983,296	3,262,000	3,334,380	278,704	351,084	11					43,314					2,292,592	140,223	6.1%	17,047	21,474	5,682	7,158	273,021	343,926
6/30/02-03	3,331,832	3,691,000	3,768,900	359,168	437,068	7	1	14.3%	51,310	62,438	42,502	13,999	32.9%	118,305	143,964	2,260,534	140,250	6.2%	22,284	27,117	36,797	44,778	322,371	392,291
6/30/03-04	3,231,766	3,642,000	3,720,960	410,234	489,194	15	1	6.7%	27,349	32,613	55,883	383	0.7%	2,812	3,353	2,255,942	137,408	6.1%	24,987	29,796	26,168	31,205	384,066	457,989
6/30/04-05	4,534,211	5,100,000	5,366,000	565,789	831,789	9	1	11.1%	62,865	92,421	52,404	1,534	2.9%	16,558	24,342	2,309,083	145,033	6.3%	35,537	52,244	38,320	56,336	527,469	775,453
6/30/05-06	3,547,792	4,200,000	4,359,000	652,208	811,208	18	1	5.6%	36,234	45,067	32,719	68	0.2%	1,355	1,686	2,480,693	156,390	6.3%	41,117	51,141	38,675	48,104	613,532	763,104
6/30/06-07	5,176,947	6,000,000	6,374,000	823,053	1,197,053	13	5	38.5%	316,559	460,405	75,995	60,933	80.2%	659,927	959,801	2,612,577	157,146	6.0%	49,506	72,002	49,506	72,002	773,547	1,125,051
6/30/07-08	4,071,658	5,000,000	5,208,000	928,342	1,136,342	12					22,902					2,783,717	168,663	6.1%	56,247	68,850	28,124	34,425	900,218	1,101,917
6/30/08-09	4,450,028	5,500,000	5,693,000	1,049,972	1,242,972	17	2	11.8%	123,526	146,232	42,844	1,400	3.3%	34,305	40,611	2,750,907	180,456	6.6%	68,877	81,537	96,201	113,885	953,771	1,129,087
6/30/09-10	4,465,213	5,600,000	5,825,000	1,134,787	1,359,787	16	1	6.3%	70,924	84,987	123,163	10,585	8.6%	97,522	116,859	2,806,048	203,138	7.2%	82,150	98,439	76,537	91,713	1,058,249	1,268,074
6/30/10-11	5,112,900	6,400,000	6,734,000	1,287,100	1,621,100	26	2	7.7%	99,008	124,700	73,310	539	0.7%	9,468	11,925	2,942,638	196,775	6.7%	86,069	108,403	92,538	116,552	1,194,562	1,504,549
6/30/11-12	4,996,900	6,500,000	6,732,000	1,503,100	1,735,100	30	4	13.3%	200,413	231,347	82,226	1,098	1.3%	20,072	23,171	3,006,849	207,250	6.9%	103,603	119,594	108,030	124,704	1,395,071	1,610,397
6/30/12-13	4,284,733	5,700,000	6,048,000	1,415,267	1,763,267	30	2	6.7%	94,351	117,551	108,054	472	0.4%	6,179	7,698	3,138,905	218,884	7.0%	98,690	122,957	66,407	82,736	1,348,860	1,680,531
6/30/13-14	4,932,962	6,800,000	7,266,000	1,867,038	2,333,038	46	7	15.2%	284,114	355,028	162,484	44,898	27.6%	515,904	644,671	3,311,947	231,765	7.0%	130,652	163,262	220,438	275,458	1,646,600	2,057,580
6/30/14-15	4,912,345	7,100,000	7,606,000	2,187,655	2,693,655	68	6	8.8%	193,028	237,675	172,348	30,926	17.9%	392,548	483,344	3,511,622	252,444	7.2%	157,266	193,642	202,440	249,264	1,985,214	2,444,390
6/30/15-16	5,110,667	7,600,000	8,153,000	2,489,333	3,042,333	118	10	8.5%	210,960	257,825	403,020	17,928	4.4%	110,735	135,334	3,491,558	239,716	6.9%	170,908	208,874	170,908	208,874	2,318,426	2,833,459
6/30/16-17	4,568,808	7,400,000	8,075,000	2,831,192	3,506,192	164	18	11.0%	310,741	384,826	780,471	79,337	10.2%	287,798	356,413	3,338,327	202,091	6.1%	171,391	212,253	171,391	212,253	2,659,801	3,293,938
6/30/17-18	3,812,384	7,600,000	8,345,000	3,787,616	4,532,616	628	53	8.4%	319,655	382,530	2,019,316	187,927	9.3%	352,492	421,825	3,401,479	204,258	6.0%	227,445	272,182	227,445	272,182	3,560,171	4,260,434
6/30/18-19	1,580,661	7,900,000	8,423,000	6,319,339	6,842,339	870	72	8.3%	522,980	566,263	1,580,661	132,216	8.4%	528,587	572,334	3,573,725	213,686	6.0%	377,857	409,129	377,857	409,129	5,941,482	6,433,210
Total	125,427,145	156,988,212	163,667,342	31,561,067	38,240,196	2,171	193	8.9%	3,092,354	3,799,709	6,210,496	613,252	9.9%	3,246,598	4,067,227						2,114,512	2,558,844	29,446,556	35,681,352

Sel. FY97 & Prior	6.50%

NOTES:

(2), (7), (8), (12), (13), (17). (18) Provided by Commonwealth of Massachusetts
(3) From Section 8, Exhibit 2, Page 1, Column 6
(4) From Section 8, Exhibit 2, Page 1, Column 7
(5) = (3) - (2)
(6) = (4) - (2)
(9) = (8) / (7)
(10) = (9) * (5)
(11) = (9) * (6)

(14) = (13) / (12)
(15) = (14) * (5)
(16) = (14) * (6)
(19) = (18) / (17)
(20) = (19) * (5)
(21) = (19) * (6)

(22) Selected judgementally based on (10), (15), (20)
(23) Selected judgementally based on (11), (16). (21)
(24) = (5) - (22)
(25) = (6) - (23)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2018

All Other - Clusters 5-17 & 95
Medical

Allocation of Outstanding Reserve to MassDOT Agencies

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
		Aon	Aon	Outstanding	Outstanding		**MassDOT Allocation - Method 1**					**MassDOT Allocation - Method 2**					**MassDOT Allocation - Method 3**				MassDOT	MassDOT	All Other	All Other
Accident		Selected Ult	Selected Ult	Losses	Losses	Paid Counts	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Paid	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Payroll	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Outstanding	Outstanding	Outstanding	Outstanding
Year	Paid Loss	(Low)	(High)	(Low)	(High)	7/1/17-18	7/1/17-18	Paid Counts	(Low)	(High)	7/1/17-18	7/1/17-18	Total Paid	(Low)	(High)	($000)	($000)	Total Payroll	(Low)	(High)	(Low)	(High)	(Low)	(High)
All Prior Yrs	3,057,851	3,087,426	3,135,570	29,574	77,718	3					3,240								1,929	5,069	1,929	5,069	27,645	72,649
6/30/82-83	512,140	512,140	519,538	0	7,398	0					0								0	483	0	483	0	6,915
6/30/83-84	797,778	803,000	810,920	5,222	13,142	1					2,500								341	857	114	286	5,108	12,857
6/30/84-85	1,123,956	1,123,956	1,144,757	0	20,801	0					0								0	1,357	0	452	0	20,349
6/30/85-86	1,893,204	1,903,435	1,932,130	10,231	38,926	1					364								667	2,539	222	846	10,008	38,079
6/30/86-87	1,724,666	1,738,265	1,765,480	13,599	40,814	2					8,501								887	2,662	296	887	13,303	39,926
6/30/87-88	3,213,256	3,249,670	3,300,680	36,414	87,424	4					12,636								2,375	5,702	792	1,901	35,623	85,523
6/30/88-89	3,580,657	3,651,000	3,689,530	70,343	108,873	3					7,421								4,588	7,101	1,529	2,367	68,813	106,506
6/30/89-90	3,867,795	3,955,000	3,998,590	87,205	130,795	5					6,040								5,688	8,531	1,896	2,844	85,309	127,951
6/30/90-91	3,505,736	3,595,000	3,631,960	89,264	126,224	5	1	20.0%	17,853	25,245	8,221	1,120	13.6%	12,162	17,197				5,822	8,233	11,946	16,892	77,318	109,332
6/30/91-92	2,789,160	2,869,000	2,898,700	79,840	109,540	3					2,364								5,208	7,145	1,736	2,382	78,105	107,159
6/30/92-93	2,512,155	2,597,000	2,622,970	84,845	110,815	3					13,452								5,534	7,228	1,845	2,409	83,001	108,406
6/30/93-94	2,962,553	3,077,000	3,108,780	114,447	146,227	5	1	20.0%	22,889	29,245	18,846	3,879	20.6%	23,557	30,099				7,465	9,538	7,465	9,538	106,982	136,689
6/30/94-95	2,570,487	2,683,000	2,710,840	112,513	140,353	8	1	12.5%	14,064	17,544	27,818	3,489	12.5%	14,112	17,604				7,339	9,155	11,838	14,768	100,675	125,585
6/30/95-96	2,087,948	2,191,000	2,213,920	103,052	125,972	2					4,211								6,722	8,217	2,241	2,739	100,811	123,233
6/30/96-97	2,770,748	2,923,000	2,952,230	152,252	181,482	4					6,805								9,931	11,838	4,965	5,919	147,287	175,564
6/30/97-98	2,030,306	2,154,000	2,179,580	123,694	149,274	3					4,930					1,917,994	137,500	7.2%	8,868	10,701	8,868	10,701	114,827	138,573
6/30/98-99	2,615,954	2,798,000	2,829,010	182,046	213,056	6	1	16.7%	30,341	35,509	23,651	997	4.2%	7,672	8,979	2,081,524	136,688	6.6%	11,954	13,991	21,148	24,750	160,898	188,306
6/30/99-00	3,186,632	3,436,000	3,504,720	249,368	318,088	13	2	15.4%	38,364	48,937	72,067	31,960	44.3%	110,589	141,064	2,207,243	137,892	6.2%	15,579	19,872	15,579	19,872	233,790	298,217
6/30/00-01	3,182,178	3,458,000	3,529,200	275,822	347,022	9					59,244					2,201,008	145,149	6.6%	18,189	22,885	6,063	7,628	269,759	339,394
6/30/01-02	2,939,983	3,237,000	3,307,860	297,017	367,877	12	1	8.3%	24,751	30,656	79,477	30	0.0%	113	140	2,292,592	140,223	6.1%	18,167	22,501	14,344	17,766	282,674	350,112
6/30/02-03	3,289,330	3,680,000	3,756,660	390,670	467,330	11	1	9.1%	35,515	42,485	54,566	11,820	21.7%	84,628	101,234	2,260,534	140,250	6.2%	24,238	28,995	48,127	57,571	342,543	409,759
6/30/03-04	3,175,883	3,651,000	3,730,140	475,117	554,257	16	2	12.5%	59,390	69,282	35,680	7,976	22.4%	106,210	123,902	2,255,942	137,408	6.1%	28,939	33,759	44,164	51,521	430,953	502,736
6/30/04-05	4,481,807	5,100,000	5,335,000	618,193	853,193	10	1	10.0%	61,819	85,319	46,139	947	2.1%	12,683	17,504	2,309,083	145,033	6.3%	38,829	53,589	37,777	52,137	580,416	801,056
6/30/05-06	3,515,073	4,200,000	4,363,000	684,927	847,927	14	1	7.1%	48,923	60,566	45,760	99	0.2%	1,478	1,830	2,480,693	156,390	6.3%	43,180	53,456	46,052	57,011	638,875	790,916
6/30/06-07	5,100,951	6,000,000	6,348,000	899,049	1,247,049	18	6	33.3%	299,683	415,683	30,776	18,298	59.5%	534,535	741,441	2,612,577	157,146	6.0%	54,077	75,010	54,077	75,010	844,971	1,172,039
6/30/07-08	4,048,757	5,000,000	5,173,000	951,243	1,124,243	14	1	7.1%	67,946	80,303	36,024	910	2.5%	24,029	28,399	2,783,717	168,663	6.1%	57,635	68,117	62,790	74,210	888,453	1,050,033
6/30/08-09	4,407,183	5,500,000	5,690,000	1,092,817	1,282,817	17	2	11.8%	128,567	150,920	29,362	1,556	5.3%	57,931	68,003	2,750,907	180,456	6.6%	71,687	84,151	100,127	117,535	992,690	1,165,281
6/30/09-10	4,342,050	5,500,000	5,721,000	1,157,950	1,378,950	21	2	9.5%	110,281	131,329	33,690	10,463	31.1%	359,610	428,244	2,806,048	203,138	7.2%	83,827	99,826	97,054	115,577	1,060,896	1,263,372
6/30/10-11	5,039,589	6,400,000	6,762,000	1,360,411	1,722,411	32	1	3.1%	42,513	53,825	90,718	-42	0.0%	-624	-789	2,942,638	196,775	6.7%	90,971	115,178	66,742	84,502	1,293,669	1,637,909
6/30/11-12	4,914,674	6,400,000	6,743,000	1,485,326	1,828,326	41	5	12.2%	181,137	222,967	79,254	5,252	6.6%	98,428	121,158	3,006,849	207,250	6.9%	102,378	126,019	127,314	156,715	1,358,012	1,671,611
6/30/12-13	4,176,679	5,700,000	6,013,000	1,523,321	1,836,321	41	2	4.9%	74,308	89,577	88,464	752	0.8%	12,943	15,602	3,138,905	218,884	7.0%	106,225	128,052	64,492	77,744	1,458,829	1,758,577
6/30/13-14	4,770,478	6,700,000	7,194,000	1,929,522	2,423,522	65	10	15.4%	296,849	372,849	221,651	50,747	22.9%	441,761	554,862	3,311,947	231,765	7.0%	135,025	169,594	213,118	267,681	1,716,403	2,155,840
6/30/14-15	4,739,997	7,100,000	7,638,000	2,360,003	2,898,003	103	8	7.8%	183,301	225,088	549,232	57,714	10.5%	247,994	304,528	3,511,622	252,444	7.2%	169,656	208,332	192,652	236,570	2,167,351	2,661,433
6/30/15-16	4,707,647	7,600,000	8,311,000	2,892,353	3,603,353	215	21	9.8%	282,509	351,955	924,390	86,278	9.3%	269,956	336,317	3,491,558	239,716	6.9%	198,577	247,392	198,577	247,392	2,693,776	3,355,961
6/30/16-17	3,788,337	7,400,000	8,311,000	3,611,663	4,522,663	636	57	9.0%	323,687	405,333	2,008,096	255,481	12.7%	459,496	575,398	3,338,327	202,091	6.1%	218,638	273,787	218,638	273,787	3,393,025	4,248,876
6/30/17-18	1,793,068	7,500,000	9,050,000	5,706,932	7,256,932	942	62	6.6%	375,615	477,632	1,793,068	98,606	5.5%	313,842	399,081	3,396,596	199,374	5.9%	334,987	425,969	334,987	425,969	5,371,945	6,830,962
Total	119,216,649	148,472,892	155,925,765	29,256,243	36,709,116	2,288	189	8.3%	2,720,308	3,422,250	6,428,659	648,332	10.1%	3,193,105	4,031,796						2,021,504	2,521,429	27,234,739	34,187,687

Sel. FY97 & Prior	6.52%

NOTES:

(2), (7), (8), (12), (13), (17). (18) Provided by Commonwealth of Massachusetts
(3) From Prior Analysis - Section 8, Exhibit 2, Page 1, Column 6
(4) From Prior Analysis - Section 8, Exhibit 2, Page 1, Column 7
(5) = (3) - (2)
(6) = (4) - (2)
(9) = (8) / (7)
(10) = (9) * (5)
(11) = (9) * (6)

(14) = (13) / (12)
(15) = (14) * (5)
(16) = (14) * (6)
(19) = (18) / (17)
(20) = (19) * (5)
(21) = (19) * (6)

(22) Selected judgementally based on (10), (15), (20)
(23) Selected judgementally based on (11), (16). (21)
(24) = (5) - (22)
(25) = (6) - (23)