



New York City Retirement Systems Part II Experience Study Report - NYCERS

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Ms. Krista Olson
Deputy Comptroller for Budget
New York City Comptroller's Office
1 Centre Street, 8th Floor
New York, NY 10007

Re: Part II Experience Study Report – NYCERS

Dear Ms. Olson:

We are pleased to present the enclosed Part II Experience Study report for the five New York City Retirement Systems ("NYCRS") containing Milliman's proposed assumptions, along with an updated Milliman Experience Study Tool.

- **New York City Employees' Retirement System ("NYCERS")**
- Teachers' Retirement System of the City of New York ("TRS")
- Board of Education Retirement System of the City of New York ("BERS")
- New York City Police Pension Fund ("POLICE")
- New York City Fire Pension Fund ("FIRE")

This report includes Section I for NYCERS and is separated into five different subsections:

- General Employees
- Correction Officers
- Sanitation Employees
- Bridges and Tunnels and Transit Employees
- Postretirement Mortality

The purpose of the Part II Experience Study report is to provide proposed demographic and economic assumptions to be used in the actuarial valuations performed by the Office of the Actuary (OA) for these systems based on our observations of the experience data and various discussions and meetings with Office of the Actuary. The experience includes data from 2012 – 2017 used in prior experience studies, along with updates for the 4-year period ending June 30, 2021.

Part II Experience Study Report – NYCERS
New York City Retirement Systems

This work product was prepared solely for New York City Comptroller's Office for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.

This report incorporates analysis performed with the Milliman Experience Study Tool (MEST). MEST enables examination of the experience of the systems using many data elements such as age, service, plan, employee group, etc. The MEST has been further updated to display a comparison of the proposed assumptions as if they were in effect during the experience study period.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by staffs of Office of the Comptroller and the OA. This information includes, but is not limited to, statutory provisions, employee data, administrative policies, and financial information. Since the results are dependent on the integrity of the data supplied, the results can be expected to differ if the underlying data is incomplete or missing. It should be noted that if any data or other information is inaccurate or incomplete, our calculations may need to be revised.

Milliman's work product was prepared exclusively for the New York City Office of the Comptroller, for a specific and limited purpose. It is a complex, technical analysis that requires a high-level of knowledge concerning NYCERS' operations, and is based on NYCERS' data, which Milliman has not audited. Milliman's work product is not intended to be used by, or for the benefit of, any third party for any purpose. Any third party recipient of Milliman's work product who desires professional guidance should not rely upon Milliman's work product, but should engage qualified professionals for advice appropriate to its specific needs.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Actuarial Standards of Practice promulgated by the Actuarial Standards Board and the applicable Code of Professional Conduct, amplifying Opinions, and supporting Recommendations of the American Academy of Actuaries.

We are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

The consultants who worked on this assignment are actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel. The signing actuaries are independent of NYCERS. We are not aware of any relationship that would impair the objectivity of our work.

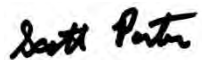
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We would like to thank the staffs of the Office of the Comptroller and the Office of the Actuary (OA) for their cooperation. Their prompt and courteous responses to our questions and requests for information were of valuable assistance to us and are greatly appreciated.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "GB", with a stylized flourish at the end.

Glenn D. Bowen, FSA, EA, MAAA

A handwritten signature in black ink, appearing to read "Scott Porter", in a cursive style.

Scott Porter, FSA, EA, MAAA

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Executive Summary

This report summarizes the Part II Experience Study performed by Milliman of the five New York City Retirement Systems (“NYCRS”):

- **Section I - New York City Employees’ Retirement System (NYCERS)**
- Section II - Teachers’ Retirement System of the City of New York (TRS)
- Section III - Board of Education Retirement System of the City of New York (BERS)
- Section IV - New York City Police Pension Fund (POLICE)
- Section V - New York City Fire Pension Fund (FIRE)

This report includes Section I for NYCERS and is separated into five different subsections:

- General Employees
- Correction Officers
- Sanitation Employees
- Bridges and Tunnels (TBTA) and Transit Employees
- Postretirement Mortality

For General employees, experience is reviewed separately for Basic Plan group members and Specialty Plan group members for certain assumptions. These groupings are explained in the [General Plan Code Groupings](#).

The primary purpose of the Part II Experience Study Report is to provide proposed actuarial assumptions based on the experience for the indicated systems:

- This report provides information on key preretirement demographic assumptions - withdrawal, retirement and disability – used in the actuarial valuations performed by the OA.
- This report provides information on key salary-related actuarial assumptions – rates of salary increase and overtime (not applicable for TRS and BERS).
- This report provides information on the pre-retirement and postretirement mortality assumptions used in the actuarial valuations performed by the OA.
- This report is supplemented by Excel files containing full age service tables detailing the proposed assumptions.

The experience study includes information for the 10-year period ending June 30, 2021, as provided by the OA. This includes data from 2012 – 2017 contained in the historical database along with updates for the 4-year period ending June 30, 2021, completed by Milliman.

The following is a summary of the proposed assumptions and the potential impact on plan liabilities for each of the groups of NYCERS. Milliman was not engaged to perform a replication nor determine the cost impact of the proposed assumptions. Therefore, the comments reflect our thoughts on the potential impact, but will ultimately depend on the current active membership based on analysis to be conducted by OA.

General

Summary of General Proposed Assumptions		
Decrement	Proposed Assumption	Potential Impact
Salary	Lower rates of salary increase for longer service members.	Reducing salary increases will result in lower plan liabilities.
Overtime	Higher overtime percentages, especially for members in physically taxing titles.	Higher overtime will result in higher plan liabilities.
Withdrawal	Lower rates of terminations for longer service members, although higher rates are proposed for shorter service members, especially Specialty Group members.	Reducing withdrawal rates results in higher plan liabilities. Actual impact to be determined by OA.
Retirement	Higher rates of retirement proposed at 20 or more years of service, especially for members in physically taxing titles, whereas lower rates are proposed for shorter service periods increasing the number of members to receive the 2% formula benefit.	Higher rates for longer service members will result in higher plan liabilities but actual impact to be determined by OA.
Ordinary Disability	Higher ordinary disability rates for members not eligible for the 2% benefit formula and unreduced retirement, especially for members in physically taxing titles, plus elimination of the assumption for those eligible.	Higher rates of ordinary disability result in higher plan liabilities plus eliminating retirement eligible members will result in higher plan liabilities.
Accidental Disability	Higher accidental disability rates, especially for members in physically taxing titles.	Increasing accidental disability rates results in higher plan liabilities.
Ordinary Death	Lower mortality rates.	Decreasing rates of mortality results in higher plan liabilities.
Accidental Death	No change in the assumption.	No impact on plan liabilities.
Post Retirement Mortality		
Service Retirees	Proposing adjustments to current custom table. Higher projected annuity factors for ages until late 60s and lower for older ages. For Housing and Transit Police, proposed assumption consistent with industry standards, decreasing projected life expectancy.	Anticipating higher liability for active members but potentially lower liability for retirees. Actual impact to be determined by OA.
Disabled Retirees	Proposed assumption consistent with industry standards, decreasing projected life expectancy.	Lower life expectancies are anticipated to decrease plan liabilities.
Contingent Beneficiaries	Proposed assumption consistent with industry standards, decreasing projected life expectancy.	Lower life expectancies are anticipated to decrease plan liabilities.

Overall, we believe the changes in overtime, withdrawal, retirement, ordinary disability, accidental disability, ordinary death and postretirement mortality that are anticipated to increase plan

liabilities will exceed the impact of the changes in rates of salary increase and postretirement mortality for retirees that are anticipated to decrease plan liabilities. The net effect is likely an increase in plan liabilities.

Correction

Summary of Correction Proposed Assumptions		
Decrement	Proposed Assumption	Potential Impact
Salary	Lower rates of salary increase.	Reducing salary increases will result in lower plan liabilities.
Overtime	Higher overtime percentages.	Higher overtime will result in higher plan liabilities.
Withdrawal	Slightly higher rates of terminations.	Increasing withdrawal rates results in lower plan
Retirement	Higher rates of retirement.	Higher rates of retirement result in higher plan liabilities.
Ordinary Disability	Lower ordinary disability rates under 20 years of service and elimination of the assumption for retirement eligible members.	Reducing rates of ordinary disability results in lower plan liabilities but eliminating retirement eligible members will result in higher plan liabilities. Actual impact to be determined by OA.
Accidental Disability	Higher accidental disability rates, especially for male members.	Increasing accidental disability rates results in higher plan liabilities.
Ordinary Death	Higher mortality rates.	Increasing rates of mortality results in lower plan liabilities.
Accidental Death	No change in the assumption.	No impact on plan liabilities.
Post Retirement Mortality		
Service Retirees	Proposed assumption consistent with industry standards adjusted for experience. Higher projected annuity factors for ages until age 60 and lower for older ages.	Anticipating higher liability for active members but potentially lower liability for retirees. Actual impact to be determined by OA.
Disabled Retirees	Proposed assumption consistent with industry standards, increasing projected life expectancy.	Higher life expectancies are anticipated to increase plan liabilities.
Contingent Beneficiaries	Proposed assumption consistent with industry standards, decreasing projected life expectancy.	Lower life expectancies are anticipated to decrease plan liabilities.

Overall, we believe the changes in overtime, retirement, accidental disability and postretirement mortality that are anticipated to increase plan liabilities will exceed the impact of the changes in rates of salary increase, withdrawal, ordinary disability, ordinary death and postretirement mortality for retirees that are anticipated to decrease plan liabilities. The net effect is likely an increase in plan liabilities.

Sanitation

Summary of Sanitation Proposed Assumptions		
Decrement	Proposed Assumption	Potential Impact
Salary	Lower rates of salary increase.	Reducing salary increases will result in lower plan liabilities.
Overtime	Higher overtime percentages.	Higher overtime will result in higher plan liabilities.
Withdrawal	No change in the assumption.	No impact on plan liabilities.
Retirement	Higher rates of retirement for mandated members.	Higher rates of retirement result in higher plan liabilities.
Ordinary Disability	Lower ordinary disability rates.	Reducing rates of ordinary disability would result in lower plan liabilities.
Accidental Disability	Higher accidental disability rates, especially for male members.	Increasing accidental disability rates results in higher plan liabilities.
Ordinary Death	Lower mortality rates.	Decreasing rates of mortality results in higher plan liabilities.
Accidental Death	No change in the assumption.	No impact on plan liabilities.
Post Retirement Mortality		
Service Retirees	Proposing adjustments to current custom table. Higher projected annuity factors for ages until late 60s and lower for older ages.	Anticipating higher liability for active members but potentially lower liability for retirees. Actual impact to be determined by OA.
Disabled Retirees	Proposed assumption consistent with industry standards, decreasing projected life expectancy.	Lower life expectancies are anticipated to decrease plan liabilities.
Contingent Beneficiaries	Proposed assumption consistent with industry standards, decreasing projected life expectancy.	Lower life expectancies are anticipated to decrease plan liabilities.

Overall, we believe the changes in overtime, retirement, accidental disability, ordinary death, and postretirement mortality that are anticipated to increase plan liabilities will exceed the impact of the changes in rates of salary increase, ordinary disability, and postretirement mortality for retirees that are anticipated to decrease plan liabilities. The net effect is likely an increase in plan liabilities.

TBTA / Transit

The following is a summary of our observations regarding the experience of TBTA and Transit members.

Summary of TBTA/Transit Proposed Assumptions		
Decrement	Proposed Assumption	Potential Impact
Salary	Lower rates of salary increase.	Reducing salary increases will result in lower plan liabilities.
Overtime	Higher overtime percentages.	Higher overtime will result in higher plan liabilities.
Withdrawal	Higher rates of terminations for female members but lower rates of termination for male members.	Higher withdrawal rates result in lower plan liabilities. Actual impact to be determined by OA.
Retirement	Higher rates of retirement proposed at 20 or more years of service whereas lower rates are proposed for shorter service periods increasing the number of members to receive the 2% formula benefit.	Higher rates for longer service members will result in higher plan liabilities but actual impact to be determined by OA.
Ordinary Disability	Lower ordinary disability rates for members not eligible for the 2% benefit formula and unreduced retirement, but elimination of the assumption for those eligible.	Reducing rates of ordinary disability results in lower plan liabilities but eliminating retirement eligible members will result in higher plan liabilities. Actual impact to be determined by OA.
Accidental Disability	Lower accidental disability rates.	Reducing accidental disability rates results in lower plan liabilities.
Ordinary Death	Lower mortality rates.	Decreasing rates of mortality results in higher plan liabilities.
Accidental Death	No change in the assumption.	No impact on plan liabilities.
Post Retirement Mortality		
Service Retirees	Proposing adjustments to current custom table. Higher projected annuity factors for ages until late 60s and lower for older ages.	Anticipating higher liability for active members but potentially lower liability for retirees. Actual impact to be determined by OA.
Disabled Retirees	Proposed assumption consistent with industry standards, decreasing projected life expectancy.	Lower life expectancies are anticipated to decrease plan liabilities.
Contingent Beneficiaries	Proposed assumption consistent with industry standards, decreasing projected life expectancy.	Lower life expectancies are anticipated to decrease plan liabilities.

Overall, it is uncertain if the changes in overtime, retirement, and ordinary death that are anticipated to increase plan liabilities will exceed the impact of the changes in rates of salary increase, withdrawal, ordinary disability, and accidental disability that are anticipated to decrease plan liabilities. Changes to postretirement mortality tables will lead to higher costs for active members, but lower costs for retirees. The net effect is likely an increase in plan liabilities, but the actual impact will be determined by OA.

Introduction

Part II Experience Study Introduction

Milliman’s focus for Part II of the experience study is to provide proposed actuarial assumptions reflecting the experience during the 10-year study period July 1, 2011 – June 30, 2021. The experience data used in our review splits this study period into three periods:

- Prior period: July 1, 2011 – June 30, 2017 (2012 – 2017), which includes updates made by Milliman to the historical data, primarily in 2017.
- Two-year period July 1, 2017 – June 30, 2019 (2018 – 2019)
- Two-year period July 1, 2019 – June 30, 2021 (2020 – 2021)

Throughout this report we refer to plan years by the end of the plan year. For example, 2012 refers to the period July 1, 2011 to June 30, 2012; 2021 refers to the period July 1, 2020 to June 30, 2021.

The proposed assumptions are based on our observations using the Milliman Experience Study Tool (MEST) which creates customized experience summaries for the chosen study periods. This report includes various graphs and charts produced by MEST.

This report focuses on key preretirement decrements – withdrawal, retirement and disability – and the mortality assumptions – pre-retirement and postretirement as well as the salary increase assumptions.

Selection of Actuarial Assumptions

The purpose of the actuarial valuation is to analyze the resources needed to meet the current and future obligations of the System. To provide the best estimate of the long-term funded status of the System, the actuarial valuation should be predicated on methods and assumptions that will estimate the future obligations of the System in a reasonable manner.

An actuarial valuation uses various methods and two different types of assumptions: economic and demographic. Economic assumptions are related to the general economy and its long-term impact on the System, or to the operation of the System itself. Demographic assumptions are based on the specific experience of the System’s members.

Actuarial Standard of Practice (ASOP) No. 35 (please note that ASOP 35 was recently replaced by an updated version of ASOP 27, but the standard remains largely the same) governs the selection of demographic and other noneconomic assumptions for measuring pension obligations. ASOP 35 states that the actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment. The actuary should select reasonable demographic assumptions in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is appropriate for the purpose of the measurement reflecting historical and current demographic data, that reflects the actuary’s professional judgment and estimate of future experience, and that contains no significant bias, i.e., it is not significantly optimistic or pessimistic.

Choosing actuarial assumptions requires the application of actuarial judgment. It is unlikely that any two actuaries, given the same set of experience statistics, would arrive at exactly the same set of actuarial assumptions for any system as complex as NYCERS. Even allowing for minor

variations that occur because of the variability of the underlying statistics and possible data anomalies, differences among actuarial approaches will occur in analyzing trends. Some actuaries prefer to match the results of recent experience very closely in setting future assumptions, while other actuaries will use recent experience as a guide but tend to change existing assumptions gradually over time. Valid arguments can be made for either approach.

Milliman's approach in selecting proposed assumptions was to primarily reflect an assumption that was in between the current assumption and the experience. There are circumstances where the proposed assumptions may reflect the experience to a greater degree, especially if there was a change in the assumption structure. For example, the proposed retirement assumption may reflect a distinction based on years of service that was not reflected in the current assumption. In these circumstances, the proposed retirement assumption may reflect the distinction contained in the experience data to a greater extent.




Experience Analysis Process

The general procedure in a study of demographic experience is to first determine the number of participants who were exposed to the possibility of retirement, withdrawal, disability, etc. We refer to these events as decrements. The next step is to determine how many actually retired, withdrew, became disabled, etc. Dividing the number of terminations in each age and service cell by the number exposed to the possibility of termination in that cell produces the rate of decrement.

In reviewing the actual rates of decrement, we compare them to the current assumed rates used in the actuarial valuations. For this purpose, the assumed rates are those used in the most recent actuarial valuation report, the June 30, 2020 lag actuarial valuation. For example, the assumed rates of withdrawal that apply in 2016 in this analysis are based on the assumptions from the 2020 lag actuarial valuation, not the assumptions in effect in 2016.

To compare actual rates of decrement to assumed rates of decrement, we produce actual to expected ratios ("A/E" ratio). These ratios compare actual decrements (one set due to retirement, a different set due to withdrawal, a different set due to disability, etc.) with expected decrements based on the actuarial assumptions. An A/E ratio that is greater than one indicates that there were more actual decrements than expected and a ratio that is less than one indicates that there were fewer actual decrements than expected. For example, a ratio of 1.5 means that 50% more members left the plan for that cause than expected. A ratio of 0.8 means that 20% fewer members left the plan for that cause than expected.

To assist reviewers in assessing whether an assumption may need to be modified or not, we incorporated a color-coded metric to indicate how far the actual experience is from that expected:

- A green circle  indicates that the experience is within 10% of that assumed, that is, the A/E ratio is in the range 0.9 – 1.1.
- An orange triangle  indicates that the experience is within 50% of that assumed, but not within 10%, that is, the A/E ratio is in the range 0.5 – 0.9 or 1.1 to 1.5.
- A red diamond  indicates that the experience is outside 50% of what was assumed, that is, the A/E ratio is smaller than 0.5 or greater than 1.5.

Please note that the color-coded symbols are meant to assist the reader to determine how far the actual experience is from that expected. Many factors are used to determine if an assumption

should be modified – reason for the deviation, credibility of the data, anticipation that experience in the future would be consistent with the prior experience, actuarial judgment, etc.

Historical Database Update

The OA provided separate historical databases with experience from 2001 to 2017 for each of the systems, the valuation files for the four-year period 2018 – 2021, detailed descriptions of the various codes contained in the data, and year by year status reconciliations or flow of lives. Milliman reviewed and updated the historical database to ensure completeness and consistency. We verified that the member valuation data provided to us was consistent with the flow of lives and updated the historical database accordingly. The historical database was imported into the MEST, and we reviewed to ensure that the number of exposures and actual decrements were captured reasonably. In our review, we noticed that the 2017 status distribution in the historical database did not match the flow of lives or was inconsistent with information contained in the 2018 data. We updated the 2017 status for consistency with the 2018 data.

While the Historical Database contains the status used in each actuarial valuation, there are situations in which this status may not indicate the actual cause of decrement. Two such situations relate to disability retirements and members on leave of absence.

Disability Retirements

There are instances in which members may have applied for disability retirement, but the application had not been approved by the time the data was provided for the annual actuarial valuation. In this situation, a member status could be classified as a termination, leave of absence, etc. in one valuation file but as a disability retirement in a subsequent valuation file. In these situations, we modified the status in the historical database to reflect the eventual approval of the disability retirement. For any record who was active during the study period (2011 or later) and had a subsequent inactive status followed by a disability retirement, the years with an inactive status code were changed to the indicated disability retirement status. These adjustments are applied after any adjustments for leave of absence noted in the following section.

Please note that approvals for disability retirement that took place after June 30, 2021, for members who are indicated as terminated in the experience data are not reflected in this analysis which, consequently, underestimates the number of disability retirements, especially in the latter years of the study.

Leave of Absence

During the study period, the OA used different terminology for identifying members on leave of absence such as active off payroll, nonvested terminated, etc. In the prior experience study, records with a status code of leave of absence had this status code modified to reflect a subsequent event as if that subsequent event occurred when the leave of absence (LOA) occurred. We applied similar adjustments to the status codes in the historical database. LOA status codes exist for the years 2016 and 2017 where the prior actuary did not have sufficient information to make an adjustment as well as on the valuation data added for years 2018 – 2021. The following summarizes the adjustments made when a record has a LOA code (“C”):

- If the status code in the year before the LOA code is an “F”, the LOA code was changed to a termination code (“F”).

- If the record has three consecutive LOA codes, then all LOA codes are changed to a termination code (“F”).
- If the record has an active status within 2 years after the first LOA code, then the LOA codes are changed to a rehire status code (“B”).
- If the record has an inactive status within 2 years after the first LOA code, then the LOA codes are changed to that inactive status code.

Due to this methodology, records will retain a LOA status code if:

- It first occurred in 2020 and remained a LOA status code in 2021.
- It first occurred in 2021.

Consistent with past practice, any member with a LOA status code was not included as a decrement because some of these members subsequently returned to active status. Furthermore, all remaining LOA status codes in 2020 are counted as exposures for withdrawal purposes. Therefore, all else being equal, the overall rates of termination are smaller during the two-year period 2020 – 2021 than in other years. Due to this situation, these years are primarily excluded from the analysis. We note that the vast majority of records with a LOA status code do terminate employment (withdrawal, retire, become disabled, etc.).

Other NYCERS Adjustments

For NYCERS, a few other adjustments were made to the historical database:

- **Plan Code for Corrections:** In the historical database, there were records with Group Codes indicating they were Corrections records, but the indicated Plan Code did not align with a Correction’s Plan Code. This primarily impacted records from 2012 – 2014. As discussed with OA, these records were re-mapped to Plan X – Correction – 20 Year Plan.
- **Year 2017:** There were 2,782 active member records in 2017 that were active in prior years, but the status codes and applicable information were not included on the record. For prior years back until date of hire, the status code, plan code, tier, service and other information were updated based on the information contained on the 2017 record.
- **Rehired Vested Records:** For the fiscal year endings 2019 – 2021, the number of vested records with an active status code the following year was significantly higher than in prior years. In discussion with OA, records with a vested code (“V”) that were preceded by an active code (A”) and followed by an active code were not assumed to terminate and the “V” code was changed to a rehire code (“B”). The following chart provides the counts of these adjustments:

Vested Records Changed to Rehired Records		
Year End	Counts of “V” to “A”	Counts of “V” Change to “B”
2021	1,248	999
2020	903	585
2019	901	577

- **Death Records:** In 2018 and 2019, OA indicated that 741 records (344 in 2018 and 397 in 2019) originally coded as terminations were deaths. We updated the historical database code accordingly.
- **Death to Retiree or Vested Records:** Based on a review of the historical database codes, we replaced the death code for those records where the death code in one year was followed by a retiree or a vested code in the next year. The following table shows the adjustments by year:

Death Records Changed to Retired or Vested Records	
Year End	Counts of “D” to “R” or “V”
2019	109
2018	49
2017	63
2016	24
2015	5
2014	5
2013	189
2012	186

Salary Adjustments

For years 2018 to 2021, base salary for all active participants (without assumed overtime percentage adjustments) were subsequently provided and reflected in this study. Prior to 2018, base salary (without assumed overtime percentage adjustments) was not specified in the historical database. It was developed equal to the field labeled “Salary_Base” divided by the assumed overtime percentage for each year ($\text{Salary_Base}_{YY} / (1 + \text{assumed overtime percentage})$). The overtime percentage used was based on the assumption (4% for General, 10% - 15% for Correction based on service), 12% for Sanitation, 20% for TBTA, and 8% for Transit) in the 2016 lag valuation report. If a record was indicated as not eligible for overtime (no_OT_YY), the assumed overtime percentage was set to 0%. See the Overtime sections under each group for additional details regarding overtime eligibility.

Pension Benefits

The amount of a member’s pension is used in the retiree mortality analysis as typically members with higher pension benefits would have lower rates of mortality. Bolton was the first actuary to incorporate pension benefits in the historical database beginning with fiscal year 2015. This process is also consistent with the method used by the Society of Actuaries in producing industry-wide tables. For consistency, we utilized the same process as Bolton which reflected a member’s fixed annuity, cost-of-living-increase and any variable fund amounts. The variable fund amounts are multiplied by a corresponding unit value contained in the data. If an annual pension benefit was less than \$10,000, \$10,000 was used for amount-weighting purposes.

The following table lists the fields used:

The amount of a member’s pension is used in the retiree mortality analysis as typically members with higher pension benefits would have lower rates of mortality. Bolton was the first actuary to incorporate pension benefits in the historical database beginning with fiscal year 2015. This

process is also consistent with the method used by the Society of Actuaries in producing industry-wide tables. For consistency, we utilized the same process as Bolton which reflected a member's fixed annuity and cost-of-living-increase. If an annual pension benefit was less than \$10,000, \$10,000 was used for amount-weighting purposes.

The following table lists the fields used:

Field	Description
PayAnn	Fixed Annuity – Employee
PayPRF1	Pension Reserve Fund 1 – Employer
PayPRF2	Pension Reserve Fund 2 – Employer
PaySup	Cost of Living Amounts

Exposures and Decrements

An exposure is a member who is subject to the particular contingency being studied. For example, an active member who has met the conditions for retirement is a retirement exposure. If they have not met that condition, then they are a withdrawal exposure. The following section describes the rules used to determine exposures and decrements in this analysis:

- Any record considered an active employee in the indicated actuarial valuation is considered an exposure for preretirement decrements. This includes status codes of “A” and “B”. For withdrawal purposes, records with a LOA status code of “C” are also included as exposures.
- Members indicated as terminations during the year who do not meet the conditions for retirement are reflected in the termination decrement.
- Members indicated as retirements during the year, or members indicated as terminations who do meet the conditions for retirement, are reflected in the retirement decrement.
- Exposures for ordinary disability exclude service periods prior to the eligibility conditions. For example, if 10 years of service is required to receive an ordinary disability benefit, the exposures exclude all members prior to 10 years of service.

Age and Service Calculations

Age was determined as age nearest on July 1 based on the date of birth and the indicated valuation year. Service is based on the service field contained in each year's valuation data as imported into the Historical Database and rounded to the nearest integer.

Due to the rounding of ages and service calculations, it may appear that some members retire before they are eligible. For example, a member retires at exactly at age 57, but the rounded age may have been calculated as age 56. Another example, a member retires once they have completed 25 years of service, but the rounded service is 24. Other reasons where a record appears to have retired prior to meeting the eligibility condition could be due to purchase service, prior service or data corrections that occur at time of retirement. In these situations, the difference between a member's actual service at retirement and that on the most recent record may be greater than 1.

To capture these records in the retirement analysis, we increased a member's age by up to 1 year or service by up to 5 years. The following details the adjustments:

- 183 members with 4 years of service were increased to 5 years.
- 252 members with between 0 and 3 years of service were increased to 5 years.
- 284 General members in the Specialty Group plans or a physically taxing plan with 24 years of service were increased to 25 years.
- 158 General members in the Specialty Group plans or a physically taxing plan with between 20 and 23 years of service were increased to 25 years.
- 439 General members (excluding Age 57 Plan) age 54 were increased to age 55.
- 266 General Age 57 Plan members age 56 were increased to age 57.
- 14 General Auto Workers members age 49 were increased to age 50.
- 591 Correction members with 19 or 24 years of service were increased to 20 or 25 years, respectively.
- 121 Correction members with between 15 and 18 years of service or between 20 and 23 years of service were increased to 20 or 25 years, respectively.
- 184 Sanitation members with 19 years of service were increased to 20 years.
- 58 Sanitation members with between 15 and 18 years of service were increased to 20 years.
- 307 Transit members in the Age 55 and 25 Plan with 24 years of service were increased to 25 years.
- 573 Transit members age 54 were increased to age 55.
- 20 TBTA members with 19 years of service were increased to 20 years.
- 14 TBTA members with between 15 and 18 years of service were increased to 20 years.
- 15 TBTA members age 49 were increased to age 50.

Confidence Intervals

Within the MEST, the user has the ability to review if the experience falls within a certain confidence interval as they can select confidence intervals at the 90th, 95th, 98th or 99th percentile levels. The 99th confidence interval will contain the widest bands as there is a 99% chance that the experience would fall within that band. The confidence interval was determined based on either the current or the proposed assumption. The confidence interval range is wider when the

number of members assumed to decrement under the particular cause being studied is small and it is narrower when the number of members is larger.

In this report, the 95th confidence interval was utilized.

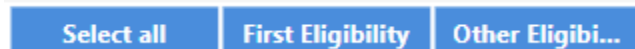
Milliman Experience Study Tool (MEST)

The purpose of the MEST is to analyze the experience by System using the status codes in the historical database. The MEST allows easy review of the experience by plan or other parameters for each System.

There are four primary charts in MEST for each decrement page. In addition, each of the four charts can be displayed on a service basis, age basis or year-by-year basis. Each of these pages is available for comparison to the current or the proposed assumptions. A tool bar at the top of page allows the user to select how the information is displayed.



For retirement, additional selections are available to review the experience at first eligibility or other eligibility criteria.



A walkthrough of these charts in MEST has been described below using the withdrawal decrement tab as an example.

The following charts show withdrawal decrements based on service. The chart includes the actual number of withdrawals, expected number, and the total number. The actual withdrawal rate is computed and compared to the current assumption.

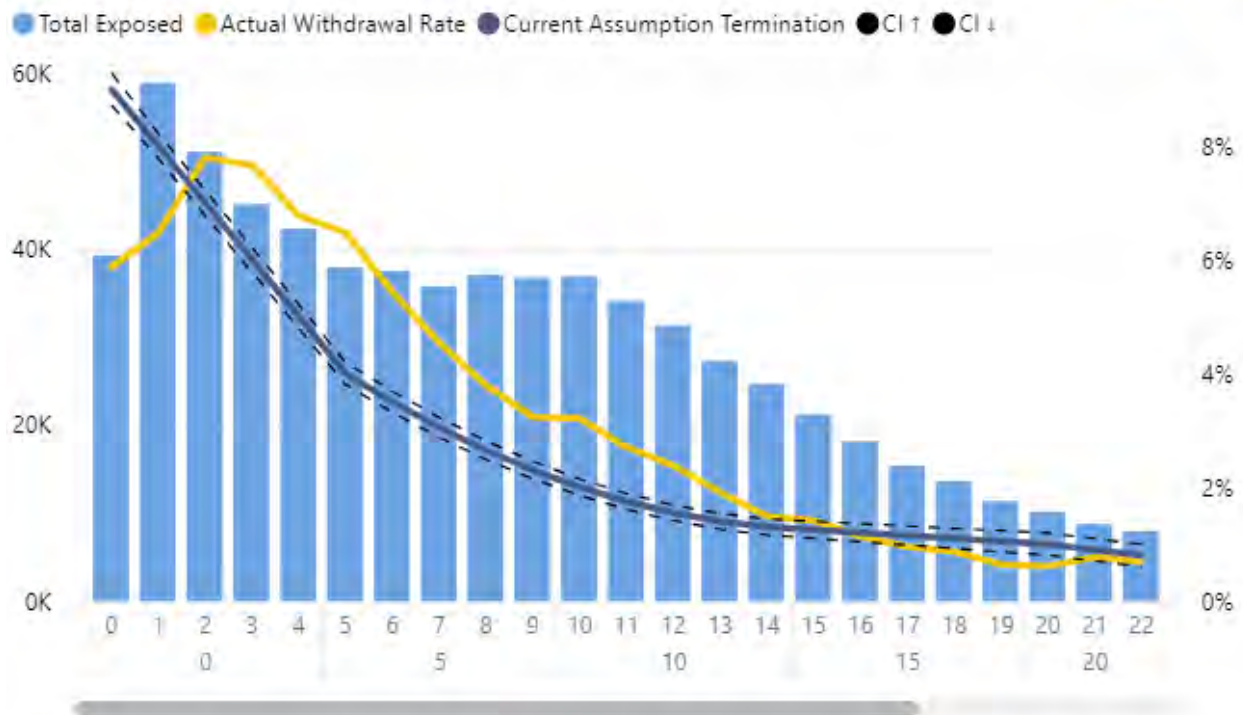
Service	Actual Withdrawals	Expected Withdrawals	Total Exposed	Actual Withdrawal Rate	Current Assumption Termination	Ratio Act/Exp Term
0	2,003	3,017.7	33,530	5.97%	9.00%	▲ 0.66
1	3,302	4,058.2	50,727	6.51%	8.00%	▲ 0.81
2	3,482	3,291.5	47,021	7.41%	7.00%	● 1.06
3	3,382	2,596.4	43,273	7.82%	6.00%	▲ 1.30
4	2,818	2,026.3	40,525	6.95%	5.00%	▲ 1.39
5	2,431	1,491.4	37,286	6.52%	4.00%	◆ 1.63
6	2,026	1,293.4	36,954	5.48%	3.50%	◆ 1.57
7	1,623	1,081.7	35,466	4.58%	3.05%	◆ 1.50
8	1,404	978.7	36,931	3.80%	2.65%	▲ 1.43
9	1,189	843.2	36,663	3.24%	2.30%	▲ 1.41
10	1,184	737.7	36,886	3.21%	2.00%	◆ 1.60
11	921	596.5	34,088	2.70%	1.75%	◆ 1.54
12	746	485.3	31,310	2.38%	1.55%	◆ 1.54
13	521	381.9	27,279	1.91%	1.40%	▲ 1.36
14	368	321.2	24,704	1.49%	1.30%	▲ 1.15
15	300	265.4	21,229	1.41%	1.25%	▲ 1.13
16	206	218.0	18,166	1.13%	1.20%	● 0.94
17	147	176.8	15,377	0.96%	1.15%	▲ 0.83
18	118	149.8	13,618	0.87%	1.10%	▲ 0.79
19	73	119.2	11,357	0.64%	1.05%	▲ 0.61
20	62	101.4	10,137	0.61%	1.00%	▲ 0.61
Total	28,693	24,564.3	693,237	4.14%	3.54%	▲ 1.17

In this version, the actual withdrawal rate is computed and compared to the proposed assumption.

Service	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
0	2,308	3,081.5	39,301	5.87%	7.84%	▲ 0.75
1	3,813	4,618.0	58,886	6.48%	7.84%	▲ 0.83
2	3,984	3,697.5	51,073	7.80%	7.24%	● 1.08
3	3,454	2,966.8	45,115	7.66%	6.58%	▲ 1.16
4	2,867	2,511.5	42,315	6.78%	5.94%	▲ 1.14
5	2,457	2,124.6	37,938	6.48%	5.60%	▲ 1.16
6	2,037	1,776.0	37,521	5.43%	4.73%	▲ 1.15
7	1,625	1,403.3	35,769	4.54%	3.92%	▲ 1.16
8	1,405	1,173.4	37,104	3.79%	3.16%	▲ 1.20
9	1,189	977.3	36,745	3.24%	2.66%	▲ 1.22
10	1,184	890.3	36,889	3.21%	2.41%	▲ 1.33
11	921	731.4	34,088	2.70%	2.15%	▲ 1.26
12	746	596.2	31,313	2.38%	1.90%	▲ 1.25
13	521	458.7	27,281	1.91%	1.68%	▲ 1.14
14	368	361.4	24,707	1.49%	1.46%	● 1.02
15	300	274.2	21,232	1.41%	1.29%	● 1.09
16	206	218.5	18,170	1.13%	1.20%	● 0.94
17	147	169.0	15,380	0.96%	1.10%	▲ 0.87
18	118	130.8	13,619	0.87%	0.96%	● 0.90
19	73	96.4	11,358	0.64%	0.85%	▲ 0.76
20	62	80.4	10,139	0.61%	0.79%	▲ 0.77
Total	30,172	28,661.8	716,666	4.21%	4.00%	● 1.05

The following chart compares the actual withdrawal rate (yellow line) to the current assumption (blue line) by service (or by age or plan year depending on selection). The blue bars show the number of exposures allowing the user to identify situations where there are relatively few exposures for that bucket and that the data may not be fully credible. In addition, the dotted lines display the confidence intervals on the current assumption.

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Service



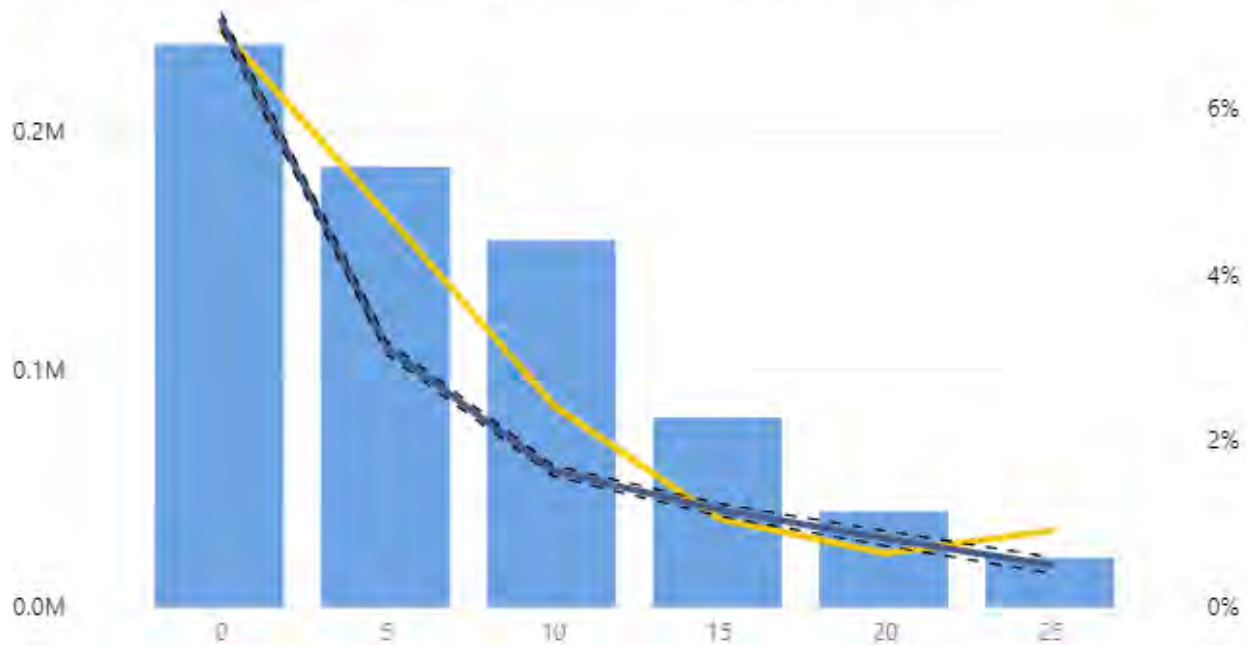
Also, this chart can be used to review the experience in 5-year service or age bins. In the chart above, the second row in the x-axis shows 0, 5, 10, etc. indicating the service bin from 0-4 years, 5-9 years, 10-14 years, etc.

The following chart shows the results based on service bins based on the current assumption.

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Service

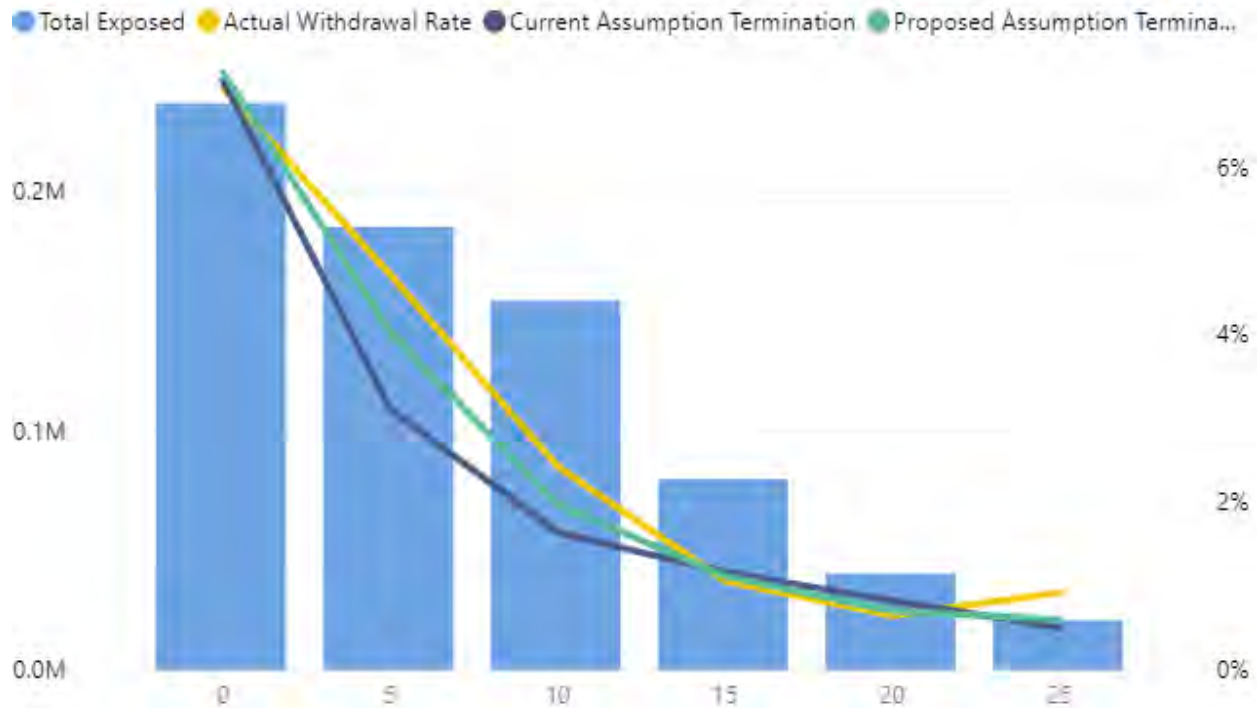


● Total Exposed ● Actual Withdrawal Rate ● Current Assumption Termination ● CI ↑ ● CI ↓



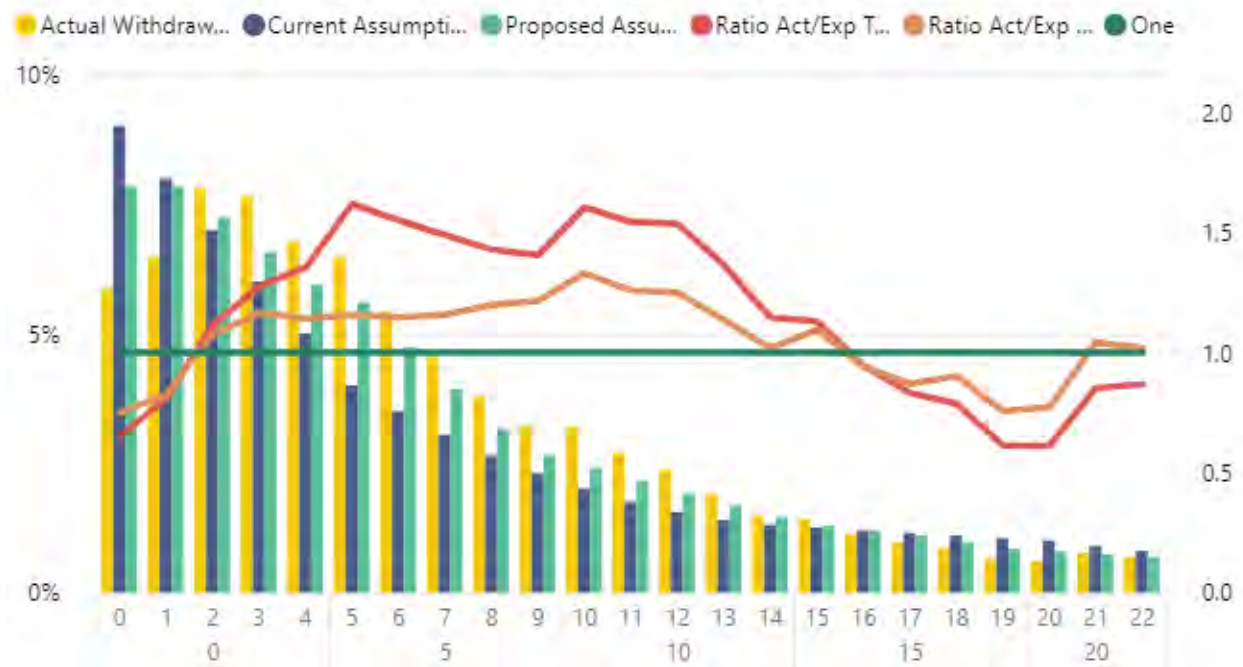
The following chart shows the results based on service bins based on the proposed assumptions (green line) in addition to the current assumption (yellow line).

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Service



In the next chart, the A/E ratio is graphed as the red line under the current assumptions and as the orange line under the proposed assumptions, and compared to the green line which is the 1.0 baseline (meaning that the actual experience is equal to that assumed). This provides the user with a different viewpoint in comparing the results of the study. The actual withdrawal rate (yellow bars), the current assumption (blue bars) and the proposed assumption (green bars) are shown on the graph.

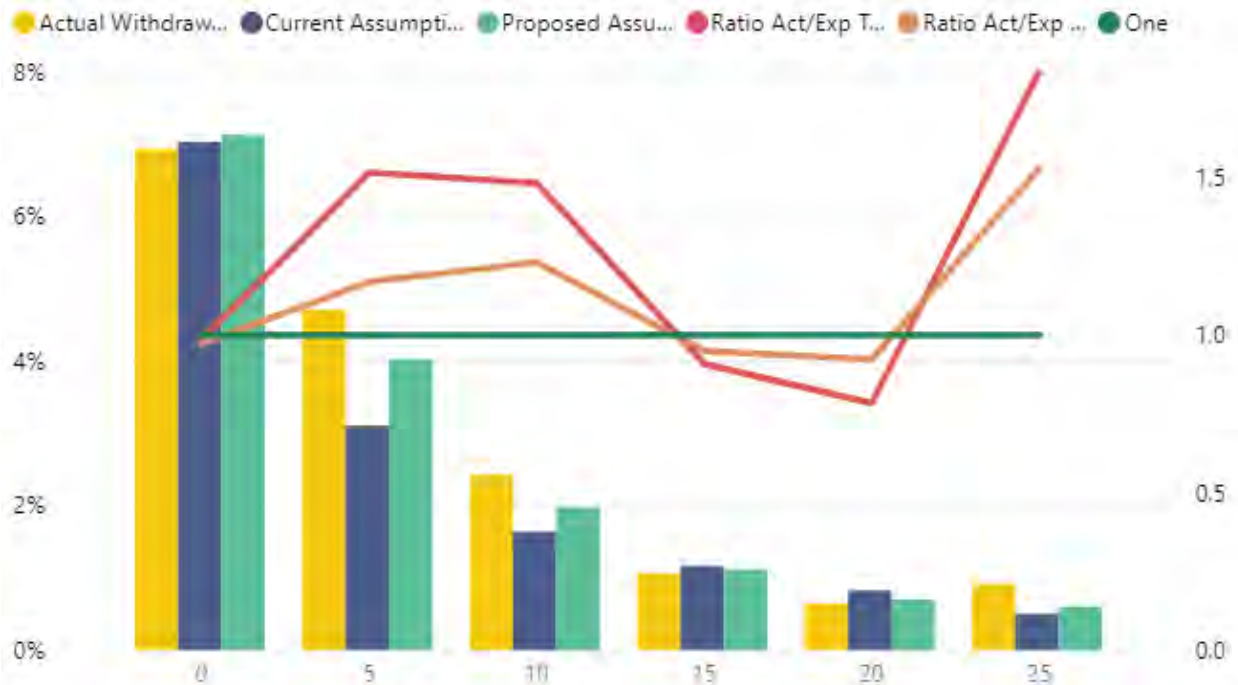
Withdrawal Rate - Actual, Expected, and Ratio; by Service w/Proposed



Also, this chart can be used to review the experience in 5-year service or age bins. In the chart above, the second row in the x-axis shows 0, 5, 10, etc. indicating the service bin from 0-4 years, 5-9 years, 10-14 years, etc.

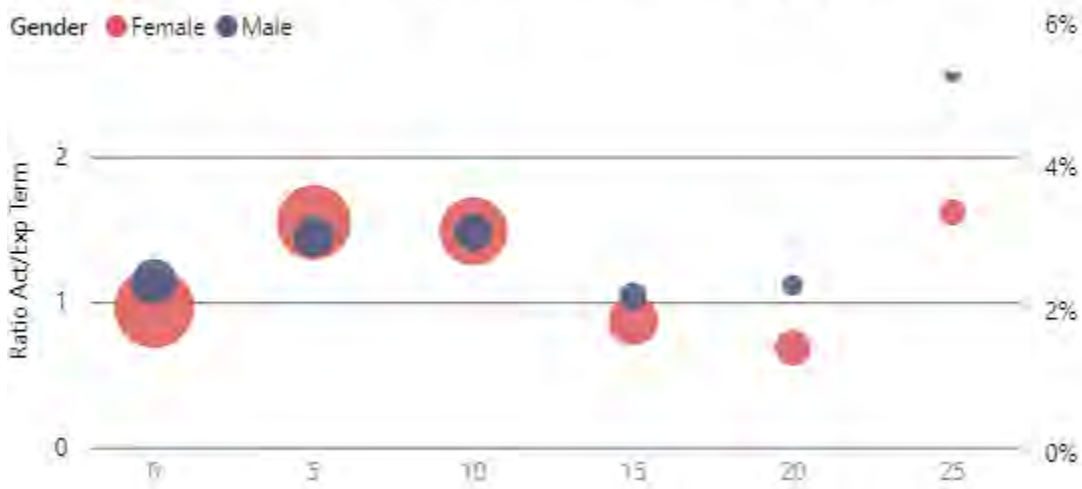
The following chart shows the results based on service bins.

Withdrawal Rate - Actual, Expected, and Ratio; by Service w/Proposed



Finally, a bubble chart displaying the A/E ratios by gender is shown. The size of the bubble reflects the number of exposures.

Actual vs. Expected - Withdrawal Rate w/ Exposure Bubbles; by Service



In MEST, there are various items that the user can select. Once a selection is made, the charts update in real time and the totals are based on the selections.

- **Group selections** – a drop-down box allows the user to select among the various NYCERS groups – General, Correction, Sanitation, Transit and TBTA.
- **Plan selections** – a drop-down box allows the user to select the available plan codes for that system (the options in the drop-down box depend on the selected system).
- **Improved Plan Code selections** – a drop-down box allows the user to select members who Elected a Plan, were Mandated into a Plan or are Not An Improved Plan member. Mandated and Not An Improved Plan members are combined in the analysis. This option is only available on retirement, disability and overtime assumptions.
- **Tier selections** – a drop-down box allows the user to select the available tier codes for that system. This option is only available on retirement, disability and overtime assumptions.
- **Physically Taxing selections** - a drop-down box allows the user to select between physically taxing and non-physically taxing members. This option is only available on retirement, disability and overtime assumptions.
- **Gender** – male or female or both can be selected.
- **Plan Year End Range** – the user can select the specific years (years selected must be consecutive). Plan year 2021 contains the experience from July 1, 2020 to June 30, 2021.
- **Age and Service Ranges** – can be adjusted and combined with the different displays to delve deeper into the experience. For example, if a user wants to view the results by age for those who terminated with 10 or more years of service, the user can select the service range from 10 years to up to the maximum contained in the data and view results by age.
- **Group, Plan, Improved Plan, Tier and Physically Taxing distributions** provide the user with the number of exposures in each bucket (hover over the indicated cell). The user can select a specific group, plan, tier, etc. to see how those results differ from the totals, but we recommend using the drop-down boxes above.
- **Confidence intervals** – the user can select to review results under the 90th, 95th, 98th, or 99th percentiles.
-

Show / Hide CI
 Confidence Level

Gender Selection

Group Selection

Plan Selection

Improved Plan Code Selection

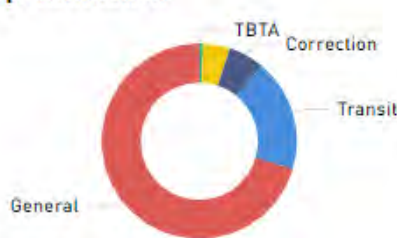
Tier Selection

Physically Taxing Selection

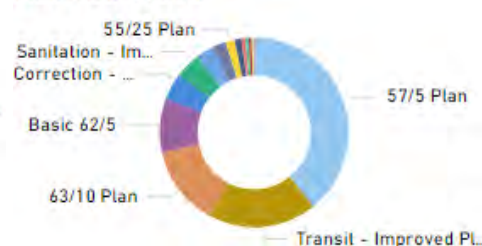
Age Range

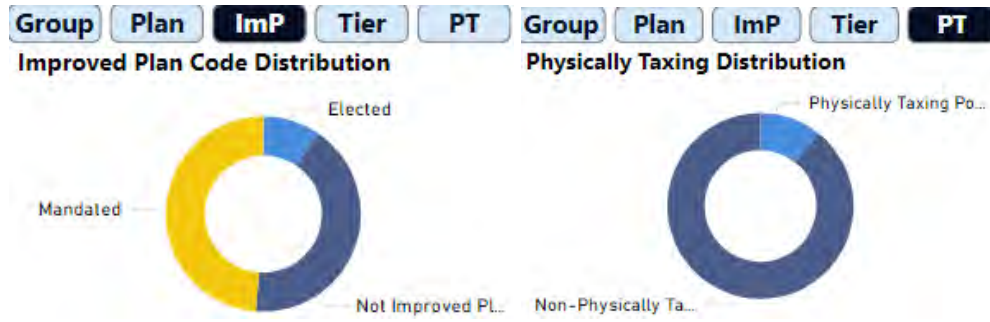
Service Range

Group Distribution



Plan Distribution





Section I(A) – General Employees of New York City Employees' Retirement System (NYCERS)

Exposures and Decrements

To set the exposures and actual decrements for NYCERS General employees, the following table details the age and service conditions for unreduced retirement and reduced retirement. If a member has not met any of these conditions for the indicated plan code by year, the member is considered a withdrawal exposure. Otherwise, if the member did meet any of these conditions, they would be considered a retirement exposure. Members with a status code of termination who, nonetheless, have met the conditions for retirement, are included as actual retirements.

Using the age and service slider, a user can drill down to view the results that reflect a variety of conditions by plan code, such as reduced retirement, retirement at first eligibility, or other conditions for retirement.

NYCERS Retirement Eligibility Chart - General

Plan Code	Plan Description	Mandated	Formula Bump at 20 YOS	Unreduced Retirement Condition 1		Unreduced Retirement Condition 2		Reduced Retirement Condition	
				Age 1	Service 1	Age 2	Service 2	Age	Service
F	Basic 62/5	TRUE	TRUE	62	5			55	5
G	Fire Alarm Dispatchers - Tier 4	BOTH	Under Basic Tier 4	0	25	62	5		
G	Fire Alarm Dispatchers - Tier 6	TRUE	Under Basic Tier 6	0	25	63	10		
I	57/5 Plan	TRUE	TRUE	57	5				
I	57/5 Plan - Physically Taxing	TRUE	TRUE	50	25	57	5		
J	Emergency Medical Technicians - Tier 4	BOTH	Under Basic Tier 4	0	25	62	5		
J	Emergency Medical Technicians - Tier 6	BOTH	Under Basic Tier 6	0	25	63	10		
L	Special Officers - Tier 4	BOTH	Under Basic Tier 4	0	25	62	5		
L	Special Officers - Tier 6	TRUE	Under Basic Tier 6	0	25	63	10		
N	55/25 Plan - Tier 4	FALSE	TRUE	55	25	62	5		
N	55/25 Plan - Tier 4 - Physically Taxing	FALSE	TRUE	50	25	62	5		
S	Deputy Sheriffs - Tier 4	FALSE	Under Basic Tier 4	0	25	62	5		
S	Deputy Sheriffs - Tier 6	TRUE	Under Basic Tier 6	0	25	63	10		
T	Auto Workers - Tier 4	BOTH	FALSE	50	25	62	5		
T	Auto Workers - Tier 6	TRUE	FALSE	50	25	63	10		
U	Transit - Improved Plan - Tier 4	BOTH	Under Basic Tier 4	55	25	62	5		
U	Transit - Improved Plan - Tier 6	TRUE	Under Basic Tier 6	55	25	63	10		
V	Police Communications Techs - Tier 4	BOTH	Under Basic Tier 4	0	25	62	5		
V	Police Communications Techs - Tier 6	TRUE	Under Basic Tier 6	0	25	63	10		
W	DA Investigators - 20 Year Plan - Tier 4	FALSE	FALSE	0	20	70	0		
W	DA Investigators - 20 Year Plan - Tier 6	TRUE	FALSE	0	25			0	20
X	Correction - 20 Year Plan - Tier 6	TRUE	FALSE	0	25			0	20
Y	63/5 Plan	TRUE	TRUE	63	10			55	10

For General employees in the Transit – Improved Plan and Correction – 20 Year Plan, OA applies the Transit or Corrections actuarial assumptions. Therefore, these members are included in the Transit or Corrections experience. See the [Group Codes](#) discussion below.

For the various Tier 6 plans, the vesting requirement was reduced from 10 years to 5 years due to the passage of Chapter 56, Laws of 2022. Since 10-year vesting was required during the study period, we have used 10 years in this report.

OA's retirement assumptions depend on whether a member can choose a certain retirement plan. If a member had a choice and elected the improved plan, the assumed rates of retirement are higher than those in which the member was mandated into the specific retirement plan. Higher rates of retirement apply to the indicated plan when the Mandated column is set to False. All Tier 6 plans are considered Mandated plans.

We understand that for certain plans, such as those that have unreduced retirement at attainment of 20 or 25 years of service, the OA assumes immediate reduced retirement for members who have not met the stated condition for unreduced retirement but have met the condition for early retirement under the Tier IV basic plan (age 55 and completion 5 years of service). In these

situations, OA applies the rates of termination at these age/service conditions and not reduced rates of retirement. We have coded these members as retirement exposures but apply the rates of termination. Please see the discussion under the [Specialty Plan Grouping](#).

Excluded Plans

The following table notes the Plan Codes where exposures were excluded from the tool, except for mortality purposes, because there are very few of them.

NYCERS Excluded Plan Codes	
Plan Code	Plan Description
1	1/100
6	Transit - 20 Year Plan
7	Sanitation - 20 Year Plan
A	CPP (Plan "A")
B	ISF (Plan "B")
C	Modified (Plan "C")
D	Modified ISF (Plan "D")
E	Original Tier 3 Plan
K	Tier 2 DA Investigators – 25 Year Plan
Z	Assumed 62/5 or 57/5 Plan for Deferred Vested Members

In addition, there may be records that were excluded in a Group Code that does not match up with the applicable Plan Code for that Group. The number of these records was insignificant.

Group Codes

To determine which records are considered General employees, we used the Group Code contained on the member's record. However, there are situations where the OA applies an assumption set that does not match this Group Code. In these instances, we have adjusted the group code used (the original group code remains in the historical data) to be consistent with the assumptions used by OA in the valuation program.

The following table indicates the records with certain plan codes that have a General employee Group Code but not included as General employees in this analysis as well as those records who have another Group Code but are included as General employees. Other code combinations were revised but impacted an insignificant number of records and thus, we did not note them below.

Adjusted Group Codes			
Plan Code	Plan Description	Original Group Code	Revised Group Code
U	Transit - Improved Plan	General, Sanitation, TBTA	Transit
R	TBTA – 50/20 Plan	General, Transit	TBTA
X	Correction - 20 Year Plan	General, Sanitation, Transit	Correction
H	Corrections Capt. – Imp Plan	General	Correction
P	Corrections Off. – 25 Year Plan	General	Correction

Adjusted Group Codes			
Plan Code	Plan Description	Original Group Code	Revised Group Code
Q	Corrections Off. – Imp Plan	General, Transit	Correction
M	Sanitation – Improved Plan	General, Transit	Sanitation
F	Basic 62/5	Sanitation, TBTA, Transit	General
Y	Basic 63/5	TBTA, Transit	General
I	57/5 Plan	Transit, Sanitation	General
L	Special Officers	Transit, Sanitation	General
N	55/25 Plan	Transit	General
T	Auto Workers	Transit, TBTA	General

General Plan Code Groupings

In our analysis, we have further segmented the General employee population into basic plans and specialty plans. The following table shows the plans in these two categories.

Plan Code	Plan Description	Grouping
F	Basic Plan 62/5	Basic
I	57/5 Plan	Basic
Y	63/10 Plan	Basic
G	Fire Alarm Dispatchers	Specialty
J	Emergency Medical Technicians	Specialty
L	Special Officer	Specialty
N	55/25 Plan	Specialty
S	Deputy Sheriffs	Specialty
T	Auto Workers	Specialty
V	Police Communication Techs	Specialty
W	DA Investigators – 20 Year Plan	Specialty

The specialty plans include those members eligible for unreduced retirement at completion of 20 or 25 years. Only the Auto Workers and 55/25 Plan require attainment of age 50 or 55; the other specialty plans have no age requirement.

Rates of Salary Increase

The rates of salary increase reflect three components: 1) price inflation, 2) real wage inflation, and 3) merit increases. The combination of price inflation and real wage inflation is known as wage inflation. The current wage inflation is 3%, which reflects a price inflation assumption of 2.5% and 0.5% real wage inflation.

Based on the 2024 and 2023 OASDI Trustees report issued by Social Security, wage inflation from 2012 to 2020 had a cumulative compound average of 2.93%. Including the rate for 2021 of 9.04%, the average increased to 3.53%. However, in our analysis of the experience, we did not notice any large increases in wages during 2021. This is typical with government sector employees with union affiliations where salary increases are specified in contracts negotiated for a 3- to 5-year period. Thus, wage increases for these employees may not adjust as quickly as for other employment sectors included in the Social Security Trustees report.

For purposes of our analysis, we believe the 3% current wage inflation is representative of the actual experience during the study period. While inflation has been higher since 2021, we propose no changes to the inflation assumption of 2.5% and wage inflation assumptions of 3%. Therefore, we have developed proposed salary increases based on total salary increases during the indicated period. The merit portion is equal to the total less the 3% wage inflation.

For purposes of salary increases only members with a status code of A in consecutive years are included. Members with a LOA status code are excluded.

Although salary increases for government employees may respond less quickly to changes in inflation, using salary experience from many years in the past may not necessarily be indicative of future salary increases as they may not include changes negotiated in union contracts such as general increases, longevity payments, or other salary items. We reviewed the salary increases by year and determined what we believe was the most reasonable period to compare to the current assumption and develop proposed assumptions.

The following chart shows the experience by year for the age range 22 to 59 and for the service range 0 to 34.



Salary increases for General varied significantly prior to 2016 and there was a much smaller average increase in 2021, which is probably impacted by the pandemic. For General, we focused on the 5-year period from 2016 – 2020, which appears to be the most stable period.

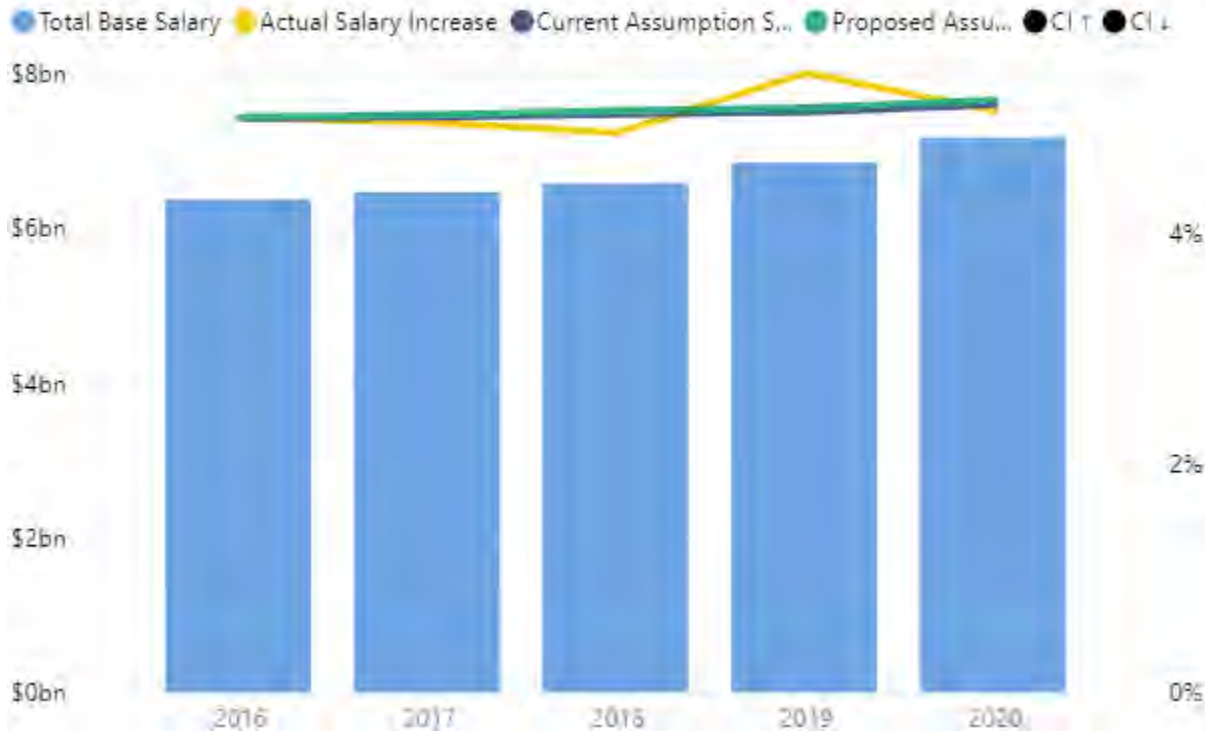
The current assumed rates of salary increases vary by service. The proposed assumption also varies by service. Overall, the proposed rates of salary increases are very similar to the current assumption.

The following table shows the experience for salary increases by year, for the age range (22 to 59), and for the service range (0 to 34) from 2016 to 2020. The actual rate of salary increases averaged 5.07% whereas the overall expected rate of increase averaged 5.05% based on the current assumptions and 5.08% based on the proposed assumptions.

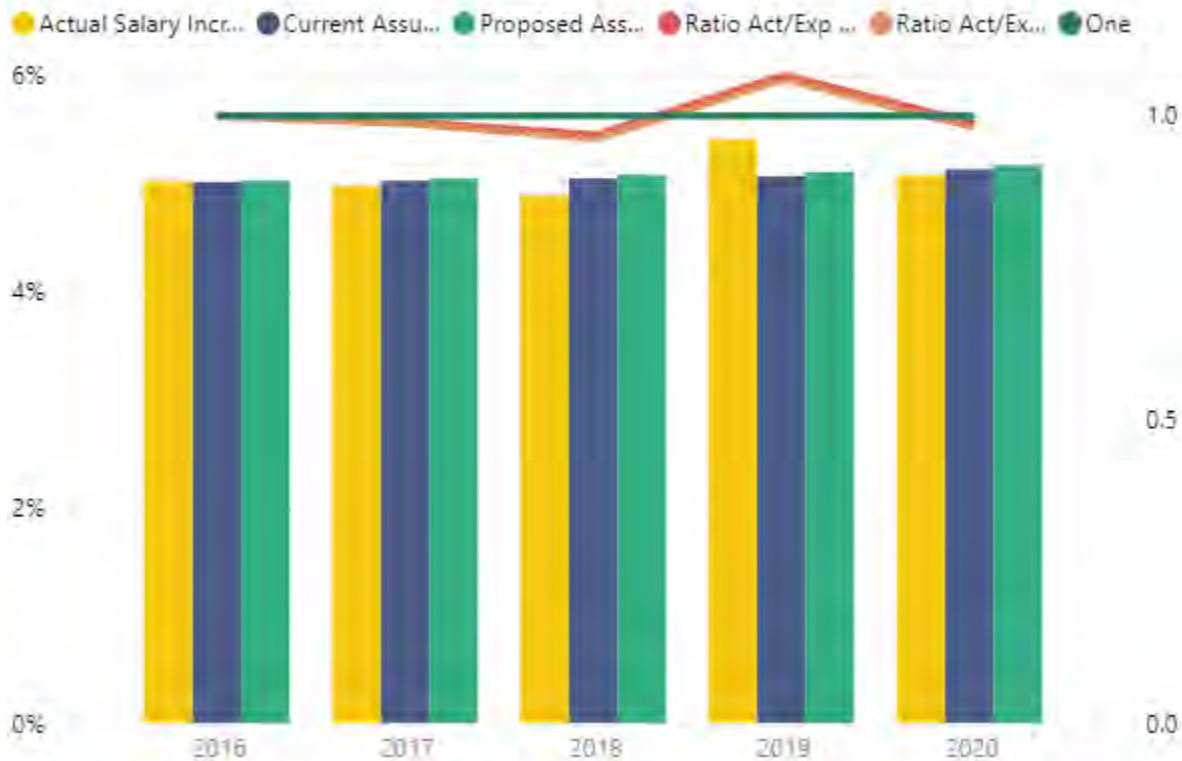
Plan Year	Exposed	Base Salary	Actual Salary	Expected Salary	Actual Salary Increase	Current Assumption Salary Increase	Ratio Act/Exp Salary Increase
2016	103,007	\$6,366.7M	\$6,686.0M	\$6,685.7M	5.01%	5.01%	1.00
2017	101,041	\$6,457.6M	\$6,778.8M	\$6,781.8M	4.97%	5.02%	0.99
2018	99,549	\$6,576.2M	\$6,897.4M	\$6,907.8M	4.88%	5.04%	0.97
2019	100,352	\$6,841.6M	\$7,211.3M	\$7,188.0M	5.40%	5.06%	1.07
2020	101,642	\$7,162.8M	\$7,526.2M	\$7,530.2M	5.07%	5.13%	0.99
Total	505,591	\$33,405.0M	\$35,099.7M	\$35,093.5M	5.07%	5.05%	1.00

Plan Year	Exposed	Base Salary	Actual Salary	Expected Salary Proposed	Actual Salary Increase	Proposed Assumption Salary Increase	Act/Exp Proposed Salary Increase
2016	103,007	\$6,366.7M	\$6,686.0M	\$6,686.3M	5.01%	5.02%	1.00
2017	101,041	\$6,457.6M	\$6,778.8M	\$6,783.1M	4.97%	5.04%	0.99
2018	99,549	\$6,576.2M	\$6,897.4M	\$6,910.1M	4.88%	5.08%	0.96
2019	100,352	\$6,841.6M	\$7,211.3M	\$7,190.5M	5.40%	5.10%	1.06
2020	101,642	\$7,162.8M	\$7,526.2M	\$7,532.8M	5.07%	5.17%	0.98
Total	505,591	\$33,405.0M	\$35,099.7M	\$35,102.9M	5.07%	5.08%	1.00

Exposure Distribution w/ Salary Increase - Actual and Expected; by Year



Salary Increase - Actual, Expected, and Ratio; by Year

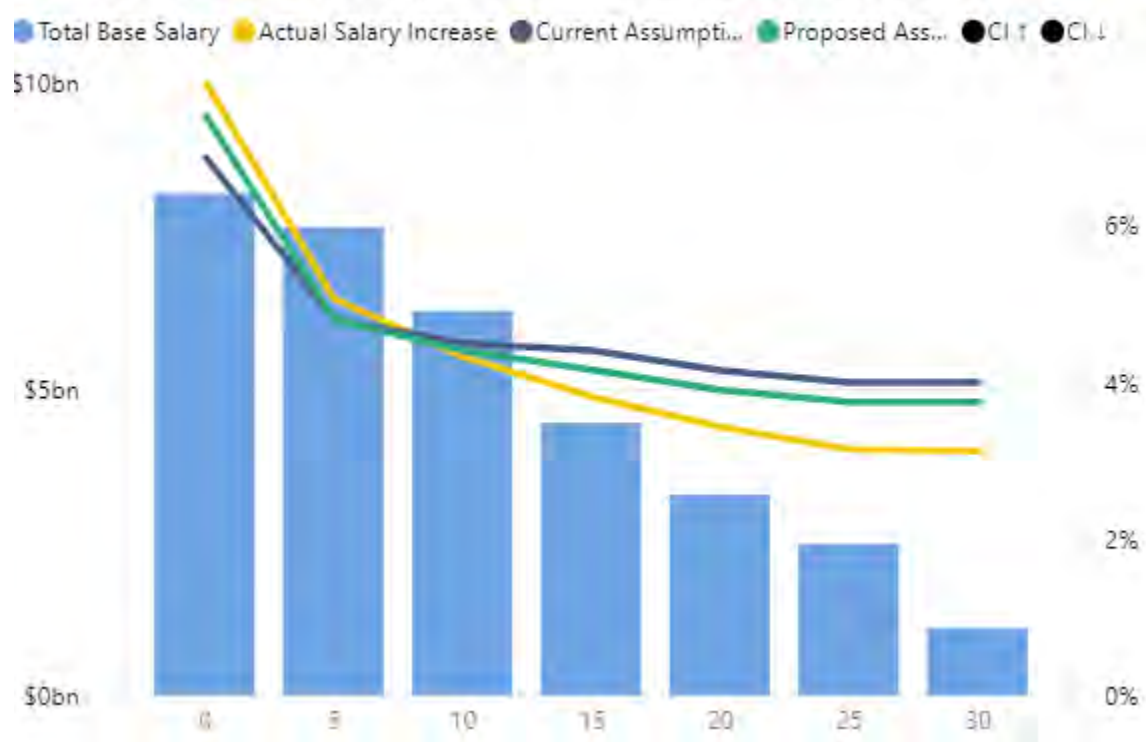


The following charts show the experience by service (0 to 34 years) from 2016 to 2020 first compared to the current assumption and then to the proposed assumption. This resulted in no change in the A/E ratio of 1.00 for ages 22 to 59.

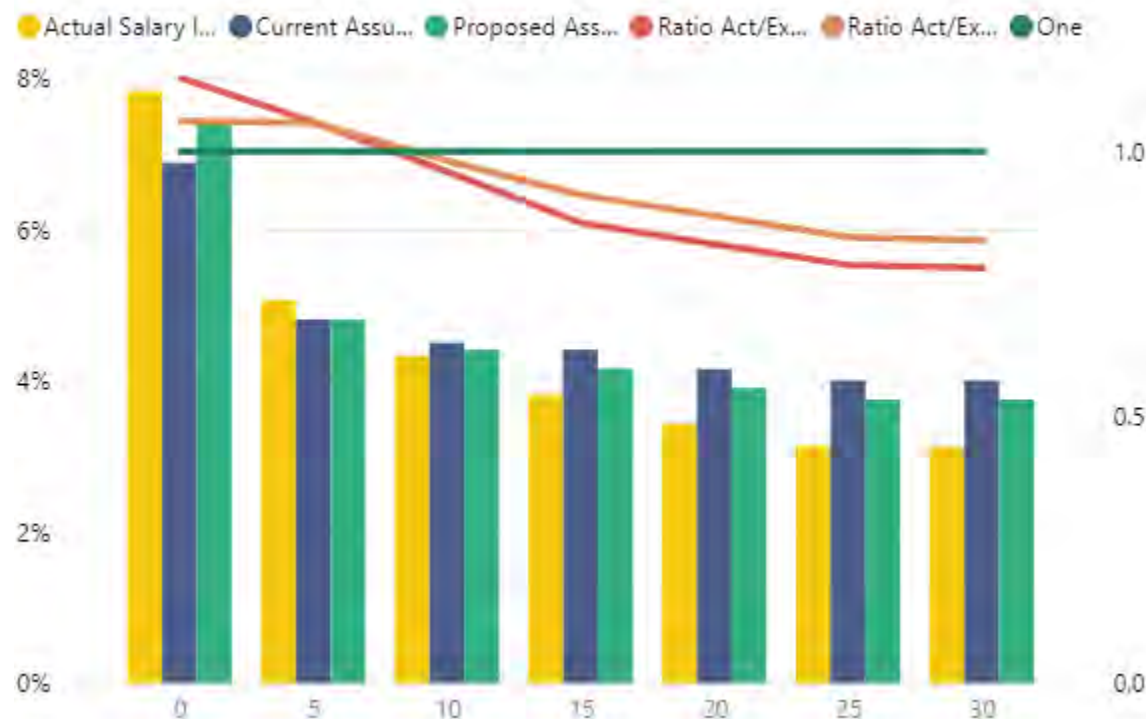
Service	Exposed	Base Salary	Actual Salary	Expected Salary	Actual Salary Increase	Current Assumption Salary Increase	Ratio Act/Exp Salary Increase
0	12,116	\$612.1M	\$692.1M	\$667.1M	13.08%	9.00%	▲ 1.45
1	41,003	\$2,235.9M	\$2,441.5M	\$2,414.8M	9.19%	8.00%	▲ 1.15
2	30,683	\$1,760.7M	\$1,902.1M	\$1,883.9M	8.03%	7.00%	▲ 1.15
3	31,516	\$1,885.4M	\$2,005.8M	\$1,998.5M	6.39%	6.00%	● 1.06
4	27,409	\$1,698.0M	\$1,792.2M	\$1,791.4M	5.54%	5.50%	● 1.01
5	25,402	\$1,599.9M	\$1,685.3M	\$1,679.9M	5.34%	5.00%	● 1.07
6	25,223	\$1,624.5M	\$1,707.2M	\$1,704.1M	5.09%	4.90%	● 1.04
7	23,849	\$1,534.3M	\$1,615.7M	\$1,607.9M	5.31%	4.80%	▲ 1.11
8	22,783	\$1,459.3M	\$1,530.8M	\$1,527.9M	4.90%	4.70%	● 1.04
9	21,972	\$1,427.5M	\$1,494.0M	\$1,493.2M	4.66%	4.60%	● 1.01
10	22,174	\$1,469.7M	\$1,536.2M	\$1,535.8M	4.53%	4.50%	● 1.01
11	20,138	\$1,354.7M	\$1,414.6M	\$1,415.6M	4.43%	4.50%	● 0.98
12	17,812	\$1,220.7M	\$1,273.3M	\$1,275.6M	4.31%	4.50%	● 0.96
13	17,073	\$1,187.1M	\$1,235.7M	\$1,240.6M	4.09%	4.50%	● 0.91
14	15,221	\$1,044.1M	\$1,088.0M	\$1,091.1M	4.20%	4.50%	● 0.93
15	14,598	\$1,009.6M	\$1,050.7M	\$1,055.1M	4.07%	4.50%	● 0.90
16	13,770	\$964.0M	\$1,001.5M	\$1,006.9M	3.88%	4.45%	▲ 0.87
17	12,864	\$910.3M	\$944.4M	\$950.4M	3.75%	4.40%	▲ 0.85
18	11,578	\$834.4M	\$864.5M	\$870.7M	3.61%	4.35%	▲ 0.83
19	9,906	\$730.5M	\$757.6M	\$762.0M	3.70%	4.30%	▲ 0.86
20	9,376	\$704.3M	\$728.5M	\$734.3M	3.43%	4.25%	▲ 0.81
21	8,728	\$665.4M	\$688.6M	\$693.4M	3.48%	4.20%	▲ 0.83
22	8,505	\$654.9M	\$678.0M	\$682.1M	3.53%	4.15%	▲ 0.85
23	8,603	\$664.1M	\$685.7M	\$691.4M	3.25%	4.10%	▲ 0.79
24	7,755	\$589.8M	\$610.2M	\$613.7M	3.47%	4.05%	▲ 0.86
25	7,595	\$580.6M	\$599.2M	\$603.9M	3.19%	4.00%	▲ 0.80
26	7,197	\$551.1M	\$567.7M	\$573.1M	3.02%	4.00%	▲ 0.75
27	6,440	\$498.4M	\$514.5M	\$518.3M	3.23%	4.00%	▲ 0.81
28	5,639	\$436.1M	\$449.1M	\$453.5M	3.00%	4.00%	▲ 0.75
29	5,084	\$401.3M	\$414.6M	\$417.4M	3.31%	4.00%	▲ 0.83
30	4,232	\$338.3M	\$349.0M	\$351.8M	3.15%	4.00%	▲ 0.79
31	3,491	\$282.4M	\$291.2M	\$293.7M	3.12%	4.00%	▲ 0.78
32	2,511	\$203.7M	\$210.2M	\$211.8M	3.18%	4.00%	▲ 0.80
33	1,906	\$155.6M	\$160.6M	\$161.8M	3.19%	4.00%	▲ 0.80
34	1,439	\$116.1M	\$119.4M	\$120.7M	2.87%	4.00%	▲ 0.72
Total	505,591	\$33,405.0M	\$35,099.7M	\$35,093.5M	5.07%	5.05%	● 1.00

Service	Exposed	Base Salary	Actual Salary	Expected Salary Proposed	Actual Salary Increase	Proposed Assumption Salary Increase	Act/Exp Proposed Salary Increase
0	12,116	\$612.1M	\$692.1M	\$679.4M	13.08%	11.00%	▲ 1.19
1	41,003	\$2,235.9M	\$2,441.5M	\$2,437.2M	9.19%	9.00%	● 1.02
2	30,683	\$1,760.7M	\$1,902.1M	\$1,892.7M	8.03%	7.50%	● 1.07
3	31,516	\$1,885.4M	\$2,005.8M	\$1,998.5M	6.39%	6.00%	● 1.06
4	27,409	\$1,698.0M	\$1,792.2M	\$1,791.4M	5.54%	5.50%	● 1.01
5	25,402	\$1,599.9M	\$1,685.3M	\$1,679.9M	5.34%	5.00%	● 1.07
6	25,223	\$1,624.5M	\$1,707.2M	\$1,704.1M	5.09%	4.90%	● 1.04
7	23,849	\$1,534.3M	\$1,615.7M	\$1,607.9M	5.31%	4.80%	▲ 1.11
8	22,783	\$1,459.3M	\$1,530.8M	\$1,527.9M	4.90%	4.70%	● 1.04
9	21,972	\$1,427.5M	\$1,494.0M	\$1,493.2M	4.66%	4.60%	● 1.01
10	22,174	\$1,469.7M	\$1,536.2M	\$1,535.8M	4.53%	4.50%	● 1.01
11	20,138	\$1,354.7M	\$1,414.6M	\$1,415.0M	4.43%	4.45%	● 0.99
12	17,812	\$1,220.7M	\$1,273.3M	\$1,274.4M	4.31%	4.40%	● 0.98
13	17,073	\$1,187.1M	\$1,235.7M	\$1,238.8M	4.09%	4.35%	● 0.94
14	15,221	\$1,044.1M	\$1,088.0M	\$1,089.0M	4.20%	4.30%	● 0.98
15	14,598	\$1,009.6M	\$1,050.7M	\$1,052.5M	4.07%	4.25%	● 0.96
16	13,770	\$964.0M	\$1,001.5M	\$1,004.5M	3.88%	4.20%	● 0.92
17	12,864	\$910.3M	\$944.4M	\$948.1M	3.75%	4.15%	● 0.90
18	11,578	\$834.4M	\$864.5M	\$868.6M	3.61%	4.10%	▲ 0.88
19	9,906	\$730.5M	\$757.6M	\$760.1M	3.70%	4.05%	● 0.91
20	9,376	\$704.3M	\$728.5M	\$732.5M	3.43%	4.00%	▲ 0.86
21	8,728	\$665.4M	\$688.6M	\$691.7M	3.48%	3.95%	▲ 0.88
22	8,505	\$654.9M	\$678.0M	\$680.4M	3.53%	3.90%	● 0.90
23	8,603	\$664.1M	\$685.7M	\$689.7M	3.25%	3.85%	▲ 0.84
24	7,755	\$589.8M	\$610.2M	\$612.2M	3.47%	3.80%	● 0.91
25	7,595	\$580.6M	\$599.2M	\$602.4M	3.19%	3.75%	▲ 0.85
26	7,197	\$551.1M	\$567.7M	\$571.8M	3.02%	3.75%	▲ 0.80
27	6,440	\$498.4M	\$514.5M	\$517.0M	3.23%	3.75%	▲ 0.86
28	5,639	\$436.1M	\$449.1M	\$452.4M	3.00%	3.75%	▲ 0.80
29	5,084	\$401.3M	\$414.6M	\$416.4M	3.31%	3.75%	▲ 0.88
30	4,232	\$338.3M	\$349.0M	\$351.0M	3.15%	3.75%	▲ 0.84
31	3,491	\$282.4M	\$291.2M	\$293.0M	3.12%	3.75%	▲ 0.83
32	2,511	\$203.7M	\$210.2M	\$211.3M	3.18%	3.75%	▲ 0.85
33	1,906	\$155.6M	\$160.6M	\$161.4M	3.19%	3.75%	▲ 0.85
34	1,439	\$116.1M	\$119.4M	\$120.4M	2.87%	3.75%	▲ 0.76
Total	505,591	\$33,405.0M	\$35,099.7M	\$35,102.9M	5.07%	5.08%	● 1.00

Exposure Distribution w/ Salary Increase - Actual and Expected; by Service



Salary Increase - Actual, Expected, and Ratio; by Service



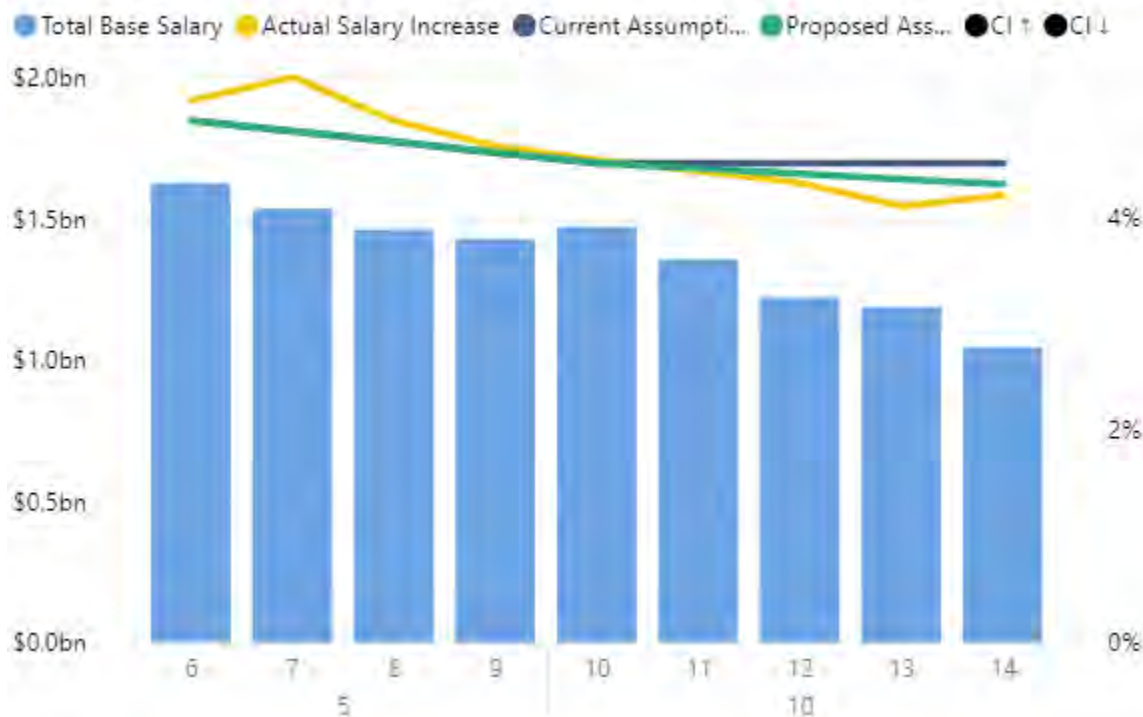
This chart shows the results by service for the service range 0 to 5 years, which increased the assumed rate of salary increases from 6.57% to 7.02% as compared to the actual rate of 7.42%. This resulted in a decrease in the A/E ratio from 1.13 to 1.06 for ages 22 to 59.

Exposure Distribution w/ Salary Increase - Actual and Expected; by Service

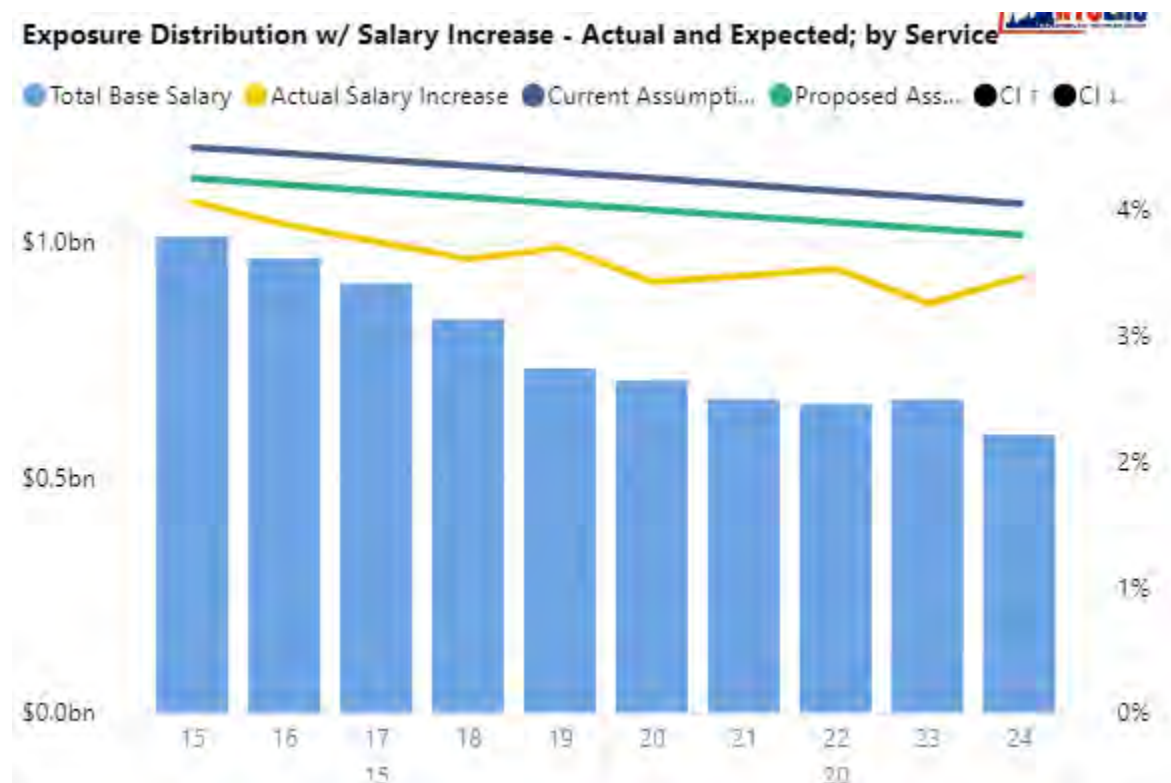


This chart shows the results by year for the service range 6 to 14 years, which decreased the assumed rate of salary increases from 4.63% to 4.58% as compared to the actual rate of 4.66%. This resulted in an increase in the A/E ratio from 1.01 to 1.02 for ages 22 to 59.

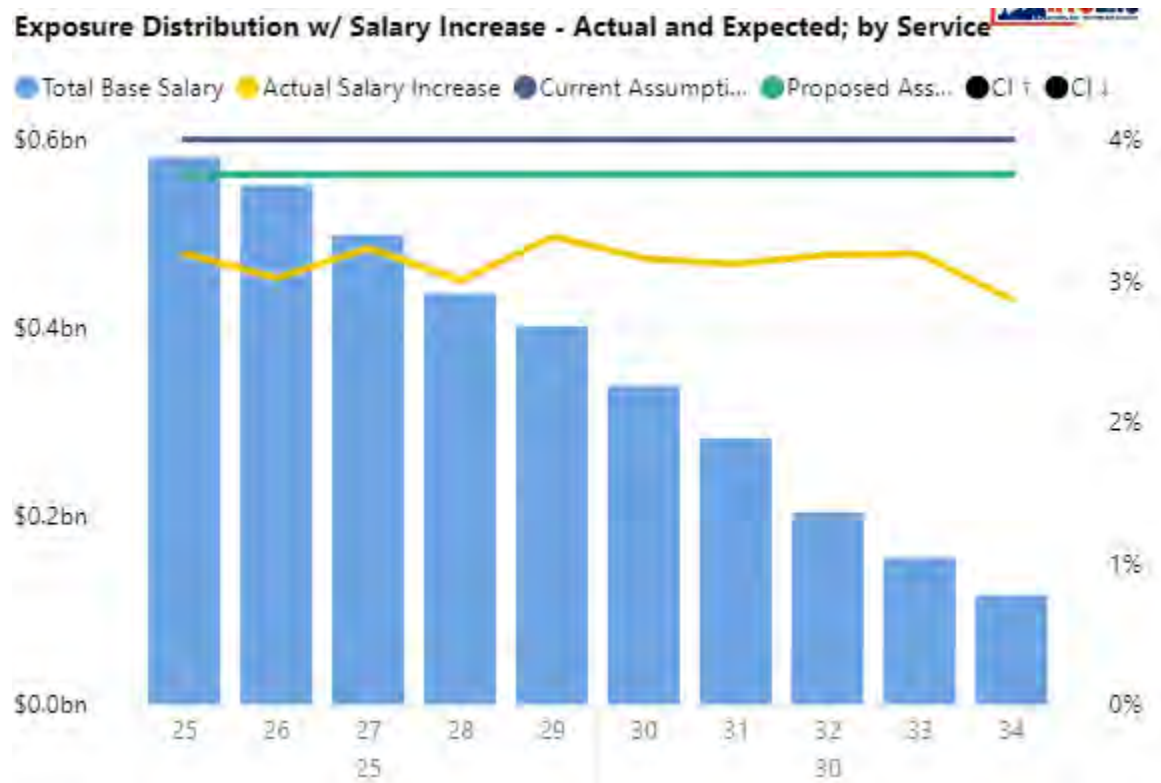
Exposure Distribution w/ Salary Increase - Actual and Expected; by Service



This chart shows the results by service for the service range 15 to 24 years, which decreased the assumed rate of salary increases from 4.30% to 4.05% as compared to the actual rate of 3.65%. This resulted in an increase in the A/E ratio from 0.85 to 0.90 for ages 22 to 59.



This chart shows the results by service for the service range 25 to 34 years, which decreased the assumed rate of salary increases from 4.00% to 3.75% as compared to the actual rate of 3.14%. This resulted in an increase in the A/E ratio from 0.78 to 0.84 for ages 22 to 59.



Summary

In total, the proposed rates of salary increases are higher than the current assumptions, primarily due to higher assumed salary increases during the first few years of employment. Thereafter, slightly lower salary increases are proposed. We would anticipate that this would decrease plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT ASSUMPTION ANNUAL RATES OF MERIT AND SALARY INCREASE		
	GENERAL	
Years of Service	Merit Increase	Salary Increase ¹
0	6.00%	9.00%
1	5.00%	8.00%
2	4.00%	7.00%
3	3.00%	6.00%
4	2.50%	5.50%
5	2.00%	5.00%
6	1.90%	4.90%
7	1.80%	4.80%
8	1.70%	4.70%
9	1.60%	4.60%
10	1.50%	4.50%
11	1.50%	4.50%
12	1.50%	4.50%
13	1.50%	4.50%
14	1.50%	4.50%
15	1.50%	4.50%
16	1.45%	4.45%
17	1.40%	4.40%
18	1.35%	4.35%
19	1.30%	4.30%
20	1.25%	4.25%
21	1.20%	4.20%
22	1.15%	4.15%
23	1.10%	4.10%
24	1.05%	4.05%
25	1.00%	4.00%
26	1.00%	4.00%
27	1.00%	4.00%
28	1.00%	4.00%
29	1.00%	4.00%
30+	1.00%	4.00%

¹ Salary increase is the general wage increase of 3% plus the merit increase

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED ASSUMPTION ANNUAL RATES OF MERIT AND SALARY INCREASE		
	GENERAL	
Years of Service	Merit Increase	Salary Increase ¹
0	8.00%	11.00%
1	6.00%	9.00%
2	4.50%	7.50%
3	3.00%	6.00%
4	2.50%	5.50%
5	2.00%	5.00%
6	1.90%	4.90%
7	1.80%	4.80%
8	1.70%	4.70%
9	1.60%	4.60%
10	1.50%	4.50%
11	1.45%	4.45%
12	1.40%	4.40%
13	1.35%	4.35%
14	1.30%	4.30%
15	1.25%	4.25%
16	1.20%	4.20%
17	1.15%	4.15%
18	1.10%	4.10%
19	1.05%	4.05%
20	1.00%	4.00%
21	0.95%	3.95%
22	0.90%	3.90%
23	0.85%	3.85%
24	0.80%	3.80%
25	0.75%	3.75%
26	0.75%	3.75%
27	0.75%	3.75%
28	0.75%	3.75%
29	0.75%	3.75%
30+	0.75%	3.75%

¹ Salary increase is the general wage increase of 3% plus the merit increase

Overtime

Overtime is considered pensionable earnings in determining a member's final average salary and benefit payable under the plan. OA applies a percentage increase to the member's base salary to account for assumed overtime. The percentage varies by years of service, tier, and whether the individual is expected to retire or become disabled within the next year.

The valuation data contains actual overtime earned during the prior year. For example, overtime contained in the 2019 data is for the year July 1, 2018 to June 30, 2019. We refer to this as 2019 overtime. The rate of overtime is defined as the amount of overtime for the year divided by the average of the member's base salary as of current year and the prior year. Therefore, 2019 overtime percentage is determined based on the average of the base salary as of July 1, 2018 and July 1, 2019.

The overtime percentage is only calculated for members with a status code of A in consecutive years. Members with a LOA status code are excluded.

Separate rates of overtime are applied if the member is expected to retire or become disabled in the following year. These are referred to as Dual Retirement or Dual Disability. We measured the rates of overtime in these situations for members who actually became disabled or retired the following year. For example, a dual overtime percentage applies in 2019 for a member who retired or became disabled in 2020. In the MEST, we developed codes S1 and D1 to identify these situations.

In addition, we also separately measured rates of overtime for those who were two years prior to retirement or disability. For example, we reviewed whether or not the 2019 overtime percentage was higher than otherwise for members who retired in 2021 or lower than otherwise for members who became disabled in 2021. In the MEST, we developed codes S2 and D2 to identify these situations.

These measures allowed us to determine if there was a spike in the amount of overtime just at the time of retirement relative to baseline (all other years). In all situations, we did not find that overtime was higher two years prior for retirement or lower two years prior for disability. For purposes of this report, the experience for members two years prior to retirement or disability is included in the Baseline analysis.

For General, we found that overtime one year prior for retirement was not higher than for members of the same service who did not retire. Therefore, the proposed assumption does not include a separate dual retirement assumption.

The proposed assumption varies by whether the member is in a Basic Plan Group or Specialty Plan Group and if in a physically taxing title or not. Separate assumptions apply for dual disability. Assumptions slightly vary by service and for some groups, the assumed overtime percentage decreases as service increases.

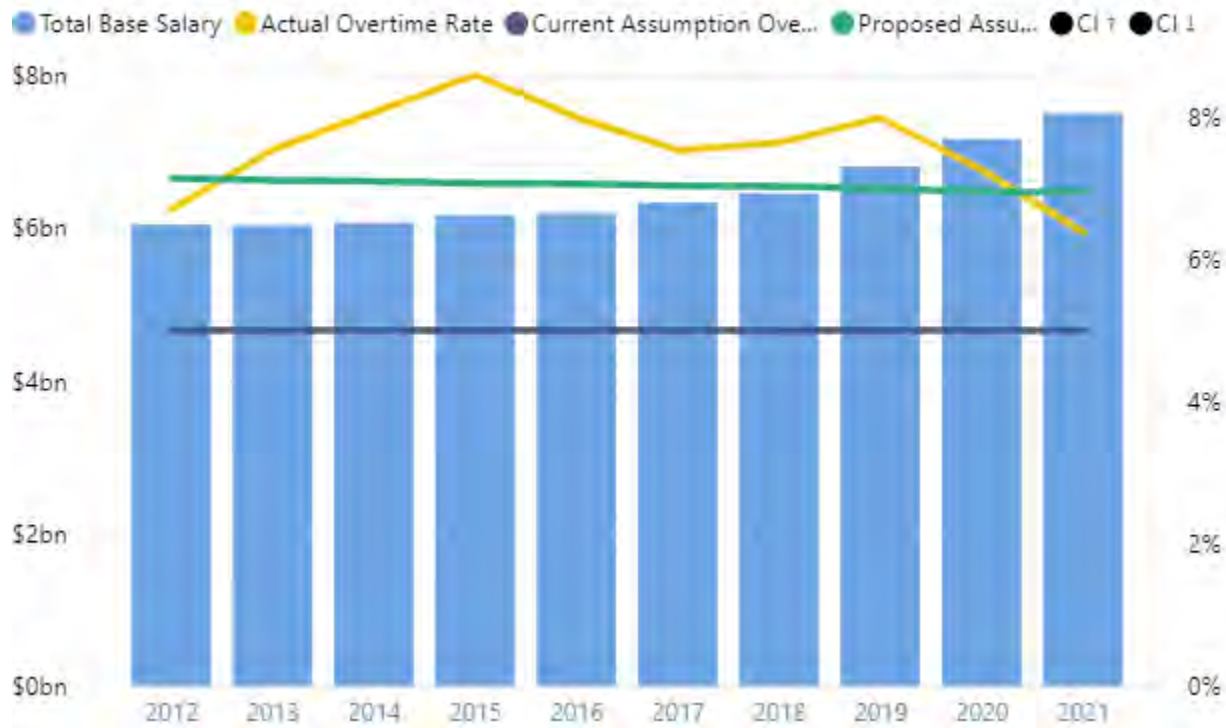
The current assumption does not vary by any other element as it is set at 5.00% for all members.

The following charts show the experience for overtime percentage by year, for the age range (22 to 69), and for the service range (0 to 34) from 2012 to 2021. The actual overtime percentage for all types of overtime averaged 7.54% for all members whereas the overall expected overtime percentage averaged 5.00% based on the current assumptions and 7.04% based on the proposed assumptions.

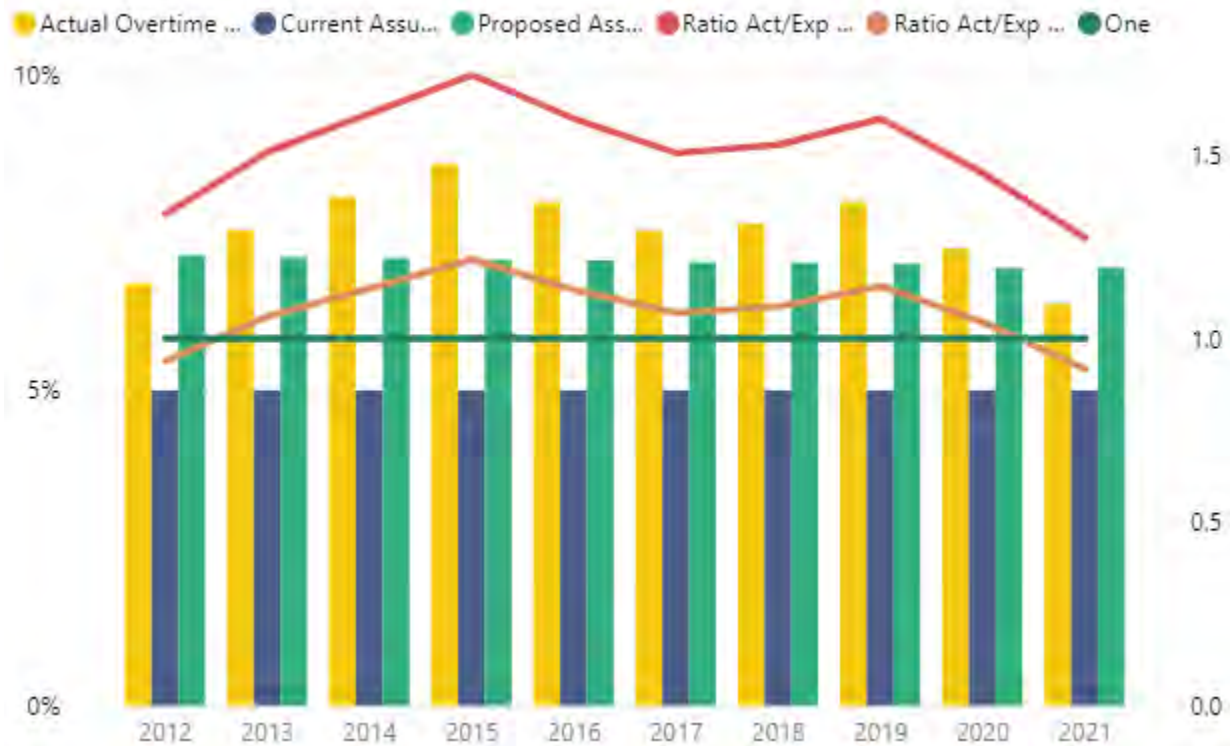
Plan Year	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
2012	107,149	\$6,051.5M	\$405.3M	\$302.6M	6.70%	5.00%	▲ 1.34
2013	108,946	\$6,093.8M	\$459.6M	\$304.7M	7.54%	5.00%	◆ 1.51
2014	108,909	\$6,192.7M	\$499.4M	\$309.6M	8.07%	5.00%	◆ 1.61
2015	107,822	\$6,260.2M	\$537.6M	\$313.0M	8.59%	5.00%	◆ 1.72
2016	107,184	\$6,338.7M	\$506.6M	\$316.9M	7.99%	5.00%	◆ 1.60
2017	106,154	\$6,481.3M	\$487.7M	\$324.1M	7.53%	5.00%	◆ 1.51
2018	104,728	\$6,612.5M	\$505.1M	\$330.6M	7.64%	5.00%	◆ 1.53
2019	106,066	\$6,968.7M	\$557.1M	\$348.4M	7.99%	5.00%	◆ 1.60
2020	108,151	\$7,337.1M	\$531.7M	\$366.9M	7.25%	5.00%	▲ 1.45
2021	110,501	\$7,611.7M	\$484.9M	\$380.6M	6.37%	5.00%	▲ 1.27
Total	1,075,610	\$65,948.0M	\$4,975.0M	\$3,297.4M	7.54%	5.00%	◆ 1.51

Plan Year	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Ratio Act/Exp Proposed Overtime Rate
2012	107,149	\$6,051.5M	\$405.3M	\$431.9M	6.70%	7.14%	● 0.94
2013	108,946	\$6,093.8M	\$459.6M	\$433.4M	7.54%	7.11%	● 1.06
2014	108,909	\$6,192.7M	\$499.4M	\$439.6M	8.07%	7.10%	▲ 1.14
2015	107,822	\$6,260.2M	\$537.6M	\$442.3M	8.59%	7.07%	▲ 1.22
2016	107,184	\$6,338.7M	\$506.6M	\$447.5M	7.99%	7.06%	▲ 1.13
2017	106,154	\$6,481.3M	\$487.7M	\$455.9M	7.53%	7.03%	● 1.07
2018	104,728	\$6,612.5M	\$505.1M	\$464.5M	7.64%	7.02%	● 1.09
2019	106,066	\$6,968.7M	\$557.1M	\$487.7M	7.99%	7.00%	▲ 1.14
2020	108,151	\$7,337.1M	\$531.7M	\$509.1M	7.25%	6.94%	● 1.04
2021	110,501	\$7,611.7M	\$484.9M	\$528.8M	6.37%	6.95%	● 0.92
Total	1,075,610	\$65,948.0M	\$4,975.0M	\$4,640.7M	7.54%	7.04%	● 1.07

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Year



Overtime Assumption - Actual, Expected, and Ratio; by Year



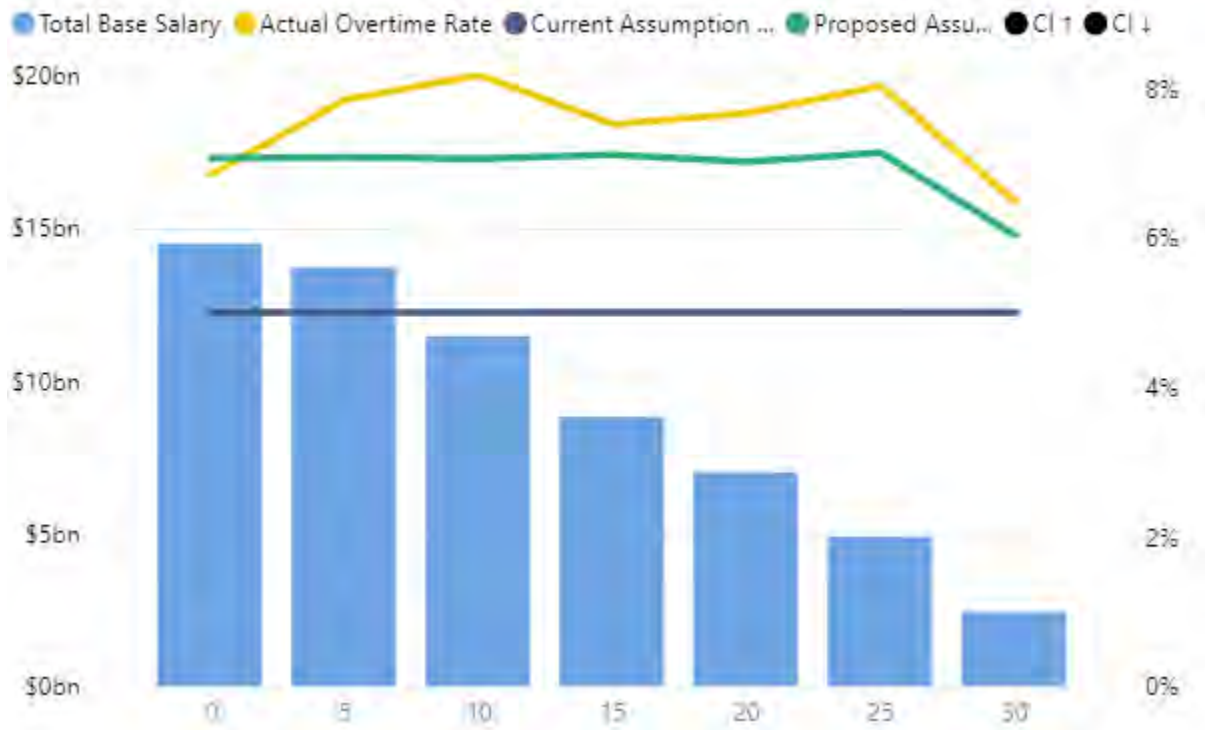
Baseline

The following charts show the experience for Baseline overtime percentage by service, for the age range (22 to 69), and for the service range (0 to 34) from 2012 to 2021. The actual Baseline overtime percentage averaged 7.57% whereas the overall expected overtime percentage averaged 5.00% based on the current assumptions and 7.03% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.51 to 1.08.

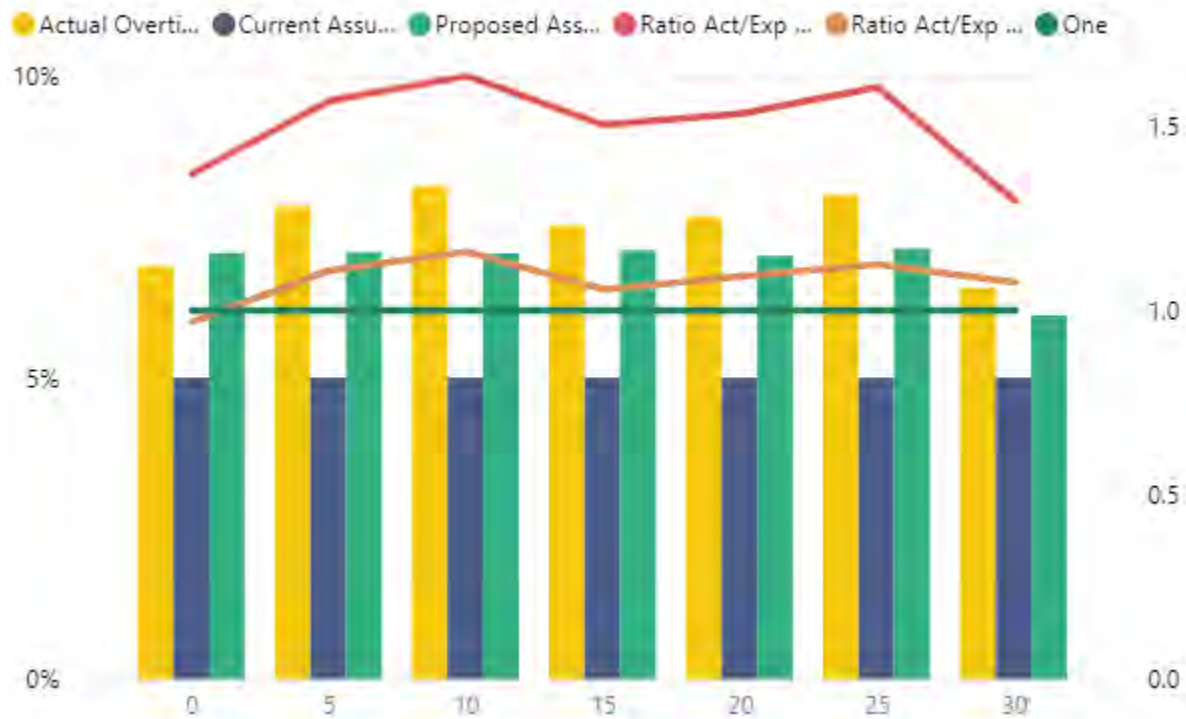
Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
0	25,808	\$1,253.0M	\$83.5M	\$62.6M	6.67%	5.00%	▲ 1.33
1	73,813	\$3,822.6M	\$254.2M	\$191.1M	6.65%	5.00%	▲ 1.33
2	64,369	\$3,482.7M	\$232.9M	\$174.1M	6.69%	5.00%	▲ 1.34
3	58,793	\$3,244.5M	\$225.6M	\$162.2M	6.95%	5.00%	▲ 1.39
4	55,869	\$3,141.6M	\$227.9M	\$157.1M	7.25%	5.00%	▲ 1.45
5	51,951	\$2,952.3M	\$222.9M	\$147.6M	7.55%	5.00%	◆ 1.51
6	51,592	\$2,979.7M	\$230.6M	\$149.0M	7.74%	5.00%	◆ 1.55
7	47,790	\$2,793.7M	\$220.2M	\$139.7M	7.88%	5.00%	◆ 1.58
8	45,525	\$2,698.2M	\$215.2M	\$134.9M	7.98%	5.00%	◆ 1.60
9	42,483	\$2,541.7M	\$207.1M	\$127.1M	8.15%	5.00%	◆ 1.63
10	42,018	\$2,545.8M	\$207.6M	\$127.3M	8.16%	5.00%	◆ 1.63
11	40,235	\$2,476.6M	\$202.4M	\$123.8M	8.17%	5.00%	◆ 1.63
12	37,567	\$2,330.8M	\$193.5M	\$116.5M	8.30%	5.00%	◆ 1.66
13	35,633	\$2,248.3M	\$184.1M	\$112.4M	8.19%	5.00%	◆ 1.64
14	32,068	\$2,035.8M	\$164.4M	\$101.8M	8.08%	5.00%	◆ 1.62
15	29,386	\$1,892.6M	\$149.3M	\$94.6M	7.89%	5.00%	◆ 1.58
16	28,160	\$1,846.6M	\$141.6M	\$92.3M	7.67%	5.00%	◆ 1.53
17	26,752	\$1,780.2M	\$132.0M	\$89.0M	7.42%	5.00%	▲ 1.48
18	25,988	\$1,756.1M	\$129.0M	\$87.8M	7.35%	5.00%	▲ 1.47
19	24,438	\$1,665.1M	\$120.3M	\$83.3M	7.22%	5.00%	▲ 1.44
20	22,490	\$1,544.6M	\$112.1M	\$77.2M	7.25%	5.00%	▲ 1.45
21	21,504	\$1,485.1M	\$110.5M	\$74.3M	7.44%	5.00%	▲ 1.49
22	20,505	\$1,420.9M	\$108.2M	\$71.0M	7.61%	5.00%	◆ 1.52
23	19,624	\$1,369.5M	\$109.2M	\$68.5M	7.97%	5.00%	◆ 1.59
24	18,222	\$1,273.7M	\$104.1M	\$63.7M	8.18%	5.00%	◆ 1.64
25	17,244	\$1,209.2M	\$99.5M	\$60.5M	8.23%	5.00%	◆ 1.65
26	15,730	\$1,108.7M	\$89.6M	\$55.4M	8.09%	5.00%	◆ 1.62
27	14,146	\$1,010.9M	\$81.3M	\$50.5M	8.04%	5.00%	◆ 1.61
28	12,080	\$866.9M	\$69.9M	\$43.3M	8.06%	5.00%	◆ 1.61
29	10,475	\$752.3M	\$57.0M	\$37.6M	7.57%	5.00%	◆ 1.51
30	9,451	\$684.3M	\$48.2M	\$34.2M	7.04%	5.00%	▲ 1.41
31	8,305	\$598.5M	\$39.6M	\$29.9M	6.61%	5.00%	▲ 1.32
32	6,738	\$487.5M	\$30.6M	\$24.4M	6.28%	5.00%	▲ 1.26
33	5,216	\$379.6M	\$23.0M	\$19.0M	6.06%	5.00%	▲ 1.21
34	3,963	\$290.9M	\$17.1M	\$14.5M	5.87%	5.00%	▲ 1.17
Total	1,045,931	\$63,970.5M	\$4,844.2M	\$3,198.5M	7.57%	5.00%	◆ 1.51

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
0	25,808	\$1,253.0M	\$83.5M	\$87.7M	6.67%	7.00%	0.95
1	73,813	\$3,622.6M	\$254.2M	\$268.0M	6.65%	7.01%	0.95
2	64,369	\$3,482.7M	\$232.9M	\$244.9M	6.69%	7.03%	0.95
3	58,793	\$3,244.5M	\$225.6M	\$231.4M	6.95%	7.13%	0.97
4	55,869	\$3,141.6M	\$227.9M	\$223.9M	7.25%	7.13%	1.02
5	51,951	\$2,952.3M	\$222.9M	\$210.1M	7.55%	7.12%	1.06
6	51,592	\$2,979.7M	\$230.6M	\$211.5M	7.74%	7.10%	1.09
7	47,790	\$2,793.7M	\$220.2M	\$198.0M	7.88%	7.09%	1.11
8	45,525	\$2,698.2M	\$215.2M	\$190.1M	7.98%	7.05%	1.13
9	42,483	\$2,541.7M	\$207.1M	\$178.8M	8.15%	7.04%	1.16
10	42,018	\$2,545.8M	\$207.6M	\$178.9M	8.16%	7.03%	1.16
11	40,235	\$2,476.6M	\$202.4M	\$174.5M	8.17%	7.05%	1.16
12	37,567	\$2,330.8M	\$193.5M	\$164.7M	8.30%	7.07%	1.17
13	35,633	\$2,248.3M	\$184.1M	\$159.1M	8.19%	7.07%	1.16
14	32,068	\$2,035.8M	\$164.4M	\$144.0M	8.08%	7.07%	1.14
15	29,386	\$1,892.6M	\$149.3M	\$133.4M	7.89%	7.05%	1.12
16	28,160	\$1,846.6M	\$141.6M	\$130.9M	7.67%	7.09%	1.08
17	26,752	\$1,780.2M	\$132.0M	\$126.9M	7.42%	7.13%	1.04
18	25,988	\$1,756.1M	\$129.0M	\$125.6M	7.35%	7.15%	1.03
19	24,438	\$1,665.1M	\$120.3M	\$119.1M	7.22%	7.15%	1.01
20	22,490	\$1,544.6M	\$112.1M	\$105.7M	7.25%	6.84%	1.06
21	21,504	\$1,485.1M	\$110.5M	\$103.7M	7.44%	6.98%	1.07
22	20,505	\$1,420.9M	\$108.2M	\$100.3M	7.61%	7.06%	1.08
23	19,624	\$1,369.5M	\$109.2M	\$97.1M	7.97%	7.09%	1.12
24	18,222	\$1,273.7M	\$104.1M	\$91.0M	8.18%	7.15%	1.14
25	17,244	\$1,209.2M	\$99.5M	\$86.2M	8.23%	7.12%	1.16
26	15,730	\$1,108.7M	\$89.6M	\$79.4M	8.09%	7.16%	1.13
27	14,146	\$1,010.9M	\$81.3M	\$72.6M	8.04%	7.18%	1.12
28	12,080	\$866.9M	\$69.9M	\$62.0M	8.06%	7.16%	1.13
29	10,475	\$752.3M	\$57.0M	\$53.1M	7.57%	7.06%	1.07
30	9,451	\$684.3M	\$48.2M	\$42.1M	7.04%	6.15%	1.15
31	8,305	\$598.5M	\$39.6M	\$35.9M	6.61%	5.99%	1.10
32	6,738	\$487.5M	\$30.6M	\$29.5M	6.28%	6.05%	1.04
33	5,216	\$379.6M	\$23.0M	\$22.6M	6.06%	5.95%	1.02
34	3,963	\$290.9M	\$17.1M	\$17.2M	5.87%	5.92%	0.99
Total	1,045,931	\$63,970.5M	\$4,844.2M	\$4,499.9M	7.57%	7.03%	1.08

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service

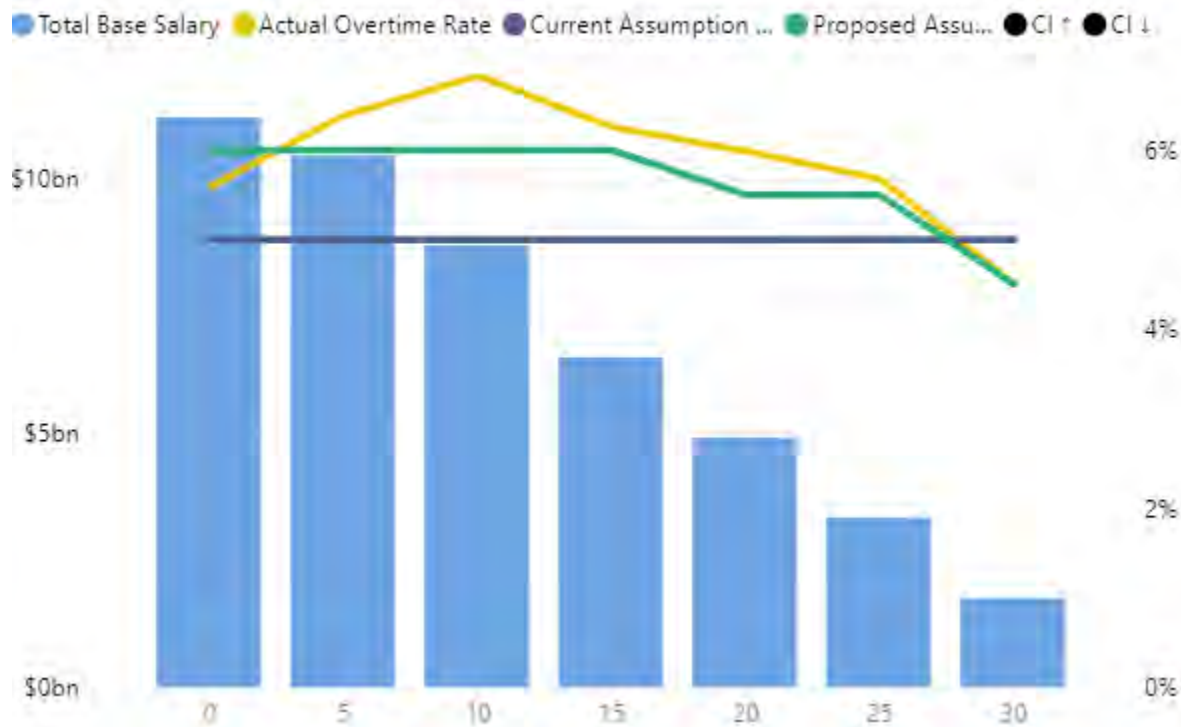


Overtime Assumption - Actual, Expected, and Ratio; by Service

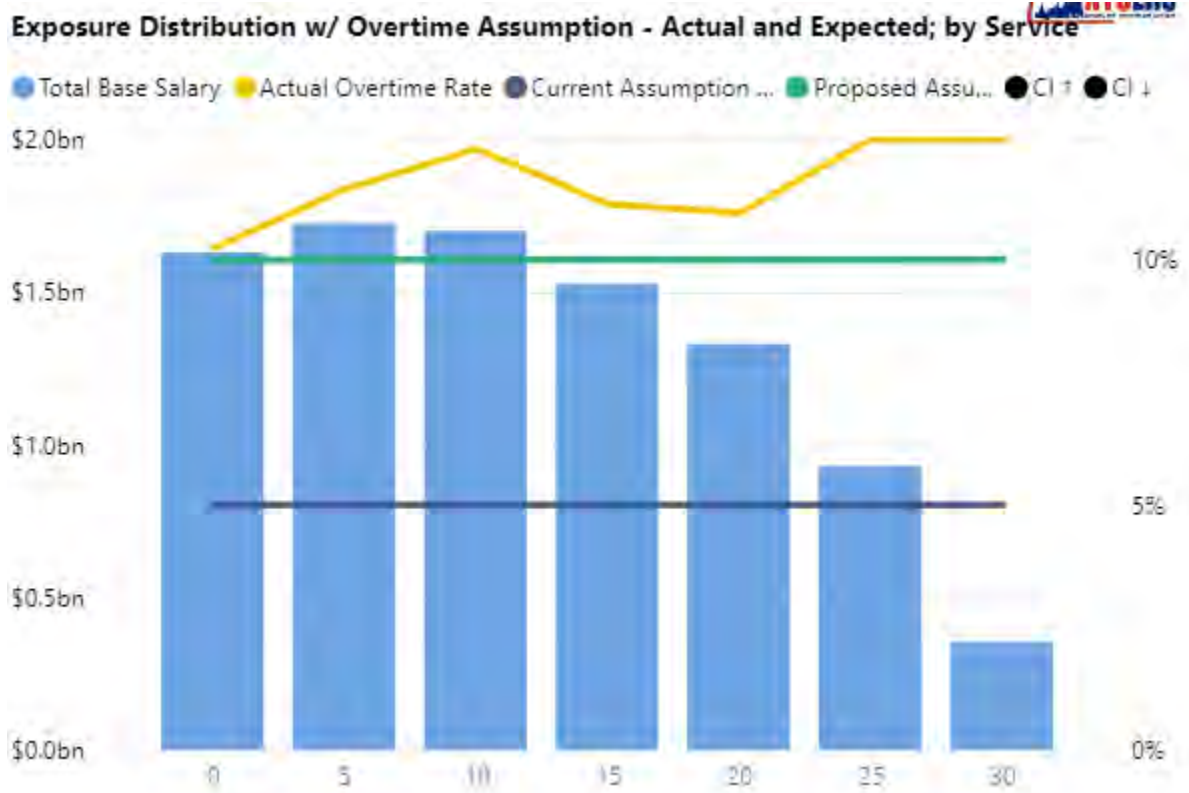


This chart shows the experience of Basic Group members not in physically taxing titles for Baseline overtime percentage by service for the service range 0 to 34 years, where the assumed overtime percentage increased from 5.00% to 5.86% as compared to the actual rate of 6.10%. This resulted in a decrease in the A/E ratio from 1.22 to 1.04 for ages 22 to 69.

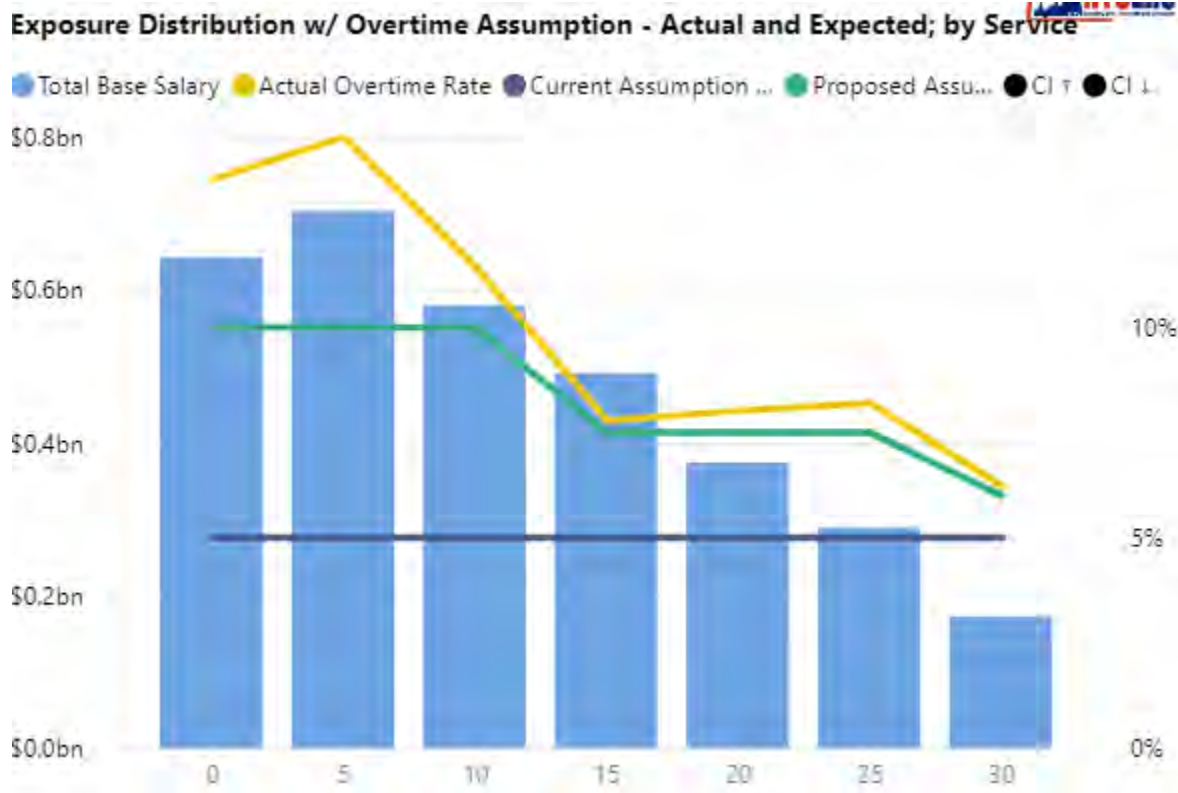
Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



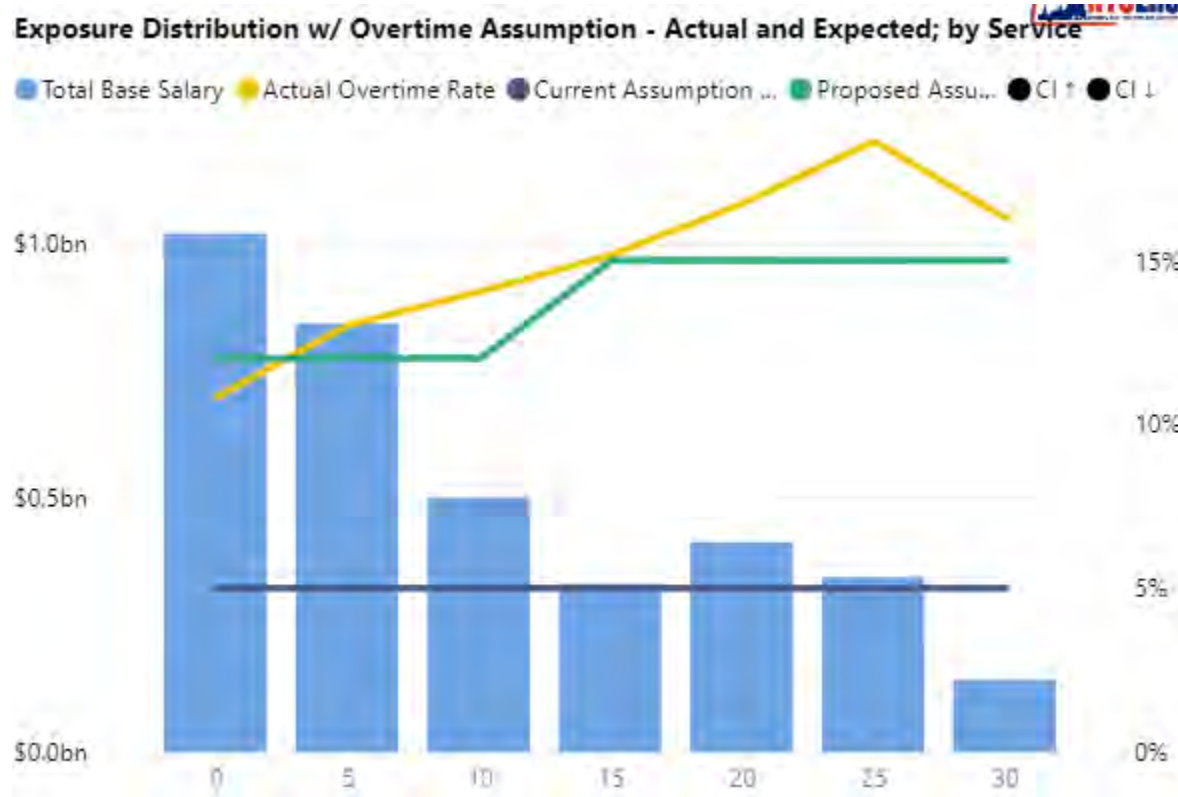
This chart shows the experience of Basic Group members in physically taxing titles for Baseline overtime percentage by service for the service range 0 to 34 years, where the assumed overtime percentage increased from 5.00% to 10.00% as compared to the actual rate of 11.39%. This resulted in a decrease in the A/E ratio from 2.28 to 1.14 for ages 22 to 69.



This chart shows the experience of Specialty Group members not in physically taxing titles for Baseline overtime percentage by service for the service range 0 to 34 years, where the assumed overtime percentage increased from 5.00% to 8.91% as compared to the actual rate of 11.03%. This resulted in a decrease in the A/E ratio from 2.21 to 1.24 for ages 22 to 69.



This chart shows the experience of Specialty Group members in physically taxing titles for Baseline overtime percentage by service for the service range 0 to 34 years, where the assumed overtime percentage increased from 5.00% to 13.01% as compared to the actual rate of 13.80%. This resulted in a decrease in the A/E ratio from 2.76 to 1.06 for ages 22 to 69.



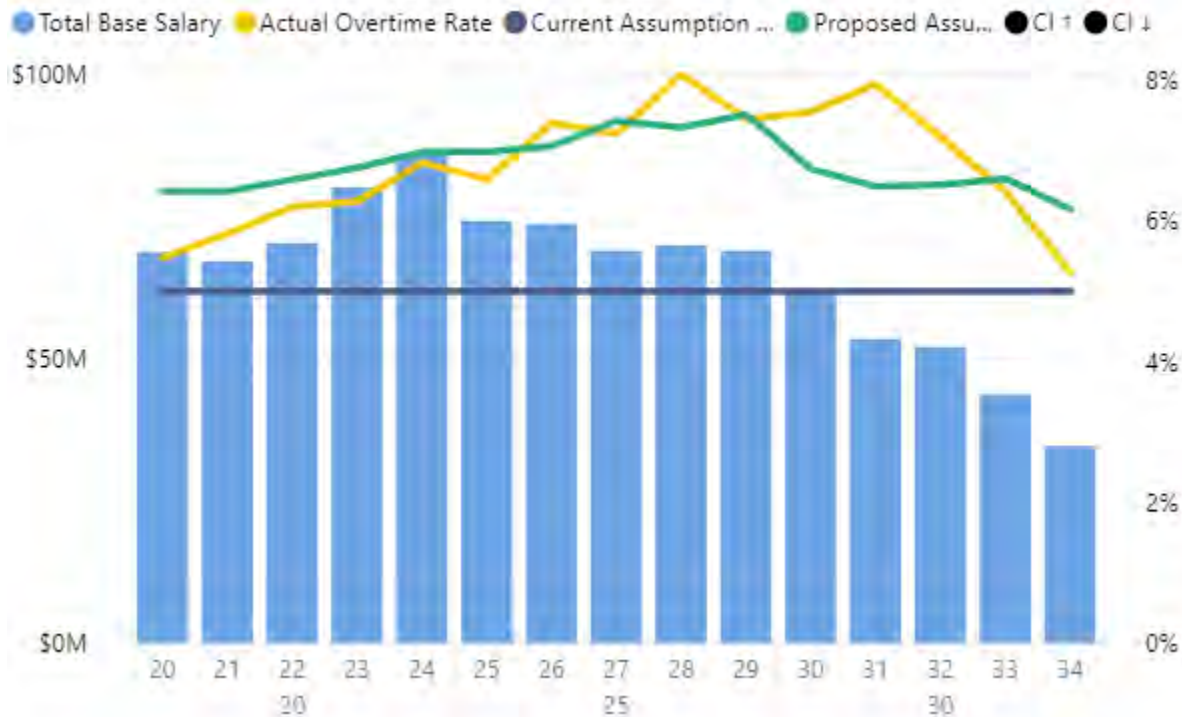
Dual Retirement

The following charts show the experience for Dual Retirement overtime percentage by service, for the age range (55 to 69), and for the service range (20 to 34) from 2012 to 2020. The actual Dual Retirement overtime percentage averaged 6.82% as compared to Baseline overtime percentage of 7.16% based on the same parameters. Since these percentages were similar, we propose to use the Baseline assumption for Dual Retirement, which varies by plan group and physically taxing title. This resulted in a decrease in the A/E ratio from 1.36 to 1.00.

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
20	998	\$69.3M	\$3.8M	\$3.5M	5.48%	5.00%	1.10
21	994	\$67.7M	\$3.9M	\$3.4M	5.82%	5.00%	1.16
22	1,029	\$70.9M	\$4.4M	\$3.5M	6.20%	5.00%	1.24
23	1,153	\$81.0M	\$5.1M	\$4.0M	6.28%	5.00%	1.26
24	1,256	\$86.8M	\$5.9M	\$4.3M	6.83%	5.00%	1.37
25	1,072	\$74.9M	\$4.9M	\$3.7M	6.59%	5.00%	1.32
26	1,070	\$74.3M	\$5.5M	\$3.7M	7.40%	5.00%	1.48
27	991	\$69.7M	\$5.0M	\$3.5M	7.24%	5.00%	1.45
28	996	\$70.7M	\$5.7M	\$3.5M	8.09%	5.00%	1.62
29	973	\$69.6M	\$5.2M	\$3.5M	7.45%	5.00%	1.49
30	875	\$62.1M	\$4.7M	\$3.1M	7.55%	5.00%	1.51
31	765	\$54.0M	\$4.3M	\$2.7M	7.95%	5.00%	1.59
32	731	\$52.6M	\$3.8M	\$2.6M	7.19%	5.00%	1.44
33	605	\$44.1M	\$2.8M	\$2.2M	6.42%	5.00%	1.28
34	480	\$35.0M	\$1.8M	\$1.7M	5.27%	5.00%	1.05
Total	13,988	\$982.6M	\$67.0M	\$49.1M	6.82%	5.00%	1.36

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
20	998	\$69.3M	\$3.8M	\$4.5M	5.48%	6.42%	0.85
21	994	\$67.7M	\$3.9M	\$4.3M	5.82%	6.42%	0.91
22	1,029	\$70.9M	\$4.4M	\$4.7M	6.20%	6.59%	0.94
23	1,153	\$81.0M	\$5.1M	\$5.5M	6.28%	6.76%	0.93
24	1,256	\$86.8M	\$5.9M	\$6.1M	6.83%	6.98%	0.98
25	1,072	\$74.9M	\$4.9M	\$5.2M	6.59%	6.98%	0.94
26	1,070	\$74.3M	\$5.5M	\$5.2M	7.40%	7.07%	1.05
27	991	\$69.7M	\$5.0M	\$5.2M	7.24%	7.42%	0.98
28	996	\$70.7M	\$5.7M	\$5.2M	8.09%	7.34%	1.10
29	973	\$69.6M	\$5.2M	\$5.2M	7.45%	7.51%	0.99
30	875	\$62.1M	\$4.7M	\$4.2M	7.55%	6.74%	1.12
31	765	\$54.0M	\$4.3M	\$3.5M	7.95%	6.49%	1.22
32	731	\$52.6M	\$3.8M	\$3.4M	7.19%	6.51%	1.10
33	605	\$44.1M	\$2.8M	\$2.9M	6.42%	6.60%	0.97
34	480	\$35.0M	\$1.8M	\$2.2M	5.27%	6.17%	0.85
Total	13,988	\$982.6M	\$67.0M	\$67.2M	6.82%	6.84%	1.00

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



Overtime Assumption - Actual, Expected, and Ratio; by Service



Dual Disability

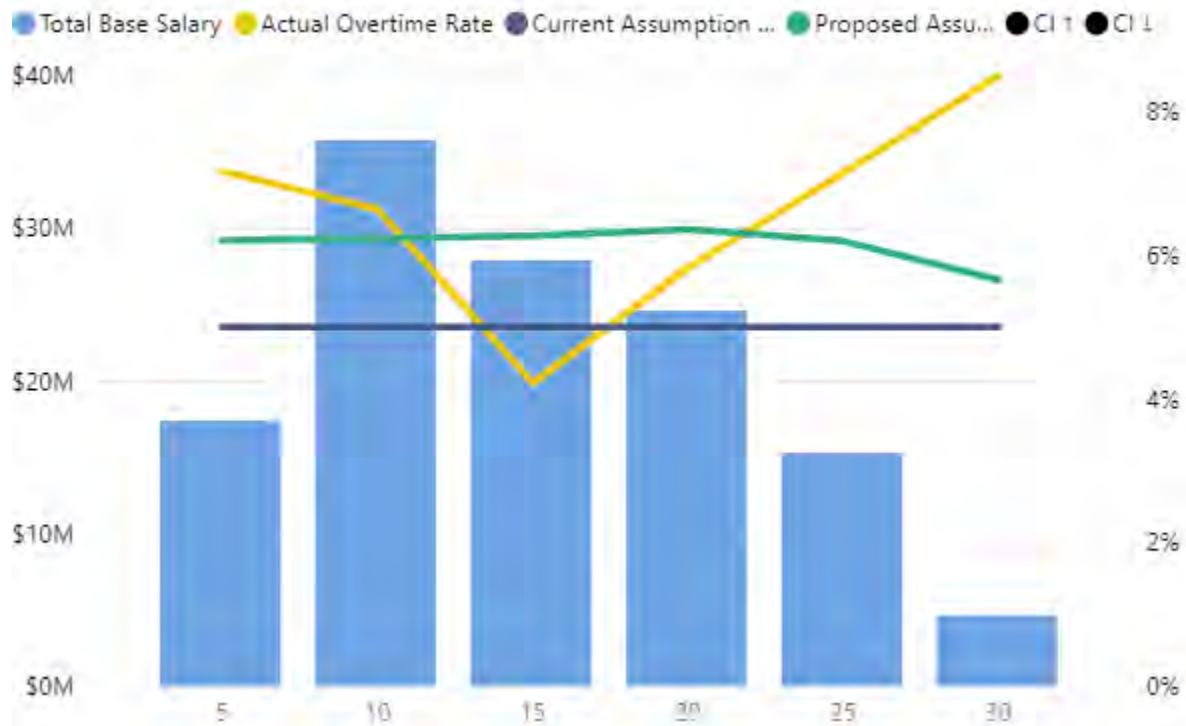
The current assumption for Dual Disability is 75% of the Baseline assumption. The proposed assumption is set to 60% to 80% of the proposed Baseline rates depending on plan group and physically taxing title.

The following charts show the experience for Dual Disability overtime percentage by service, for the age range (22 to 69), and for the service range (5 to 34) from 2012 to 2020. The actual Dual Disability overtime percentage averaged 6.15% whereas the overall expected overtime percentage averaged 5.00% based on the current assumptions and 6.24% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.23 to 0.99.

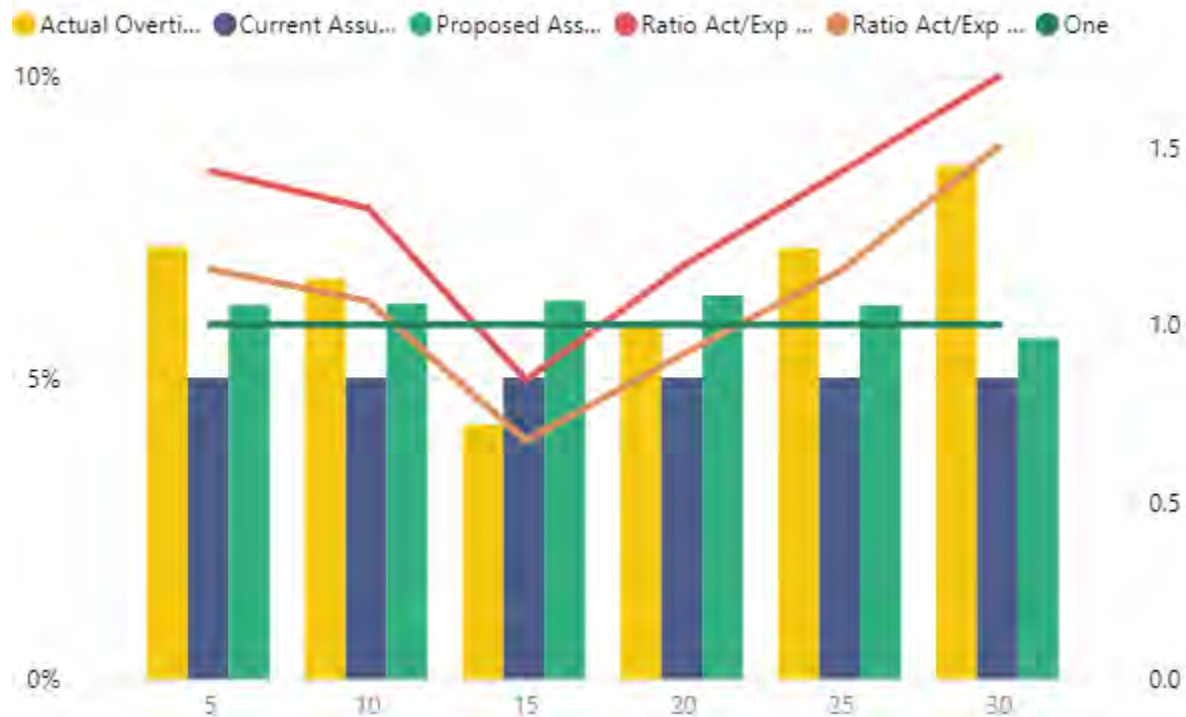
Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
5	26	\$1.4M	\$0.0M	\$0.1M	3.43%	5.00%	▲ 0.69
6	42	\$2.3M	\$0.2M	\$0.1M	9.63%	5.00%	◆ 1.93
7	41	\$2.2M	\$0.2M	\$0.1M	6.80%	5.00%	▲ 1.36
8	81	\$4.4M	\$0.2M	\$0.2M	5.30%	5.00%	● 1.06
9	138	\$7.2M	\$0.6M	\$0.4M	8.35%	5.00%	◆ 1.67
10	115	\$5.9M	\$0.4M	\$0.3M	5.99%	5.00%	▲ 1.20
11	153	\$8.6M	\$0.5M	\$0.4M	5.86%	5.00%	▲ 1.17
12	141	\$7.5M	\$0.5M	\$0.4M	7.00%	5.00%	▲ 1.40
13	134	\$7.3M	\$0.6M	\$0.4M	8.18%	5.00%	◆ 1.64
14	122	\$6.8M	\$0.4M	\$0.3M	6.16%	5.00%	▲ 1.23
15	97	\$5.3M	\$0.2M	\$0.3M	4.24%	5.00%	▲ 0.85
16	107	\$6.0M	\$0.3M	\$0.3M	4.17%	5.00%	▲ 0.83
17	96	\$5.6M	\$0.2M	\$0.3M	3.89%	5.00%	▲ 0.78
18	88	\$5.2M	\$0.2M	\$0.3M	3.67%	5.00%	▲ 0.73
19	100	\$5.9M	\$0.3M	\$0.3M	5.05%	5.00%	● 1.01
20	89	\$5.4M	\$0.4M	\$0.3M	7.41%	5.00%	▲ 1.48
21	76	\$4.5M	\$0.2M	\$0.2M	3.37%	5.00%	▲ 0.67
22	88	\$5.2M	\$0.3M	\$0.3M	5.70%	5.00%	▲ 1.14
23	69	\$4.2M	\$0.1M	\$0.2M	3.52%	5.00%	▲ 0.70
24	79	\$5.3M	\$0.4M	\$0.3M	8.27%	5.00%	◆ 1.65
25	62	\$3.8M	\$0.4M	\$0.2M	10.30%	5.00%	◆ 2.06
26	55	\$3.4M	\$0.2M	\$0.2M	5.49%	5.00%	● 1.10
27	45	\$2.7M	\$0.1M	\$0.1M	3.26%	5.00%	▲ 0.65
28	38	\$2.6M	\$0.2M	\$0.1M	9.07%	5.00%	◆ 1.81
29	40	\$2.7M	\$0.2M	\$0.1M	6.84%	5.00%	▲ 1.37
30	26	\$1.7M	\$0.2M	\$0.1M	9.32%	5.00%	◆ 1.86
31	22	\$1.4M	\$0.1M	\$0.1M	9.82%	5.00%	◆ 1.96
32	11	\$0.8M	\$0.1M	\$0.0M	10.67%	5.00%	◆ 2.13
33	6	\$0.4M	\$0.0M	\$0.0M	2.71%	5.00%	▲ 0.54
34	5	\$0.3M	\$0.0M	\$0.0M	0.58%	5.00%	◆ 0.12
Total	2,192	\$126.1M	\$7.8M	\$6.3M	6.15%	5.00%	▲ 1.23

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
5	26	\$1.4M	\$0.0M	\$0.1M	3.43%	6.02%	▲ 0.57
6	42	\$2.3M	\$0.2M	\$0.1M	9.63%	6.46%	▲ 1.49
7	41	\$2.2M	\$0.2M	\$0.1M	6.80%	5.97%	▲ 1.14
8	81	\$4.4M	\$0.2M	\$0.3M	5.30%	6.44%	▲ 0.82
9	138	\$7.2M	\$0.6M	\$0.4M	8.35%	6.06%	▲ 1.37
10	115	\$5.9M	\$0.4M	\$0.4M	5.99%	6.13%	● 0.98
11	153	\$8.6M	\$0.5M	\$0.5M	5.86%	6.26%	● 0.93
12	141	\$7.5M	\$0.5M	\$0.5M	7.00%	6.12%	▲ 1.14
13	134	\$7.3M	\$0.6M	\$0.5M	8.18%	6.17%	▲ 1.33
14	122	\$6.8M	\$0.4M	\$0.4M	6.16%	6.44%	● 0.96
15	97	\$5.3M	\$0.2M	\$0.3M	4.24%	6.05%	▲ 0.70
16	107	\$6.0M	\$0.3M	\$0.4M	4.17%	6.13%	▲ 0.68
17	96	\$5.6M	\$0.2M	\$0.3M	3.89%	6.27%	▲ 0.62
18	88	\$5.2M	\$0.2M	\$0.3M	3.67%	6.31%	▲ 0.58
19	100	\$5.9M	\$0.3M	\$0.4M	5.05%	6.56%	▲ 0.77
20	89	\$5.4M	\$0.4M	\$0.4M	7.41%	6.50%	▲ 1.14
21	76	\$4.5M	\$0.2M	\$0.3M	3.37%	6.22%	▲ 0.54
22	88	\$5.2M	\$0.3M	\$0.3M	5.70%	6.43%	▲ 0.89
23	69	\$4.2M	\$0.1M	\$0.3M	3.52%	6.17%	▲ 0.57
24	79	\$5.3M	\$0.4M	\$0.3M	8.27%	6.43%	▲ 1.29
25	62	\$3.8M	\$0.4M	\$0.3M	10.30%	6.57%	◆ 1.57
26	55	\$3.4M	\$0.2M	\$0.2M	5.49%	6.39%	▲ 0.86
27	45	\$2.7M	\$0.1M	\$0.2M	3.26%	5.67%	▲ 0.58
28	38	\$2.6M	\$0.2M	\$0.2M	9.07%	6.26%	▲ 1.45
29	40	\$2.7M	\$0.2M	\$0.2M	6.84%	5.91%	▲ 1.16
30	26	\$1.7M	\$0.2M	\$0.1M	9.32%	6.25%	▲ 1.49
31	22	\$1.4M	\$0.1M	\$0.1M	9.82%	5.92%	◆ 1.66
32	11	\$0.8M	\$0.1M	\$0.0M	10.67%	5.55%	◆ 1.92
33	6	\$0.4M	\$0.0M	\$0.0M	2.71%	3.50%	▲ 0.78
34	5	\$0.3M	\$0.0M	\$0.0M	0.56%	4.19%	◆ 0.14
Total	2,192	\$126.1M	\$7.8M	\$7.9M	6.15%	6.24%	● 0.99

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



Overtime Assumption - Actual, Expected, and Ratio; by Service



Summary

In total, the proposed overtime percentages are anticipated to increase a member's anticipated pensionable earnings under the plan, which would increase plan liabilities. It would also increase the assumed amount of employee contributions received, which would partially offset the increase in the employer's portion of the normal cost.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT ASSUMPTION OVERTIME AS A PERCENTAGE OF BASE PAY	
	GENERAL
Years of Service	All
0	5.00%
1	5.00%
2	5.00%
3	5.00%
4	5.00%
5	5.00%
6	5.00%
7	5.00%
8	5.00%
9	5.00%
10	5.00%
11	5.00%
12	5.00%
13	5.00%
14	5.00%
15	5.00%
16	5.00%
17	5.00%
18	5.00%
19	5.00%
20	5.00%
21	5.00%
22	5.00%
23	5.00%
24	5.00%
25	5.00%
26	5.00%
27	5.00%
28	5.00%
29	5.00%
30+	5.00%

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED ASSUMPTION OVERTIME AS A PERCENTAGE OF BASE PAY				
	General			
	Basic Group ¹ Members			
Years of Service	Not Physically Taxing Baseline and Dual Retirement ³	Not Physically Taxing Dual Disability ⁴	Physically Taxing Baseline and Dual Retirement ³	Physically Taxing Dual Disability ⁴
0	6.00%	5.00%	10.00%	8.00%
1	6.00%	5.00%	10.00%	8.00%
2	6.00%	5.00%	10.00%	8.00%
3	6.00%	5.00%	10.00%	8.00%
4	6.00%	5.00%	10.00%	8.00%
5	6.00%	5.00%	10.00%	8.00%
6	6.00%	5.00%	10.00%	8.00%
7	6.00%	5.00%	10.00%	8.00%
8	6.00%	5.00%	10.00%	8.00%
9	6.00%	5.00%	10.00%	8.00%
10	6.00%	5.00%	10.00%	8.00%
11	6.00%	5.00%	10.00%	8.00%
12	6.00%	5.00%	10.00%	8.00%
13	6.00%	5.00%	10.00%	8.00%
14	6.00%	5.00%	10.00%	8.00%
15	6.00%	5.00%	10.00%	8.00%
16	6.00%	5.00%	10.00%	8.00%
17	6.00%	5.00%	10.00%	8.00%
18	6.00%	5.00%	10.00%	8.00%
19	6.00%	5.00%	10.00%	8.00%
20	5.50%	4.50%	10.00%	8.00%
21	5.50%	4.50%	10.00%	8.00%
22	5.50%	4.50%	10.00%	8.00%
23	5.50%	4.50%	10.00%	8.00%
24	5.50%	4.50%	10.00%	8.00%
25	5.50%	4.50%	10.00%	8.00%
26	5.50%	4.50%	10.00%	8.00%
27	5.50%	4.50%	10.00%	8.00%
28	5.50%	4.50%	10.00%	8.00%
29	5.50%	4.50%	10.00%	8.00%
30+	4.50%	3.50%	10.00%	8.00%

¹ Includes members of Basic Tier 4 (Plan F) and Tier 6 (Plan Y) Plans, including Sanitation, TBTA and Transit members of these plans, as well as members of the Age 57 Plan (Plan I)

² Includes members eligible for unreduced retirement at completion of 25 years of service with or without an age requirement (Fire Alarm Dispatchers, EMTs, Special Officers, 55/25 Plan members, Deputy Sheriffs, Auto Workers, Police Communication Techs and DA Investigators)

³ Dual retirement rate applies in year before assumed retirement

⁴ Dual disability rate applies in year before assumed disability

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED ASSUMPTION OVERTIME AS A PERCENTAGE OF BASE PAY				
	General			
	Specialty Group ² Members			
Years of Service	Not Physically Taxing Baseline and Dual Retirement ³	Not Physically Taxing Dual Disability ⁴	Physically Taxing Baseline and Dual Retirement ³	Physically Taxing Dual Disability ⁴
0	10.00%	8.00%	12.00%	7.00%
1	10.00%	8.00%	12.00%	7.00%
2	10.00%	8.00%	12.00%	7.00%
3	10.00%	8.00%	12.00%	7.00%
4	10.00%	8.00%	12.00%	7.00%
5	10.00%	8.00%	12.00%	7.00%
6	10.00%	8.00%	12.00%	7.00%
7	10.00%	8.00%	12.00%	7.00%
8	10.00%	8.00%	12.00%	7.00%
9	10.00%	8.00%	12.00%	7.00%
10	10.00%	8.00%	12.00%	7.00%
11	10.00%	8.00%	12.00%	7.00%
12	10.00%	8.00%	12.00%	7.00%
13	10.00%	8.00%	12.00%	7.00%
14	10.00%	8.00%	12.00%	7.00%
15	7.50%	6.00%	15.00%	9.00%
16	7.50%	6.00%	15.00%	9.00%
17	7.50%	6.00%	15.00%	9.00%
18	7.50%	6.00%	15.00%	9.00%
19	7.50%	6.00%	15.00%	9.00%
20	7.50%	6.00%	15.00%	9.00%
21	7.50%	6.00%	15.00%	9.00%
22	7.50%	6.00%	15.00%	9.00%
23	7.50%	6.00%	15.00%	9.00%
24	7.50%	6.00%	15.00%	9.00%
25	7.50%	6.00%	15.00%	9.00%
26	7.50%	6.00%	15.00%	9.00%
27	7.50%	6.00%	15.00%	9.00%
28	7.50%	6.00%	15.00%	9.00%
29	7.50%	6.00%	15.00%	9.00%
30+	6.00%	5.00%	15.00%	9.00%

¹ Includes members of Basic Tier 4 (Plan F) and Tier 6 (Plan Y) Plans, including Sanitation, TBTA and Transit members of these plans, as well as members of the Age 57 Plan (Plan I)

² Includes members eligible for unreduced retirement at completion of 25 years of service with or without an age requirement (Fire Alarm Dispatchers, EMTs, Special Officers, 55/25 Plan members, Deputy Sheriffs, Auto Workers, Police Communication Techs and DA Investigators)

³ Dual retirement rate applies in year before assumed retirement

⁴ Dual disability rate applies in year before assumed disability

Withdrawal

The current withdrawal assumption varies by service. The proposed assumption varies by group, age and gender, in addition to service. Overall, this results in an increase in the assumed rates of withdrawal, although the increase only impacts members with 6 or fewer years of service as slightly lower assumed rates of withdrawal at higher years of service.

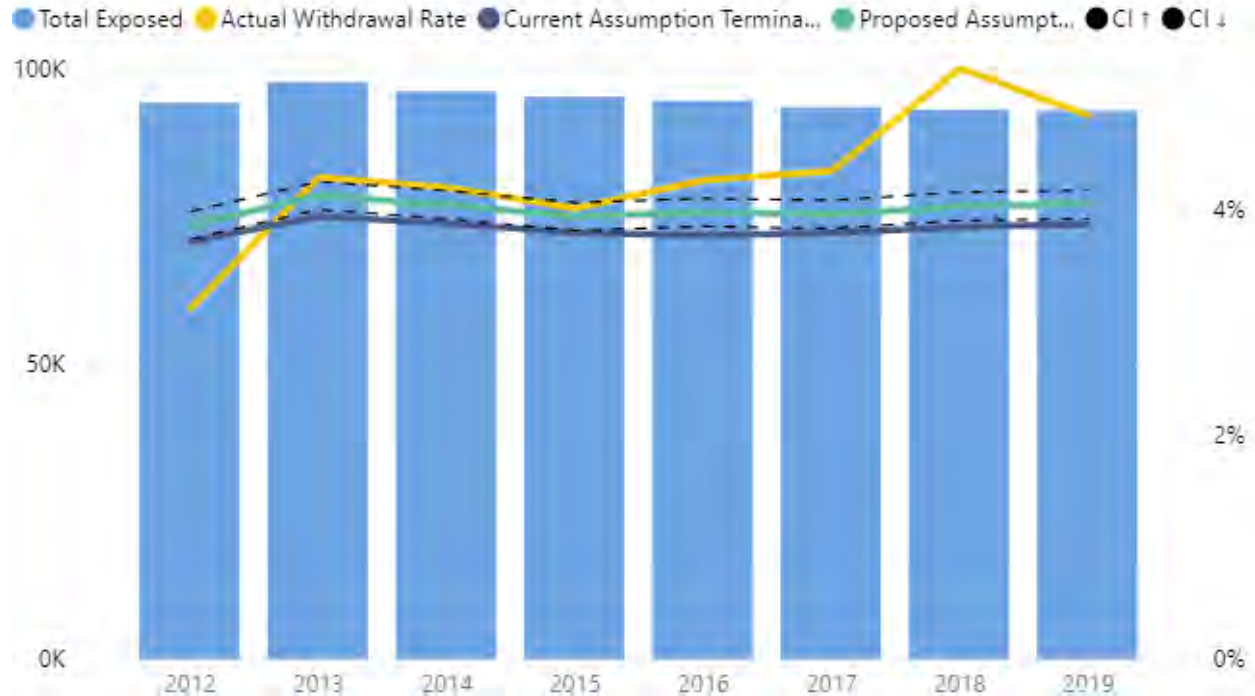
The analysis reflected years from 2012 - 2019 as the rate of termination during 2020 and 2021 may be artificially low due to members with a LOA status code. A record with a LOA status code is included as an exposure and not a decrement.

The following table shows the experience for withdrawal by year, for the age range (22 to 59), and for the service range (0 to 29). The actual rate of withdrawal averaged 4.28% whereas the overall expected rate of withdrawal averaged 3.82% based on the current assumptions and 3.99% based on the proposed assumptions.

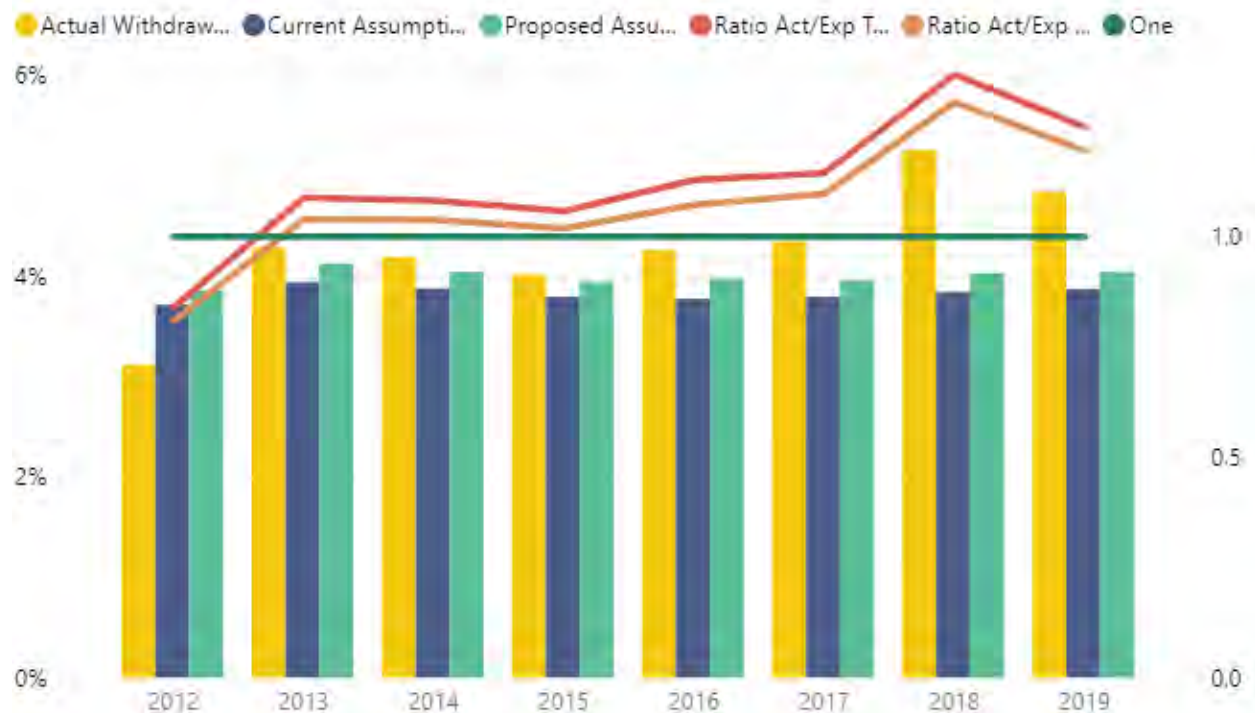
Plan Year	Actual Withdrawals	Expected Withdrawals	Total Exposed	Actual Withdrawal Rate	Current Assumption Termination	Ratio Act/Exp Term
2012	2,934	3,491.1	94,159	3.12%	3.71%	0.84
2013	4,180	3,842.4	97,682	4.28%	3.93%	1.09
2014	4,026	3,720.4	96,119	4.19%	3.87%	1.08
2015	3,814	3,606.4	95,192	4.01%	3.79%	1.06
2016	4,019	3,560.2	94,499	4.25%	3.77%	1.13
2017	4,048	3,537.1	93,361	4.34%	3.79%	1.14
2018	4,880	3,567.7	92,963	5.25%	3.84%	1.37
2019	4,483	3,588.1	92,837	4.83%	3.86%	1.25
Total	32,384	28,913.3	756,812	4.28%	3.82%	1.12

Plan Year	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
2012	2,934	3,628.5	94,159	3.12%	3.85%	0.81
2013	4,180	4,022.7	97,682	4.28%	4.12%	1.04
2014	4,026	3,879.4	96,119	4.19%	4.04%	1.04
2015	3,814	3,743.0	95,192	4.01%	3.93%	1.02
2016	4,019	3,750.2	94,499	4.25%	3.97%	1.07
2017	4,048	3,688.9	93,361	4.34%	3.95%	1.10
2018	4,880	3,739.2	92,963	5.25%	4.02%	1.31
2019	4,483	3,749.0	92,837	4.83%	4.04%	1.20
Total	32,384	30,200.9	756,812	4.28%	3.99%	1.07

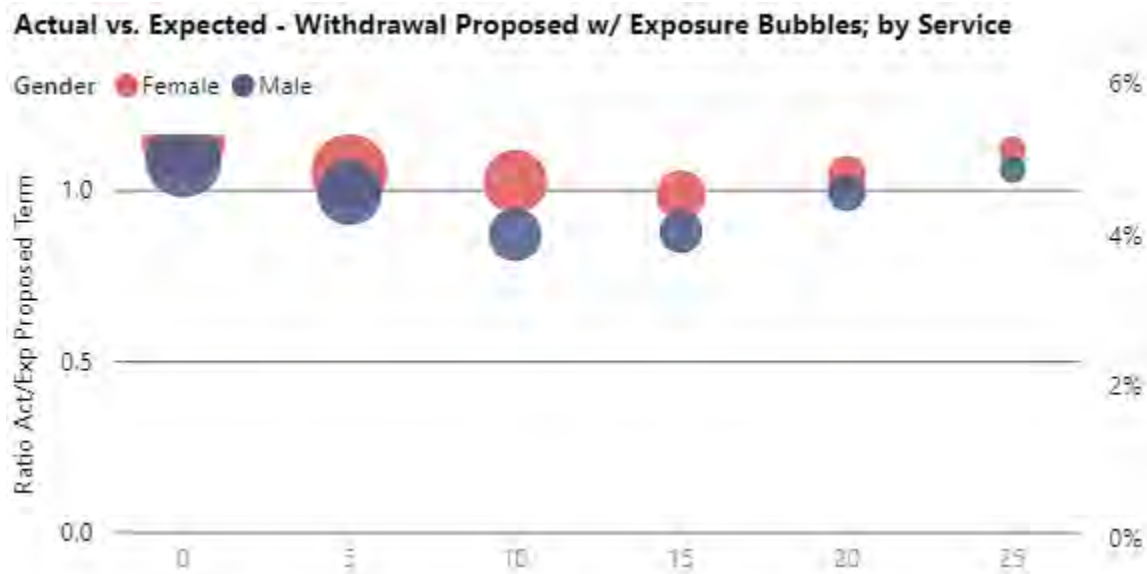
Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Year



Withdrawal Rate - Actual, Expected, and Ratio; by Year



The following chart shows the actual experience by gender versus the proposed assumption. As the experience varied by gender, separate tables are proposed.



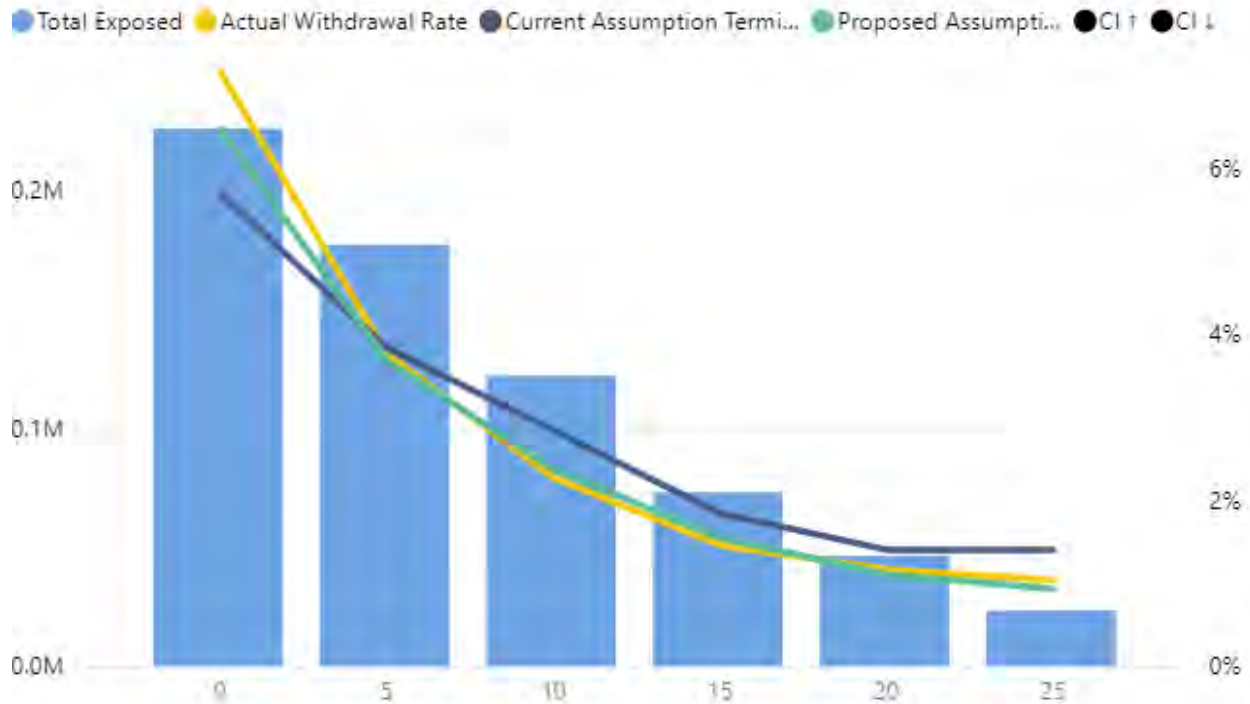
Basic Plan Grouping

The following table shows the experience for withdrawal by service, for the age range (22 to 59), and for the service range (0 to 29). The actual rate of withdrawal averaged 4.11% whereas the overall expected rate of withdrawal averaged 3.81% based on the current assumptions and 3.88% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.08 to 1.06. For ages 22 to 39, the A/E ratio decreased from 1.46 to 1.13 and for ages 40 to 59, the A/E ratio increased from 0.79 to 0.98.

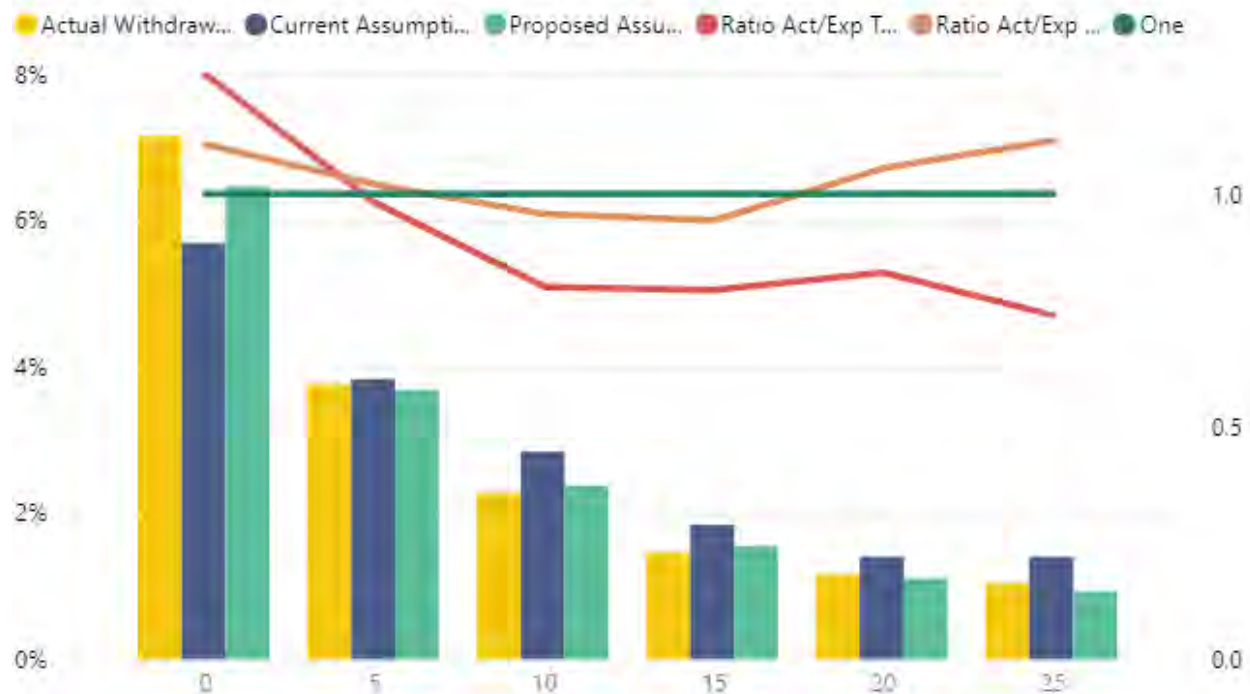
Service	Actual Withdrawals	Expected Withdrawals	Total Exposed	Actual Withdrawal Rate	Current Assumption Termination	Ratio Act/Exp Term
0	2,437	2,243.8	26,712	9.12%	8.40%	1.09
1	4,579	3,852.7	55,038	8.32%	7.00%	1.19
2	3,786	2,875.5	51,349	7.37%	5.60%	1.32
3	3,023	1,993.0	47,452	6.37%	4.20%	1.52
4	2,355	1,907.3	45,412	5.19%	4.20%	1.23
5	2,042	1,687.8	40,186	5.08%	4.20%	1.21
6	1,573	1,584.8	39,621	3.97%	4.00%	0.99
7	1,188	1,297.8	34,152	3.48%	3.80%	0.92
8	983	1,164.9	32,357	3.04%	3.60%	0.84
9	869	1,045.0	30,735	2.83%	3.40%	0.83
10	818	929.3	29,040	2.82%	3.20%	0.88
11	634	808.5	26,949	2.35%	3.00%	0.78
12	523	681.2	24,328	2.15%	2.80%	0.77
13	418	579.1	22,275	1.88%	2.60%	0.72
14	378	465.3	19,386	1.95%	2.40%	0.81
15	286	380.1	17,277	1.66%	2.20%	0.75
16	258	322.7	16,137	1.60%	2.00%	0.80
17	175	262.8	14,599	1.20%	1.80%	0.67
18	174	209.6	13,100	1.33%	1.60%	0.83
19	171	166.4	11,887	1.44%	1.40%	1.03
20	151	149.4	10,672	1.41%	1.40%	1.01
21	123	140.3	10,023	1.23%	1.40%	0.88
22	105	131.8	9,416	1.12%	1.40%	0.80
23	90	121.1	8,649	1.04%	1.40%	0.74
24	71	107.0	7,645	0.93%	1.40%	0.66
25	73	95.3	6,805	1.07%	1.40%	0.77
26	70	80.7	5,761	1.22%	1.40%	0.87
27	41	64.9	4,639	0.88%	1.40%	0.63
28	33	49.8	3,557	0.93%	1.40%	0.66
29	25	36.9	2,637	0.95%	1.40%	0.68
Total	27,452	25,434.8	667,796	4.11%	3.81%	1.08

Service	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
0	2,437	2,449.0	26,712	9.12%	9.17%	1.00
1	4,579	4,240.0	55,038	8.32%	7.70%	1.08
2	3,786	3,133.7	51,349	7.37%	6.10%	1.21
3	3,023	2,574.9	47,452	6.37%	5.43%	1.17
4	2,355	2,218.1	45,412	5.19%	4.88%	1.06
5	2,042	1,811.3	40,186	5.08%	4.51%	1.13
6	1,573	1,599.9	39,621	3.97%	4.04%	0.98
7	1,188	1,197.8	34,152	3.48%	3.51%	0.99
8	983	1,014.0	32,357	3.04%	3.13%	0.97
9	869	898.5	30,735	2.83%	2.92%	0.97
10	818	802.2	29,040	2.82%	2.76%	1.02
11	634	699.2	26,949	2.35%	2.59%	0.91
12	523	565.1	24,328	2.15%	2.32%	0.93
13	418	465.5	22,275	1.88%	2.09%	0.90
14	378	364.9	19,386	1.95%	1.88%	1.04
15	286	302.0	17,277	1.66%	1.75%	0.95
16	258	264.8	16,137	1.60%	1.64%	0.97
17	175	222.2	14,599	1.20%	1.52%	0.79
18	174	184.8	13,100	1.33%	1.41%	0.94
19	171	153.9	11,887	1.44%	1.29%	1.11
20	151	129.0	10,672	1.41%	1.21%	1.17
21	123	115.2	10,023	1.23%	1.15%	1.07
22	105	102.8	9,416	1.12%	1.09%	1.02
23	90	89.6	8,649	1.04%	1.04%	1.00
24	71	75.0	7,645	0.93%	0.98%	0.95
25	73	63.6	6,805	1.07%	0.93%	1.15
26	70	53.5	5,761	1.22%	0.93%	1.31
27	41	42.9	4,639	0.88%	0.93%	0.95
28	33	32.8	3,557	0.93%	0.92%	1.01
29	25	24.1	2,637	0.95%	0.92%	1.04
Total	27,452	25,890.4	667,796	4.11%	3.88%	1.06

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Service

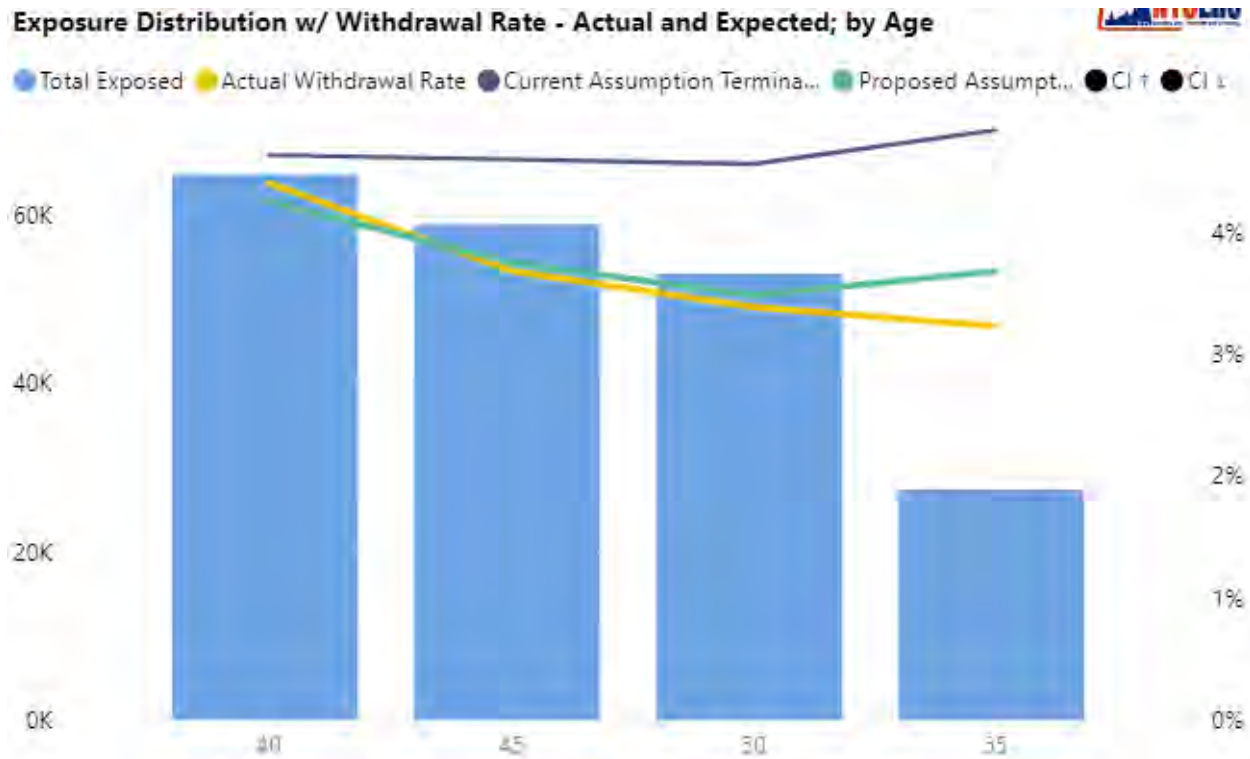


Withdrawal Rate - Actual, Expected, and Ratio; by Service w/Proposed

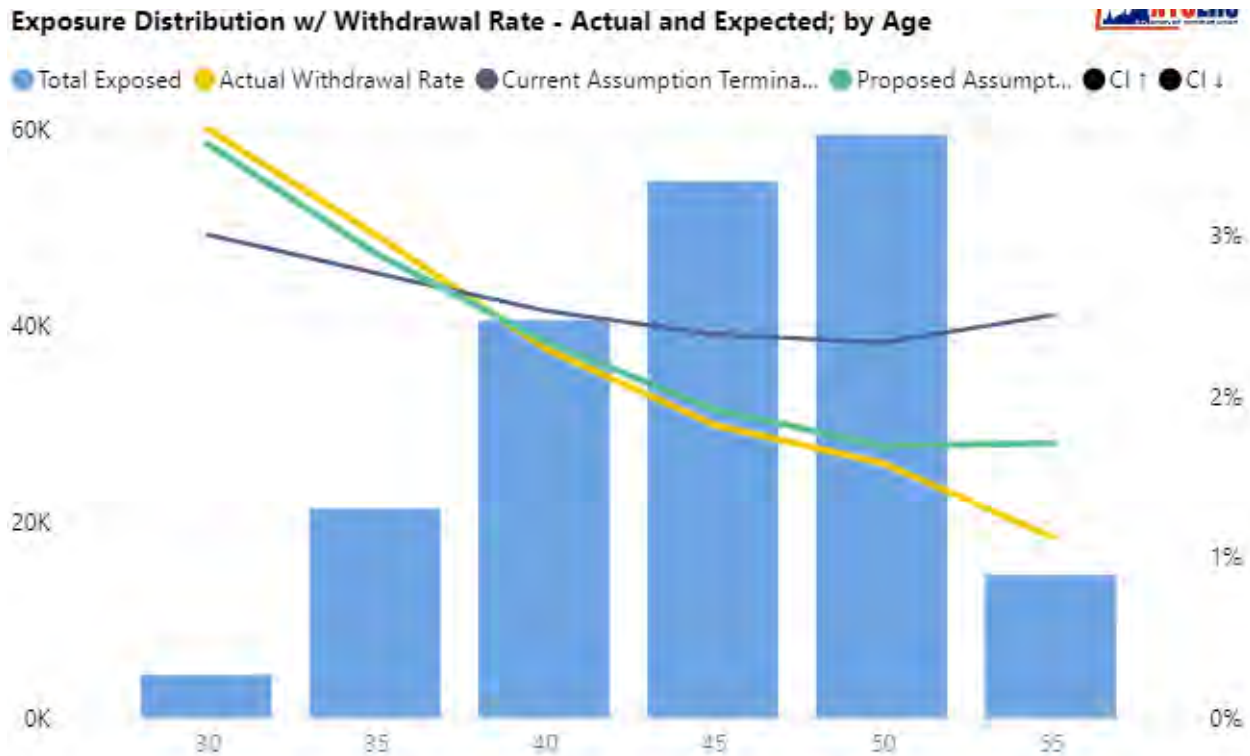


The proposed assumption varies by age in addition to service as we observed lower rates of withdrawal for older members at the same service periods. The following charts show the results by age over 10-year service periods.

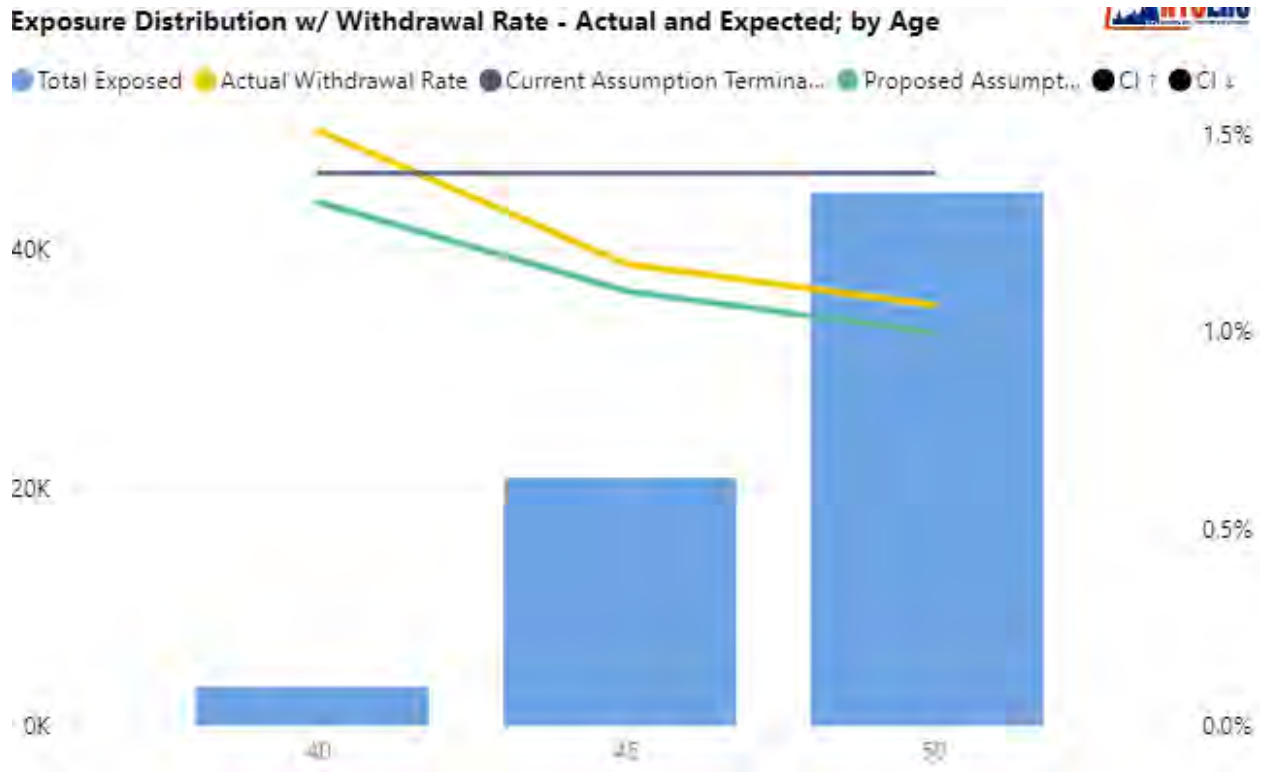
This chart shows the results by age for the service range 0 to 9 years, which increased the assumed rate of withdrawal from 4.88% to 5.24% as compared to the actual rate of 5.67%. This resulted in a decrease in the A/E ratio from 1.16 to 1.08 for ages 22 to 59. For ages 22 to 39, the A/E ratio decreased from 1.48 to 1.14 and for ages 40 to 59, the A/E ratio increased from 0.81 to 0.99.



This chart shows the results by age for the service range 10 to 19 years, which decreased the assumed rate of withdrawal from 2.46% to 2.06% as compared to the actual rate of 1.97%. This resulted in an increase in the A/E ratio from 0.80 to 0.95 for ages 22 to 59. For ages 30 to 39, the A/E ratio decreased from 1.11 to 1.04 and for ages 40 to 59, the A/E ratio increased from 0.74 to 0.93.



This chart shows the results by age for the service range 20 to 29 years, which decreased the assumed rate of withdrawal from 1.40% to 1.04% as compared to the actual rate of 1.12%. This resulted in an increase in the A/E ratio from 0.80 to 1.07 for ages 40 to 54.

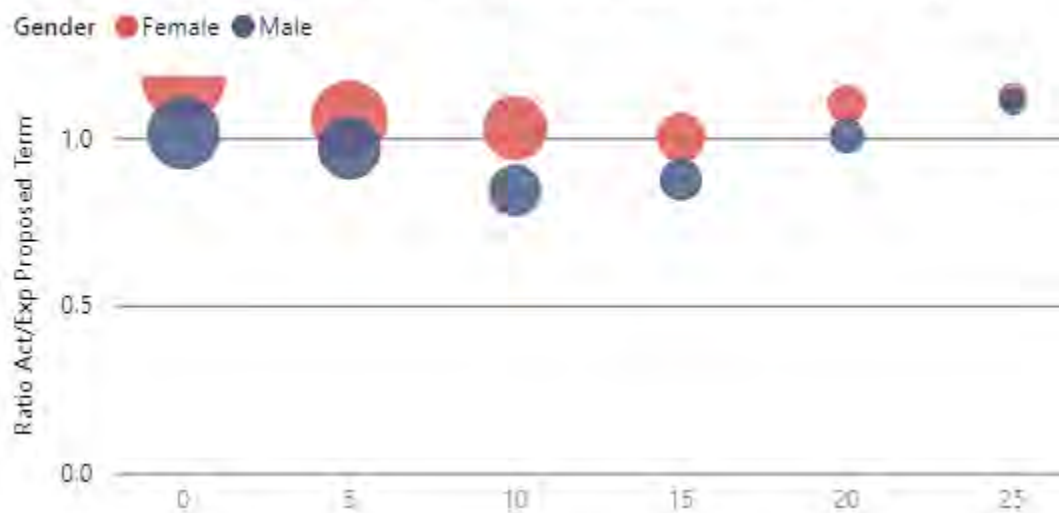


The following chart shows the actual experience of Basic Plan Group members for withdrawal by gender for the service range (0 to 29) versus the proposed assumption.

For male members, the assumed rate of withdrawal decreased from 3.81% to 3.79% as compared to the actual rate of 3.71%. This resulted in an increase in the A/E ratio from 0.97 to 0.98 for ages 22 to 59. For ages 22 to 39, the A/E ratio decreased from 1.32 to 1.04 and for ages 40 to 59, the A/E ratio increased from 0.71 to 0.90.

For female members, the assumed rate of withdrawal increased from 3.81% to 3.94% as compared to the actual rate of 4.40%. This resulted in a decrease in the A/E ratio from 1.15 to 1.12 for ages 22 to 59. For ages 22 to 39, the A/E ratio decreased from 1.55 to 1.19 and for ages 40 to 59, the A/E ratio increased from 0.85 to 1.03. Please note that the assumption applies to female members in the Specialty Plan Group.

Actual vs. Expected - Withdrawal Proposed w/ Exposure Bubbles; by Service



Specialty Plan Grouping

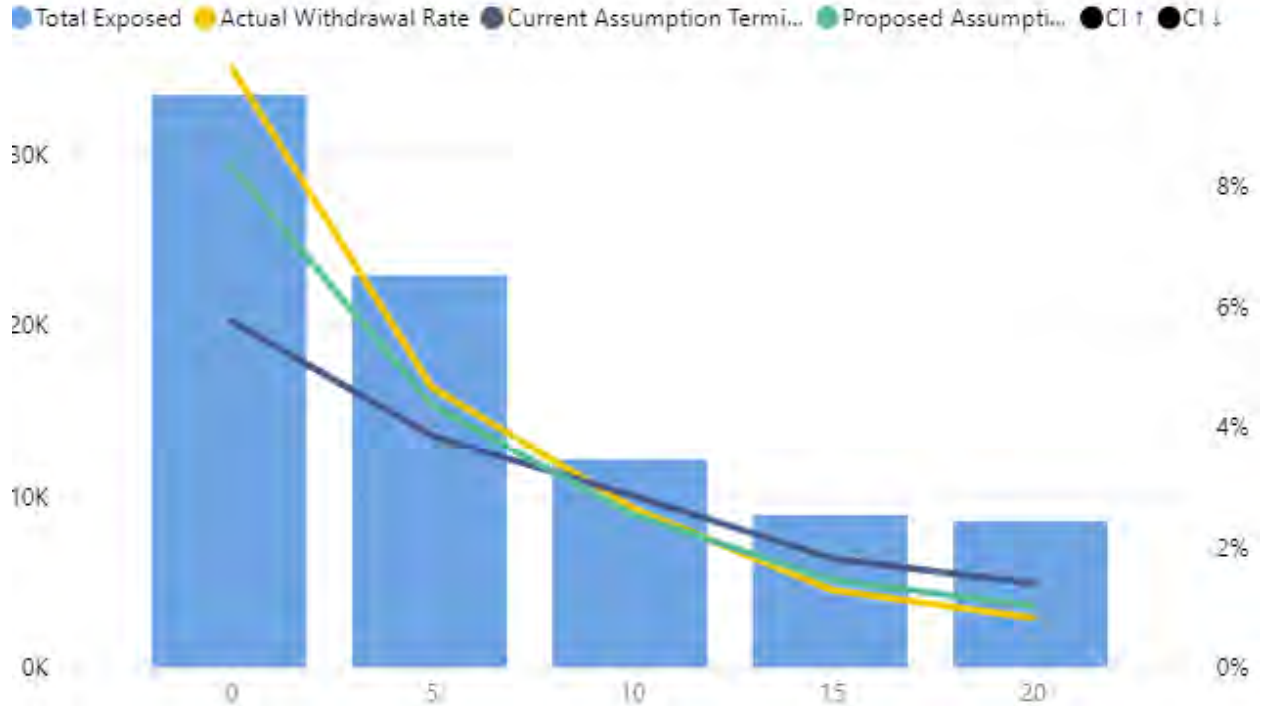
Please note that Specialty Plan group members may elect to retire under the Basic Plan rather than their specific Specialty Plan. When a member is eligible for reduced retirement under the Basic Plan and not eligible for unreduced retirement under their specific plan, OA utilizes the rates of withdrawal during this period, but values an immediate reduced early retirement benefit. The experience of these members during this period is included in the retirement analysis.

The following table shows the experience for withdrawal by service, for the age range (20 to 54), and for the service range (0 to 24). The actual rate of withdrawal averaged 5.70% whereas the overall expected rate of withdrawal averaged 3.99% based on the current assumptions and 5.00% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.43 to 1.14. For ages 20 to 39, the A/E ratio decreased from 1.76 to 1.20 and for ages 40 to 54, the A/E ratio increased from 0.69 to 0.88.

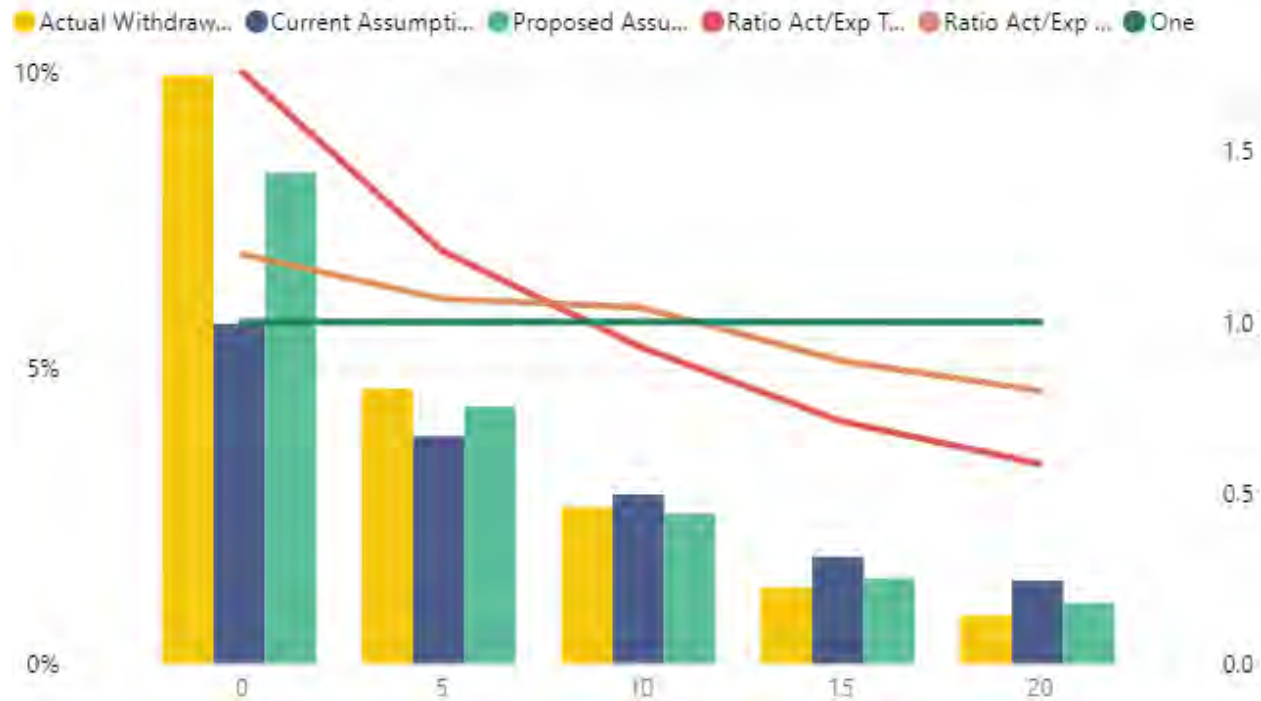
Service	Actual Withdrawals	Expected Withdrawals	Total Exposed	Actual Withdrawal Rate	Current Assumption Termination	Ratio Act/Exp Term
0	313	337.7	4,020	7.79%	8.40%	0.93
1	868	608.6	8,695	9.98%	7.00%	1.43
2	1,031	419.6	7,492	13.76%	5.60%	2.46
3	593	289.3	6,889	8.61%	4.20%	2.05
4	523	266.6	6,347	8.24%	4.20%	1.96
5	358	233.1	5,550	6.45%	4.20%	1.54
6	221	205.5	5,138	4.30%	4.00%	1.08
7	204	171.1	4,502	4.53%	3.80%	1.19
8	148	144.5	4,015	3.69%	3.60%	1.02
9	133	125.8	3,699	3.60%	3.40%	1.06
10	103	105.8	3,306	3.12%	3.20%	0.97
11	61	78.2	2,608	2.34%	3.00%	0.78
12	57	64.2	2,292	2.49%	2.80%	0.89
13	80	55.4	2,131	3.75%	2.60%	1.44
14	21	44.0	1,834	1.15%	2.40%	0.48
15	26	38.6	1,755	1.48%	2.20%	0.67
16	28	37.9	1,897	1.48%	2.00%	0.74
17	22	32.5	1,808	1.22%	1.80%	0.68
18	21	27.8	1,739	1.21%	1.60%	0.75
19	17	23.8	1,699	1.00%	1.40%	0.71
20	12	23.6	1,687	0.71%	1.40%	0.51
21	15	24.2	1,732	0.87%	1.40%	0.62
22	16	24.9	1,776	0.90%	1.40%	0.64
23	12	24.5	1,750	0.69%	1.40%	0.49
24	15	22.6	1,612	0.93%	1.40%	0.66
Total	4,898	3,429.9	85,973	5.70%	3.99%	1.43

Service	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
0	313	443.2	4,020	7.79%	11.02%	▲ 0.71
1	868	849.9	8,695	9.98%	9.77%	● 1.02
2	1,031	617.7	7,492	13.76%	8.25%	◆ 1.67
3	593	478.3	6,889	8.61%	6.94%	▲ 1.24
4	523	387.8	6,347	8.24%	6.11%	▲ 1.35
5	358	303.1	5,550	6.45%	5.46%	▲ 1.18
6	221	244.8	5,138	4.30%	4.77%	● 0.90
7	204	182.5	4,502	4.53%	4.05%	▲ 1.12
8	148	144.4	4,015	3.69%	3.60%	● 1.02
9	133	121.2	3,699	3.60%	3.28%	● 1.10
10	103	99.4	3,306	3.12%	3.01%	● 1.04
11	61	72.2	2,608	2.34%	2.77%	▲ 0.84
12	57	56.5	2,292	2.49%	2.46%	● 1.01
13	80	46.1	2,131	3.75%	2.16%	◆ 1.74
14	21	34.7	1,834	1.15%	1.89%	▲ 0.61
15	26	30.2	1,755	1.48%	1.72%	▲ 0.86
16	28	29.7	1,897	1.48%	1.57%	● 0.94
17	22	26.0	1,808	1.22%	1.44%	▲ 0.85
18	21	22.5	1,739	1.21%	1.29%	● 0.93
19	17	20.1	1,699	1.00%	1.18%	▲ 0.85
20	12	18.1	1,687	0.71%	1.07%	▲ 0.66
21	15	18.1	1,732	0.87%	1.04%	▲ 0.83
22	16	18.1	1,776	0.90%	1.02%	▲ 0.88
23	12	17.5	1,750	0.69%	1.00%	▲ 0.68
24	15	15.9	1,612	0.93%	0.99%	● 0.94
Total	4,898	4,298.1	85,973	5.70%	5.00%	▲ 1.14

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Service

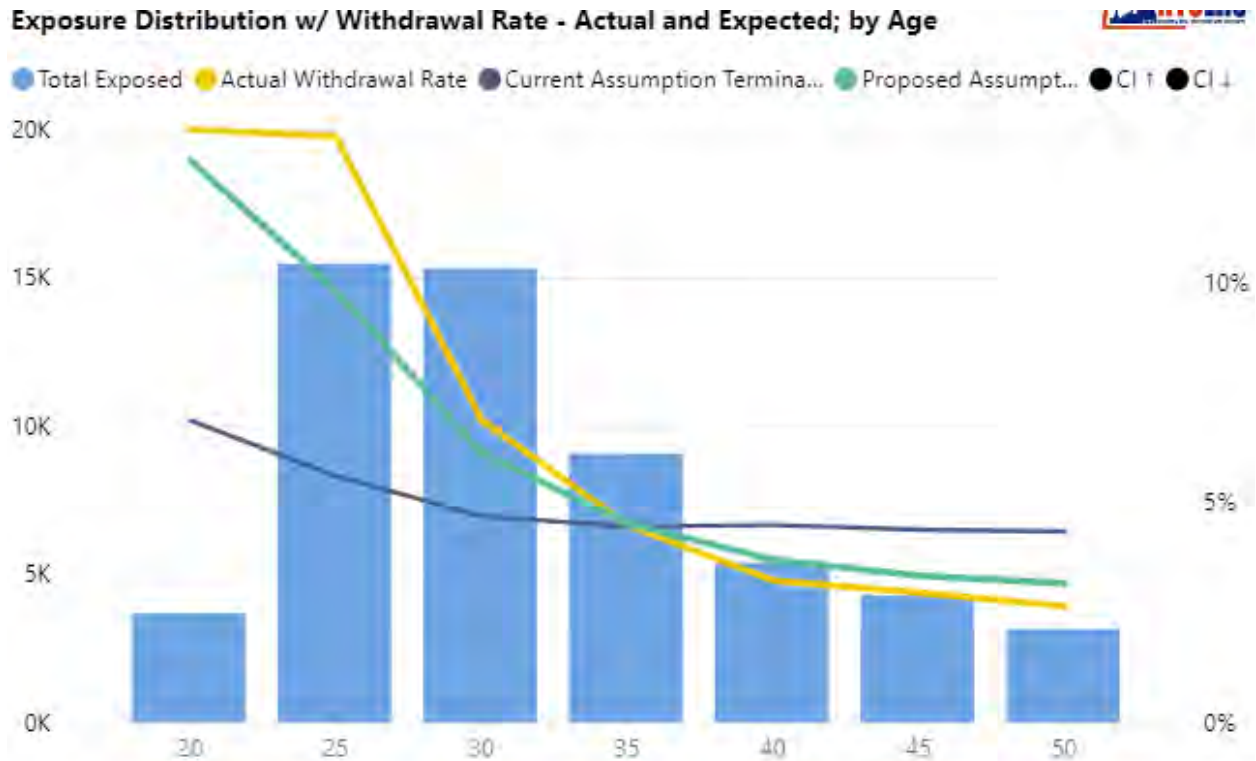


Withdrawal Rate - Actual, Expected, and Ratio; by Service w/Proposed



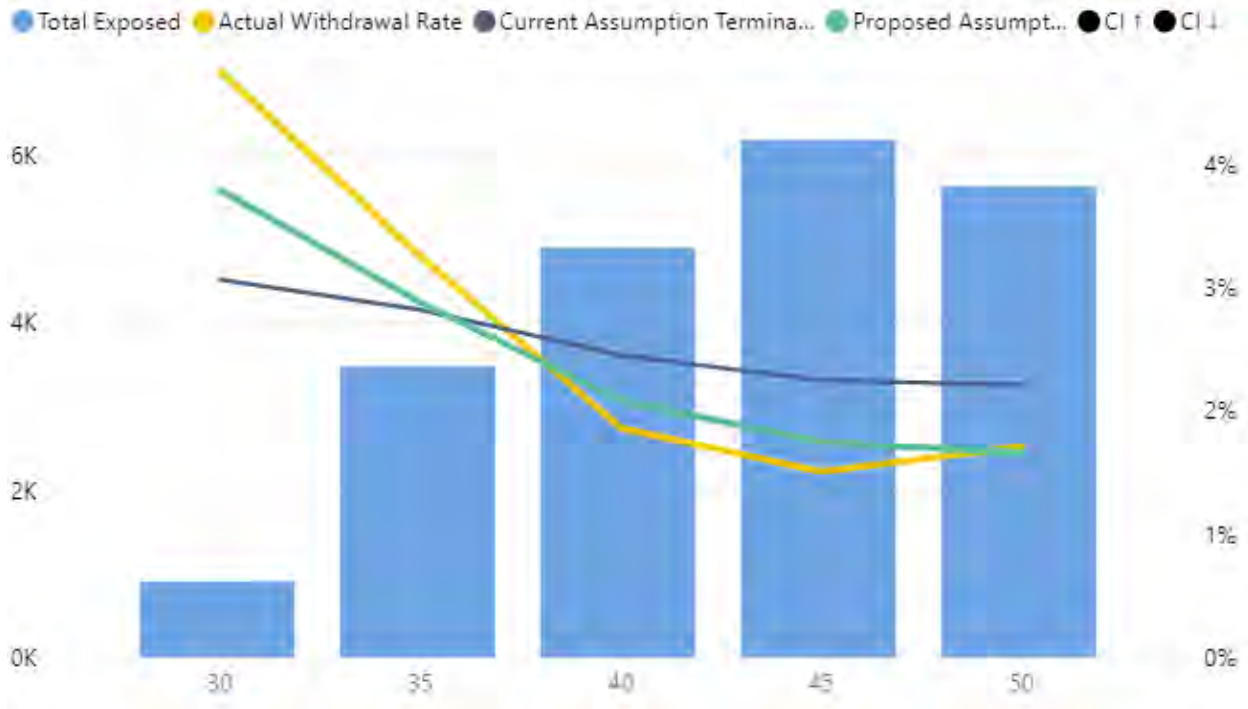
The proposed assumption varies by age in addition to service as we observed lower rates of withdrawal for older members at the same service periods. The following charts show the results by age over 10-year service periods.

This chart shows the results by age for the service range 0 to 9 years, which increased the assumed rate of withdrawal from 4.97% to 6.70% as compared to the actual rate of 7.79%. This resulted in a decrease in the A/E ratio from 1.57 to 1.16 for ages 20 to 54. For ages 20 to 39, the A/E ratio decreased from 1.79 to 1.20 and for ages 40 to 54, the A/E ratio increased from 0.68 to 0.87.

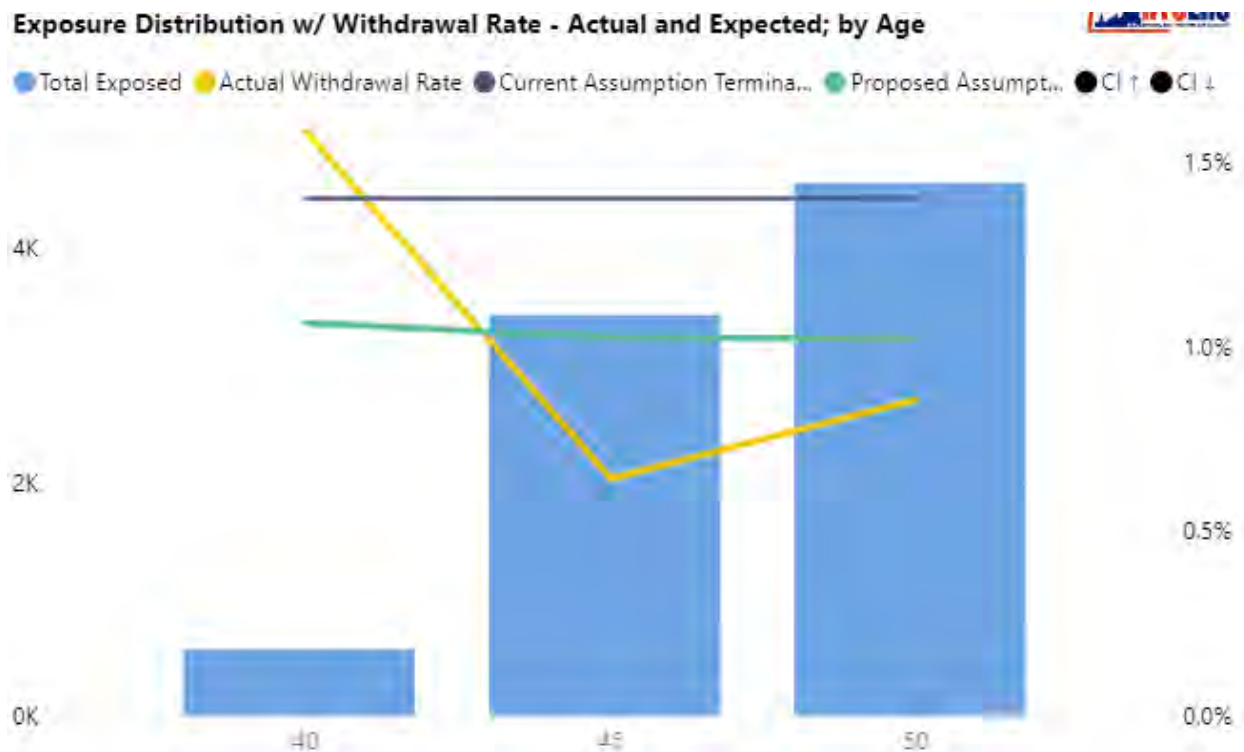


This chart shows the results by age for the service range 10 to 19 years, which decreased the assumed rate of withdrawal from 2.41% to 2.08% as compared to the actual rate of 2.07%. This resulted in an increase in the A/E ratio from 0.86 to 1.00 for ages 30 to 54. For ages 30 to 39, the A/E ratio decreased from 1.24 to 1.16 and for ages 40 to 54, the A/E ratio increased from 0.73 to 0.92.

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Age



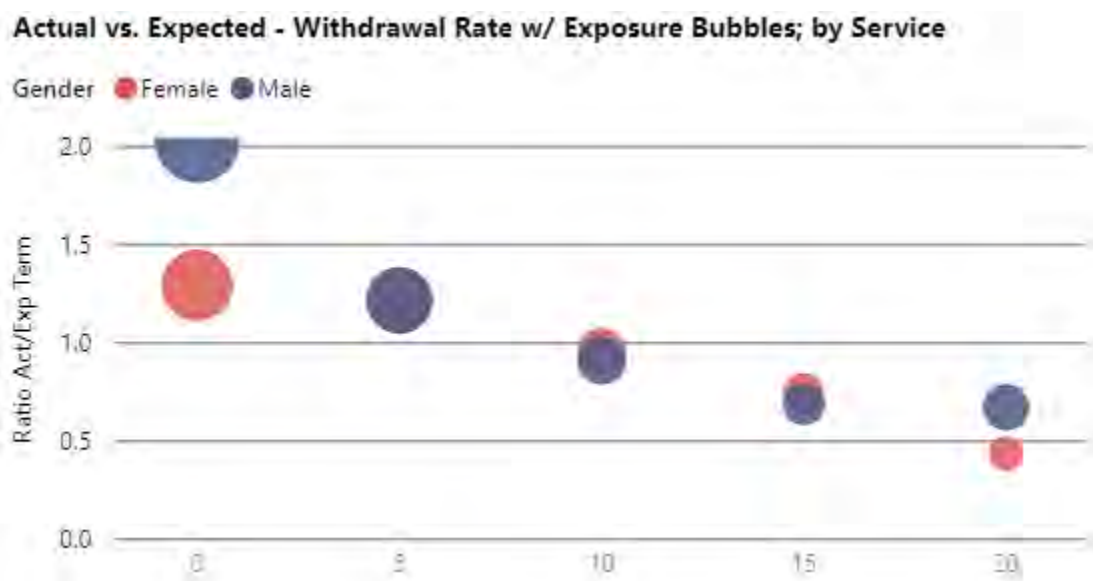
This chart shows the results by age for the service range 20 to 24 years, which decreased the assumed rate of withdrawal from 1.40% to 1.02% as compared to the actual rate of 0.82%. This resulted in an increase in the A/E ratio from 0.58 to 0.80 for ages 40 to 54.



The following chart shows the actual experience of Specialty Plan Group members for withdrawal by gender for the service range (0 to 24) versus the proposed assumption.

For male members, the assumed rate of withdrawal increased from 4.06% to 5.19% as compared to the actual rate of 6.59%. This resulted in a decrease in the A/E ratio from 1.62 to 1.27 for ages 20 to 54. For ages 20 to 39, the A/E ratio decreased from 2.07 to 1.35 and for ages 40 to 54, the A/E ratio increased from 0.64 to 0.88.

For female members, the assumed rate of withdrawal increased from 3.91% to 4.75% as compared to the actual rate of 4.58%. This resulted in a decrease in the A/E ratio from 1.17 to 0.96 for ages 20 to 54. For ages 20 to 39, the A/E ratio decreased from 1.37 to 0.99 and for ages 40 to 54, the A/E ratio increased from 0.75 to 0.88. Please note that the assumption applies to female members in the Basic Plan Group.



Summary

In total, the proposed rates of withdrawal have increased the anticipated number of terminations. The increases occur primarily for service periods less than 7 years and are significantly greater for Specialty Group members than Basic Group members. Typically, higher rates of withdrawal will result in a decrease in plan liabilities. However, lower assumptions are proposed for longer service members as well as older members increasing plan liabilities for these members. The actual impact will depend on the demographics of the active membership.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF TERMINATION	
	Probabilities of Termination
Years of Service	General
0	8.40%
1	7.00%
2	5.60%
3	4.20%
4	4.20%
5	4.20%
6	4.00%
7	3.80%
8	3.60%
9	3.40%
10	3.20%
11	3.00%
12	2.80%
13	2.60%
14	2.40%
15	2.20%
16	2.00%
17	1.80%
18	1.60%
19	1.40%
20	1.40%

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF TERMINATION GENERAL MALE EMPLOYEES - BASIC GROUP ¹						
Sample Service Periods ²						
Age	0	5	10	15	20	25
25 ³	13.60%	7.40%	4.25%	2.70%	2.00%	1.60%
26	12.95%	7.15%	4.20%	2.70%	1.95%	1.60%
27	12.35%	6.85%	4.15%	2.65%	1.95%	1.55%
28	11.70%	6.55%	4.05%	2.60%	1.90%	1.55%
29	11.05%	6.25%	4.00%	2.55%	1.90%	1.50%
30	10.85%	6.10%	3.90%	2.50%	1.85%	1.50%
31	10.40%	5.90%	3.75%	2.45%	1.80%	1.45%
32	10.00%	5.70%	3.65%	2.40%	1.80%	1.45%
33	9.55%	5.55%	3.50%	2.40%	1.75%	1.40%
34	9.15%	5.30%	3.40%	2.35%	1.70%	1.40%
35	8.70%	5.00%	3.25%	2.30%	1.70%	1.35%
36	8.50%	4.70%	3.15%	2.25%	1.65%	1.35%
37	8.30%	4.50%	2.90%	2.20%	1.65%	1.30%
38	8.10%	4.05%	2.85%	2.15%	1.60%	1.30%
39	7.85%	3.80%	2.80%	2.15%	1.55%	1.25%
40	7.65%	3.80%	2.75%	2.10%	1.55%	1.25%
41	7.45%	3.75%	2.70%	2.05%	1.50%	1.20%
42	7.25%	3.70%	2.65%	2.00%	1.45%	1.20%
43	7.00%	3.65%	2.60%	1.95%	1.45%	1.15%
44	6.80%	3.60%	2.55%	1.90%	1.40%	1.15%
45	6.65%	3.55%	2.45%	1.85%	1.40%	1.10%
46	6.55%	3.50%	2.35%	1.85%	1.35%	1.10%
47	6.40%	3.45%	2.30%	1.80%	1.30%	1.05%
48	6.30%	3.40%	2.25%	1.75%	1.30%	1.05%
49	6.15%	3.35%	2.20%	1.70%	1.25%	1.00%
50	6.10%	3.35%	2.15%	1.65%	1.20%	1.00%
51	6.00%	3.35%	2.10%	1.60%	1.20%	0.95%
52	5.90%	3.35%	2.05%	1.55%	1.15%	0.95%
53	5.80%	3.35%	2.05%	1.55%	1.15%	0.90%
54 ⁴	5.75%	3.35%	2.05%	1.50%	1.10%	0.90%

¹ Includes members of Basic Tier 4 (Plan F) and Tier 6 (Plan Y) Plans, including Sanitation, TBTA and Transit members of these plans, as well as members of the Age 57 Plan (Plan I)

² See full age / service table for rates at all service periods

³ Applies to ages 25 and younger

⁴ Applies to ages 54 and older

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF TERMINATION GENERAL MALE EMPLOYEES - SPECIALTY GROUP ¹						
Sample Service Periods ²						
Age	0	5	10	15	20	25
25 ³	14.40%	10.65%	6.75%	3.85%	2.25%	2.25%
26	13.50%	9.75%	6.00%	3.40%	2.00%	2.00%
27	12.60%	9.10%	5.55%	3.15%	1.85%	1.85%
28	11.70%	8.35%	5.10%	2.90%	1.70%	1.70%
29	10.35%	7.65%	4.65%	2.65%	1.55%	1.55%
30	8.55%	6.60%	4.50%	2.55%	1.50%	1.50%
31	7.65%	6.05%	4.35%	2.45%	1.45%	1.45%
32	7.20%	5.55%	4.20%	2.40%	1.40%	1.40%
33	6.30%	5.00%	3.75%	2.30%	1.35%	1.35%
34	6.05%	4.75%	3.50%	2.20%	1.30%	1.30%
35	5.85%	4.40%	3.35%	2.15%	1.25%	1.25%
36	5.60%	4.20%	3.15%	2.05%	1.20%	1.20%
37	5.40%	3.90%	3.05%	1.95%	1.15%	1.15%
38	5.15%	3.85%	2.85%	1.85%	1.10%	1.10%
39	4.95%	3.70%	2.65%	1.80%	1.05%	1.05%
40	4.70%	3.60%	2.30%	1.70%	1.00%	1.00%
41	4.70%	3.60%	2.30%	1.70%	1.00%	1.00%
42	4.65%	3.55%	2.30%	1.70%	1.00%	1.00%
43	4.60%	3.55%	2.30%	1.65%	1.00%	1.00%
44	4.55%	3.50%	2.30%	1.65%	1.00%	1.00%
45	4.50%	3.40%	2.30%	1.65%	1.00%	1.00%
46	4.50%	3.40%	2.30%	1.65%	1.00%	1.00%
47	4.50%	3.40%	2.30%	1.65%	1.00%	1.00%
48	4.50%	3.40%	2.30%	1.65%	1.00%	1.00%
49	4.50%	3.40%	2.30%	1.65%	1.00%	1.00%
50	4.30%	3.25%	2.30%	1.65%	1.00%	1.00%
51	4.30%	3.25%	2.30%	1.65%	1.00%	1.00%
52	4.30%	3.25%	2.30%	1.65%	1.00%	1.00%
53	4.30%	3.25%	2.30%	1.65%	1.00%	1.00%
54 ⁴	4.30%	3.25%	2.30%	1.65%	1.00%	1.00%

¹ Includes members eligible for unreduced retirement at completion of 25 years of service with or without an age requirement (Fire Alarm Dispatchers, EMTs, Special Officers, 55/25 Plan members, Deputy Sheriffs, Auto Workers, Police Communication Techs and DA Investigators)

² See full age / service table for rates at all service periods

³ Applies to ages 25 and younger

⁴ Applies to ages 54 and older

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM						
PROPOSED						
PROBABILITIES OF TERMINATION						
GENERAL FEMALE EMPLOYEES ¹						
Sample Service Periods ²						
Age	0	5	10	15	20	25
25 ³	12.60%	7.40%	5.25%	3.15%	2.30%	1.75%
26	12.15%	7.20%	5.10%	3.10%	2.25%	1.75%
27	11.70%	6.90%	5.05%	3.05%	2.20%	1.70%
28	11.25%	6.70%	4.95%	3.00%	2.20%	1.70%
29	10.80%	6.45%	4.90%	2.95%	2.15%	1.65%
30	10.60%	6.35%	4.75%	2.90%	2.10%	1.60%
31	10.35%	6.25%	4.60%	2.80%	2.00%	1.55%
32	10.15%	6.10%	4.45%	2.70%	1.95%	1.50%
33	9.90%	6.00%	4.30%	2.60%	1.90%	1.45%
34	9.70%	5.80%	4.15%	2.50%	1.80%	1.40%
35	9.25%	5.50%	4.05%	2.45%	1.75%	1.35%
36	9.00%	5.20%	3.80%	2.40%	1.70%	1.35%
37	8.55%	4.85%	3.55%	2.35%	1.70%	1.30%
38	8.10%	4.50%	3.40%	2.30%	1.65%	1.30%
39	7.65%	4.25%	3.30%	2.25%	1.65%	1.25%
40	7.55%	4.15%	3.20%	2.15%	1.55%	1.20%
41	7.45%	4.10%	3.15%	2.05%	1.50%	1.15%
42	7.40%	4.00%	3.05%	2.00%	1.45%	1.10%
43	7.30%	3.95%	3.00%	1.90%	1.35%	1.05%
44	7.20%	3.85%	2.90%	1.80%	1.30%	1.00%
45	7.00%	3.70%	2.80%	1.70%	1.25%	0.95%
46	6.85%	3.55%	2.65%	1.60%	1.15%	0.90%
47	6.75%	3.50%	2.60%	1.60%	1.15%	0.90%
48	6.65%	3.45%	2.55%	1.60%	1.15%	0.90%
49	6.55%	3.45%	2.45%	1.60%	1.15%	0.90%
50	6.50%	3.40%	2.40%	1.60%	1.15%	0.90%
51	6.40%	3.40%	2.35%	1.60%	1.15%	0.90%
52	6.30%	3.35%	2.30%	1.60%	1.15%	0.90%
53	6.20%	3.30%	2.25%	1.60%	1.15%	0.90%
54 ⁴	6.10%	3.30%	2.20%	1.60%	1.15%	0.90%

¹ Includes all female members classified as General Employees

² See full age / service table for rates at all service periods

³ Applies to ages 25 and younger

⁴ Applies to ages 54 and older

Retirement

The current retirement assumption varies by age and eligibility for unreduced retirement with higher rates occurring at first eligibility. Furthermore, higher rates of retirement are assumed for members who had the option to elect an improved program. The proposed assumption varies by service, plan and if the member was considered physically taxing or not in addition to these elements. Generally, lower rates of retirement are assumed prior to 20 or 25 years of service with even lower rates prior to 10 years of service. Higher rates are proposed for members in physically taxing titles.

Lower rates of retirement are proposed for members with less than 10 years of service since these members are not eligible for retiree health benefits. Higher rates of retirement are proposed for members with at least 20 years of service or 25 years of service for the improved plan members to reflect the higher benefit accrual rate.

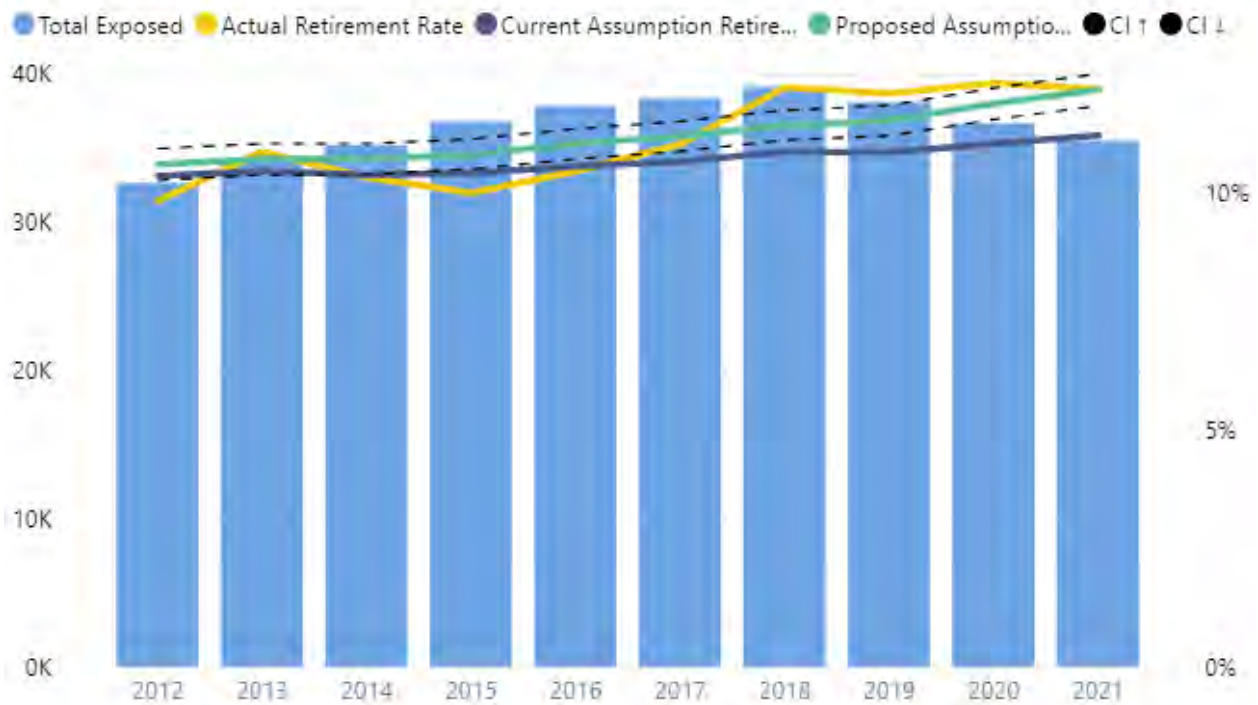
Since Tier 6 became effective on April 1, 2012, and required 10 years of service for vesting, there is little to no retirement experience associated with these plans. Chapter 56 Laws of 2022 changed the vesting requirements for the Tier 6 plans. Since the vesting requirement was 10 years during the study period, we used the 10-year requirement in this report.

The following table shows the experience for retirement by year, for the age range (55 to 79), and for the service range (5 to 39) for all plans and all types of retirement. The actual rate of retirement averaged 11.13% whereas the overall expected rate of retirement averaged 10.66% based on the current assumptions and 11.19% based on the proposed assumptions.

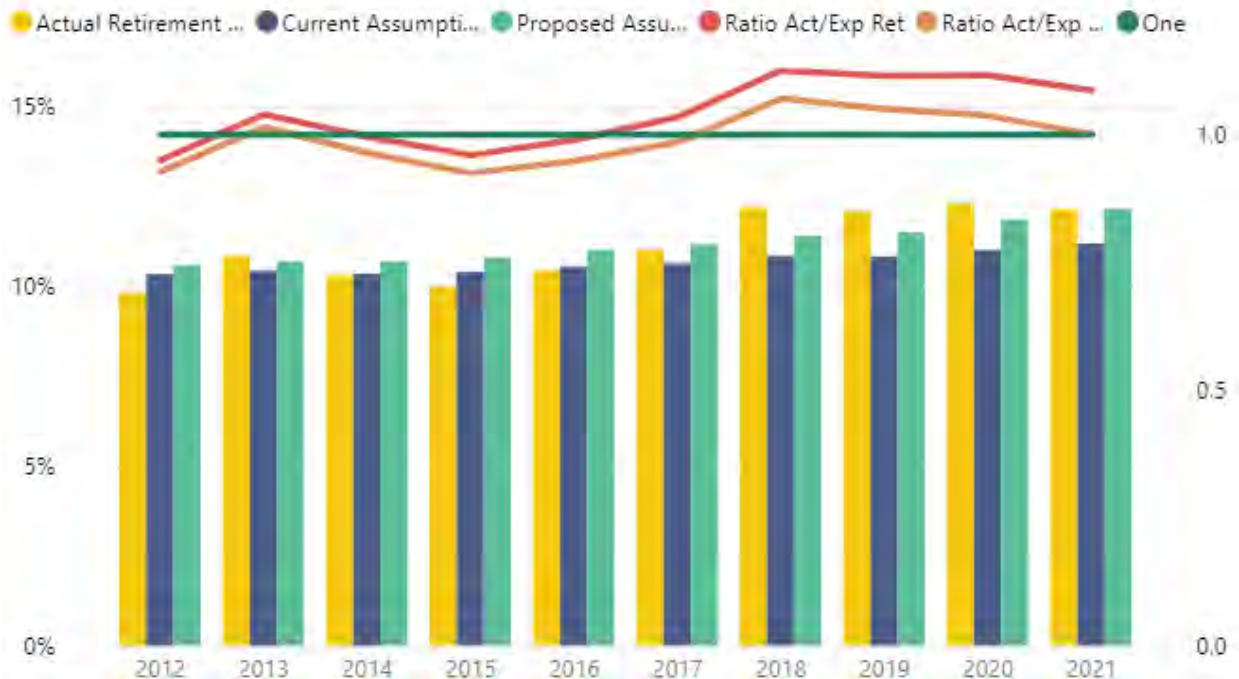
Plan Year	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
2012	3,200	3,370.8	32,625	9.81%	10.33%	0.95
2013	3,700	3,559.2	34,118	10.84%	10.43%	1.04
2014	3,624	3,640.2	35,173	10.30%	10.35%	1.00
2015	3,669	3,822.2	36,759	9.98%	10.40%	0.96
2016	3,945	3,983.6	37,803	10.44%	10.54%	0.99
2017	4,218	4,078.3	38,331	11.00%	10.64%	1.03
2018	4,773	4,240.7	39,116	12.20%	10.84%	1.13
2019	4,597	4,123.9	38,075	12.07%	10.83%	1.11
2020	4,506	4,036.7	36,663	12.29%	11.01%	1.12
2021	4,312	3,968.3	35,475	12.16%	11.19%	1.09
Total	40,544	38,823.9	364,138	11.13%	10.66%	1.04

Plan Year	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
2012	3,200	3,450.6	32,625	9.81%	10.58%	0.93
2013	3,700	3,646.0	34,118	10.84%	10.69%	1.01
2014	3,624	3,759.8	35,173	10.30%	10.69%	0.96
2015	3,669	3,967.9	36,759	9.98%	10.79%	0.92
2016	3,945	4,161.4	37,803	10.44%	11.01%	0.95
2017	4,218	4,281.3	38,331	11.00%	11.17%	0.99
2018	4,773	4,459.8	39,116	12.20%	11.40%	1.07
2019	4,597	4,378.3	38,075	12.07%	11.50%	1.05
2020	4,506	4,345.9	36,663	12.29%	11.85%	1.04
2021	4,312	4,309.3	35,475	12.16%	12.15%	1.00
Total	40,544	40,760.4	364,138	11.13%	11.19%	0.99

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Year



Retirement Rate - Actual, Expected, and Ratio; by Year



Analysis

We will review the retirement experience split by basic plan group versus the specialty plan group and by other characteristics within each group code as follows:

A. Basic Plan Grouping

1. Basic 62/5 (plan code F) – normal retirement at age 62 with reduced retirement benefits at age 55 and mandated plan retirement rates.
2. Age 57/5 (plan code I) – normal retirement at age 57 and mandated plan retirement rates. Members in physically taxing titles are eligible for unreduced retirement at age 50 with 25 years of service.

Experience among physically taxing members will be reviewed separately for each of the plans for members with at least 20 years of service.

- B. Specialty Plan Grouping – retirement occurs at 25 years of service. Certain groups (autoworkers) require a minimum age of 50, including members in physically taxing titles, and certain groups (55/25 plan) require a minimum age of 55. Our analysis combined the experience of all the specialty group plans, except that experience among physically taxing members is reviewed separately.

Basic Plan Grouping

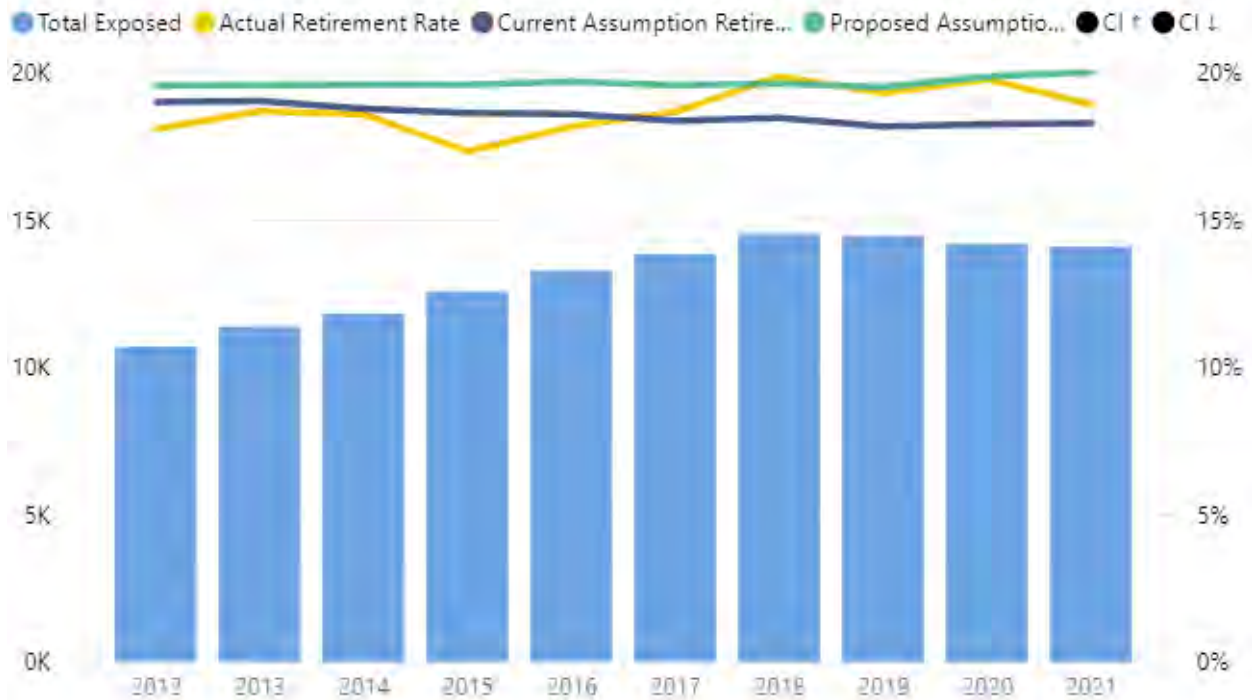
The Basic Plan Group includes the Basic Plan and the Age 57 Plan. The experience of these plans can be combined beginning at age 62. Prior to age 62, the Basic Plan offers early retirement at ages 55 to 61 whereas unreduced retirement begins at age 57.

The following table shows the experience for retirement by year, for the age range (62 to 79), and for the service range (5 to 39) for the basic plan group for the period 2012 – 2021. The actual rate of retirement averaged 18.79% whereas the overall expected rate of retirement averaged 18.50% based on the current assumptions and 19.67% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.02 to 0.96. For the service range 5 to 19 years, the A/E ratio increased from 0.85 to 0.96. For the service range 20 to 39 years, the A/E ratio decreased from 1.14 to 0.95 for members not in physically taxing titles and from 1.63 to 0.93 for members in physically taxing titles.

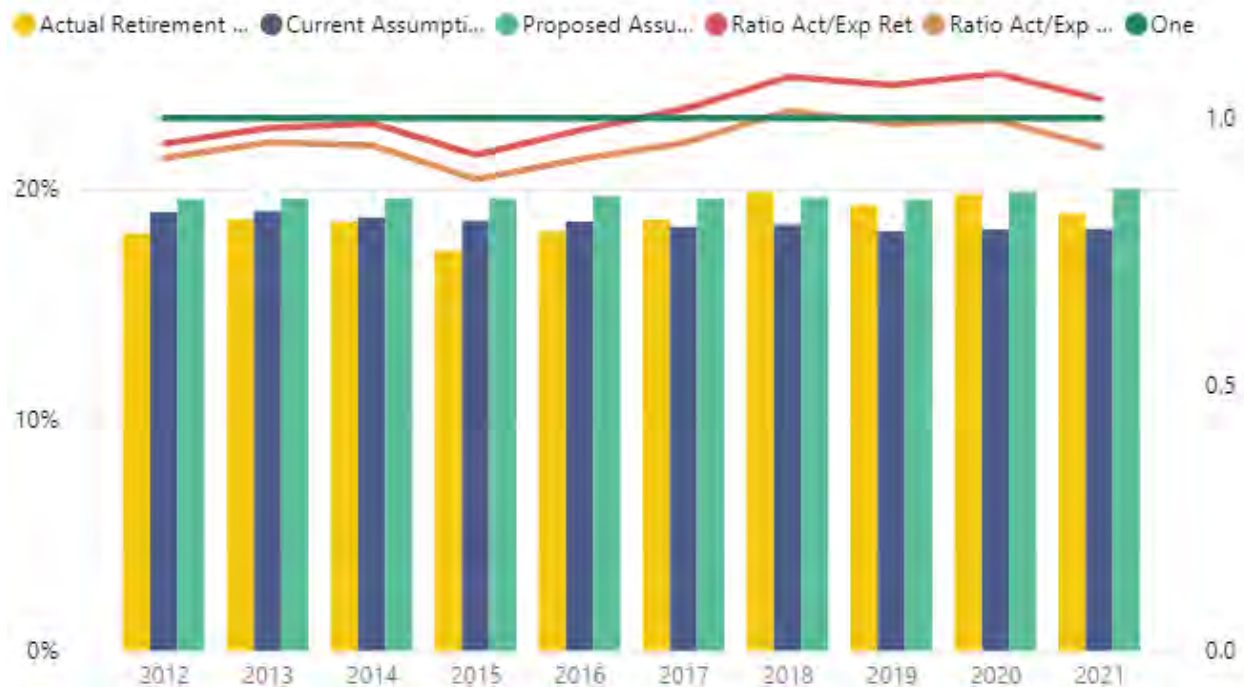
Plan Year	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
2012	1,934	2,031.6	10,692	18.09%	19.00%	0.95
2013	2,121	2,154.7	11,335	18.71%	19.01%	0.98
2014	2,190	2,206.7	11,775	18.60%	18.74%	0.99
2015	2,171	2,329.1	12,526	17.33%	18.59%	0.93
2016	2,405	2,456.3	13,235	18.17%	18.56%	0.98
2017	2,578	2,529.5	13,800	18.68%	18.33%	1.02
2018	2,878	2,668.7	14,481	19.87%	18.43%	1.08
2019	2,786	2,616.8	14,423	19.32%	18.14%	1.06
2020	2,795	2,578.4	14,148	19.76%	18.22%	1.08
2021	2,663	2,567.5	14,065	18.93%	18.25%	1.04
Total	24,521	24,139.5	130,480	18.79%	18.50%	1.02

Plan Year	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
2012	1,934	2,091.1	10,692	18.09%	19.56%	0.92
2013	2,121	2,220.1	11,335	18.71%	19.59%	0.96
2014	2,190	2,307.4	11,775	18.60%	19.60%	0.95
2015	2,171	2,454.9	12,526	17.33%	19.60%	0.88
2016	2,405	2,606.9	13,235	18.17%	19.70%	0.92
2017	2,578	2,703.1	13,800	18.68%	19.59%	0.95
2018	2,878	2,841.6	14,481	19.87%	19.62%	1.01
2019	2,786	2,814.8	14,423	19.32%	19.52%	0.99
2020	2,795	2,810.0	14,148	19.76%	19.86%	0.99
2021	2,663	2,816.0	14,065	18.93%	20.02%	0.95
Total	24,521	25,665.9	130,480	18.79%	19.67%	0.96

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Year

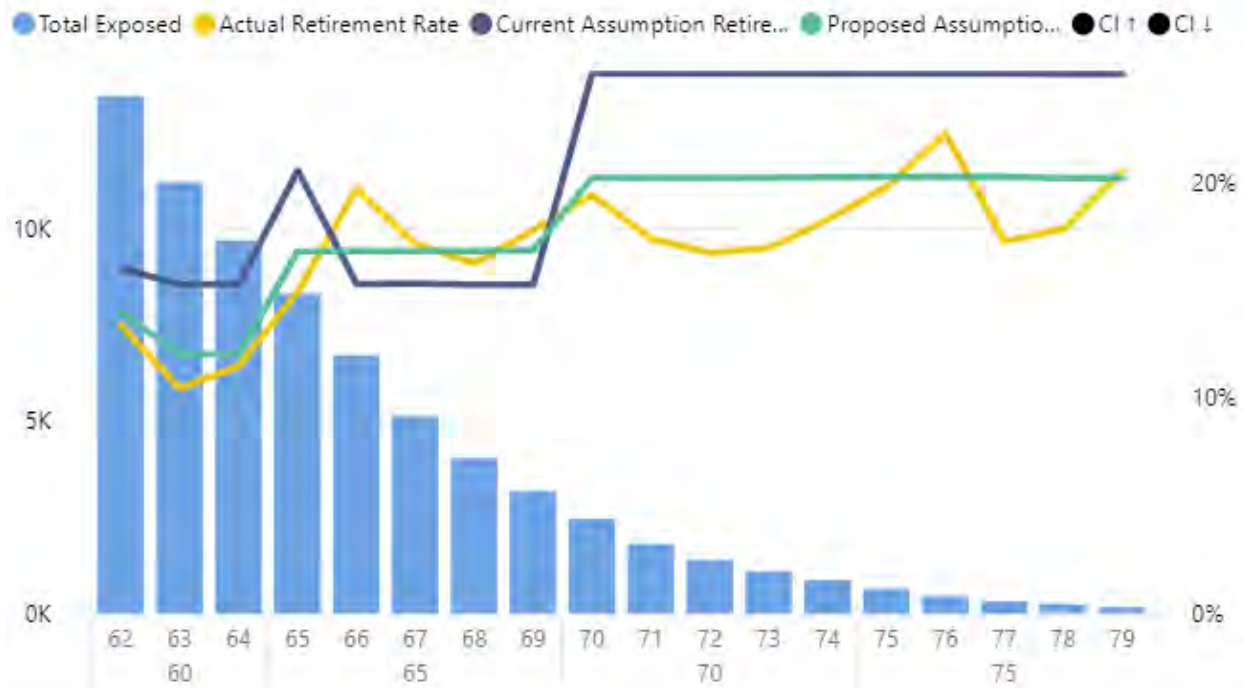


Retirement Rate - Actual, Expected, and Ratio; by Year



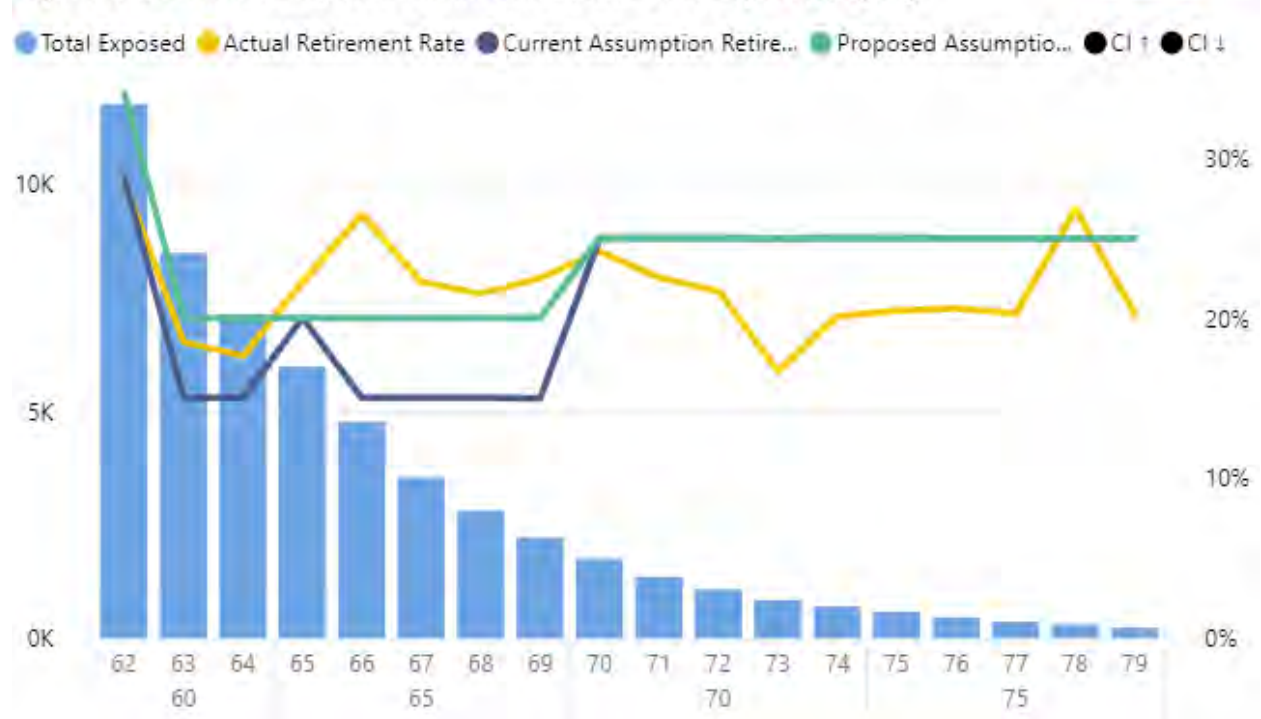
This chart shows the results by age for the service range 5 to 19 years, which decreased the assumed rate of retirement from 17.26 % to 15.30% as compared to the actual rate of 14.71%. This resulted in an increase in the A/E ratio from 0.85 to 0.96 for ages 62 to 79.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



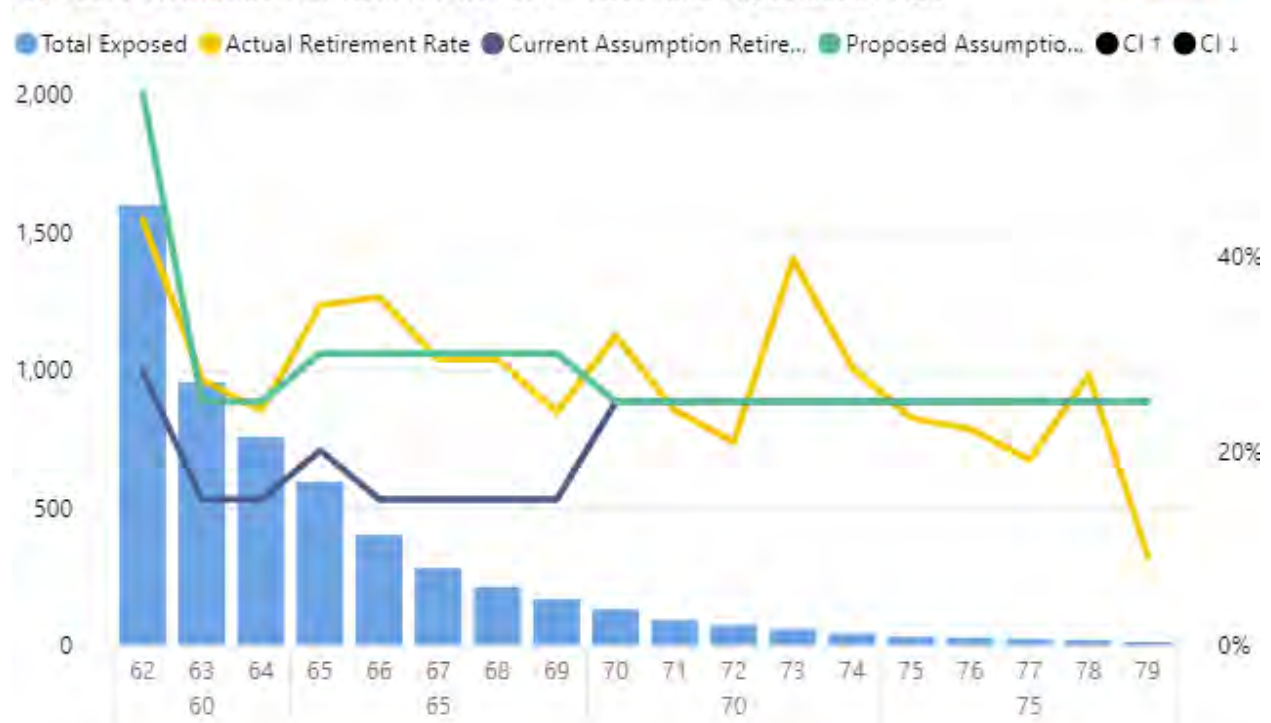
This chart shows the results by age for the service range 20 to 39 years for members not in physically taxing titles, which increased the assumed rate of retirement from 19.94% to 23.75% as compared to the actual rate of 22.68%. This resulted in a decrease in the A/E ratio from 1.14 to 0.95 for ages 62 to 79.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



This chart shows the results by age for the service range 20 to 39 years for members in physically taxing titles, which increased the assumed rate of retirement from 20.29% to 35.78% as compared to the actual rate of 33.17%. This resulted in a decrease in the A/E ratio from 1.63 to 0.93 for ages 62 to 79.





































Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



Basic 62/5 Plan (Plan F)

The following charts show the experience of Basic Age 62 Plan (Plan F) by service based on the age range (55 to 79) and service range (5 to 39) for the period 2012 – 2021 for all types of retirement. The actual rate of retirement averaged 11.64% whereas the overall expected rate of retirement averaged 10.10% based on the current assumptions and 11.26% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.15 to 1.03.

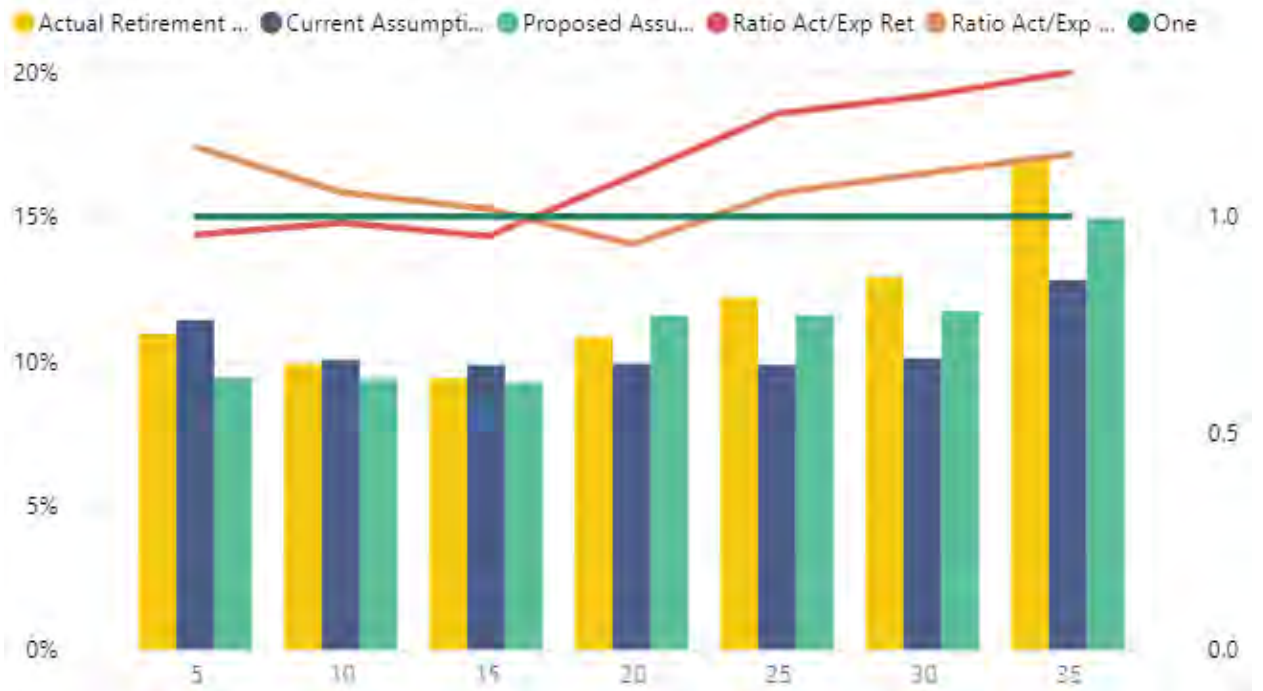
Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
5	45	33.3	212	21.23%	15.69%	▲ 1.35
6	58	48.7	390	14.87%	12.49%	▲ 1.19
7	61	78.9	674	9.05%	11.70%	▲ 0.77
8	75	85.6	799	9.39%	10.72%	▲ 0.88
9	101	108.4	1,035	9.76%	10.47%	● 0.93
10	160	146.0	1,400	11.43%	10.43%	● 1.10
11	155	186.0	1,821	8.51%	10.21%	▲ 0.83
12	208	244.4	2,420	8.60%	10.10%	▲ 0.85
13	344	296.5	2,988	11.51%	9.92%	▲ 1.16
14	337	348.3	3,541	9.52%	9.84%	● 0.97
15	405	402.5	4,107	9.86%	9.80%	● 1.01
16	498	519.2	5,246	9.49%	9.90%	● 0.96
17	581	619.7	6,339	9.17%	9.78%	● 0.94
18	715	764.5	7,708	9.28%	9.92%	● 0.94
19	836	874.3	8,870	9.43%	9.86%	● 0.96
20	1,111	969.0	9,841	11.29%	9.85%	▲ 1.15
21	1,106	1,044.9	10,558	10.48%	9.90%	● 1.06
22	1,161	1,105.6	11,250	10.32%	9.83%	● 1.05
23	1,247	1,195.8	11,986	10.40%	9.98%	● 1.04
24	1,428	1,215.1	12,264	11.64%	9.91%	▲ 1.18
25	1,575	1,245.6	12,488	12.61%	9.97%	▲ 1.26
26	1,420	1,186.1	12,010	11.82%	9.88%	▲ 1.20
27	1,366	1,118.8	11,413	11.97%	9.80%	▲ 1.22
28	1,226	1,020.5	10,435	11.75%	9.78%	▲ 1.20
29	1,278	974.1	9,901	12.91%	9.84%	▲ 1.31
30	1,239	945.2	9,547	12.98%	9.90%	▲ 1.31
31	1,124	890.8	9,005	12.48%	9.89%	▲ 1.26
32	984	775.3	7,853	12.53%	9.87%	▲ 1.27
33	844	672.2	6,499	12.99%	10.34%	▲ 1.26
34	729	566.1	5,270	13.83%	10.74%	▲ 1.29
35	581	451.4	3,981	14.59%	11.34%	▲ 1.29
36	496	368.1	2,962	16.75%	12.43%	▲ 1.35
37	385	281.9	2,066	18.64%	13.65%	▲ 1.37
38	276	204.4	1,410	19.57%	14.50%	▲ 1.35
39	177	130.3	802	22.07%	16.24%	▲ 1.36
Total	24,332	21,117.6	209,091	11.64%	10.10%	▲ 1.15

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret	
5	45	29.4	212	21.23%	13.89%		1.53
6	58	38.9	390	14.87%	9.97%		1.49
7	61	64.1	674	9.05%	9.52%		0.95
8	75	71.0	799	9.39%	8.88%		1.06
9	101	89.7	1,035	9.76%	8.67%		1.13
10	160	136.2	1,400	11.43%	9.73%		1.17
11	155	174.0	1,821	8.51%	9.56%		0.89
12	208	228.3	2,420	8.60%	9.43%		0.91
13	344	276.6	2,988	11.51%	9.26%		1.24
14	337	325.7	3,541	9.52%	9.20%		1.03
15	405	378.7	4,107	9.86%	9.22%		1.07
16	498	488.4	5,246	9.49%	9.31%		1.02
17	581	581.7	6,339	9.17%	9.18%		1.00
18	715	715.8	7,708	9.28%	9.29%		1.00
19	836	818.5	8,870	9.43%	9.23%		1.02
20	1,111	1,128.1	9,841	11.29%	11.46%		0.98
21	1,106	1,216.5	10,558	10.48%	11.52%		0.91
22	1,161	1,290.6	11,250	10.32%	11.47%		0.90
23	1,247	1,401.9	11,986	10.40%	11.70%		0.89
24	1,428	1,430.9	12,264	11.64%	11.67%		1.00
25	1,575	1,469.1	12,488	12.61%	11.76%		1.07
26	1,420	1,389.1	12,010	11.82%	11.57%		1.02
27	1,366	1,316.5	11,413	11.97%	11.53%		1.04
28	1,226	1,195.7	10,435	11.75%	11.46%		1.03
29	1,278	1,144.4	9,901	12.91%	11.56%		1.12
30	1,239	1,105.0	9,547	12.98%	11.57%		1.12
31	1,124	1,038.0	9,005	12.48%	11.53%		1.08
32	984	900.2	7,853	12.53%	11.46%		1.09
33	844	778.8	6,499	12.99%	11.98%		1.08
34	729	653.8	5,270	13.83%	12.41%		1.12
35	581	521.7	3,981	14.59%	13.11%		1.11
36	496	428.8	2,962	16.75%	14.48%		1.16
37	385	330.6	2,066	18.64%	16.00%		1.16
38	276	239.2	1,410	19.57%	16.96%		1.15
39	177	155.0	802	22.07%	19.33%		1.14
Total	24,332	23,550.8	209,091	11.64%	11.26%		1.03

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



Retirement Rate - Actual, Expected, and Ratio; by Service



The following charts show the experience of Basic Age 62 Plan (Plan F) by age, based on the age range (55 to 79) and service range (5 to 39) for the period 2012 – 2021 for all types of retirement.

Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
55	1,010	691.2	19,750	5.11%	3.50%	▲ 1.46
56	669	694.2	19,834	3.37%	3.50%	● 0.96
57	720	706.0	20,172	3.57%	3.50%	● 1.02
58	775	708.7	20,249	3.83%	3.50%	● 1.09
59	919	1,044.1	19,887	4.62%	5.25%	▲ 0.88
60	1,116	1,354.4	19,348	5.77%	7.00%	▲ 0.82
61	2,870	1,479.2	18,490	15.52%	8.00%	◆ 1.94
62	4,623	4,765.2	15,884	29.10%	30.00%	● 0.97
63	2,107	1,707.1	11,374	18.52%	15.01%	▲ 1.23
64	1,682	1,423.9	9,486	17.73%	15.01%	▲ 1.18
65	1,769	1,579.6	7,894	22.41%	20.01%	▲ 1.12
66	1,623	923.7	6,154	26.37%	15.01%	◆ 1.76
67	987	686.7	4,575	21.57%	15.01%	▲ 1.44
68	782	544.8	3,629	21.55%	15.01%	▲ 1.44
69	632	424.6	2,828	22.35%	15.02%	▲ 1.49
70	521	550.5	2,202	23.66%	25.00%	● 0.95
71	377	418.8	1,675	22.51%	25.00%	● 0.90
72	281	333.8	1,335	21.05%	25.00%	▲ 0.84
73	187	266.8	1,067	17.53%	25.00%	▲ 0.70
74	181	221.0	884	20.48%	25.00%	▲ 0.82
75	144	180.5	722	19.94%	25.00%	▲ 0.80
76	121	143.3	573	21.12%	25.00%	▲ 0.84
77	89	111.3	445	20.00%	25.00%	▲ 0.80
78	94	90.8	363	25.90%	25.00%	● 1.04
79	53	67.8	271	19.56%	25.00%	▲ 0.78
Total	24,332	21,117.6	209,091	11.64%	10.10%	▲ 1.15

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
55	1,010	987.5	19,750	5.11%	5.00%	1.02
56	669	694.2	19,834	3.37%	3.50%	0.96
57	720	706.0	20,172	3.57%	3.50%	1.02
58	775	708.7	20,249	3.83%	3.50%	1.09
59	919	994.4	19,887	4.62%	5.00%	0.92
60	1,116	1,257.6	19,348	5.77%	6.50%	0.89
61	2,870	1,479.2	18,490	15.52%	8.00%	1.94
62	4,623	5,568.5	15,884	29.10%	35.06%	0.83
63	2,107	2,115.3	11,374	18.52%	18.60%	1.00
64	1,682	1,758.4	9,486	17.73%	18.54%	0.96
65	1,769	1,581.3	7,894	22.41%	20.03%	1.12
66	1,623	1,228.2	6,154	26.37%	19.96%	1.32
67	987	910.7	4,575	21.57%	19.91%	1.08
68	782	720.9	3,629	21.55%	19.87%	1.08
69	632	562.5	2,828	22.35%	19.89%	1.12
70	521	525.7	2,202	23.66%	23.87%	0.99
71	377	399.9	1,675	22.51%	23.87%	0.94
72	281	318.9	1,335	21.05%	23.89%	0.88
73	187	254.4	1,067	17.53%	23.84%	0.74
74	181	210.1	884	20.48%	23.77%	0.86
75	144	172.3	722	19.94%	23.86%	0.84
76	121	137.0	573	21.12%	23.92%	0.88
77	89	106.8	445	20.00%	24.00%	0.83
78	94	87.3	363	25.90%	24.04%	1.08
79	53	65.2	271	19.56%	24.06%	0.81
Total	24,332	23,550.9	209,091	11.64%	11.26%	1.03

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age

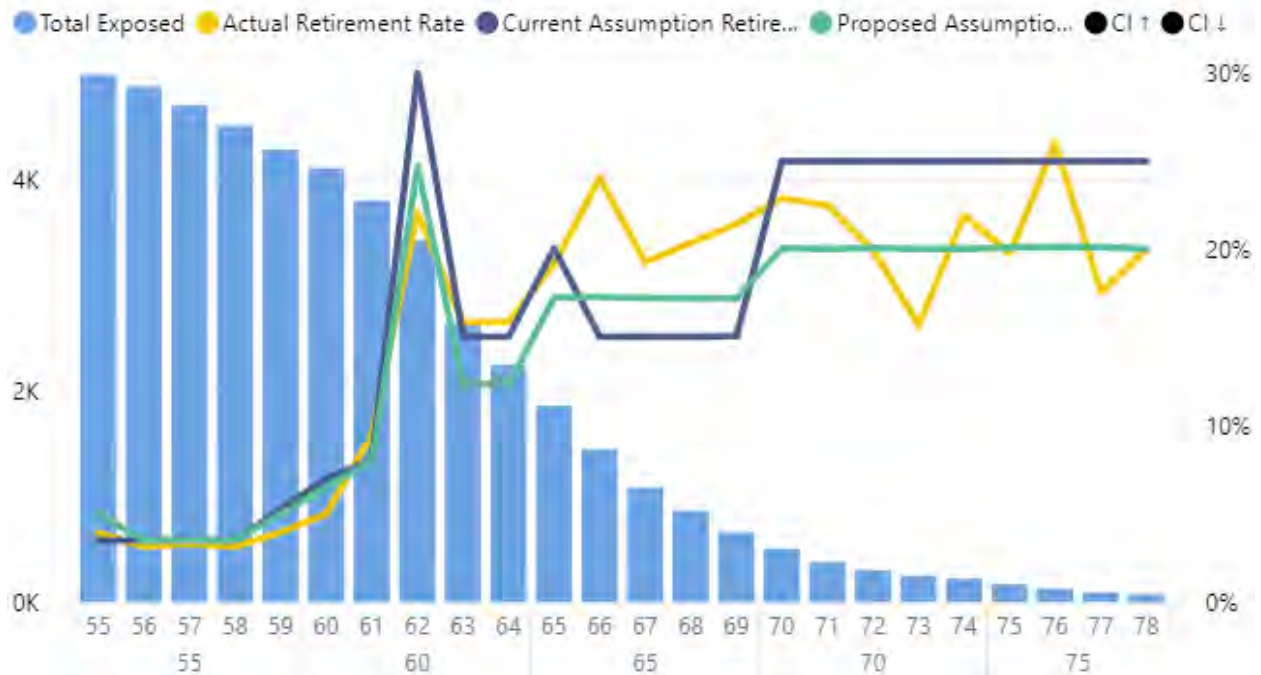


Retirement Rate - Actual, Expected, and Ratio; by Age



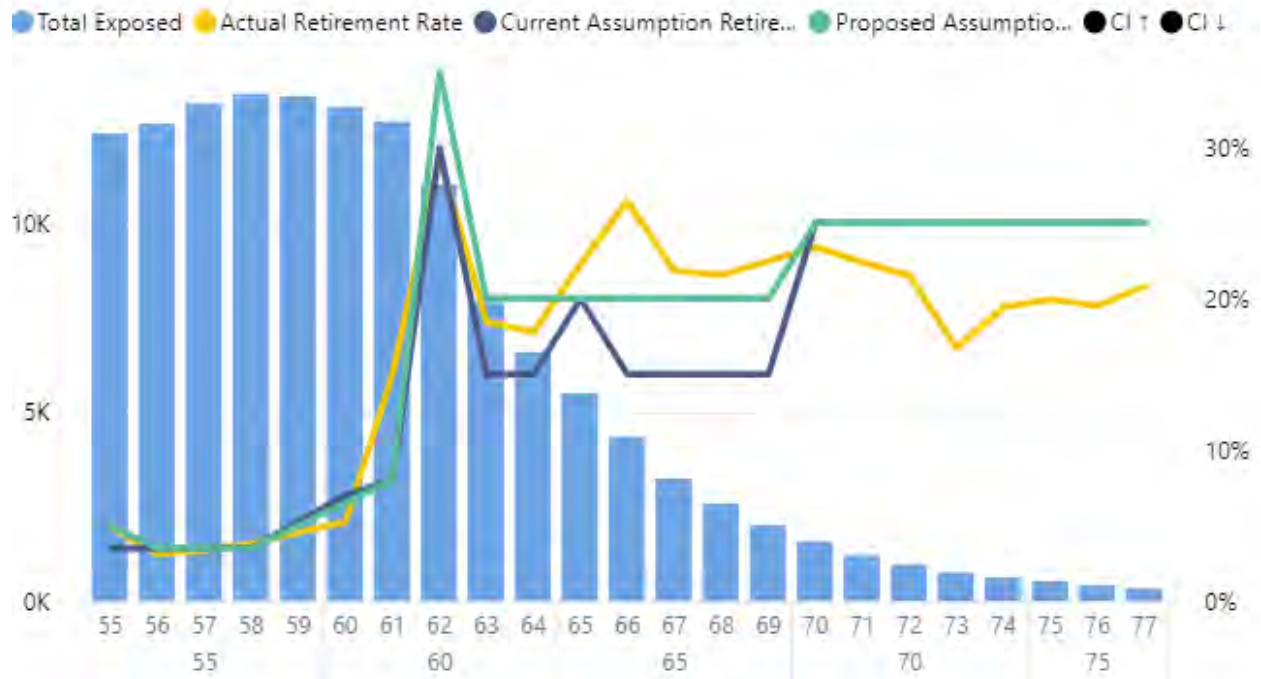
This chart shows the results by age for the service range 5 to 19 years, which decreased the assumed rate of retirement from 10.00% to 9.29% as compared to the actual rate of 9.63%. This resulted in an increase in the A/E ratio from 0.96 to 1.04 for ages 55 to 79. For early retirement ages 55 to 61, the A/E ratio decreased from 0.93 to 0.90 and for normal retirement ages 62 to 79, the A/E ratio increased from 0.98 to 1.11.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



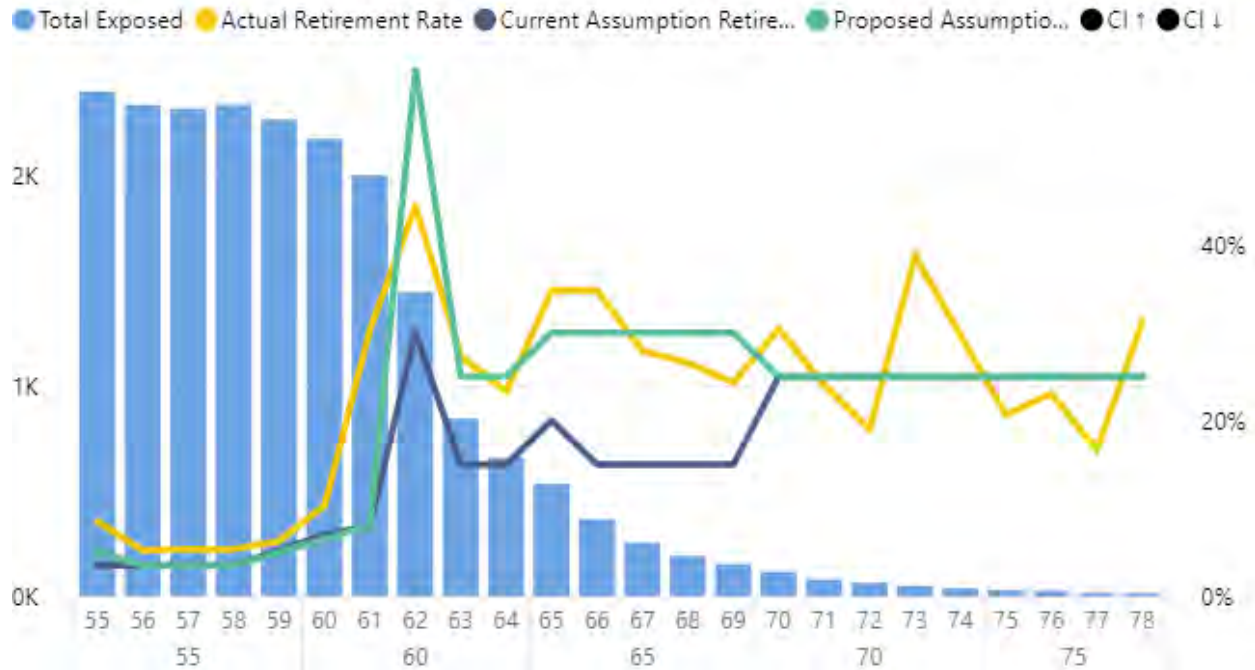
This chart shows the results by age for the service range 20 to 39 years for members not in physically taxing titles, which increased the assumed rate of retirement from 10.35% to 11.75% as compared to the actual rate of 11.78%. This resulted in a decrease in the A/E ratio from 1.14 to 1.00 for ages 55 to 79. For early retirement ages 55 to 61, the A/E ratio decreased from 1.16 to 1.14 and for normal retirement ages 62 to 79, the A/E ratio decreased from 1.13 to 0.95. Please note that we believe some of the age 61 retirements actually occurred at age 62 but due to rounding are recorded at age 61. As such, age 62 proposed rates were set based on the combined experience of age 61 and age 62.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



This chart shows the results by age for the service range 20 to 39 years for members in physically taxing titles, which increased the assumed rate of retirement from 8.60% to 12.47% as compared to the actual rate of 15.28%. This resulted in a decrease in the A/E ratio from 1.78 to 1.23 for ages 55 to 79. For early retirement ages 55 to 61, the A/E ratio decreased from 2.04 to 1.99 and for normal retirement ages 62 to 79, the A/E ratio decreased from 1.58 to 0.90. Please note that we believe some of the age 61 retirements actually occurred at age 62 but due to rounding are recorded at age 61. As such, age 62 proposed rates were set based on the combined experience of age 61 and age 62.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



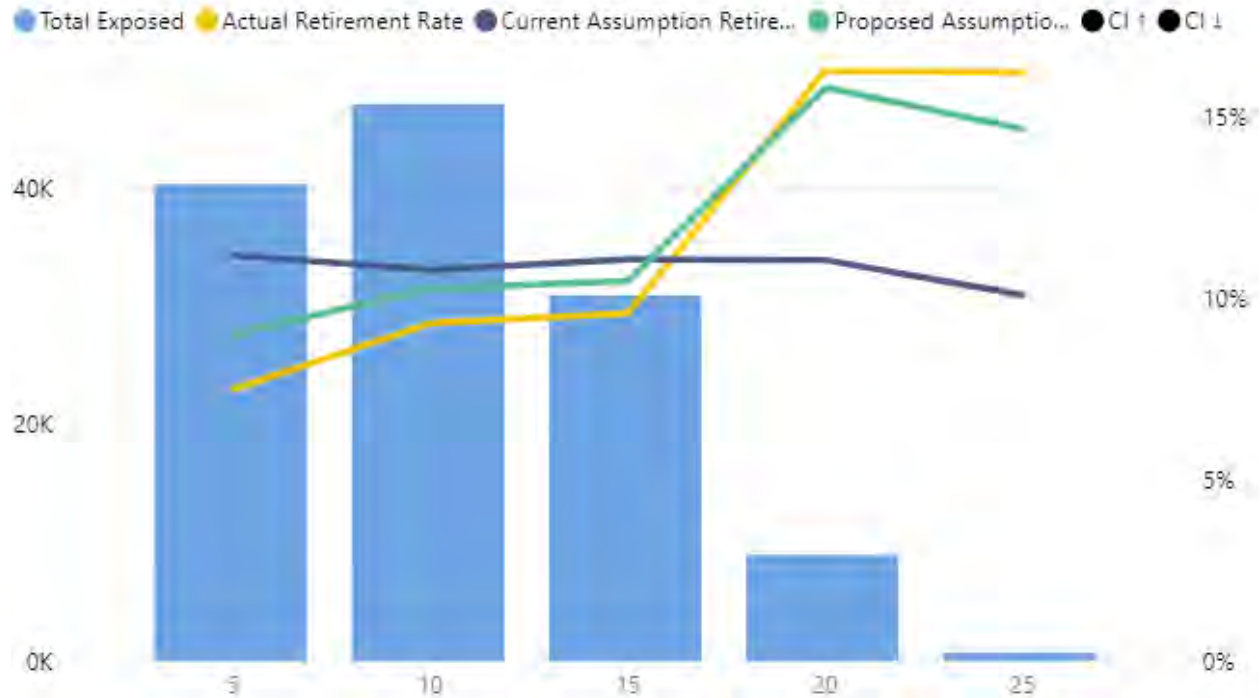
Age 57/5 Plan (Plan I)

The following charts show the experience of Age 57 Plan (Plan I) by service based on the age range (57 to 79) and service range (5 to 29) for the period 2012 – 2021. The actual rate of retirement averaged 9.32% whereas the overall expected rate of retirement averaged 10.99% based on the current assumptions and 10.33% based on the proposed assumptions. This resulted in an increase in the A/E ratio from 0.85 to 0.90.

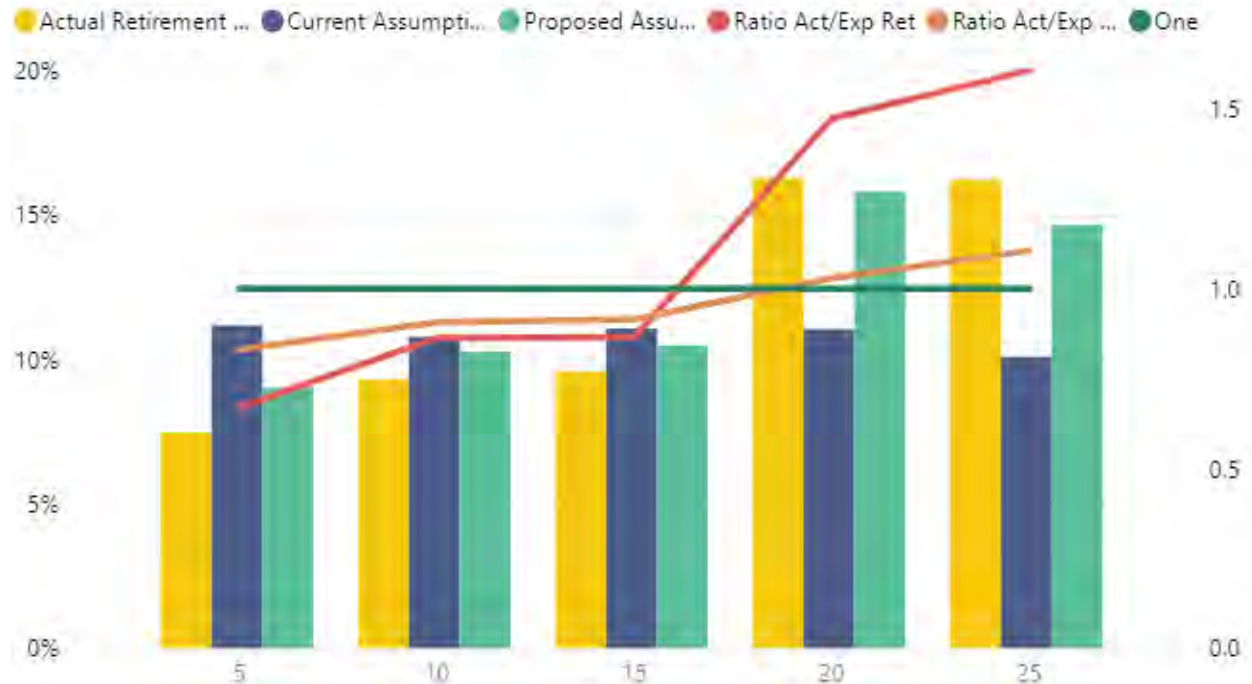
Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
5	763	976.4	6,469	11.79%	15.09%	▲ 0.78
6	560	785.9	7,625	7.34%	10.31%	▲ 0.71
7	520	833.1	8,062	6.45%	10.33%	▲ 0.62
8	526	926.0	8,877	5.93%	10.43%	▲ 0.57
9	652	990.8	9,337	6.98%	10.61%	▲ 0.66
10	1,060	1,067.9	9,965	10.64%	10.72%	● 0.99
11	906	1,052.7	9,852	9.20%	10.68%	▲ 0.86
12	821	1,005.2	9,385	8.75%	10.71%	▲ 0.82
13	839	1,017.3	9,399	8.93%	10.82%	▲ 0.82
14	762	939.4	8,561	8.90%	10.97%	▲ 0.81
15	755	868.4	7,934	9.52%	10.94%	▲ 0.87
16	642	772.0	7,024	9.14%	10.99%	▲ 0.83
17	574	673.4	6,116	9.39%	11.01%	▲ 0.85
18	453	591.8	5,327	8.50%	11.11%	▲ 0.77
19	538	516.3	4,536	11.86%	11.38%	● 1.04
20	633	384.0	3,413	18.55%	11.25%	◆ 1.65
21	352	254.2	2,338	15.06%	10.87%	▲ 1.38
22	222	170.3	1,549	14.33%	10.99%	▲ 1.30
23	163	115.8	1,060	15.38%	10.93%	▲ 1.41
24	88	65.2	600	14.67%	10.86%	▲ 1.35
25	48	26.7	249	19.28%	10.73%	◆ 1.80
26	17	13.1	135	12.59%	9.72%	▲ 1.30
27	18	11.0	117	15.38%	9.36%	◆ 1.64
28	15	10.5	104	14.42%	10.07%	▲ 1.43
29	14	8.4	86	16.28%	9.76%	◆ 1.67
Total	11,941	14,075.8	128,120	9.32%	10.99%	▲ 0.85

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
5	763	866.7	6,469	11.79%	13.40%	▲ 0.88
6	560	616.3	7,625	7.34%	8.08%	● 0.91
7	520	651.3	8,062	6.45%	8.08%	▲ 0.80
8	526	724.4	8,877	5.93%	8.16%	▲ 0.73
9	652	775.9	9,337	6.98%	8.31%	▲ 0.84
10	1,060	1,020.8	9,965	10.64%	10.24%	● 1.04
11	906	1,004.7	9,852	9.20%	10.20%	● 0.90
12	821	957.8	9,385	8.75%	10.21%	▲ 0.86
13	839	966.9	9,399	8.93%	10.29%	▲ 0.87
14	762	889.6	8,561	8.90%	10.39%	▲ 0.86
15	755	823.5	7,934	9.52%	10.38%	● 0.92
16	642	731.7	7,024	9.14%	10.42%	▲ 0.88
17	574	638.4	6,116	9.39%	10.44%	▲ 0.90
18	453	560.6	5,327	8.50%	10.52%	▲ 0.81
19	538	484.9	4,536	11.86%	10.69%	▲ 1.11
20	633	547.1	3,413	18.55%	16.03%	▲ 1.16
21	352	365.0	2,338	15.06%	15.61%	● 0.96
22	222	243.7	1,549	14.33%	15.74%	● 0.91
23	163	166.8	1,060	15.38%	15.73%	● 0.98
24	88	93.5	600	14.67%	15.59%	● 0.94
25	48	38.0	249	19.26%	15.26%	▲ 1.26
26	17	19.2	135	12.59%	14.23%	▲ 0.88
27	18	16.2	117	15.38%	13.88%	▲ 1.11
28	15	15.4	104	14.42%	14.84%	● 0.97
29	14	12.4	86	16.28%	14.41%	▲ 1.13
Total	11,941	13,230.8	128,120	9.32%	10.33%	● 0.90

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



Retirement Rate - Actual, Expected, and Ratio; by Service

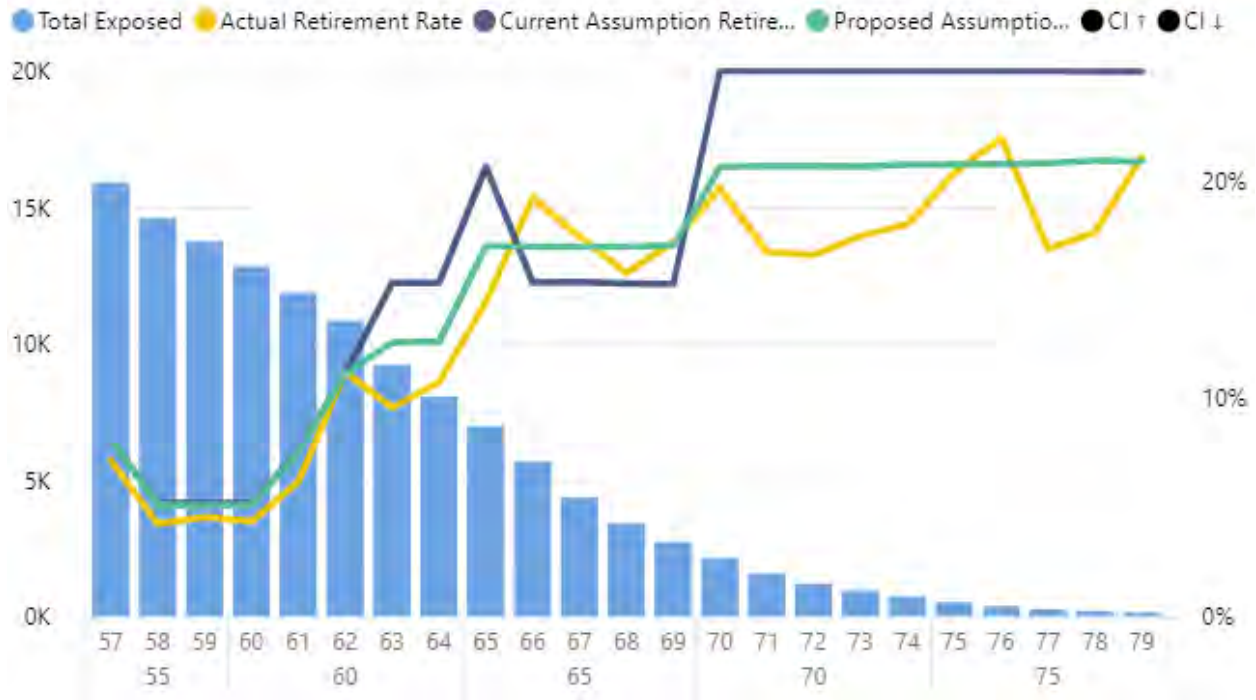


The following charts show the experience of Age 57 Plan (Plan I) by age, based on the age range (57 to 79) and service range (5 to 29) for the period 2012 – 2021.

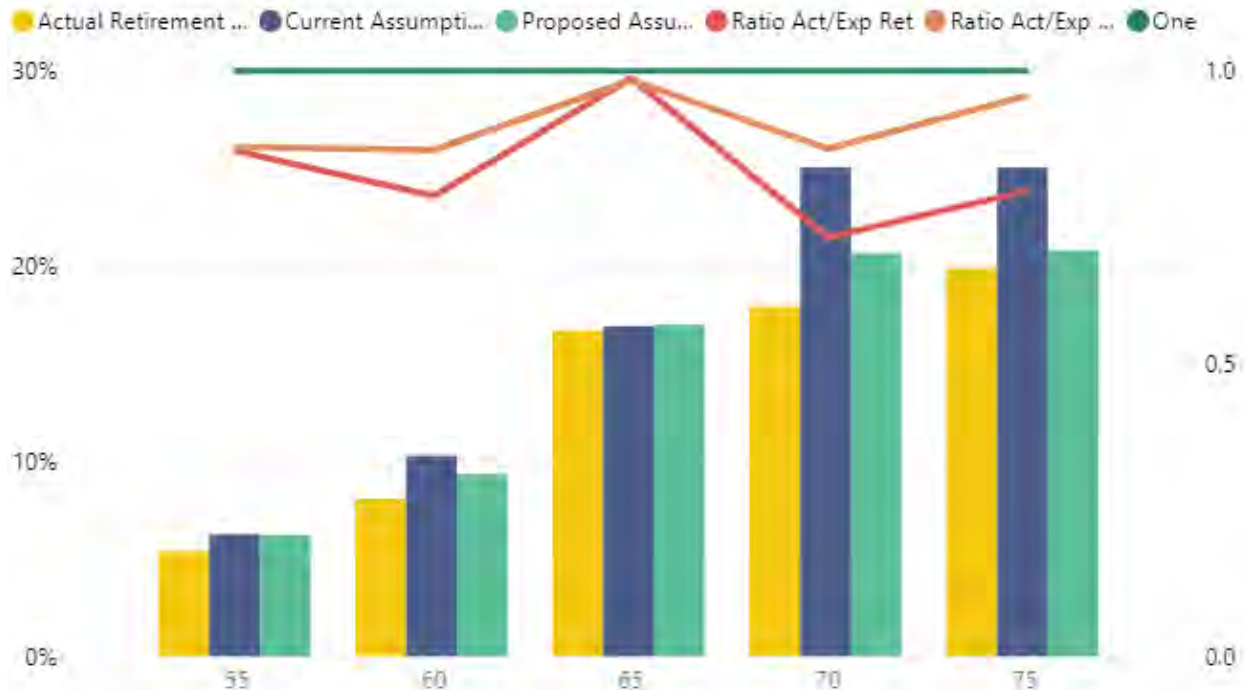
Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
57	1,133	1,282.1	15,899	7.13%	8.06%	▲ 0.88
58	619	760.5	14,596	4.24%	5.21%	▲ 0.81
59	625	715.0	13,736	4.55%	5.21%	▲ 0.87
60	557	665.8	12,823	4.34%	5.19%	▲ 0.84
61	732	899.6	11,857	6.17%	7.59%	▲ 0.81
62	1,215	1,206.3	10,839	11.21%	11.13%	● 1.01
63	881	1,407.1	9,204	9.57%	15.29%	▲ 0.63
64	864	1,230.8	8,045	10.74%	15.30%	▲ 0.70
65	1,002	1,433.5	6,955	14.41%	20.61%	▲ 0.70
66	1,090	869.1	5,676	19.20%	15.31%	▲ 1.25
67	758	666.8	4,351	17.42%	15.32%	▲ 1.14
68	538	521.7	3,415	15.75%	15.28%	● 1.03
69	467	415.1	2,722	17.16%	15.25%	▲ 1.12
70	418	532.6	2,128	19.64%	25.03%	▲ 0.78
71	261	391.1	1,563	16.70%	25.02%	▲ 0.67
72	197	297.6	1,189	16.57%	25.03%	▲ 0.66
73	162	232.3	928	17.46%	25.03%	▲ 0.70
74	130	181.0	723	17.98%	25.03%	▲ 0.72
75	106	130.4	521	20.35%	25.03%	▲ 0.81
76	81	92.4	369	21.95%	25.03%	▲ 0.88
77	43	63.8	255	16.86%	25.02%	▲ 0.67
78	34	48.3	193	17.62%	25.00%	▲ 0.70
79	28	33.3	133	21.05%	25.00%	▲ 0.84
Total	11,941	14,075.8	128,120	9.32%	10.99%	▲ 0.85

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
57	1,133	1,291.7	15,899	7.13%	8.12%	▲ 0.88
58	619	744.6	14,596	4.24%	5.10%	▲ 0.83
59	625	699.4	13,736	4.55%	5.09%	▲ 0.89
60	557	654.3	12,823	4.34%	5.10%	▲ 0.85
61	732	890.3	11,857	6.17%	7.51%	▲ 0.82
62	1,215	1,203.6	10,839	11.21%	11.10%	● 1.01
63	881	1,156.6	9,204	9.57%	12.57%	▲ 0.76
64	864	1,013.5	8,045	10.74%	12.60%	▲ 0.85
65	1,002	1,180.5	6,955	14.41%	16.97%	▲ 0.85
66	1,090	962.4	5,676	19.20%	16.96%	▲ 1.13
67	758	737.6	4,351	17.42%	16.95%	● 1.03
68	538	579.3	3,415	15.75%	16.96%	● 0.93
69	467	463.1	2,722	17.16%	17.01%	● 1.01
70	418	438.6	2,128	19.64%	20.61%	● 0.95
71	261	323.0	1,563	16.70%	20.66%	▲ 0.81
72	197	245.5	1,189	16.57%	20.65%	▲ 0.80
73	162	191.4	928	17.46%	20.63%	▲ 0.85
74	130	149.8	723	17.98%	20.72%	▲ 0.87
75	106	107.9	521	20.35%	20.72%	● 0.98
76	81	76.5	369	21.95%	20.75%	● 1.06
77	43	53.0	255	16.86%	20.78%	▲ 0.81
78	34	40.4	193	17.62%	20.91%	▲ 0.84
79	28	27.8	133	21.05%	20.86%	● 1.01
Total	11,941	13,230.8	128,120	9.32%	10.33%	● 0.90

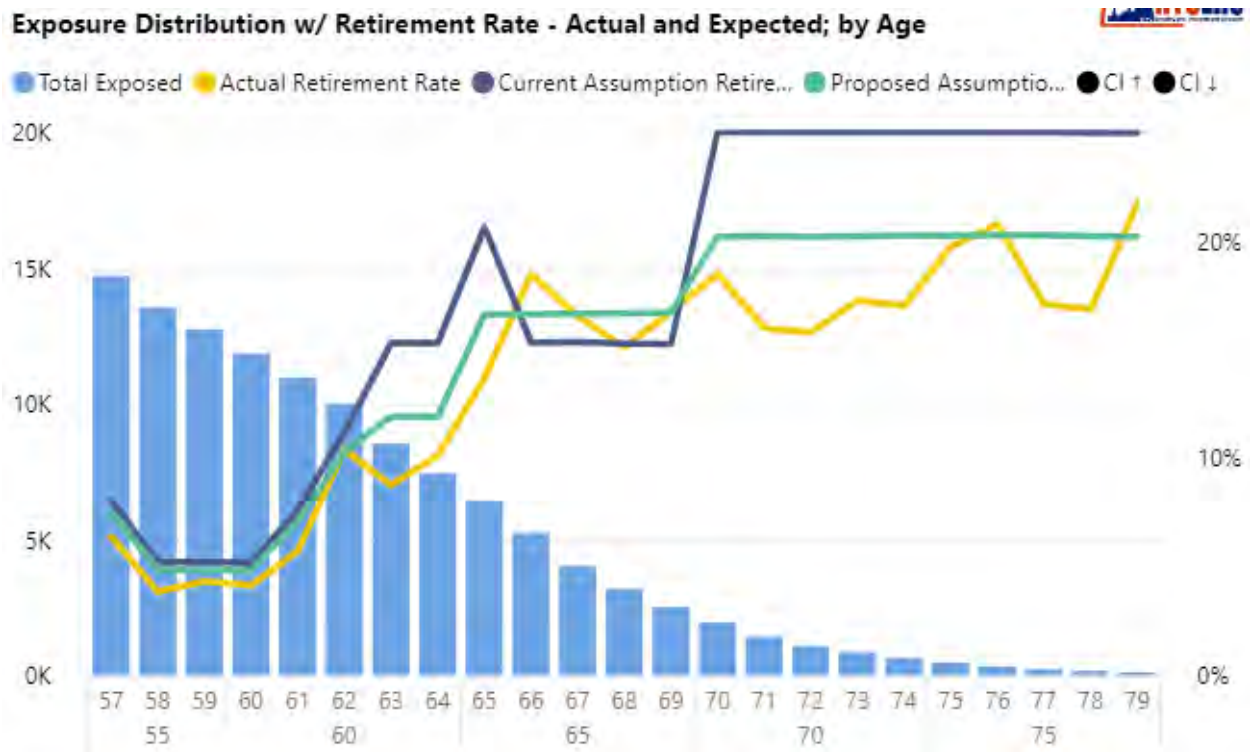
Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



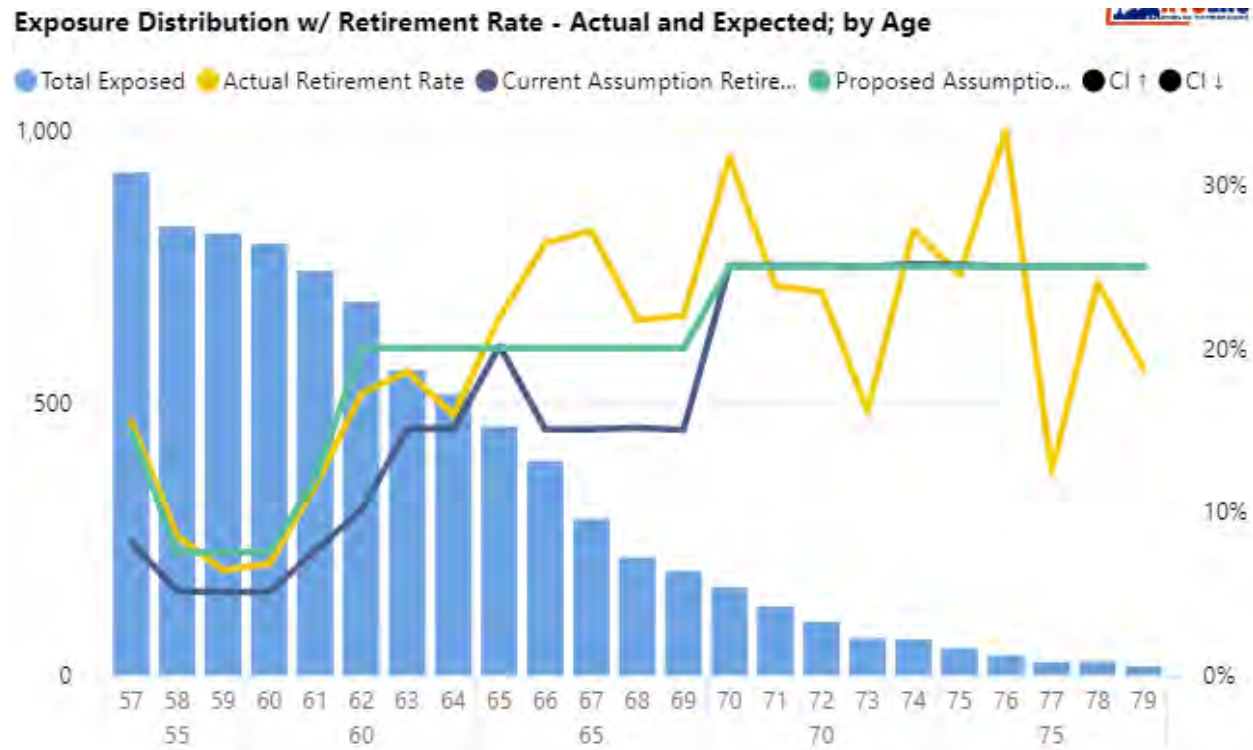
Retirement Rate - Actual, Expected, and Ratio; by Age



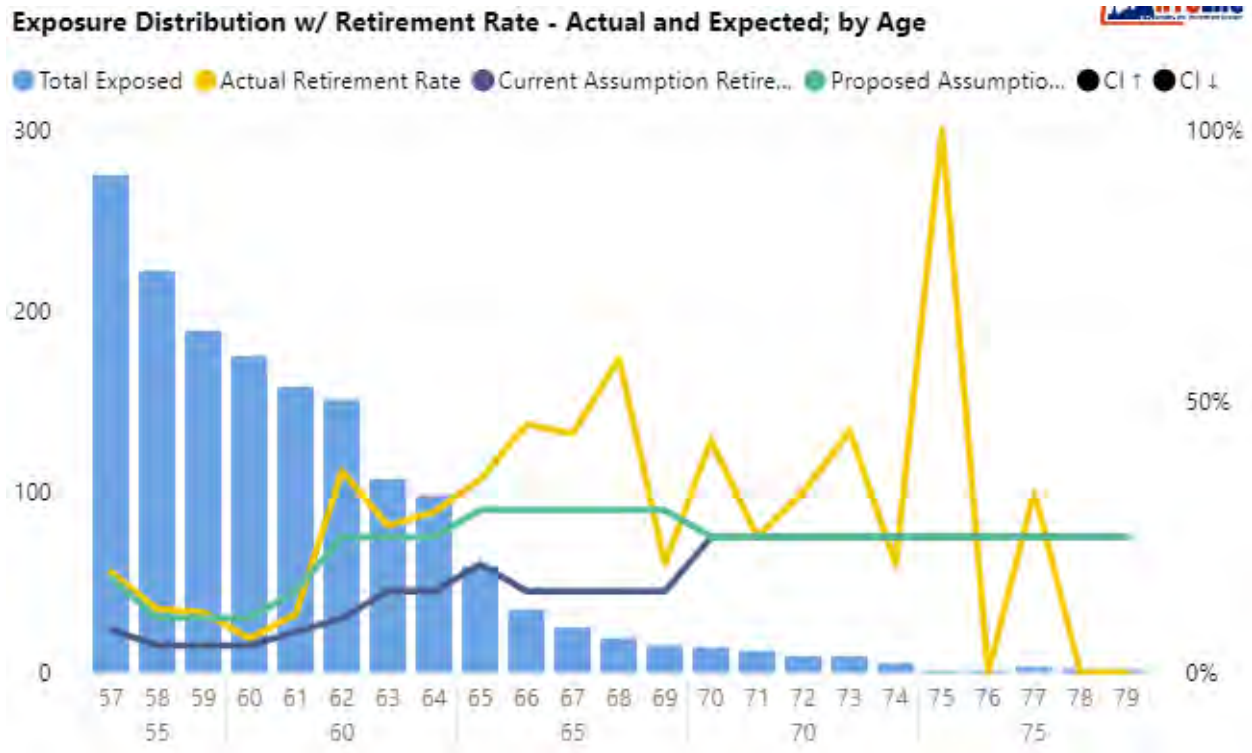
This chart shows the results by age for the service range 5 to 19 years, which decreased the assumed rate of retirement from 10.99% to 9.89% as compared to the actual rate of 8.75%. This resulted in an increase in the A/E ratio from 0.80 to 0.89 for ages 57 to 79.



This chart shows the results by age for the service range 20 to 29 years for members not in physically taxing titles, which increased the assumed rate of retirement from 11.29% to 15.34% as compared to the actual rate of 15.49%. This resulted in a decrease in the A/E ratio from 1.37 to 1.01 for ages 57 to 79.



This chart shows the results by age for the service range 20 to 29 years for members in physically taxing titles, which increased the assumed rate of retirement from 9.39% to 17.64% as compared to the actual rate of 20.24%. This resulted in a decrease in the A/E ratio from 2.15 to 1.15 for ages 57 to 79.



Specialty Plan Grouping

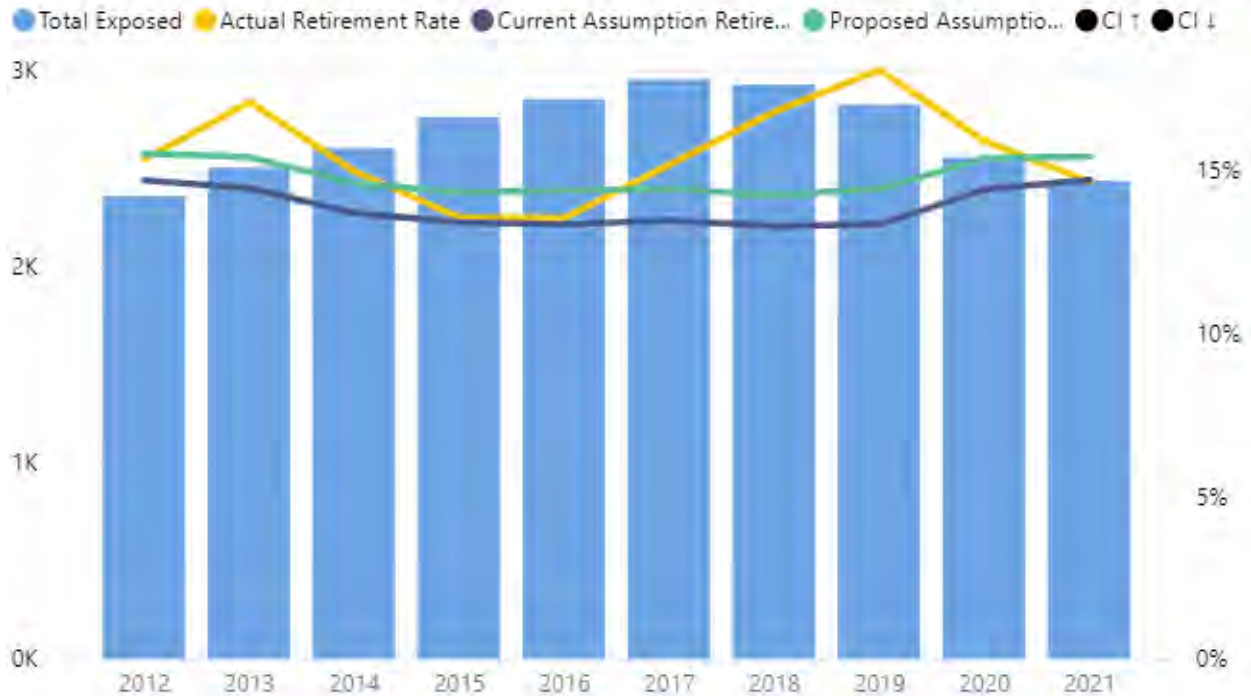
The Specialty Plan Group includes plans that require 25 years to retire with an unreduced benefit. Alternatively, these members could retire under the Basic Plan provisions and receive an unreduced retirement benefit. We propose to use the proposed reduced retirement rates.

The following table shows the experience for retirement by year, for the age range (55 to 79), and for the service range (5 to 39) for the specialty plan group for the period 2012 – 2021 for all types of retirement. The actual rate of retirement averaged 15.52% whereas the overall expected rate of retirement averaged 13.84% based on the current assumptions and 14.78% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.12 to 1.05.

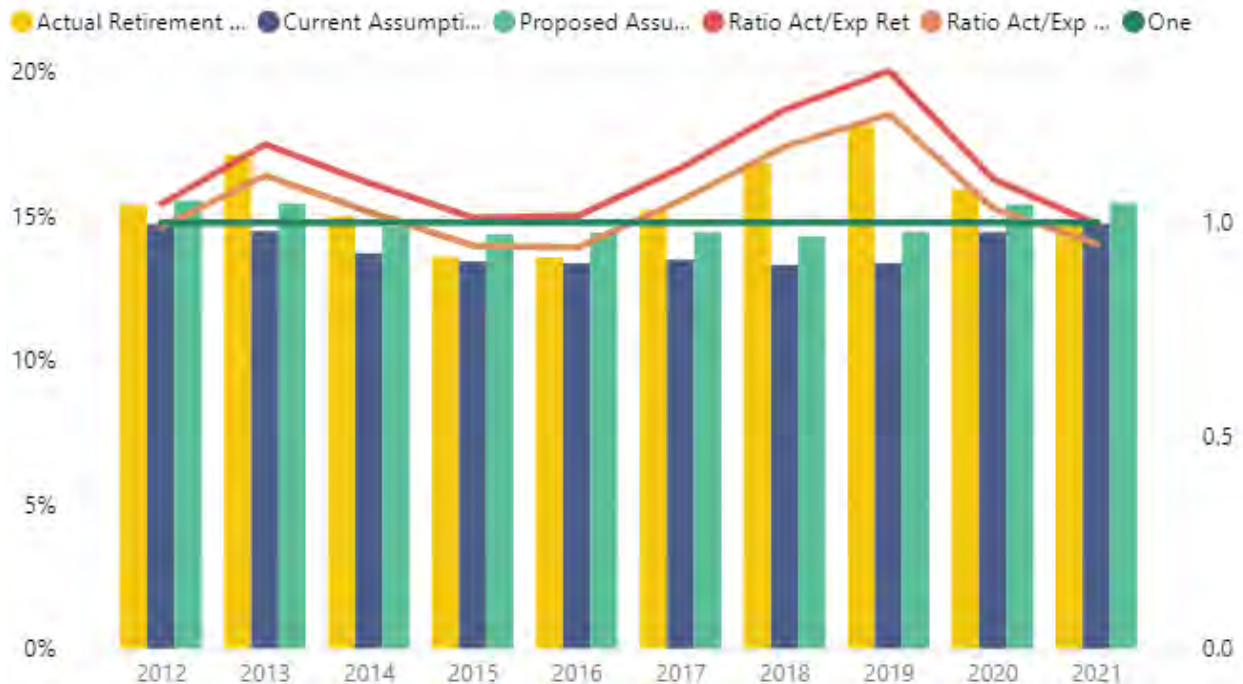
Plan Year	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
2012	362	346.7	2,358	15.35%	14.70%	1.04
2013	428	361.6	2,502	17.11%	14.45%	1.18
2014	389	356.0	2,600	14.96%	13.69%	1.09
2015	374	369.9	2,759	13.56%	13.41%	1.01
2016	386	380.1	2,849	13.55%	13.34%	1.02
2017	448	397.1	2,950	15.19%	13.46%	1.13
2018	492	388.8	2,926	16.81%	13.29%	1.27
2019	511	376.9	2,824	18.09%	13.35%	1.36
2020	406	368.5	2,555	15.89%	14.42%	1.10
2021	357	358.3	2,435	14.66%	14.71%	1.00
Total	4,153	3,703.8	26,758	15.52%	13.84%	1.12

Plan Year	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
2012	362	365.9	2,358	15.35%	15.52%	0.99
2013	428	385.6	2,502	17.11%	15.41%	1.11
2014	389	379.6	2,600	14.96%	14.60%	1.02
2015	374	395.7	2,759	13.56%	14.34%	0.95
2016	386	409.9	2,849	13.55%	14.39%	0.94
2017	448	425.5	2,950	15.19%	14.42%	1.05
2018	492	417.3	2,926	16.81%	14.26%	1.18
2019	511	407.5	2,824	18.09%	14.43%	1.25
2020	406	393.0	2,555	15.89%	15.38%	1.03
2021	357	375.7	2,435	14.66%	15.43%	0.95
Total	4,153	3,955.8	26,758	15.52%	14.78%	1.05

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Year



Retirement Rate - Actual, Expected, and Ratio; by Year



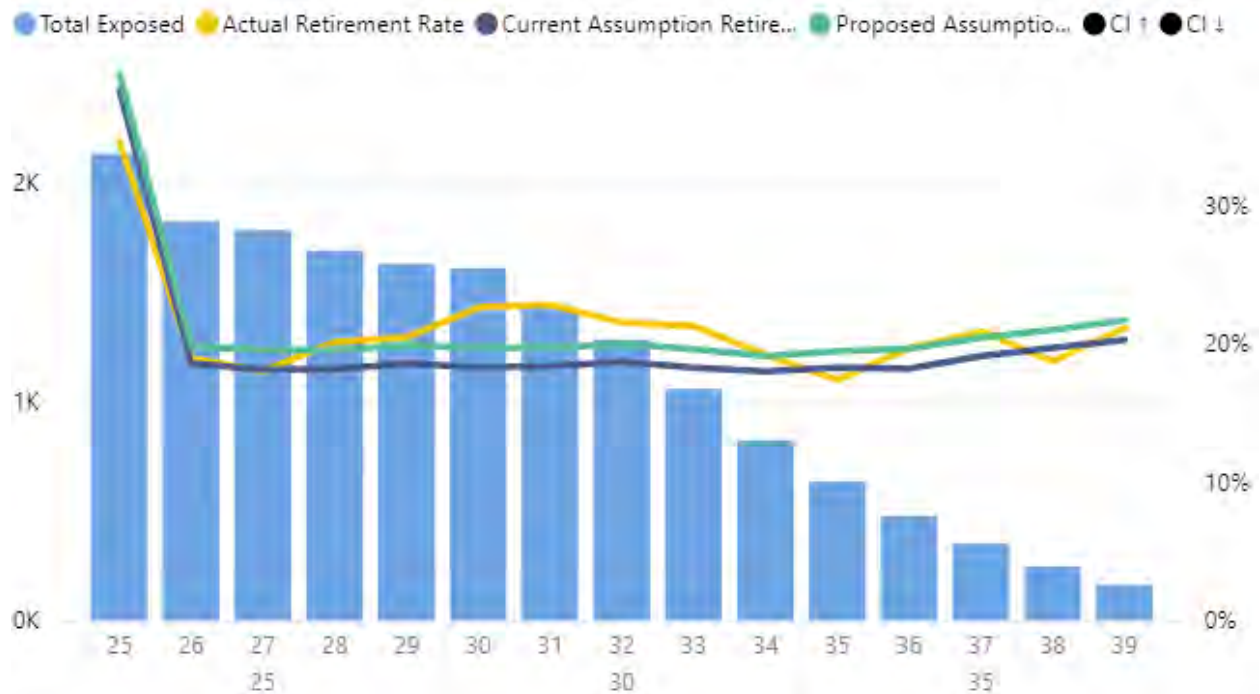
Since retirement experience varies by eligibility for unreduced retirement, we have reviewed the experience of the specialty plan group with service of at least 25 years. The following charts show

the experience for retirement by service, for the age range (50 to 79), and for the service range (25 to 39) for the specialty plan group for the period 2012 – 2021 for the current and proposed assumptions. The actual rate of retirement averaged 22.08% whereas the overall expected rate of retirement averaged 20.86% based on the current assumptions and 22.17% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.06 to 1.00. For members not in a physically taxing title, the A/E ratio decreased from 0.94 to 0.93 and for members in a physically taxing title, the A/E ratio decreased from 1.21 to 1.07.

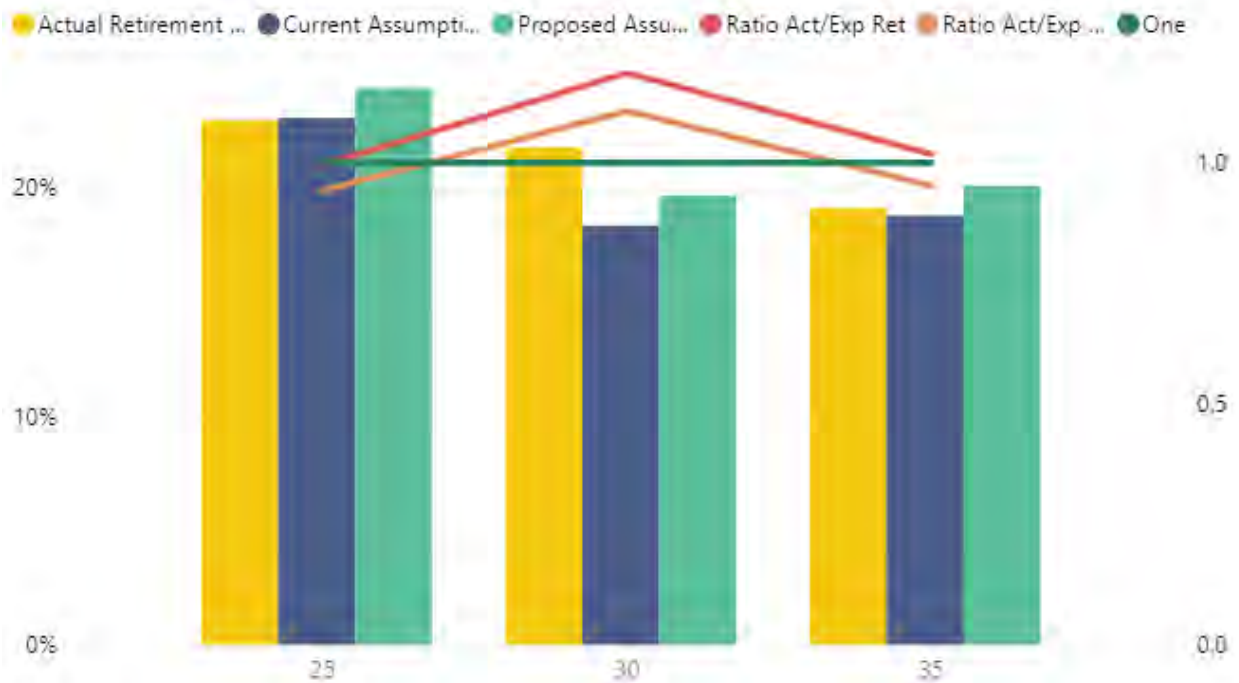
Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
25	739	818.0	2,135	34.61%	38.31%	0.90
26	345	337.8	1,824	18.91%	18.52%	1.02
27	321	322.8	1,783	18.00%	18.11%	0.99
28	340	306.5	1,690	20.12%	18.14%	1.11
29	333	302.2	1,630	20.43%	18.54%	1.10
30	364	294.2	1,610	22.61%	18.27%	1.24
31	327	263.0	1,434	22.80%	18.34%	1.24
32	276	239.9	1,284	21.50%	18.68%	1.15
33	225	193.0	1,058	21.27%	18.24%	1.17
34	158	148.0	824	19.17%	17.96%	1.07
35	110	115.8	634	17.35%	18.26%	0.95
36	94	87.0	478	19.67%	18.19%	1.08
37	73	66.9	350	20.86%	19.10%	1.09
38	46	48.5	246	18.70%	19.70%	0.95
39	34	32.6	161	21.12%	20.25%	1.04
Total	3,785	3,576.0	17,141	22.08%	20.86%	1.06

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
25	739	842.9	2,135	34.61%	39.48%	0.88
26	345	361.0	1,824	18.91%	19.79%	0.96
27	321	347.8	1,783	18.00%	19.51%	0.92
28	340	329.5	1,690	20.12%	19.50%	1.03
29	333	323.8	1,630	20.43%	19.86%	1.03
30	364	316.9	1,610	22.61%	19.68%	1.15
31	327	281.6	1,434	22.80%	19.64%	1.16
32	276	256.6	1,284	21.50%	19.98%	1.08
33	225	207.0	1,058	21.27%	19.57%	1.09
34	158	157.3	824	19.17%	19.10%	1.00
35	110	123.3	634	17.35%	19.45%	0.89
36	94	93.8	478	19.67%	19.62%	1.00
37	73	71.4	350	20.86%	20.41%	1.02
38	46	51.6	246	18.70%	20.99%	0.89
39	34	34.9	161	21.12%	21.66%	0.97
Total	3,785	3,799.5	17,141	22.08%	22.17%	1.00

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



Retirement Rate - Actual, Expected, and Ratio; by Service



The following charts show the experience for retirement by age, for the age range (50 to 79), and for the service range (25 to 39) for the specialty plan group for the period 2012 – 2021.

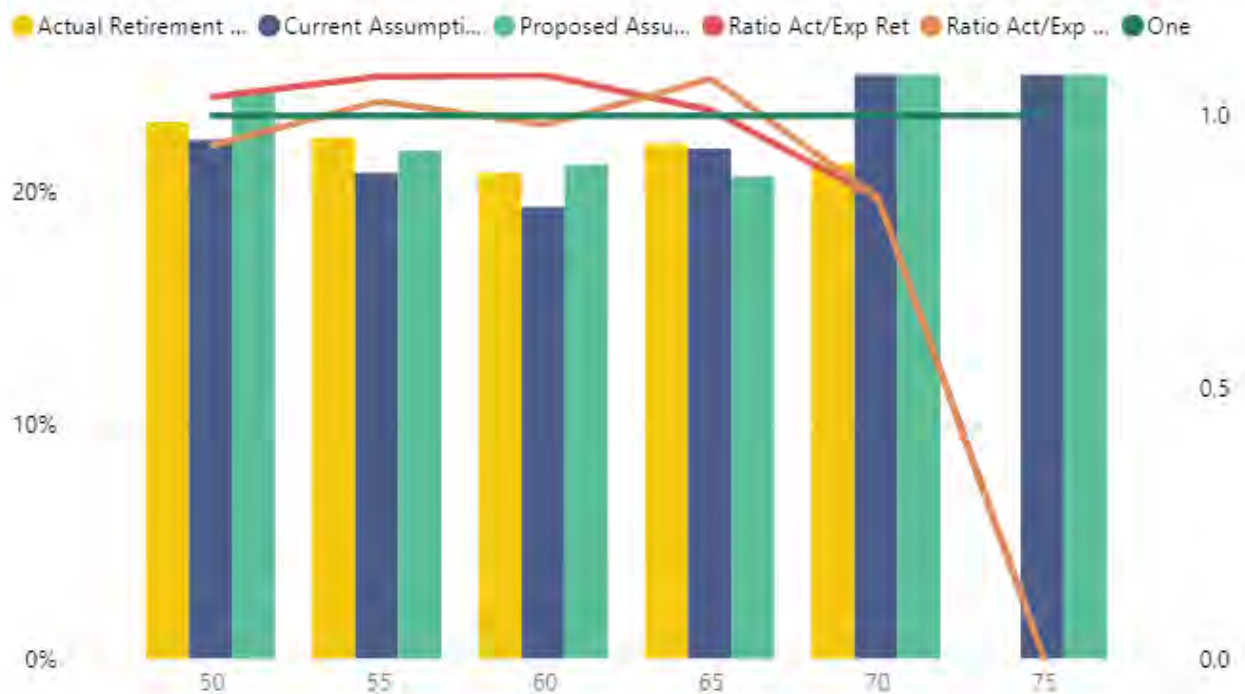
Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
50	285	261.6	770	37.01%	33.97%	1.09
51	140	150.4	721	19.42%	20.85%	0.93
52	155	155.0	798	19.42%	19.42%	1.00
53	160	158.8	840	19.05%	18.90%	1.01
54	181	164.3	876	20.66%	18.76%	1.10
55	672	622.5	2,034	33.04%	30.60%	1.08
56	347	293.3	1,642	21.13%	17.86%	1.18
57	268	273.5	1,546	17.34%	17.69%	0.98
58	264	256.5	1,469	17.97%	17.46%	1.03
59	241	224.9	1,338	18.01%	16.81%	1.07
60	162	194.3	1,177	13.76%	16.51%	0.83
61	203	175.4	1,077	18.85%	16.29%	1.16
62	291	231.0	884	32.92%	26.13%	1.26
63	124	114.9	576	21.53%	19.95%	1.08
64	80	84.2	422	18.96%	19.95%	0.95
65	63	80.5	322	19.57%	24.98%	0.78
66	56	45.0	225	24.89%	19.98%	1.25
67	36	30.4	152	23.68%	19.97%	1.19
68	20	20.4	102	19.61%	19.95%	0.98
69	16	13.0	65	24.62%	20.00%	1.23
70	9	10.5	42	21.43%	25.00%	0.86
71	6	6.3	25	24.00%	25.00%	0.96
72	2	4.3	17	11.76%	25.00%	0.47
73	3	2.3	9	33.33%	25.00%	1.33
74	1	1.5	6	16.67%	25.00%	0.67
75	0	0.5	2	0.00%	25.00%	0.00
76	0	0.5	2	0.00%	25.00%	0.00
77	0	0.5	2	0.00%	25.00%	0.00
Total	3,785	3,576.0	17,141	22.08%	20.86%	1.06

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
50	285	276.3	770	37.01%	35.89%	1.03
51	140	165.6	721	19.42%	22.98%	0.85
52	155	172.6	798	19.42%	21.63%	0.90
53	160	176.2	840	19.05%	20.98%	0.91
54	181	183.0	876	20.66%	20.89%	0.99
55	672	642.5	2,034	33.04%	31.59%	1.05
56	347	309.9	1,642	21.13%	18.87%	1.12
57	268	288.3	1,546	17.34%	18.65%	0.93
58	264	269.8	1,469	17.97%	18.37%	0.98
59	241	235.7	1,338	18.01%	17.61%	1.02
60	162	203.8	1,177	13.76%	17.31%	0.79
61	203	182.0	1,077	18.85%	16.90%	1.12
62	291	276.3	884	32.92%	31.26%	1.05
63	124	122.8	576	21.53%	21.32%	1.01
64	80	89.6	422	18.96%	21.23%	0.89
65	63	67.1	322	19.57%	20.84%	0.94
66	56	46.7	225	24.89%	20.76%	1.20
67	36	31.1	152	23.68%	20.46%	1.16
68	20	20.8	102	19.61%	20.39%	0.96
69	16	13.1	65	24.62%	20.15%	1.22
70	9	10.5	42	21.43%	25.00%	0.86
71	6	6.3	25	24.00%	25.00%	0.96
72	2	4.3	17	11.76%	25.00%	0.47
73	3	2.3	9	33.33%	25.00%	1.33
74	1	1.5	6	16.67%	25.00%	0.67
75	0	0.5	2	0.00%	25.00%	0.00
76	0	0.5	2	0.00%	25.00%	0.00
77	0	0.5	2	0.00%	25.00%	0.00
Total	3,785	3,799.5	17,141	22.08%	22.17%	1.00

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age

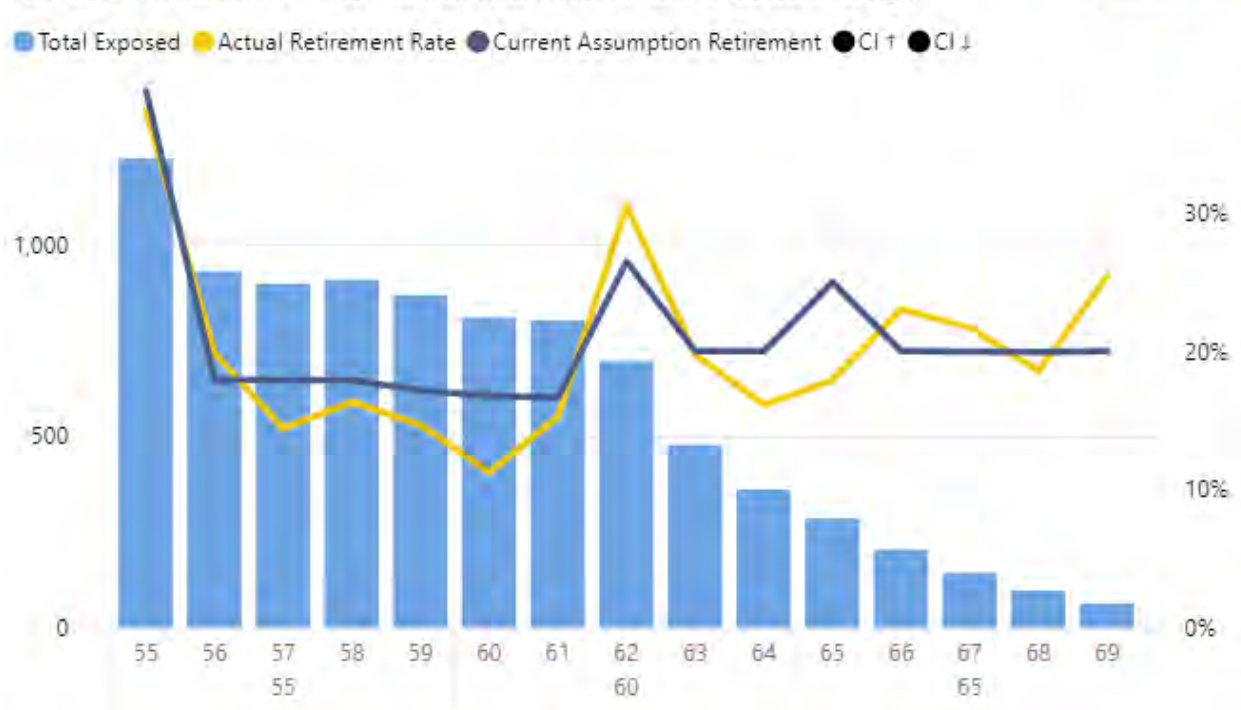


Retirement Rate - Actual, Expected, and Ratio; by Age



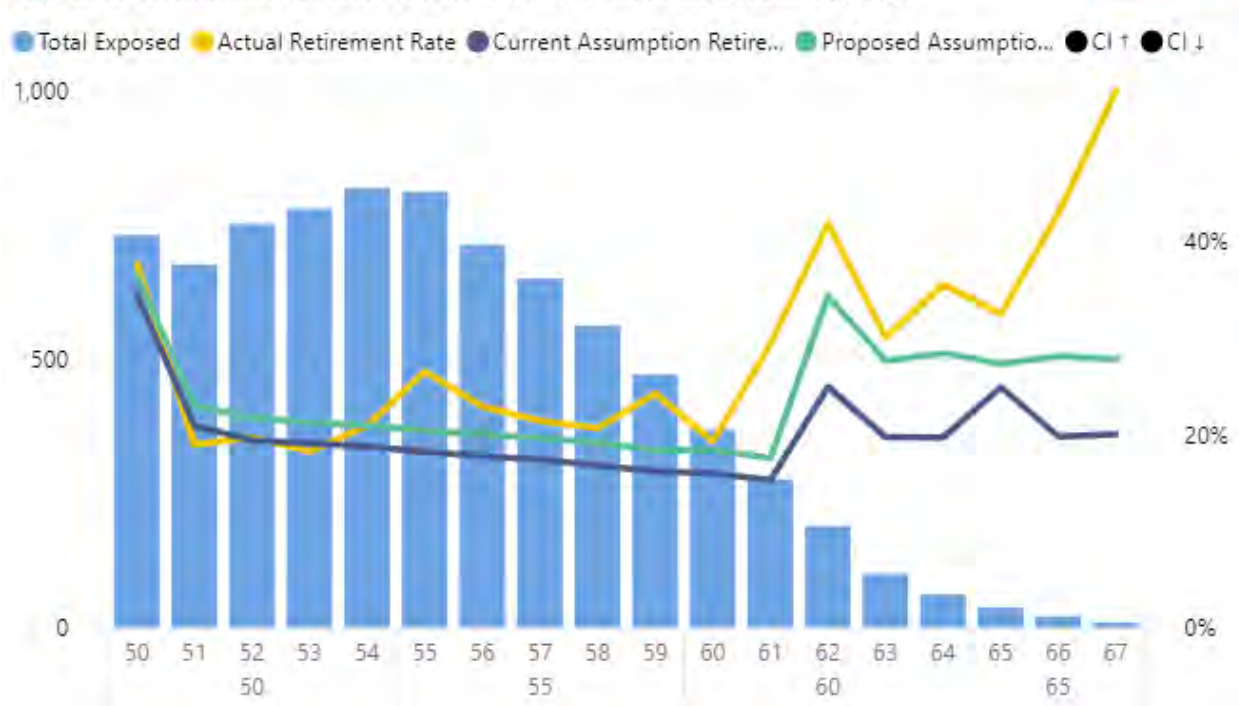
This chart shows the results by age for the service range 25 to 39 years for members not in physically taxing titles, which increased the assumed rate of retirement from 21.77% to 21.98% as compared to the actual rate of 20.39%. This resulted in a slight decrease in the A/E ratio from 0.94 to 0.93 for ages 55 to 69.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



This chart shows the results by age for the service range 25 to 39 years for members in physically taxing titles, which increased the assumed rate of retirement from 19.84% to 22.35% as compared to the actual rate of 23.92%. This resulted in a decrease in the A/E ratio from 1.21 to 1.07 for ages 50 to 67.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



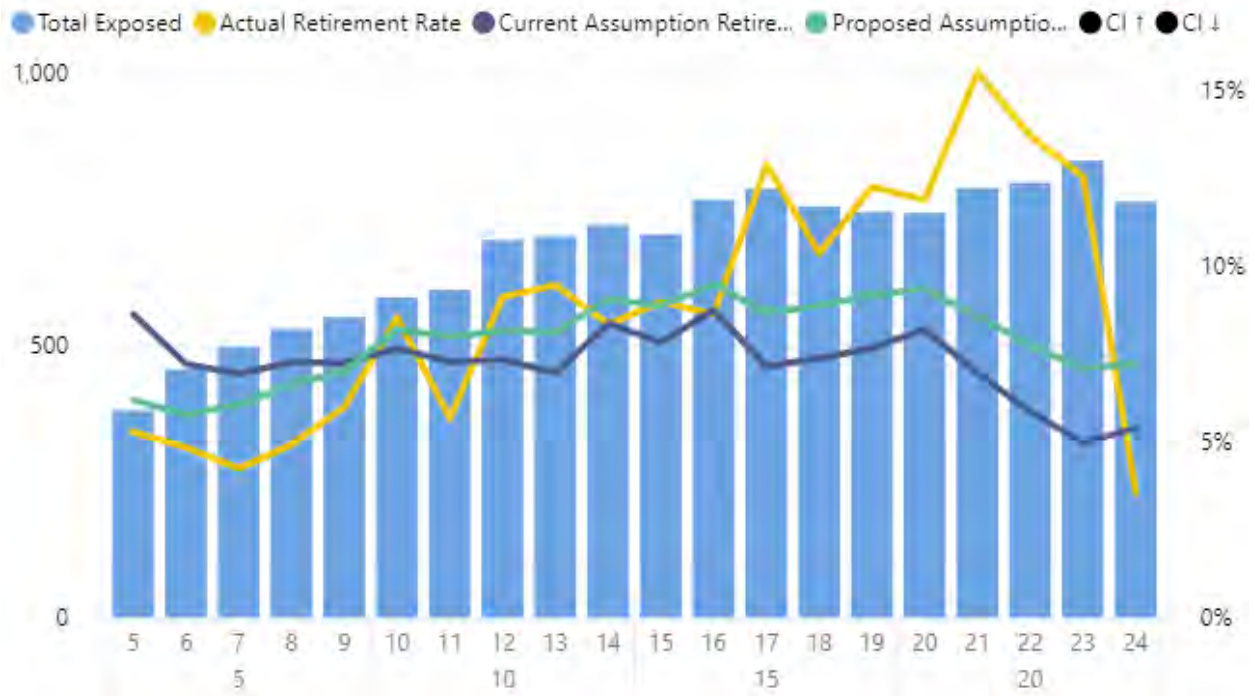
For Specialty Plan Group members that do not complete at least 25 years, they could retire under the Basic Plan provisions and receive an unreduced retirement benefit. The following charts show the experience for retirement by service, for the age range (55 to 69), and for the service range (5 to 24) for the specialty plan group for the period 2012 – 2021 for the current and proposed assumptions. The actual rate of retirement averaged 9.30% whereas the overall expected rate of retirement averaged 7.17% based on the current assumptions and 8.05% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.30 to 1.16.

For early retirement ages 55 to 61, the A/E ratio decreased from 3.11 to 1.52 and for normal retirement ages 62 to 69, the A/E ratio increased from 0.69 to 0.85. The current assumption early retirement uses the rates of termination for specialty plan group members who retire under basic plan provisions. Based on early retirement experience, we propose the reduced retirement rates should apply in these situations.

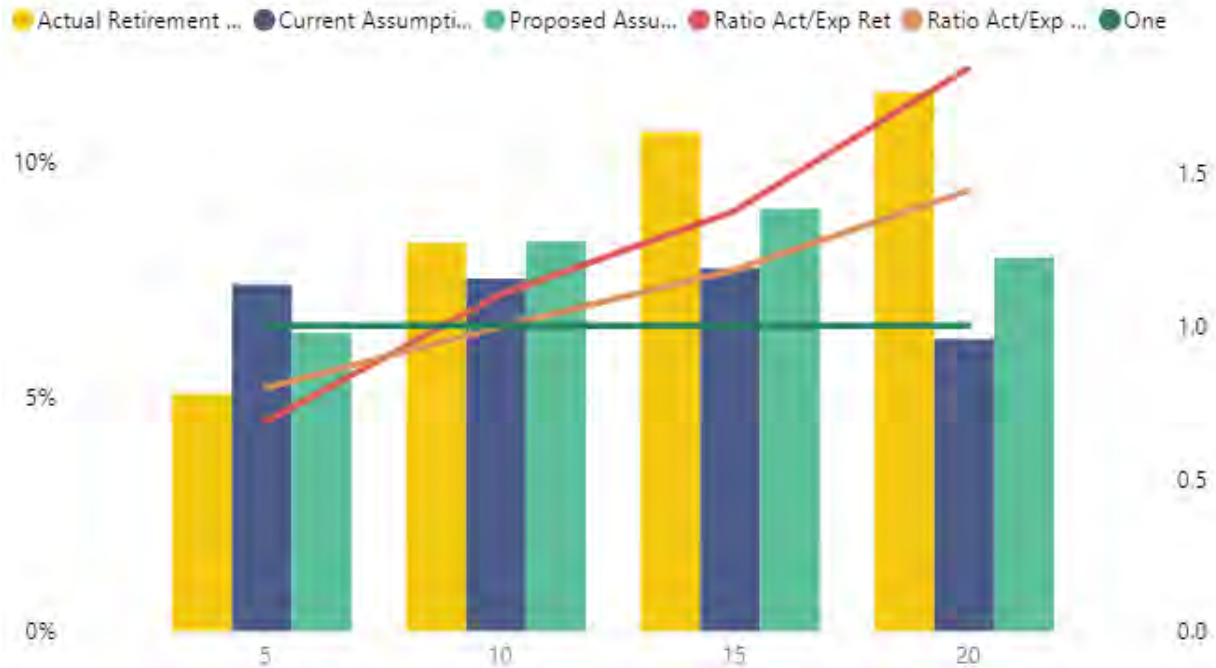
Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
5	20	32.7	380	5.26%	8.61%	▲ 0.61
6	22	32.8	455	4.84%	7.20%	▲ 0.67
7	21	34.4	496	4.23%	6.93%	▲ 0.61
8	26	38.4	529	4.91%	7.25%	▲ 0.68
9	33	39.8	551	5.99%	7.23%	▲ 0.83
10	50	44.8	587	8.52%	7.64%	▲ 1.12
11	34	43.7	601	5.66%	7.27%	▲ 0.78
12	63	50.7	692	9.10%	7.32%	▲ 1.24
13	66	48.6	699	9.44%	6.95%	▲ 1.36
14	60	60.1	720	8.33%	8.34%	● 1.00
15	63	55.0	703	8.96%	7.82%	▲ 1.15
16	66	66.9	766	8.62%	8.73%	● 0.99
17	101	56.0	786	12.85%	7.13%	◆ 1.80
18	78	55.5	754	10.34%	7.36%	▲ 1.40
19	91	56.9	744	12.23%	7.65%	◆ 1.60
20	88	60.8	742	11.86%	8.20%	▲ 1.45
21	122	54.6	788	15.48%	6.93%	◆ 2.23
22	109	46.6	797	13.68%	5.85%	◆ 2.34
23	105	41.6	838	12.53%	4.96%	◆ 2.53
24	27	41.1	763	3.54%	5.38%	▲ 0.66
Total	1,245	960.8	13,391	9.30%	7.17%	▲ 1.30

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
5	20	23.5	380	5.26%	6.18%	▲ 0.85
6	22	26.2	455	4.84%	5.76%	▲ 0.84
7	21	30.0	496	4.23%	6.05%	▲ 0.70
8	26	35.0	529	4.91%	6.62%	▲ 0.74
9	33	38.5	551	5.99%	7.00%	▲ 0.86
10	50	48.1	587	8.52%	8.19%	● 1.04
11	34	47.9	601	5.66%	7.97%	▲ 0.71
12	63	56.3	692	9.10%	8.14%	▲ 1.12
13	66	56.6	699	9.44%	8.10%	▲ 1.17
14	60	65.2	720	8.33%	9.05%	● 0.92
15	63	62.2	703	8.96%	8.84%	● 1.01
16	66	72.5	766	8.62%	9.47%	● 0.91
17	101	68.0	786	12.85%	8.65%	▲ 1.49
18	78	66.7	754	10.34%	8.85%	▲ 1.17
19	91	68.2	744	12.23%	9.16%	▲ 1.34
20	88	69.3	742	11.86%	9.34%	▲ 1.27
21	122	67.3	788	15.48%	8.55%	◆ 1.81
22	109	61.7	797	13.66%	7.74%	◆ 1.77
23	105	59.2	838	12.53%	7.06%	◆ 1.77
24	27	55.0	763	3.54%	7.21%	◆ 0.49
Total	1,245	1,077.4	13,391	9.30%	8.05%	▲ 1.16

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



Retirement Rate - Actual, Expected, and Ratio; by Service

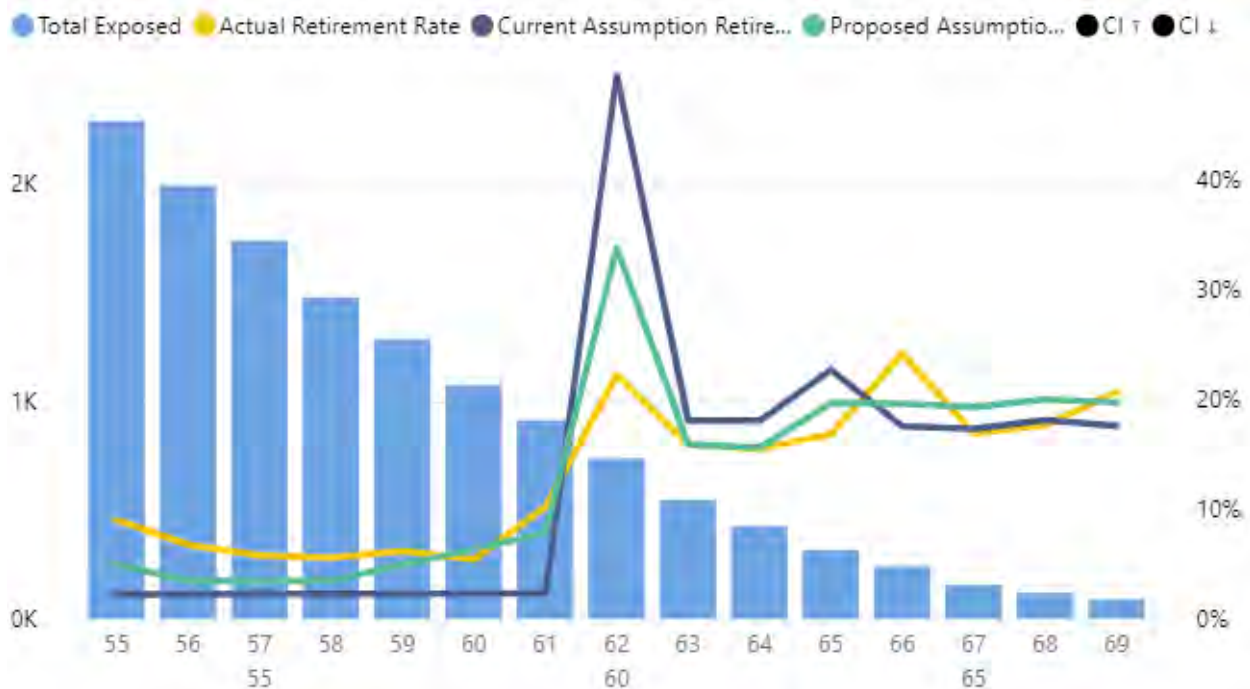


The following charts show the experience for retirement by age, for the age range (55 to 69), and for the service range (5 to 24) for the specialty plan group for the period 2012 – 2021 for the current and proposed assumptions.

Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
55	206	50.3	2,289	9.00%	2.20%	4.10
56	134	44.4	1,991	6.73%	2.23%	3.02
57	100	39.4	1,739	5.75%	2.27%	2.54
58	82	33.5	1,477	5.55%	2.27%	2.45
59	79	29.1	1,285	6.15%	2.26%	2.72
60	58	24.5	1,073	5.41%	2.29%	2.36
61	93	20.9	911	10.21%	2.29%	4.45
62	164	365.8	738	22.22%	49.57%	0.45
63	87	98.9	547	15.90%	18.07%	0.88
64	66	76.9	426	15.49%	18.04%	0.86
65	53	71.5	315	16.83%	22.70%	0.74
66	58	42.1	240	24.17%	17.54%	1.38
67	26	26.7	154	16.88%	17.34%	0.97
68	21	21.5	119	17.65%	18.10%	0.97
69	18	15.3	87	20.69%	17.57%	1.18
Total	1,245	960.8	13,391	9.30%	7.17%	1.30

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
55	206	112.8	2,289	9.00%	4.93%	1.83
56	134	68.7	1,991	6.73%	3.45%	1.95
57	100	60.1	1,739	5.75%	3.45%	1.67
58	82	50.9	1,477	5.55%	3.45%	1.61
59	79	63.2	1,285	6.15%	4.91%	1.25
60	58	68.3	1,073	5.41%	6.37%	0.85
61	93	71.2	911	10.21%	7.82%	1.31
62	164	249.4	738	22.22%	33.80%	0.66
63	87	86.9	547	15.90%	15.88%	1.00
64	66	66.5	426	15.49%	15.61%	0.99
65	53	61.8	315	16.83%	19.63%	0.86
66	58	47.1	240	24.17%	19.61%	1.23
67	26	29.7	154	16.88%	19.31%	0.87
68	21	23.8	119	17.65%	19.96%	0.88
69	18	17.2	87	20.69%	19.71%	1.05
Total	1,245	1,077.4	13,391	9.30%	8.05%	1.16

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age

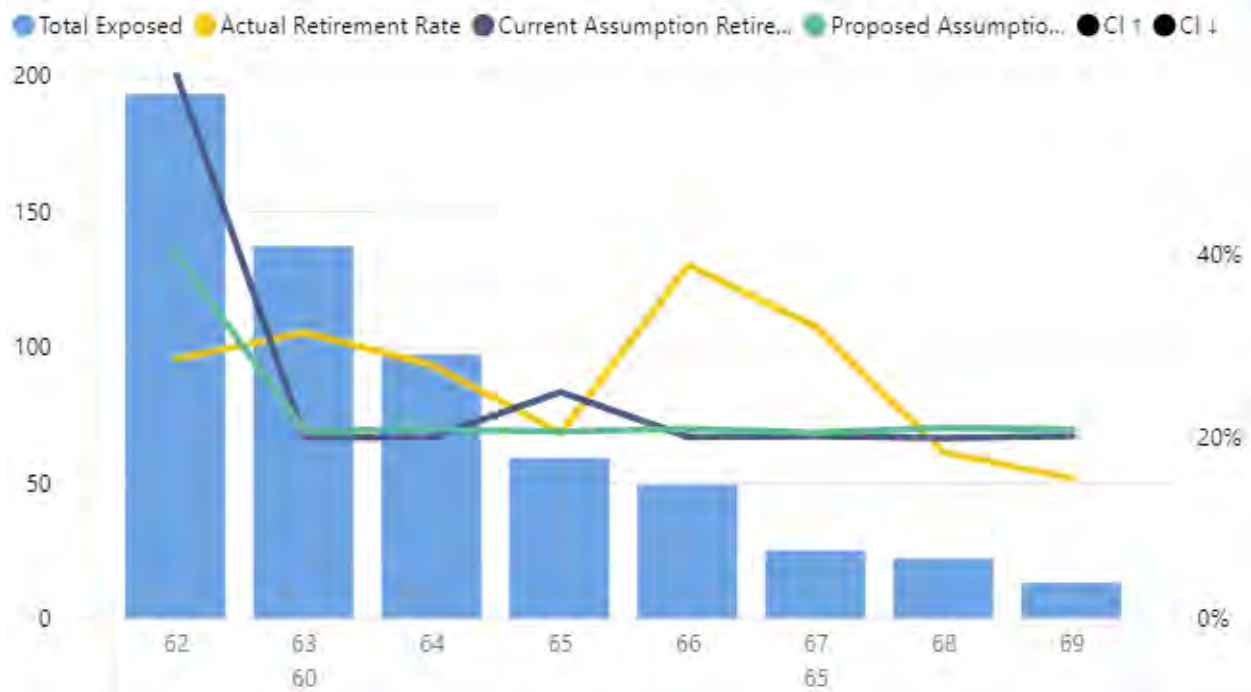


Retirement Rate - Actual, Expected, and Ratio; by Age

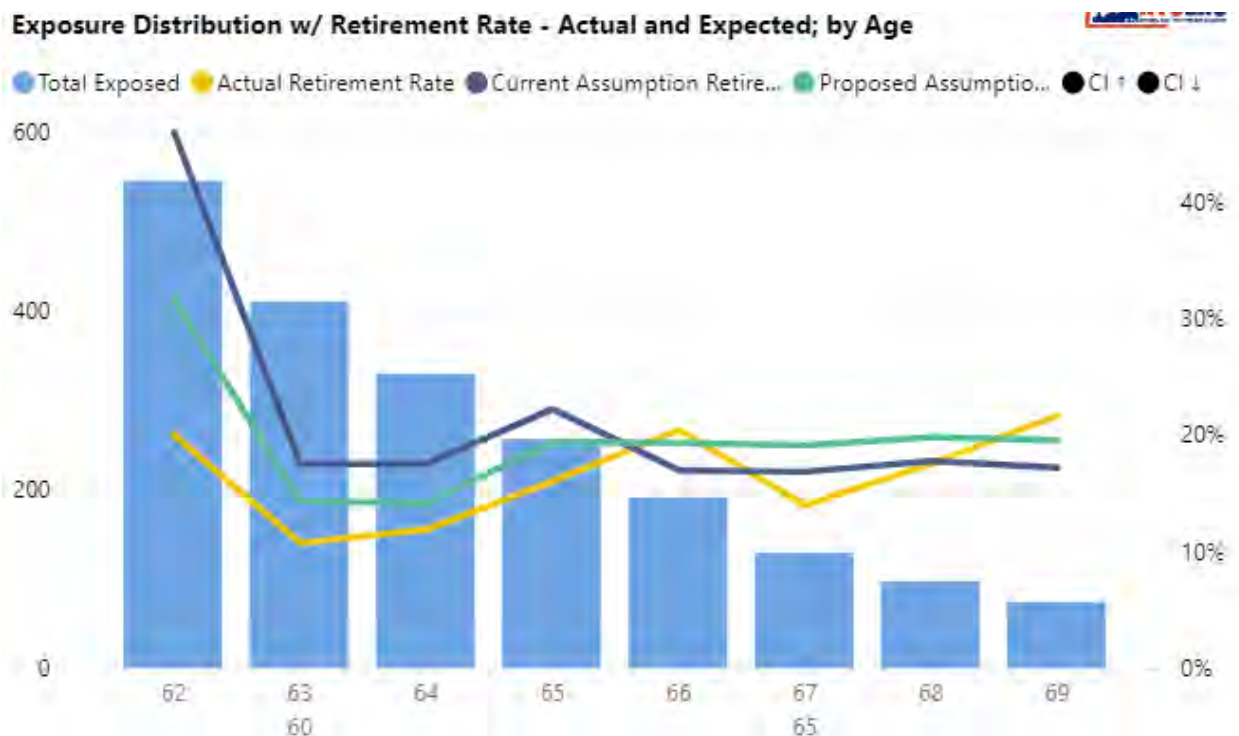


This chart shows the experience for retirement by age, for the age range (62 to 69) and for the service range (20 to 24) for the specialty plan group for the period 2012 – 2021 for the current and proposed assumptions. These members are eligible for unreduced retirement through the basic plan provisions. This resulted in an increase in the A/E ratio from 0.86 to 1.06. For members not in a physically taxing title, the A/E ratio increased from 0.82 to 1.03 and for members in a physically taxing title, the A/E ratio increased from 1.26 to 1.29.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



This chart shows the experience for retirement by age, for the age range (62 to 69) and for the service range (5 to 19) for the specialty plan group for the period 2012 – 2021 for the current and proposed assumptions. These members are eligible for unreduced retirement through the basic plan provisions but not the 2% benefit formula. This resulted in an increase in the A/E ratio from 0.62 to 0.77.



Summary

In total, the proposed rates of retirement have increased the anticipated number of retirements due to higher assumptions proposed for members with at least 20 years of service, especially for those in physically taxing titles, which increase the number of members retiring with a 2% benefit accrual. We believe this would lead to higher plan liabilities. This will be offset by lower assumptions for members retiring with less than 20 years of service. The actual impact will depend on the demographics of the active membership.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF SERVICE RETIREMENT: GENERAL					
Age	Reduced Service Retirement	Unreduced Service Retirement For Members Mandated Into Their Retirement Program		Unreduced Service Retirement For Members Who Elected an Improved Retirement Program	
		Year 1	Ultimate	Year 1	Ultimate
50	0.00%	8.00%	5.00%	40.00%	15.00%
51	0.00%	8.00%	5.00%	40.00%	15.00%
52	0.00%	8.00%	5.00%	40.00%	15.00%
53	0.00%	8.00%	5.00%	40.00%	15.00%
54	0.00%	8.00%	5.00%	40.00%	15.00%
55	3.50%	8.00%	5.00%	40.00%	15.00%
56	3.50%	8.00%	5.00%	40.00%	15.00%
57	3.50%	8.00%	5.00%	40.00%	15.00%
58	3.50%	8.00%	5.00%	40.00%	15.00%
59	5.25%	8.00%	5.00%	40.00%	15.00%
60	7.00%	8.00%	5.00%	40.00%	15.00%
61	8.00%	8.00%	7.50%	40.00%	15.00%
62	0.00%	30.00%	10.00%	60.00%	25.00%
63	0.00%	20.00%	15.00%	40.00%	20.00%
64	0.00%	20.00%	15.00%	40.00%	20.00%
65	0.00%	30.00%	20.00%	60.00%	25.00%
66	0.00%	20.00%	15.00%	40.00%	20.00%
67	0.00%	20.00%	15.00%	40.00%	20.00%
68	0.00%	20.00%	15.00%	40.00%	20.00%
69	0.00%	20.00%	15.00%	40.00%	20.00%
70	0.00%	25.00%	25.00%	40.00%	25.00%
71	0.00%	25.00%	25.00%	40.00%	25.00%
72	0.00%	25.00%	25.00%	40.00%	25.00%
73	0.00%	25.00%	25.00%	40.00%	25.00%
74	0.00%	25.00%	25.00%	40.00%	25.00%
75	0.00%	25.00%	25.00%	40.00%	25.00%
76	0.00%	25.00%	25.00%	40.00%	25.00%
77	0.00%	25.00%	25.00%	40.00%	25.00%
78	0.00%	25.00%	25.00%	40.00%	25.00%
79	0.00%	25.00%	25.00%	40.00%	25.00%
80	N/A	100.00%	100.00%	100.00%	100.00%

¹ 8.00% only applies to Tier 6 members; 0.00% otherwise.

² 30.00% for Tiers 1-4 members and 8.00% for Tier 6 members.

³ 20.00% for Tiers 1-4 members and 30.00% for Tier 6 members.

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: GENERAL						
Age	Reduced Service Retirement ³	Unreduced Service Retirement Probabilities For Basic Group ¹ Members				
		5 YOS	6-9 YOS	10 - 19 YOS	Not Physically Taxing ≥ 20 YOS ⁴	Physically Taxing ≥ 20 YOS ⁴
55 ⁶	5.00%	N/A	N/A	N/A	N/A	17.50%
56	3.50%	N/A	N/A	N/A	N/A	17.50%
57	3.50%	8.00%	6.40%	8.00%	15.00%	17.50%
58	3.50%	8.00%	4.00%	5.00%	7.50%	10.00%
59	5.00%	8.00%	4.00%	5.00%	7.50%	10.00%
60	6.50%	8.00%	4.00%	5.00%	7.50%	10.00%
61	8.00%	8.00%	6.00%	7.50%	12.00%	15.00%
62 ⁷	0.00%	25.00%	8.00% ⁸	10.00% ⁹	20.00%	25.00%
63 ⁷	0.00%	15.00%	10.00%	12.50%	20.00%	25.00%
64	0.00%	15.00%	10.00%	12.50%	20.00%	25.00%
65	0.00%	20.00%	14.00%	17.50%	20.00%	30.00%
66	0.00%	20.00%	14.00%	17.50%	20.00%	30.00%
67	0.00%	20.00%	14.00%	17.50%	20.00%	30.00%
68	0.00%	20.00%	14.00%	17.50%	20.00%	30.00%
69	0.00%	20.00%	14.00%	17.50%	20.00%	30.00%
70	0.00%	25.00%	20.00%	20.00%	25.00%	25.00%
71	0.00%	25.00%	20.00%	20.00%	25.00%	25.00%
72	0.00%	25.00%	20.00%	20.00%	25.00%	25.00%
73	0.00%	25.00%	20.00%	20.00%	25.00%	25.00%
74	0.00%	25.00%	20.00%	20.00%	25.00%	25.00%
75	0.00%	25.00%	20.00%	20.00%	25.00%	25.00%
76	0.00%	25.00%	20.00%	20.00%	25.00%	25.00%
77	0.00%	25.00%	20.00%	20.00%	25.00%	25.00%
78	0.00%	25.00%	20.00%	20.00%	25.00%	25.00%
79	0.00%	25.00%	20.00%	20.00%	25.00%	25.00%
80	N/A	100.00%	100.00%	100.00%	100.00%	100.00%

¹ Includes members of Basic Tier 4 (Plan F) and Tier 6 (Plan Y) Plans, including Sanitation, TBTA and Transit members of these plans, as well as members of the Age 57 Plan (Plan I)

² Includes members eligible for unreduced retirement at completion of 25 years of service with or without an age requirement (fire alarm dispatchers, EMTs, Special Officers, 55/25 Plan members, Deputy Sheriffs, Auto Workers, Police Communication Techs and DA Investigators)

³ Reduced retirement rates also apply to Specialty Group members eligible for early retirement under Tier 4 or 6 Basic Plan.

⁴ Refer to separate table of First eligibility rates

⁵ For Specialty Group members mandated into a retirement plan, Basic Group rates apply to members with less than 20 years of service

⁶ Age 55 rates apply to ages below 55, if applicable

⁷ Refer to separate table of rates for Tier 6 members at ages 62 - 63

⁸ 20% for Tier 4 Basic Plan members

⁹ 25% for Tier 4 Basic Plan members

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: GENERAL				
Age	Unreduced Service Retirement Probabilities For Specialty Group ² Members			
	< 10 YOS ⁵	10 - 19 YOS ⁵	Not Physically Taxing ≥ 20 YOS ⁴	Physically Taxing ≥ 20 YOS ⁴
55 ⁶	N/A	N/A	15.00%	17.50%
56	N/A	N/A	15.00%	17.50%
57	N/A	N/A	15.00%	17.50%
58	N/A	N/A	15.00%	17.50%
59	N/A	N/A	15.00%	17.50%
60	N/A	N/A	15.00%	17.50%
61	N/A	N/A	15.00%	17.50%
62 ⁷	32.00%	40.00%	30.00%	35.00%
63 ⁷	14.00%	17.50%	20.00%	30.00%
64	14.00%	17.50%	20.00%	30.00%
65	20.00%	25.00%	20.00%	30.00%
66	20.00%	25.00%	20.00%	30.00%
67	20.00%	25.00%	20.00%	30.00%
68	20.00%	25.00%	20.00%	30.00%
69	20.00%	25.00%	20.00%	30.00%
70	25.00%	25.00%	25.00%	25.00%
71	25.00%	25.00%	25.00%	25.00%
72	25.00%	25.00%	25.00%	25.00%
73	25.00%	25.00%	25.00%	25.00%
74	25.00%	25.00%	25.00%	25.00%
75	25.00%	25.00%	25.00%	25.00%
76	25.00%	25.00%	25.00%	25.00%
77	25.00%	25.00%	25.00%	25.00%
78	25.00%	25.00%	25.00%	25.00%
79	25.00%	25.00%	25.00%	25.00%
80	100.00%	100.00%	100.00%	100.00%

⁴ Refer to separate table of First eligibility rates

⁵ For Specialty Group members mandated into a retirement plan, Basic Group rates apply to members with less than 20 years of service

⁶ Age 55 rates apply to ages below 55, if applicable

⁷ Refer to separate table of rates for Tier 6 members at ages 62 - 63

⁸ 20% for Tier 4 Basic Plan members

⁹ 25% for Tier 4 Basic Plan members

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: GENERAL			
Unreduced Service Retirement Probabilities at Specified Age / Service Conditions (First Eligibility Rates) ¹			
Plan / Employee Group	Physically Taxing	Age / Service Condition	Rate
Basic Group Members ²			
Basic Plan	No	62 / 20	35.0%
Basic Plan	Yes	62 / 20	60.0%
Age 57 Plan	No	57 / 20	15.0%
Age 57 Plan	Yes	57 / 20; 50 / 25	17.5%
Tier 6 Basic Plan	No	63 / 20	30.0%
Tier 6 Basic Plan	Yes	63 / 20	40.0%
Specialty Group Members ³			
55 / 25 Plan ⁴	No	62 / 20; 55 / 25	40.0%
Auto Workers ⁴	No	62 / 20; 50 / 25	40.0%
Physically Taxing Plans ⁴	Yes	62 / 20; 50 / 25	40.0%
Other Plans ⁴	No	62 / 20; 0 / 25	40.0%

¹ These rates supersede rates noted elsewhere.

² Includes members of Basic Tier 4 (Plan F) and Tier 6 (Plan Y) Plans, including Sanitation, TBTA and Transit members of these plans, as well as members of the Age 57 Plan (Plan I)

³ Includes members eligible for unreduced retirement at completion of 25 years of service with or without an age requirement (fire alarm dispatchers, EMTs, Special Officers, 55/25 Plan members, Deputy Sheriffs, Auto Workers, Police Communication Techs and DA Investigators)

⁴ For Tier 6 members participating in these plans, first age / service condition is 63 / 20

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: GENERAL						
Service Retirement for Tier 6 Basic Group and Specialty Group Members Mandated into Their Retirement Program at Selected Ages ¹						
Age	Reduced ²	5 YOS	6 - 9 YOS	10 - 19 YOS	Not Physically Taxing ≥ 20 YOS	Physically Taxing ≥ 20 YOS
62	10.00%	N/A	N/A	N/A	N/A	N/A
63	0.00%	25.00%	20.00%	25.00%	30.00%	40.00%

¹ This table only includes select ages 62 - 63. Please refer to primary table for rates at other ages.

² Reduced retirement rates also apply to Specialty Group members eligible for early retirement under Tier 4 or 6 Basic Plan.

Disability

The current ordinary disability assumption varies by age and gender but does not apply during the 10-year eligibility service period. Furthermore, a separate rate applies for accidental disability during all service periods. The ordinary and accidental disability benefit is equal to 1/60 times final average salary for each year of service accrued but no less than 1/3 of the member's final average salary. For accidental disability, some groups are eligible for either a 50% or 75% of final average salary minimum. The benefit is payable during the lifetime of the member and members may select any optional forms of payment. For members who have accrued at least 20 years of service, the service retirement benefit is greater than the ordinary disability retirement benefit if the member has met the conditions for an unreduced retirement benefit.

Due to this fact, rates of ordinary disability were determined excluding the experience for members eligible for unreduced retirement and the 2% benefit accrual formula. Therefore, we propose the rates of ordinary disability do not apply upon attainment of age 62 and completion of 20 years of service or other criteria to receive an unreduced retirement benefit that varies by Plan (57 and 20 for Age 57 Plan, 50 and 25 for members in physically taxing titles, 55 and 25 for 55 and 25 Plan, etc.). If eligible for early retirement, we propose that the greater of the early retirement benefit and the ordinary disability retirement be valued.

In addition, the rates of ordinary disability would not apply during the 10-year eligibility service period.

The proposed assumptions vary by whether the member is in a physically taxing title or not.

In performing the experience analysis, it is necessary to reassign disability retirement codes retroactively to reflect the eventual approval of a disability retirement. Members with a disability code in a given year had all inactive status codes in prior years changed to a disability status code. Adjustments were made as far back as 2012.

It is difficult to determine how future years would impact the experience during the study period as we believe that this type of retroactive adjustment will be required in subsequent iterations of this study. The consequence will be a restatement of the number of disability retirements experienced during this study period, specifically 2019 – 2021.

For this purpose, our analysis reflected years from 2012 – 2019.

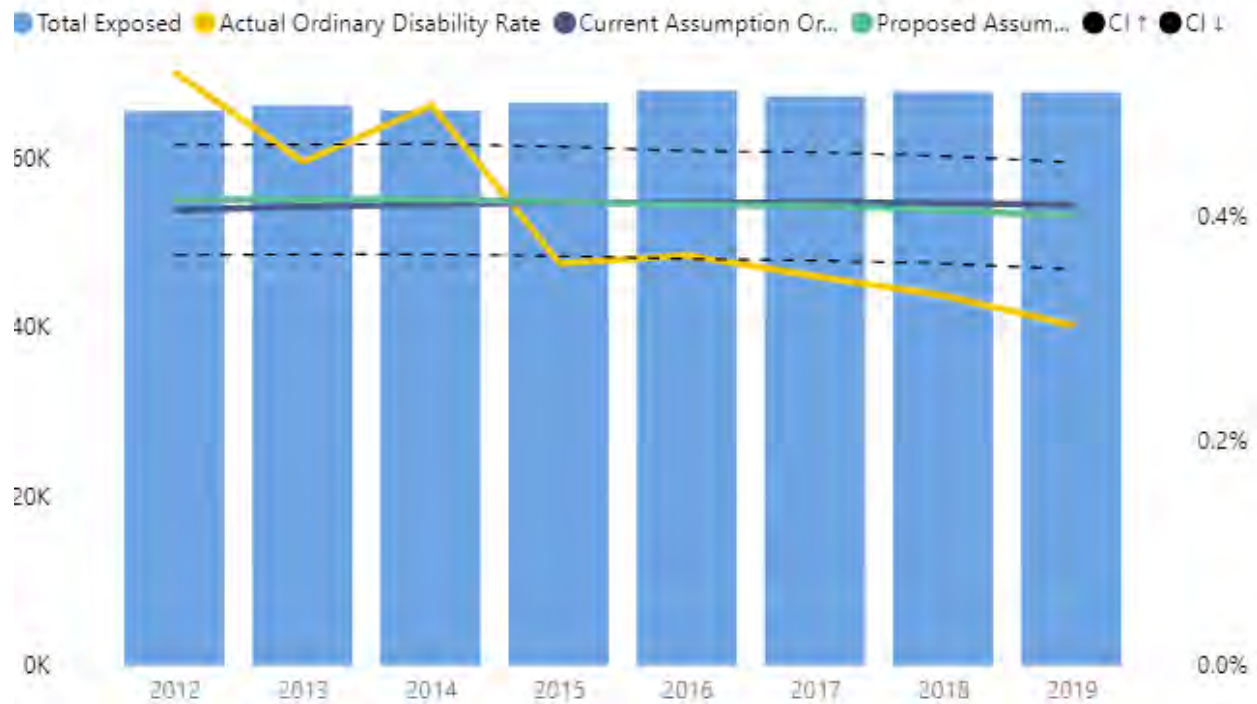
Ordinary Disability

The following table shows the experience for ordinary disability retirement by year, for the age range 35 to 69 and the service range 10 to 34. The actual rate of ordinary disability averaged 0.3965% whereas the overall expected rate of ordinary disability averaged 0.4107% based on the current assumptions and 0.4107% based on the proposed assumptions.

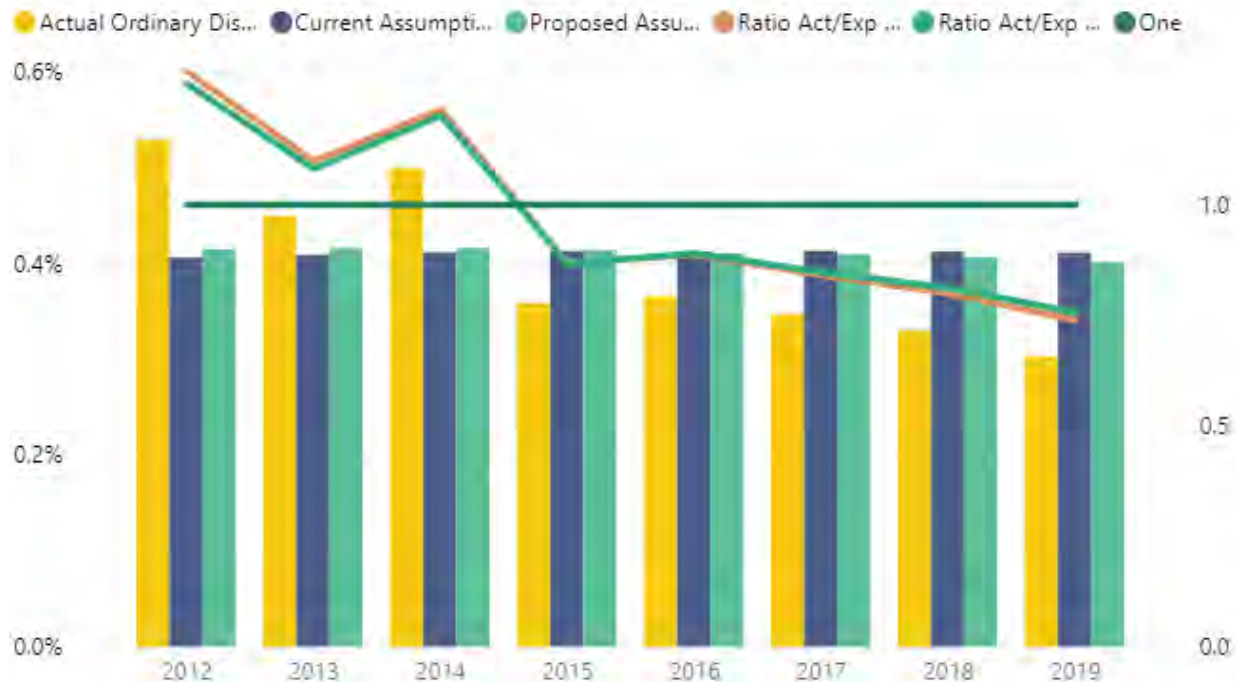
Plan Year	Actual Ordinary Disabilities	Expected Ordinary Disabilities	Total Exposed	Actual Ordinary Disability Rate	Current Assumption Ordinary Disability	Ratio Act/Exp Ordinary Disability
2012	346	265.7	65,475	0.5284%	0.4058%	▲ 1.30
2013	297	270.3	66,151	0.4490%	0.4087%	● 1.10
2014	327	269.1	65,477	0.4994%	0.4110%	▲ 1.21
2015	238	274.0	66,415	0.3584%	0.4126%	▲ 0.87
2016	248	279.6	67,861	0.3655%	0.4121%	▲ 0.89
2017	233	277.4	67,197	0.3467%	0.4128%	▲ 0.84
2018	223	278.9	67,680	0.3295%	0.4121%	▲ 0.80
2019	205	277.8	67,641	0.3031%	0.4107%	▲ 0.74
Total	2,117	2,192.9	533,897	0.3965%	0.4107%	● 0.97

Plan Year	Actual Ordinary Disabilities	Expected Ordinary Disabilities Proposed	Total Exposed	Actual Ordinary Disability Rate	Proposed Assumption Ordinary Disability	Ratio Act/Exp Proposed Ordinary Disability
2012	346	271.6	65,475	0.5284%	0.4149%	▲ 1.27
2013	297	274.7	66,151	0.4490%	0.4153%	● 1.08
2014	327	272.1	65,477	0.4994%	0.4155%	▲ 1.20
2015	238	274.7	66,415	0.3584%	0.4136%	▲ 0.87
2016	248	278.5	67,861	0.3655%	0.4104%	▲ 0.89
2017	233	274.9	67,197	0.3467%	0.4091%	▲ 0.85
2018	223	274.8	67,680	0.3295%	0.4060%	▲ 0.81
2019	205	271.1	67,641	0.3031%	0.4008%	▲ 0.76
Total	2,117	2,192.5	533,897	0.3965%	0.4107%	● 0.97

Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Year



Ordinary Disability Rate - Actual, Expected, and Ratio; by Year



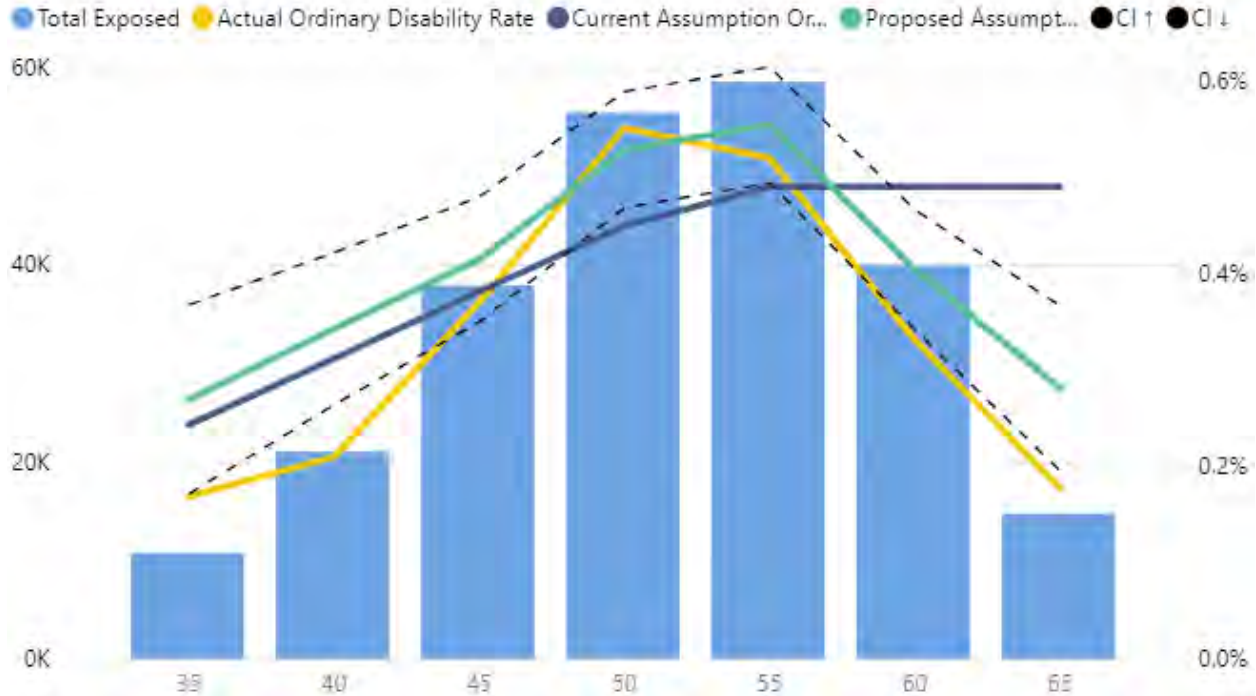
Males

The following table shows the experience of male members for ordinary disability retirement by age, for the age range 35 to 69 and the service range 10 to 34 for the period 2012 – 2019 for all plans. The actual rate of ordinary disability averaged 0.4071% whereas the overall expected rate of ordinary disability averaged 0.4363% based on the current assumptions and 0.4523% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 0.93 to 0.90.

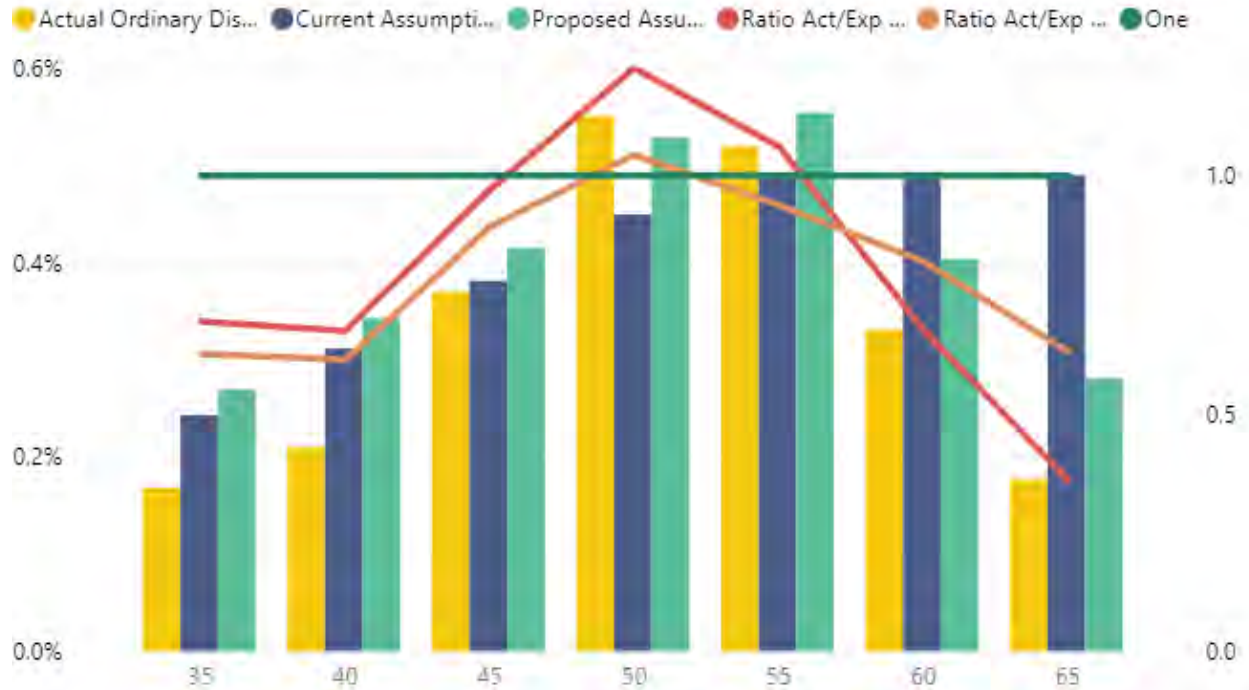
Age	Actual Ordinary Disabilities	Expected Ordinary Disabilities	Total Exposed	Actual Ordinary Disability Rate	Current Assumption Ordinary Disability	Ratio Act/Exp Ordinary Disability
35	3	3.0	1,435	0.2091%	0.2100%	1.00
36	4	4.0	1,795	0.2228%	0.2240%	0.99
37	4	5.0	2,113	0.1893%	0.2380%	0.80
38	2	6.3	2,509	0.0797%	0.2520%	0.32
39	5	7.6	2,853	0.1753%	0.2660%	0.66
40	2	9.1	3,237	0.0618%	0.2800%	0.22
41	7	10.8	3,682	0.1901%	0.2940%	0.65
42	10	12.8	4,162	0.2403%	0.3080%	0.78
43	8	15.0	4,661	0.1716%	0.3220%	0.53
44	17	17.6	5,245	0.3241%	0.3360%	0.96
45	19	20.7	5,927	0.3206%	0.3500%	0.92
46	20	24.5	6,733	0.2970%	0.3640%	0.82
47	26	28.6	7,562	0.3438%	0.3780%	0.91
48	35	33.2	8,465	0.4135%	0.3920%	1.05
49	40	37.3	9,185	0.4355%	0.4060%	1.07
50	51	42.1	10,012	0.5094%	0.4200%	1.21
51	56	45.7	10,533	0.5317%	0.4340%	1.23
52	82	50.1	11,175	0.7338%	0.4480%	1.64
53	66	54.1	11,702	0.5640%	0.4620%	1.22
54	50	56.9	11,952	0.4183%	0.4760%	0.88
55	71	61.0	12,451	0.5702%	0.4900%	1.16
56	71	58.7	11,975	0.5929%	0.4900%	1.21
57	62	58.0	11,830	0.5241%	0.4900%	1.07
58	63	55.9	11,400	0.5526%	0.4900%	1.13
59	37	53.2	10,847	0.3411%	0.4900%	0.70
60	39	50.3	10,266	0.3799%	0.4900%	0.78
61	39	47.2	9,633	0.4049%	0.4900%	0.83
62	21	40.4	8,254	0.2544%	0.4900%	0.52
63	19	31.2	6,376	0.2980%	0.4900%	0.61
64	14	26.4	5,379	0.2603%	0.4900%	0.53
65	10	21.9	4,476	0.2234%	0.4900%	0.46
66	3	17.6	3,591	0.0835%	0.4900%	0.17
67	2	13.3	2,720	0.0735%	0.4900%	0.15
68	6	10.7	2,182	0.2750%	0.4900%	0.56
69	5	8.5	1,736	0.2880%	0.4900%	0.59
Total	969	1,038.7	238,054	0.4071%	0.4363%	0.93

Age	Actual Ordinary Disabilities	Expected Ordinary Disabilities Proposed	Total Exposed	Actual Ordinary Disability Rate	Proposed Assumption Ordinary Disability	Act/Exp Proposed Ordinary Disability
35	3	3.4	1,435	0.2091%	0.2365%	▲ 0.88
36	4	4.5	1,795	0.2228%	0.2509%	▲ 0.89
37	4	5.6	2,113	0.1893%	0.2638%	▲ 0.72
38	2	7.0	2,509	0.0797%	0.2789%	◆ 0.29
39	5	8.3	2,853	0.1753%	0.2921%	▲ 0.60
40	2	9.9	3,237	0.0618%	0.3070%	◆ 0.20
41	7	11.8	3,682	0.1901%	0.3217%	▲ 0.59
42	10	14.1	4,162	0.2403%	0.3392%	▲ 0.71
43	8	16.5	4,661	0.1716%	0.3548%	◆ 0.48
44	17	19.4	5,245	0.3241%	0.3704%	▲ 0.88
45	19	22.9	5,927	0.3206%	0.3856%	▲ 0.83
46	20	26.8	6,733	0.2970%	0.3985%	▲ 0.75
47	26	31.2	7,562	0.3438%	0.4129%	▲ 0.83
48	35	35.9	8,465	0.4135%	0.4243%	● 0.97
49	40	40.1	9,185	0.4355%	0.4371%	● 1.00
50	51	45.1	10,012	0.5094%	0.4505%	▲ 1.13
51	56	51.5	10,533	0.5317%	0.4894%	● 1.09
52	82	58.8	11,175	0.7338%	0.5262%	▲ 1.39
53	66	65.6	11,702	0.5640%	0.5606%	● 1.01
54	50	71.4	11,952	0.4183%	0.5978%	▲ 0.70
55	71	69.5	12,451	0.5702%	0.5580%	● 1.02
56	71	67.3	11,975	0.5929%	0.5624%	● 1.05
57	62	64.9	11,830	0.5241%	0.5488%	● 0.95
58	63	62.7	11,400	0.5526%	0.5497%	● 1.01
59	37	59.7	10,847	0.3411%	0.5505%	▲ 0.62
60	39	56.7	10,266	0.3799%	0.5520%	▲ 0.69
61	39	53.1	9,633	0.4049%	0.5516%	▲ 0.73
62	21	20.0	8,254	0.2544%	0.2419%	● 1.05
63	19	16.8	6,376	0.2980%	0.2635%	▲ 1.13
64	14	14.6	5,379	0.2603%	0.2707%	● 0.96
65	10	12.2	4,476	0.2234%	0.2718%	▲ 0.82
66	3	10.1	3,591	0.0835%	0.2812%	◆ 0.30
67	2	7.8	2,720	0.0735%	0.2871%	◆ 0.26
68	6	6.2	2,182	0.2750%	0.2855%	● 0.96
69	5	5.0	1,736	0.2880%	0.2869%	● 1.00
Total	969	1,076.7	238,054	0.4071%	0.4523%	▲ 0.90

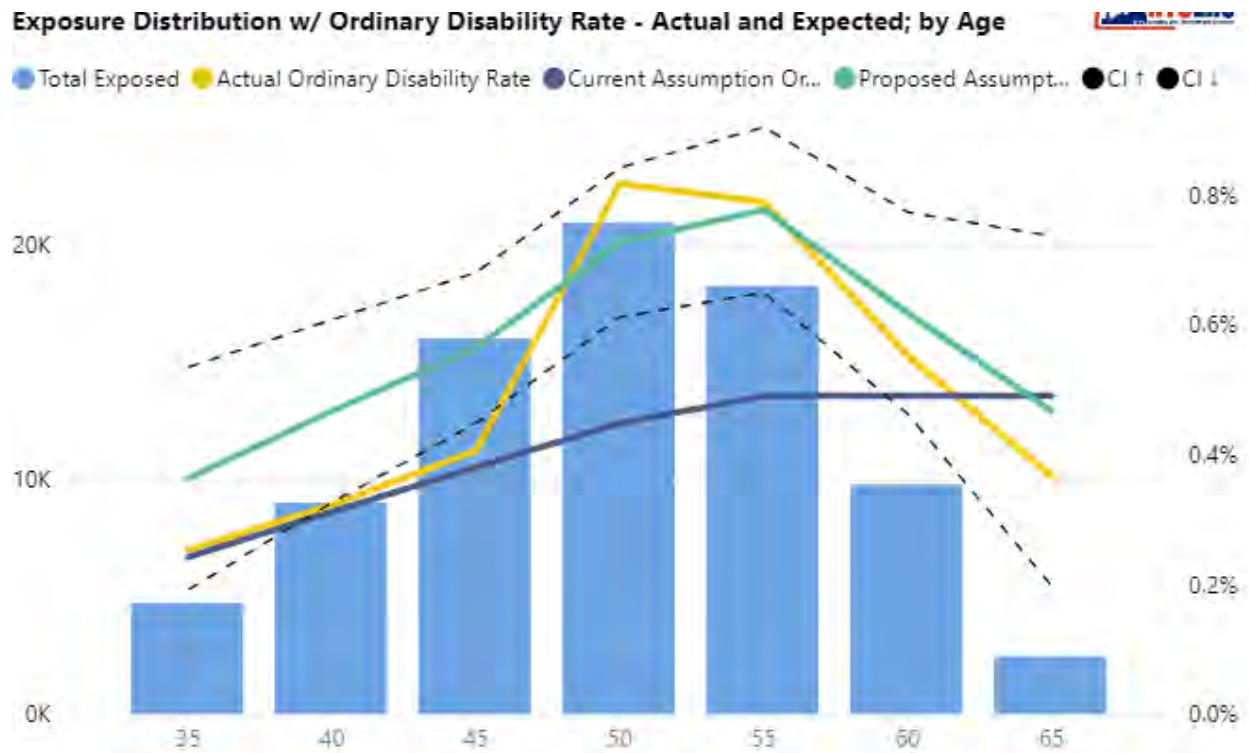
Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Age



Ordinary Disability Rate - Actual, Expected, and Ratio; by Age

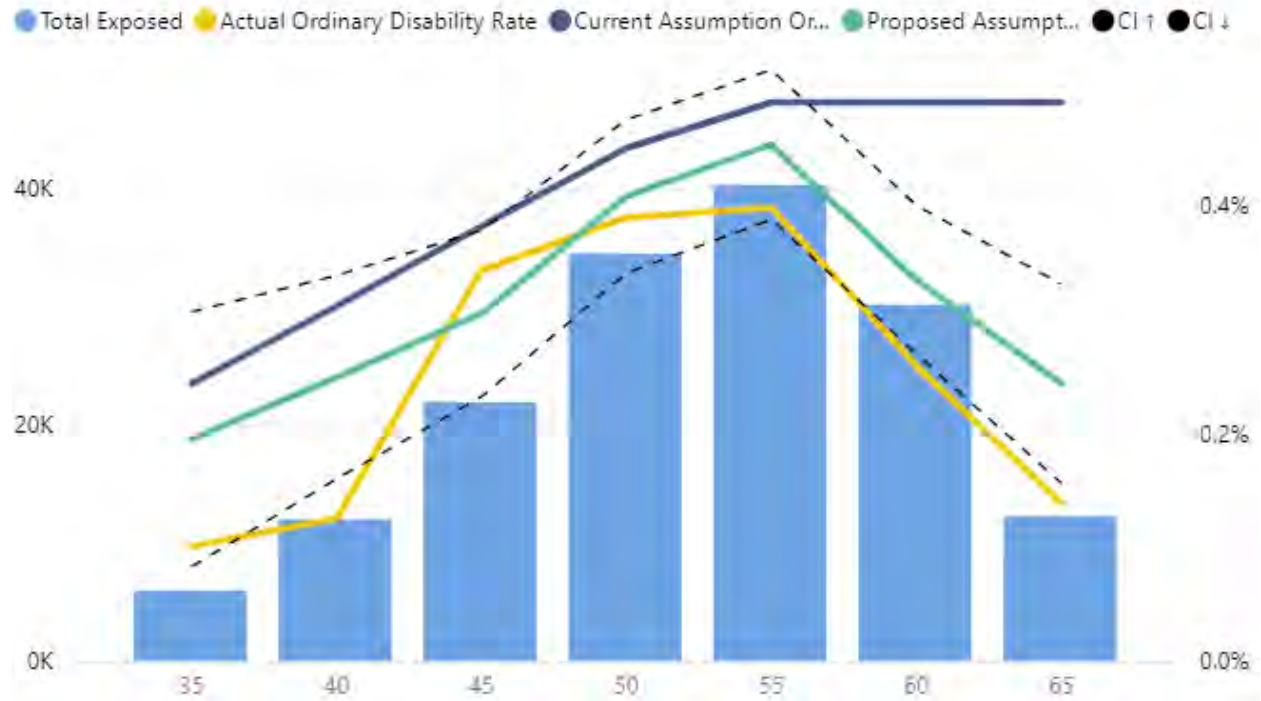


This chart shows the experience of male members in physically taxing titles for the age range 35 to 69 and the service range 10 to 34 for the period 2012 – 2019 for all plans. The actual rate of ordinary disability averaged 0.5965% whereas the overall expected rate of ordinary disability averaged 0.4234% based on the current assumptions and 0.6350% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.41 to 0.94.



This chart shows the experience of male members not in physically taxing titles for the age range 35 to 69 and the service range 10 to 34 for the period 2012 – 2019 for all plans. The actual rate of ordinary disability averaged 0.3091% whereas the overall expected rate of ordinary disability averaged 0.4430% based on the current assumptions and 0.3578% based on the proposed assumptions. This resulted in an increase in the A/E ratio from 0.70 to 0.86.

Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Age



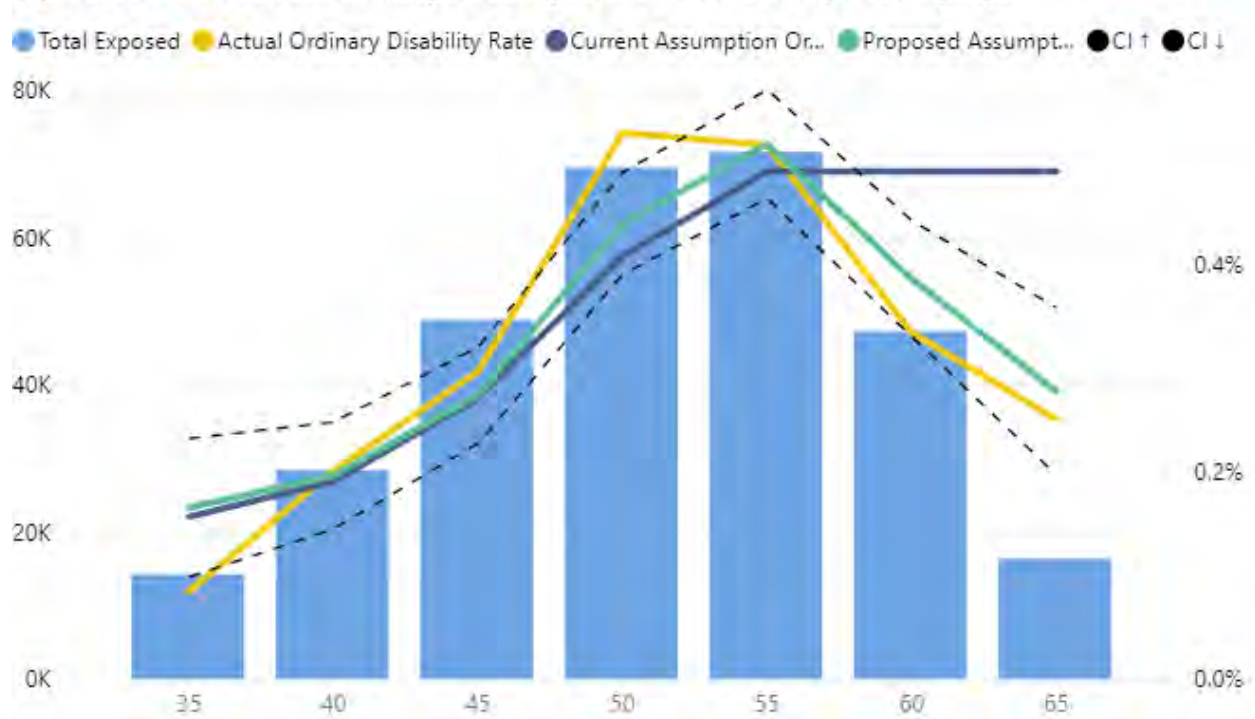
Females

The following table shows the experience of female members for ordinary disability retirement by age, for the age range 35 to 69 and the service range 10 to 34 for the period 2012 – 2019 for all plans. The actual rate of ordinary disability averaged 0.3880% whereas the overall expected rate of ordinary disability averaged 0.3902% based on the current assumptions and 0.3772% based on the proposed assumptions. This resulted in an increase in the A/E ratio from 0.99 to 1.03.

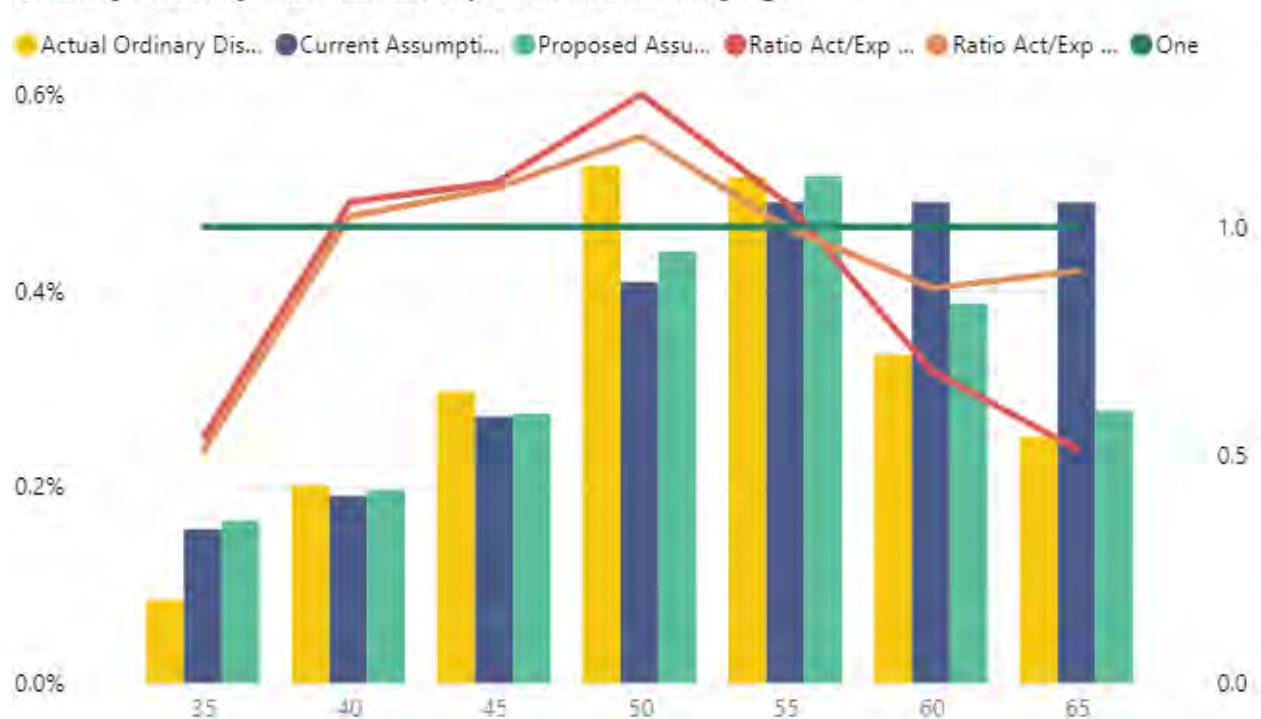
Age	Actual Ordinary Disabilities	Expected Ordinary Disabilities	Total Exposed	Actual Ordinary Disability Rate	Current Assumption Ordinary Disability	Ratio Act/Exp Ordinary Disability
35	1	2.5	1,753	0.0570%	0.1400%	0.41
36	4	3.4	2,314	0.1729%	0.1470%	1.18
37	2	4.4	2,846	0.0703%	0.1540%	0.46
38	1	5.5	3,419	0.0292%	0.1610%	0.18
39	4	6.5	3,877	0.1032%	0.1680%	0.61
40	7	7.7	4,389	0.1595%	0.1750%	0.91
41	13	9.1	4,988	0.2606%	0.1820%	1.43
42	9	10.6	5,613	0.1603%	0.1890%	0.85
43	13	12.4	6,323	0.2056%	0.1960%	1.05
44	15	14.3	7,041	0.2130%	0.2030%	1.05
45	18	16.6	7,918	0.2273%	0.2100%	1.08
46	13	21.0	8,826	0.1473%	0.2380%	0.62
47	35	26.0	9,776	0.3580%	0.2660%	1.35
48	38	31.3	10,647	0.3569%	0.2940%	1.21
49	41	37.3	11,590	0.3538%	0.3220%	1.10
50	56	43.7	12,477	0.4488%	0.3500%	1.28
51	65	50.1	13,255	0.4904%	0.3780%	1.30
52	79	56.9	14,018	0.5636%	0.4060%	1.39
53	77	63.6	14,662	0.5252%	0.4340%	1.21
54	89	69.3	14,996	0.5935%	0.4620%	1.28
55	84	75.6	15,424	0.5446%	0.4900%	1.11
56	89	72.8	14,862	0.5988%	0.4900%	1.22
57	82	71.0	14,499	0.5656%	0.4900%	1.15
58	65	67.2	13,723	0.4737%	0.4900%	0.97
59	49	63.9	13,047	0.3756%	0.4900%	0.77
60	49	60.1	12,262	0.3996%	0.4900%	0.82
61	29	55.7	11,359	0.2553%	0.4900%	0.52
62	33	48.9	9,973	0.3309%	0.4900%	0.68
63	28	36.4	7,423	0.3772%	0.4900%	0.77
64	19	30.4	6,202	0.3064%	0.4900%	0.63
65	17	25.3	5,168	0.3289%	0.4900%	0.67
66	6	19.9	4,062	0.1477%	0.4900%	0.30
67	8	14.5	2,966	0.2697%	0.4900%	0.55
68	4	11.4	2,326	0.1720%	0.4900%	0.35
69	6	8.9	1,819	0.3299%	0.4900%	0.67
Total	1,148	1,154.2	295,843	0.3880%	0.3902%	0.99

Age	Actual Ordinary Disabilities	Expected Ordinary Disabilities Proposed	Total Exposed	Actual Ordinary Disability Rate	Proposed Assumption Ordinary Disability	Act/Exp Proposed Ordinary Disability
35	1	2.6	1,753	0.0570%	0.1509%	0.38
36	4	3.6	2,314	0.1729%	0.1559%	1.11
37	2	4.7	2,846	0.0703%	0.1634%	0.43
38	1	5.8	3,419	0.0292%	0.1688%	0.17
39	4	6.8	3,877	0.1032%	0.1760%	0.59
40	7	8.0	4,389	0.1595%	0.1814%	0.88
41	13	9.4	4,988	0.2606%	0.1888%	1.38
42	9	11.0	5,613	0.1603%	0.1953%	0.82
43	13	12.7	6,323	0.2056%	0.2013%	1.02
44	15	14.7	7,041	0.2130%	0.2083%	1.02
45	18	17.0	7,918	0.2273%	0.2150%	1.06
46	13	21.4	8,826	0.1473%	0.2424%	0.61
47	35	26.4	9,776	0.3580%	0.2697%	1.33
48	38	31.6	10,647	0.3569%	0.2964%	1.20
49	41	37.4	11,590	0.3538%	0.3224%	1.10
50	56	45.0	12,477	0.4488%	0.3610%	1.24
51	65	52.8	13,255	0.4904%	0.3985%	1.23
52	79	61.2	14,018	0.5636%	0.4364%	1.29
53	77	69.5	14,662	0.5252%	0.4743%	1.11
54	89	76.8	14,996	0.5935%	0.5118%	1.16
55	84	80.3	15,424	0.5446%	0.5209%	1.05
56	89	77.7	14,862	0.5988%	0.5230%	1.15
57	82	74.5	14,499	0.5656%	0.5138%	1.10
58	65	70.3	13,723	0.4737%	0.5120%	0.93
59	49	66.8	13,047	0.3756%	0.5117%	0.73
60	49	62.7	12,262	0.3996%	0.5117%	0.78
61	29	58.0	11,359	0.2553%	0.5108%	0.50
62	33	25.1	9,973	0.3309%	0.2517%	1.31
63	28	19.9	7,423	0.3772%	0.2680%	1.41
64	19	16.8	6,202	0.3064%	0.2706%	1.13
65	17	14.1	5,168	0.3289%	0.2719%	1.21
66	6	11.2	4,062	0.1477%	0.2756%	0.54
67	8	8.4	2,966	0.2697%	0.2823%	0.96
68	4	6.6	2,326	0.1720%	0.2854%	0.60
69	6	5.1	1,819	0.3299%	0.2817%	1.17
Total	1,148	1,115.8	295,843	0.3880%	0.3772%	1.03

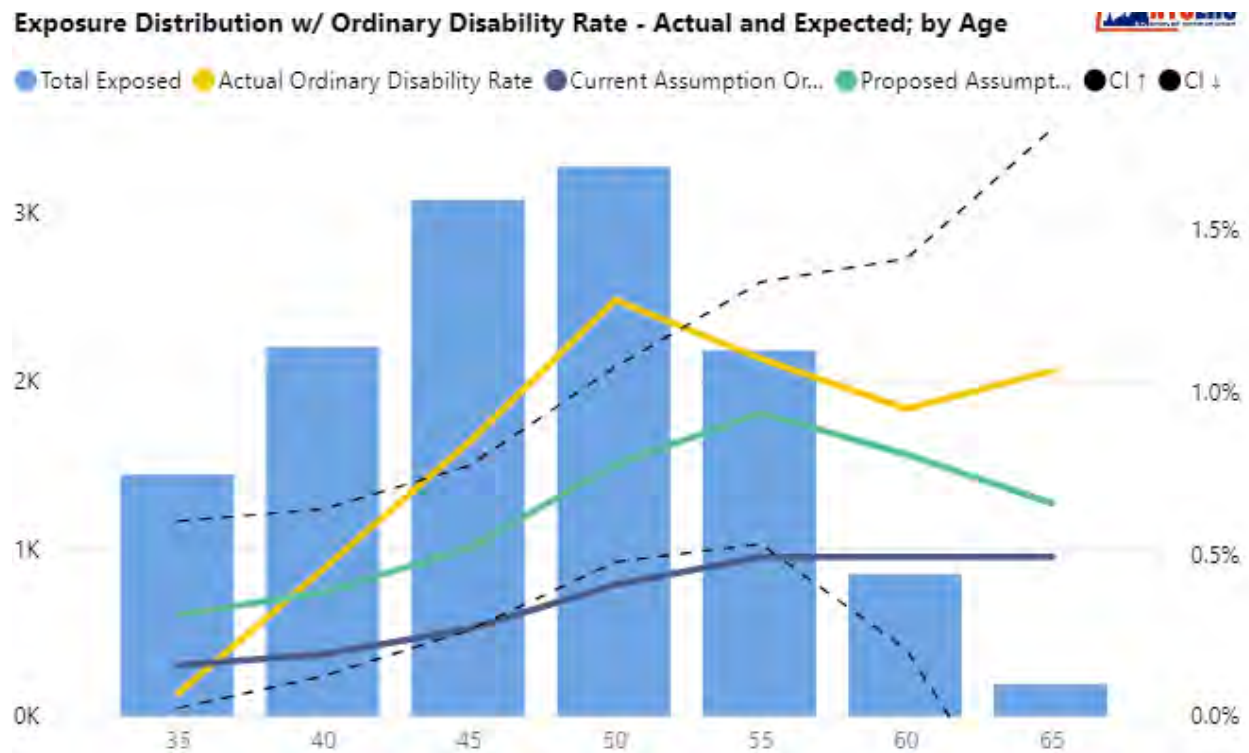
Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Age



Ordinary Disability Rate - Actual, Expected, and Ratio; by Age

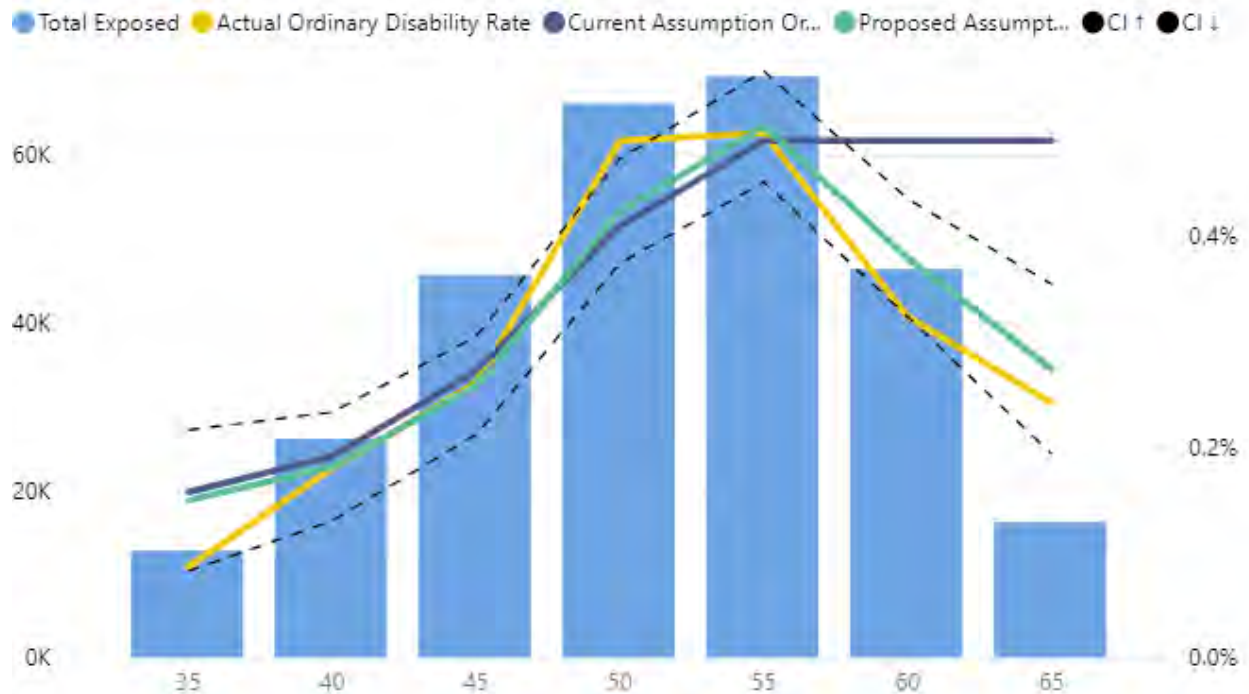


This chart shows the experience of female members in physically taxing titles for the age range 35 to 69 and the service range 10 to 34 for the period 2012 – 2019 for all plans. The actual rate of ordinary disability averaged 0.8556% whereas the overall expected rate of ordinary disability averaged 0.3306% based on the current assumptions and 0.6252% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 2.59 to 1.37.



This chart shows the experience of female members not in physically taxing titles for the age range 35 to 69 and the service range 10 to 34 for the period 2012 – 2019 for all plans. The actual rate of ordinary disability averaged 0.3662% whereas the overall expected rate of ordinary disability averaged 0.3929% based on the current assumptions and 0.3656% based on the proposed assumptions. This resulted in an increase in the A/E ratio from 0.93 to 1.00.

Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Age



Summary

Retirement eligibility and the change in the benefit accrual rate upon completing 20 years of service have a significant impact on the number of members who apply for disability retirement. By eliminating rates of ordinary disability retirement at these criteria, we believe it will increase plan liabilities. Furthermore, increasing the rates of ordinary disability for other members, especially members in physically taxing titles, will also result in higher plan liabilities.

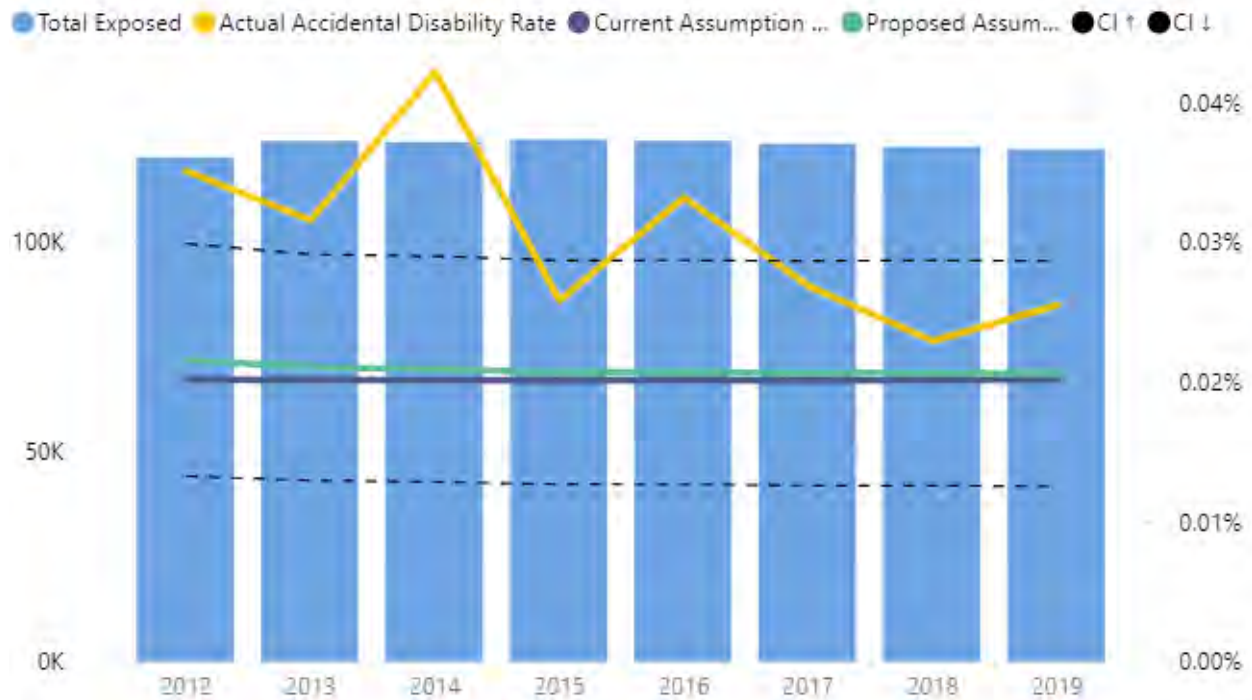
Accidental Disability

The current accidental assumption varies by gender. The proposed assumption also varies by gender, but also varies by age, plan and whether the member is in a physically taxing title. The following table shows the experience for accidental disability retirement by year, for the age range 30 to 69 and the service range 0 to 34. The actual rate of accidental disability averaged 0.0304% whereas the overall expected rate of accidental disability averaged 0.0201% based on the current assumptions and 0.0208% based on the proposed assumptions.

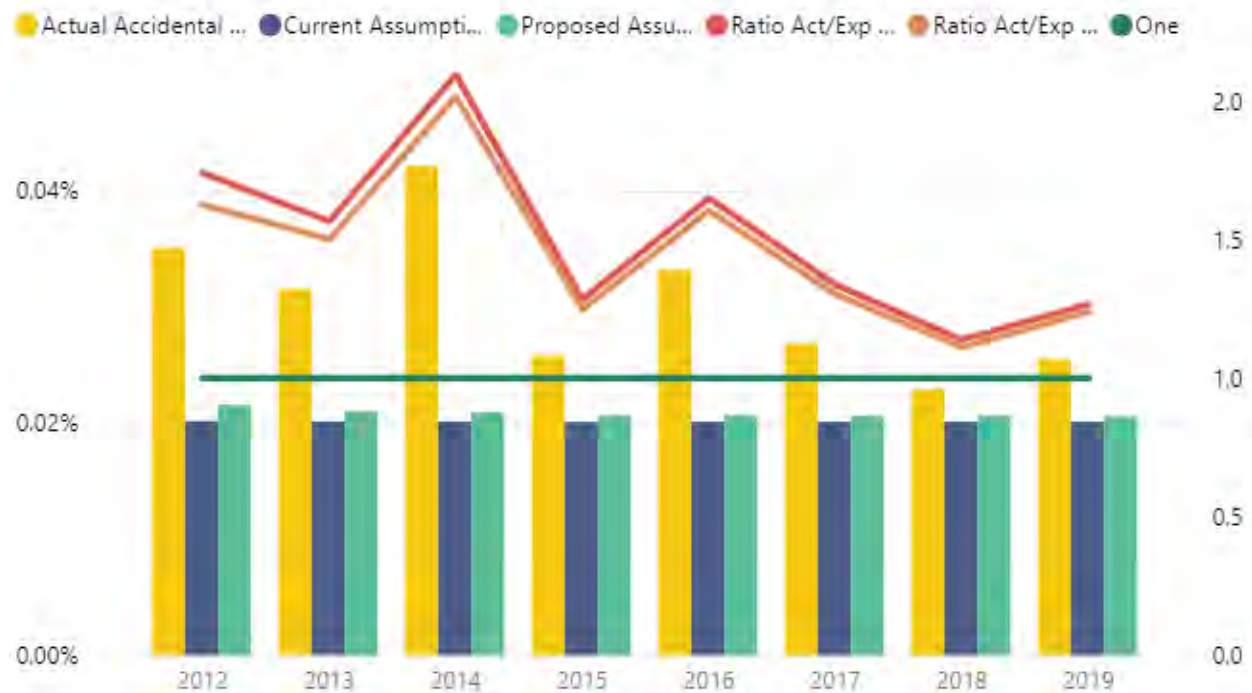
Plan Year	Actual Accidental Disabilities	Expected Accidental Disabilities	Total Exposed	Actual Accidental Disability Rate	Current Assumption Accidental Disability	Ratio Act/Exp Accidental Disability
2012	42	24.1	119,756	0.0351%	0.0202%	1.74
2013	39	24.9	123,590	0.0316%	0.0201%	1.57
2014	52	24.8	123,399	0.0421%	0.0201%	2.10
2015	32	24.9	123,995	0.0258%	0.0201%	1.28
2016	41	24.9	123,641	0.0332%	0.0201%	1.65
2017	33	24.7	122,934	0.0268%	0.0201%	1.34
2018	28	24.6	122,239	0.0229%	0.0201%	1.14
2019	31	24.5	121,647	0.0255%	0.0201%	1.27
Total	298	197.4	981,201	0.0304%	0.0201%	1.51

Plan Year	Actual Accidental Disabilities	Expected Accidental Disabilities Proposed	Total Exposed	Actual Accidental Disability Rate	Proposed Assumption Accidental Disability	Ratio Act/Exp Proposed Accidental Disability
2012	42	25.8	119,756	0.0351%	0.0216%	1.63
2013	39	26.0	123,590	0.0316%	0.0210%	1.50
2014	52	25.8	123,399	0.0421%	0.0209%	2.02
2015	32	25.6	123,995	0.0258%	0.0207%	1.25
2016	41	25.6	123,641	0.0332%	0.0207%	1.60
2017	33	25.3	122,934	0.0268%	0.0206%	1.30
2018	28	25.2	122,239	0.0229%	0.0206%	1.11
2019	31	25.0	121,647	0.0255%	0.0206%	1.24
Total	298	204.3	981,201	0.0304%	0.0208%	1.46

Exposure Distribution w/ Accidental Disability Rate - Actual and Expected; by Year



Accidental Disability Rate - Actual, Expected, and Ratio; by Year



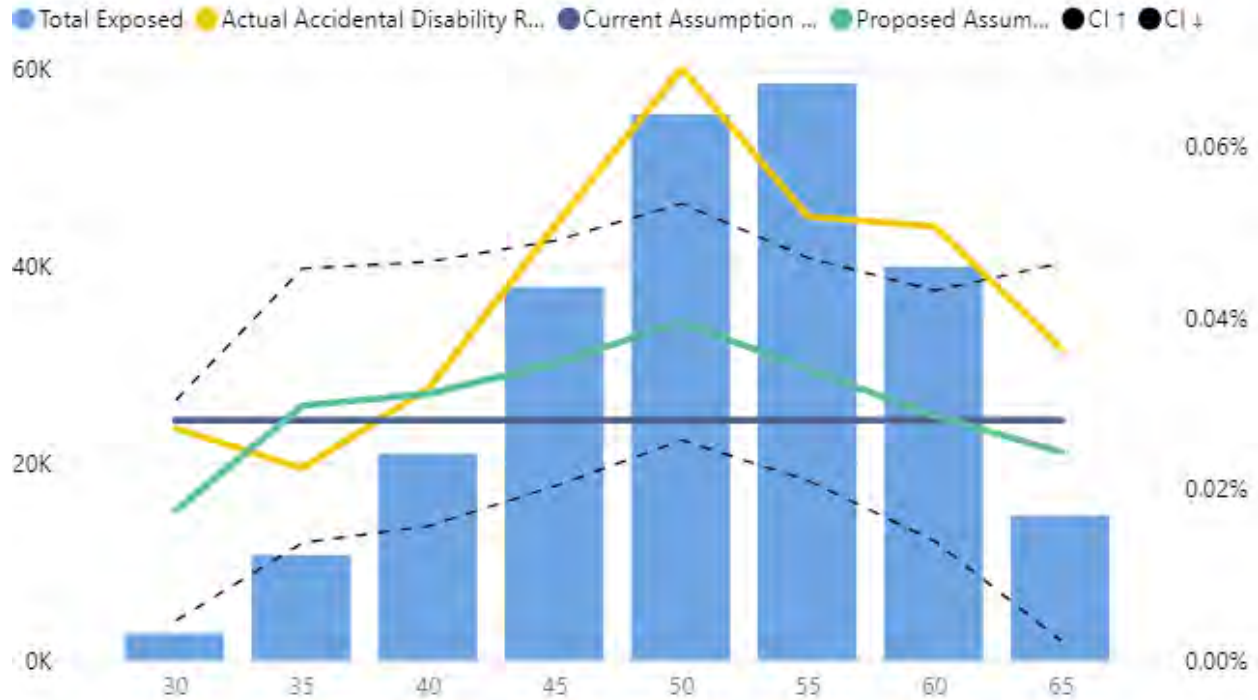
Males

The following table shows the experience of male members for accidental disability retirement by age, for the age range 30 to 69 and the service range 0 to 34 for the period 2012 – 2019 for all plans. The actual rate of accidental disability averaged 0.0462% whereas the overall expected rate of accidental disability averaged 0.0280% based on the current assumptions and 0.0316% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.65 to 1.46.

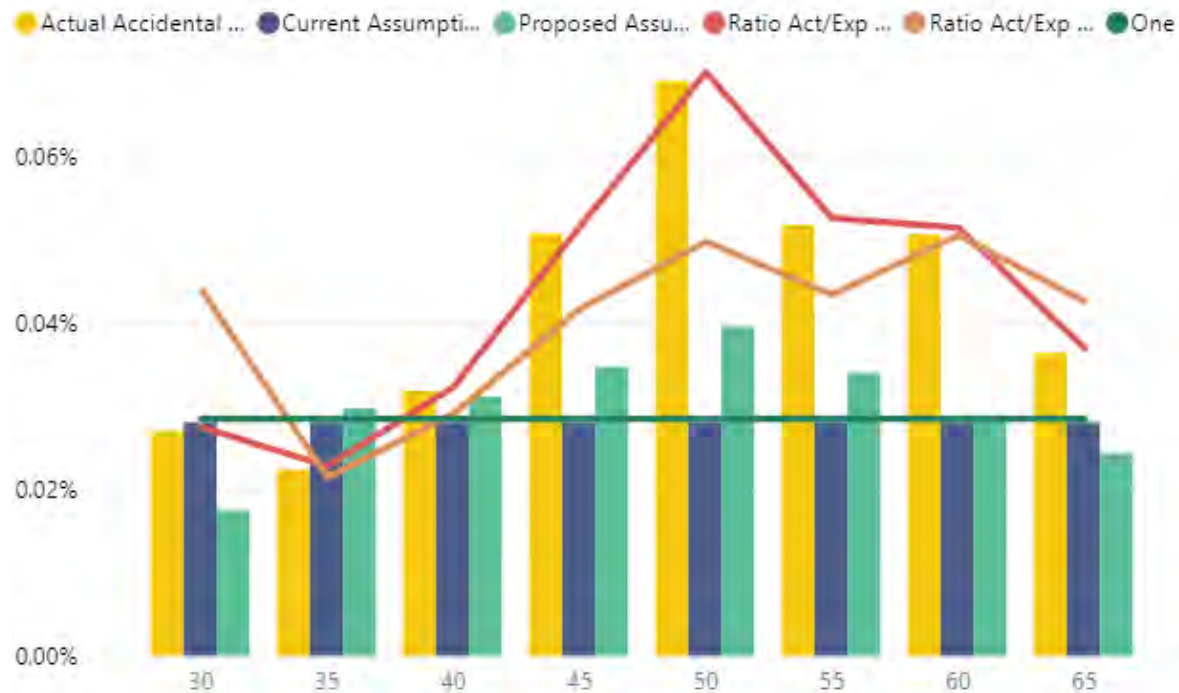
Age	Actual Accidental Disabilities	Expected Accidental Disabilities	Total Exposed	Actual Accidental Disability Rate	Current Assumption Accidental Disability	Ratio Act/Exp Accidental Disability
30	0	2.1	7,537	0.0000%	0.0280%	0.00
31	1	2.2	7,886	0.0127%	0.0280%	0.45
32	3	2.3	8,173	0.0367%	0.0280%	1.31
33	2	2.4	8,443	0.0237%	0.0280%	0.85
34	5	2.4	8,621	0.0580%	0.0280%	2.07
35	2	2.4	8,738	0.0229%	0.0280%	0.82
36	1	2.5	8,815	0.0113%	0.0280%	0.41
37	2	2.5	8,887	0.0225%	0.0280%	0.80
38	3	2.5	9,059	0.0331%	0.0280%	1.18
39	2	2.6	9,148	0.0219%	0.0280%	0.78
40	1	2.6	9,294	0.0108%	0.0280%	0.38
41	6	2.7	9,676	0.0620%	0.0280%	2.21
42	3	2.8	10,006	0.0300%	0.0280%	1.07
43	4	2.9	10,445	0.0383%	0.0280%	1.37
44	2	3.1	10,928	0.0183%	0.0280%	0.65
45	5	3.2	11,539	0.0433%	0.0280%	1.55
46	3	3.4	12,250	0.0245%	0.0280%	0.87
47	5	3.7	13,047	0.0383%	0.0280%	1.37
48	11	3.9	13,821	0.0796%	0.0280%	2.84
49	9	4.0	14,416	0.0624%	0.0280%	2.23
50	10	4.3	15,195	0.0658%	0.0280%	2.35
51	10	4.4	15,614	0.0640%	0.0280%	2.29
52	11	4.5	16,057	0.0685%	0.0280%	2.45
53	12	4.6	16,404	0.0732%	0.0280%	2.61
54	12	4.6	16,478	0.0728%	0.0280%	2.60
55	7	4.7	16,718	0.0419%	0.0280%	1.50
56	9	4.5	16,039	0.0561%	0.0280%	2.00
57	12	4.4	15,640	0.0767%	0.0280%	2.74
58	6	4.2	14,892	0.0403%	0.0280%	1.44
59	6	3.9	14,028	0.0428%	0.0280%	1.53
60	4	3.7	13,170	0.0304%	0.0280%	1.08
61	4	3.4	12,247	0.0327%	0.0280%	1.17
62	8	3.0	10,548	0.0758%	0.0280%	2.71
63	7	2.3	8,380	0.0835%	0.0280%	2.98
64	3	2.0	7,073	0.0424%	0.0280%	1.51
65	5	1.7	5,905	0.0847%	0.0280%	3.02
66	1	1.3	4,674	0.0214%	0.0280%	0.76
67	0	1.0	3,566	0.0000%	0.0280%	0.00
68	1	0.8	2,858	0.0350%	0.0280%	1.25
69	0	0.6	2,254	0.0000%	0.0280%	0.00
Total	198	120.0	428,469	0.0462%	0.0280%	1.65

Age	Actual Accidental Disabilities	Expected Accidental Disabilities Proposed	Total Exposed	Actual Accidental Disability Rate	Proposed Assumption Accidental Disability	Act/Exp Proposed Accidental Disability
30	0	1.4	7,537	0.0000%	0.0183%	0.00
31	1	1.4	7,886	0.0127%	0.0180%	0.70
32	3	1.4	8,173	0.0367%	0.0175%	2.10
33	2	1.4	8,443	0.0237%	0.0170%	1.39
34	5	1.4	8,621	0.0580%	0.0167%	3.47
35	2	2.6	8,738	0.0229%	0.0300%	0.76
36	1	2.6	8,815	0.0113%	0.0300%	0.38
37	2	2.6	8,887	0.0225%	0.0296%	0.76
38	3	2.7	9,059	0.0331%	0.0296%	1.12
39	2	2.7	9,148	0.0219%	0.0294%	0.74
40	1	2.8	9,294	0.0108%	0.0298%	0.36
41	6	2.9	9,676	0.0620%	0.0302%	2.05
42	3	3.1	10,006	0.0300%	0.0309%	0.97
43	4	3.3	10,445	0.0383%	0.0317%	1.21
44	2	3.5	10,928	0.0183%	0.0325%	0.56
45	5	3.8	11,539	0.0433%	0.0333%	1.30
46	3	4.2	12,250	0.0245%	0.0340%	0.72
47	5	4.5	13,047	0.0383%	0.0349%	1.10
48	11	4.9	13,821	0.0796%	0.0354%	2.25
49	9	5.1	14,416	0.0624%	0.0353%	1.77
50	10	6.4	15,195	0.0658%	0.0419%	1.57
51	10	6.3	15,614	0.0640%	0.0403%	1.59
52	11	6.3	16,057	0.0685%	0.0395%	1.73
53	12	6.3	16,404	0.0732%	0.0383%	1.91
54	12	6.2	16,478	0.0728%	0.0375%	1.94
55	7	6.1	16,718	0.0419%	0.0364%	1.15
56	9	5.6	16,039	0.0561%	0.0351%	1.60
57	12	5.3	15,640	0.0767%	0.0338%	2.27
58	6	4.8	14,892	0.0403%	0.0325%	1.24
59	6	4.4	14,028	0.0428%	0.0313%	1.37
60	4	4.0	13,170	0.0304%	0.0303%	1.00
61	4	3.6	12,247	0.0327%	0.0296%	1.10
62	8	3.0	10,548	0.0758%	0.0281%	2.70
63	7	2.2	8,380	0.0835%	0.0267%	3.12
64	3	1.8	7,073	0.0424%	0.0259%	1.64
65	5	1.5	5,905	0.0847%	0.0251%	3.38
66	1	1.1	4,674	0.0214%	0.0245%	0.87
67	0	0.9	3,566	0.0000%	0.0239%	0.00
68	1	0.7	2,858	0.0350%	0.0235%	1.49
69	0	0.5	2,254	0.0000%	0.0234%	0.00
Total	198	135.6	428,469	0.0462%	0.0316%	1.46

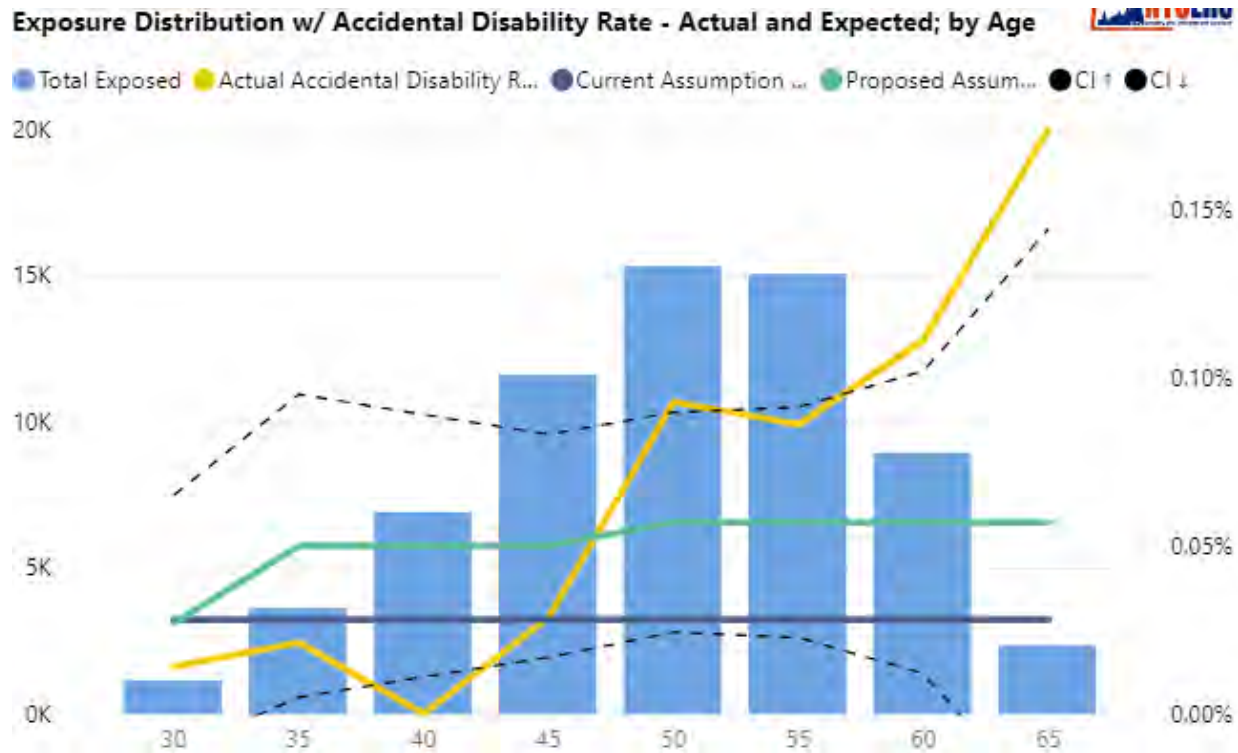
Exposure Distribution w/ Accidental Disability Rate - Actual and Expected; by Age



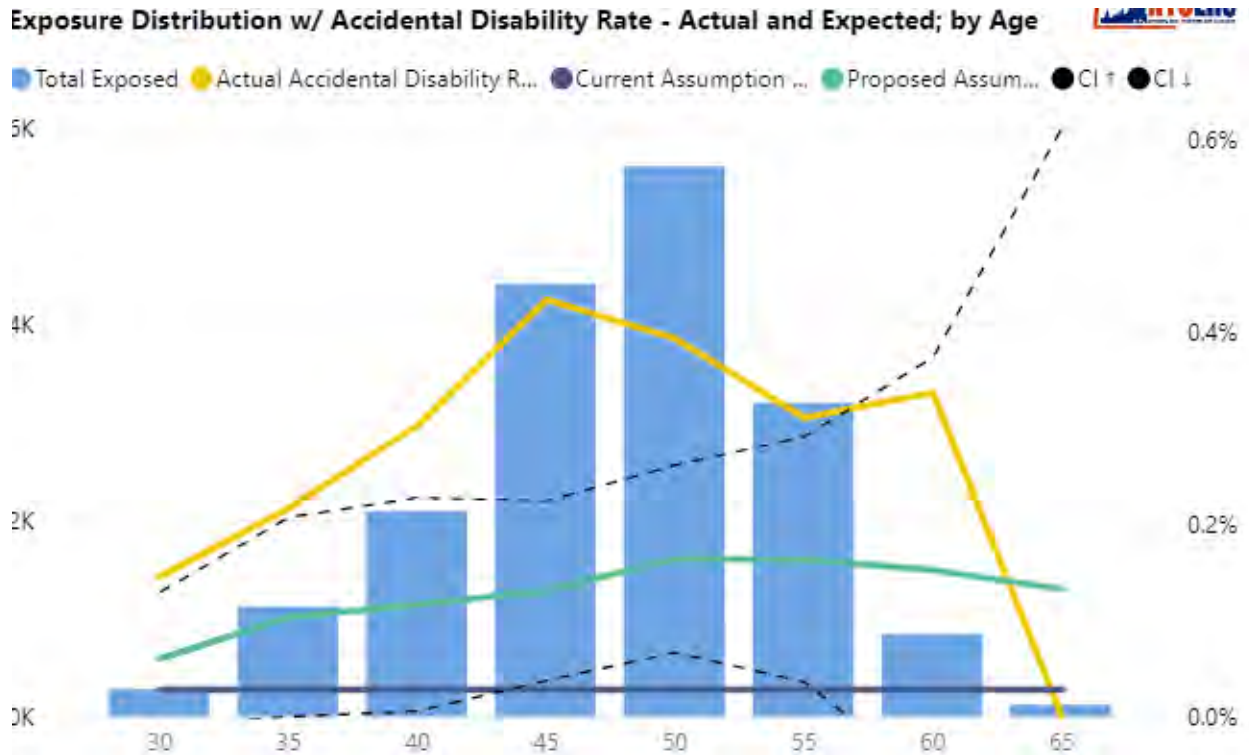
Accidental Disability Rate - Actual, Expected, and Ratio; by Age



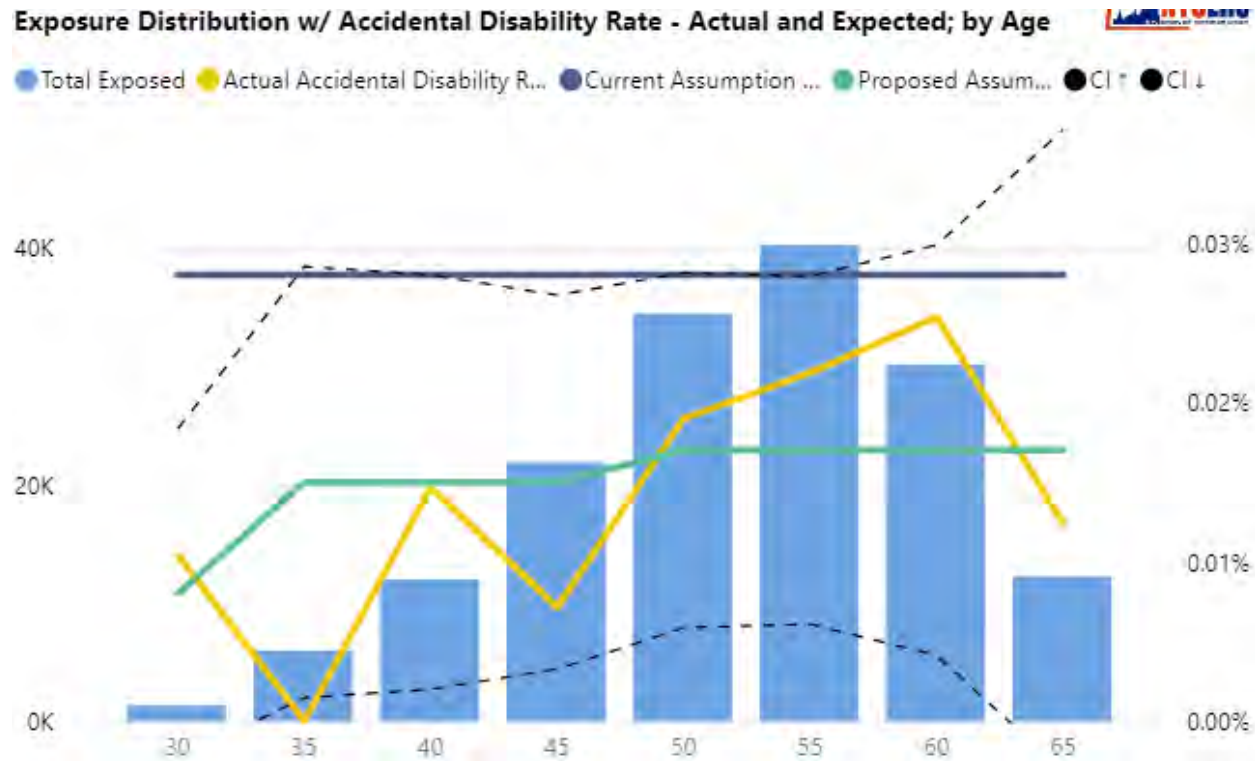
This chart shows the experience of male members in physically taxing titles in the Basic Plan group for the age range 30 to 69 and the service range 0 to 34 for the period 2012 – 2019 for all plans. The actual rate of accidental disability averaged 0.0604% whereas the overall expected rate of accidental disability averaged 0.0280% based on the current assumptions and 0.0521% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 2.16 to 1.16.



This chart shows the experience of male members in physically taxing titles in the Specialty Plan group for the age range 30 to 69 and the service range 0 to 34 for the period 2012 – 2019 for all plans. The actual rate of accidental disability averaged 0.3127% whereas the overall expected rate of accidental disability averaged 0.0280% based on the current assumptions and 0.1269% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 11.17 to 2.46.



This chart shows the experience of male members not in physically taxing titles for the age range 30 to 69 and the service range 0 to 34 for the period 2012 – 2019 for all plans. The actual rate of accidental disability averaged 0.0150% whereas the overall expected rate of accidental disability averaged 0.0280% based on the current assumptions and 0.0154% based on the proposed assumptions. This resulted in an increase in the A/E ratio from 0.54 to 0.97.



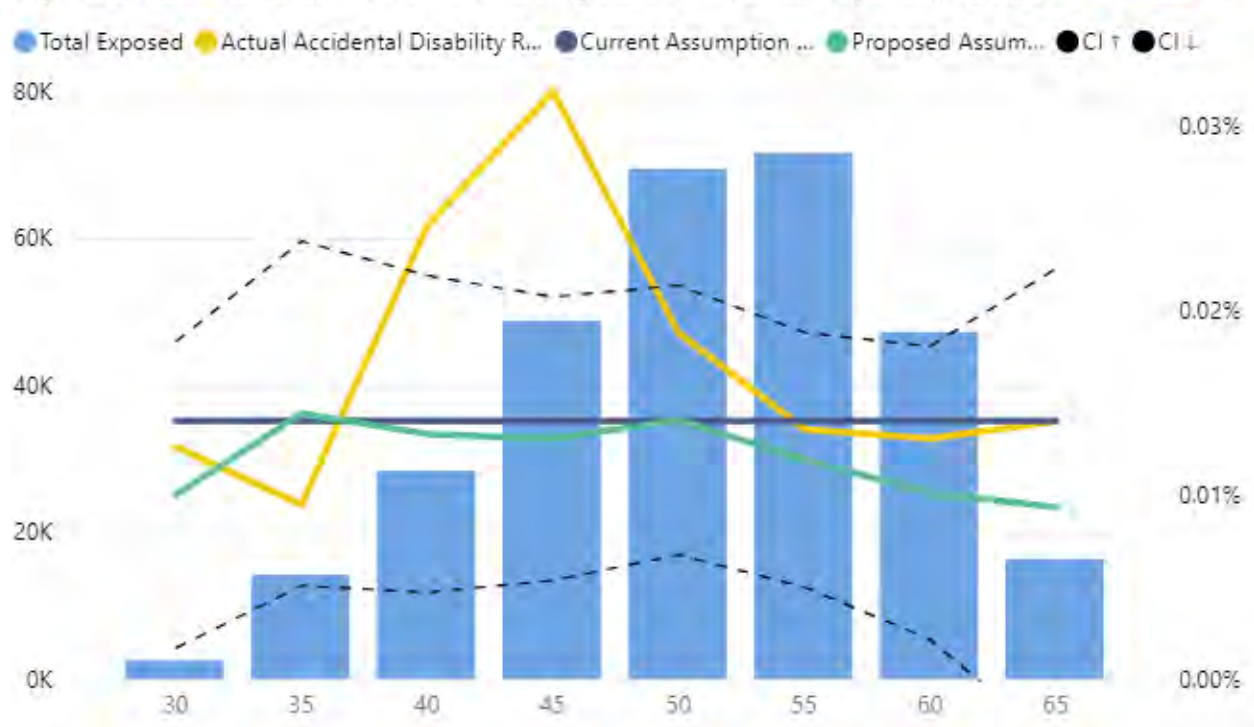
Females

The following table shows the experience of female members for accidental disability retirement by age, for the age range 30 to 69 and the service range 0 to 34 for the period 2012 – 2019 for all plans. The actual rate of accidental disability averaged 0.0181% whereas the overall expected rate of accidental disability averaged 0.0140% based on the current assumptions and 0.0124% based on the proposed assumptions. This resulted in an increase in the A/E ratio from 1.29 to 1.46.

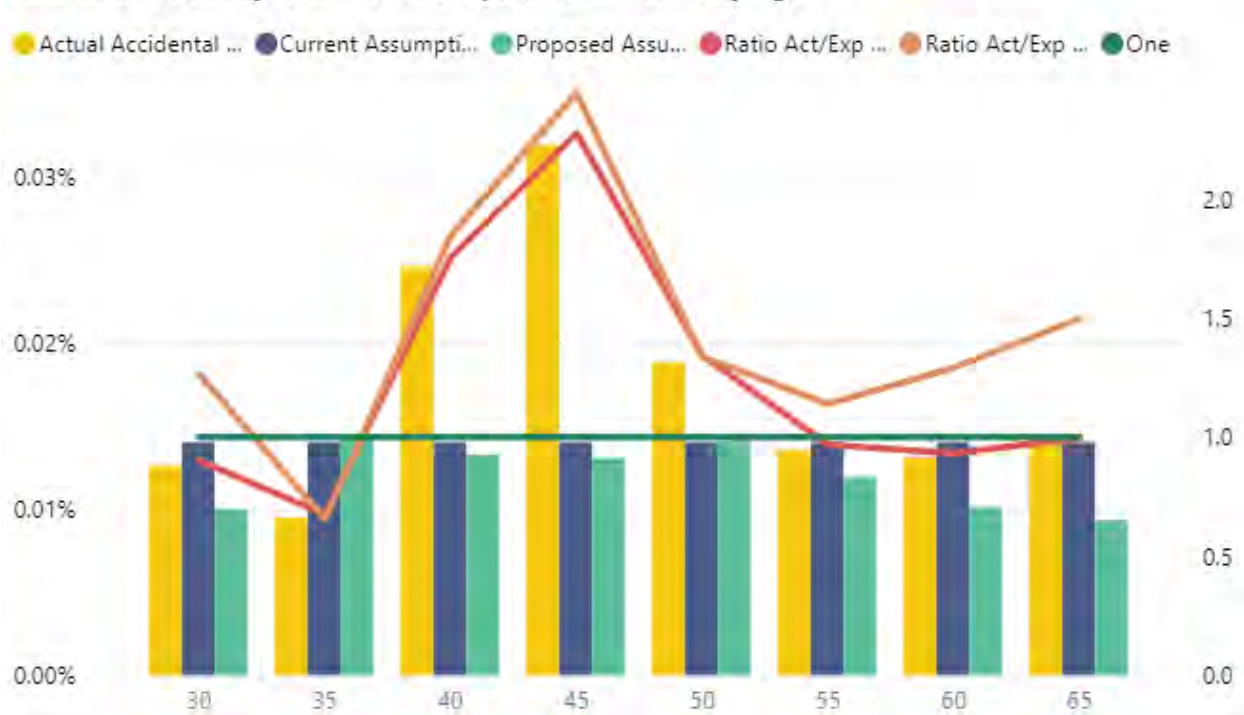
Age	Actual Accidental Disabilities	Expected Accidental Disabilities	Total Exposed	Actual Accidental Disability Rate	Current Assumption Accidental Disability	Ratio Act/Exp Accidental Disability
30	1	1.4	9,818	0.0102%	0.0140%	▲ 0.73
31	1	1.5	10,591	0.0094%	0.0140%	▲ 0.67
32	1	1.6	11,202	0.0089%	0.0140%	▲ 0.64
33	2	1.6	11,699	0.0171%	0.0140%	▲ 1.22
34	2	1.7	12,198	0.0164%	0.0140%	▲ 1.17
35	0	1.7	12,477	0.0000%	0.0140%	◆ 0.00
36	0	1.8	12,589	0.0000%	0.0140%	◆ 0.00
37	3	1.8	12,671	0.0237%	0.0140%	◆ 1.69
38	1	1.8	12,795	0.0078%	0.0140%	▲ 0.56
39	2	1.8	12,862	0.0155%	0.0140%	▲ 1.11
40	2	1.8	13,093	0.0153%	0.0140%	● 1.09
41	5	1.9	13,445	0.0372%	0.0140%	◆ 2.66
42	4	1.9	13,794	0.0290%	0.0140%	◆ 2.07
43	4	2.0	14,148	0.0283%	0.0140%	◆ 2.02
44	2	2.1	14,692	0.0136%	0.0140%	● 0.97
45	7	2.1	15,279	0.0458%	0.0140%	◆ 3.27
46	9	2.3	16,163	0.0557%	0.0140%	◆ 3.98
47	5	2.4	17,057	0.0293%	0.0140%	◆ 2.09
48	1	2.5	17,742	0.0056%	0.0140%	◆ 0.40
49	5	2.6	18,431	0.0271%	0.0140%	◆ 1.94
50	3	2.7	19,212	0.0156%	0.0140%	▲ 1.12
51	4	2.8	19,820	0.0202%	0.0140%	▲ 1.44
52	4	2.9	20,415	0.0196%	0.0140%	▲ 1.40
53	4	2.9	20,827	0.0192%	0.0140%	▲ 1.37
54	4	2.9	20,888	0.0191%	0.0140%	▲ 1.37
55	3	2.9	21,007	0.0143%	0.0140%	● 1.02
56	2	2.8	20,063	0.0100%	0.0140%	▲ 0.71
57	4	2.7	19,468	0.0205%	0.0140%	▲ 1.47
58	3	2.6	18,246	0.0164%	0.0140%	▲ 1.17
59	1	2.4	17,182	0.0058%	0.0140%	◆ 0.42
60	2	2.2	15,914	0.0126%	0.0140%	▲ 0.90
61	2	2.0	14,623	0.0137%	0.0140%	● 0.98
62	2	1.8	12,810	0.0156%	0.0140%	▲ 1.12
63	1	1.4	9,800	0.0102%	0.0140%	▲ 0.73
64	1	1.2	8,235	0.0121%	0.0140%	▲ 0.87
65	0	1.0	6,856	0.0000%	0.0140%	◆ 0.00
66	1	0.8	5,379	0.0186%	0.0140%	▲ 1.33
67	1	0.6	3,932	0.0254%	0.0140%	◆ 1.82
68	1	0.4	3,008	0.0332%	0.0140%	◆ 2.37
69	0	0.3	2,301	0.0000%	0.0140%	◆ 0.00
Total	100	77.4	552,732	0.0181%	0.0140%	▲ 1.29

Age	Actual Accidental Disabilities	Expected Accidental Disabilities Proposed	Total Exposed	Actual Accidental Disability Rate	Proposed Assumption Accidental Disability	Act/Exp Proposed Accidental Disability
30	1	1.1	9,818	0.0102%	0.0114%	▲ 0.90
31	1	1.1	10,591	0.0094%	0.0106%	▲ 0.89
32	1	1.1	11,202	0.0089%	0.0100%	▲ 0.89
33	2	1.1	11,699	0.0171%	0.0093%	◆ 1.83
34	2	1.1	12,198	0.0164%	0.0090%	◆ 1.82
35	0	1.9	12,477	0.0000%	0.0150%	◆ 0.00
36	0	1.8	12,589	0.0000%	0.0145%	◆ 0.00
37	3	1.8	12,671	0.0237%	0.0144%	◆ 1.65
38	1	1.8	12,795	0.0078%	0.0141%	▲ 0.55
39	2	1.8	12,862	0.0155%	0.0141%	▲ 1.10
40	2	1.8	13,093	0.0153%	0.0135%	▲ 1.13
41	5	1.8	13,445	0.0372%	0.0135%	◆ 2.76
42	4	1.8	13,794	0.0290%	0.0134%	◆ 2.17
43	4	1.8	14,148	0.0283%	0.0130%	◆ 2.17
44	2	1.9	14,692	0.0136%	0.0131%	● 1.04
45	7	2.0	15,279	0.0458%	0.0132%	◆ 3.46
46	9	2.1	16,163	0.0557%	0.0132%	◆ 4.22
47	5	2.2	17,057	0.0293%	0.0130%	◆ 2.25
48	1	2.3	17,742	0.0056%	0.0130%	◆ 0.43
49	5	2.4	18,431	0.0271%	0.0128%	◆ 2.12
50	3	2.9	19,212	0.0156%	0.0149%	● 1.05
51	4	2.9	19,820	0.0202%	0.0146%	▲ 1.38
52	4	2.9	20,415	0.0196%	0.0141%	▲ 1.39
53	4	2.8	20,827	0.0192%	0.0135%	▲ 1.42
54	4	2.7	20,888	0.0191%	0.0131%	▲ 1.47
55	3	2.6	21,007	0.0143%	0.0125%	▲ 1.14
56	2	2.5	20,063	0.0100%	0.0123%	▲ 0.81
57	4	2.3	19,468	0.0205%	0.0119%	◆ 1.72
58	3	2.1	18,246	0.0164%	0.0114%	▲ 1.44
59	1	1.9	17,182	0.0058%	0.0111%	▲ 0.52
60	2	1.7	15,914	0.0126%	0.0105%	▲ 1.20
61	2	1.5	14,623	0.0137%	0.0102%	▲ 1.34
62	2	1.3	12,810	0.0156%	0.0100%	◆ 1.57
63	1	1.0	9,800	0.0102%	0.0098%	● 1.05
64	1	0.8	8,235	0.0121%	0.0097%	▲ 1.26
65	0	0.7	6,856	0.0000%	0.0095%	◆ 0.00
66	1	0.5	5,379	0.0186%	0.0094%	◆ 1.98
67	1	0.4	3,932	0.0254%	0.0092%	◆ 2.76
68	1	0.3	3,008	0.0332%	0.0091%	◆ 3.65
69	0	0.2	2,301	0.0000%	0.0091%	◆ 0.00
Total	100	68.7	552,732	0.0181%	0.0124%	▲ 1.46

Exposure Distribution w/ Accidental Disability Rate - Actual and Expected; by Age

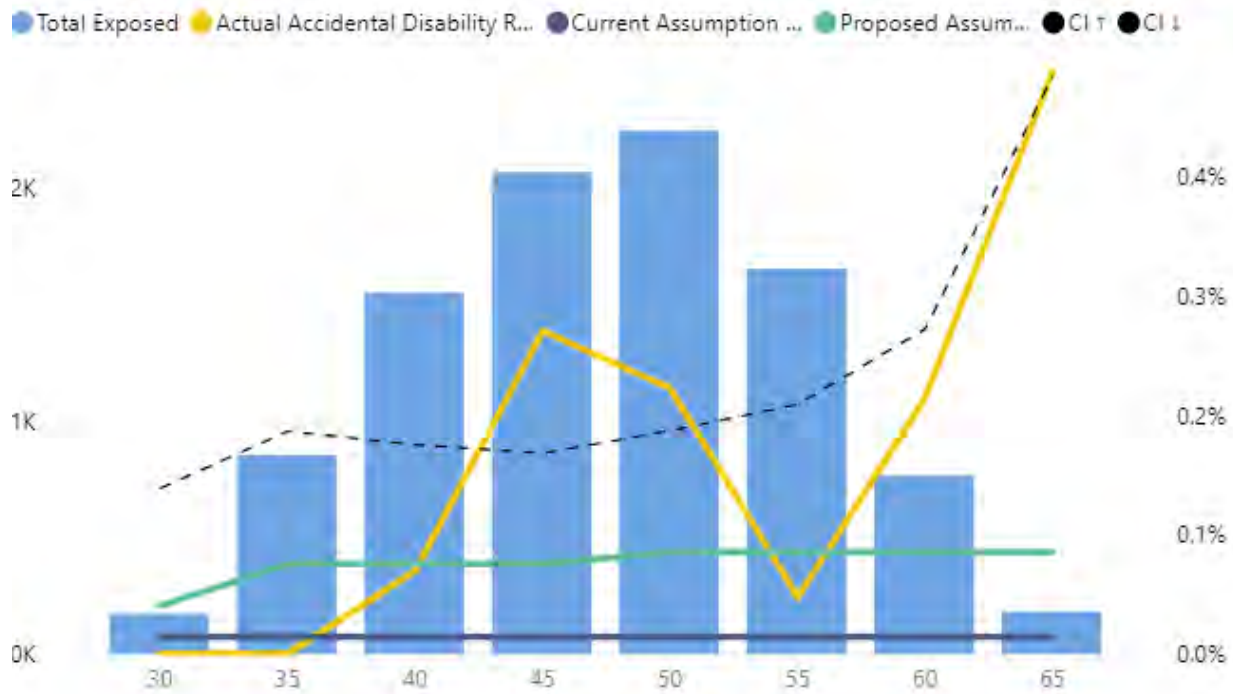


Accidental Disability Rate - Actual, Expected, and Ratio; by Age

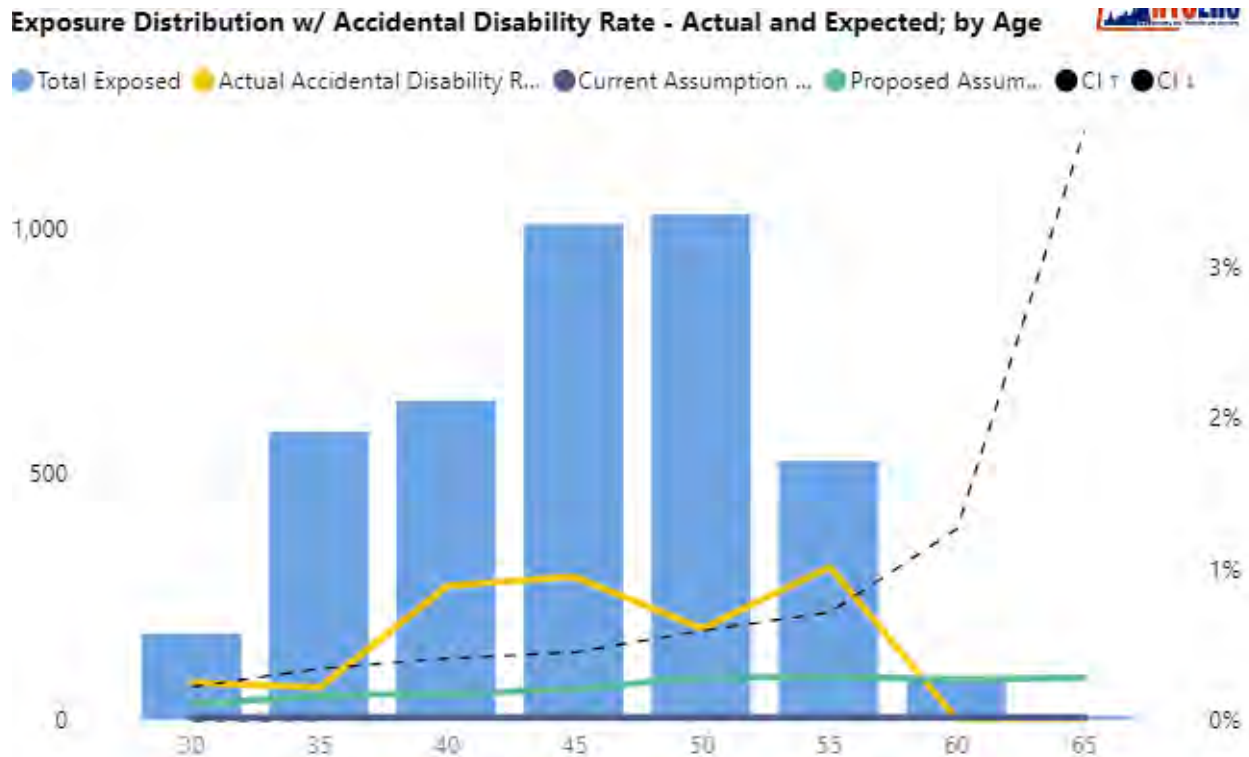


This chart shows the experience of female members in physically taxing titles in the Basic Plan group for the age range 30 to 69 and the service range 0 to 34 for the period 2012 – 2019 for all plans. The actual rate of accidental disability averaged 0.1332% whereas the overall expected rate of accidental disability averaged 0.0140% based on the current assumptions and 0.0755% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 9.52 to 1.76.

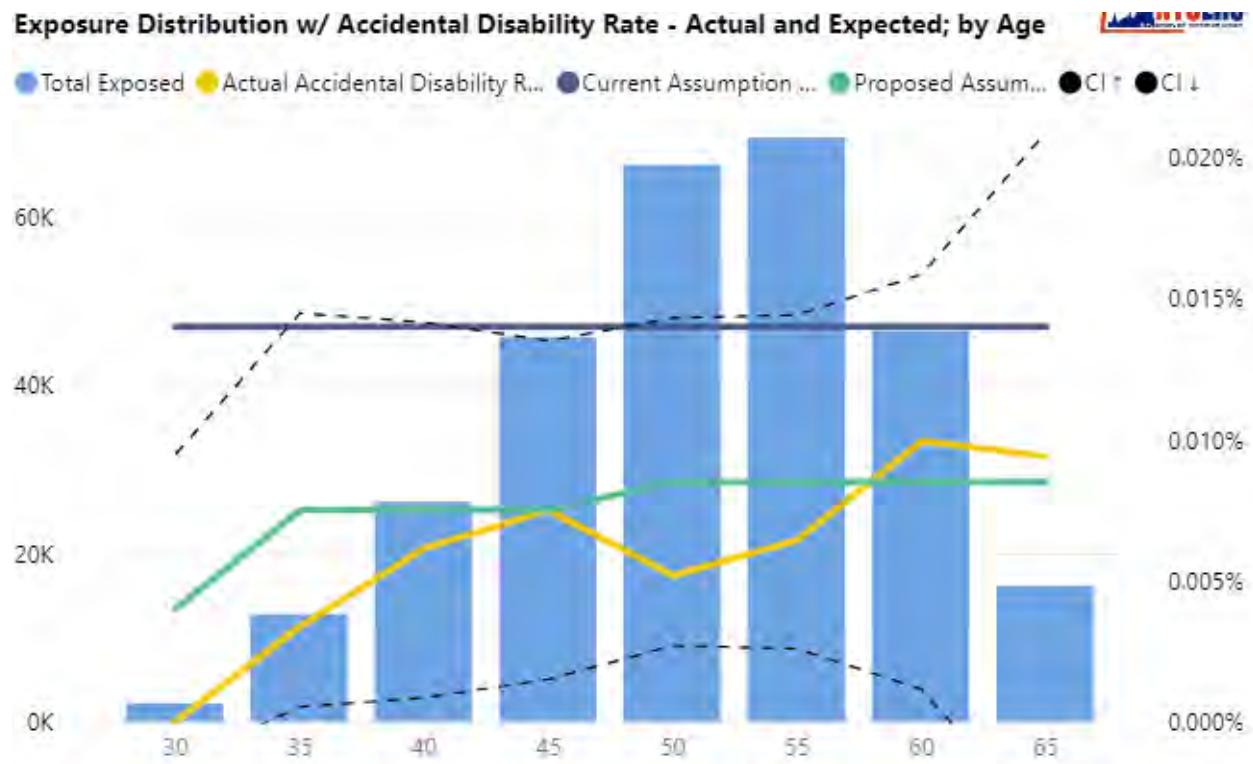
Exposure Distribution w/ Accidental Disability Rate - Actual and Expected; by Age



This chart shows the experience of female members in physically taxing titles in the Specialty Plan group for the age range 30 to 69 and the service range 0 to 34 for the period 2012 – 2019 for all plans. The actual rate of accidental disability averaged 0.5162% whereas the overall expected rate of accidental disability averaged 0.0140% based on the current assumptions and 0.1734% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 36.87 to 2.98.



This chart shows the experience of female members not in physically taxing titles for the age range 30 to 69 and the service range 0 to 34 for the period 2012 – 2019 for all plans. The actual rate of accidental disability averaged 0.0059% whereas the overall expected rate of accidental disability averaged 0.0140% based on the current assumptions and 0.0077% based on the proposed assumptions. This resulted in an increase in the A/E ratio from 0.42 to 0.77.



Summary

The proposed rates have increased the anticipated number of accidental disability retirements, especially members in physically taxing titles, which will result in an increase in plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF DISABILITY FOR ACTIVE MEMBERS: GENERAL				
	Ordinary Disability		Accidental Disability	
Age	Males	Females	Males	Females
20	0.140%	0.140%	0.028%	0.014%
21	0.140%	0.140%	0.028%	0.014%
22	0.140%	0.140%	0.028%	0.014%
23	0.140%	0.140%	0.028%	0.014%
24	0.140%	0.140%	0.028%	0.014%
25	0.140%	0.140%	0.028%	0.014%
26	0.140%	0.140%	0.028%	0.014%
27	0.140%	0.140%	0.028%	0.014%
28	0.140%	0.140%	0.028%	0.014%
29	0.140%	0.140%	0.028%	0.014%
30	0.140%	0.140%	0.028%	0.014%
31	0.154%	0.140%	0.028%	0.014%
32	0.168%	0.140%	0.028%	0.014%
33	0.182%	0.140%	0.028%	0.014%
34	0.196%	0.140%	0.028%	0.014%
35	0.210%	0.140%	0.028%	0.014%
36	0.224%	0.147%	0.028%	0.014%
37	0.238%	0.154%	0.028%	0.014%
38	0.252%	0.161%	0.028%	0.014%
39	0.266%	0.168%	0.028%	0.014%
40	0.280%	0.175%	0.028%	0.014%
41	0.294%	0.182%	0.028%	0.014%
42	0.308%	0.189%	0.028%	0.014%
43	0.322%	0.196%	0.028%	0.014%
44	0.336%	0.203%	0.028%	0.014%
45	0.350%	0.210%	0.028%	0.014%
46	0.364%	0.238%	0.028%	0.014%
47	0.378%	0.266%	0.028%	0.014%
48	0.392%	0.294%	0.028%	0.014%
49	0.406%	0.322%	0.028%	0.014%
50	0.420%	0.350%	0.028%	0.014%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF DISABILITY FOR ACTIVE MEMBERS: GENERAL				
	Ordinary Disability		Accidental Disability	
Age	Males	Females	Males	Females
51	0.434%	0.378%	0.028%	0.014%
52	0.448%	0.406%	0.028%	0.014%
53	0.462%	0.434%	0.028%	0.014%
54	0.476%	0.462%	0.028%	0.014%
55	0.490%	0.490%	0.028%	0.014%
56	0.490%	0.490%	0.028%	0.014%
57	0.490%	0.490%	0.028%	0.014%
58	0.490%	0.490%	0.028%	0.014%
59	0.490%	0.490%	0.028%	0.014%
60	0.490%	0.490%	0.028%	0.014%
61	0.490%	0.490%	0.028%	0.014%
62	0.490%	0.490%	0.028%	0.014%
63	0.490%	0.490%	0.028%	0.014%
64	0.490%	0.490%	0.028%	0.014%
65	0.490%	0.490%	0.028%	0.014%
66	0.490%	0.490%	0.028%	0.014%
67	0.490%	0.490%	0.028%	0.014%
68	0.490%	0.490%	0.028%	0.014%
69	0.490%	0.490%	0.028%	0.014%
70	0.490%	0.490%	0.028%	0.014%
71	0.490%	0.490%	0.028%	0.014%
72	0.490%	0.490%	0.028%	0.014%
73	0.490%	0.490%	0.028%	0.014%
74	0.490%	0.490%	0.028%	0.014%
75	0.490%	0.490%	0.028%	0.014%
76	0.490%	0.490%	0.028%	0.014%
77	0.490%	0.490%	0.028%	0.014%
78	0.490%	0.490%	0.028%	0.014%
79	0.490%	0.490%	0.028%	0.014%
80	N/A	N/A	N/A	N/A

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF DISABILITY RETIREMENT ¹ : GENERAL				
	Ordinary Disability ²			
	Not Physically Taxing		Physically Taxing	
Age	Males	Females	Males	Females
20	0.0880%	0.1330%	0.1650%	0.2800%
21	0.0880%	0.1330%	0.1650%	0.2800%
22	0.0880%	0.1330%	0.1650%	0.2800%
23	0.0880%	0.1330%	0.1650%	0.2800%
24	0.0880%	0.1330%	0.1650%	0.2800%
25	0.0880%	0.1330%	0.1650%	0.2800%
26	0.0880%	0.1330%	0.1650%	0.2800%
27	0.0880%	0.1330%	0.1650%	0.2800%
28	0.0880%	0.1330%	0.1650%	0.2800%
29	0.0880%	0.1330%	0.1650%	0.2800%
30	0.0880%	0.1330%	0.1650%	0.2800%
31	0.1040%	0.1330%	0.1950%	0.2800%
32	0.1200%	0.1330%	0.2250%	0.2800%
33	0.1360%	0.1330%	0.2550%	0.2800%
34	0.1520%	0.1330%	0.2850%	0.2800%
35	0.1680%	0.1330%	0.3150%	0.2800%
36	0.1792%	0.1397%	0.3360%	0.2940%
37	0.1904%	0.1463%	0.3570%	0.3080%
38	0.2016%	0.1529%	0.3780%	0.3220%
39	0.2128%	0.1596%	0.3990%	0.3360%
40	0.2240%	0.1662%	0.4200%	0.3500%
41	0.2352%	0.1729%	0.4410%	0.3640%
42	0.2464%	0.1795%	0.4620%	0.3780%
43	0.2576%	0.1862%	0.4830%	0.3920%
44	0.2688%	0.1928%	0.5040%	0.4060%
45	0.2800%	0.1995%	0.5250%	0.4200%
46	0.2912%	0.2261%	0.5460%	0.4760%
47	0.3024%	0.2527%	0.5670%	0.5320%
48	0.3136%	0.2793%	0.5880%	0.5880%
49	0.3248%	0.3059%	0.6090%	0.6440%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF DISABILITY RETIREMENT ¹ : GENERAL				
	Ordinary Disability ²			
	Not Physically Taxing		Physically Taxing	
Age	Males	Females	Males	Females
50	0.3408%	0.3439%	0.6390%	0.7240%
51	0.3728%	0.3819%	0.6990%	0.8040%
52	0.4048%	0.4199%	0.7590%	0.8840%
53	0.4368%	0.4579%	0.8190%	0.9640%
54	0.4688%	0.4959%	0.8790%	1.0440%
55	0.4800%	0.5225%	0.9000%	1.1000%
56	0.4800%	0.5225%	0.9000%	1.1000%
57	0.4800%	0.5225%	0.9000%	1.1000%
58	0.4800%	0.5225%	0.9000%	1.1000%
59	0.4800%	0.5225%	0.9000%	1.1000%
60	0.4800%	0.5225%	0.9000%	1.1000%
61	0.4800%	0.5225%	0.9000%	1.1000%
62	0.4800%	0.5225%	0.9000%	1.1000%
63	0.4800%	0.5225%	0.9000%	1.1000%
64	0.4800%	0.5225%	0.9000%	1.1000%
65	0.4800%	0.5225%	0.9000%	1.1000%
66	0.4800%	0.5225%	0.9000%	1.1000%
67	0.4800%	0.5225%	0.9000%	1.1000%
68	0.4800%	0.5225%	0.9000%	1.1000%
69	0.4800%	0.5225%	0.9000%	1.1000%
70	0.4800%	0.5225%	0.9000%	1.1000%
71	0.4800%	0.5225%	0.9000%	1.1000%
72	0.4800%	0.5225%	0.9000%	1.1000%
73	0.4800%	0.5225%	0.9000%	1.1000%
74	0.4800%	0.5225%	0.9000%	1.1000%
75	0.4800%	0.5225%	0.9000%	1.1000%
76	0.4800%	0.5225%	0.9000%	1.1000%
77	0.4800%	0.5225%	0.9000%	1.1000%
78	0.4800%	0.5225%	0.9000%	1.1000%
79	0.4800%	0.5225%	0.9000%	1.1000%
80	N/A	N/A	N/A	N/A

¹ Greater of disability benefit and retirement benefit is valued if eligible for early or service retirement

² No rates of ordinary disability apply prior to completion of 10 years of service or upon attainment of the following age/service combinations:

Basic Plan (Plan F): Age 62 and 20 years of service

Age 57 Plan (Plans I): Age 57 and 20 years of service

Tier 6 (Plan R): Age 63 and 20 years of service

55/25 (Plan N): Age 62 and 20 years of service or Age 55 and 25 years of service

0/25 Specialty Plans: Age 62 and 20 years of service or 25 years of service

Auto Workers (Plan T) or Physically Taxing Plans: Age 62 and 20 years of service or Age 50 and 25 years of service

For Tier 6 plans, Age 63 is used instead of Age 62.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF DISABILITY RETIREMENT ¹ : GENERAL						
	Accidental Disability					
	Not Physically Taxing		Physically Taxing Basic Group ³		Physically Taxing Specialty Group 4	
Age	Males	Females	Males	Females	Males ⁵	Females ⁵
20	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
21	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
22	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
23	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
24	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
25	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
26	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
27	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
28	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
29	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
30	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
31	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
32	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
33	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
34	0.0080%	0.0040%	0.0270%	0.0400%	0.0600%	0.100%
35	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
36	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
37	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
38	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
39	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
40	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
41	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
42	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
43	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
44	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
45	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
46	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
47	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
48	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%
49	0.0150%	0.0075%	0.0500%	0.0750%	0.1000%	0.150%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF DISABILITY RETIREMENT ¹ : GENERAL						
	Accidental Disability					
	Not Physically Taxing		Physically Taxing Basic Group ³		Physically Taxing Specialty Group 4	
Age	Males	Females	Males	Females	Males ⁵	Females ⁵
50	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
51	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
52	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
53	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
54	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
55	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
56	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
57	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
58	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
59	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
60	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
61	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
62	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
63	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
64	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
65	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
66	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
67	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
68	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
69	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
70	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
71	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
72	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
73	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
74	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
75	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
76	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
77	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
78	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
79	0.0170%	0.0085%	0.0570%	0.0850%	0.1200%	0.200%
80	N/A	N/A	N/A	N/A	N/A	N/A

³ Includes members of Basic Tier 4 (Plan F) and Tier 6 (Plan Y) Plans, including Sanitation, TBTA and Transit members of these plans, as well as members of the Age 57 Plan (Plan I)

⁴ Includes members eligible for unreduced retirement at completion of 25 years of service with or without an age requirement (fire alarm dispatchers, EMTs, Special Officers, 55/25 Plan members, Deputy Sheriffs, Auto Workers, Police Communication Techs and DA Investigators)

⁵ For members who elected an Improved Plan, multiply rates by 150%

Pre-retirement Death

Plan codes excluded in the analysis of other contingencies are part of the analysis of pre-retirement death.

Mortality assumptions involve two components: a base table and a mortality improvement scale. The mortality improvement scale adjusts the mortality rates of the base table to reflect that generally rates of mortality are anticipated to improve over time.

The Society of Actuaries (SOA) has published mortality improvement scales (MP scales) each year from 2014 to 2021. In the last several actuarial valuations, OA has used the mortality improvement scale that coincides with the valuation date. For example, OA used the MP-2020 scale in its June 30, 2020 lag actuarial valuation. In this analysis, we used the most recent improvement scale (MP-2021) published by the SOA as of the date of this analysis. Please note that the SOA has not published an updated MP scale due to the pandemic.

The SOA MP-2021 improvement scale is based on data through 2019 (before the onset of Covid) from the Social Security Administration (SSA). Even though the aggregate (for all ages) long-term trend has been towards mortality improvements, this is not always the case for each age. Therefore, there are situations where the expected mortality rate in a later year is higher than base rate.

There is much discussion in the actuarial profession and among retirement systems about the development of mortality tables and treatment of excess deaths due to the Covid pandemic, which occurred in 2020 – 2022. The analysis to develop our recommendations exclude the mortality experience of members during the pandemic and reflect the experience from 2012 - 2019.

In this study the base table of the current assumption corresponds to the year 2012; expected mortality rates in future years are obtained from the base table and the MP-2021 scale. For example, the 2017 (July 1, 2016 – June 30, 2017) mortality rates are derived from the base table (2012) adjusted with four years of improvements until 2016. This method links mortality rates across the years and, consequently, allows mortality comparisons from one year to another.

For the proposed assumption, proposed rates were initially determined as of the mid-year of the study period or fiscal year 2016. MP-2021 was then used to adjust those rates to earlier and later years. The proposed mortality rates shown in the following section have been adjusted to reflect a base year of 2019. We recommend that MP-2021 continue to be used to reflect mortality improvements both before and after the measurement date.

In reviewing the current assumption, we compared the actual experience to published tables from the SOA. The most recent tables published by the SOA reflected experience for public plan retirement systems separated into General employees (PubG), Teachers (PubT) and Public Safety (PubS) members. Adjustments were made to the standard SOA tables to match the experience of the system or the current tables, and for consistency with recommended postretirement mortality tables, to determine if the SOA tables provided a better fit.

Ordinary Death

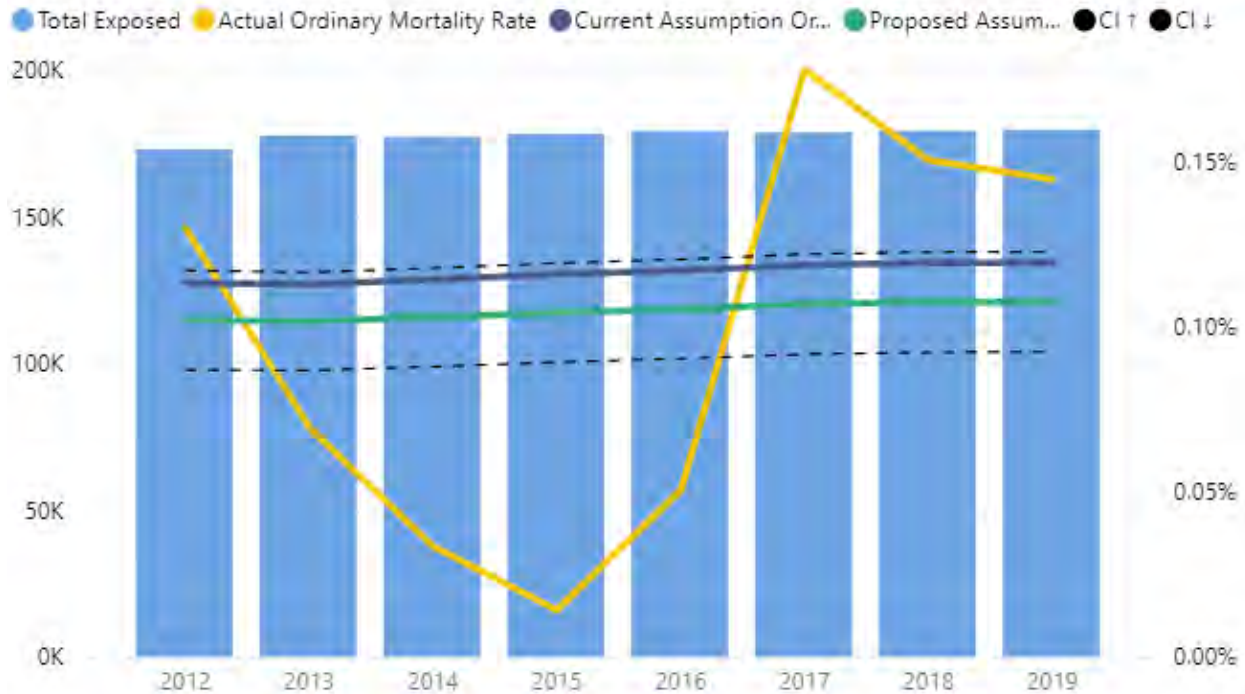
The current assumption is the same for General employees, Transit and TBTA. For these groups, we compared the experience to PubG tables and found the current assumption to provide a better fit. We proposed to reduce the current rates of ordinary death by 10% to account for recent experience.

The following tables show the experience of ordinary death by year, for the age range (20 to 69) during the period 2012 – 2019 based on the current and proposed assumptions for both males and females combined for General employees, Transit and TBTA members. The A/E ratio increased from 0.84 to 0.94 and from 0.85 to 0.94 for only General employees.

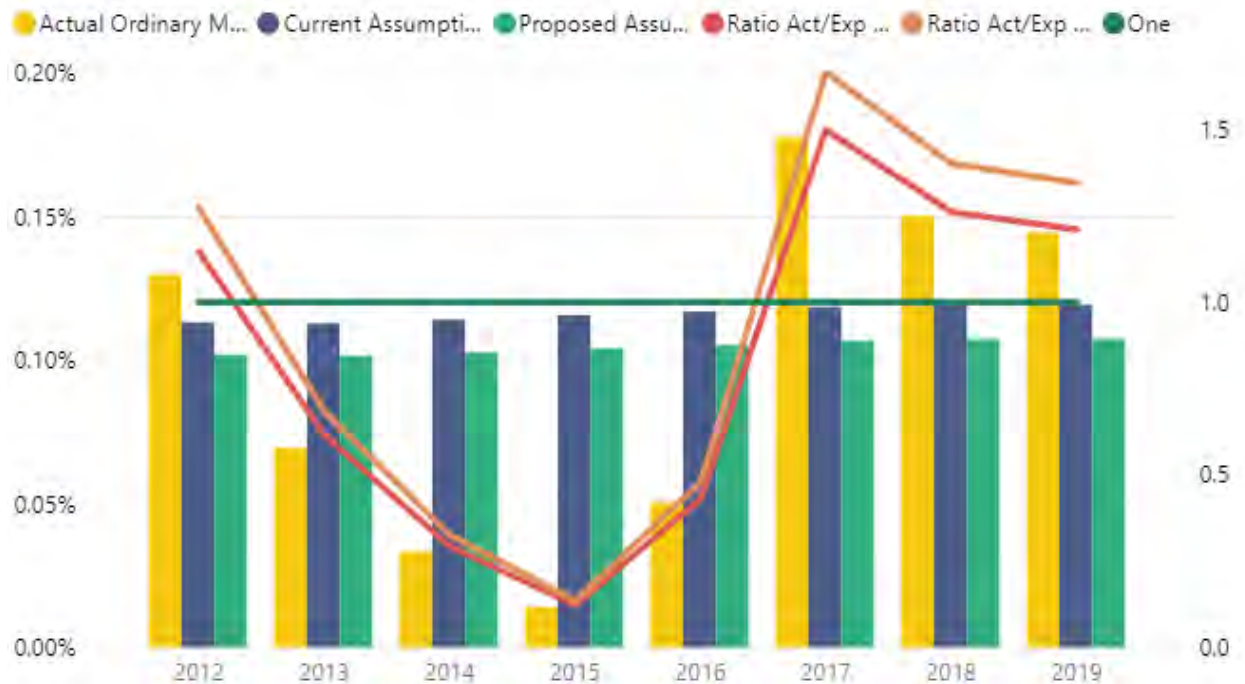
Plan Year	Actual Ordinary Deaths	Expected Ordinary Deaths	Total Exposed	Actual Ordinary Mortality Rate	Current Assumption Ordinary Mortality	Ratio Act/Exp Ordinary Mortality
2012	216	186.3	166,012	0.1301%	0.1122%	▲ 1.16
2013	120	190.8	170,644	0.0703%	0.1118%	▲ 0.63
2014	59	192.5	170,083	0.0347%	0.1132%	◆ 0.31
2015	25	196.4	171,062	0.0146%	0.1148%	◆ 0.13
2016	88	199.1	171,710	0.0512%	0.1160%	◆ 0.44
2017	307	201.2	171,172	0.1794%	0.1175%	◆ 1.53
2018	262	202.7	171,731	0.1526%	0.1180%	▲ 1.29
2019	246	202.9	172,007	0.1430%	0.1180%	▲ 1.21
Total	1,323	1,571.9	1,364,421	0.0970%	0.1152%	▲ 0.84

Plan Year	Actual Ordinary Deaths	Expected Ordinary Deaths Proposed	Total Exposed	Actual Ordinary Mortality Rate	Proposed Assumption Ordinary Mortality	Act/Exp Proposed Ordinary Mortality
2012	216	167.7	166,012	0.1301%	0.1010%	▲ 1.29
2013	120	171.7	170,644	0.0703%	0.1006%	▲ 0.70
2014	59	173.2	170,083	0.0347%	0.1018%	◆ 0.34
2015	25	176.7	171,062	0.0146%	0.1033%	◆ 0.14
2016	88	179.2	171,710	0.0512%	0.1044%	◆ 0.49
2017	307	181.1	171,172	0.1794%	0.1058%	◆ 1.70
2018	262	182.4	171,731	0.1526%	0.1062%	▲ 1.44
2019	246	182.6	172,007	0.1430%	0.1062%	▲ 1.35
Total	1,323	1,414.7	1,364,421	0.0970%	0.1037%	● 0.94

Exposure Distribution w/ Ordinary Mortality Rate - Actual and Expected; by Year



Ordinary Mortality Rate - Actual, Expected, and Ratio; by Year



Actual vs. Expected - Ordinary Mortality Proposed w/ Exposure Bubbles; by Year



The following section displays results by gender.

Males

The following charts show the experience of ordinary death by age band, for the age range (20 to 69) during the period 2012 – 2019 based on the current and proposed assumption for General employees, Transit and TBTA members combined. The A/E ratio increased from 0.82 to 0.92 and from 0.85 to 0.94 for only General employees. Please note that the charts by age are based on 5-year brackets. For example, the age bracket 45 should be interpreted as the interval 45 – 49.

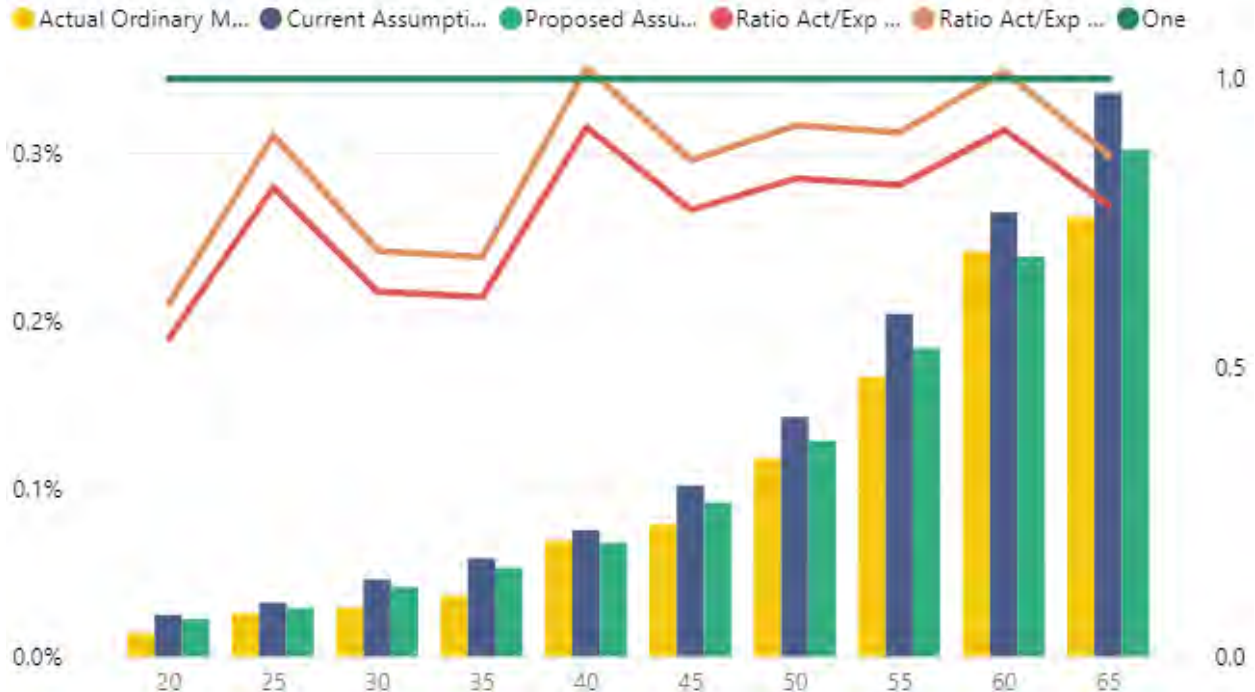
Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths	Total Exposed	Actual Ordinary Mortality Rate	Current Assumption Ordinary Mortality	Ratio Act/Exp Ordinary Mortality
20	1	1.8	7,319	0.0137%	0.0248%	▲ 0.55
25	9	11.1	34,642	0.0260%	0.0320%	▲ 0.81
30	16	25.3	55,237	0.0290%	0.0458%	▲ 0.63
35	24	38.6	66,049	0.0363%	0.0584%	▲ 0.62
40	55	60.0	79,816	0.0689%	0.0752%	● 0.92
45	85	109.9	108,025	0.0787%	0.1018%	▲ 0.77
50	157	189.8	133,203	0.1179%	0.1425%	▲ 0.83
55	206	252.3	123,812	0.1664%	0.2038%	▲ 0.82
60	197	216.1	81,739	0.2410%	0.2644%	● 0.91
65	81	103.7	30,949	0.2617%	0.3352%	▲ 0.78
Total	831	1,008.7	720,791	0.1153%	0.1399%	▲ 0.82

Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths Proposed	Total Exposed	Actual Ordinary Mortality Rate	Proposed Assumption Ordinary Mortality	Act/Exp Proposed Ordinary Mortality
20	1	1.6	7,319	0.0137%	0.0223%	▲ 0.61
25	9	10.0	34,642	0.0260%	0.0288%	● 0.90
30	16	22.8	55,237	0.0290%	0.0413%	▲ 0.70
35	24	34.7	66,049	0.0363%	0.0526%	▲ 0.69
40	55	54.0	79,816	0.0689%	0.0677%	● 1.02
45	85	98.9	108,025	0.0787%	0.0916%	▲ 0.86
50	157	170.8	133,203	0.1179%	0.1282%	● 0.92
55	206	227.1	123,812	0.1664%	0.1834%	● 0.91
60	197	194.5	81,739	0.2410%	0.2380%	● 1.01
65	81	93.4	30,949	0.2617%	0.3017%	▲ 0.87
Total	831	907.9	720,791	0.1153%	0.1260%	● 0.92

Exposure Distribution w/ Ordinary Mortality Rate - Actual and Expected; by Age



Ordinary Mortality Rate - Actual, Expected, and Ratio; by Age



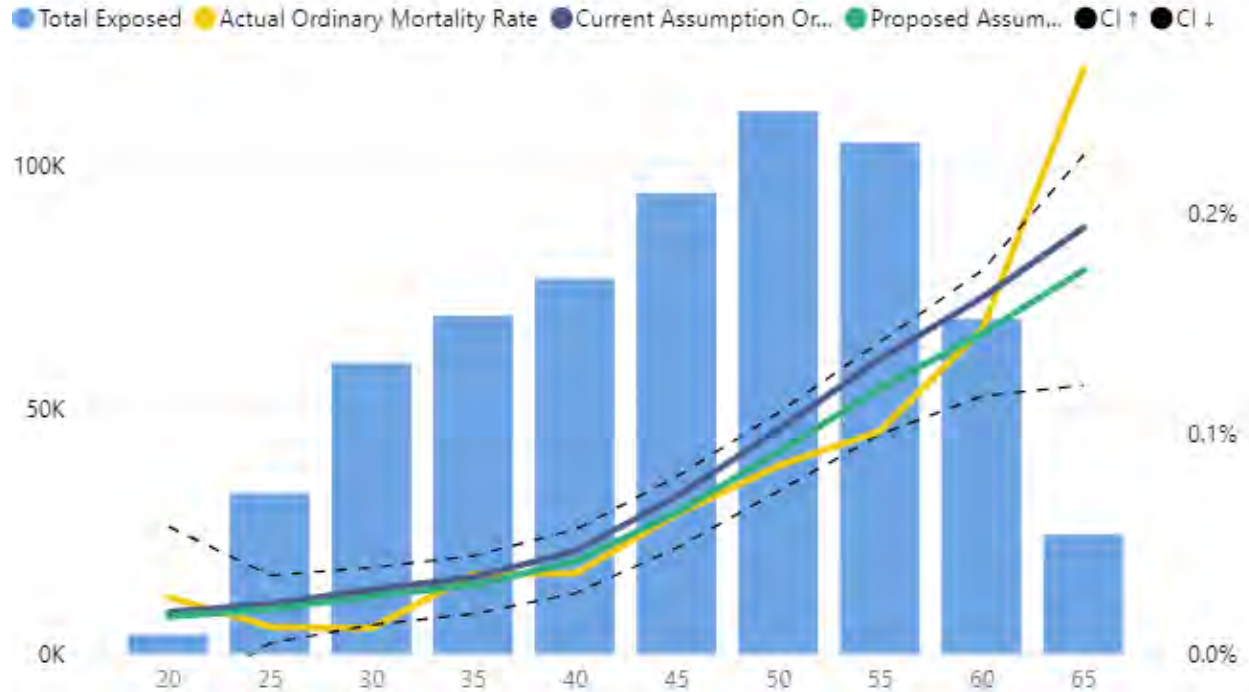
Females

The following charts show the experience of ordinary death by age band, for the age range (20 to 69) during the period 2012 – 2019 based on the current and proposed assumption for General employees, Transit and TBTA members combined. The A/E ratio increased from 0.87 to 0.97 and from 0.85 to 0.94 for only General employees. Please note that the charts by age are based on 5-year brackets. For example, the age bracket 45 should be interpreted as the interval 45 – 49.

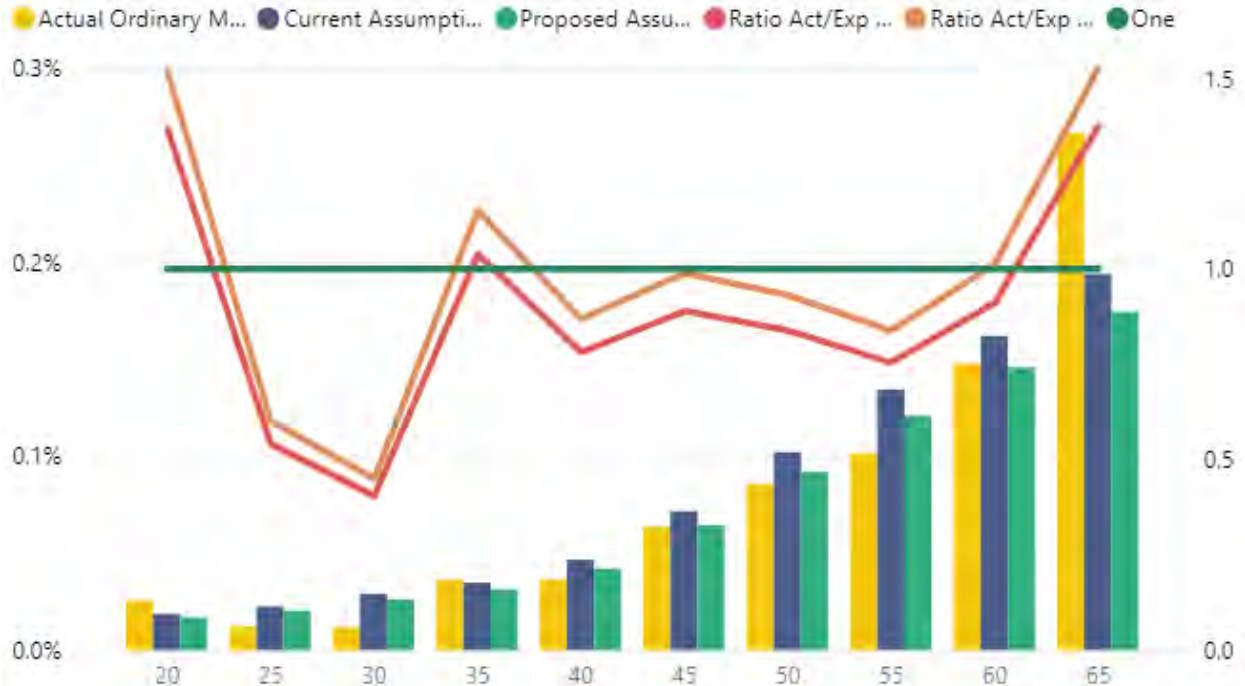
Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths	Total Exposed	Actual Ordinary Mortality Rate	Current Assumption Ordinary Mortality	Ratio Act/Exp Ordinary Mortality
20	1	0.7	3,892	0.0257%	0.0188%	▲ 1.37
25	4	7.4	32,821	0.0122%	0.0225%	▲ 0.54
30	7	17.2	59,340	0.0118%	0.0290%	◆ 0.41
35	25	23.9	68,862	0.0363%	0.0347%	● 1.05
40	28	35.6	76,464	0.0366%	0.0465%	▲ 0.79
45	60	67.2	94,013	0.0638%	0.0714%	▲ 0.89
50	95	113.0	110,839	0.0857%	0.1019%	▲ 0.84
55	106	140.3	104,543	0.1014%	0.1342%	▲ 0.76
60	101	110.7	68,457	0.1475%	0.1617%	● 0.91
65	65	47.3	24,399	0.2664%	0.1937%	▲ 1.38
Total	492	563.2	643,630	0.0764%	0.0875%	▲ 0.87

Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths Proposed	Total Exposed	Actual Ordinary Mortality Rate	Proposed Assumption Ordinary Mortality	Act/Exp Proposed Ordinary Mortality
20	1	0.7	3,892	0.0257%	0.0169%	◆ 1.52
25	4	6.6	32,821	0.0122%	0.0202%	▲ 0.60
30	7	15.5	59,340	0.0118%	0.0261%	◆ 0.45
35	25	21.5	68,862	0.0363%	0.0313%	▲ 1.16
40	28	32.0	76,464	0.0366%	0.0419%	▲ 0.87
45	60	60.4	94,013	0.0638%	0.0643%	● 0.99
50	95	101.7	110,839	0.0857%	0.0917%	● 0.93
55	106	126.2	104,543	0.1014%	0.1207%	▲ 0.84
60	101	99.7	68,457	0.1475%	0.1456%	● 1.01
65	65	42.5	24,399	0.2664%	0.1743%	◆ 1.53
Total	492	506.9	643,630	0.0764%	0.0788%	● 0.97

Exposure Distribution w/ Ordinary Mortality Rate - Actual and Expected; by Age



Ordinary Mortality Rate - Actual, Expected, and Ratio; by Age



Summary

The proposed assumption decreased the anticipated number of deaths occurring prior to retirement, which will result in an increase in plan liabilities.

Accidental Death

There is no accidental death assumption for General employees. During the Covid pandemic (2020 – 2021), there were deaths characterized as accidental deaths. The following table shows the experience of accidental death by year. Unless the experience of accidental deaths after 2021 is anticipated to be greater than prior to 2020, we recommend no change in the current assumption.

Plan Year	Actual Accidental Deaths
2012	0
2013	0
2014	1
2015	0
2016	1
2017	0
2018	0
2019	1
2020	105
2021	29
Total	137

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: PLAN GROUPS OTHER THAN CORRECTION AND SANITATION			
	General		
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.0240%	0.0180%	0.0000%
16	0.0240%	0.0180%	0.0000%
17	0.0240%	0.0180%	0.0000%
18	0.0240%	0.0180%	0.0000%
19	0.0240%	0.0180%	0.0000%
20	0.0240%	0.0180%	0.0000%
21	0.0240%	0.0180%	0.0000%
22	0.0240%	0.0180%	0.0000%
23	0.0240%	0.0180%	0.0000%
24	0.0240%	0.0180%	0.0000%
25	0.0240%	0.0180%	0.0000%
26	0.0264%	0.0192%	0.0000%
27	0.0288%	0.0204%	0.0000%
28	0.0312%	0.0216%	0.0000%
29	0.0336%	0.0228%	0.0000%
30	0.0360%	0.0240%	0.0000%
31	0.0384%	0.0252%	0.0000%
32	0.0408%	0.0264%	0.0000%
33	0.0432%	0.0276%	0.0000%
34	0.0456%	0.0288%	0.0000%
35	0.0480%	0.0300%	0.0000%
36	0.0504%	0.0312%	0.0000%
37	0.0528%	0.0324%	0.0000%
38	0.0552%	0.0336%	0.0000%
39	0.0576%	0.0348%	0.0000%
40	0.0600%	0.0360%	0.0000%
41	0.0660%	0.0408%	0.0000%
42	0.0720%	0.0456%	0.0000%
43	0.0780%	0.0504%	0.0000%
44	0.0840%	0.0552%	0.0000%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT (continued) PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: PLAN GROUPS OTHER THAN CORRECTION AND SANITATION			
	General		
	Ordinary Death		Accidental Death
Age	Males	Females	All
45	0.0900%	0.0600%	0.0000%
46	0.0960%	0.0660%	0.0000%
47	0.1020%	0.0720%	0.0000%
48	0.1080%	0.0780%	0.0000%
49	0.1140%	0.0840%	0.0000%
50	0.1200%	0.0900%	0.0000%
51	0.1320%	0.0960%	0.0000%
52	0.1440%	0.1020%	0.0000%
53	0.1560%	0.1080%	0.0000%
54	0.1680%	0.1140%	0.0000%
55	0.1800%	0.1200%	0.0000%
56	0.1920%	0.1260%	0.0000%
57	0.2040%	0.1320%	0.0000%
58	0.2160%	0.1380%	0.0000%
59	0.2280%	0.1440%	0.0000%
60	0.2400%	0.1500%	0.0000%
61	0.2520%	0.1560%	0.0000%
62	0.2640%	0.1620%	0.0000%
63	0.2760%	0.1680%	0.0000%
64	0.2880%	0.1740%	0.0000%
65	0.3000%	0.1800%	0.0000%
66	0.3240%	0.1920%	0.0000%
67	0.3480%	0.2040%	0.0000%
68	0.3720%	0.2160%	0.0000%
69	0.3960%	0.2280%	0.0000%
70	0.4000%	0.2400%	0.0000%
71	0.4240%	0.2580%	0.0000%
72	0.4480%	0.2760%	0.0000%
73	0.4720%	0.2940%	0.0000%
74	0.4960%	0.3120%	0.0000%
75	0.5200%	0.3300%	0.0000%
76	0.5680%	0.3660%	0.0000%
77	0.6160%	0.4020%	0.0000%
78	0.6640%	0.4380%	0.0000%
79	0.7120%	0.4740%	0.0000%
80	N/A	N/A	N/A

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: PLAN GROUPS OTHER THAN CORRECTION AND BASE YEAR 2019			
	General		
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.0216%	0.0162%	0.0000%
16	0.0216%	0.0162%	0.0000%
17	0.0216%	0.0162%	0.0000%
18	0.0216%	0.0162%	0.0000%
19	0.0216%	0.0162%	0.0000%
20	0.0229%	0.0176%	0.0000%
21	0.0231%	0.0178%	0.0000%
22	0.0234%	0.0180%	0.0000%
23	0.0238%	0.0183%	0.0000%
24	0.0243%	0.0186%	0.0000%
25	0.0249%	0.0189%	0.0000%
26	0.0280%	0.0205%	0.0000%
27	0.0313%	0.0221%	0.0000%
28	0.0346%	0.0238%	0.0000%
29	0.0381%	0.0255%	0.0000%
30	0.0416%	0.0271%	0.0000%
31	0.0450%	0.0288%	0.0000%
32	0.0484%	0.0303%	0.0000%
33	0.0517%	0.0317%	0.0000%
34	0.0548%	0.0329%	0.0000%
35	0.0577%	0.0339%	0.0000%
36	0.0603%	0.0348%	0.0000%
37	0.0625%	0.0354%	0.0000%
38	0.0643%	0.0359%	0.0000%
39	0.0656%	0.0362%	0.0000%
40	0.0666%	0.0364%	0.0000%
41	0.0711%	0.0401%	0.0000%
42	0.0752%	0.0435%	0.0000%
43	0.0789%	0.0468%	0.0000%
44	0.0823%	0.0500%	0.0000%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: PLAN GROUPS OTHER THAN CORRECTION AND BASE YEAR 2019			
	General		
	Ordinary Death		Accidental Death
Age	Males	Females	All
45	0.0856%	0.0532%	0.0000%
46	0.0889%	0.0575%	0.0000%
47	0.0923%	0.0619%	0.0000%
48	0.0960%	0.0665%	0.0000%
49	0.0999%	0.0714%	0.0000%
50	0.1042%	0.0767%	0.0000%
51	0.1142%	0.0824%	0.0000%
52	0.1245%	0.0885%	0.0000%
53	0.1354%	0.0950%	0.0000%
54	0.1468%	0.1018%	0.0000%
55	0.1588%	0.1089%	0.0000%
56	0.1713%	0.1160%	0.0000%
57	0.1842%	0.1230%	0.0000%
58	0.1974%	0.1297%	0.0000%
59	0.2105%	0.1359%	0.0000%
60	0.2233%	0.1414%	0.0000%
61	0.2356%	0.1461%	0.0000%
62	0.2470%	0.1501%	0.0000%
63	0.2575%	0.1534%	0.0000%
64	0.2669%	0.1563%	0.0000%
65	0.2754%	0.1589%	0.0000%
66	0.2940%	0.1666%	0.0000%
67	0.3118%	0.1745%	0.0000%
68	0.3290%	0.1826%	0.0000%
69	0.3461%	0.1911%	0.0000%
70	0.3458%	0.2001%	0.0000%
71	0.3633%	0.2146%	0.0000%
72	0.3812%	0.2296%	0.0000%
73	0.3998%	0.2451%	0.0000%
74	0.4190%	0.2610%	0.0000%
75	0.4388%	0.2773%	0.0000%
76	0.4794%	0.3090%	0.0000%
77	0.5206%	0.3411%	0.0000%
78	0.5621%	0.3736%	0.0000%
79	0.6040%	0.4063%	0.0000%
80	N/A	N/A	N/A

Section I(B) – Correction Officers of New York City Employees’ Retirement System (NYCERS)

Exposures and Decrement

To set the exposures and actual decrements for NYCERS Correction Officers, the following table details the age and service conditions for unreduced retirement and reduced retirement. If a member has not met any of these conditions for the indicated plan code by year, the member is considered a withdrawal exposure. Otherwise, if the member did meet any of these conditions, they would be considered a retirement exposure. Members with a status code of termination who, nonetheless, have met the conditions for retirement, are included as actual retirements.

NYCERS Retirement Eligibility Chart - Corrections

Plan Code	Plan Description	Mandated	Formula Bump at 20 YOS	Unreduced Retirement Condition 1		Unreduced Retirement Condition 2		Reduced Retirement Condition	
				Age 1	Service 1	Age 2	Service 2	Age	Service
H	Correction Capt. - Imp Plan	BOTH	FALSE	0	20				
P	Correction Off. - 25 Year Plan	TRUE	TRUE	0	25	62	5	55	5
Q	Correction Capt. - Imp Plan	BOTH	FALSE	0	20				
X	Correction - 20 Year Plan - Tier 3	BOTH ¹	FALSE	0	20				
X	Correction - 20 Year Plan - Tier 6	BOTH ¹	FALSE	0	25			0	20

¹ Prior to 2018, all COR members in Plan X had a Mandated retirement code.

Please note that Plan Code X Correction - 20 Year Plan - Tier 6 represents Correction officers in the Tier 3 22-year plan.

OA's retirement assumptions depend on whether a member can choose a certain retirement plan. If a member had a choice and elected the improved plan, the assumed rates of retirement are higher than those in which the member was mandated into the specific retirement plan. Higher rates of retirement apply to the indicated plan when the Mandated column is set to False. The majority of Correction Officers were indicated as Mandated.

In the historical database, there were Correction records where the indicated Plan Code did not align with a Correction's Plan Code. This primarily impacted records from 2012 – 2014. As discussed with OA, these records were re-mapped to Plan X – Correction – 20 Year Plan. In reviewing the experience for Corrections, these re-mapped records may not have exhibited similar patterns as other Corrections records. As such, some analysis excludes these records or these years all together.

Rates of Salary Increase

The rates of salary increase reflect three components: 1) price inflation, 2) real wage inflation, and 3) merit increases. The combination of price inflation and real wage inflation is known as wage inflation. The current wage inflation is 3%, which reflects a price inflation assumption of 2.5% and 0.5% real wage inflation.

Based on the 2024 and 2023 OASDI Trustees report issued by Social Security, wage inflation from 2012 to 2020 had a cumulative compound average of 2.93%. Including the rate for 2021 of 9.04%, the average increased to 3.53%. However, in our analysis of the experience, we did not notice any large increases in wages during 2021. This is typical with government sector employees with union affiliations where salary increases are specified in contracts negotiated for a 3- to 5-year period. Thus, wage increases for these employees may not adjust as quickly as for other employment sectors included in the Social Security Trustees report.

For purposes of our analysis, we believe the 3% current wage inflation is representative of the actual experience during the study period. While inflation has been higher since 2021, we propose no changes to the inflation assumption of 2.5% and wage inflation assumptions of 3%. Therefore, we have developed proposed salary increases based on total salary increases during the indicated period. The merit portion is equal to the total less the 3% wage inflation.

For purposes of salary increases only members with a status code of A in consecutive years are included. Members with a LOA status code are excluded.

Although salary increases for government employees may respond less quickly to changes in inflation, using salary experience from many years in the past may not necessarily be indicative of future salary increases as they may not include changes negotiated in union contracts such as general increases, longevity payments, or other salary items. We reviewed the salary increases by year and determined what we believe was the most reasonable period to compare to the current assumption and develop proposed assumptions.

The following chart shows the experience by year for the age range 22 to 59 and for the service range 0 to 34.



Salary increases for Correction officers varied significantly from one year to the next. There were much lower salary increases measured prior to 2017. For Correction, we focused on the 5-year period from 2017 – 2021, which appears to be the most stable period.

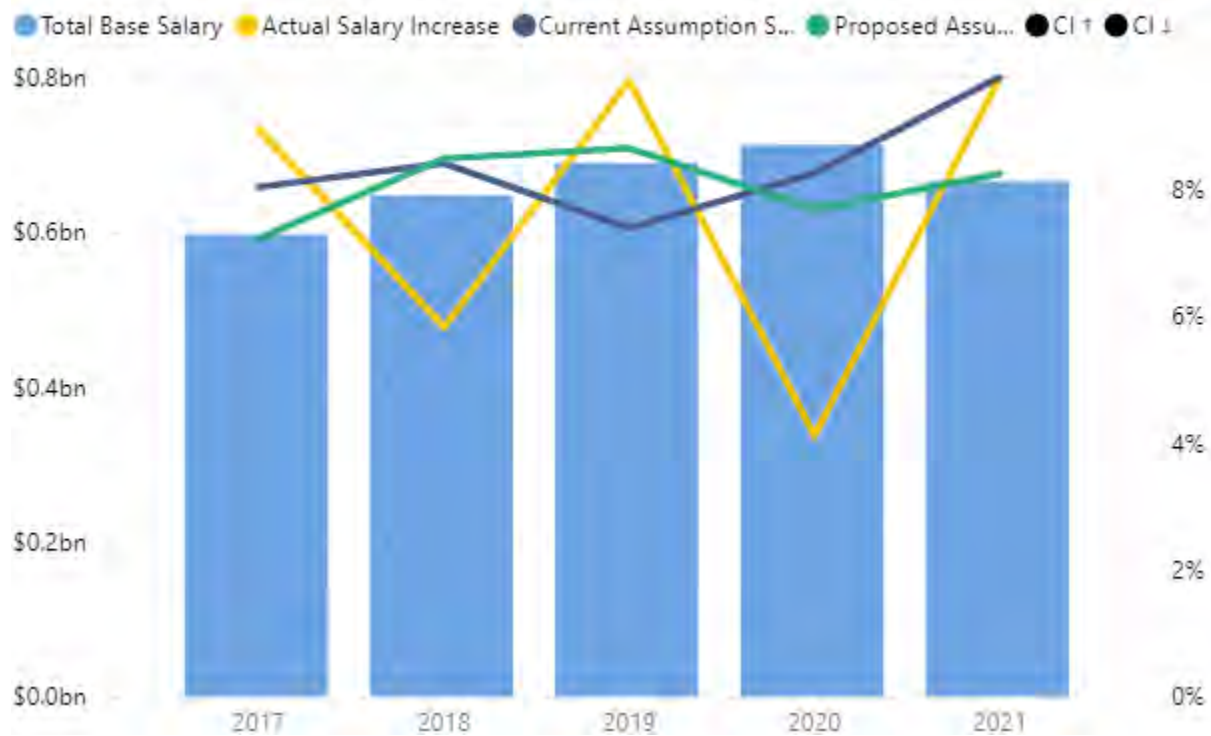
The current assumed rates of salary increases vary by service. The proposed assumption also varies by service. Overall, lower rates of salary increases are proposed.

The following table shows the experience for salary increases by year, for the age range (22 to 59), and for the service range (0 to 34) from 2017 to 2021. The actual rate of salary increases averaged 7.62% whereas the overall expected rate of increase averaged 8.37% based on the current assumptions and 8.07% based on the proposed assumptions.

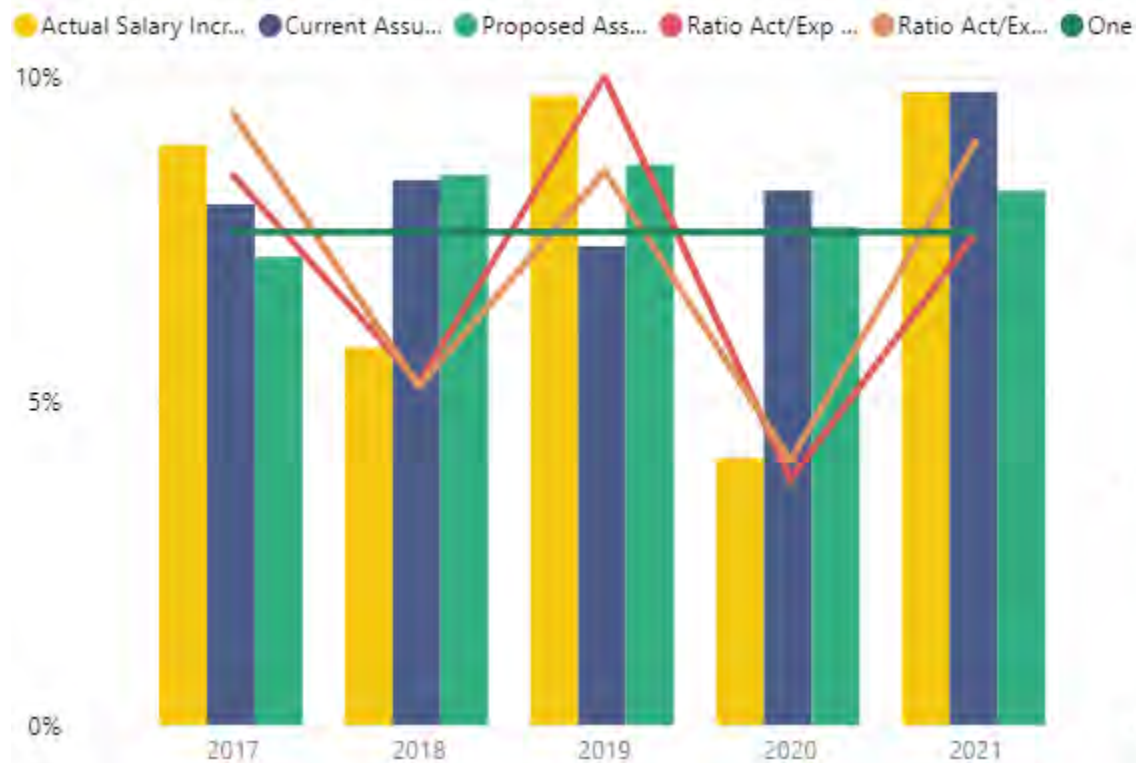
Plan Year	Exposed	Base Salary	Actual Salary	Expected Salary	Actual Salary Increase	Current Assumption Salary Increase	Ratio Act/Exp Salary Increase
2017	7,797	\$595.9M	\$649.3M	\$643.8M	8.95%	8.04%	▲ 1.11
2018	8,426	\$647.2M	\$685.0M	\$701.7M	5.83%	8.41%	▲ 0.69
2019	9,101	\$689.1M	\$756.0M	\$740.0M	9.71%	7.39%	▲ 1.31
2020	8,797	\$712.5M	\$741.9M	\$771.3M	4.12%	8.25%	◆ 0.50
2021	7,822	\$665.4M	\$730.3M	\$730.4M	9.77%	9.77%	● 1.00
Total	41,943	\$3,310.1M	\$3,562.5M	\$3,587.1M	7.62%	8.37%	● 0.91

Plan Year	Exposed	Base Salary	Actual Salary	Expected Salary Proposed	Actual Salary Increase	Proposed Assumption Salary Increase	Act/Exp Proposed Salary Increase
2017	7,797	\$595.9M	\$649.3M	\$639.0M	8.95%	7.22%	▲ 1.24
2018	8,426	\$647.2M	\$685.0M	\$702.2M	5.83%	8.49%	▲ 0.69
2019	9,101	\$689.1M	\$756.0M	\$748.7M	9.71%	8.64%	▲ 1.12
2020	8,797	\$712.5M	\$741.9M	\$767.3M	4.12%	7.69%	▲ 0.54
2021	7,822	\$665.4M	\$730.3M	\$720.2M	9.77%	8.24%	▲ 1.18
Total	41,943	\$3,310.1M	\$3,562.5M	\$3,577.3M	7.62%	8.07%	● 0.94

Exposure Distribution w/ Salary Increase - Actual and Expected; by Year



Salary Increase - Actual, Expected, and Ratio; by Year



The following charts show the experience by service (0 to 34 years) from 2017 to 2021 first compared to the current assumption and then to the proposed assumption. This resulted in an increase in the A/E ratio from 0.91 to 0.94 for ages 22 to 59.

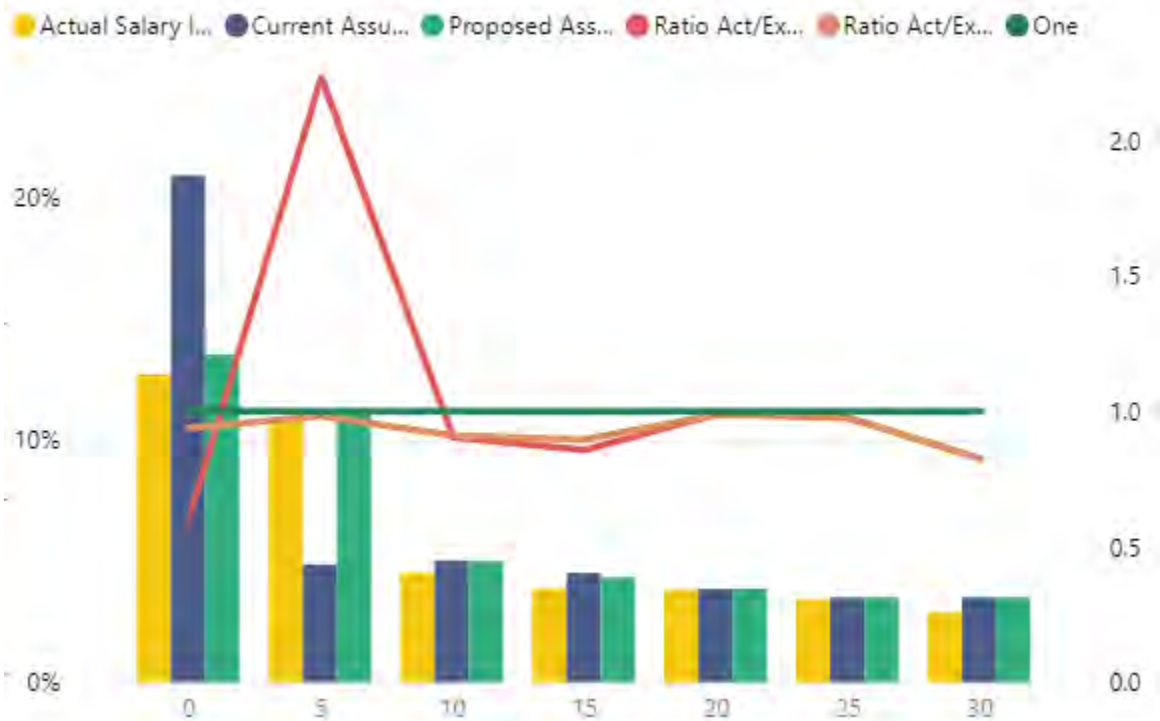
Service	Exposed	Base Salary	Actual Salary	Expected Salary	Actual Salary Increase	Current Assumption Salary Increase	Ratio Act/Exp Salary Increase
0	1,551	\$67.6M	\$75.5M	\$77.1M	11.63%	14.00%	▲ 0.83
1	3,783	\$177.3M	\$198.3M	\$200.3M	11.85%	13.00%	● 0.91
2	3,268	\$170.0M	\$187.9M	\$190.4M	10.54%	12.00%	▲ 0.88
3	2,830	\$155.6M	\$177.1M	\$172.8M	13.76%	11.00%	▲ 1.25
4	2,901	\$175.9M	\$202.6M	\$262.1M	15.16%	49.00%	◆ 0.31
5	2,067	\$139.5M	\$187.8M	\$145.4M	34.60%	4.20%	◆ 8.24
6	1,733	\$149.6M	\$158.6M	\$156.2M	6.02%	4.40%	▲ 1.37
7	1,669	\$147.9M	\$155.3M	\$154.7M	5.00%	4.60%	● 1.09
8	1,853	\$162.4M	\$171.9M	\$170.2M	5.88%	4.80%	▲ 1.22
9	1,768	\$155.8M	\$163.6M	\$165.4M	5.01%	6.20%	▲ 0.81
10	1,922	\$173.0M	\$183.4M	\$181.6M	6.00%	5.00%	▲ 1.20
11	2,242	\$209.0M	\$217.8M	\$219.2M	4.23%	4.90%	▲ 0.86
12	2,308	\$221.0M	\$230.3M	\$231.6M	4.19%	4.80%	▲ 0.87
13	1,790	\$173.3M	\$180.5M	\$181.4M	4.15%	4.70%	▲ 0.88
14	1,615	\$158.1M	\$164.9M	\$167.4M	4.29%	5.90%	▲ 0.73
15	1,504	\$148.1M	\$154.8M	\$154.7M	4.53%	4.50%	● 1.01
16	1,251	\$124.3M	\$129.2M	\$129.8M	3.93%	4.40%	▲ 0.89
17	1,135	\$113.2M	\$117.2M	\$118.0M	3.55%	4.30%	▲ 0.82
18	1,107	\$112.1M	\$115.7M	\$116.8M	3.24%	4.20%	▲ 0.77
19	871	\$87.9M	\$91.3M	\$92.6M	3.91%	5.40%	▲ 0.72
20	521	\$52.8M	\$54.9M	\$54.9M	4.07%	4.00%	● 1.02
21	379	\$39.1M	\$40.5M	\$40.6M	3.77%	3.90%	● 0.97
22	263	\$27.2M	\$28.3M	\$28.3M	3.88%	3.80%	● 1.02
23	226	\$23.7M	\$24.4M	\$24.5M	3.14%	3.70%	▲ 0.85
24	153	\$15.7M	\$16.4M	\$16.3M	3.97%	3.60%	▲ 1.10
25	156	\$16.2M	\$16.8M	\$16.7M	4.21%	3.50%	▲ 1.20
26	198	\$20.1M	\$20.9M	\$20.9M	3.87%	3.50%	▲ 1.11
27	213	\$22.3M	\$23.0M	\$23.1M	3.22%	3.50%	● 0.92
28	197	\$20.7M	\$21.3M	\$21.4M	3.20%	3.50%	● 0.91
29	176	\$18.6M	\$19.2M	\$19.3M	2.72%	3.50%	▲ 0.78
30	119	\$12.6M	\$12.9M	\$13.0M	3.03%	3.50%	▲ 0.87
31	81	\$8.9M	\$9.2M	\$9.2M	3.30%	3.50%	● 0.94
32	55	\$6.2M	\$6.3M	\$6.4M	1.90%	3.50%	▲ 0.54
33	22	\$2.7M	\$2.7M	\$2.8M	2.78%	3.50%	▲ 0.79
34	16	\$1.9M	\$2.0M	\$2.0M	3.36%	3.50%	● 0.96
Total	41,943	\$3,310.1M	\$3,562.5M	\$3,587.1M	7.62%	8.37%	● 0.91

Service	Exposed	Base Salary	Actual Salary	Expected Salary Proposed	Actual Salary Increase	Proposed Assumption Salary Increase	Act/Exp Proposed Salary Increase
0	1,551	\$67.6M	\$75.5M	\$77.1M	11.63%	14.00%	▲ 0.83
1	3,783	\$177.3M	\$198.3M	\$200.3M	11.85%	13.00%	● 0.91
2	3,268	\$170.0M	\$187.9M	\$190.4M	10.54%	12.00%	▲ 0.88
3	2,830	\$155.6M	\$177.1M	\$177.4M	13.76%	14.00%	● 0.98
4	2,901	\$175.9M	\$202.6M	\$202.3M	15.16%	15.00%	● 1.01
5	2,067	\$139.5M	\$187.8M	\$188.4M	34.60%	35.00%	● 0.99
6	1,733	\$149.6M	\$158.6M	\$158.6M	6.02%	6.00%	● 1.00
7	1,669	\$147.9M	\$155.3M	\$156.0M	5.00%	5.50%	● 0.91
8	1,853	\$162.4M	\$171.9M	\$171.3M	5.88%	5.50%	● 1.07
9	1,768	\$155.8M	\$163.6M	\$164.3M	5.01%	5.50%	● 0.91
10	1,922	\$173.0M	\$183.4M	\$183.4M	6.00%	6.00%	● 1.00
11	2,242	\$209.0M	\$217.8M	\$219.2M	4.23%	4.90%	▲ 0.86
12	2,308	\$221.0M	\$230.3M	\$231.6M	4.19%	4.80%	▲ 0.87
13	1,790	\$173.3M	\$180.5M	\$181.4M	4.15%	4.70%	▲ 0.88
14	1,615	\$158.1M	\$164.9M	\$165.3M	4.29%	4.60%	● 0.93
15	1,504	\$148.1M	\$154.8M	\$154.7M	4.53%	4.50%	● 1.01
16	1,251	\$124.3M	\$129.2M	\$129.8M	3.93%	4.40%	▲ 0.89
17	1,135	\$113.2M	\$117.2M	\$118.0M	3.55%	4.30%	▲ 0.82
18	1,107	\$112.1M	\$115.7M	\$116.8M	3.24%	4.20%	▲ 0.77
19	871	\$87.9M	\$91.3M	\$91.5M	3.91%	4.10%	● 0.95
20	521	\$52.8M	\$54.9M	\$54.9M	4.07%	4.00%	● 1.02
21	379	\$39.1M	\$40.5M	\$40.6M	3.77%	3.90%	● 0.97
22	263	\$27.2M	\$28.3M	\$28.3M	3.88%	3.80%	● 1.02
23	226	\$23.7M	\$24.4M	\$24.5M	3.14%	3.70%	▲ 0.85
24	153	\$15.7M	\$16.4M	\$16.3M	3.97%	3.60%	▲ 1.10
25	156	\$16.2M	\$16.8M	\$16.7M	4.21%	3.50%	▲ 1.20
26	198	\$20.1M	\$20.9M	\$20.9M	3.87%	3.50%	▲ 1.11
27	213	\$22.3M	\$23.0M	\$23.1M	3.22%	3.50%	● 0.92
28	197	\$20.7M	\$21.3M	\$21.4M	3.20%	3.50%	● 0.91
29	176	\$18.6M	\$19.2M	\$19.3M	2.72%	3.50%	▲ 0.78
30	119	\$12.6M	\$12.9M	\$13.0M	3.03%	3.50%	▲ 0.87
31	81	\$8.9M	\$9.2M	\$9.2M	3.30%	3.50%	● 0.94
32	55	\$6.2M	\$6.3M	\$6.4M	1.90%	3.50%	▲ 0.54
33	22	\$2.7M	\$2.7M	\$2.8M	2.78%	3.50%	▲ 0.79
34	16	\$1.9M	\$2.0M	\$2.0M	3.36%	3.50%	● 0.96
Total	41,943	\$3,310.1M	\$3,562.5M	\$3,577.3M	7.62%	8.07%	● 0.94

Exposure Distribution w/ Salary Increase - Actual and Expected; by Service



Salary Increase - Actual, Expected, and Ratio; by Service



This chart shows the results by service for the service range 0 to 5 years, which decreased the assumed rate of salary increases from 18.29% to 16.92% as compared to the actual rate of 16.15%. This resulted in an increase in the A/E ratio from 0.88 to 0.95 for ages 22 to 59.

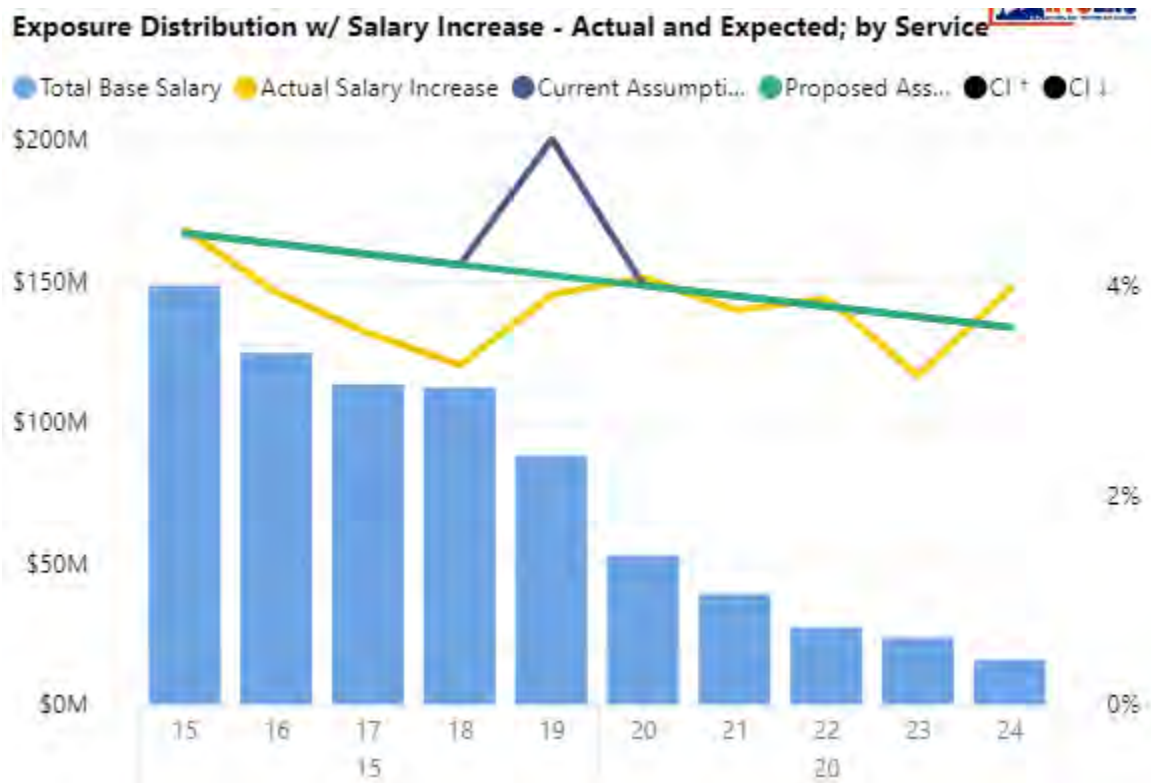
Exposure Distribution w/ Salary Increase - Actual and Expected; by Service



This chart shows the results by year for the service range 6 to 14 years, which increased the assumed rate of salary increases from 5.02% to 5.24% as compared to the actual rate of 4.92%. This resulted in a decrease in the A/E ratio from 0.98 to 0.94 for ages 22 to 59.



This chart shows the results by service for the service range 15 to 24 years, which increased the assumed rate of salary increases from 4.38% to 4.22% as compared to the actual rate of 3.86%. This resulted in an increase in the A/E ratio from 0.88 to 0.91 for ages 22 to 59.



This chart shows the results by service for the service range 25 to 34 years, which maintained the assumed rate of salary increases at 3.50% as compared to the actual rate of 3.29%. This resulted in no change in the A/E ratio of 0.94 for ages 22 to 59.



Summary

In total, the proposed rates of salary increases are lower than the current assumptions, which would decrease plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT ASSUMPTION ANNUAL RATES OF MERIT AND SALARY INCREASE		
	CORRECTION	
Years of Service	Merit Increase	Salary Increase ¹
0	11.00%	14.00%
1	10.00%	13.00%
2	9.00%	12.00%
3	8.00%	11.00%
4	46.00%	49.00%
5	1.20%	4.20%
6	1.40%	4.40%
7	1.60%	4.60%
8	1.80%	4.80%
9	3.20%	6.20%
10	2.00%	5.00%
11	1.90%	4.90%
12	1.80%	4.80%
13	1.70%	4.70%
14	2.90%	5.90%
15	1.50%	4.50%
16	1.40%	4.40%
17	1.30%	4.30%
18	1.20%	4.20%
19	2.40%	5.40%
20	1.00%	4.00%
21	0.90%	3.90%
22	0.80%	3.80%
23	0.70%	3.70%
24	0.60%	3.60%
25	0.50%	3.50%
26	0.50%	3.50%
27	0.50%	3.50%
28	0.50%	3.50%
29	0.50%	3.50%
30+	0.50%	3.50%

¹ Salary increase is the general wage increase of 3% plus the merit increase

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED ASSUMPTION ANNUAL RATES OF MERIT AND SALARY INCREASE		
	CORRECTION	
Years of Service	Merit Increase	Salary Increase ¹
0	11.00%	14.00%
1	10.00%	13.00%
2	9.00%	12.00%
3	11.00%	14.00%
4	12.00%	15.00%
5	32.00%	35.00%
6	3.00%	6.00%
7	2.50%	5.50%
8	2.50%	5.50%
9	2.50%	5.50%
10	3.00%	6.00%
11	1.90%	4.90%
12	1.80%	4.80%
13	1.70%	4.70%
14	1.60%	4.60%
15	1.50%	4.50%
16	1.40%	4.40%
17	1.30%	4.30%
18	1.20%	4.20%
19	1.10%	4.10%
20	1.00%	4.00%
21	0.90%	3.90%
22	0.80%	3.80%
23	0.70%	3.70%
24	0.60%	3.60%
25	0.50%	3.50%
26	0.50%	3.50%
27	0.50%	3.50%
28	0.50%	3.50%
29	0.50%	3.50%
30+	0.50%	3.50%

¹ Salary increase is the general wage increase of 3% plus the merit increase

Overtime

Overtime is considered pensionable earnings in determining a member's final average salary and benefit payable under the plan. OA applies a percentage increase to the member's base salary to account for assumed overtime. The percentage varies by years of service, tier, and whether the individual is expected to retire or become disabled within the next year.

The valuation data contains actual overtime earned during the prior year. For example, overtime contained in the 2019 data is for the year July 1, 2018 to June 30, 2019. We refer to this as 2019 overtime. The rate of overtime is defined as the amount of overtime for the year divided by the average of the member's base salary as of current year and the prior year. Therefore, 2019 overtime percentage is determined based on the average of the base salary as of July 1, 2018 and July 1, 2019.

The overtime percentage is only calculated for members with a status code of A in consecutive years. Members with a LOA status code are excluded.

Separate rates of overtime are applied if the member is expected to retire or become disabled in the following year. These are referred to as Dual Retirement or Dual Disability. We measured the rates of overtime in these situations for members who actually became disabled or retired the following year. For example, a dual overtime percentage applies in 2019 for a member who retired or became disabled in 2020. In the MEST, we developed codes S1 and D1 to identify these situations.

In addition, we also separately measured rates of overtime for those who were two years prior to retirement or disability. For example, we reviewed whether or not the 2019 overtime percentage was higher than otherwise for members who retired in 2021 or lower than otherwise for members who became disabled in 2021. In the MEST, we developed codes S2 and D2 to identify these situations.

These measures allowed us to determine if there was a spike in the amount of overtime just at the time of retirement relative to baseline (all other years). In all situations, we did not find that overtime was higher two years prior for retirement or lower two years prior for disability. For purposes of this report, the experience for members two years prior to retirement or disability is included in the Baseline analysis.

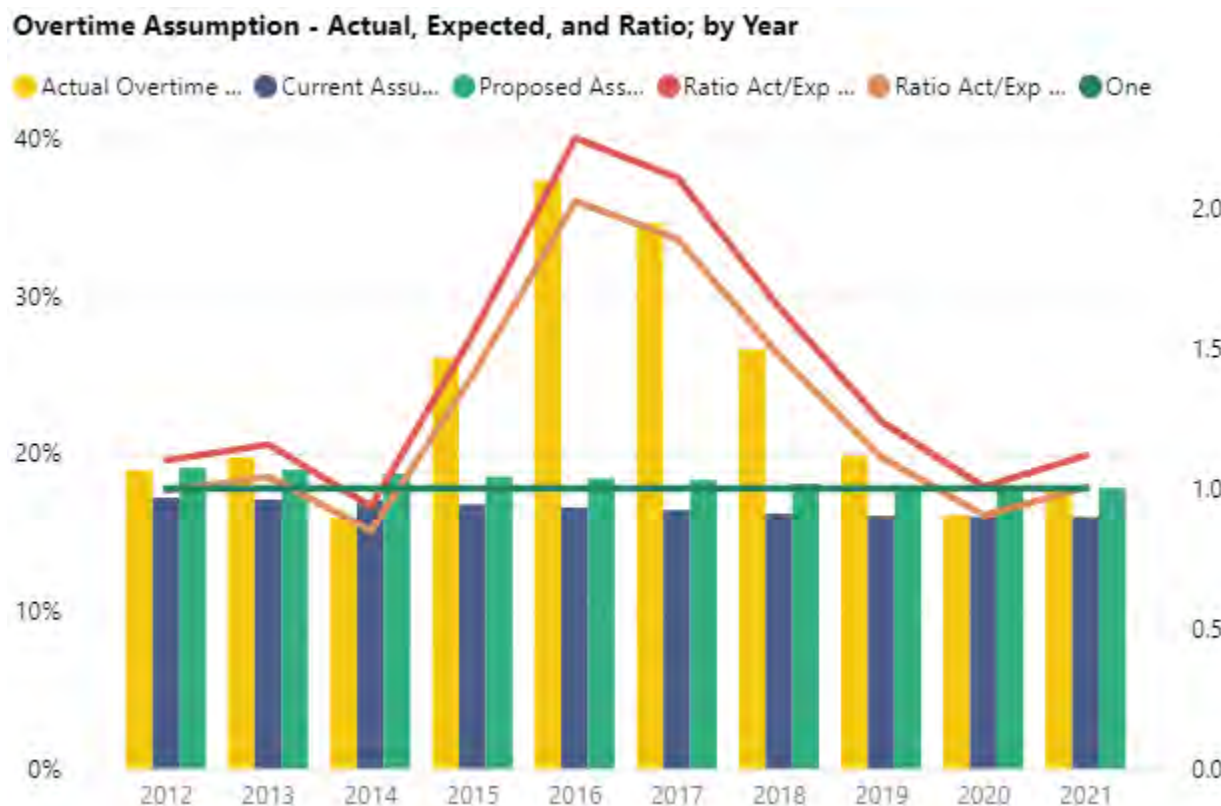
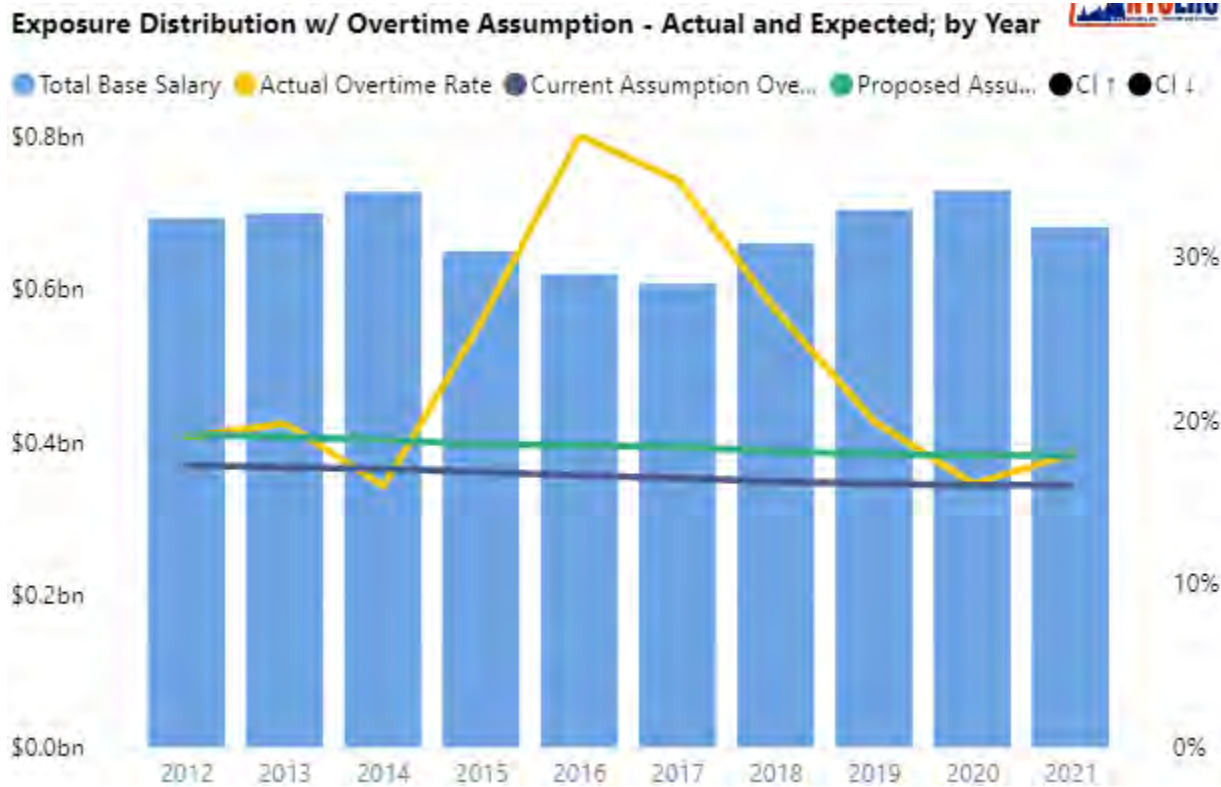
For Correction officers, we found that overtime one year prior for retirement was somewhat higher than for members of the same service who did not retire. Therefore, the proposed Dual Retirement assumption has been set to 10% higher than the proposed Baseline assumption. Currently, there is no Dual Retirement current assumption.

The proposed assumption varies by service, dual retirement and dual disability.

The following charts show the experience for overtime percentage by year, for the age range (22 to 69), and for the service range (0 to 39) from 2012 to 2021. The actual overtime percentage for all types of overtime averaged 22.87% whereas the overall expected overtime percentage averaged 16.52% based on the current assumptions and 18.35% based on the proposed assumptions. Overtime during the period 2015 to 2018, especially 2016 and 2017, was much higher than the years before and after. We proposed assumptions that were a bit higher than the current assumption but not to the full extent that this period would indicate.

Plan Year	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
2012	8,826	\$703.2M	\$133.1M	\$120.9M	18.93%	17.20%	▲ 1.10
2013	8,957	\$710.7M	\$140.4M	\$121.3M	19.75%	17.07%	▲ 1.16
2014	9,500	\$745.7M	\$118.6M	\$126.8M	15.91%	17.00%	● 0.94
2015	7,977	\$659.6M	\$171.6M	\$110.6M	26.02%	16.77%	◆ 1.55
2016	7,635	\$624.1M	\$232.8M	\$103.5M	37.30%	16.58%	◆ 2.25
2017	7,927	\$633.9M	\$219.3M	\$104.0M	34.59%	16.41%	◆ 2.11
2018	8,561	\$678.0M	\$180.4M	\$109.8M	26.60%	16.19%	◆ 1.64
2019	9,256	\$737.3M	\$146.3M	\$118.3M	19.84%	16.04%	▲ 1.24
2020	8,961	\$743.1M	\$119.4M	\$118.8M	16.07%	15.99%	● 1.01
2021	7,979	\$713.5M	\$127.5M	\$114.0M	17.87%	15.98%	▲ 1.12
Total	85,579	\$6,949.2M	\$1,589.3M	\$1,148.1M	22.87%	16.52%	▲ 1.38

Plan Year	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
2012	8,826	\$703.2M	\$133.1M	\$134.1M	18.93%	19.08%	● 0.99
2013	8,957	\$710.7M	\$140.4M	\$134.8M	19.75%	18.96%	● 1.04
2014	9,500	\$745.7M	\$118.6M	\$139.7M	15.91%	18.73%	▲ 0.85
2015	7,977	\$659.6M	\$171.6M	\$122.1M	26.02%	18.51%	▲ 1.41
2016	7,635	\$624.1M	\$232.8M	\$114.9M	37.30%	18.41%	◆ 2.03
2017	7,927	\$633.9M	\$219.3M	\$116.0M	34.59%	18.31%	◆ 1.89
2018	8,561	\$678.0M	\$180.4M	\$122.5M	26.60%	18.06%	▲ 1.47
2019	9,256	\$737.3M	\$146.3M	\$131.7M	19.84%	17.86%	▲ 1.11
2020	8,961	\$743.1M	\$119.4M	\$132.3M	16.07%	17.80%	● 0.90
2021	7,979	\$713.5M	\$127.5M	\$127.0M	17.87%	17.80%	● 1.00
Total	85,579	\$6,949.2M	\$1,589.3M	\$1,275.1M	22.87%	18.35%	▲ 1.25



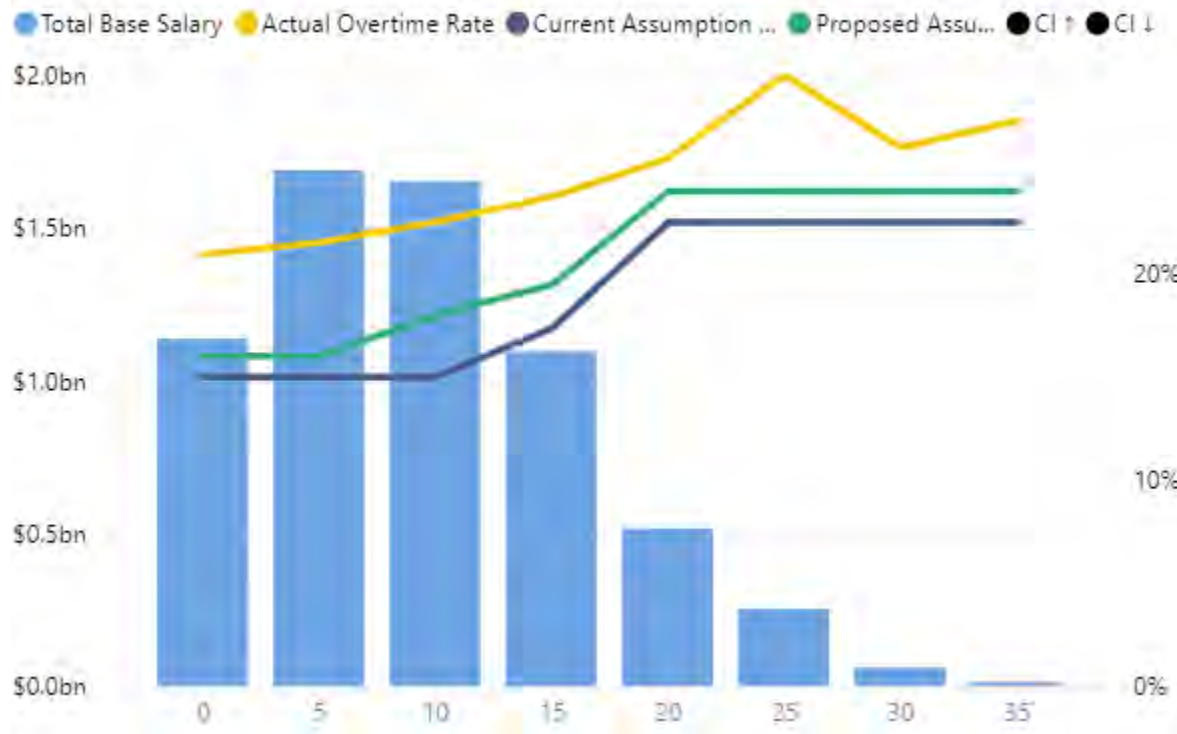
Baseline

The following charts show the experience for Baseline overtime percentage by service, for the age range (22 to 69), and for the service range (0 to 39) from 2012 to 2021. The actual Baseline overtime percentage averaged 22.73% whereas the overall expected overtime percentage averaged 16.36% based on the current assumptions and 18.12% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.39 to 1.25.

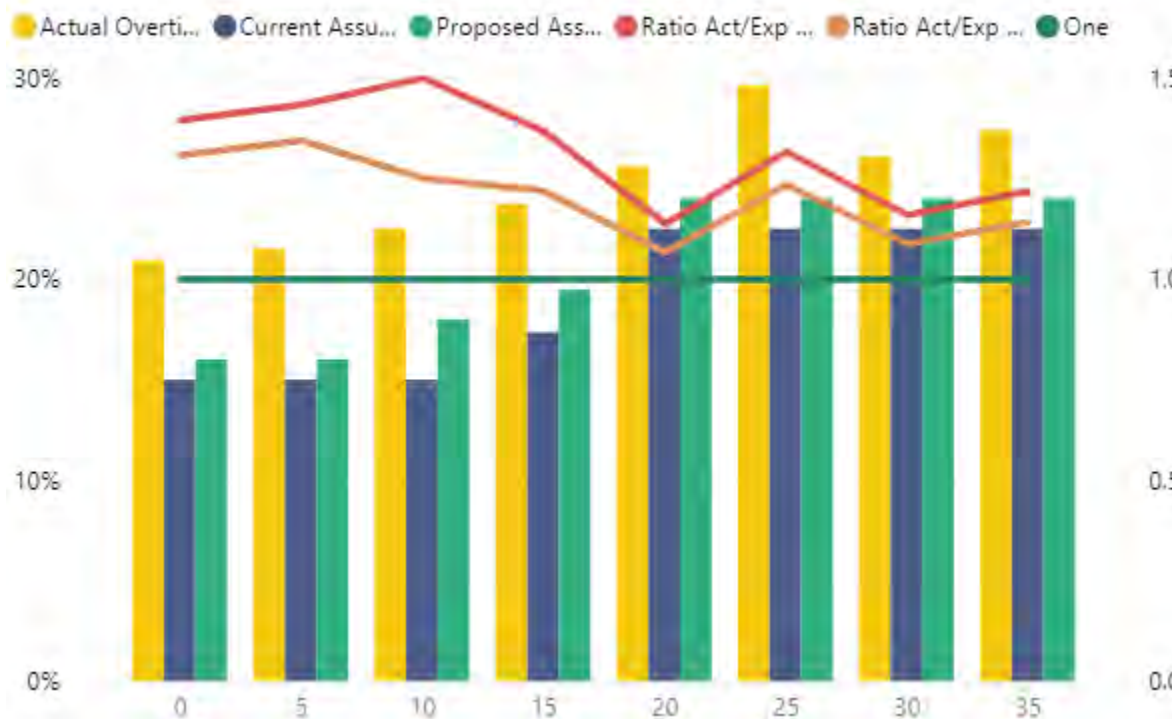
Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
0	2,593	\$118.0M	\$29.1M	\$17.7M	24.66%	15.00%	1.64
1	5,519	\$267.1M	\$56.2M	\$40.1M	21.03%	15.00%	1.40
2	4,909	\$260.4M	\$53.3M	\$39.1M	20.47%	15.00%	1.36
3	4,596	\$262.7M	\$53.8M	\$39.4M	20.50%	15.00%	1.37
4	4,676	\$299.6M	\$60.5M	\$44.9M	20.18%	15.00%	1.35
5	4,167	\$320.8M	\$64.9M	\$48.1M	20.22%	15.00%	1.35
6	4,322	\$366.6M	\$73.7M	\$55.0M	20.11%	15.00%	1.34
7	4,470	\$385.9M	\$81.5M	\$57.9M	21.13%	15.00%	1.41
8	4,027	\$349.0M	\$78.9M	\$52.4M	22.61%	15.00%	1.51
9	3,756	\$327.7M	\$77.5M	\$49.2M	23.63%	15.00%	1.58
10	3,808	\$339.9M	\$82.3M	\$51.0M	24.20%	15.00%	1.61
11	3,816	\$348.3M	\$78.9M	\$52.2M	22.65%	15.00%	1.51
12	3,840	\$356.4M	\$76.4M	\$53.5M	21.43%	15.00%	1.43
13	3,358	\$312.9M	\$68.8M	\$46.9M	22.00%	15.00%	1.47
14	3,423	\$321.7M	\$71.7M	\$48.3M	22.28%	15.00%	1.49
15	3,223	\$306.2M	\$71.2M	\$45.9M	23.26%	15.00%	1.55
16	2,849	\$270.4M	\$61.8M	\$44.6M	22.85%	16.50%	1.38
17	2,509	\$238.3M	\$55.7M	\$42.9M	23.37%	18.00%	1.30
18	1,938	\$183.4M	\$45.3M	\$35.8M	24.71%	19.50%	1.27
19	1,207	\$111.8M	\$29.5M	\$23.5M	26.43%	21.00%	1.26
20	989	\$90.5M	\$23.7M	\$20.4M	26.18%	22.50%	1.16
21	1,192	\$110.9M	\$28.2M	\$25.0M	25.46%	22.50%	1.13
22	1,266	\$118.4M	\$30.0M	\$26.6M	25.35%	22.50%	1.13
23	1,176	\$110.4M	\$27.3M	\$24.8M	24.70%	22.50%	1.10
24	963	\$90.6M	\$24.2M	\$20.4M	26.67%	22.50%	1.19
25	809	\$76.6M	\$22.3M	\$17.2M	29.15%	22.50%	1.30
26	640	\$61.4M	\$18.3M	\$13.8M	29.73%	22.50%	1.32
27	530	\$51.3M	\$15.3M	\$11.6M	29.80%	22.50%	1.32
28	407	\$39.8M	\$12.2M	\$8.9M	30.81%	22.50%	1.37
29	268	\$26.1M	\$7.5M	\$5.9M	28.79%	22.50%	1.28
30	210	\$20.9M	\$5.9M	\$4.7M	28.19%	22.50%	1.25
31	149	\$15.0M	\$3.8M	\$3.4M	25.37%	22.50%	1.13
32	109	\$11.1M	\$2.7M	\$2.5M	23.90%	22.50%	1.06
33	82	\$8.5M	\$2.0M	\$1.9M	23.48%	22.50%	1.04
34	59	\$6.3M	\$1.8M	\$1.4M	28.41%	22.50%	1.26
35	41	\$4.2M	\$1.3M	\$1.0M	30.73%	22.50%	1.37
36	32	\$3.4M	\$0.9M	\$0.8M	27.66%	22.50%	1.23
37	22	\$2.3M	\$0.6M	\$0.5M	27.46%	22.50%	1.22
38	21	\$2.2M	\$0.5M	\$0.5M	22.17%	22.50%	0.99
39	13	\$1.4M	\$0.4M	\$0.3M	25.15%	22.50%	1.12
Total	81,984	\$6,598.4M	\$1,499.8M	\$1,079.8M	22.73%	16.36%	1.39

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
0	2,593	\$118.0M	\$29.1M	\$18.9M	24.66%	16.00%	1.54
1	5,519	\$267.1M	\$56.2M	\$42.7M	21.03%	16.00%	1.31
2	4,909	\$260.4M	\$53.3M	\$41.7M	20.47%	16.00%	1.28
3	4,596	\$262.7M	\$53.8M	\$42.0M	20.50%	16.00%	1.28
4	4,676	\$299.6M	\$60.5M	\$47.9M	20.18%	16.00%	1.26
5	4,167	\$320.8M	\$64.9M	\$51.3M	20.22%	16.00%	1.26
6	4,322	\$366.6M	\$73.7M	\$58.7M	20.11%	16.00%	1.26
7	4,470	\$385.9M	\$81.5M	\$61.7M	21.13%	16.00%	1.32
8	4,027	\$349.0M	\$78.9M	\$55.8M	22.61%	16.00%	1.41
9	3,756	\$327.7M	\$77.5M	\$52.4M	23.63%	16.00%	1.48
10	3,808	\$339.9M	\$82.3M	\$61.2M	24.20%	18.00%	1.34
11	3,816	\$348.3M	\$78.9M	\$62.7M	22.65%	18.00%	1.26
12	3,840	\$356.4M	\$76.4M	\$64.1M	21.43%	18.00%	1.19
13	3,358	\$312.9M	\$68.8M	\$56.3M	22.00%	18.00%	1.22
14	3,423	\$321.7M	\$71.7M	\$57.9M	22.28%	18.00%	1.24
15	3,223	\$306.2M	\$71.2M	\$58.2M	23.26%	19.00%	1.22
16	2,849	\$270.4M	\$61.8M	\$51.4M	22.85%	19.00%	1.20
17	2,509	\$238.3M	\$55.7M	\$45.3M	23.37%	19.00%	1.23
18	1,938	\$183.4M	\$45.3M	\$36.7M	24.71%	20.00%	1.24
19	1,207	\$111.8M	\$29.5M	\$24.6M	26.43%	22.00%	1.20
20	989	\$90.5M	\$23.7M	\$21.7M	26.18%	24.00%	1.09
21	1,192	\$110.9M	\$28.2M	\$26.6M	25.46%	24.00%	1.06
22	1,266	\$118.4M	\$30.0M	\$28.4M	25.35%	24.00%	1.06
23	1,176	\$110.4M	\$27.3M	\$26.5M	24.70%	24.00%	1.03
24	963	\$90.6M	\$24.2M	\$21.7M	26.67%	24.00%	1.11
25	809	\$76.6M	\$22.3M	\$18.4M	29.15%	24.00%	1.21
26	640	\$61.4M	\$18.3M	\$14.7M	29.73%	24.00%	1.24
27	530	\$51.3M	\$15.3M	\$12.3M	29.80%	24.00%	1.24
28	407	\$39.8M	\$12.2M	\$9.5M	30.81%	24.00%	1.28
29	268	\$26.1M	\$7.5M	\$6.3M	28.79%	24.00%	1.20
30	210	\$20.9M	\$5.9M	\$5.0M	28.19%	24.00%	1.17
31	149	\$15.0M	\$3.8M	\$3.6M	25.37%	24.00%	1.06
32	109	\$11.1M	\$2.7M	\$2.7M	23.90%	24.00%	1.00
33	82	\$8.5M	\$2.0M	\$2.0M	23.48%	24.00%	0.98
34	59	\$6.3M	\$1.8M	\$1.5M	28.41%	24.00%	1.18
35	41	\$4.2M	\$1.3M	\$1.0M	30.73%	24.00%	1.28
36	32	\$3.4M	\$0.9M	\$0.8M	27.66%	24.00%	1.15
37	22	\$2.3M	\$0.6M	\$0.5M	27.46%	24.00%	1.14
38	21	\$2.2M	\$0.5M	\$0.5M	22.17%	24.00%	0.92
39	13	\$1.4M	\$0.4M	\$0.3M	25.15%	24.00%	1.05
Total	81,984	\$6,598.4M	\$1,499.8M	\$1,195.9M	22.73%	18.12%	1.25

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service

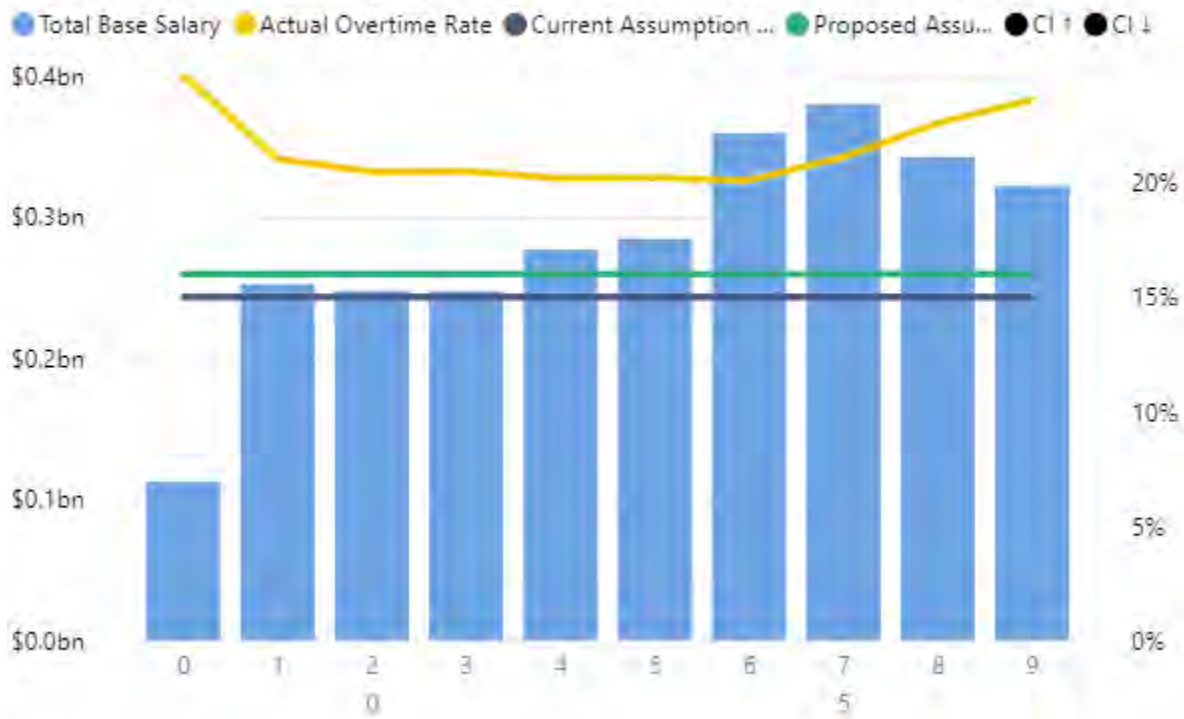


Overtime Assumption - Actual, Expected, and Ratio; by Service

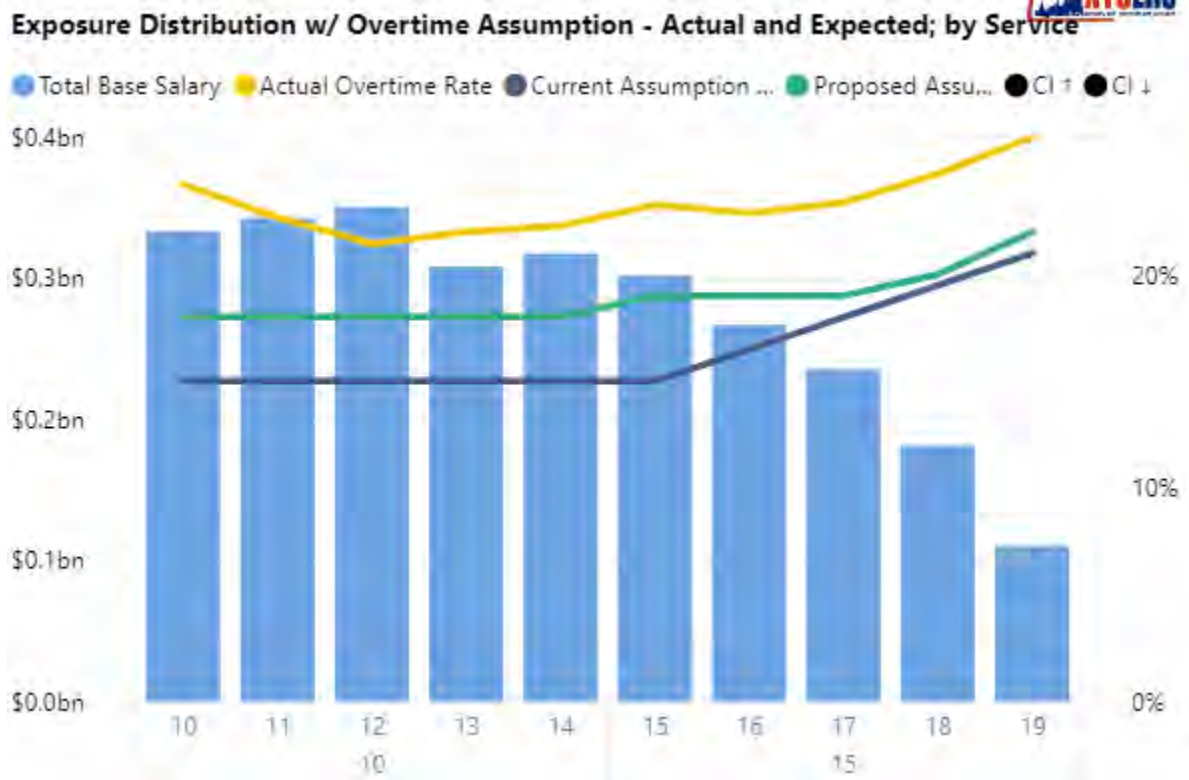


The current assumption varies by service. The proposed assumption also varies by service. This chart shows the experience for Baseline overtime percentage by service for the service range 0 to 9 years, where the assumed overtime percentage increased from 15.00% to 16.00% as compared to the actual rate of 21.28%. This resulted in a decrease in the A/E ratio from 1.42 to 1.33 for ages 22 to 69.

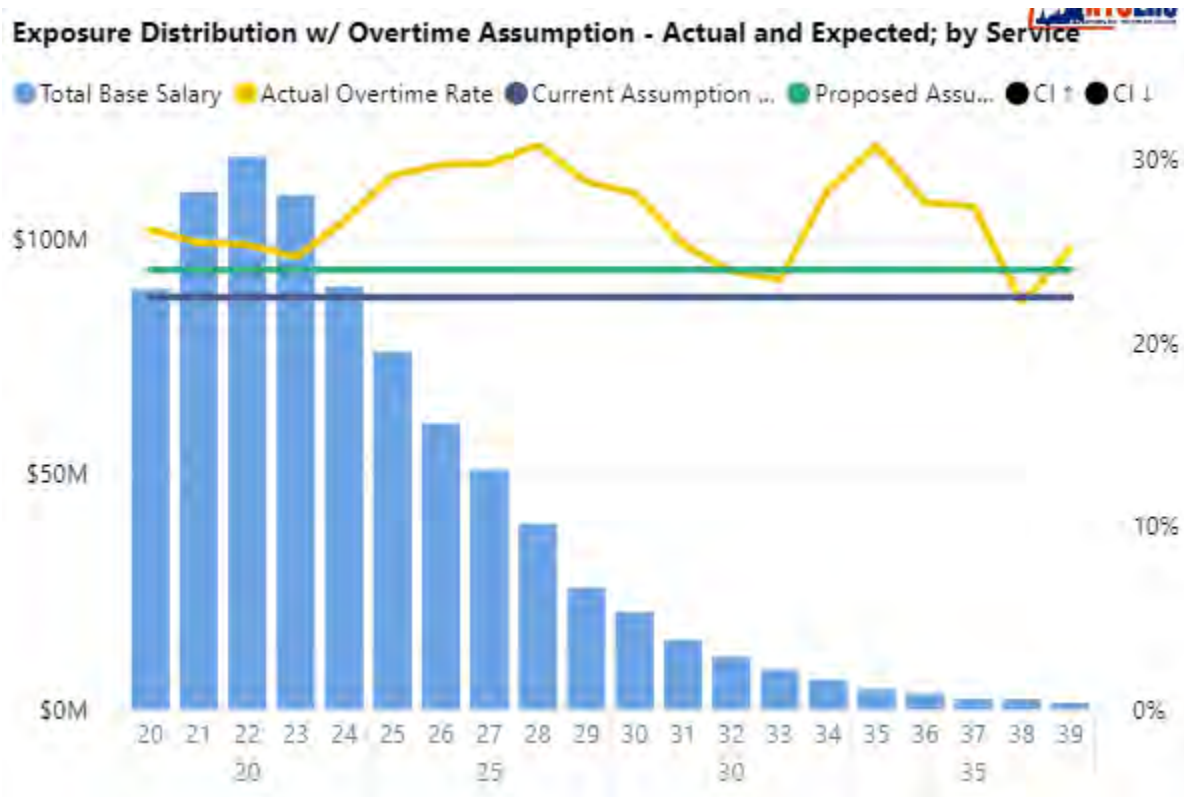
Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



This chart shows the experience for Baseline overtime percentage by service for the service range 10 to 19 years, where the assumed overtime percentage increased from 15.94% to 18.58% as compared to the actual rate of 23.00%. This resulted in a decrease in the A/E ratio from 1.44 to 1.24 for ages 22 to 69.



This chart shows the experience for Baseline overtime percentage by service for the service range 20 to 39 years, where the assumed overtime percentage increased from 22.50% to 24.00% as compared to the actual rate of 26.88%. This resulted in a decrease in the A/E ratio from 1.19 to 1.12 for ages 40 to 69.



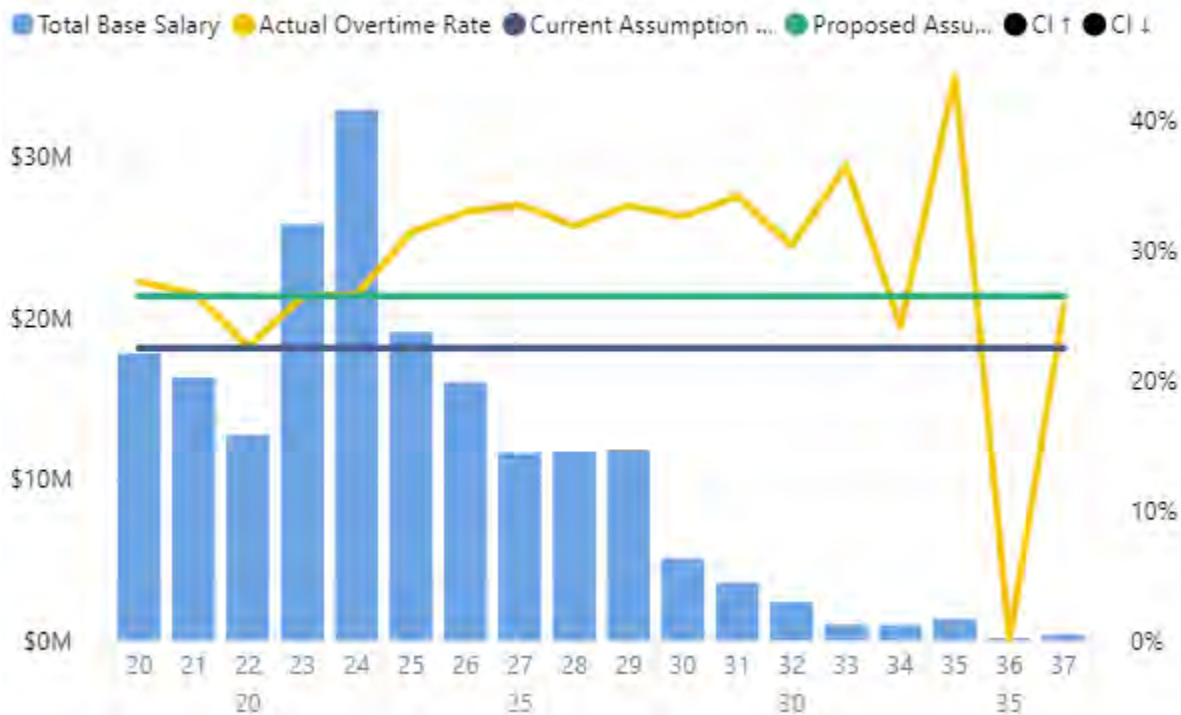
Dual Retirement

The following charts show the experience for Dual Retirement overtime percentage by service, for the age range (40 to 69), and for the service range (20 to 39) from 2012 to 2020. The actual Dual Retirement overtime percentage averaged 29.11% as compared to Baseline overtime percentage of 26.88%. This is approximately 8% higher and we propose a Dual Retirement assumption that is 10% higher than the proposed Baseline assumption. This resulted in a decrease in the A/E ratio from 1.29 to 1.10.

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
20	182	\$18.0M	\$5.0M	\$4.1M	27.61%	22.50%	▲ 1.23
21	169	\$16.4M	\$4.4M	\$3.7M	26.72%	22.50%	▲ 1.19
22	130	\$12.8M	\$2.9M	\$2.9M	22.62%	22.50%	● 1.01
23	268	\$26.0M	\$6.9M	\$5.9M	26.46%	22.50%	▲ 1.18
24	339	\$33.1M	\$8.8M	\$7.4M	26.64%	22.50%	▲ 1.18
25	195	\$19.2M	\$6.0M	\$4.3M	31.42%	22.50%	▲ 1.40
26	162	\$16.1M	\$5.3M	\$3.6M	32.98%	22.50%	▲ 1.47
27	114	\$11.7M	\$3.9M	\$2.6M	33.54%	22.50%	▲ 1.49
28	118	\$11.8M	\$3.8M	\$2.7M	31.90%	22.50%	▲ 1.42
29	115	\$11.9M	\$4.0M	\$2.7M	33.47%	22.50%	▲ 1.49
30	50	\$5.1M	\$1.7M	\$1.2M	32.62%	22.50%	▲ 1.45
31	36	\$3.6M	\$1.2M	\$0.8M	34.17%	22.50%	◆ 1.52
32	23	\$2.4M	\$0.7M	\$0.5M	30.43%	22.50%	▲ 1.35
33	9	\$1.0M	\$0.4M	\$0.2M	36.55%	22.50%	◆ 1.62
34	9	\$0.9M	\$0.2M	\$0.2M	24.14%	22.50%	● 1.07
35	12	\$1.3M	\$0.6M	\$0.3M	43.45%	22.50%	◆ 1.93
36	1	\$0.1M	\$0.0M	\$0.0M	0.00%	22.50%	◆ 0.00
37	3	\$0.3M	\$0.1M	\$0.1M	25.72%	22.50%	▲ 1.14
Total	1,935	\$192.0M	\$55.9M	\$43.2M	29.11%	22.50%	▲ 1.29

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
20	182	\$18.0M	\$5.0M	\$4.8M	27.61%	26.50%	1.04
21	169	\$16.4M	\$4.4M	\$4.3M	26.72%	26.50%	1.01
22	130	\$12.8M	\$2.9M	\$3.4M	22.62%	26.50%	0.85
23	268	\$26.0M	\$6.9M	\$6.9M	26.46%	26.50%	1.00
24	339	\$33.1M	\$8.8M	\$8.8M	26.64%	26.50%	1.01
25	195	\$19.2M	\$6.0M	\$5.1M	31.42%	26.50%	1.19
26	162	\$16.1M	\$5.3M	\$4.3M	32.98%	26.50%	1.24
27	114	\$11.7M	\$3.9M	\$3.1M	33.54%	26.50%	1.27
28	118	\$11.8M	\$3.8M	\$3.1M	31.90%	26.50%	1.20
29	115	\$11.9M	\$4.0M	\$3.2M	33.47%	26.50%	1.26
30	50	\$5.1M	\$1.7M	\$1.4M	32.62%	26.50%	1.23
31	36	\$3.6M	\$1.2M	\$1.0M	34.17%	26.50%	1.29
32	23	\$2.4M	\$0.7M	\$0.6M	30.43%	26.50%	1.15
33	9	\$1.0M	\$0.4M	\$0.3M	36.55%	26.50%	1.38
34	9	\$0.9M	\$0.2M	\$0.2M	24.14%	26.50%	0.91
35	12	\$1.3M	\$0.6M	\$0.4M	43.45%	26.50%	1.64
36	1	\$0.1M	\$0.0M	\$0.0M	0.00%	26.50%	0.00
37	3	\$0.3M	\$0.1M	\$0.1M	25.72%	26.50%	0.97
Total	1,935	\$192.0M	\$55.9M	\$50.9M	29.11%	26.50%	1.10

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



Overtime Assumption - Actual, Expected, and Ratio; by Service



Dual Disability

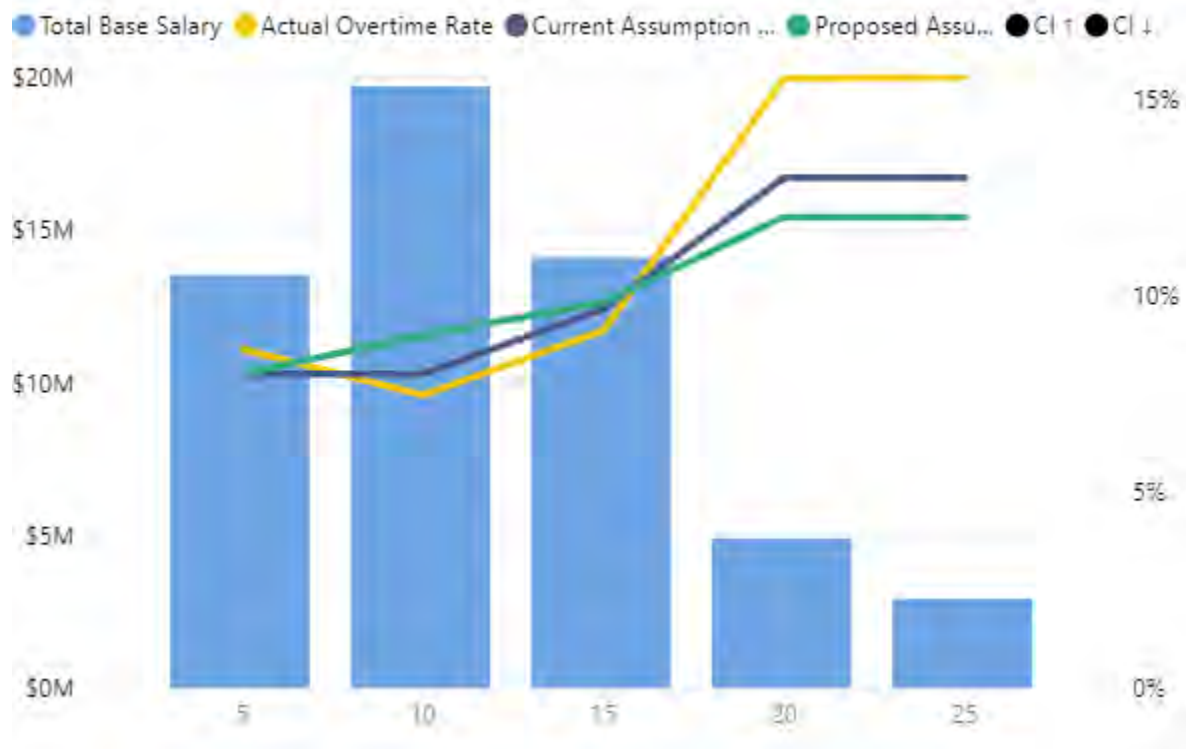
The current assumption varies by service. The proposed assumption also varies by service. The proposed assumption is set to 50% of the proposed Baseline rates.

The following charts show the experience for Dual Disability overtime percentage by service, for the age range (22 to 69), and for the service range (5 to 29) from 2012 to 2020. The actual Dual Disability overtime percentage averaged 9.32% whereas the overall expected overtime percentage averaged 9.13% based on the current assumptions and 9.39% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.02 to 0.99.

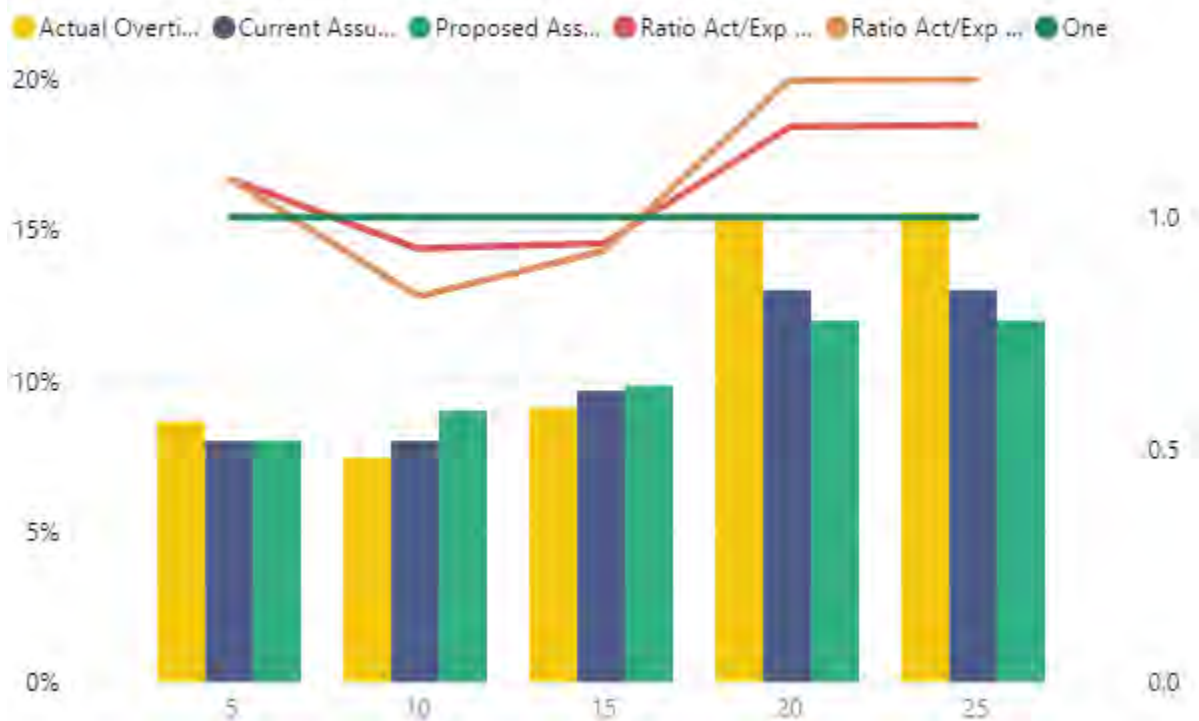
Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
5	9	\$0.7M	\$0.1M	\$0.1M	7.30%	8.00%	0.91
6	21	\$1.8M	\$0.1M	\$0.1M	5.96%	8.00%	0.75
7	25	\$2.2M	\$0.1M	\$0.2M	5.64%	8.00%	0.71
8	46	\$4.1M	\$0.5M	\$0.3M	12.19%	8.00%	1.52
9	54	\$4.8M	\$0.4M	\$0.4M	8.18%	8.00%	1.02
10	47	\$4.2M	\$0.5M	\$0.3M	11.73%	8.00%	1.47
11	47	\$4.5M	\$0.2M	\$0.4M	5.15%	8.00%	0.64
12	39	\$3.6M	\$0.3M	\$0.3M	7.26%	8.00%	0.91
13	45	\$4.2M	\$0.2M	\$0.3M	6.00%	8.00%	0.75
14	37	\$3.4M	\$0.2M	\$0.3M	7.22%	8.00%	0.90
15	44	\$4.1M	\$0.3M	\$0.3M	8.42%	8.00%	1.05
16	35	\$3.3M	\$0.2M	\$0.3M	7.18%	9.00%	0.80
17	27	\$2.6M	\$0.2M	\$0.3M	7.55%	10.00%	0.76
18	17	\$1.6M	\$0.1M	\$0.2M	8.20%	11.00%	0.75
19	26	\$2.5M	\$0.4M	\$0.3M	14.98%	12.00%	1.25
20	9	\$0.9M	\$0.2M	\$0.1M	16.79%	13.00%	1.29
21	12	\$1.1M	\$0.2M	\$0.1M	14.63%	13.00%	1.13
22	6	\$0.6M	\$0.1M	\$0.1M	12.91%	13.00%	0.99
23	13	\$1.2M	\$0.3M	\$0.2M	20.68%	13.00%	1.59
24	12	\$1.1M	\$0.1M	\$0.1M	11.04%	13.00%	0.85
25	8	\$0.8M	\$0.1M	\$0.1M	14.74%	13.00%	1.13
26	9	\$0.8M	\$0.1M	\$0.1M	14.69%	13.00%	1.13
27	5	\$0.6M	\$0.1M	\$0.1M	14.33%	13.00%	1.10
28	2	\$0.3M	\$0.0M	\$0.0M	7.56%	13.00%	0.58
29	4	\$0.4M	\$0.1M	\$0.1M	26.58%	13.00%	2.04
Total	599	\$55.5M	\$5.2M	\$5.1M	9.32%	9.13%	1.02

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
5	9	\$0.7M	\$0.1M	\$0.1M	7.30%	8.00%	0.91
6	21	\$1.8M	\$0.1M	\$0.1M	5.96%	8.00%	0.75
7	25	\$2.2M	\$0.1M	\$0.2M	5.64%	8.00%	0.71
8	46	\$4.1M	\$0.5M	\$0.3M	12.19%	8.00%	1.52
9	54	\$4.8M	\$0.4M	\$0.4M	8.18%	8.00%	1.02
10	47	\$4.2M	\$0.5M	\$0.4M	11.73%	9.00%	1.30
11	47	\$4.5M	\$0.2M	\$0.4M	5.15%	9.00%	0.57
12	39	\$3.6M	\$0.3M	\$0.3M	7.26%	9.00%	0.81
13	45	\$4.2M	\$0.2M	\$0.4M	6.00%	9.00%	0.67
14	37	\$3.4M	\$0.2M	\$0.3M	7.22%	9.00%	0.80
15	44	\$4.1M	\$0.3M	\$0.4M	8.42%	9.50%	0.89
16	35	\$3.3M	\$0.2M	\$0.3M	7.18%	9.50%	0.76
17	27	\$2.6M	\$0.2M	\$0.2M	7.55%	9.50%	0.80
18	17	\$1.6M	\$0.1M	\$0.2M	8.20%	10.00%	0.82
19	26	\$2.5M	\$0.4M	\$0.3M	14.98%	11.00%	1.36
20	9	\$0.9M	\$0.2M	\$0.1M	16.79%	12.00%	1.40
21	12	\$1.1M	\$0.2M	\$0.1M	14.63%	12.00%	1.22
22	6	\$0.6M	\$0.1M	\$0.1M	12.91%	12.00%	1.08
23	13	\$1.2M	\$0.3M	\$0.1M	20.68%	12.00%	1.72
24	12	\$1.1M	\$0.1M	\$0.1M	11.04%	12.00%	0.92
25	8	\$0.8M	\$0.1M	\$0.1M	14.74%	12.00%	1.23
26	9	\$0.8M	\$0.1M	\$0.1M	14.69%	12.00%	1.22
27	5	\$0.6M	\$0.1M	\$0.1M	14.33%	12.00%	1.19
28	2	\$0.3M	\$0.0M	\$0.0M	7.56%	12.00%	0.63
29	4	\$0.4M	\$0.1M	\$0.0M	26.58%	12.00%	2.21
Total	599	\$55.5M	\$5.2M	\$5.2M	9.32%	9.39%	0.99

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



Overtime Assumption - Actual, Expected, and Ratio; by Service



Summary

In total, the proposed overtime percentages are anticipated to increase a member's anticipated pensionable earnings under the plan, which would increase plan liabilities. It would also increase the assumed amount of employee contributions received, which would partially offset the increase in the employer's portion of the normal cost.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT ASSUMPTION OVERTIME AS A PERCENTAGE OF BASE PAY		
	CORRECTION	
Years of Service	Baseline and Dual Retirement	Dual Disability
0	15.00%	8.00%
1	15.00%	8.00%
2	15.00%	8.00%
3	15.00%	8.00%
4	15.00%	8.00%
5	15.00%	8.00%
6	15.00%	8.00%
7	15.00%	8.00%
8	15.00%	8.00%
9	15.00%	8.00%
10	15.00%	8.00%
11	15.00%	8.00%
12	15.00%	8.00%
13	15.00%	8.00%
14	15.00%	8.00%
15	15.00%	8.00%
16	16.50%	9.00%
17	18.00%	10.00%
18	19.50%	11.00%
19	21.00%	12.00%
20	22.50%	13.00%
21	22.50%	13.00%
22	22.50%	13.00%
23	22.50%	13.00%
24	22.50%	13.00%
25	22.50%	13.00%
26	22.50%	13.00%
27	22.50%	13.00%
28	22.50%	13.00%
29	22.50%	13.00%
30+	22.50%	13.00%

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED ASSUMPTION OVERTIME AS A PERCENTAGE OF BASE PAY			
	CORRECTION		
Years of Service	Baseline	Dual Retirement ¹	Dual Disability ²
0	16.00%	17.50%	8.00%
1	16.00%	17.50%	8.00%
2	16.00%	17.50%	8.00%
3	16.00%	17.50%	8.00%
4	16.00%	17.50%	8.00%
5	16.00%	17.50%	8.00%
6	16.00%	17.50%	8.00%
7	16.00%	17.50%	8.00%
8	16.00%	17.50%	8.00%
9	16.00%	17.50%	8.00%
10	18.00%	20.00%	9.00%
11	18.00%	20.00%	9.00%
12	18.00%	20.00%	9.00%
13	18.00%	20.00%	9.00%
14	18.00%	20.00%	9.00%
15	19.00%	21.00%	9.50%
16	19.00%	21.00%	9.50%
17	19.00%	21.00%	9.50%
18	20.00%	22.00%	10.00%
19	22.00%	24.00%	11.00%
20	24.00%	26.50%	12.00%
21	24.00%	26.50%	12.00%
22	24.00%	26.50%	12.00%
23	24.00%	26.50%	12.00%
24	24.00%	26.50%	12.00%
25	24.00%	26.50%	12.00%
26	24.00%	26.50%	12.00%
27	24.00%	26.50%	12.00%
28	24.00%	26.50%	12.00%
29	24.00%	26.50%	12.00%
30+	24.00%	26.50%	12.00%

¹ Dual retirement rate applies in year before assumed retirement

² Dual disability rate applies in year before assumed disability

Withdrawal

The current withdrawal assumption varies by service. The proposed assumption also varies by service. Overall, this results in an increase in the assumed rates of withdrawal, especially at 5 or fewer years of service.

The analysis reflected years from 2012 - 2019 as the rate of termination during 2020 and 2021 may be artificially low due to members with a LOA status code. A record with a LOA status code is included as an exposure and not a decrement.

The following table shows the experience of withdrawal by year, for the age range (22 to 59) and service range (0 to 19 years). The actual rate of withdrawal averaged 3.12% whereas the overall expected rate of withdrawal averaged 2.11% based on the current assumptions and 2.50% based on the proposed assumptions.

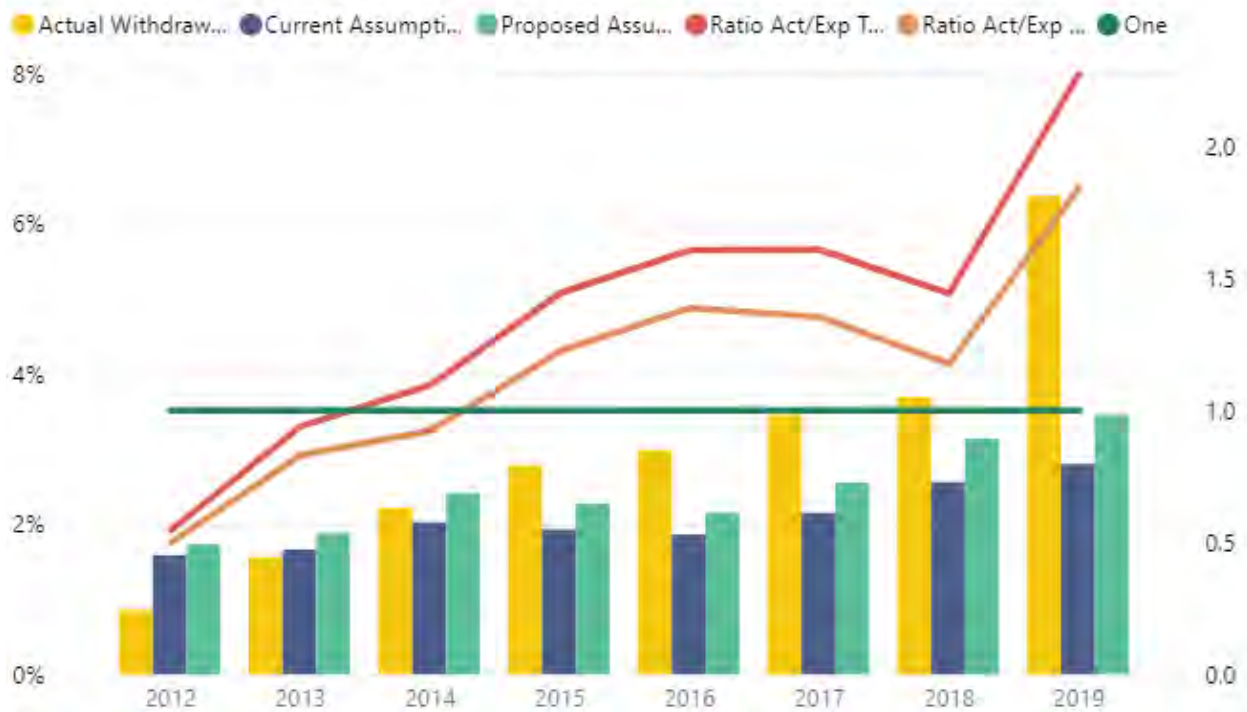
Plan Year	Actual Withdrawals	Expected Withdrawals	Total Exposed	Actual Withdrawal Rate	Current Assumption Termination	Ratio Act/Exp Term
2012	61	111.9	7,052	0.87%	1.59%	▲ 0.55
2013	115	122.4	7,363	1.56%	1.66%	● 0.94
2014	181	165.1	8,155	2.22%	2.02%	● 1.10
2015	202	139.8	7,245	2.79%	1.93%	▲ 1.44
2016	214	133.1	7,154	2.99%	1.86%	◆ 1.61
2017	265	164.6	7,655	3.46%	2.15%	◆ 1.61
2018	309	214.0	8,362	3.70%	2.56%	▲ 1.44
2019	600	263.6	9,412	6.37%	2.80%	◆ 2.28
Total	1,947	1,314.5	62,398	3.12%	2.11%	▲ 1.48

Plan Year	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
2012	61	122.3	7,052	0.87%	1.73%	◆ 0.50
2013	115	138.3	7,363	1.56%	1.88%	▲ 0.83
2014	181	196.3	8,155	2.22%	2.41%	● 0.92
2015	202	164.9	7,245	2.79%	2.28%	▲ 1.23
2016	214	154.0	7,154	2.99%	2.15%	▲ 1.39
2017	265	195.6	7,655	3.46%	2.55%	▲ 1.35
2018	309	262.4	8,362	3.70%	3.14%	▲ 1.18
2019	600	325.3	9,412	6.37%	3.46%	◆ 1.84
Total	1,947	1,559.1	62,398	3.12%	2.50%	▲ 1.25

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Year



Withdrawal Rate - Actual, Expected, and Ratio; by Year



The following charts show the experience by service (0 to 19 years) in the experience study period first compared to the current assumption and then to the proposed assumption. This resulted in a decrease in the A/E ratio from 1.48 to 1.25 for ages 22 to 59. For service periods 0 to 4, the A/E ratio decreased from 1.62 to 1.30 and for service period 5 to 19, the A/E ratio increased from 1.18 to 1.12.

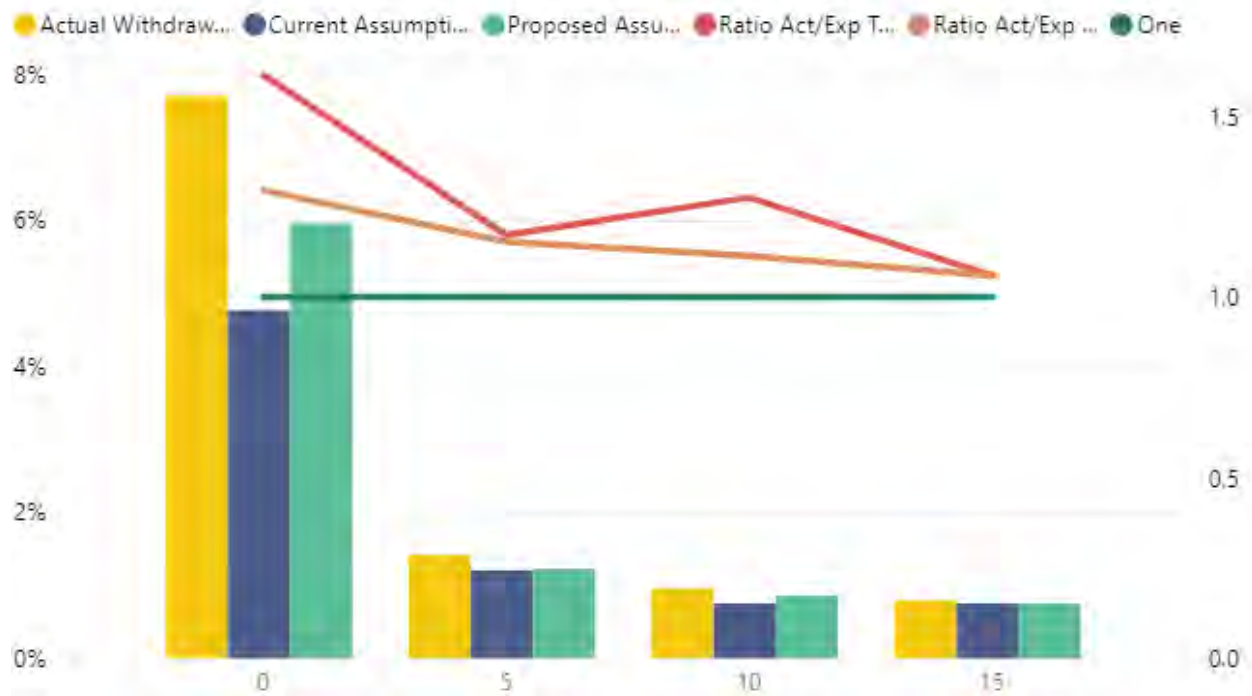
Service	Actual Withdrawals	Expected Withdrawals	Total Exposed	Actual Withdrawal Rate	Current Assumption Termination	Ratio Act/Exp Term
0	457	246.8	3,290	13.89%	7.50%	1.85
1	596	318.1	5,301	11.24%	6.00%	1.87
2	246	165.0	3,666	6.71%	4.50%	1.49
3	102	103.2	3,439	2.97%	3.00%	0.99
4	67	75.1	3,336	2.01%	2.25%	0.89
5	59	54.4	3,629	1.63%	1.50%	1.08
6	60	50.3	3,725	1.61%	1.35%	1.19
7	36	43.1	3,591	1.00%	1.20%	0.84
8	52	35.8	3,412	1.52%	1.05%	1.45
9	45	31.4	3,493	1.29%	0.90%	1.43
10	36	26.9	3,590	1.00%	0.75%	1.34
11	30	23.7	3,156	0.95%	0.75%	1.27
12	34	22.3	2,967	1.15%	0.75%	1.53
13	25	19.9	2,649	0.94%	0.75%	1.26
14	18	19.4	2,586	0.70%	0.75%	0.93
15	31	19.2	2,566	1.21%	0.75%	1.61
16	14	18.9	2,526	0.55%	0.75%	0.74
17	9	16.7	2,224	0.40%	0.75%	0.54
18	12	14.5	1,930	0.62%	0.75%	0.83
19	18	9.9	1,322	1.36%	0.75%	1.82
Total	1,947	1,314.5	62,398	3.12%	2.11%	1.48

Service	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
0	457	329.0	3,290	13.89%	10.00%	▲ 1.39
1	596	424.1	5,301	11.24%	8.00%	▲ 1.41
2	246	201.6	3,666	6.71%	5.50%	▲ 1.22
3	102	103.2	3,439	2.97%	3.00%	● 0.99
4	67	75.1	3,336	2.01%	2.25%	▲ 0.89
5	59	54.4	3,629	1.63%	1.50%	● 1.08
6	60	50.3	3,725	1.61%	1.35%	▲ 1.19
7	36	43.1	3,591	1.00%	1.20%	▲ 0.84
8	52	35.8	3,412	1.52%	1.05%	▲ 1.45
9	45	34.9	3,493	1.29%	1.00%	▲ 1.29
10	36	34.1	3,590	1.00%	0.95%	● 1.06
11	30	28.4	3,156	0.95%	0.90%	● 1.06
12	34	25.2	2,967	1.15%	0.85%	▲ 1.35
13	25	21.2	2,649	0.94%	0.80%	▲ 1.18
14	18	19.4	2,586	0.70%	0.75%	● 0.93
15	31	19.2	2,566	1.21%	0.75%	◆ 1.61
16	14	18.9	2,526	0.55%	0.75%	▲ 0.74
17	9	16.7	2,224	0.40%	0.75%	▲ 0.54
18	12	14.5	1,930	0.62%	0.75%	▲ 0.83
19	18	9.9	1,322	1.36%	0.75%	◆ 1.82
Total	1,947	1,559.1	62,398	3.12%	2.50%	▲ 1.25

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Service



Withdrawal Rate - Actual, Expected, and Ratio; by Service w/Proposed



Summary

In total, the proposed rates of withdrawal have increased the anticipated number of terminations. Higher rates of withdrawal will result in a decrease in plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF TERMINATION	
	Probabilities of Termination
Years of Service	Correction
0	7.50%
1	6.00%
2	4.50%
3	3.00%
4	2.25%
5	1.50%
6	1.35%
7	1.20%
8	1.05%
9	0.90%
10	0.75%
11	0.75%
12	0.75%
13	0.75%
14	0.75%
15	0.75%
16	0.75%
17	0.75%
18	0.75%
19	0.75%
20	0.75%

The following table shows the proposed assumptions.

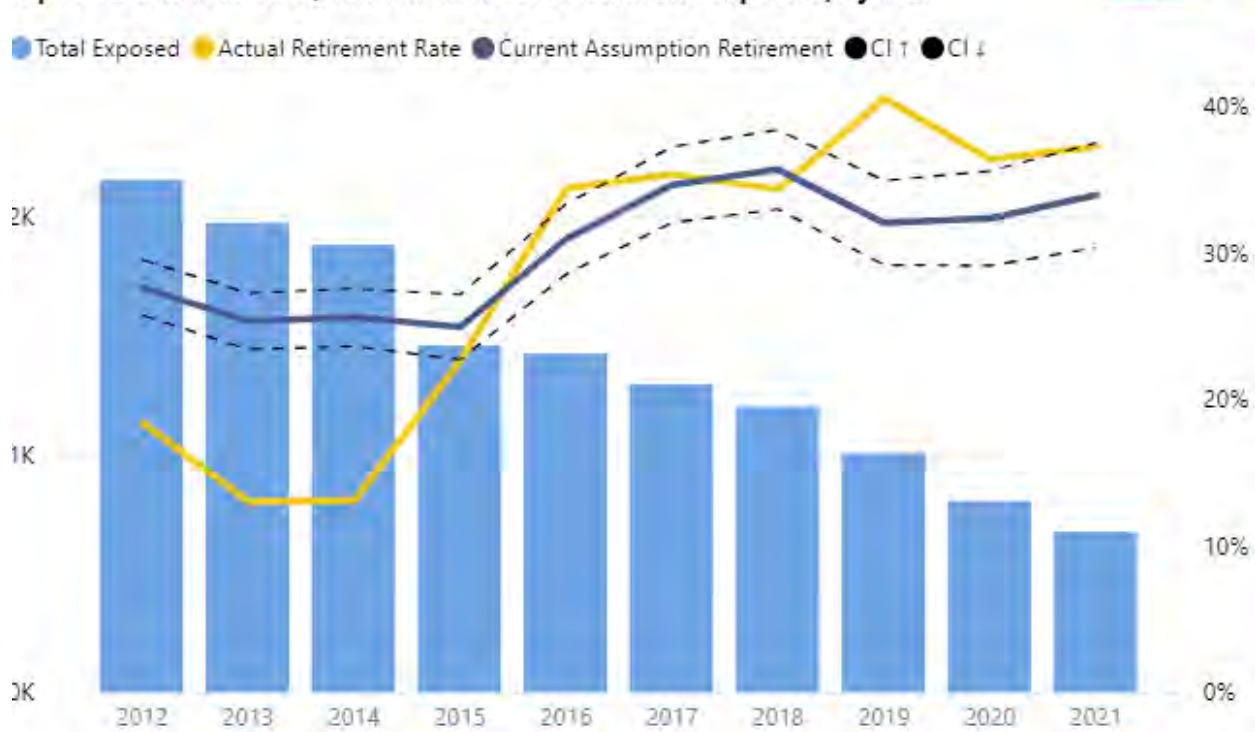
NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF TERMINATION	
	Probabilities of Termination
Years of Service	Correction
0	10.00%
1	8.00%
2	5.50%
3	3.00%
4	2.25%
5	1.50%
6	1.35%
7	1.20%
8	1.05%
9	1.00%
10	0.95%
11	0.90%
12	0.85%
13	0.80%
14	0.75%
15	0.75%
16	0.75%
17	0.75%
18	0.75%
19	0.75%
20+	0.75%

Retirement

The current retirement assumption varies by age and eligibility for unreduced retirement with higher rates occurring at first eligibility. Furthermore, higher rates of retirement are assumed for members who had the option to elect an improved program. The proposed assumption maintains the same structure but reflects greater differences by age. Generally higher rates of retirement are proposed.

In the historical database, there were inconsistencies with some records that may not have the correct Corrections plan code. While adjustments were made, we believe this may have impacted the retirement rates for Correction records prior to 2015. Therefore, our analysis reflected years from 2015 – 2021, which also were more consistent with the current assumptions.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Year

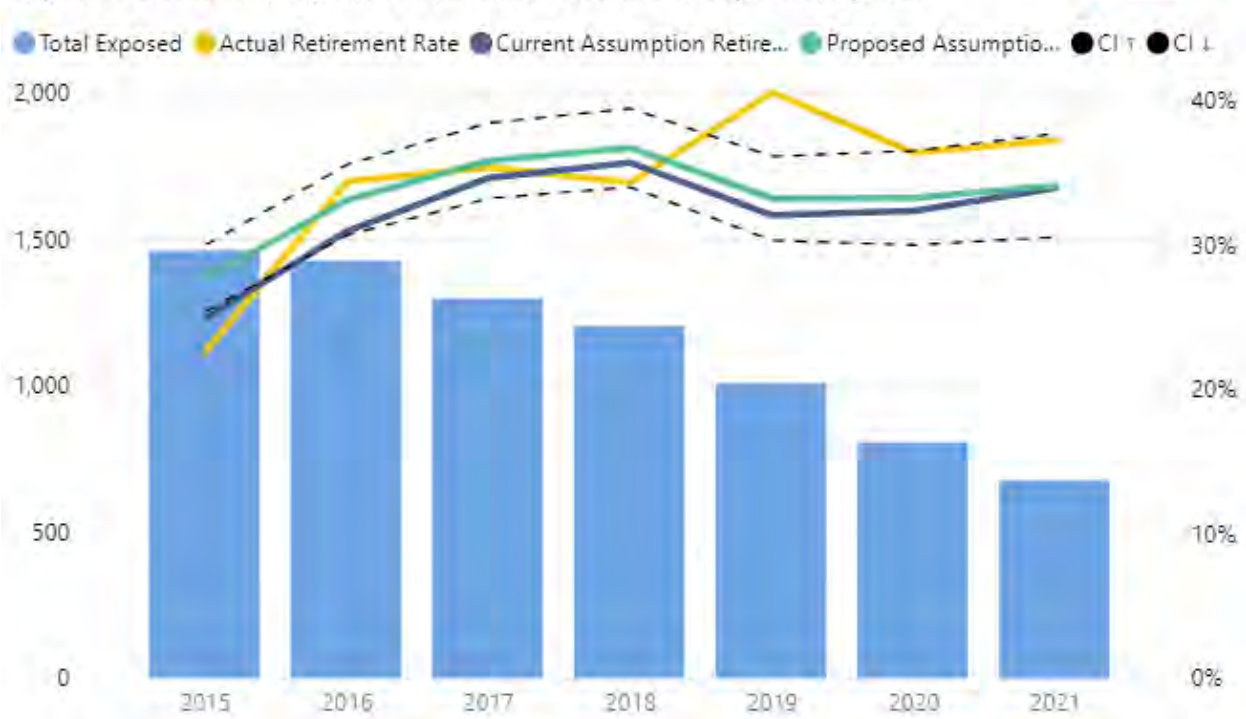


The following table shows the experience for retirement by year, for the age range (40 to 69), and for the service range (20 to 34) for all plans for the period 2015 - 2021. The actual rate of retirement averaged 33.58% whereas the overall expected rate of retirement averaged 31.69% based on the current assumptions and 33.21% based on the proposed assumptions.

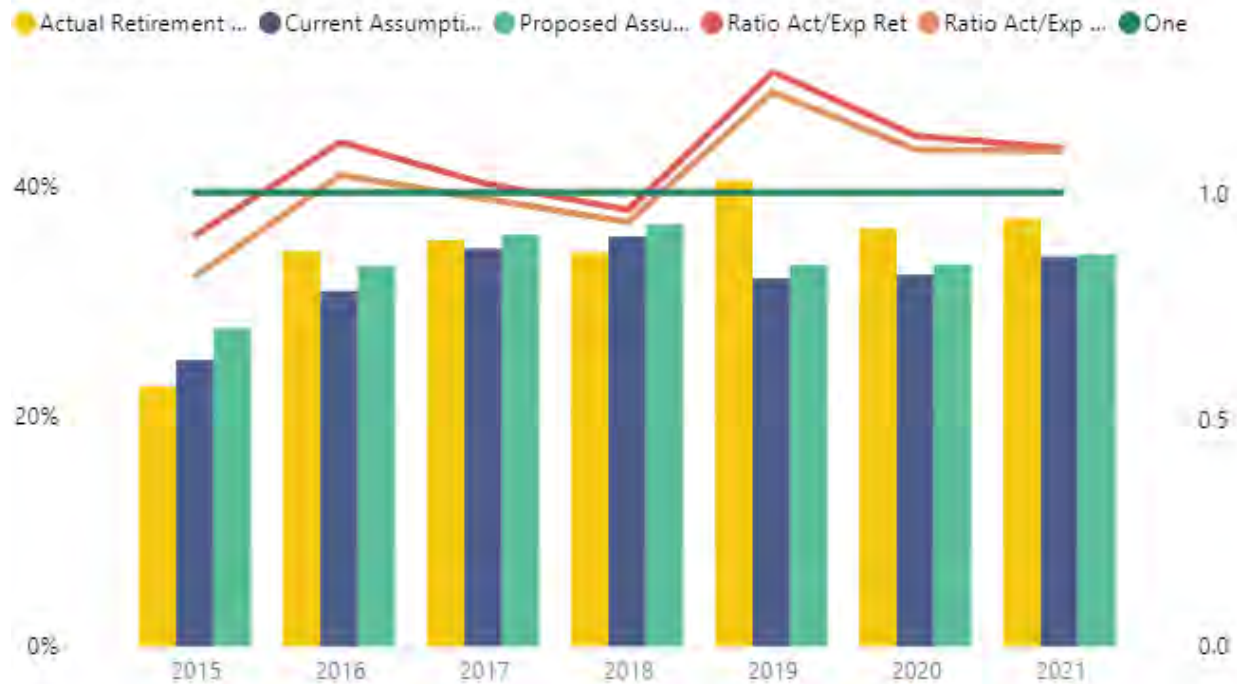
Plan Year	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
2015	330	363.6	1,459	22.62%	24.92%	0.91
2016	490	440.8	1,425	34.39%	30.94%	1.11
2017	458	448.8	1,296	35.34%	34.63%	1.02
2018	412	428.4	1,201	34.30%	35.67%	0.96
2019	408	322.2	1,006	40.56%	32.03%	1.27
2020	292	259.7	803	36.36%	32.34%	1.12
2021	251	228.6	674	37.24%	33.92%	1.10
Total	2,641	2,492.2	7,864	33.58%	31.69%	1.06

Plan Year	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
2015	330	403.9	1,459	22.62%	27.68%	0.82
2016	490	471.7	1,425	34.39%	33.10%	1.04
2017	458	464.3	1,296	35.34%	35.82%	0.99
2018	412	440.8	1,201	34.30%	36.70%	0.93
2019	408	334.0	1,006	40.56%	33.20%	1.22
2020	292	266.9	803	36.36%	33.24%	1.09
2021	251	229.9	674	37.24%	34.11%	1.09
Total	2,641	2,611.4	7,864	33.58%	33.21%	1.01

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Year



Retirement Rate - Actual, Expected, and Ratio; by Year



Analysis

We have reviewed the retirement experience split by following plans:

1. Improved Plan - retirement at 20 years of service
2. Mandated Plan – retirement at 20 years of service
3. Mandated Plan – retirement at 25 years of service

Members coded as Tier 4 or Tier 6 in the MEST are excluded.

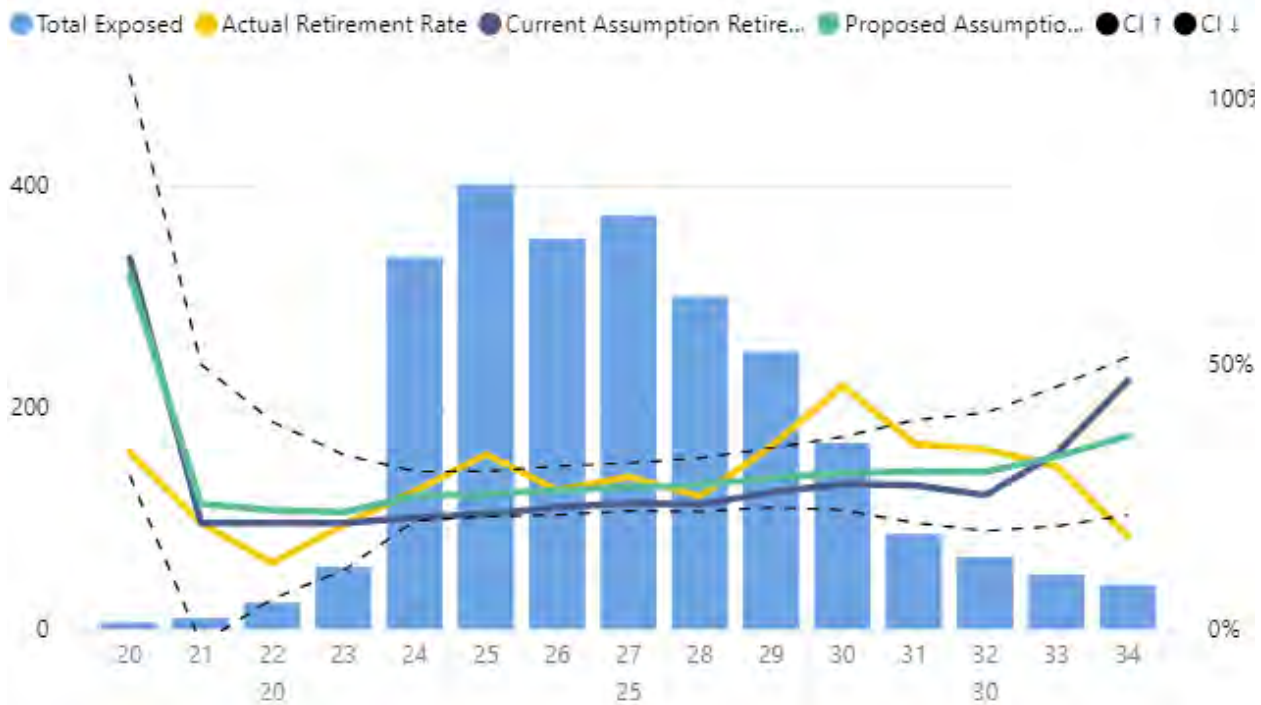
Improved Plan

The following table shows the experience of improved plan members by service based on the age range (40 to 69) and service range (20 to 34) for the period 2015 – 2021. The actual rate of retirement averaged 29.71% whereas the overall expected rate of retirement averaged 23.99% based on the current assumptions and 26.98% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.24 to 1.10. There is nearly no experience at first eligibility (20 years of service) and thus, we propose no change in the assumption.

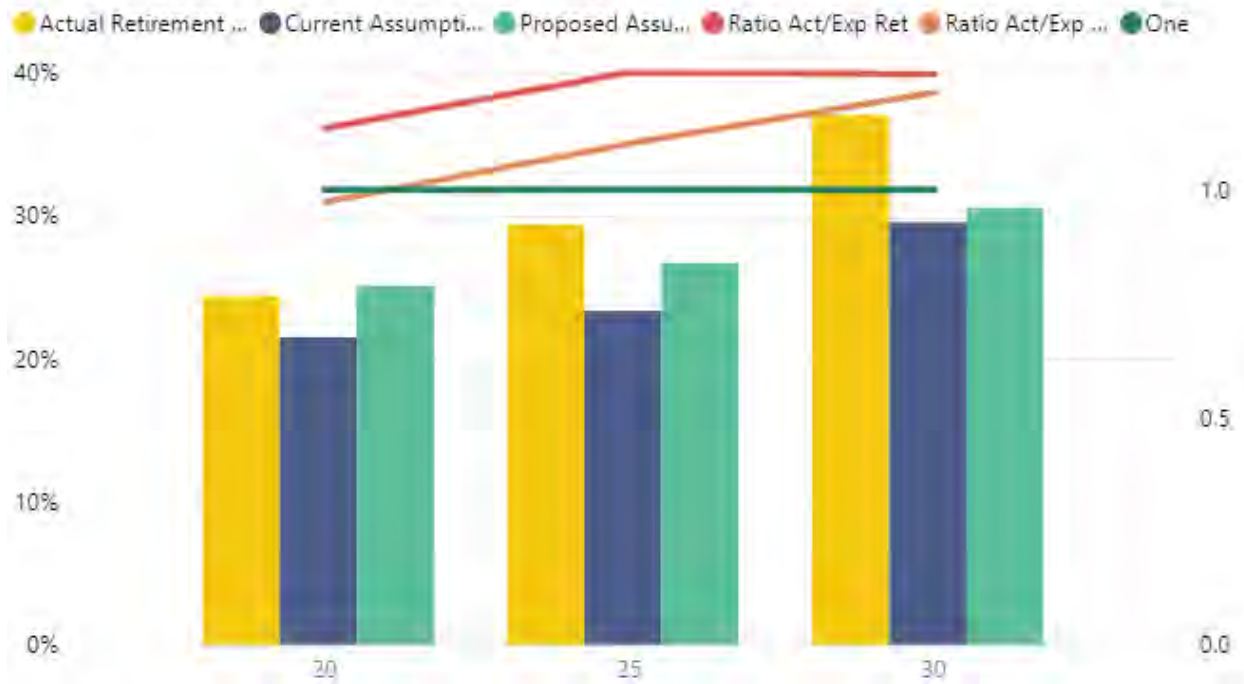
Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
20	2	3.5	5	40.00%	70.00%	▲ 0.57
21	2	1.8	9	22.22%	20.00%	▲ 1.11
22	2	4.6	23	8.70%	20.00%	◆ 0.43
23	11	11.2	56	19.64%	20.00%	● 0.98
24	87	70.3	335	25.97%	20.99%	▲ 1.24
25	132	86.8	401	32.92%	21.65%	◆ 1.52
26	92	80.8	352	26.14%	22.95%	▲ 1.14
27	106	88.2	372	28.49%	23.71%	▲ 1.20
28	75	70.5	300	25.00%	23.50%	● 1.06
29	86	64.4	250	34.40%	25.76%	▲ 1.34
30	77	45.8	168	45.83%	27.26%	◆ 1.68
31	30	23.3	86	34.88%	27.09%	▲ 1.29
32	22	16.4	65	33.85%	25.23%	▲ 1.34
33	15	16.2	49	30.61%	33.06%	● 0.93
34	7	18.7	40	17.50%	46.75%	◆ 0.37
Total	746	602.5	2,511	29.71%	23.99%	▲ 1.24

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
20	2	3.3	5	40.00%	66.00%	▲ 0.61
21	2	2.1	9	22.22%	23.61%	● 0.94
22	2	5.1	23	8.70%	22.35%	◆ 0.39
23	11	12.3	56	19.64%	21.98%	▲ 0.89
24	87	83.9	335	25.97%	25.05%	● 1.04
25	132	102.0	401	32.92%	25.45%	▲ 1.29
26	92	91.9	352	26.14%	26.11%	● 1.00
27	106	99.5	372	28.49%	26.75%	● 1.07
28	75	81.4	300	25.00%	27.15%	● 0.92
29	86	71.3	250	34.40%	28.52%	▲ 1.21
30	77	49.2	168	45.83%	29.30%	◆ 1.56
31	30	25.5	86	34.88%	29.69%	▲ 1.18
32	22	19.3	65	33.85%	29.62%	▲ 1.14
33	15	15.9	49	30.61%	32.50%	● 0.94
34	7	14.6	40	17.50%	36.38%	◆ 0.48
Total	746	677.4	2,511	29.71%	26.98%	▲ 1.10

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



Retirement Rate - Actual, Expected, and Ratio; by Service

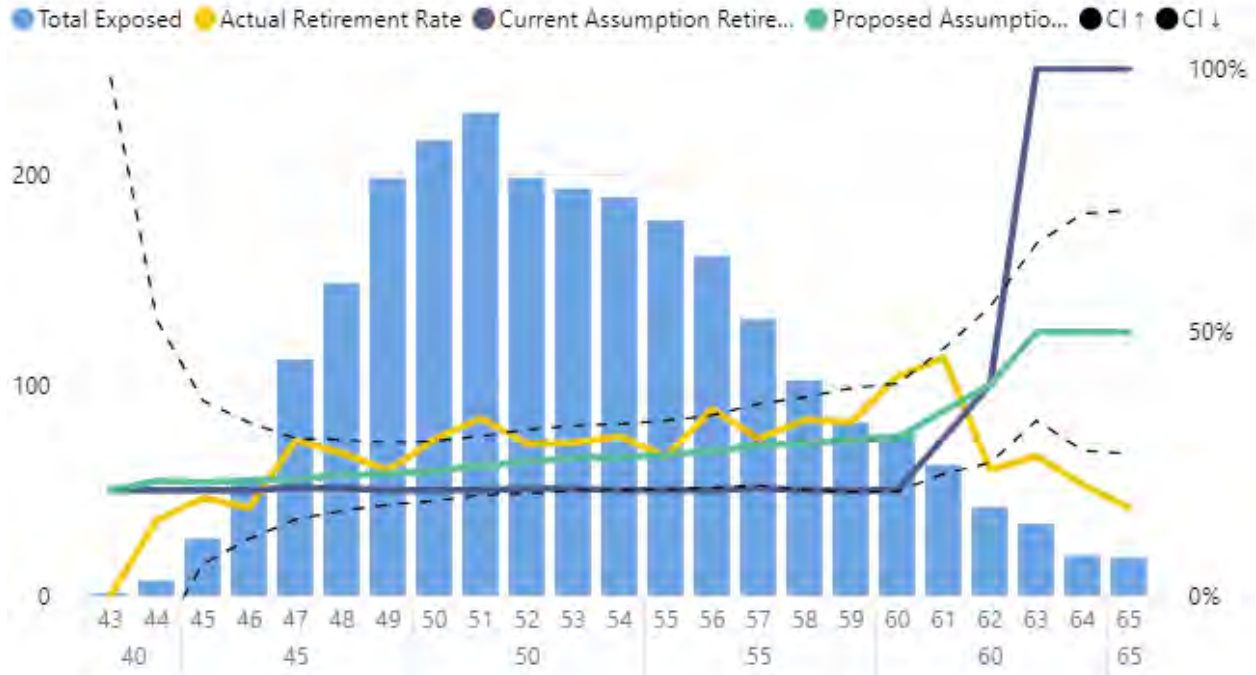


The following charts display the experience by age based on the age range (40 to 69) and the service range (20 to 34) for the current and proposed assumptions.

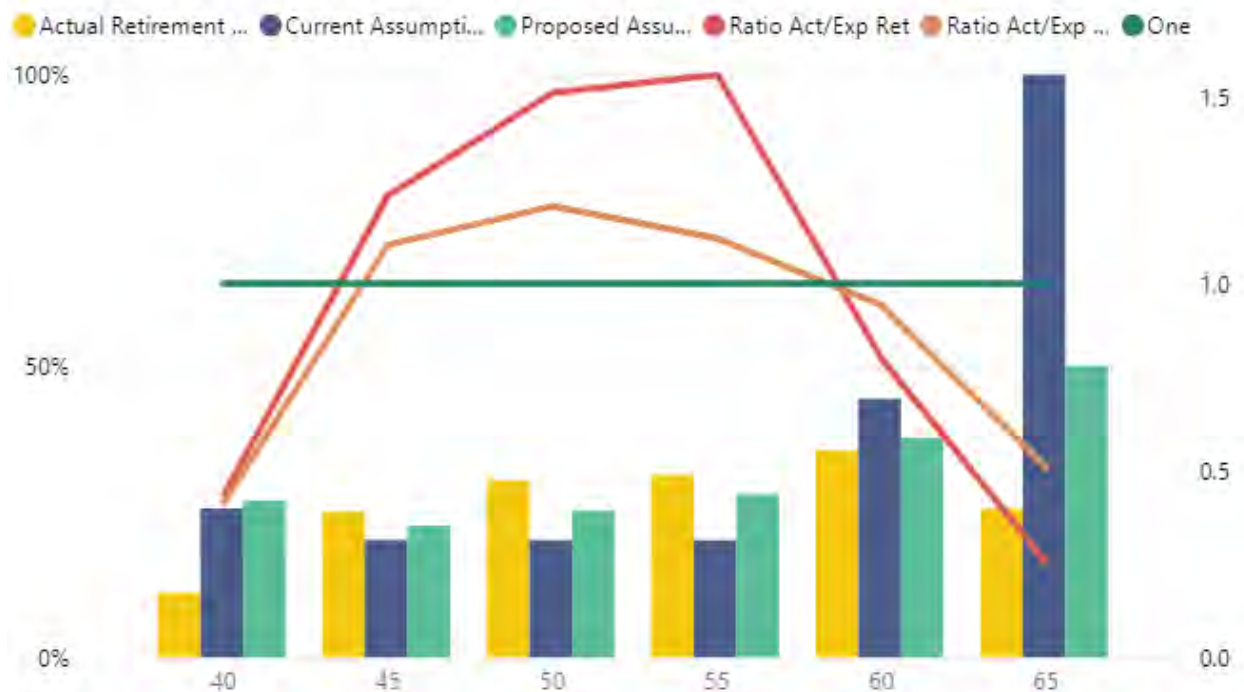
Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
43	0	0.2	1	0.00%	20.00%	0.00
44	1	1.4	7	14.29%	20.00%	0.71
45	5	5.4	27	18.52%	20.00%	0.93
46	9	10.8	54	16.67%	20.00%	0.83
47	33	22.9	112	29.46%	20.45%	1.44
48	40	30.1	148	27.03%	20.34%	1.33
49	47	39.6	198	23.74%	20.00%	1.19
50	64	43.2	216	29.63%	20.00%	1.48
51	77	45.8	229	33.62%	20.00%	1.68
52	57	40.1	198	28.79%	20.25%	1.42
53	56	39.1	193	29.02%	20.26%	1.43
54	57	37.8	189	30.16%	20.00%	1.51
55	47	35.6	178	26.40%	20.00%	1.32
56	57	32.2	161	35.40%	20.00%	1.77
57	39	26.7	131	29.77%	20.38%	1.46
58	34	20.4	102	33.33%	20.00%	1.67
59	27	16.4	82	32.93%	20.00%	1.65
60	32	15.4	77	41.56%	20.00%	2.08
61	28	18.6	62	45.16%	30.00%	1.51
62	10	16.8	42	23.81%	40.00%	0.60
63	9	34.0	34	26.47%	100.00%	0.26
64	4	19.0	19	21.05%	100.00%	0.21
65	3	18.0	18	16.67%	100.00%	0.17
66	5	13.0	13	38.46%	100.00%	0.38
67	1	9.0	9	11.11%	100.00%	0.11
68	2	7.0	7	28.57%	100.00%	0.29
69	2	4.0	4	50.00%	100.00%	0.50
Total	746	602.5	2,511	29.71%	23.99%	1.24

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
43	0	0.2	1	0.00%	20.00%	0.00
44	1	1.5	7	14.29%	21.71%	0.66
45	5	5.8	27	18.52%	21.44%	0.86
46	9	11.8	54	16.67%	21.78%	0.77
47	33	24.8	112	29.46%	22.13%	1.33
48	40	33.7	148	27.03%	22.80%	1.19
49	47	45.8	198	23.74%	23.12%	1.03
50	64	51.0	216	29.63%	23.61%	1.25
51	77	56.5	229	33.62%	24.66%	1.36
52	57	50.2	198	28.79%	25.37%	1.13
53	56	50.3	193	29.02%	26.07%	1.11
54	57	49.6	189	30.16%	26.26%	1.15
55	47	47.5	178	26.40%	26.69%	0.99
56	57	44.0	161	35.40%	27.33%	1.30
57	39	37.5	131	29.77%	28.63%	1.04
58	34	29.4	102	33.33%	28.83%	1.16
59	27	24.2	82	32.93%	29.49%	1.12
60	32	23.1	77	41.56%	30.00%	1.39
61	28	21.7	62	45.16%	35.00%	1.29
62	10	16.8	42	23.81%	40.00%	0.60
63	9	17.0	34	26.47%	50.00%	0.53
64	4	9.5	19	21.05%	50.00%	0.42
65	3	9.0	18	16.67%	50.00%	0.33
66	5	6.5	13	38.46%	50.00%	0.77
67	1	4.5	9	11.11%	50.00%	0.22
68	2	3.5	7	28.57%	50.00%	0.57
69	2	2.0	4	50.00%	50.00%	1.00
Total	746	677.4	2,511	29.71%	26.98%	1.10

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



Retirement Rate - Actual, Expected, and Ratio; by Age



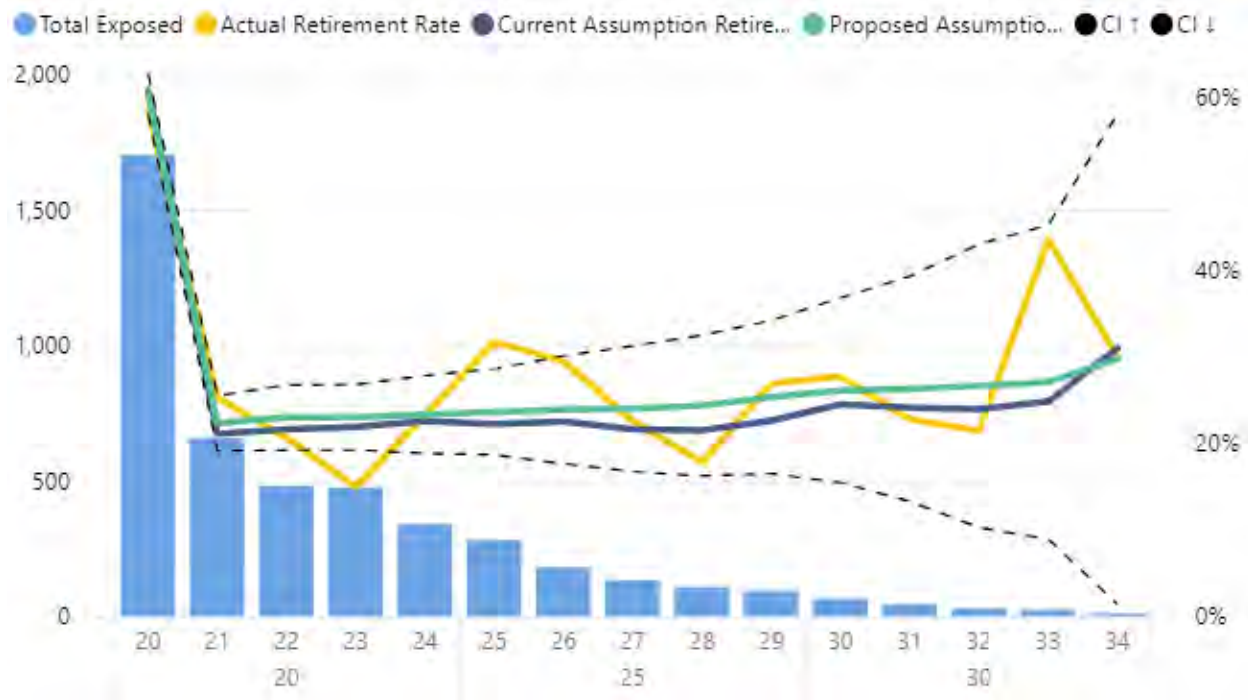
Mandated Plan - 20 Years of Service

The following table shows the experience of mandated members in the 20-year plans by service based on the age range (40 to 69) and service range (20 to 34) for the period 2015 – 2021. The actual rate of retirement averaged 36.38% whereas the overall expected rate of retirement averaged 36.36% based on the current assumptions and 37.05% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.00 to 0.98. At first eligibility (20 years of service), the A/E ratio remained at 0.97 and after first eligibility (21 or more years of service), the A/E ratio decreased from 1.06 to 1.00.

Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
20	995	1,031.0	1,695	58.70%	60.83%	0.97
21	166	138.6	652	25.46%	21.26%	1.20
22	97	103.3	474	20.46%	21.79%	0.94
23	71	103.6	473	15.01%	21.90%	0.69
24	79	76.4	338	23.37%	22.60%	1.03
25	89	61.6	279	31.90%	22.08%	1.44
26	52	39.9	177	29.38%	22.54%	1.30
27	30	28.7	133	22.56%	21.58%	1.05
28	19	23.0	107	17.76%	21.50%	0.83
29	25	21.0	93	26.88%	22.58%	1.19
30	18	15.9	65	27.69%	24.46%	1.13
31	10	10.6	44	22.73%	24.09%	0.94
32	6	6.7	28	21.43%	23.93%	0.90
33	10	5.7	23	43.48%	24.78%	1.75
34	3	3.1	10	30.00%	31.00%	0.97
Total	1,670	1,669.1	4,591	36.38%	36.36%	1.00

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
20	995	1,024.0	1,695	58.70%	60.41%	0.97
21	166	146.4	652	25.46%	22.45%	1.13
22	97	108.4	474	20.46%	22.87%	0.89
23	71	108.8	473	15.01%	23.01%	0.65
24	79	78.9	338	23.37%	23.34%	1.00
25	89	65.5	279	31.90%	23.48%	1.36
26	52	42.3	177	29.38%	23.89%	1.23
27	30	31.9	133	22.56%	23.95%	0.94
28	19	26.0	107	17.76%	24.33%	0.73
29	25	23.5	93	26.88%	25.32%	1.06
30	18	17.0	65	27.69%	26.10%	1.06
31	10	11.6	44	22.73%	26.26%	0.87
32	6	7.5	28	21.43%	26.61%	0.81
33	10	6.2	23	43.48%	27.04%	1.61
34	3	3.0	10	30.00%	29.70%	1.01
Total	1,670	1,700.9	4,591	36.38%	37.05%	0.98

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



Retirement Rate - Actual, Expected, and Ratio; by Service



The following charts display the experience of first eligibility (20 years of service) by age based on the age range (40 to 69) for the current and proposed assumptions. The actual rate of retirement averaged 58.70% whereas the overall expected rate of retirement averaged 60.83% based on the current assumptions and 60.41% based on the proposed assumptions, which is a result of proposing that certain retirement age increase from age 63 to age 70. This resulted in no change in the A/E ratio of 0.97.

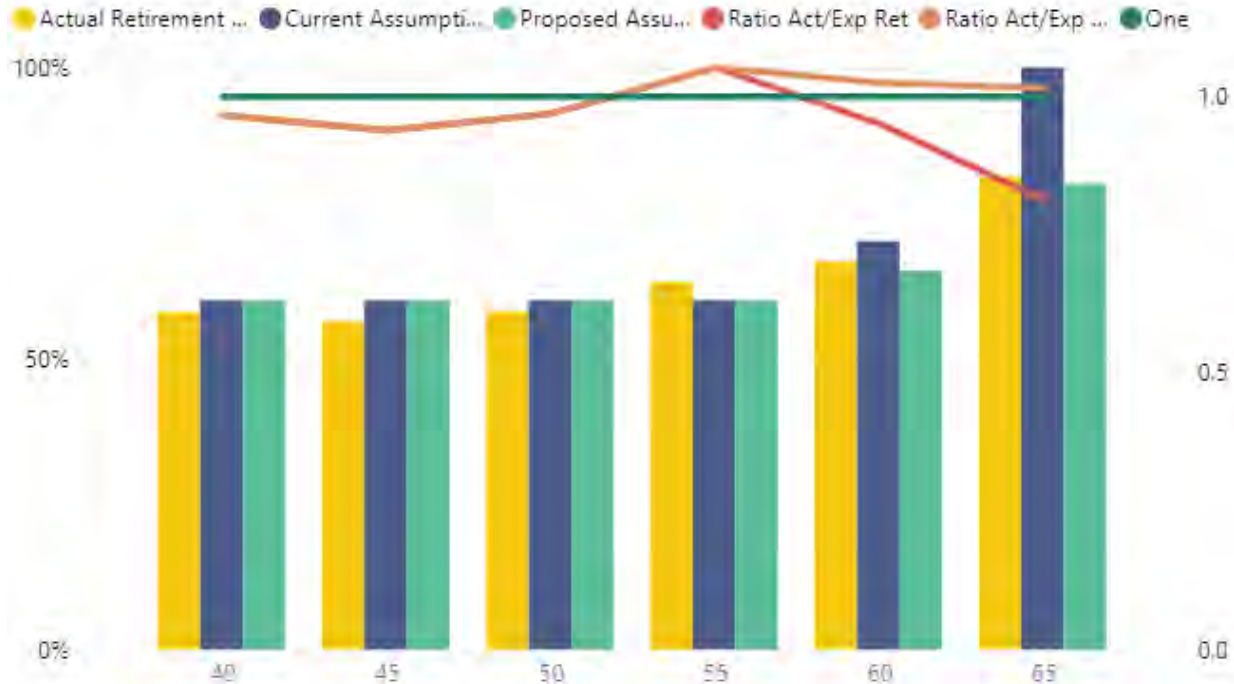
Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
40	1	1.8	3	33.33%	60.00%	▲ 0.56
41	6	8.4	14	42.86%	60.00%	▲ 0.71
42	29	25.2	42	69.05%	60.00%	▲ 1.15
43	42	46.8	78	53.85%	60.00%	▲ 0.90
44	60	60.6	101	59.41%	60.00%	● 0.99
45	81	79.8	133	60.90%	60.00%	● 1.02
46	87	90.6	151	57.62%	60.00%	● 0.96
47	71	79.8	133	53.38%	60.00%	▲ 0.89
48	76	82.8	138	55.07%	60.00%	● 0.92
49	76	81.6	136	55.88%	60.00%	● 0.93
50	64	68.4	114	56.14%	60.00%	● 0.94
51	55	60.0	100	55.00%	60.00%	● 0.92
52	57	60.6	101	56.44%	60.00%	● 0.94
53	42	44.4	74	56.76%	60.00%	● 0.95
54	53	46.2	77	68.83%	60.00%	▲ 1.15
55	35	36.0	60	58.33%	60.00%	● 0.97
56	29	26.4	44	65.91%	60.00%	● 1.10
57	25	21.6	36	69.44%	60.00%	▲ 1.16
58	19	19.8	33	57.58%	60.00%	● 0.96
59	24	21.6	36	66.67%	60.00%	▲ 1.11
60	15	13.2	22	68.18%	60.00%	▲ 1.14
61	13	12.6	21	61.90%	60.00%	● 1.03
62	7	7.8	13	53.85%	60.00%	▲ 0.90
63	10	14.0	14	71.43%	100.00%	▲ 0.71
64	5	5.0	5	100.00%	100.00%	● 1.00
65	4	6.0	6	66.67%	100.00%	▲ 0.67
66	4	4.0	4	100.00%	100.00%	● 1.00
67	2	2.0	2	100.00%	100.00%	● 1.00
68	2	3.0	3	66.67%	100.00%	▲ 0.67
69	1	1.0	1	100.00%	100.00%	● 1.00
Total	995	1,031.0	1,695	58.70%	60.83%	● 0.97

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
40	1	1.8	3	33.33%	60.00%	▲ 0.56
41	6	8.4	14	42.86%	60.00%	▲ 0.71
42	29	25.2	42	69.05%	60.00%	▲ 1.15
43	42	46.8	78	53.85%	60.00%	▲ 0.90
44	60	60.6	101	59.41%	60.00%	● 0.99
45	81	79.8	133	60.90%	60.00%	● 1.02
46	87	90.6	151	57.62%	60.00%	● 0.96
47	71	79.8	133	53.38%	60.00%	▲ 0.89
48	76	82.8	138	55.07%	60.00%	● 0.92
49	76	81.6	136	55.88%	60.00%	● 0.93
50	64	68.4	114	56.14%	60.00%	● 0.94
51	55	60.0	100	55.00%	60.00%	● 0.92
52	57	60.6	101	56.44%	60.00%	● 0.94
53	42	44.4	74	56.76%	60.00%	● 0.95
54	53	46.2	77	68.83%	60.00%	▲ 1.15
55	35	36.0	60	58.33%	60.00%	● 0.97
56	29	26.4	44	65.91%	60.00%	● 1.10
57	25	21.6	36	69.44%	60.00%	▲ 1.16
58	19	19.8	33	57.58%	60.00%	● 0.96
59	24	21.6	36	66.67%	60.00%	▲ 1.11
60	15	13.2	22	68.18%	60.00%	▲ 1.14
61	13	12.6	21	61.90%	60.00%	● 1.03
62	7	7.8	13	53.85%	60.00%	▲ 0.90
63	10	11.2	14	71.43%	80.00%	▲ 0.89
64	5	4.0	5	100.00%	80.00%	▲ 1.25
65	4	4.8	6	66.67%	80.00%	▲ 0.83
66	4	3.2	4	100.00%	80.00%	▲ 1.25
67	2	1.6	2	100.00%	80.00%	▲ 1.25
68	2	2.4	3	66.67%	80.00%	▲ 0.83
69	1	0.8	1	100.00%	80.00%	▲ 1.25
Total	995	1,024.0	1,695	58.70%	60.41%	● 0.97

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



Retirement Rate - Actual, Expected, and Ratio; by Age



The following charts display the experience after first eligibility by age based on the age range (40 to 69) and the service range (21 to 34) for the current and proposed assumptions. The actual rate of retirement averaged 23.31% whereas the overall expected rate of retirement averaged 22.03% based on the current assumptions and 23.37% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.06 to 1.00.

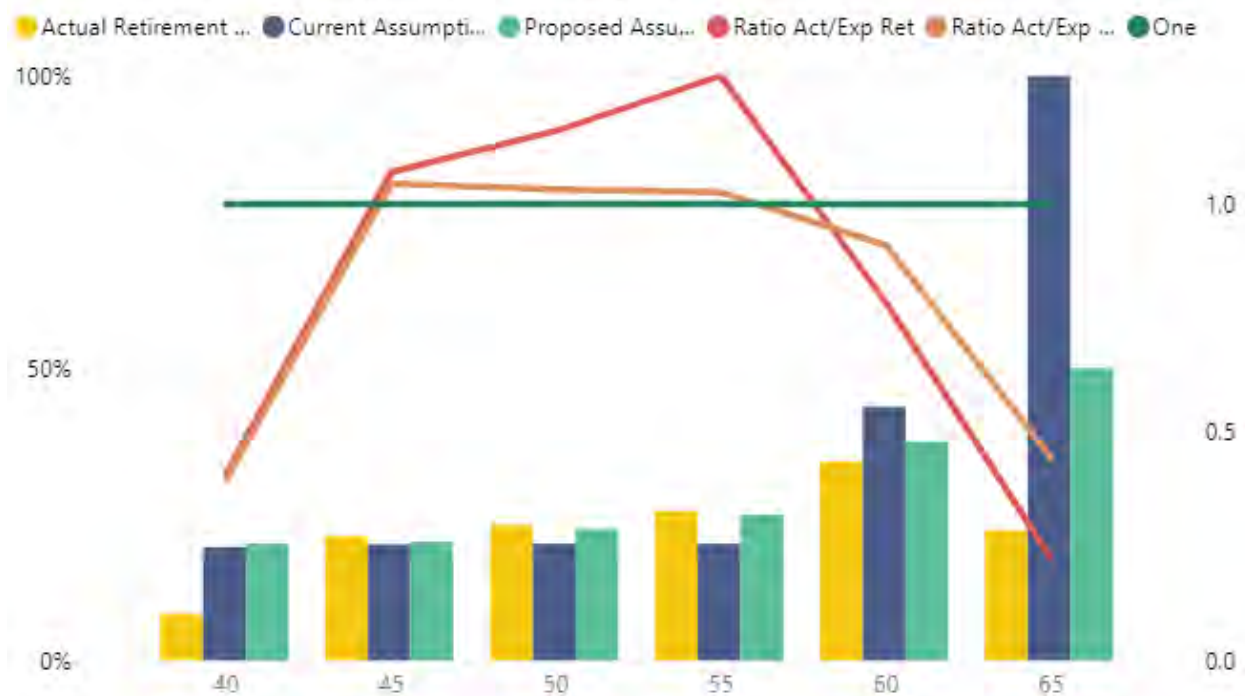
Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
40	0	0.2	1	0.00%	20.00%	0.00
41	0	0.4	2	0.00%	20.00%	0.00
42	2	2.4	12	16.67%	20.00%	0.83
43	0	3.8	19	0.00%	20.00%	0.00
44	5	12.6	63	7.94%	20.00%	0.40
45	22	22.0	110	20.00%	20.00%	1.00
46	23	29.4	147	15.65%	20.00%	0.78
47	40	36.8	184	21.74%	20.00%	1.09
48	47	42.8	214	21.96%	20.00%	1.10
49	59	47.4	237	24.89%	20.00%	1.24
50	39	48.0	240	16.25%	20.00%	0.81
51	74	50.8	254	29.13%	20.00%	1.46
52	59	44.6	224	26.34%	19.91%	1.32
53	41	40.4	202	20.30%	20.00%	1.01
54	45	38.6	193	23.32%	20.00%	1.17
55	39	33.6	168	23.21%	20.00%	1.16
56	43	29.4	147	29.25%	20.00%	1.46
57	34	22.8	114	29.82%	20.00%	1.49
58	16	16.2	81	19.75%	20.00%	0.99
59	18	15.0	75	24.00%	20.00%	1.20
60	23	13.4	67	34.33%	20.00%	1.72
61	16	14.1	47	34.04%	30.00%	1.13
62	13	14.4	36	36.11%	40.00%	0.90
63	6	26.0	26	23.08%	100.00%	0.23
64	7	15.0	15	46.67%	100.00%	0.47
65	0	7.0	7	0.00%	100.00%	0.00
66	3	5.0	5	60.00%	100.00%	0.60
67	0	2.0	2	0.00%	100.00%	0.00
68	0	2.0	2	0.00%	100.00%	0.00
69	1	2.0	2	50.00%	100.00%	0.50
Total	675	638.1	2,896	23.31%	22.03%	1.06

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
40	0	0.2	1	0.00%	20.00%	0.00
41	0	0.4	2	0.00%	20.00%	0.00
42	2	2.4	12	16.67%	20.00%	0.83
43	0	3.8	19	0.00%	20.00%	0.00
44	5	12.6	63	7.94%	20.00%	0.40
45	22	22.0	110	20.00%	20.00%	1.00
46	23	29.4	147	15.65%	20.00%	0.78
47	40	36.8	184	21.74%	20.00%	1.09
48	47	43.9	214	21.96%	20.50%	1.07
49	59	49.8	237	24.89%	21.00%	1.19
50	39	51.6	240	16.25%	21.50%	0.76
51	74	55.9	254	29.13%	22.00%	1.32
52	59	50.2	224	26.34%	22.40%	1.18
53	41	46.5	202	20.30%	23.00%	0.88
54	45	45.4	193	23.32%	23.50%	0.99
55	39	40.3	168	23.21%	24.00%	0.97
56	43	36.0	147	29.25%	24.50%	1.19
57	34	28.5	114	29.82%	25.00%	1.19
58	16	20.7	81	19.75%	25.50%	0.77
59	18	20.3	75	24.00%	27.00%	0.89
60	23	20.1	67	34.33%	30.00%	1.14
61	16	16.5	47	34.04%	35.00%	0.97
62	13	14.4	36	36.11%	40.00%	0.90
63	6	13.0	26	23.08%	50.00%	0.46
64	7	7.5	15	46.67%	50.00%	0.93
65	0	3.5	7	0.00%	50.00%	0.00
66	3	2.5	5	60.00%	50.00%	1.20
67	0	1.0	2	0.00%	50.00%	0.00
68	0	1.0	2	0.00%	50.00%	0.00
69	1	1.0	2	50.00%	50.00%	1.00
Total	675	676.9	2,896	23.31%	23.37%	1.00

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



Retirement Rate - Actual, Expected, and Ratio; by Age



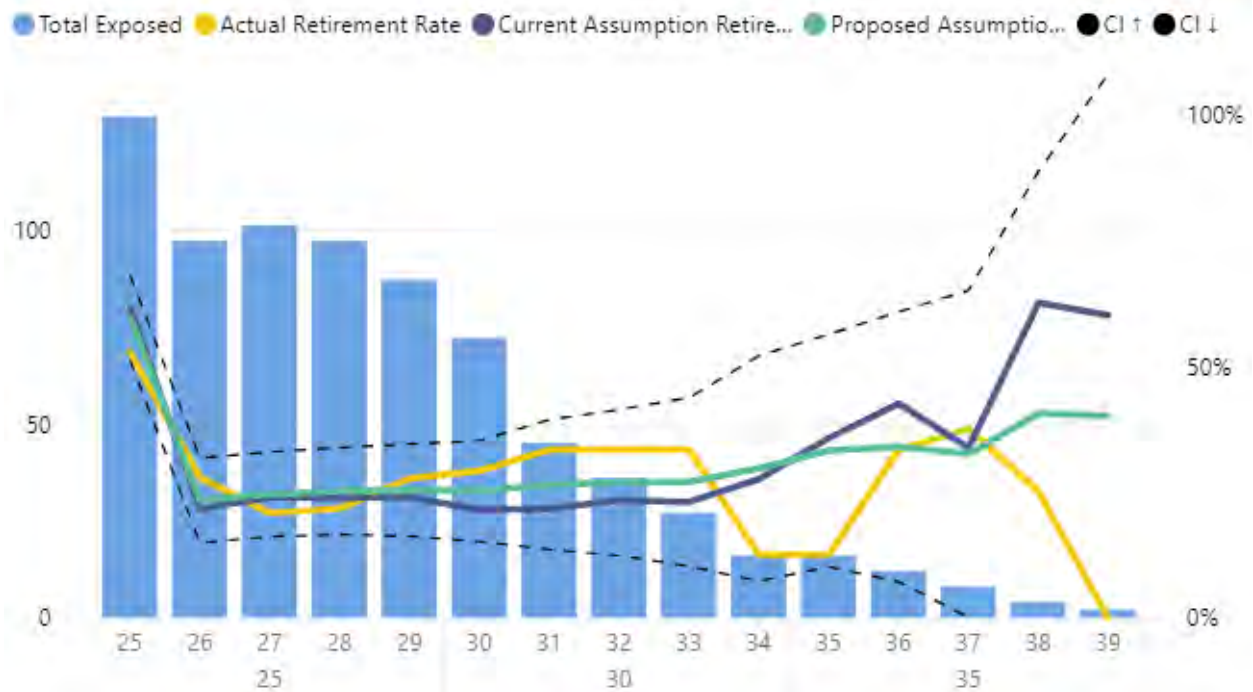
Mandated - 25 Years of Service

The following table shows the experience of mandated members in the 25-year plan by service based on the age range (45 to 69) and service range (25 to 39) for the period 2015 – 2021. The actual rate of retirement averaged 30.71% whereas the overall expected rate of retirement averaged 30.65% based on the current assumptions and 31.59% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.00 to 0.97. At first eligibility (25 years of service), the A/E ratio remained at 0.85 and after first eligibility (26 or more years of service), the A/E ratio decreased from 1.08 to 1.03.

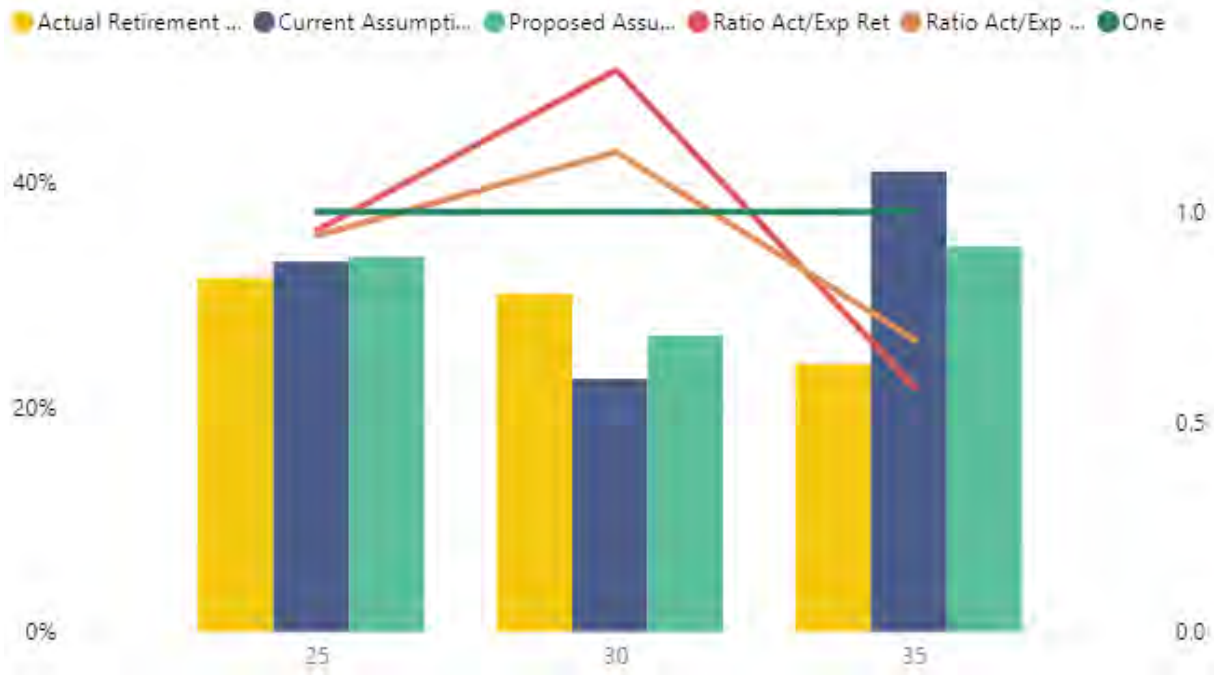
Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
25	68	79.4	129	52.71%	61.55%	▲ 0.86
26	27	20.9	97	27.84%	21.55%	▲ 1.29
27	21	24.1	101	20.79%	23.86%	▲ 0.87
28	21	23.1	97	21.65%	23.81%	● 0.91
29	24	20.8	87	27.59%	23.91%	▲ 1.15
30	21	15.4	72	29.17%	21.39%	▲ 1.36
31	15	9.7	45	33.33%	21.56%	◆ 1.55
32	12	8.4	36	33.33%	23.33%	▲ 1.43
33	9	6.2	27	33.33%	22.96%	▲ 1.45
34	2	4.4	16	12.50%	27.50%	◆ 0.45
35	2	5.7	16	12.50%	35.63%	◆ 0.35
36	4	5.1	12	33.33%	42.50%	▲ 0.78
37	3	2.7	8	37.50%	33.75%	▲ 1.11
38	1	2.5	4	25.00%	62.50%	◆ 0.40
39	0	1.2	2	0.00%	60.00%	◆ 0.00
Total	230	229.6	749	30.71%	30.65%	● 1.00

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
25	68	76.9	129	52.71%	59.61%	▲ 0.88
26	27	22.6	97	27.84%	23.28%	▲ 1.20
27	21	24.7	101	20.79%	24.50%	▲ 0.85
28	21	24.4	97	21.65%	25.11%	▲ 0.86
29	24	22.0	87	27.59%	25.32%	● 1.09
30	21	18.1	72	29.17%	25.12%	▲ 1.16
31	15	11.9	45	33.33%	26.40%	▲ 1.26
32	12	9.7	36	33.33%	26.82%	▲ 1.24
33	9	7.3	27	33.33%	26.94%	▲ 1.24
34	2	4.7	16	12.50%	29.63%	◆ 0.42
35	2	5.3	16	12.50%	33.16%	◆ 0.38
36	4	4.1	12	33.33%	33.92%	● 0.98
37	3	2.6	8	37.50%	32.50%	▲ 1.15
38	1	1.6	4	25.00%	40.50%	▲ 0.62
39	0	0.8	2	0.00%	40.00%	◆ 0.00
Total	230	236.6	749	30.71%	31.59%	● 0.97

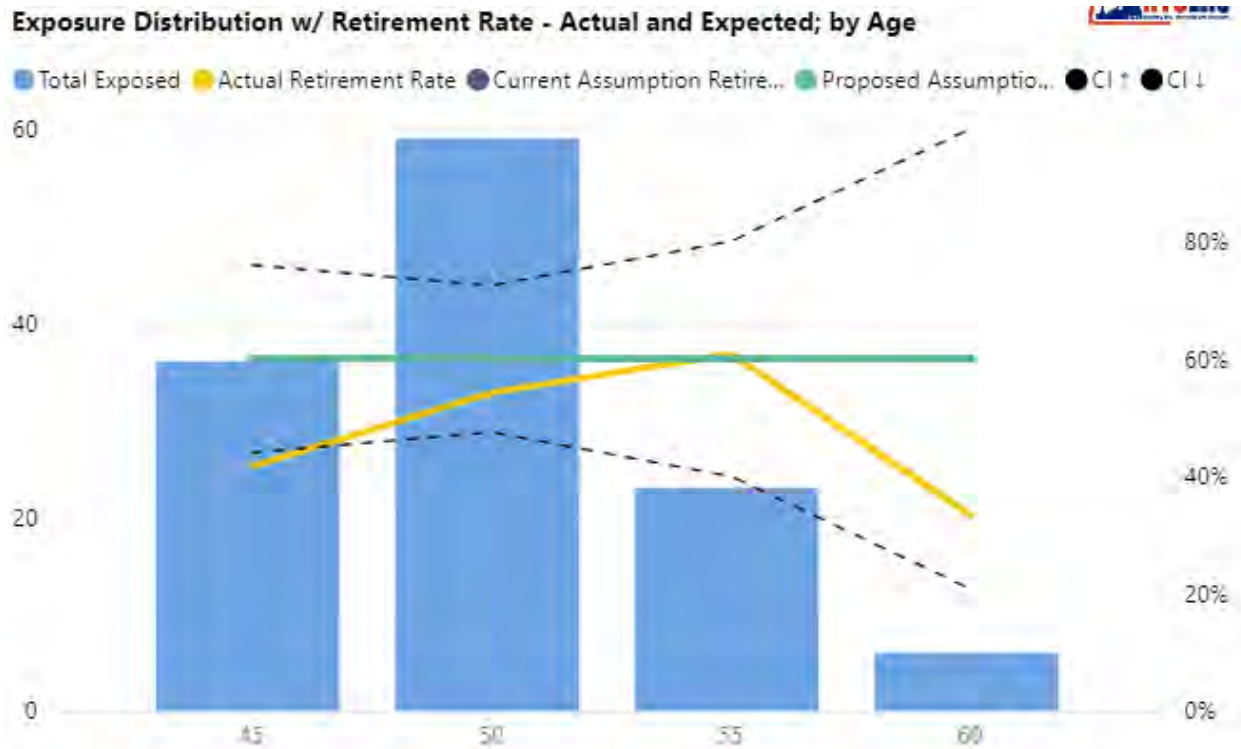
Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



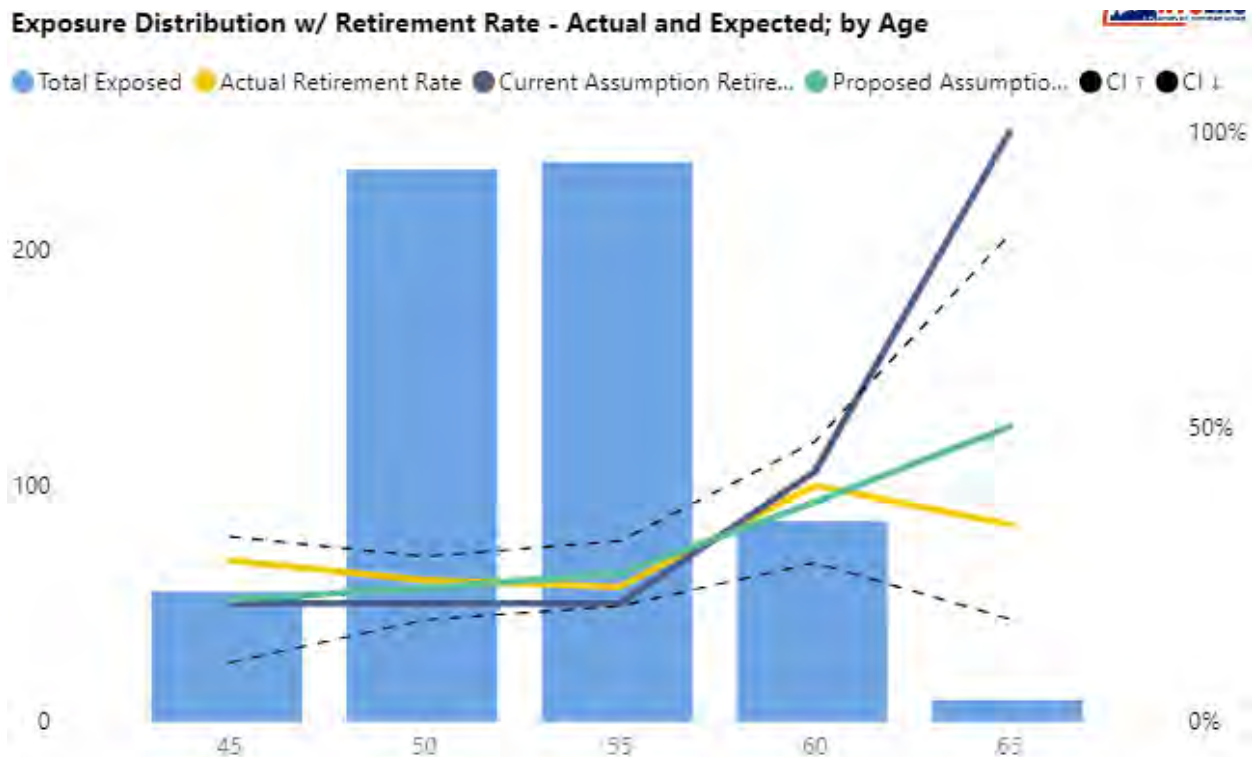
Retirement Rate - Actual, Expected, and Ratio; by Service



This chart displays the experience of first eligibility (20 years of service) by age based on the age range (45 to 69) for the current and proposed assumptions. The actual rate of retirement averaged 50.81% whereas the overall expected rate of retirement averaged 60.00% based on the current and proposed assumptions. The experience for the mandated 25-year plan is limited and we continue the current assumption of using the mandated 20-year plan assumptions for these members. This resulted in no change in the A/E ratio of 0.85.



This chart displays the experience after first eligibility by age based on the age range (45 to 69) and the service range (26 to 39) for the current and proposed assumptions. The actual rate of retirement averaged 26.13% whereas the overall expected rate of retirement averaged 24.23% based on the current assumptions and 25.77% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.08 to 1.01.



Tier 3 22-Year Plan (Tier 3R)

Setting retirement rates for a new benefit tier is effectively a theoretical exercise. When setting the rates for the new tier, we must consider how changes to eligibility requirements and benefit levels would impact member behavior and specifically rates of retirement, especially at certain service levels. In most situations, we can review the experience of prior membership tiers to determine how future membership tiers may act based on differences in the plan provisions.

The following items were reflected in our analysis in proposing modifications to the current assumptions:

- A Correction officer can retire at 20 years of service under Tier 3R, although the benefit is lower than prior tier benefits. Experience has shown that a significant number of prior tier members retire at 20 years of service (assumption is approximately 30%). How significantly would this percentage drop due to the changes in plan provisions.
- At 22 years of service, Tier 3R members receive a benefit of 50% of final average salary which equals the percentage provided under prior tiers, although the definition of final average salary is more stringent under Tier 3 than under the prior tiers.
- Beginning at 22 years of service, Tier 3R members can accrue credit towards full escalation of benefits. Providing a cost-of-living adjustment can be a fairly expensive benefit for Corrections members who retire earlier than other public employee groups.
- At 25 years of service, a Tier 3R member has fully accrued the full escalation benefit. Furthermore, there are no further accruals if the member works beyond 25 years of service. Under prior tiers, members continue to accrue benefits up to 30 years of service. This could incentivize Tier 3R members to retire at 25 years of service.

Based on these points, we believe that the number of Correction officers who will retire after 25 years of service would be similar under Tier 3R as compared to those who would retire under prior tiers. If there were 1,000 prior tier members eligible to retire at 20 years of service, we have estimated approximately 900 would retire by the time they would have completed 25 years of service. Under the current assumption for Tier 3R members, we have estimated that approximately 30% fewer retirements occur during this same time period. We propose rates for the Tier 3R members that would approximate the same number of 900 that are anticipated to retire under the prior tiers as we would not necessarily expect a significant reduction in the number Correction officers retiring after completing 25 years of service.

The following table compares the current assumption to the proposed assumption.

Correction Tier 3R Comparison of Current and Proposed Retirement Assumption		
Years of Service	Current Assumption	Proposed Assumption
20	5.0%	25.0%
21	2.0%	5.0%
22	5.0%	30.0%
23	2.0%	10.0%
24	2.0%	15.0%
25	60.0%	60.0%

Summary

In total, the proposed rates of retirement have increased the anticipated number of retirements, including Tier 3R members, which would increase plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF SERVICE RETIREMENT: CORRECTION				
	Reduced Service Retirement Tiers 1-3		Reduced Service Retirement Tier 3R ¹	
	Age	Rate	Service	Rate
	55	2.00%	20	5.00%
	56	2.00%	21	2.00%
	57	2.00%	22	5.00%
	58	2.00%	23	2.00%
	59	3.00%	24	2.00%
	60	4.00%	25	N/A
	61	5.00%		
	62	0.00%		
	63	N/A		
Age	Unreduced Service Retirement For Members Mandated Into Their Retirement Program		Unreduced Service Retirement For Members Who Elected an Improved Retirement Program	
	Year 1	Ultimate	Year 1	Ultimate
50	60.00%	20.00%	70.00%	20.00%
51	60.00%	20.00%	70.00%	20.00%
52	60.00%	20.00%	70.00%	20.00%
53	60.00%	20.00%	70.00%	20.00%
54	60.00%	20.00%	70.00%	20.00%
55	60.00%	20.00%	70.00%	20.00%
56	60.00%	20.00%	70.00%	20.00%
57	60.00%	20.00%	70.00%	20.00%
58	60.00%	20.00%	70.00%	20.00%
59	60.00%	20.00%	70.00%	20.00%
60	60.00%	20.00%	70.00%	20.00%
61	60.00%	30.00%	70.00%	30.00%
62	60.00%	40.00%	70.00%	40.00%
63	100.00%	100.00%	100.00%	100.00%

¹ Assumption also used for IDA Tier 3R members.

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: CORRECTION					
	Unreduced Service Retirement For Members Mandated Into Their Retirement Program			Unreduced Service Retirement For Members Who Elected an Improved Retirement Program	
Age	First Eligibility ¹	First Eligibility Tier 3R ²	Ultimate	First Eligibility ¹	Ultimate
40	60.00%	60.00%	20.00%	70.00%	23.00%
41	60.00%	60.00%	20.00%	70.00%	23.00%
42	60.00%	60.00%	20.00%	70.00%	23.00%
43	60.00%	60.00%	20.00%	70.00%	23.00%
44	60.00%	60.00%	20.00%	70.00%	23.00%
45	60.00%	60.00%	20.00%	70.00%	23.00%
46	60.00%	60.00%	20.00%	70.00%	23.00%
47	60.00%	60.00%	20.00%	70.00%	23.00%
48	60.00%	60.00%	20.50%	70.00%	23.50%
49	60.00%	60.00%	21.00%	70.00%	24.00%
50	60.00%	60.00%	21.50%	70.00%	24.50%
51	60.00%	60.00%	22.00%	70.00%	25.00%
52	60.00%	60.00%	22.50%	70.00%	26.00%
53	60.00%	60.00%	23.00%	70.00%	26.50%
54	60.00%	60.00%	23.50%	70.00%	27.00%
55	60.00%	60.00%	24.00%	70.00%	27.50%
56	60.00%	60.00%	24.50%	70.00%	28.00%
57	60.00%	60.00%	25.00%	70.00%	29.00%
58	60.00%	60.00%	25.50%	70.00%	29.50%
59	60.00%	60.00%	27.00%	70.00%	30.00%
60	60.00%	60.00%	30.00%	70.00%	30.00%
61	60.00%	60.00%	35.00%	70.00%	35.00%
62	60.00%	60.00%	40.00%	70.00%	40.00%
63	80.00%	80.00%	50.00%	80.00%	50.00%
64	80.00%	80.00%	50.00%	80.00%	50.00%
65	80.00%	100.00%	50.00%	80.00%	50.00%
66	80.00%	100.00%	50.00%	80.00%	50.00%
67	80.00%	100.00%	50.00%	80.00%	50.00%
68	80.00%	100.00%	50.00%	80.00%	50.00%
69	80.00%	100.00%	50.00%	80.00%	50.00%
70	100.00%	100.00%	100.00%	100.00%	100.00%

¹ First eligibility rates apply at 20 years of service or 25 years of service for 25-Year Plan members

² First eligibility rates apply at 25 years of service for Tier 3R and IDA members

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: CORRECTION			
Reduced Service Retirement (25-Year Plan)		Reduced Service Retirement Tier 3R ¹	
Age	Rate	Service	Rate
55	2.00%	20	25.00%
56	2.00%	21	5.00%
57	2.00%	22	30.00%
58	2.00%	23	10.00%
59	3.00%	24	15.00%
60	4.00%	25	N/A
61	5.00%		
62	N/A		

¹ Assumption also used for IDA Tier 3R members.

Disability

Current ordinary disability assumptions vary by age and do not apply during the 5-year eligibility service period. Furthermore, different rates apply to accidental disability; these rates depend on age and Tier and apply during all service periods. The ordinary disability benefit is equal to 1/60 times final average salary for each year of service accrued but no less than 1/3 of the member's final average salary. For accidental disability, a higher final average salary minimum applies; 50% for Tier 3 non-enhanced disability members and 75% for all other members. The benefit is payable during the lifetime of the member and members may select any optional forms of payment.

The member can elect a service retirement benefit instead of the ordinary disability benefit if eligible. Due to this fact, rates or ordinary disability were determined excluding the experience for members eligible for retirement.

In addition, the rates of ordinary disability would not apply during the 5-year eligibility service period.

In performing the experience analysis, it is necessary to reassign disability retirement codes retroactively to reflect the eventual approval of a disability retirement. Members with a disability code in a given year had all inactive status codes in prior years changed to a disability status code. Adjustments were made as far back as 2012.

It is difficult to determine how future years would impact the experience during the study period as we believe that this type of retroactive adjustment will be required in subsequent iterations of this study. The consequence will be a restatement of the number of disability retirements experienced during this study period, specifically 2019 – 2021.

For this purpose, our analysis reflected years from 2012 – 2019.

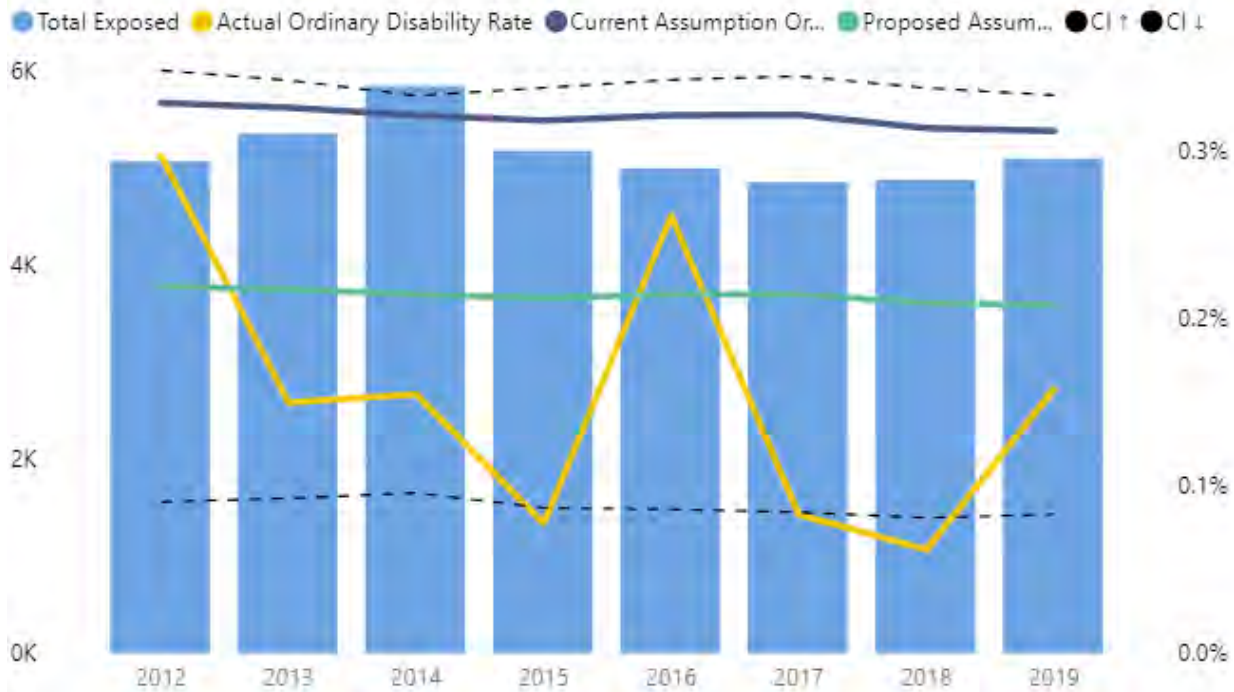
Ordinary Disability

The following charts show the experience of ordinary disability retirement by year, for the age range 25 to 54 and the service range 5 to 19 years during the period 2012 - 2019. As nearly no ordinary disability retirements occur once eligible for retirement, this analysis excludes all exposures at this point. During the selected service and age ranges, the actual rate of ordinary disability averaged 0.1552% whereas the overall expected rate of ordinary disability averaged 0.3197% based on the current assumptions and 0.2132% based on the proposed assumptions.

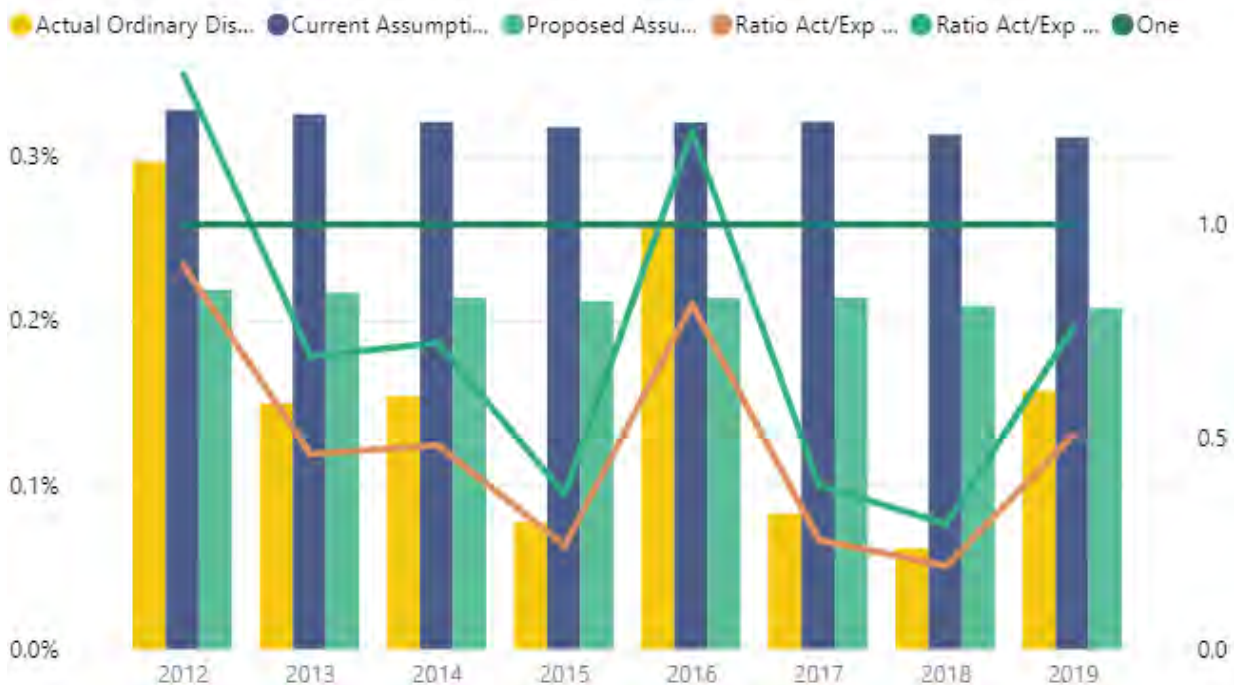
Plan Year	Actual Ordinary Disabilities	Expected Ordinary Disabilities	Total Exposed	Actual Ordinary Disability Rate	Current Assumption Ordinary Disability	Ratio Act/Exp Ordinary Disability
2012	15	16.6	5,063	0.2963%	0.3279%	0.90
2013	8	17.4	5,352	0.1495%	0.3252%	0.46
2014	9	18.7	5,841	0.1541%	0.3206%	0.48
2015	4	16.4	5,173	0.0773%	0.3175%	0.24
2016	13	16.0	4,991	0.2605%	0.3205%	0.81
2017	4	15.6	4,851	0.0825%	0.3208%	0.26
2018	3	15.2	4,872	0.0616%	0.3130%	0.20
2019	8	15.9	5,092	0.1571%	0.3113%	0.50
Total	64	131.8	41,235	0.1552%	0.3197%	0.49

Plan Year	Actual Ordinary Disabilities	Expected Ordinary Disabilities Proposed	Total Exposed	Actual Ordinary Disability Rate	Proposed Assumption Ordinary Disability	Act/Exp Proposed Ordinary Disability
2012	15	11.1	5,063	0.2963%	0.2187%	1.35
2013	8	11.6	5,352	0.1495%	0.2169%	0.69
2014	9	12.5	5,841	0.1541%	0.2138%	0.72
2015	4	11.0	5,173	0.0773%	0.2117%	0.37
2016	13	10.7	4,991	0.2605%	0.2137%	1.22
2017	4	10.4	4,851	0.0825%	0.2139%	0.39
2018	3	10.2	4,872	0.0616%	0.2087%	0.30
2019	8	10.6	5,092	0.1571%	0.2076%	0.76
Total	64	87.9	41,235	0.1552%	0.2132%	0.73

Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Year



Ordinary Disability Rate - Actual, Expected, and Ratio; by Year

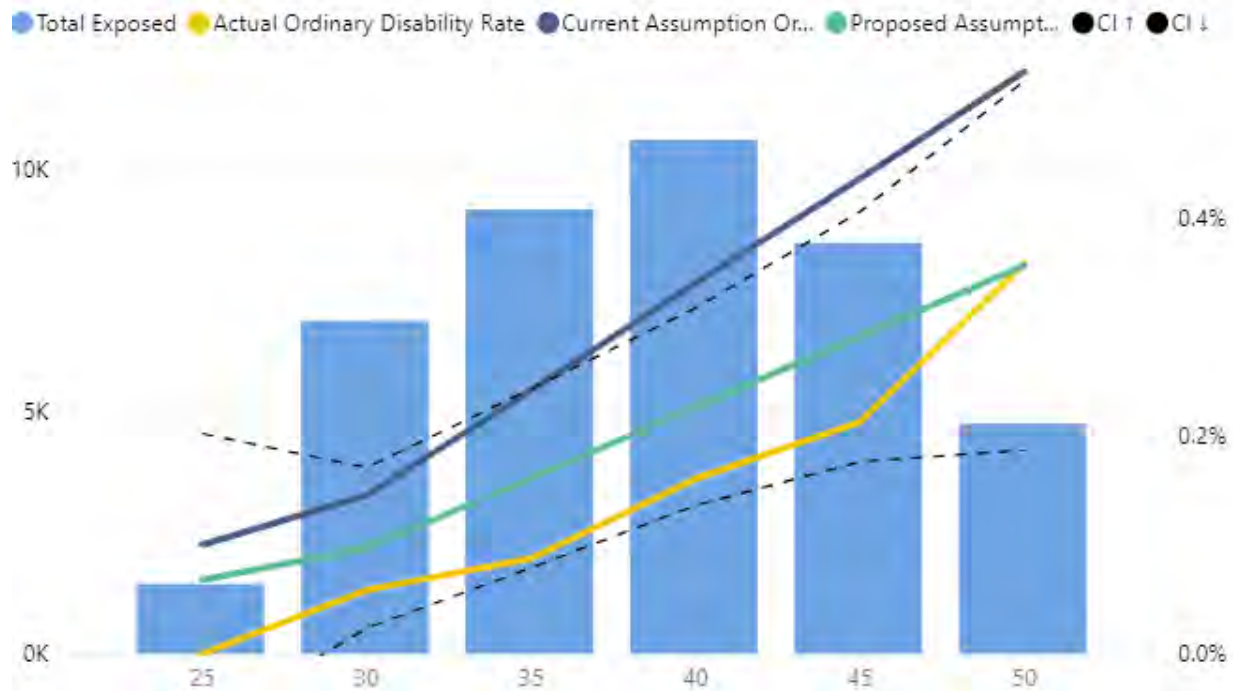


The following charts show the experience of ordinary disability retirement by age, for the age range 25 to 54 and the service range 5 to 19 years during the period 2012 - 2019. This resulted in an increase in the A/E ratio from 0.49 to 0.73.

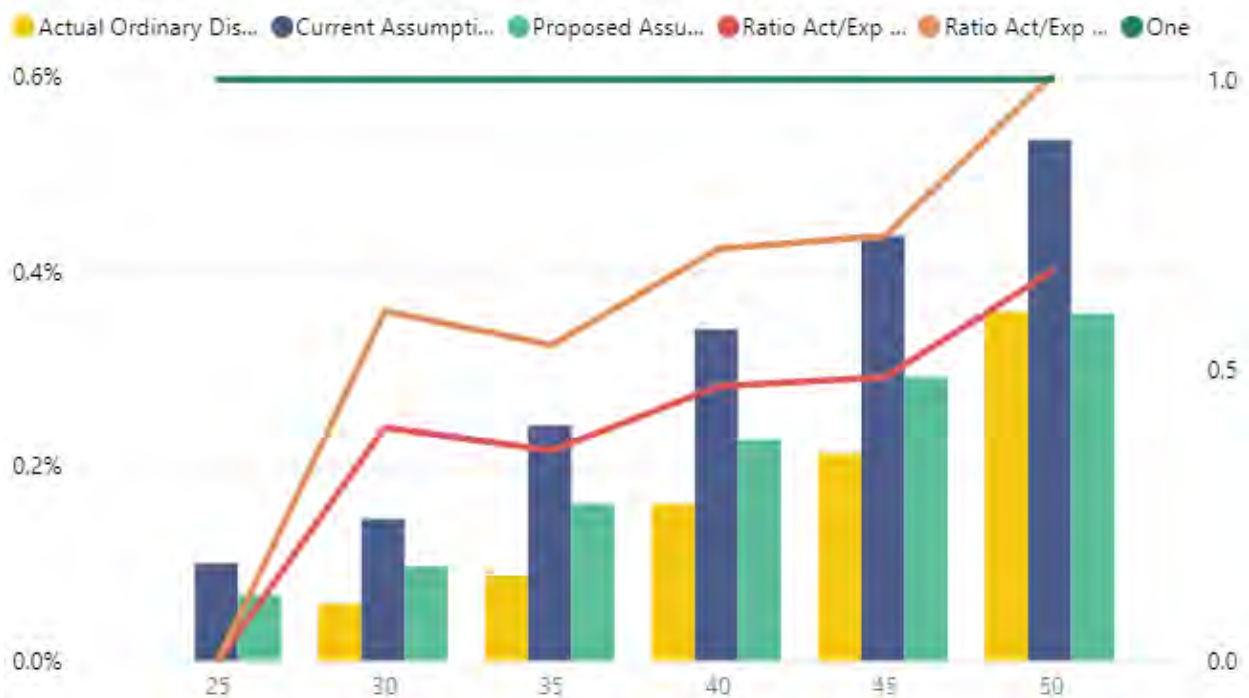
Age	Actual Ordinary Disabilities	Expected Ordinary Disabilities	Total Exposed	Actual Ordinary Disability Rate	Current Assumption Ordinary Disability	Ratio Act/Exp Ordinary Disability
25	0	0.0	7	0.0000%	0.1000%	0.00
26	0	0.1	69	0.0000%	0.1000%	0.00
27	0	0.2	217	0.0000%	0.1000%	0.00
28	0	0.4	447	0.0000%	0.1000%	0.00
29	0	0.7	693	0.0000%	0.1000%	0.00
30	0	0.9	942	0.0000%	0.1000%	0.00
31	1	1.4	1,201	0.0833%	0.1200%	0.69
32	1	2.0	1,450	0.0690%	0.1400%	0.49
33	0	2.5	1,588	0.0000%	0.1600%	0.00
34	2	3.0	1,674	0.1195%	0.1800%	0.66
35	1	3.4	1,680	0.0595%	0.2000%	0.30
36	1	3.9	1,785	0.0560%	0.2200%	0.25
37	1	4.4	1,841	0.0543%	0.2400%	0.23
38	1	4.9	1,880	0.0532%	0.2600%	0.20
39	4	5.5	1,970	0.2030%	0.2800%	0.73
40	4	6.1	2,041	0.1960%	0.3000%	0.65
41	6	6.7	2,100	0.2857%	0.3200%	0.89
42	2	7.4	2,183	0.0916%	0.3400%	0.27
43	4	7.8	2,171	0.1842%	0.3600%	0.51
44	1	7.9	2,088	0.0479%	0.3800%	0.13
45	5	7.9	1,984	0.2520%	0.4000%	0.63
46	5	7.8	1,860	0.2688%	0.4200%	0.64
47	2	7.6	1,721	0.1162%	0.4400%	0.26
48	2	7.1	1,539	0.1300%	0.4600%	0.28
49	4	6.5	1,360	0.2941%	0.4800%	0.61
50	3	6.1	1,217	0.2465%	0.5000%	0.49
51	5	5.6	1,076	0.4647%	0.5200%	0.89
52	5	5.0	924	0.5411%	0.5400%	1.00
53	2	4.6	819	0.2442%	0.5600%	0.44
54	2	4.1	708	0.2825%	0.5800%	0.49
Total	64	131.8	41,235	0.1552%	0.3197%	0.49

Age	Actual Ordinary Disabilities	Expected Ordinary Disabilities Proposed	Total Exposed	Actual Ordinary Disability Rate	Proposed Assumption Ordinary Disability	Act/Exp Proposed Ordinary Disability
25	0	0.0	7	0.0000%	0.0675%	0.00
26	0	0.0	69	0.0000%	0.0675%	0.00
27	0	0.1	217	0.0000%	0.0675%	0.00
28	0	0.3	447	0.0000%	0.0675%	0.00
29	0	0.5	693	0.0000%	0.0675%	0.00
30	0	0.6	942	0.0000%	0.0675%	0.00
31	1	1.0	1,201	0.0833%	0.0800%	1.04
32	1	1.3	1,450	0.0690%	0.0925%	0.75
33	0	1.7	1,588	0.0000%	0.1075%	0.00
34	2	2.0	1,674	0.1195%	0.1200%	1.00
35	1	2.2	1,680	0.0595%	0.1325%	0.45
36	1	2.6	1,785	0.0560%	0.1475%	0.38
37	1	2.9	1,841	0.0543%	0.1600%	0.34
38	1	3.2	1,880	0.0532%	0.1725%	0.31
39	4	3.7	1,970	0.2030%	0.1875%	1.08
40	4	4.1	2,041	0.1960%	0.2000%	0.98
41	6	4.5	2,100	0.2857%	0.2125%	1.34
42	2	5.0	2,183	0.0916%	0.2275%	0.40
43	4	5.2	2,171	0.1842%	0.2400%	0.77
44	1	5.3	2,088	0.0479%	0.2525%	0.19
45	5	5.3	1,984	0.2520%	0.2675%	0.94
46	5	5.2	1,860	0.2688%	0.2800%	0.96
47	2	5.0	1,721	0.1162%	0.2925%	0.40
48	2	4.7	1,539	0.1300%	0.3075%	0.42
49	4	4.4	1,360	0.2941%	0.3200%	0.92
50	3	4.0	1,217	0.2465%	0.3325%	0.74
51	5	3.7	1,076	0.4647%	0.3475%	1.34
52	5	3.3	924	0.5411%	0.3600%	1.50
53	2	3.1	819	0.2442%	0.3725%	0.66
54	2	2.7	708	0.2825%	0.3875%	0.73
Total	64	87.9	41,235	0.1552%	0.2132%	0.73

Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Age



Ordinary Disability Rate - Actual, Expected, and Ratio; by Age



Summary

Retirement eligibility has a significant impact on the number of members who apply for disability retirement. By eliminating rates of ordinary disability retirement at 20 years of service, we believe it will increase plan liabilities. On the other hand, the proposed assumptions decreased the anticipated number of ordinary disability retirements by approximately one-third. Overall, we believe this would result in a decrease in plan liabilities. The actual impact will depend on the demographics of the active membership.

Accidental Disability

The rates of accidental disability retirement vary by the following characteristics:

1. Tier 2 and Tier 3 22-year plan enhanced members
2. Tier 3 22-year plan non-enhanced members.

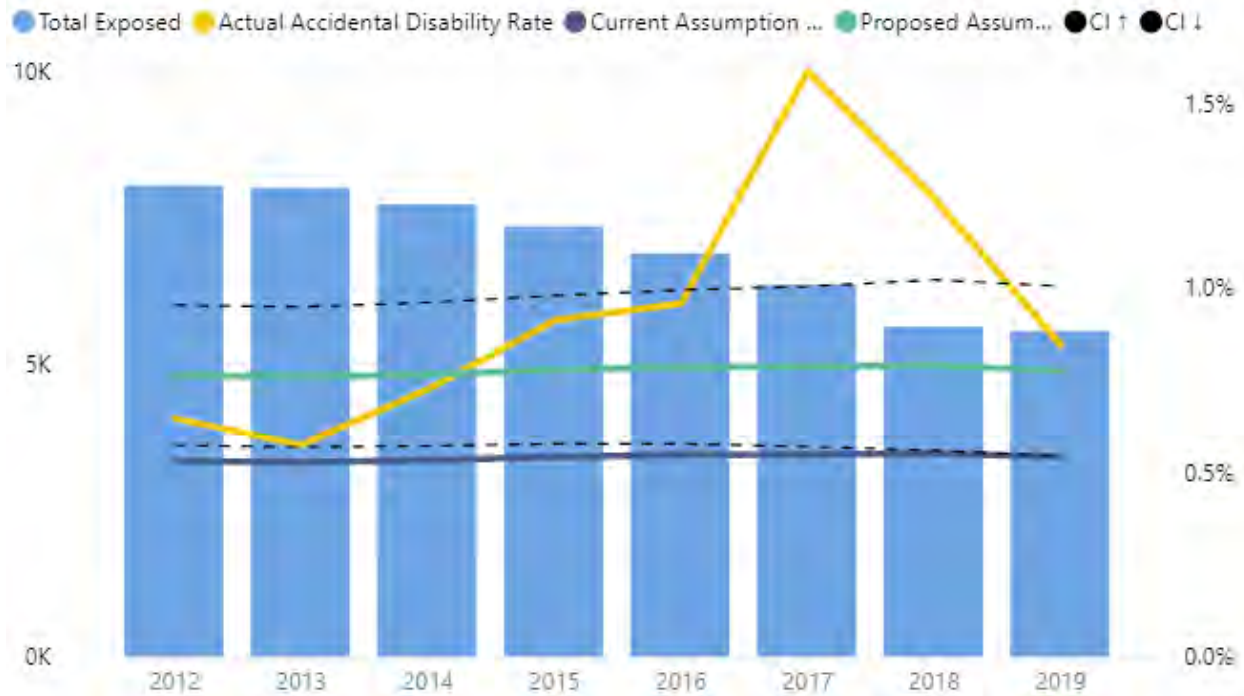
Records labeled as Tier 6 represents Tier 3 22-year plan non-enhanced members. There were very few accidental disability retirements and were eliminated from the analysis. Proposed assumptions were extrapolated based on the current tiers and set to 50% of the proposed rates for Tier 2 and Tier 3 22-year plan enhanced members. In addition, we propose the rates cease to apply once 22 years of service has been accrued.

The current accidental disability assumption varies by tier and age service. The proposed assumption varies by gender in addition to these elements. The following charts show the experience of Tier 2 and Tier 3 22-Year plan enhanced members for accidental disability retirement by year, for the age range 25 to 59 and the service range 0 to 29. The actual rate of accidental disability averaged 0.9089% whereas the overall expected rate of accidental disability averaged 0.5392% based on the current assumptions and 0.7744% based on the proposed assumptions.

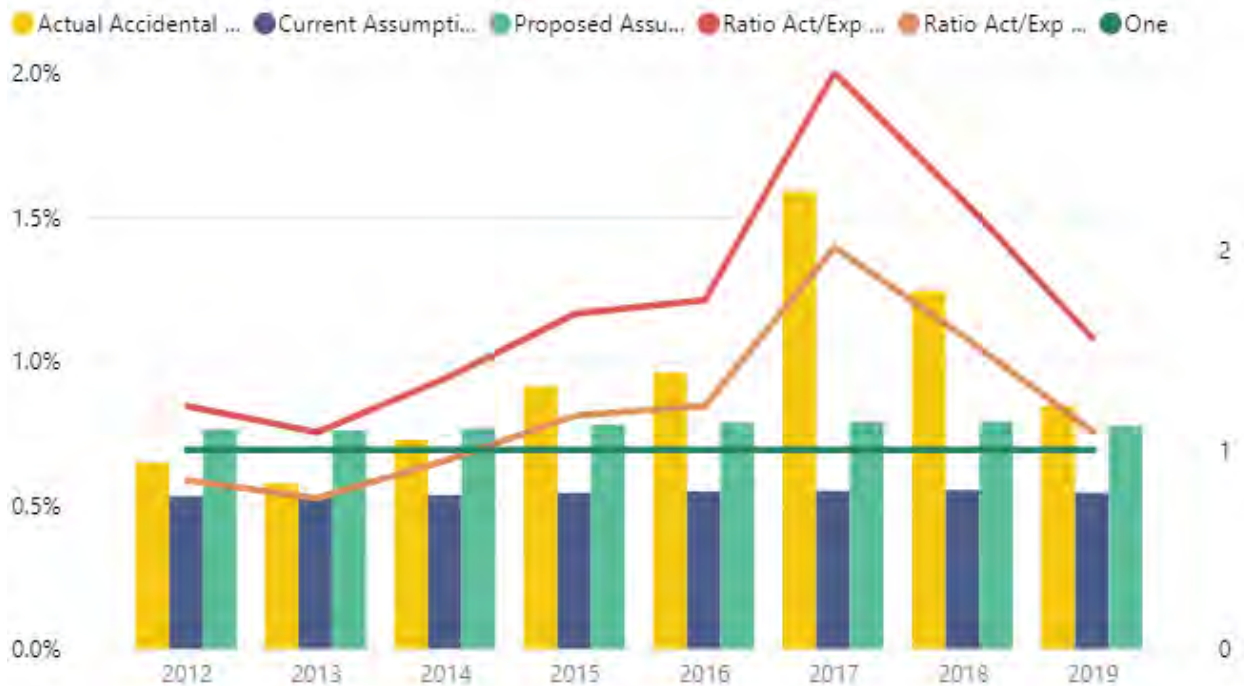
Plan Year	Actual Accidental Disabilities	Expected Accidental Disabilities	Total Exposed	Actual Accidental Disability Rate	Current Assumption Accidental Disability	Ratio Act/Exp Accidental Disability
2012	52	42.6	8,046	0.6463%	0.5300%	▲ 1.22
2013	46	42.3	8,005	0.5746%	0.5281%	● 1.09
2014	56	41.2	7,722	0.7252%	0.5334%	▲ 1.36
2015	67	39.8	7,346	0.9121%	0.5414%	◆ 1.68
2016	66	37.7	6,887	0.9583%	0.5470%	◆ 1.75
2017	101	34.9	6,359	1.5883%	0.5484%	◆ 2.90
2018	70	31.0	5,633	1.2427%	0.5510%	◆ 2.26
2019	47	30.1	5,561	0.8452%	0.5420%	◆ 1.56
Total	505	299.6	55,559	0.9089%	0.5392%	◆ 1.69

Plan Year	Actual Accidental Disabilities	Expected Accidental Disabilities Proposed	Total Exposed	Actual Accidental Disability Rate	Proposed Assumption Accidental Disability	Act/Exp Proposed Accidental Disability
2012	52	61.4	8,046	0.6463%	0.7634%	▲ 0.85
2013	46	60.7	8,005	0.5746%	0.7588%	▲ 0.76
2014	56	59.2	7,722	0.7252%	0.7660%	● 0.95
2015	67	57.2	7,346	0.9121%	0.7784%	▲ 1.17
2016	66	54.1	6,887	0.9583%	0.7860%	▲ 1.22
2017	101	50.0	6,359	1.5883%	0.7871%	◆ 2.02
2018	70	44.5	5,633	1.2427%	0.7906%	◆ 1.57
2019	47	43.1	5,561	0.8452%	0.7745%	● 1.09
Total	505	430.3	55,559	0.9089%	0.7744%	▲ 1.17

Exposure Distribution w/ Accidental Disability Rate - Actual and Expected; by Year



Accidental Disability Rate - Actual, Expected, and Ratio; by Year



The following chart shows the actual experience by gender versus the proposed assumption. As the experience varied by gender, separate tables are proposed.

Actual vs. Expected - Accidental Disability Proposed w/ Exposure Bubbles; by ...



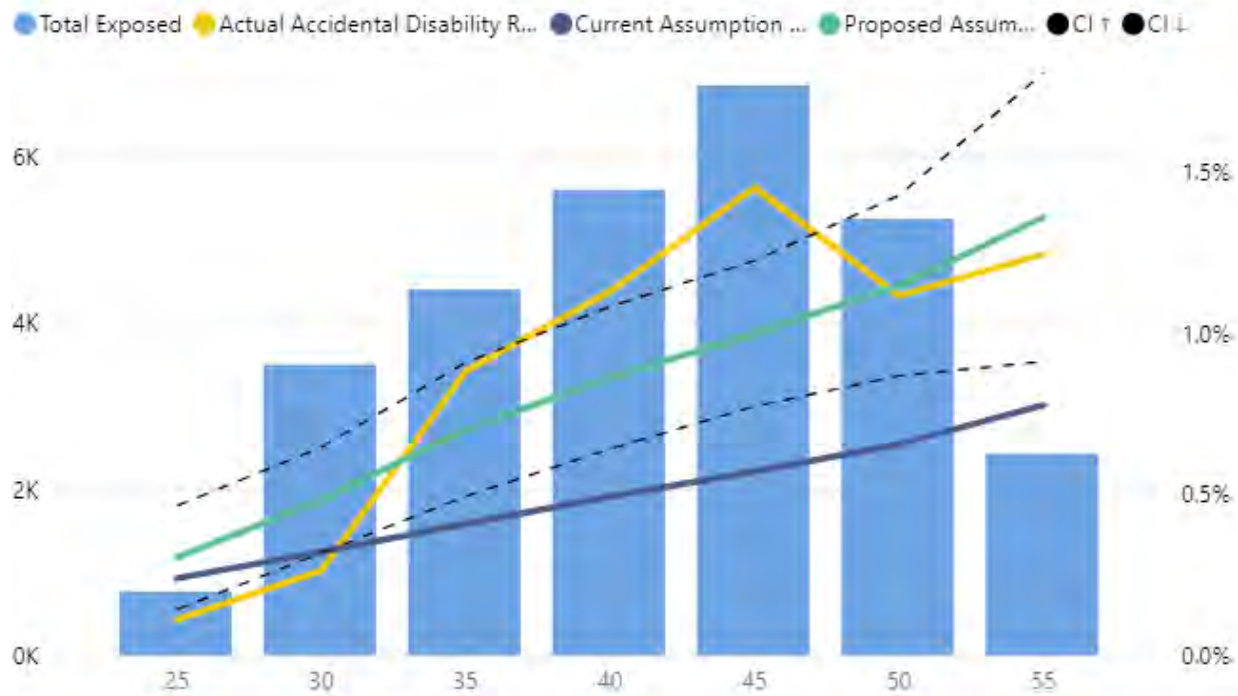
Males

The following charts show the experience of Tier 2 and Tier 3 22-Year plan enhanced male members for accidental disability retirement by age, for the age range 25 to 59 and the service range 0 to 29. The actual rate of accidental disability averaged 1.1851% whereas the overall expected rate of accidental disability averaged 0.5451% based on the current assumptions and 0.9299% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 2.17 to 1.27.

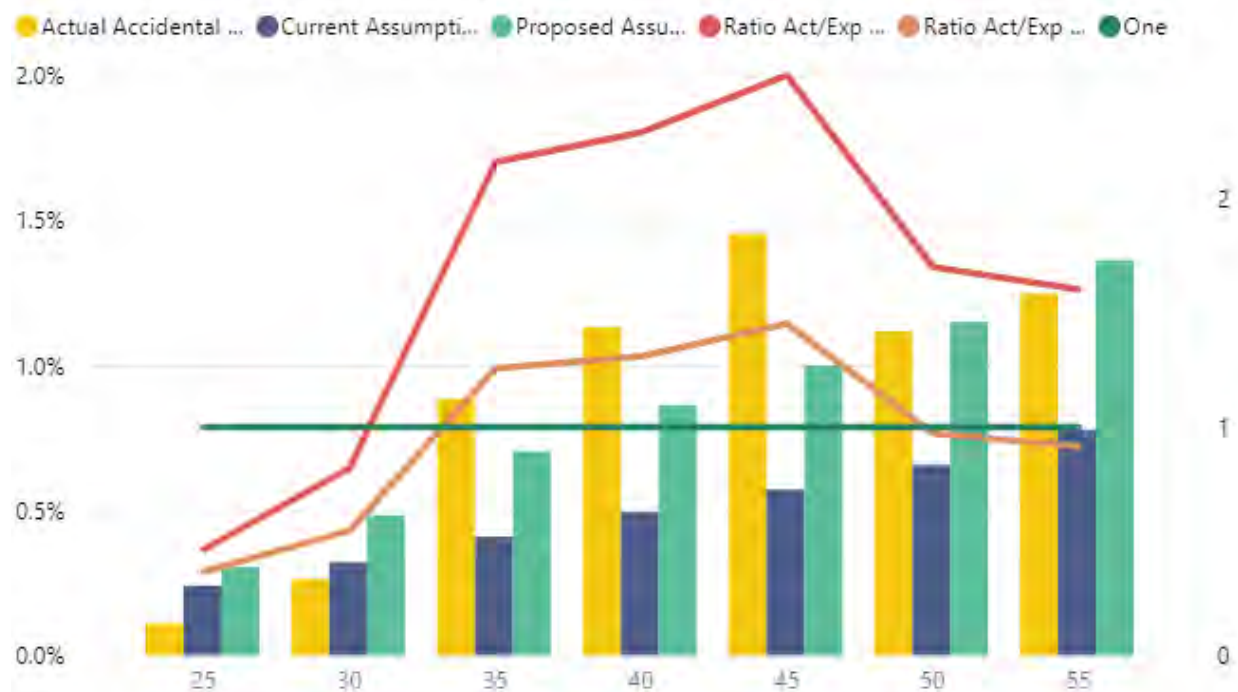
Age	Actual Accidental Disabilities	Expected Accidental Disabilities	Total Exposed	Actual Accidental Disability Rate	Current Assumption Accidental Disability	Ratio Act/Exp Accidental Disability
25	0	0.3	109	0.0000%	0.3125%	0.00
26	0	0.7	222	0.0000%	0.3250%	0.00
27	0	1.1	322	0.0000%	0.3375%	0.00
28	2	1.6	449	0.4454%	0.3500%	1.27
29	2	2.0	560	0.3571%	0.3625%	0.99
30	2	2.5	672	0.2976%	0.3750%	0.79
31	0	2.9	753	0.0000%	0.3875%	0.00
32	2	3.3	827	0.2418%	0.4000%	0.60
33	7	3.5	859	0.8149%	0.4125%	1.98
34	6	3.8	893	0.6719%	0.4250%	1.58
35	9	3.9	880	1.0227%	0.4375%	2.34
36	7	4.1	908	0.7709%	0.4500%	1.71
37	13	4.3	926	1.4039%	0.4625%	3.04
38	11	4.4	927	1.1866%	0.4750%	2.50
39	13	4.7	960	1.3542%	0.4875%	2.78
40	22	5.0	996	2.2088%	0.5000%	4.42
41	5	5.3	1,042	0.4798%	0.5125%	0.94
42	9	5.9	1,122	0.8021%	0.5250%	1.53
43	18	6.4	1,189	1.5139%	0.5375%	2.82
44	20	6.9	1,258	1.5898%	0.5500%	2.89
45	18	7.3	1,289	1.3964%	0.5625%	2.48
46	26	7.7	1,344	1.9345%	0.5750%	3.36
47	23	8.1	1,376	1.6715%	0.5875%	2.85
48	21	8.1	1,349	1.5567%	0.6000%	2.59
49	19	7.9	1,282	1.4821%	0.6125%	2.42
50	14	7.3	1,165	1.2017%	0.6250%	1.92
51	15	7.0	1,073	1.3979%	0.6500%	2.15
52	10	6.4	950	1.0526%	0.6750%	1.56
53	9	5.7	816	1.1029%	0.7000%	1.58
54	14	5.3	725	1.9310%	0.7250%	2.66
55	8	4.4	586	1.3652%	0.7500%	1.82
56	6	3.9	507	1.1834%	0.7750%	1.53
57	7	3.3	410	1.7073%	0.8000%	2.13
58	5	2.9	350	1.4286%	0.8250%	1.73
59	5	2.3	269	1.8587%	0.8500%	2.19
Total	348	160.1	29,365	1.1851%	0.5451%	2.17

Age	Actual Accidental Disabilities	Expected Accidental Disabilities Proposed	Total Exposed	Actual Accidental Disability Rate	Proposed Assumption Accidental Disability	Act/Exp Proposed Accidental Disability
25	0	0.4	109	0.0000%	0.3600%	0.00
26	0	0.9	222	0.0000%	0.3900%	0.00
27	0	1.4	322	0.0000%	0.4225%	0.00
28	2	2.0	449	0.4454%	0.4550%	0.98
29	2	2.7	560	0.3571%	0.4900%	0.73
30	2	3.5	672	0.2976%	0.5250%	0.57
31	0	4.2	753	0.0000%	0.5625%	0.00
32	2	5.0	827	0.2418%	0.6000%	0.40
33	7	5.5	859	0.8149%	0.6400%	1.27
34	6	6.1	893	0.6719%	0.6800%	0.99
35	9	6.4	880	1.0227%	0.7225%	1.42
36	7	6.9	908	0.7709%	0.7650%	1.01
37	13	7.5	926	1.4039%	0.8100%	1.73
38	11	7.7	927	1.1866%	0.8325%	1.43
39	13	8.2	960	1.3542%	0.8525%	1.59
40	22	8.7	996	2.2088%	0.8750%	2.52
41	5	9.4	1,042	0.4798%	0.8975%	0.53
42	9	10.3	1,122	0.8021%	0.9175%	0.87
43	18	11.2	1,189	1.5139%	0.9400%	1.61
44	20	12.1	1,258	1.5898%	0.9625%	1.65
45	18	12.7	1,289	1.3964%	0.9850%	1.42
46	26	13.5	1,344	1.9345%	1.0050%	1.92
47	23	14.1	1,376	1.6715%	1.0275%	1.63
48	21	14.2	1,349	1.5567%	1.0500%	1.48
49	19	13.7	1,282	1.4821%	1.0725%	1.38
50	14	12.8	1,165	1.2017%	1.0950%	1.10
51	15	12.2	1,073	1.3979%	1.1375%	1.23
52	10	11.2	950	1.0526%	1.1825%	0.89
53	9	10.0	816	1.1029%	1.2250%	0.90
54	14	9.2	725	1.9310%	1.2675%	1.52
55	8	7.7	586	1.3652%	1.3125%	1.04
56	6	6.9	507	1.1834%	1.3575%	0.87
57	7	5.7	410	1.7073%	1.4000%	1.22
58	5	5.0	350	1.4286%	1.4425%	0.99
59	5	4.0	269	1.8587%	1.4875%	1.25
Total	348	273.1	29,365	1.1851%	0.9299%	1.27

Exposure Distribution w/ Accidental Disability Rate - Actual and Expected; by Age



Accidental Disability Rate - Actual, Expected, and Ratio; by Age



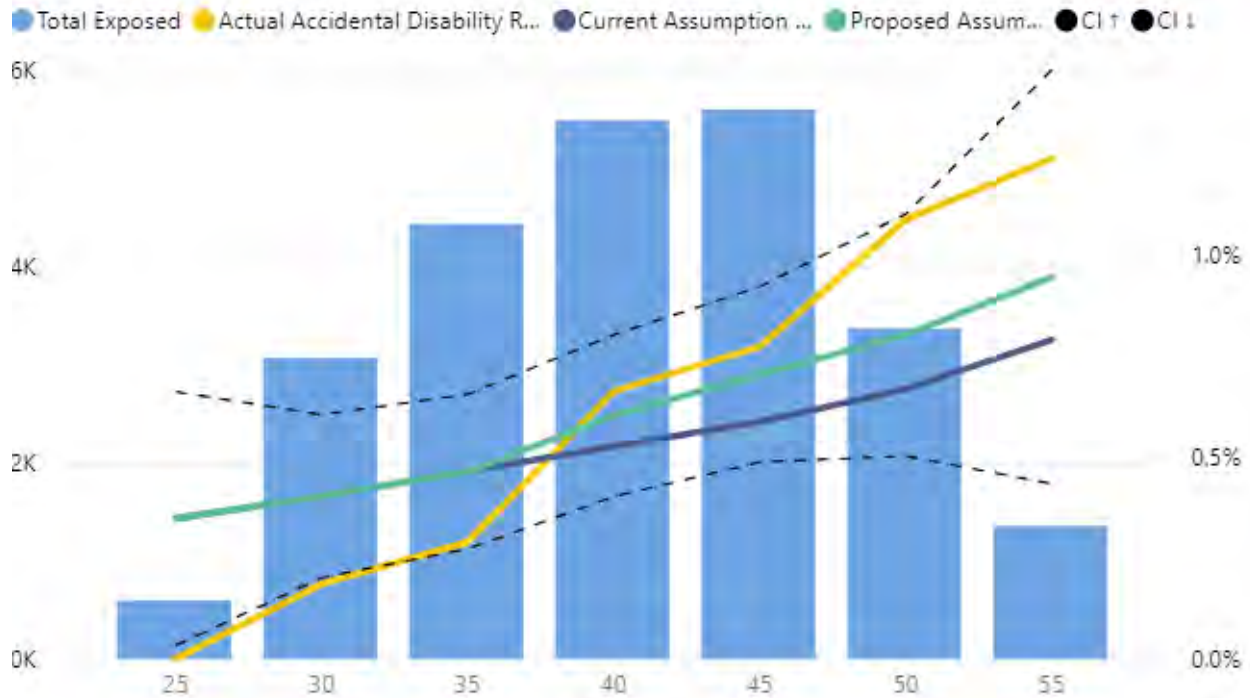
Females

The following charts show the experience of Tier 2 and Tier 3 22-Year plan enhanced female members for accidental disability retirement by age, for the age range 25 to 59 and the service range 0 to 29. The actual rate of accidental disability averaged 0.4711% whereas the overall expected rate of accidental disability averaged 0.4919% based on the current assumptions and 0.5531% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 0.96 to 0.85.

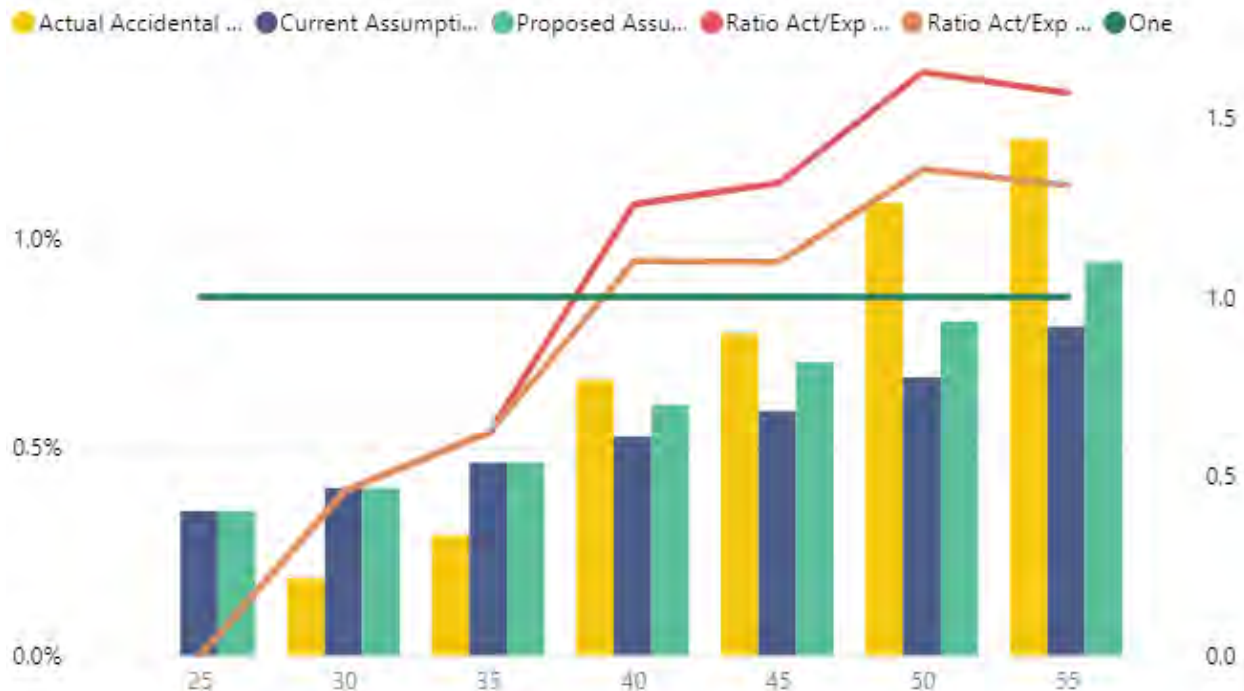
Age	Actual Accidental Disabilities	Expected Accidental Disabilities	Total Exposed	Actual Accidental Disability Rate	Current Assumption Accidental Disability	Ratio Act/Exp Accidental Disability
25	0	0.2	79	0.0000%	0.3125%	0.00
26	0	0.5	160	0.0000%	0.3250%	0.00
27	0	0.9	271	0.0000%	0.3375%	0.00
28	0	1.3	359	0.0000%	0.3500%	0.00
29	0	1.7	478	0.0000%	0.3625%	0.00
30	1	2.2	591	0.1692%	0.3750%	0.45
31	1	2.7	690	0.1449%	0.3875%	0.37
32	0	3.1	782	0.0000%	0.4000%	0.00
33	1	3.5	848	0.1179%	0.4125%	0.29
34	4	3.7	872	0.4587%	0.4250%	1.08
35	0	3.9	892	0.0000%	0.4375%	0.00
36	2	4.3	962	0.2079%	0.4500%	0.46
37	5	4.5	967	0.5171%	0.4625%	1.12
38	2	4.7	998	0.2004%	0.4750%	0.42
39	5	5.0	1,027	0.4869%	0.4875%	1.00
40	5	5.3	1,061	0.4713%	0.5000%	0.94
41	5	5.8	1,128	0.4433%	0.5125%	0.86
42	8	6.2	1,184	0.6757%	0.5250%	1.29
43	9	6.4	1,184	0.7601%	0.5375%	1.41
44	11	6.5	1,186	0.9275%	0.5500%	1.69
45	12	6.8	1,202	0.9983%	0.5625%	1.77
46	11	6.9	1,208	0.9106%	0.5750%	1.58
47	9	6.9	1,181	0.7621%	0.5875%	1.30
48	9	6.6	1,103	0.8160%	0.6000%	1.36
49	3	6.1	1,002	0.2994%	0.6125%	0.49
50	11	5.7	905	1.2155%	0.6250%	1.94
51	12	5.0	775	1.5484%	0.6500%	2.38
52	3	4.4	656	0.4573%	0.6750%	0.68
53	4	4.1	581	0.6885%	0.7000%	0.98
54	7	3.5	489	1.4315%	0.7250%	1.97
55	5	3.0	399	1.2531%	0.7500%	1.67
56	2	2.6	331	0.6042%	0.7750%	0.78
57	4	2.1	267	1.4981%	0.8000%	1.87
58	3	1.8	213	1.4085%	0.8250%	1.71
59	3	1.4	163	1.8405%	0.8500%	2.17
Total	157	139.5	26,194	0.5994%	0.5326%	1.13

Age	Actual Accidental Disabilities	Expected Accidental Disabilities Proposed	Total Exposed	Actual Accidental Disability Rate	Proposed Assumption Accidental Disability	Act/Exp Proposed Accidental Disability	
25	0	0.2	79	0.0000%	0.3125%	◆	0.00
26	0	0.5	160	0.0000%	0.3250%	◆	0.00
27	0	0.9	271	0.0000%	0.3375%	◆	0.00
28	0	1.3	359	0.0000%	0.3500%	◆	0.00
29	0	1.7	478	0.0000%	0.3625%	◆	0.00
30	1	2.2	591	0.1692%	0.3750%	◆	0.45
31	1	2.7	690	0.1449%	0.3875%	◆	0.37
32	0	3.1	782	0.0000%	0.4000%	◆	0.00
33	1	3.5	848	0.1179%	0.4125%	◆	0.29
34	4	3.7	872	0.4587%	0.4250%	●	1.08
35	0	3.9	892	0.0000%	0.4375%	◆	0.00
36	2	4.3	962	0.2079%	0.4500%	◆	0.46
37	5	4.5	967	0.5171%	0.4625%	▲	1.12
38	2	4.7	998	0.2004%	0.4750%	◆	0.42
39	5	5.0	1,027	0.4869%	0.4875%	●	1.00
40	5	5.6	1,061	0.4713%	0.5250%	▲	0.90
41	5	6.4	1,128	0.4433%	0.5650%	▲	0.78
42	8	7.1	1,184	0.6757%	0.6025%	▲	1.12
43	9	7.6	1,184	0.7601%	0.6450%	▲	1.18
44	11	7.8	1,186	0.9275%	0.6600%	▲	1.41
45	12	8.1	1,202	0.9983%	0.6750%	▲	1.48
46	11	8.3	1,208	0.9106%	0.6900%	▲	1.32
47	9	8.3	1,181	0.7621%	0.7050%	●	1.08
48	9	7.9	1,103	0.8160%	0.7200%	▲	1.13
49	3	7.4	1,002	0.2994%	0.7350%	◆	0.41
50	11	6.8	905	1.2155%	0.7500%	◆	1.62
51	12	6.0	775	1.5484%	0.7800%	◆	1.99
52	3	5.3	656	0.4573%	0.8100%	▲	0.56
53	4	4.9	581	0.6885%	0.8400%	▲	0.82
54	7	4.3	489	1.4315%	0.8700%	◆	1.65
55	5	3.6	399	1.2531%	0.9000%	▲	1.39
56	2	3.1	331	0.6042%	0.9300%	▲	0.65
57	4	2.6	267	1.4981%	0.9600%	◆	1.56
58	3	2.1	213	1.4085%	0.9900%	▲	1.42
59	3	1.6	163	1.8405%	1.0000%	◆	1.84
Total	157	157.2	26,194	0.5994%	0.6002%	●	1.00

Exposure Distribution w/ Accidental Disability Rate - Actual and Expected; by Age



Accidental Disability Rate - Actual, Expected, and Ratio; by Age



Summary

The proposed rates have increased the anticipated number of accidental disability retirements, especially among male members, which will result in an increase in plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF DISABILITY FOR ACTIVE MEMBERS: UNIFORMED GROUPS			
	Correction		
Age	Ordinary Disability	Accidental Disability: Tier 3R Non-enhanced Plan	Accidental Disability: All Other Plans
15	0.100%	0.125%	0.250%
16	0.100%	0.125%	0.250%
17	0.100%	0.125%	0.250%
18	0.100%	0.125%	0.250%
19	0.100%	0.125%	0.250%
20	0.100%	0.125%	0.250%
21	0.100%	0.138%	0.263%
22	0.100%	0.138%	0.275%
23	0.100%	0.150%	0.288%
24	0.100%	0.150%	0.300%
25	0.100%	0.163%	0.313%
26	0.100%	0.163%	0.325%
27	0.100%	0.175%	0.338%
28	0.100%	0.175%	0.350%
29	0.100%	0.188%	0.363%
30	0.100%	0.188%	0.375%
31	0.120%	0.200%	0.388%
32	0.140%	0.200%	0.400%
33	0.160%	0.213%	0.413%
34	0.180%	0.213%	0.425%
35	0.200%	0.225%	0.438%
36	0.220%	0.225%	0.450%
37	0.240%	0.238%	0.463%
38	0.260%	0.238%	0.475%
39	0.280%	0.250%	0.488%
40	0.300%	0.250%	0.500%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF DISABILITY FOR ACTIVE MEMBERS: UNIFORMED GROUPS			
	Correction		
Age	Ordinary Disability	Accidental Disability: Tier 3R Non-enhanced Plan	Accidental Disability: All Other Plans
41	0.320%	0.263%	0.513%
42	0.340%	0.263%	0.525%
43	0.360%	0.275%	0.538%
44	0.380%	0.275%	0.550%
45	0.400%	0.288%	0.563%
46	0.420%	0.288%	0.575%
47	0.440%	0.300%	0.588%
48	0.460%	0.300%	0.600%
49	0.480%	0.313%	0.613%
50	0.500%	0.313%	0.625%
51	0.520%	0.325%	0.650%
52	0.540%	0.338%	0.675%
53	0.560%	0.350%	0.700%
54	0.580%	0.363%	0.725%
55	0.600%	0.375%	0.750%
56	0.620%	0.388%	0.775%
57	0.640%	0.400%	0.800%
58	0.660%	0.413%	0.825%
59	0.680%	0.425%	0.850%
60	0.700%	0.438%	0.875%
61	0.720%	0.450%	0.900%
62	0.740%	0.463%	0.925%
63	N/A	N/A	N/A
64	N/A	N/A	N/A
65	N/A	N/A	N/A
66	N/A	N/A	N/A
67	N/A	N/A	N/A
68	N/A	N/A	N/A
69	N/A	N/A	N/A
70	N/A	N/A	N/A

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF DISABILITY RETIREMENT ¹ : UNIFORM GROUPS			
	Correction		
	Ordinary Disability ²	Accidental Disability ³	
Age	Unisex	Males	Females
20	0.0675%	0.2750%	0.2750%
21	0.0675%	0.2750%	0.2750%
22	0.0675%	0.2750%	0.2750%
23	0.0675%	0.3025%	0.2875%
24	0.0675%	0.3300%	0.3000%
25	0.0675%	0.3600%	0.3125%
26	0.0675%	0.3900%	0.3250%
27	0.0675%	0.4225%	0.3375%
28	0.0675%	0.4550%	0.3500%
29	0.0675%	0.4900%	0.3625%
30	0.0675%	0.5250%	0.3750%
31	0.0800%	0.5625%	0.3875%
32	0.0925%	0.6000%	0.4000%
33	0.1075%	0.6400%	0.4125%
34	0.1200%	0.6800%	0.4250%
35	0.1325%	0.7225%	0.4375%
36	0.1475%	0.7650%	0.4500%
37	0.1600%	0.8100%	0.4625%
38	0.1725%	0.8325%	0.4750%
39	0.1875%	0.8525%	0.4875%
40	0.2000%	0.8750%	0.5250%
41	0.2125%	0.8975%	0.5650%
42	0.2275%	0.9175%	0.6025%
43	0.2400%	0.9400%	0.6450%
44	0.2525%	0.9625%	0.6600%
45	0.2675%	0.9850%	0.6750%
46	0.2800%	1.0050%	0.6900%
47	0.2925%	1.0275%	0.7050%
48	0.3075%	1.0500%	0.7200%
49	0.3200%	1.0725%	0.7350%
50	0.3325%	1.0950%	0.7500%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF DISABILITY RETIREMENT ¹ : UNIFORM GROUPS			
	Correction		
	Ordinary Disability ²	Accidental Disability ³	
Age	Unisex	Males	Females
51	0.3475%	1.1375%	0.7800%
52	0.3600%	1.1825%	0.8100%
53	0.3725%	1.2250%	0.8400%
54	0.3875%	1.2675%	0.8700%
55	0.4000%	1.3125%	0.9000%
56	0.4125%	1.3575%	0.9300%
57	0.4275%	1.4000%	0.9600%
58	0.4400%	1.4425%	0.9900%
59	0.4525%	1.4875%	1.0000%
60	0.4675%	1.5000%	1.0000%
61	0.4800%	1.5000%	1.0000%
62	0.4925%	1.5000%	1.0000%
63	0.4925%	1.5000%	1.0000%
64	0.4925%	1.5000%	1.0000%
65	0.4925%	1.5000%	1.0000%
66	0.4925%	1.5000%	1.0000%
67	0.4925%	1.5000%	1.0000%
68	0.4925%	1.5000%	1.0000%
69	0.4925%	1.5000%	1.0000%
70	N/A	N/A	N/A

¹ Greater of disability benefit and retirement benefit is valued if eligible for early or service retirement.

² No rates of ordinary disability apply prior to completion of 5 years of service or upon completion of 20 years of service:

³ For Tier 3R non-enhanced disability plan, multiply rates by 50% and no rates apply upon completion of 22 years of service.

Pre-retirement Death

Plan codes excluded in the analysis of other contingencies are part of the analysis of pre-retirement death.

Mortality assumptions involve two components: a base table and a mortality improvement scale. The mortality improvement scale adjusts the mortality rates of the base table to reflect that generally rates of mortality are anticipated to improve over time.

The Society of Actuaries (SOA) has published mortality improvement scales (MP scales) each year from 2014 to 2021. In the last several actuarial valuations, OA has used the mortality improvement scale that coincides with the valuation date. For example, OA used the MP-2020 scale in its June 30, 2020 lag actuarial valuation. In this analysis, we used the most recent improvement scale (MP-2021) published by the SOA as of the date of this analysis. Please note that the SOA has not published an updated MP scale due to the pandemic.

The SOA MP-2021 improvement scale is based on data through 2019 (before the onset of Covid) from the Social Security Administration (SSA). Even though the aggregate (for all ages) long-term trend has been towards mortality improvements, this is not always the case for each age. Therefore, there are situations where the expected mortality rate in a later year is higher than base rate.

There is much discussion in the actuarial profession and among retirement systems about the development of mortality tables and treatment of excess deaths due to the Covid pandemic, which occurred in 2020 – 2022. The analysis to develop our recommendations exclude the mortality experience of members during the pandemic and reflect the experience from 2012 - 2019.

In this study the base table of the current assumption corresponds to the year 2012; expected mortality rates in future years are obtained from the base table and the MP-2021 scale. For example, the 2017 (July 1, 2016 – June 30, 2017) mortality rates are derived from the base table (2012) adjusted with four years of improvements until 2016. This method links mortality rates across the years and, consequently, allows mortality comparisons from one year to another.

For the proposed assumption, proposed rates were initially determined as of the mid-year of the study period or fiscal year 2016. MP-2021 was then used to adjust those rates to earlier and later years. The proposed mortality rates shown in the following section have been adjusted to reflect a base year of 2019. We recommend that MP-2021 continue to be used to reflect mortality improvements both before and after the measurement date.

In reviewing the current assumption, we compared the actual experience to published tables from the SOA. The most recent tables published by the SOA reflected experience for public plan retirement systems separated into General employees (PubG), Teachers (PubT) and Public Safety (PubS) members. Adjustments were made to the standard SOA tables to match the experience of the system or the current tables, and for consistency with recommended postretirement mortality tables, to determine if the SOA tables provided a better fit.

Ordinary Death

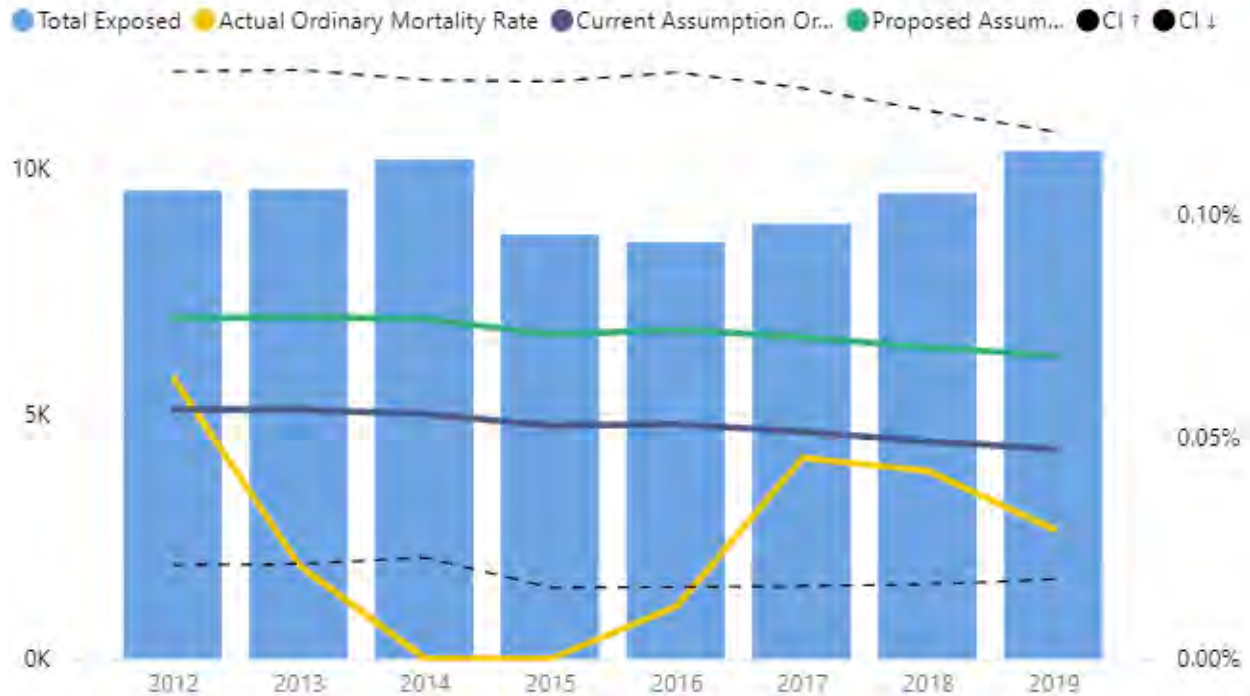
A separate assumption applies to Correction officers than for General employees. There is no credible experience to make any statistically based decision. We propose to use the PubS table, which is consistent with the proposed healthy annuitant mortality table.

The following tables show the experience of ordinary death by year, for the age range (20 to 59) during the period 2012 – 2019 based on the current and proposed assumptions for both males and females. The A/E ratio decreased from 0.51 to 0.36.

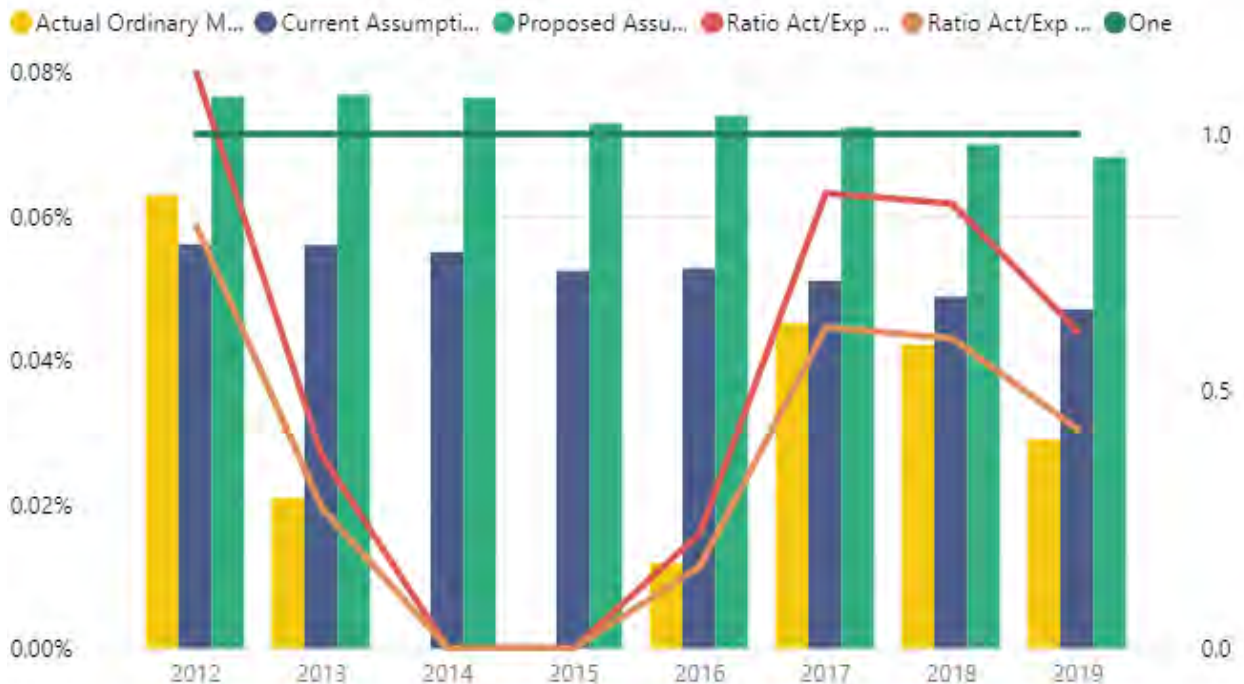
Plan Year	Actual Ordinary Deaths	Expected Ordinary Deaths	Total Exposed	Actual Ordinary Mortality Rate	Current Assumption Ordinary Mortality	Ratio Act/Exp Ordinary Mortality
2012	6	5.4	9,544	0.0629%	0.0561%	▲ 1.12
2013	2	5.4	9,569	0.0209%	0.0560%	◆ 0.37
2014	0	5.6	10,172	0.0000%	0.0550%	◆ 0.00
2015	0	4.5	8,649	0.0000%	0.0524%	◆ 0.00
2016	1	4.5	8,486	0.0118%	0.0527%	◆ 0.22
2017	4	4.5	8,860	0.0451%	0.0510%	▲ 0.89
2018	4	4.6	9,484	0.0422%	0.0488%	▲ 0.86
2019	3	4.9	10,343	0.0290%	0.0471%	▲ 0.62
Total	20	39.3	75,107	0.0266%	0.0524%	▲ 0.51

Plan Year	Actual Ordinary Deaths	Expected Ordinary Deaths Proposed	Total Exposed	Actual Ordinary Mortality Rate	Proposed Assumption Ordinary Mortality	Act/Exp Proposed Ordinary Mortality
2012	6	7.3	9,544	0.0629%	0.0765%	▲ 0.82
2013	2	7.4	9,569	0.0209%	0.0768%	◆ 0.27
2014	0	7.8	10,172	0.0000%	0.0764%	◆ 0.00
2015	0	6.3	8,649	0.0000%	0.0728%	◆ 0.00
2016	1	6.3	8,486	0.0118%	0.0739%	◆ 0.16
2017	4	6.4	8,860	0.0451%	0.0723%	▲ 0.62
2018	4	6.6	9,484	0.0422%	0.0699%	▲ 0.60
2019	3	7.0	10,343	0.0290%	0.0682%	◆ 0.43
Total	20	55.1	75,107	0.0266%	0.0733%	◆ 0.36

Exposure Distribution w/ Ordinary Mortality Rate - Actual and Expected; by Year



Ordinary Mortality Rate - Actual, Expected, and Ratio; by Year



Actual vs. Expected - Ordinary Mortality Proposed w/ Exposure Bubbles; by Year



The following section displays results by age for males and females combined since there is nearly no female experience.

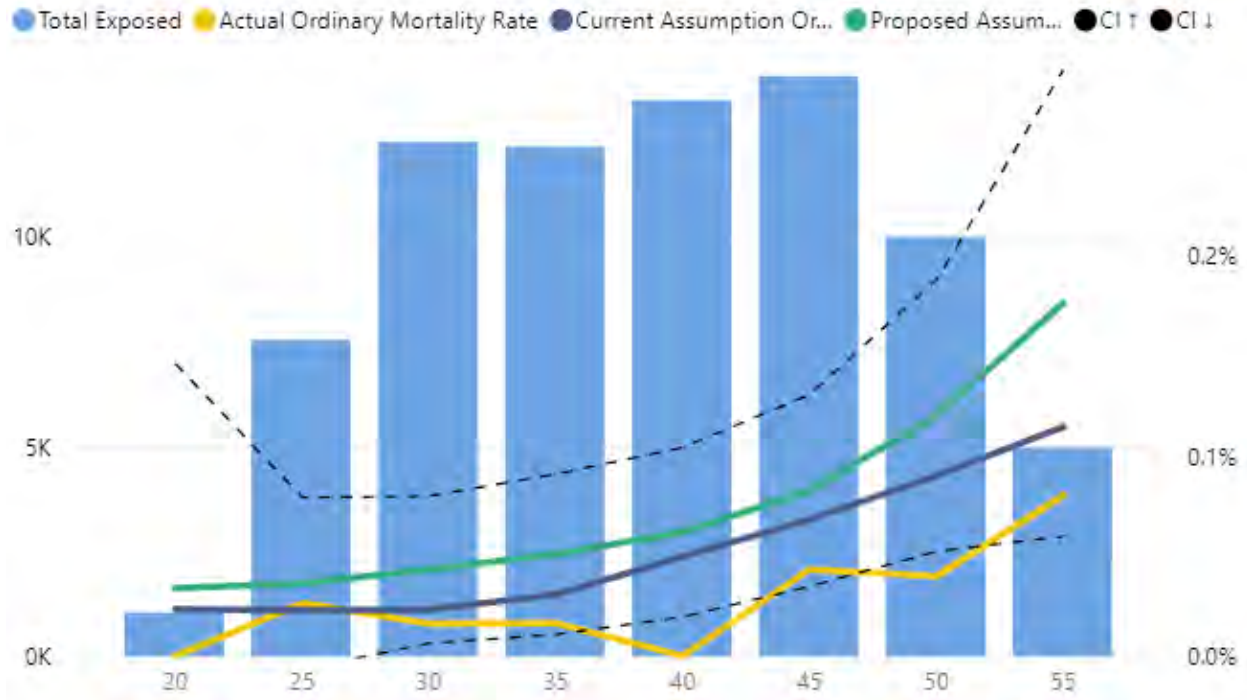
Males and Females

The following charts show the experience of ordinary death by age band, for the age range (20 to 59) during the period 2012 – 2019 based on the current and proposed assumption. The A/E ratio decreased from 0.51 to 0.36. Please note that the charts by age are based on 5-year brackets. For example, the age bracket 45 should be interpreted as the interval 45 – 49.

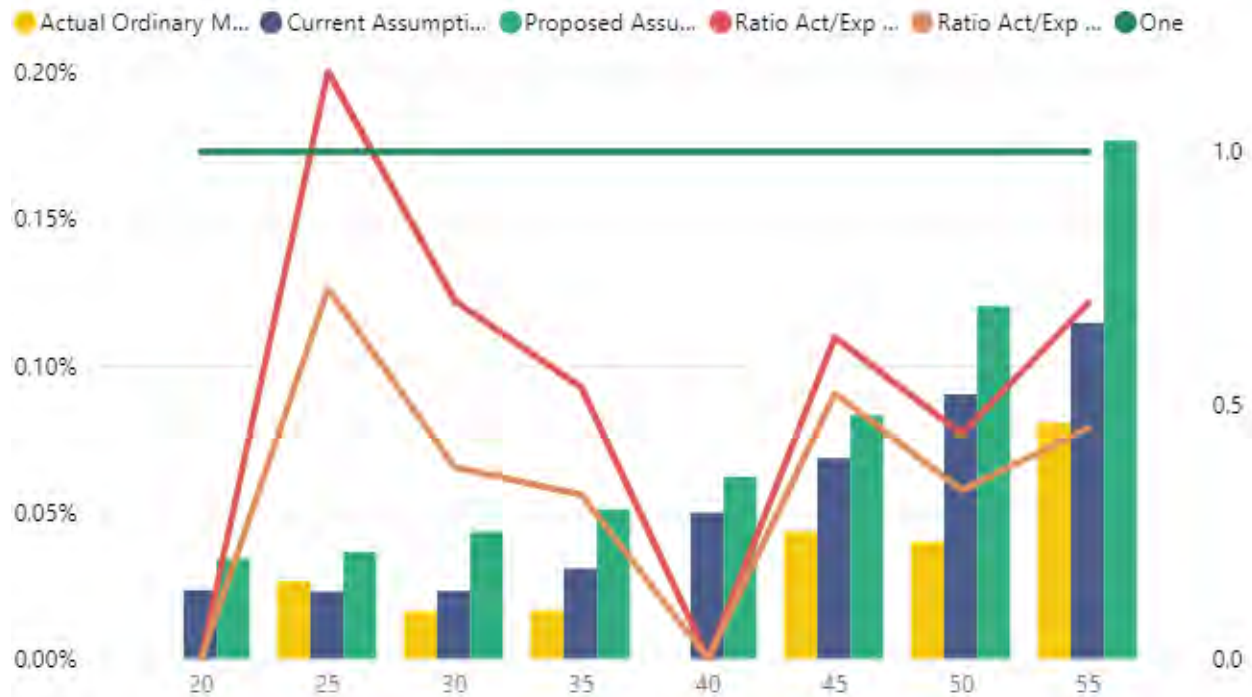
Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths	Total Exposed	Actual Ordinary Mortality Rate	Current Assumption Ordinary Mortality	Ratio Act/Exp Ordinary Mortality
20	0	0.2	1,035	0.0000%	0.0234%	0.00
25	2	1.7	7,551	0.0265%	0.0229%	1.16
30	2	2.8	12,269	0.0163%	0.0231%	0.71
35	2	3.7	12,158	0.0165%	0.0308%	0.53
40	0	6.6	13,265	0.0000%	0.0497%	0.00
45	6	9.5	13,843	0.0433%	0.0684%	0.63
50	4	9.0	10,009	0.0400%	0.0901%	0.44
55	4	5.7	4,977	0.0804%	0.1145%	0.70
Total	20	39.3	75,107	0.0266%	0.0524%	0.51

Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths Proposed	Total Exposed	Actual Ordinary Mortality Rate	Proposed Assumption Ordinary Mortality	Act/Exp Proposed Ordinary Mortality
20	0	0.4	1,035	0.0000%	0.0340%	0.00
25	2	2.7	7,551	0.0265%	0.0363%	0.73
30	2	5.3	12,269	0.0163%	0.0432%	0.38
35	2	6.2	12,158	0.0165%	0.0509%	0.32
40	0	8.2	13,265	0.0000%	0.0619%	0.00
45	6	11.5	13,843	0.0433%	0.0828%	0.52
50	4	12.0	10,009	0.0400%	0.1202%	0.33
55	4	8.8	4,977	0.0804%	0.1766%	0.46
Total	20	55.1	75,107	0.0266%	0.0733%	0.36

Exposure Distribution w/ Ordinary Mortality Rate - Actual and Expected; by Age



Ordinary Mortality Rate - Actual, Expected, and Ratio; by Age



Summary

The proposed assumption increased the anticipated number of deaths occurring prior to retirement, which will result in a decrease in plan liabilities.

Accidental Death

The accidental death rate assumption is a constant percentage (0.005%) that does not vary by gender nor age and is not subject to mortality improvements. During the Covid pandemic (2020 – 2021), there were deaths characterized as accidental deaths. The following table shows the experience of accidental death by year. While there were no accidental deaths coded prior to the pandemic years, it is prudent to continue to have an assumption to vary this contingency. We recommend no change in the current assumption.

Plan Year	Actual Accidental Deaths	Expected Accidental Deaths	Total Exposed	Actual Accidental Mortality Rate	Current Assumption Accidental Mortality	Ratio Act/Exp Accidental Mortality
2012	0	0.5	9,728	0.0000%	0.0050%	0.00
2013	0	0.5	9,821	0.0000%	0.0050%	0.00
2014	0	0.5	10,493	0.0000%	0.0049%	0.00
2015	0	0.4	8,833	0.0000%	0.0050%	0.00
2016	0	0.4	8,691	0.0000%	0.0050%	0.00
2017	0	0.4	9,071	0.0000%	0.0050%	0.00
2018	0	0.5	9,689	0.0000%	0.0050%	0.00
2019	0	0.5	10,563	0.0000%	0.0050%	0.00
2020	7	0.5	10,175	0.0688%	0.0050%	13.87
2021	0	0.4	9,078	0.0000%	0.0049%	0.00
Total	7	4.8	96,142	0.0073%	0.0050%	1.47

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS			
	Correction		
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.025%	0.015%	0.005%
16	0.025%	0.015%	0.005%
17	0.025%	0.015%	0.005%
18	0.025%	0.015%	0.005%
19	0.025%	0.015%	0.005%
20	0.025%	0.015%	0.005%
21	0.025%	0.015%	0.005%
22	0.025%	0.015%	0.005%
23	0.025%	0.015%	0.005%
24	0.025%	0.015%	0.005%
25	0.025%	0.015%	0.005%
26	0.025%	0.015%	0.005%
27	0.025%	0.015%	0.005%
28	0.025%	0.015%	0.005%
29	0.025%	0.015%	0.005%
30	0.025%	0.015%	0.005%
31	0.025%	0.015%	0.005%
32	0.025%	0.015%	0.005%
33	0.025%	0.015%	0.005%
34	0.025%	0.015%	0.005%
35	0.025%	0.015%	0.005%
36	0.030%	0.018%	0.005%
37	0.035%	0.021%	0.005%
38	0.040%	0.024%	0.005%
39	0.045%	0.027%	0.005%
40	0.050%	0.030%	0.005%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT (continued) PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS			
	Correction		
	Ordinary Death		Accidental Death
Age	Males	Females	All
41	0.055%	0.033%	0.005%
42	0.060%	0.036%	0.005%
43	0.065%	0.039%	0.005%
44	0.070%	0.042%	0.005%
45	0.075%	0.045%	0.005%
46	0.080%	0.048%	0.005%
47	0.085%	0.051%	0.005%
48	0.090%	0.054%	0.005%
49	0.095%	0.057%	0.005%
50	0.100%	0.060%	0.005%
51	0.105%	0.064%	0.005%
52	0.110%	0.068%	0.005%
53	0.115%	0.072%	0.005%
54	0.120%	0.076%	0.005%
55	0.125%	0.080%	0.005%
56	0.130%	0.084%	0.005%
57	0.135%	0.088%	0.005%
58	0.140%	0.092%	0.005%
59	0.145%	0.096%	0.005%
60	0.150%	0.100%	0.005%
61	0.160%	0.105%	0.005%
62	0.170%	0.110%	0.005%
63	N/A	N/A	N/A
64	N/A	N/A	N/A
65	N/A	N/A	N/A
66	N/A	N/A	N/A
67	N/A	N/A	N/A
68	N/A	N/A	N/A
69	N/A	N/A	N/A
70	N/A	N/A	N/A

The following table shows the proposed assumptions.

Part II Experience Study Report – NYCERS
New York City Retirement Systems

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: BASE YEAR 2019			
	Correction		
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.017%	0.009%	0.005%
16	0.023%	0.011%	0.005%
17	0.031%	0.012%	0.005%
18	0.037%	0.014%	0.005%
19	0.040%	0.015%	0.005%
20	0.041%	0.017%	0.005%
21	0.042%	0.018%	0.005%
22	0.042%	0.019%	0.005%
23	0.042%	0.020%	0.005%
24	0.042%	0.022%	0.005%
25	0.042%	0.024%	0.005%
26	0.045%	0.025%	0.005%
27	0.047%	0.027%	0.005%
28	0.050%	0.030%	0.005%
29	0.053%	0.032%	0.005%
30	0.054%	0.035%	0.005%
31	0.056%	0.037%	0.005%
32	0.058%	0.039%	0.005%
33	0.060%	0.042%	0.005%
34	0.062%	0.044%	0.005%
35	0.064%	0.046%	0.005%
36	0.066%	0.048%	0.005%
37	0.066%	0.051%	0.005%
38	0.069%	0.051%	0.005%
39	0.071%	0.053%	0.005%
40	0.072%	0.055%	0.005%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: BASE YEAR 2019			
	Correction		
	Ordinary Death		Accidental Death
Age	Males	Females	All
41	0.073%	0.056%	0.005%
42	0.076%	0.058%	0.005%
43	0.077%	0.060%	0.005%
44	0.080%	0.062%	0.005%
45	0.083%	0.064%	0.005%
46	0.087%	0.067%	0.005%
47	0.092%	0.071%	0.005%
48	0.097%	0.075%	0.005%
49	0.105%	0.079%	0.005%
50	0.113%	0.086%	0.005%
51	0.121%	0.092%	0.005%
52	0.132%	0.100%	0.005%
53	0.144%	0.107%	0.005%
54	0.156%	0.117%	0.005%
55	0.171%	0.126%	0.005%
56	0.189%	0.136%	0.005%
57	0.207%	0.147%	0.005%
58	0.228%	0.156%	0.005%
59	0.251%	0.166%	0.005%
60	0.275%	0.176%	0.005%
61	0.300%	0.184%	0.005%
62	0.328%	0.193%	0.005%
63	N/A	N/A	N/A
64	N/A	N/A	N/A
65	N/A	N/A	N/A
66	N/A	N/A	N/A
67	N/A	N/A	N/A
68	N/A	N/A	N/A
69	N/A	N/A	N/A
70	N/A	N/A	N/A

Section I(C) – Sanitation Employees of New York City Employees' Retirement System (NYCERS)

Exposures and Decrements

To set the exposures and actual decrements for NYCERS Sanitation employees, the following table details the age and service conditions for unreduced retirement and reduced retirement. If a member has not met any of these conditions for the indicated plan code by year, the member is considered a withdrawal exposure. Otherwise, if the member did meet any of these conditions, they would be considered a retirement exposure. Members with a status code of termination who, nonetheless, have met the conditions for retirement, are included as actual retirements.

NYCERS Retirement Eligibility Chart - Sanitation

Plan Code	Plan Description	Mandated	Formula Bump at 20 YOS	Unreduced Retirement Condition 1		Unreduced Retirement Condition 2		Reduced Retirement Condition	
				Age 1	Service 1	Age 2	Service 2	Age	Service
F	Basic 62/5	TRUE	TRUE	62	5			55	5
M	Sanitation - Improved Plan - Tier 4	BOTH	FALSE	0	20				
M	Sanitation - Improved Plan - Tier 6	TRUE	FALSE	0	25			0	20

Please note that Plan Code M Sanitation - Improved Plan – Tier 6 represents Sanitation employees in the Tier 3 22-year plan.

For Sanitation employees in the Basic 62/5 Plan, OA applies the General employee actuarial assumptions. Therefore, these members are included in the General employee experience.

OA's retirement assumptions depend on whether a member can choose a certain retirement plan. If a member had a choice and elected the improved plan, the assumed rates of retirement are higher than those in which the member was mandated into the specific retirement plan. Higher rates of retirement apply to the indicated plan when the Mandated column is set to False. A little more than half of the number of Sanitation employees were indicated as electing an improved plan.

Rates of Salary Increase

The rates of salary increase reflect three components: 1) price inflation, 2) real wage inflation, and 3) merit increases. The combination of price inflation and real wage inflation is known as wage inflation. The current wage inflation is 3%, which reflects a price inflation assumption of 2.5% and 0.5% real wage inflation.

Based on the 2024 and 2023 OASDI Trustees report issued by Social Security, wage inflation from 2012 to 2020 had a cumulative compound average of 2.93%. Including the rate for 2021 of 9.04%, the average increased to 3.53%. However, in our analysis of the experience, we did not notice any large increases in wages during 2021. This is typical with government sector employees with union affiliations where salary increases are specified in contracts negotiated for a 3- to 5-year period. Thus, wage increases for these employees may not adjust as quickly as for other employment sectors included in the Social Security Trustees report.

For purposes of our analysis, we believe the 3% current wage inflation is representative of the actual experience during the study period. While inflation has been higher since 2021, we propose no changes to the inflation assumption of 2.5% and wage inflation assumptions of 3%. Therefore, we have developed proposed salary increases based on total salary increases during the indicated period. The merit portion is equal to the total less the 3% wage inflation.

For purposes of salary increases only members with a status code of A in consecutive years are included. Members with a LOA status code are excluded.

Although salary increases for government employees may respond less quickly to changes in inflation, using salary experience from many years in the past may not necessarily be indicative of future salary increases as they may not include changes negotiated in union contracts such as general increases, longevity payments, or other salary items. We reviewed the salary increases by year and determined what we believe was the most reasonable period to compare to the current assumption and develop proposed assumptions.

The following chart shows the experience by year for the age range 22 to 59 and for the service range 0 to 34.



Salary increases for Sanitation members varied significantly from one year to the next. There were much lower salary increases measured prior to 2016 and a spike in 2021 most likely due to the pandemic. For Sanitation, we focused on the 5-year period from 2016 – 2020, which appears to be the most stable period.

The current assumed rates of salary increases vary by service. The proposed assumption also varies by service. Overall, lower rates of salary increases are proposed.

The following table shows the experience for salary increases by year, for the age range (22 to 59), and for the service range (0 to 34) from 2016 to 2020. The actual rate of salary increases averaged 5.16% whereas the overall expected rate of increase averaged 6.29% based on the current assumptions and 6.06% based on the proposed assumptions.

Plan Year	Exposed	Base Salary	Actual Salary	Expected Salary	Actual Salary Increase	Current Assumption Salary Increase	Ratio Act/Exp Salary Increase
2016	6,616	\$525.8M	\$548.8M	\$556.6M	4.37%	5.85%	▲ 0.75
2017	6,789	\$544.0M	\$573.0M	\$578.7M	5.33%	6.39%	▲ 0.83
2018	6,821	\$560.6M	\$592.3M	\$596.4M	5.66%	6.39%	▲ 0.89
2019	6,886	\$583.5M	\$622.9M	\$620.8M	6.76%	6.39%	● 1.06
2020	7,083	\$610.5M	\$633.2M	\$649.4M	3.71%	6.36%	▲ 0.58
Total	34,195	\$2,824.4M	\$2,970.2M	\$3,001.9M	5.16%	6.29%	▲ 0.82

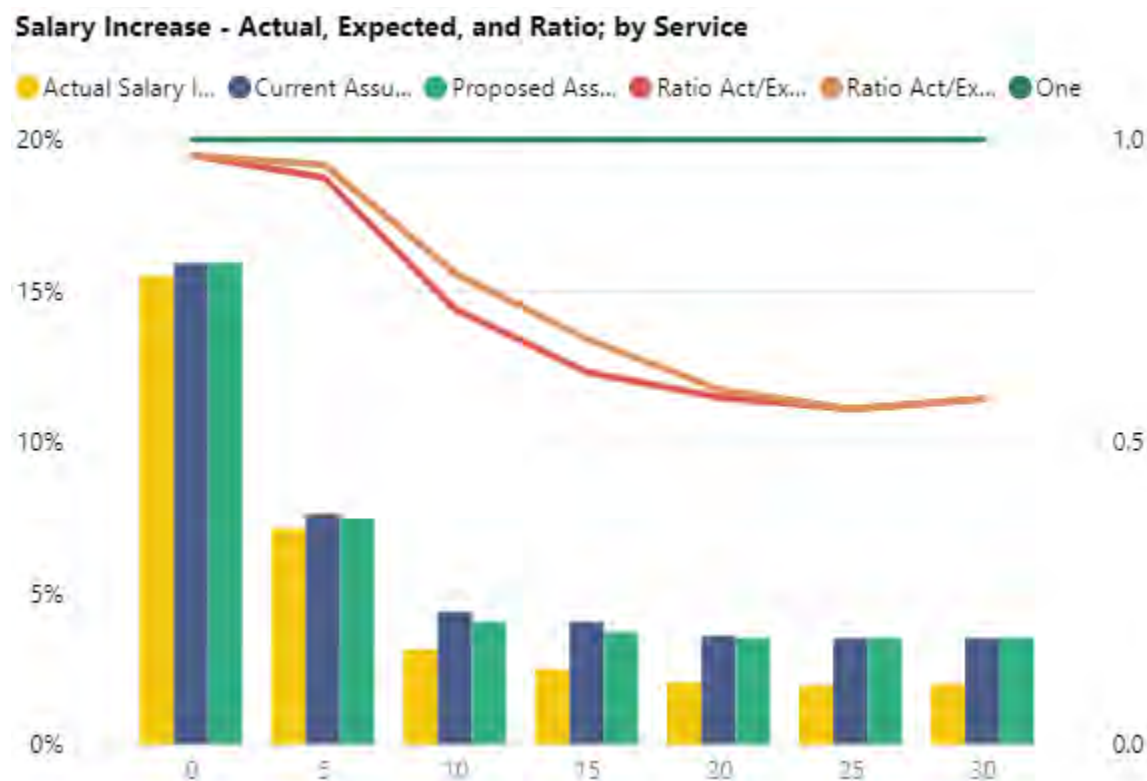
Plan Year	Exposed	Base Salary	Actual Salary	Expected Salary Proposed	Actual Salary Increase	Proposed Assumption Salary Increase	Act/Exp Proposed Salary Increase
2016	6,616	\$525.8M	\$548.8M	\$555.5M	4.37%	5.65%	▲ 0.77
2017	6,789	\$544.0M	\$573.0M	\$577.7M	5.33%	6.19%	▲ 0.86
2018	6,821	\$560.6M	\$592.3M	\$595.5M	5.66%	6.23%	● 0.91
2019	6,886	\$583.5M	\$622.9M	\$619.2M	6.76%	6.13%	▲ 1.10
2020	7,083	\$610.5M	\$633.2M	\$647.7M	3.71%	6.08%	▲ 0.61
Total	34,195	\$2,824.4M	\$2,970.2M	\$2,995.7M	5.16%	6.06%	▲ 0.85



The following charts show the experience by service (0 to 34 years) from 2016 to 2020 first compared to the current assumption and then to the proposed assumption. This resulted in an increase in the A/E ratio from 0.82 to 0.85 for ages 22 to 59.

Service	Exposed	Base Salary	Actual Salary	Expected Salary	Actual Salary Increase	Current Assumption Salary Increase	Ratio Act/Exp Salary Increase
0	42	\$1.8M	\$2.0M	\$2.0M	8.37%	7.00%	▲ 1.20
1	1,924	\$86.1M	\$93.4M	\$93.9M	8.44%	9.00%	● 0.94
2	1,767	\$83.9M	\$93.0M	\$93.1M	10.90%	11.00%	● 0.99
3	1,871	\$97.1M	\$112.2M	\$112.6M	15.53%	16.00%	● 0.97
4	1,876	\$111.0M	\$138.1M	\$138.8M	24.43%	25.00%	● 0.98
5	1,583	\$115.5M	\$138.0M	\$136.3M	19.48%	18.00%	● 1.08
6	1,166	\$100.0M	\$103.9M	\$104.0M	3.90%	4.00%	● 0.97
7	1,003	\$86.4M	\$89.1M	\$89.9M	3.16%	4.10%	▲ 0.77
8	1,024	\$87.0M	\$89.4M	\$90.7M	2.73%	4.20%	▲ 0.65
9	1,091	\$91.3M	\$94.1M	\$96.0M	3.06%	5.10%	▲ 0.60
10	1,682	\$143.6M	\$149.0M	\$150.0M	3.76%	4.40%	▲ 0.85
11	2,371	\$209.2M	\$215.7M	\$218.2M	3.08%	4.30%	▲ 0.72
12	2,174	\$196.9M	\$202.5M	\$205.1M	2.85%	4.20%	▲ 0.68
13	1,877	\$174.1M	\$179.5M	\$181.2M	3.12%	4.10%	▲ 0.76
14	1,584	\$149.0M	\$153.5M	\$156.4M	3.03%	5.00%	▲ 0.61
15	1,747	\$164.9M	\$168.7M	\$171.5M	2.35%	4.00%	▲ 0.59
16	1,468	\$137.0M	\$141.0M	\$142.5M	2.89%	4.00%	▲ 0.72
17	1,616	\$155.3M	\$159.2M	\$161.4M	2.52%	3.90%	▲ 0.65
18	1,539	\$149.9M	\$154.5M	\$155.6M	3.03%	3.80%	▲ 0.80
19	1,235	\$123.8M	\$125.6M	\$129.5M	1.49%	4.60%	◆ 0.32
20	619	\$61.5M	\$62.9M	\$63.8M	2.26%	3.70%	▲ 0.61
21	360	\$35.6M	\$36.5M	\$36.9M	2.52%	3.60%	▲ 0.70
22	454	\$44.8M	\$45.4M	\$46.3M	1.45%	3.50%	◆ 0.41
23	343	\$33.8M	\$34.7M	\$35.0M	2.57%	3.50%	▲ 0.73
24	279	\$28.7M	\$29.1M	\$29.7M	1.35%	3.50%	◆ 0.39
25	285	\$29.5M	\$30.3M	\$30.6M	2.43%	3.50%	▲ 0.69
26	317	\$32.8M	\$33.2M	\$33.9M	1.25%	3.50%	◆ 0.36
27	229	\$23.4M	\$23.8M	\$24.2M	1.66%	3.50%	◆ 0.47
28	243	\$25.0M	\$25.7M	\$25.9M	2.46%	3.50%	▲ 0.70
29	184	\$19.5M	\$19.9M	\$20.2M	2.00%	3.50%	▲ 0.57
30	100	\$10.4M	\$10.6M	\$10.8M	1.75%	3.50%	◆ 0.50
31	60	\$6.5M	\$6.6M	\$6.7M	2.27%	3.50%	▲ 0.65
32	41	\$4.5M	\$4.6M	\$4.6M	2.21%	3.50%	▲ 0.63
33	21	\$2.1M	\$2.2M	\$2.2M	1.93%	3.50%	▲ 0.55
34	20	\$2.2M	\$2.3M	\$2.3M	2.02%	3.50%	▲ 0.58
Total	34,195	\$2,824.4M	\$2,970.2M	\$3,001.9M	5.16%	6.29%	▲ 0.82

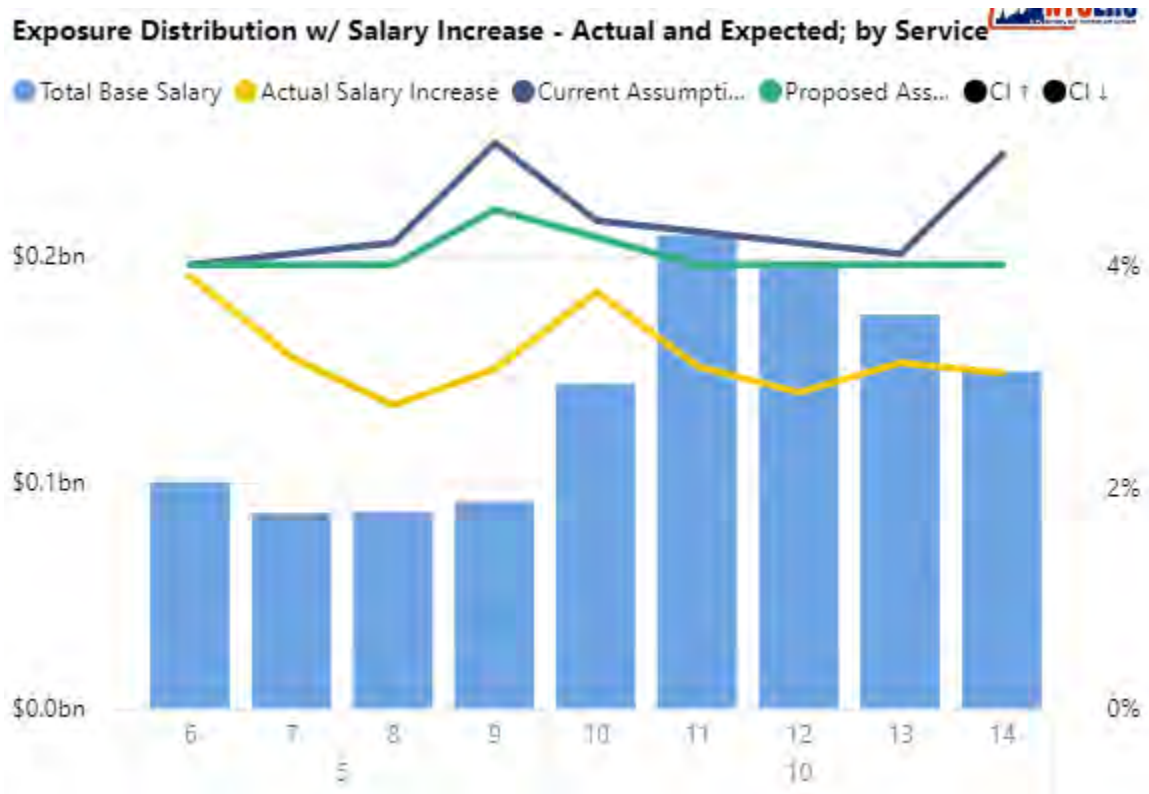
Service	Exposed	Base Salary	Actual Salary	Expected Salary Proposed	Actual Salary Increase	Proposed Assumption Salary Increase	Act/Exp Proposed Salary Increase
0	42	\$1.8M	\$2.0M	\$2.0M	8.37%	9.00%	0.93
1	1,924	\$86.1M	\$93.4M	\$93.9M	8.44%	9.00%	0.94
2	1,767	\$83.9M	\$93.0M	\$93.1M	10.90%	11.00%	0.99
3	1,871	\$97.1M	\$112.2M	\$112.6M	15.53%	16.00%	0.97
4	1,876	\$111.0M	\$138.1M	\$138.8M	24.43%	25.00%	0.98
5	1,583	\$115.5M	\$138.0M	\$136.3M	19.48%	18.00%	1.08
6	1,166	\$100.0M	\$103.9M	\$104.0M	3.90%	4.00%	0.97
7	1,003	\$86.4M	\$89.1M	\$89.8M	3.16%	4.00%	0.79
8	1,024	\$87.0M	\$89.4M	\$90.5M	2.73%	4.00%	0.68
9	1,091	\$91.3M	\$94.1M	\$95.4M	3.06%	4.50%	0.68
10	1,682	\$143.6M	\$149.0M	\$149.8M	3.76%	4.25%	0.88
11	2,371	\$209.2M	\$215.7M	\$217.6M	3.08%	4.00%	0.77
12	2,174	\$196.9M	\$202.5M	\$204.7M	2.85%	4.00%	0.71
13	1,877	\$174.1M	\$179.5M	\$181.1M	3.12%	4.00%	0.78
14	1,584	\$149.0M	\$153.5M	\$154.9M	3.03%	4.00%	0.76
15	1,747	\$164.9M	\$168.7M	\$171.3M	2.35%	3.90%	0.60
16	1,468	\$137.0M	\$141.0M	\$142.2M	2.89%	3.80%	0.76
17	1,616	\$155.3M	\$159.2M	\$161.1M	2.52%	3.70%	0.68
18	1,539	\$149.9M	\$154.5M	\$155.3M	3.03%	3.60%	0.84
19	1,235	\$123.8M	\$125.6M	\$128.1M	1.49%	3.50%	0.42
20	619	\$61.5M	\$62.9M	\$63.6M	2.26%	3.50%	0.65
21	360	\$35.6M	\$36.5M	\$36.9M	2.52%	3.50%	0.72
22	454	\$44.8M	\$45.4M	\$46.3M	1.45%	3.50%	0.41
23	343	\$33.8M	\$34.7M	\$35.0M	2.57%	3.50%	0.73
24	279	\$28.7M	\$29.1M	\$29.7M	1.35%	3.50%	0.39
25	285	\$29.5M	\$30.3M	\$30.6M	2.43%	3.50%	0.69
26	317	\$32.8M	\$33.2M	\$33.9M	1.25%	3.50%	0.36
27	229	\$23.4M	\$23.8M	\$24.2M	1.66%	3.50%	0.47
28	243	\$25.0M	\$25.7M	\$25.9M	2.46%	3.50%	0.70
29	184	\$19.5M	\$19.9M	\$20.2M	2.00%	3.50%	0.57
30	100	\$10.4M	\$10.6M	\$10.8M	1.75%	3.50%	0.50
31	60	\$6.5M	\$6.6M	\$6.7M	2.27%	3.50%	0.65
32	41	\$4.5M	\$4.6M	\$4.6M	2.21%	3.50%	0.63
33	21	\$2.1M	\$2.2M	\$2.2M	1.93%	3.50%	0.55
34	20	\$2.2M	\$2.3M	\$2.3M	2.02%	3.50%	0.58
Total	34,195	\$2,824.4M	\$2,970.2M	\$2,995.7M	5.16%	6.06%	0.85



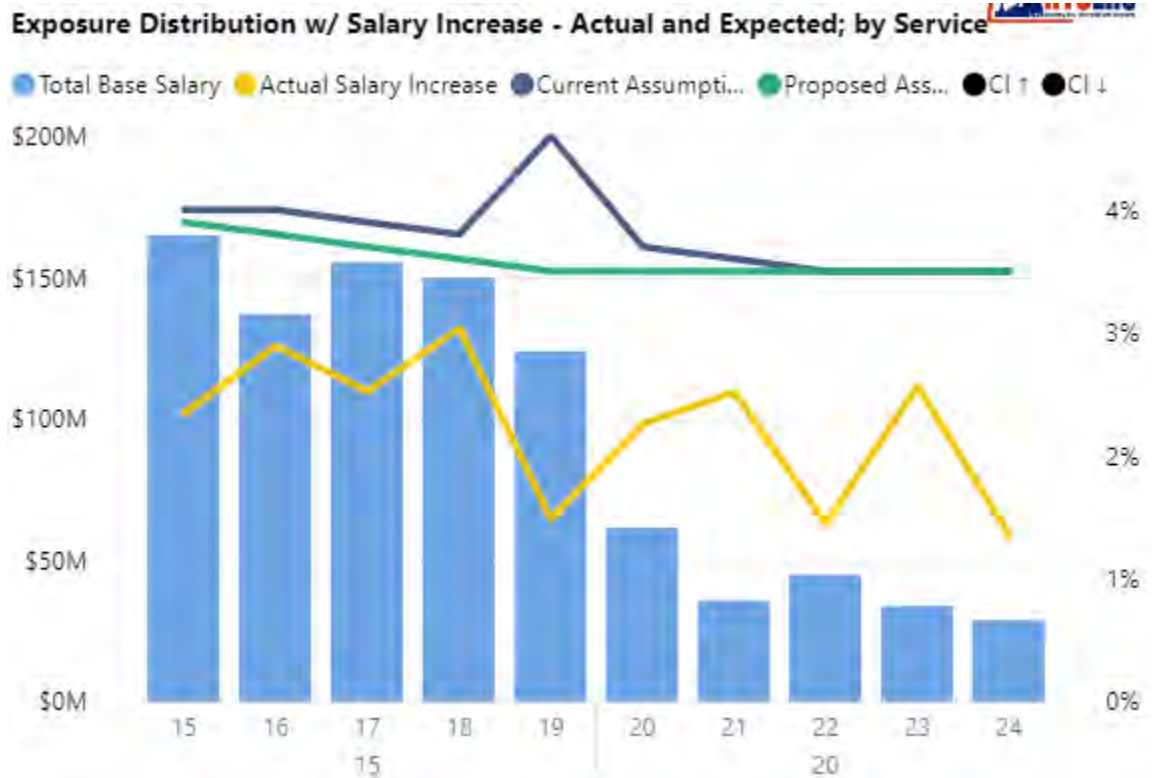
This chart shows the results by service for the service range 0 to 5 years, which maintained the assumed rate of salary increases of 16.39% as compared to the actual rate of 16.40%. This resulted in no change in the A/E ratio of 1.00 for ages 22 to 59.



This chart shows the results by year for the service range 6 to 14 years, which decreased the assumed rate of salary increases from 4.37% to 4.07% as compared to the actual rate of 3.17%. This resulted in an increase in the A/E ratio from 0.73 to 0.78 for ages 25 to 59.



This chart shows the results by service for the service range 15 to 24 years, which decreased the assumed rate of salary increases from 3.94% to 3.66% as compared to the actual rate of 2.39%. This resulted in an increase in the A/E ratio from 0.61 to 0.65 for ages 22 to 59.



This chart shows the results by service for the service range 25 to 34 years, which maintained the assumed rate of salary increases of 3.50% as compared to the actual rate of 1.95%. This resulted in no change in the A/E ratio of 0.56 for ages 22 to 59.



Summary

In total, the proposed rates of salary increases are lower than the current assumptions, which would decrease plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT ASSUMPTION ANNUAL RATES OF MERIT AND SALARY INCREASE		
	SANITATION	
Years of Service	Merit Increase	Salary Increase ¹
0	4.00%	7.00%
1	6.00%	9.00%
2	8.00%	11.00%
3	13.00%	16.00%
4	22.00%	25.00%
5	15.00%	18.00%
6	1.00%	4.00%
7	1.10%	4.10%
8	1.20%	4.20%
9	2.10%	5.10%
10	1.40%	4.40%
11	1.30%	4.30%
12	1.20%	4.20%
13	1.10%	4.10%
14	2.00%	5.00%
15	1.00%	4.00%
16	1.00%	4.00%
17	0.90%	3.90%
18	0.80%	3.80%
19	1.60%	4.60%
20	0.70%	3.70%
21	0.60%	3.60%
22	0.50%	3.50%
23	0.50%	3.50%
24	0.50%	3.50%
25	0.50%	3.50%
26	0.50%	3.50%
27	0.50%	3.50%
28	0.50%	3.50%
29	0.50%	3.50%
30+	0.50%	3.50%

¹ Salary increase is the general wage increase of 3% plus the merit increase

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED ASSUMPTION ANNUAL RATES OF MERIT AND SALARY INCREASE		
	SANITATION	
Years of Service	Merit Increase	Salary Increase ¹
0	6.00%	9.00%
1	6.00%	9.00%
2	8.00%	11.00%
3	13.00%	16.00%
4	22.00%	25.00%
5	15.00%	18.00%
6	1.00%	4.00%
7	1.00%	4.00%
8	1.00%	4.00%
9	1.50%	4.50%
10	1.25%	4.25%
11	1.00%	4.00%
12	1.00%	4.00%
13	1.00%	4.00%
14	1.00%	4.00%
15	0.90%	3.90%
16	0.80%	3.80%
17	0.70%	3.70%
18	0.60%	3.60%
19	0.50%	3.50%
20	0.50%	3.50%
21	0.50%	3.50%
22	0.50%	3.50%
23	0.50%	3.50%
24	0.50%	3.50%
25	0.50%	3.50%
26	0.50%	3.50%
27	0.50%	3.50%
28	0.50%	3.50%
29	0.50%	3.50%
30+	0.50%	3.50%

¹ Salary increase is the general wage increase of 3% plus the merit increase

Overtime

Overtime is considered pensionable earnings in determining a member's final average salary and benefit payable under the plan. OA applies a percentage increase to the member's base salary to account for assumed overtime. The percentage varies by years of service, tier, and whether the individual is expected to retire or become disabled within the next year.

The valuation data contains actual overtime earned during the prior year. For example, overtime contained in the 2019 data is for the year July 1, 2018 to June 30, 2019. We refer to this as 2019 overtime. The rate of overtime is defined as the amount of overtime for the year divided by the average of the member's base salary as of current year and the prior year. Therefore, 2019 overtime percentage is determined based on the average of the base salary as of July 1, 2018 and July 1, 2019.

The overtime percentage is only calculated for members with a status code of A in consecutive years. Members with a LOA status code are excluded.

Separate rates of overtime are applied if the member is expected to retire or become disabled in the following year. These are referred to as Dual Retirement or Dual Disability. We measured the rates of overtime in these situations for members who actually became disabled or retired the following year. For example, a dual overtime percentage applies in 2019 for a member who retired or became disabled in 2020. In the MEST, we developed codes S1 and D1 to identify these situations.

In addition, we also separately measured rates of overtime for those who were two years prior to retirement or disability. For example, we reviewed whether or not the 2019 overtime percentage was higher than otherwise for members who retired in 2021 or lower than otherwise for members who became disabled in 2021. In the MEST, we developed codes S2 and D2 to identify these situations.

These measures allowed us to determine if there was a spike in the amount of overtime just at the time of retirement relative to baseline (all other years). In all situations, we did not find that overtime was higher two years prior for retirement or lower two years prior for disability. For purposes of this report, the experience for members two years prior to retirement or disability is included in the Baseline analysis.

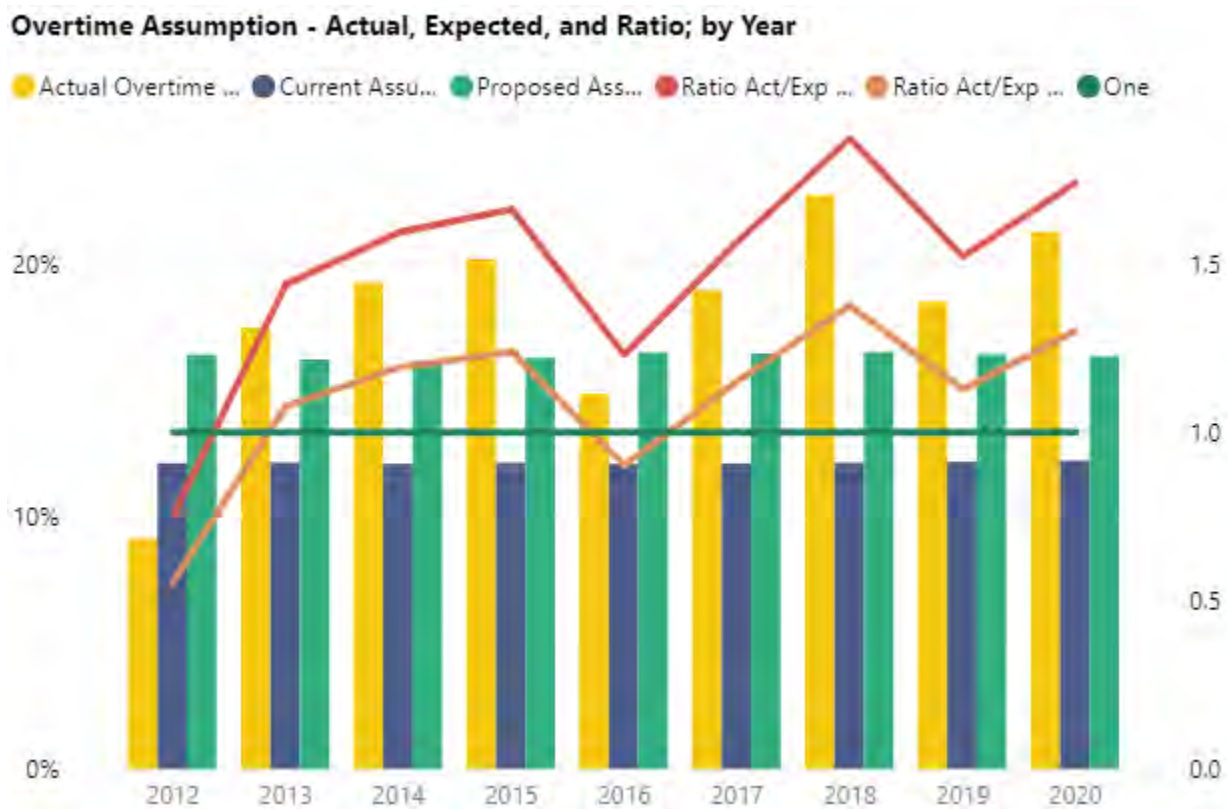
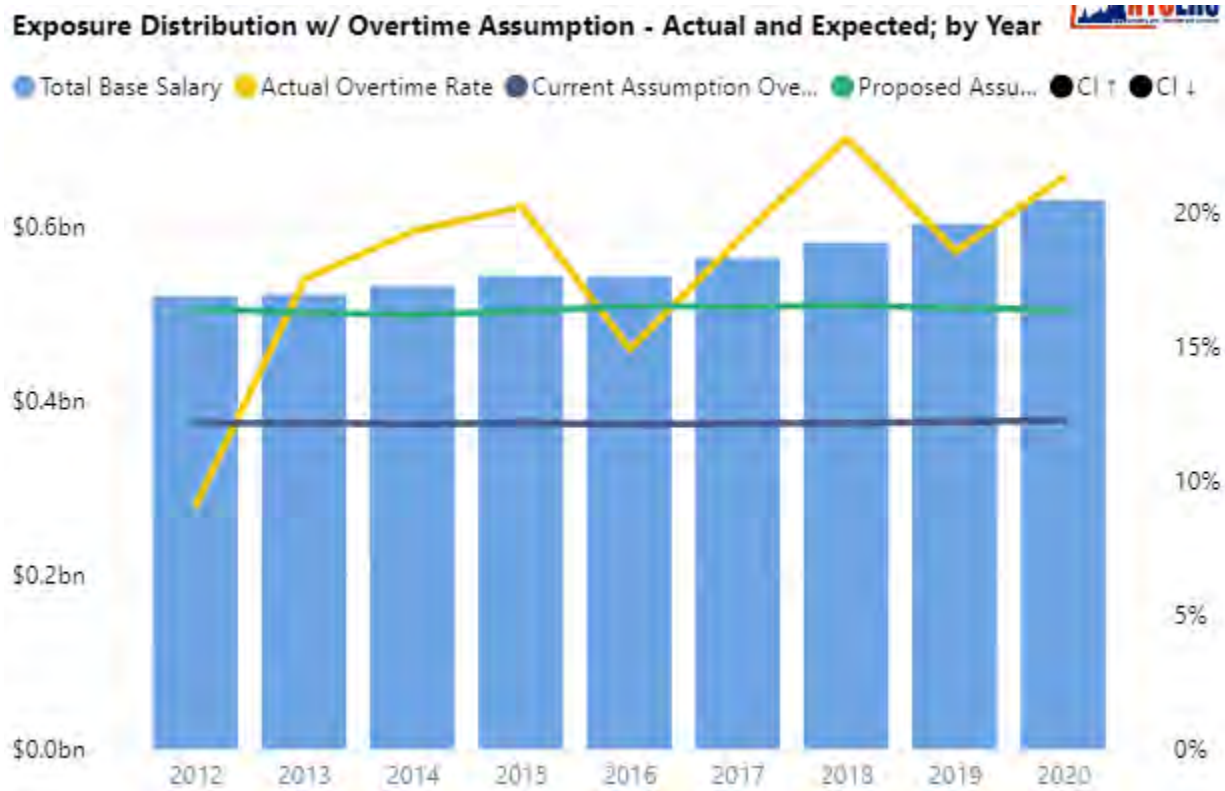
For Sanitation, we found that overtime one year prior for retirement was not higher than for members of the same service who did not retire. Therefore, the proposed assumption does not include a separate dual retirement assumption.

The proposed assumption varies by service and dual disability.

The following charts show the experience for overtime percentage by year, for the age range (22 to 69), and for the service range (0 to 39) from 2012 to 2020. The actual overtime percentage for all types of overtime averaged 18.20% whereas the overall expected overtime percentage averaged 12.13% based on the current assumptions and 16.37% based on the proposed assumptions. Overtime during 2021 was much higher than other years, most likely due to the pandemic, and was excluded from the analysis.

Plan Year	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
2012	6,439	\$526.7M	\$48.0M	\$63.8M	9.11%	12.11%	▲ 0.75
2013	6,462	\$530.5M	\$92.8M	\$64.4M	17.49%	12.14%	▲ 1.44
2014	6,571	\$540.2M	\$104.1M	\$65.3M	19.27%	12.09%	◆ 1.59
2015	6,689	\$548.0M	\$110.6M	\$66.5M	20.19%	12.14%	◆ 1.66
2016	6,798	\$553.0M	\$82.3M	\$66.8M	14.87%	12.08%	▲ 1.23
2017	6,998	\$577.1M	\$109.5M	\$69.9M	18.97%	12.11%	◆ 1.57
2018	7,038	\$596.0M	\$135.5M	\$72.3M	22.74%	12.13%	◆ 1.87
2019	7,091	\$622.0M	\$115.2M	\$75.6M	18.52%	12.16%	◆ 1.52
2020	7,280	\$640.4M	\$136.3M	\$78.3M	21.29%	12.22%	◆ 1.74
Total	61,366	\$5,133.9M	\$934.3M	\$622.9M	18.20%	12.13%	▲ 1.50

Plan Year	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
2012	6,439	\$526.7M	\$48.0M	\$86.4M	9.11%	16.40%	▲ 0.56
2013	6,462	\$530.5M	\$92.8M	\$86.1M	17.49%	16.22%	● 1.08
2014	6,571	\$540.2M	\$104.1M	\$87.3M	19.27%	16.16%	▲ 1.19
2015	6,689	\$548.0M	\$110.6M	\$89.3M	20.19%	16.29%	▲ 1.24
2016	6,798	\$553.0M	\$82.3M	\$91.2M	14.87%	16.49%	● 0.90
2017	6,998	\$577.1M	\$109.5M	\$95.0M	18.97%	16.46%	▲ 1.15
2018	7,038	\$596.0M	\$135.5M	\$98.5M	22.74%	16.52%	▲ 1.38
2019	7,091	\$622.0M	\$115.2M	\$102.2M	18.52%	16.42%	▲ 1.13
2020	7,280	\$640.4M	\$136.3M	\$104.7M	21.29%	16.34%	▲ 1.30
Total	61,366	\$5,133.9M	\$934.3M	\$840.5M	18.20%	16.37%	▲ 1.11



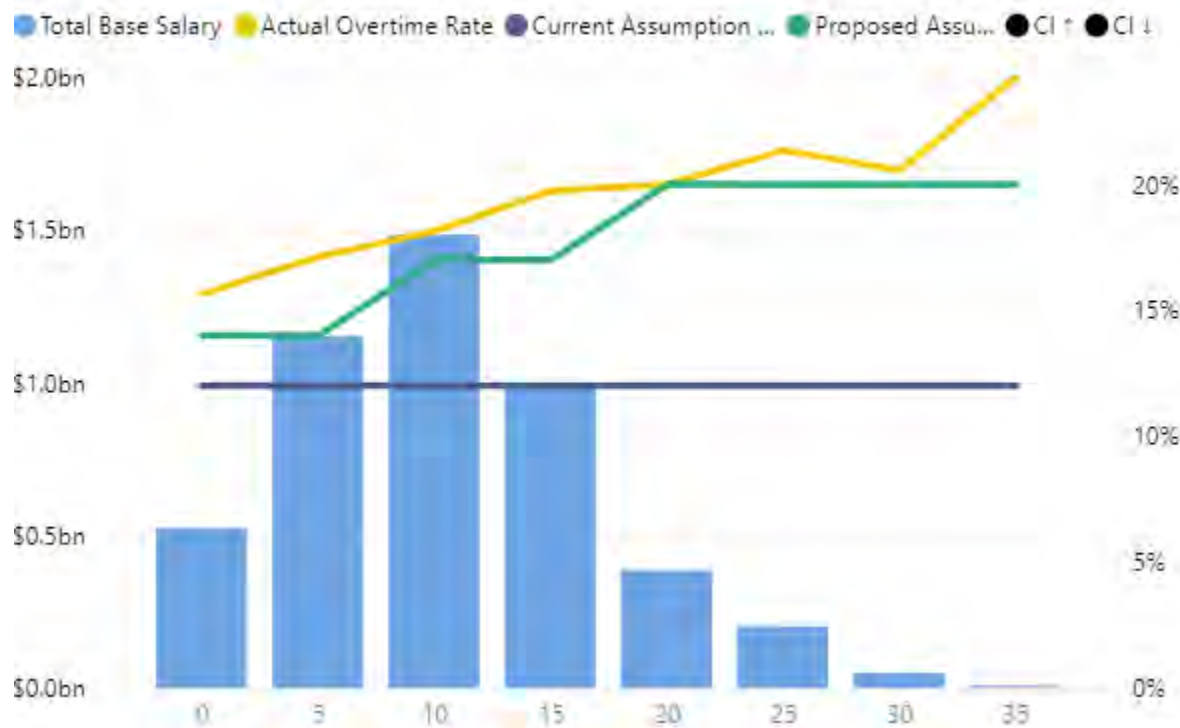
Baseline

The following charts show the experience for Baseline overtime percentage by service, for the age range (22 to 69), and for the service range (0 to 39) from 2012 to 2020. The actual Baseline overtime percentage averaged 18.25% whereas the overall expected overtime percentage averaged 12.00% based on the current assumptions and 16.33% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.52 to 1.12.

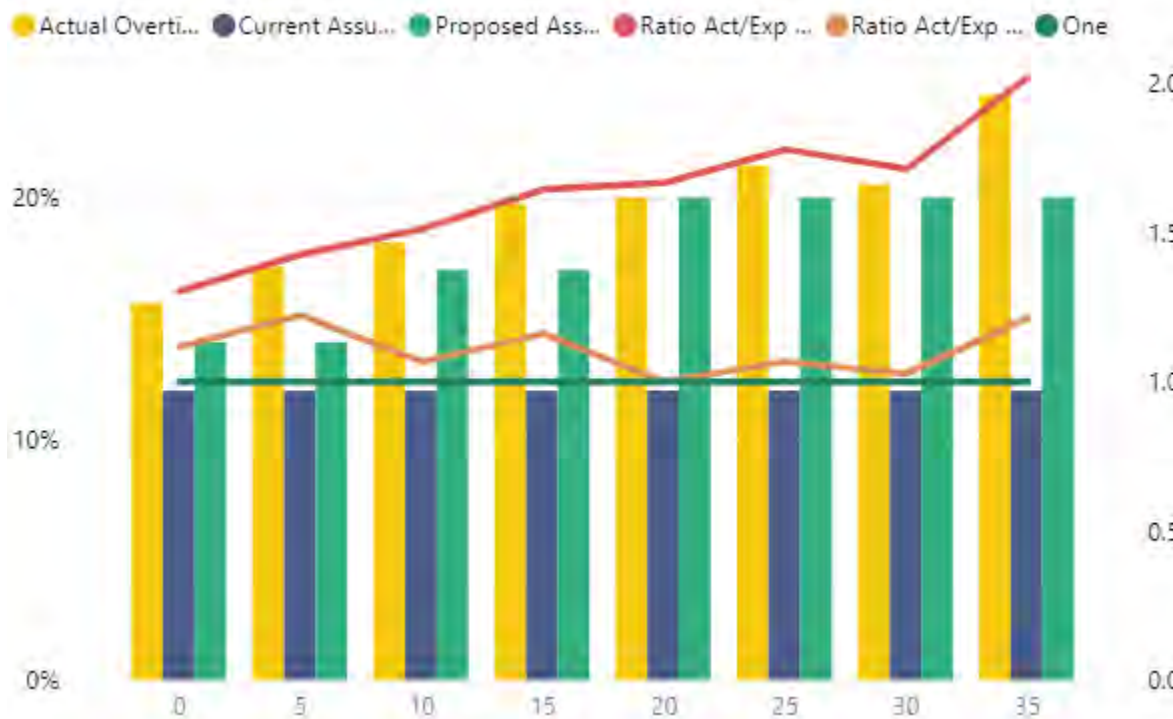
Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
0	66	\$3.0M	\$0.5M	\$0.4M	16.13%	12.00%	▲ 1.34
1	3,050	\$138.8M	\$22.5M	\$16.7M	16.20%	12.00%	▲ 1.35
2	2,538	\$125.3M	\$19.9M	\$15.0M	15.90%	12.00%	▲ 1.33
3	2,439	\$134.1M	\$20.7M	\$16.1M	15.47%	12.00%	▲ 1.29
4	2,539	\$163.0M	\$24.6M	\$19.6M	15.11%	12.00%	▲ 1.26
5	2,637	\$201.9M	\$32.9M	\$24.2M	16.29%	12.00%	▲ 1.36
6	2,885	\$238.7M	\$39.6M	\$28.6M	16.57%	12.00%	▲ 1.38
7	3,315	\$275.6M	\$44.5M	\$33.1M	16.13%	12.00%	▲ 1.34
8	2,955	\$247.7M	\$44.7M	\$29.7M	18.07%	12.00%	◆ 1.51
9	2,592	\$219.2M	\$41.0M	\$26.3M	18.69%	12.00%	◆ 1.56
10	2,798	\$241.4M	\$42.9M	\$29.0M	17.77%	12.00%	▲ 1.48
11	3,554	\$313.5M	\$50.4M	\$37.6M	16.08%	12.00%	▲ 1.34
12	3,733	\$335.3M	\$61.3M	\$40.2M	18.30%	12.00%	◆ 1.52
13	3,499	\$320.5M	\$63.0M	\$38.5M	19.65%	12.00%	◆ 1.64
14	3,163	\$292.8M	\$55.1M	\$35.1M	18.83%	12.00%	◆ 1.57
15	2,539	\$237.9M	\$45.4M	\$28.6M	19.09%	12.00%	◆ 1.59
16	2,174	\$202.0M	\$36.4M	\$24.2M	18.00%	12.00%	◆ 1.50
17	2,234	\$212.8M	\$44.6M	\$25.5M	20.94%	12.00%	◆ 1.75
18	2,181	\$208.9M	\$39.8M	\$25.1M	19.04%	12.00%	◆ 1.59
19	1,437	\$140.6M	\$31.7M	\$16.9M	22.57%	12.00%	◆ 1.88
20	821	\$80.5M	\$17.2M	\$9.7M	21.39%	12.00%	◆ 1.78
21	835	\$80.8M	\$15.2M	\$9.7M	18.78%	12.00%	◆ 1.56
22	887	\$85.4M	\$16.0M	\$10.3M	18.70%	12.00%	◆ 1.56
23	768	\$74.7M	\$15.1M	\$9.0M	20.24%	12.00%	◆ 1.69
24	689	\$68.1M	\$14.4M	\$8.2M	21.18%	12.00%	◆ 1.76
25	571	\$56.3M	\$11.4M	\$6.8M	20.19%	12.00%	◆ 1.68
26	527	\$52.1M	\$10.7M	\$6.3M	20.53%	12.00%	◆ 1.71
27	419	\$41.3M	\$9.2M	\$5.0M	22.16%	12.00%	◆ 1.85
28	314	\$31.5M	\$7.0M	\$3.8M	22.13%	12.00%	◆ 1.84
29	223	\$22.5M	\$5.3M	\$2.7M	23.53%	12.00%	◆ 1.96
30	175	\$17.5M	\$3.5M	\$2.1M	20.18%	12.00%	◆ 1.68
31	120	\$11.9M	\$2.6M	\$1.4M	22.07%	12.00%	◆ 1.84
32	101	\$10.1M	\$2.2M	\$1.2M	21.44%	12.00%	◆ 1.79
33	56	\$5.6M	\$1.1M	\$0.7M	19.48%	12.00%	◆ 1.62
34	41	\$4.4M	\$0.8M	\$0.5M	17.40%	12.00%	▲ 1.45
35	24	\$2.5M	\$0.6M	\$0.3M	24.04%	12.00%	◆ 2.00
36	13	\$1.4M	\$0.4M	\$0.2M	27.63%	12.00%	◆ 2.30
37	7	\$0.7M	\$0.2M	\$0.1M	22.76%	12.00%	◆ 1.90
38	5	\$0.5M	\$0.1M	\$0.1M	20.75%	12.00%	◆ 1.73
39	3	\$0.3M	\$0.1M	\$0.0M	19.45%	12.00%	◆ 1.62
Total	58,927	\$4,901.0M	\$894.3M	\$588.1M	18.25%	12.00%	◆ 1.52

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
0	66	\$3.0M	\$0.5M	\$0.4M	16.13%	14.00%	▲ 1.15
1	3,050	\$138.8M	\$22.5M	\$19.4M	16.20%	14.00%	▲ 1.16
2	2,538	\$125.3M	\$19.9M	\$17.5M	15.90%	14.00%	▲ 1.14
3	2,439	\$134.1M	\$20.7M	\$18.8M	15.47%	14.00%	▲ 1.11
4	2,539	\$163.0M	\$24.6M	\$22.8M	15.11%	14.00%	● 1.08
5	2,637	\$201.9M	\$32.9M	\$28.3M	16.29%	14.00%	▲ 1.16
6	2,885	\$238.7M	\$39.6M	\$33.4M	16.57%	14.00%	▲ 1.18
7	3,315	\$275.6M	\$44.5M	\$38.6M	16.13%	14.00%	▲ 1.15
8	2,955	\$247.7M	\$44.7M	\$34.7M	18.07%	14.00%	▲ 1.29
9	2,592	\$219.2M	\$41.0M	\$30.7M	18.69%	14.00%	▲ 1.34
10	2,798	\$241.4M	\$42.9M	\$41.0M	17.77%	17.00%	● 1.05
11	3,554	\$313.5M	\$50.4M	\$53.3M	16.08%	17.00%	● 0.95
12	3,733	\$335.3M	\$61.3M	\$57.0M	18.30%	17.00%	● 1.08
13	3,499	\$320.5M	\$63.0M	\$54.5M	19.65%	17.00%	▲ 1.16
14	3,163	\$292.8M	\$55.1M	\$49.8M	18.83%	17.00%	▲ 1.11
15	2,539	\$237.9M	\$45.4M	\$40.4M	19.09%	17.00%	▲ 1.12
16	2,174	\$202.0M	\$36.4M	\$34.3M	18.00%	17.00%	● 1.06
17	2,234	\$212.8M	\$44.6M	\$36.2M	20.94%	17.00%	▲ 1.23
18	2,181	\$208.9M	\$39.8M	\$35.5M	19.04%	17.00%	▲ 1.12
19	1,437	\$140.6M	\$31.7M	\$23.9M	22.57%	17.00%	▲ 1.33
20	821	\$80.5M	\$17.2M	\$16.1M	21.39%	20.00%	● 1.07
21	835	\$80.8M	\$15.2M	\$16.2M	18.78%	20.00%	● 0.94
22	887	\$85.4M	\$16.0M	\$17.1M	18.70%	20.00%	● 0.94
23	768	\$74.7M	\$15.1M	\$14.9M	20.24%	20.00%	● 1.01
24	689	\$68.1M	\$14.4M	\$13.6M	21.18%	20.00%	● 1.06
25	571	\$56.3M	\$11.4M	\$11.3M	20.19%	20.00%	● 1.01
26	527	\$52.1M	\$10.7M	\$10.4M	20.53%	20.00%	● 1.03
27	419	\$41.3M	\$9.2M	\$8.3M	22.16%	20.00%	▲ 1.11
28	314	\$31.5M	\$7.0M	\$6.3M	22.13%	20.00%	▲ 1.11
29	223	\$22.5M	\$5.3M	\$4.5M	23.53%	20.00%	▲ 1.18
30	175	\$17.5M	\$3.5M	\$3.5M	20.18%	20.00%	● 1.01
31	120	\$11.9M	\$2.6M	\$2.4M	22.07%	20.00%	▲ 1.10
32	101	\$10.1M	\$2.2M	\$2.0M	21.44%	20.00%	● 1.07
33	56	\$5.6M	\$1.1M	\$1.1M	19.48%	20.00%	● 0.97
34	41	\$4.4M	\$0.8M	\$0.9M	17.40%	20.00%	▲ 0.87
35	24	\$2.5M	\$0.6M	\$0.5M	24.04%	20.00%	▲ 1.20
36	13	\$1.4M	\$0.4M	\$0.3M	27.63%	20.00%	▲ 1.38
37	7	\$0.7M	\$0.2M	\$0.1M	22.76%	20.00%	▲ 1.14
38	5	\$0.5M	\$0.1M	\$0.1M	20.75%	20.00%	● 1.04
39	3	\$0.3M	\$0.1M	\$0.1M	19.45%	20.00%	● 0.97
Total	58,927	\$4,901.0M	\$894.3M	\$800.2M	18.25%	16.33%	▲ 1.12

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service

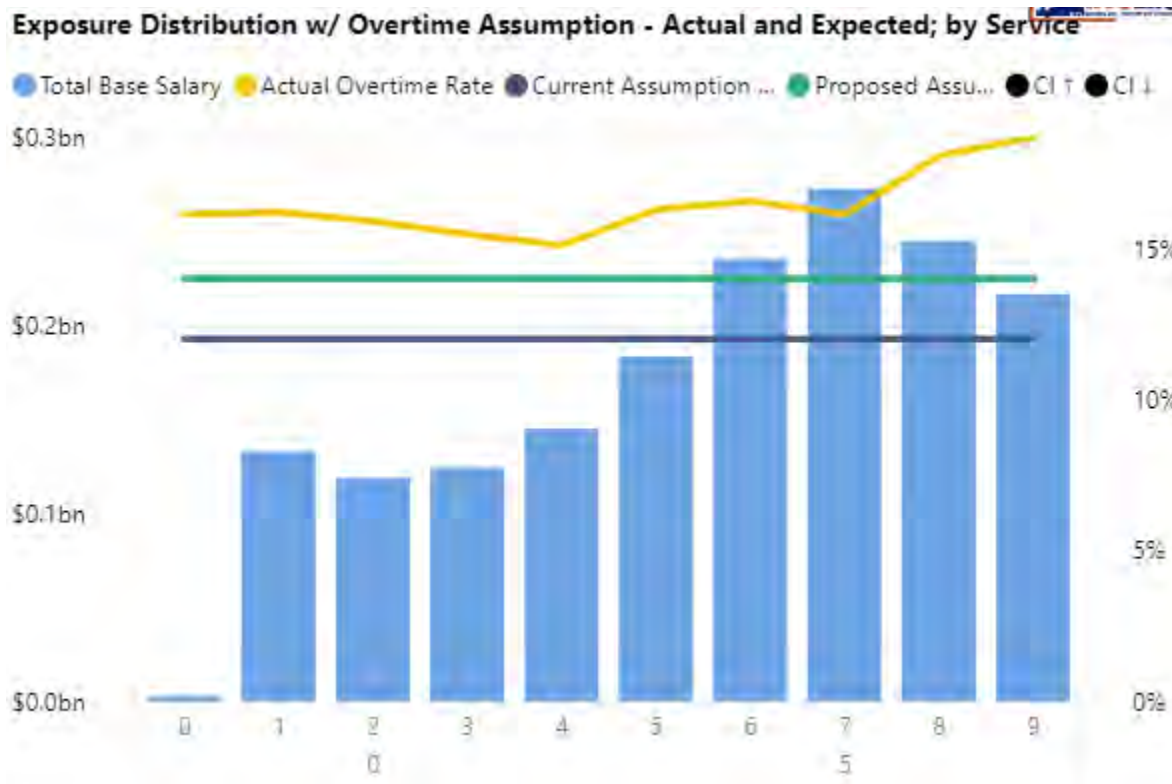


Overtime Assumption - Actual, Expected, and Ratio; by Service



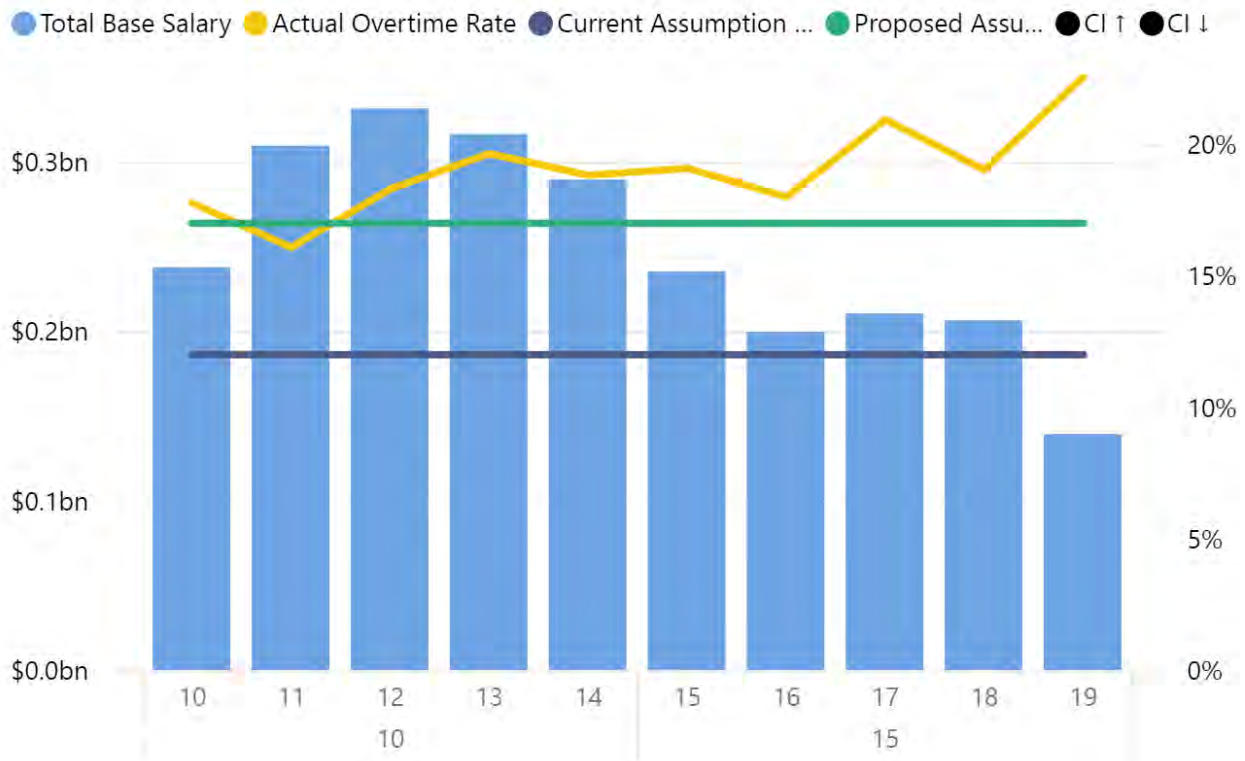
The current assumption did not vary by service. The actual experience showed the overtime percentage was positively correlated with service. The proposed assumption varies by service period; beginning at 20 years of service the same overtime percentage is proposed for all service periods. Increasing the assumed rate for all members eligible for retirement appears to have eliminated the need to include a dual retirement assumption.

This chart shows the experience for Baseline overtime percentage by service for the service range 0 to 9 years, where the assumed overtime percentage increased from 12.00% to 14.00% as compared to the actual rate of 16.65%. This resulted in a decrease in the A/E ratio from 1.39 to 1.19 for ages 22 to 69.

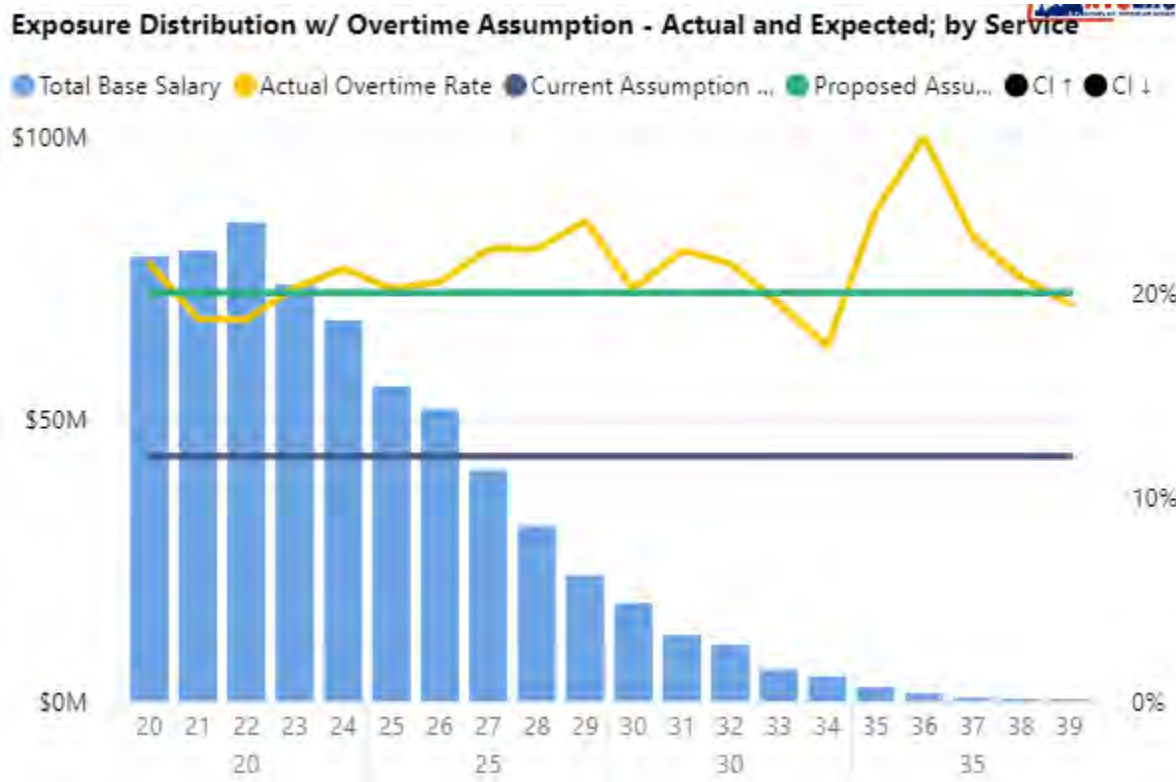


This chart shows the experience for Baseline overtime percentage by service for the service range 10 to 19 years, where the assumed overtime percentage increased from 12.00% to 17.00% as compared to the actual rate of 18.78%. This resulted in a decrease in the A/E ratio from 1.57 to 1.10 for ages 22 to 69.

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



This chart shows the experience for Baseline overtime percentage by service for the service range 20 to 39 years, where the assumed overtime percentage increased from 12.00% to 20.00% as compared to the actual rate of 20.50%. This resulted in a decrease in the A/E ratio from 1.71 to 1.03 for ages 40 to 69.



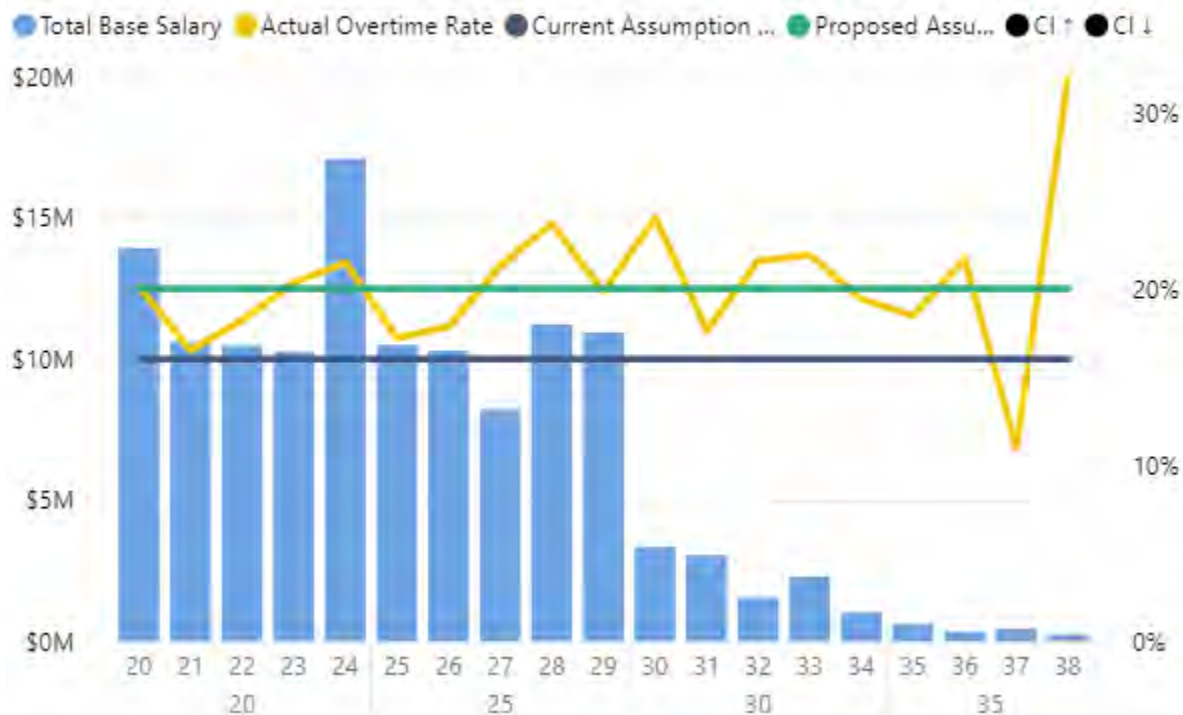
Dual Retirement

The following charts show the experience for Dual Retirement overtime percentage by service, for the age range (40 to 69), and for the service range (20 to 39) from 2012 to 2020. The actual Dual Retirement overtime percentage averaged 19.87% as compared to Baseline overtime percentage of 20.50%. Since these percentages were similar, we propose to use the Baseline assumption for Dual Retirement. This resulted in a decrease in the A/E ratio from 1.24 to 0.99.

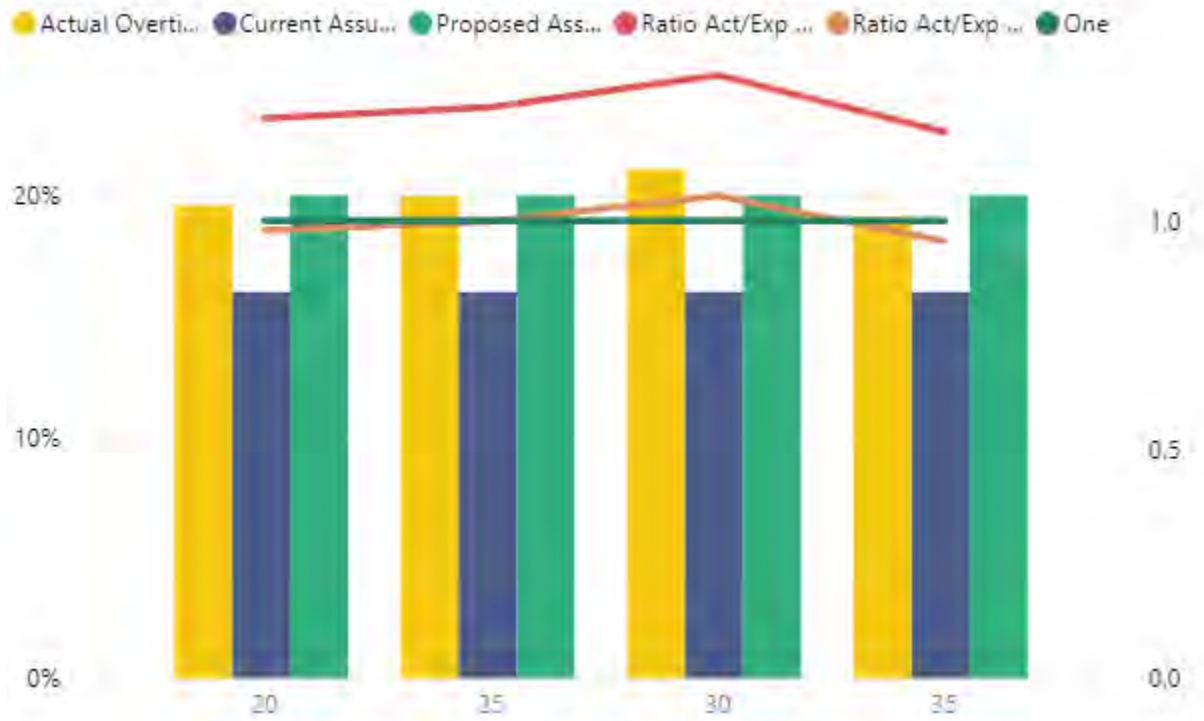
Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
20	147	\$14.0M	\$2.8M	\$2.2M	20.09%	16.00%	▲ 1.26
21	112	\$10.7M	\$1.8M	\$1.7M	16.49%	16.00%	● 1.03
22	107	\$10.5M	\$1.9M	\$1.7M	18.22%	16.00%	▲ 1.14
23	108	\$10.3M	\$2.1M	\$1.7M	20.34%	16.00%	▲ 1.27
24	178	\$17.2M	\$3.7M	\$2.7M	21.48%	16.00%	▲ 1.34
25	102	\$10.5M	\$1.8M	\$1.7M	17.19%	16.00%	● 1.07
26	102	\$10.3M	\$1.8M	\$1.7M	17.84%	16.00%	▲ 1.11
27	84	\$8.2M	\$1.8M	\$1.3M	21.31%	16.00%	▲ 1.33
28	116	\$11.3M	\$2.7M	\$1.8M	23.67%	16.00%	▲ 1.48
29	106	\$11.0M	\$2.2M	\$1.8M	19.82%	16.00%	▲ 1.24
30	35	\$3.4M	\$0.8M	\$0.5M	24.01%	16.00%	◆ 1.50
31	29	\$3.1M	\$0.5M	\$0.5M	17.64%	16.00%	▲ 1.10
32	14	\$1.6M	\$0.3M	\$0.3M	21.57%	16.00%	▲ 1.35
33	21	\$2.3M	\$0.5M	\$0.4M	21.91%	16.00%	▲ 1.37
34	10	\$1.0M	\$0.2M	\$0.2M	19.39%	16.00%	▲ 1.21
35	6	\$0.6M	\$0.1M	\$0.1M	18.46%	16.00%	▲ 1.15
36	3	\$0.3M	\$0.1M	\$0.1M	21.66%	16.00%	▲ 1.35
37	4	\$0.5M	\$0.0M	\$0.1M	11.01%	16.00%	▲ 0.69
38	2	\$0.2M	\$0.1M	\$0.0M	31.99%	16.00%	◆ 2.00
Total	1,286	\$127.1M	\$25.2M	\$20.3M	19.87%	16.00%	▲ 1.24

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
20	147	\$14.0M	\$2.8M	\$2.8M	20.09%	20.00%	1.00
21	112	\$10.7M	\$1.8M	\$2.1M	16.49%	20.00%	0.82
22	107	\$10.5M	\$1.9M	\$2.1M	18.22%	20.00%	0.91
23	108	\$10.3M	\$2.1M	\$2.1M	20.34%	20.00%	1.02
24	178	\$17.2M	\$3.7M	\$3.4M	21.48%	20.00%	1.07
25	102	\$10.5M	\$1.8M	\$2.1M	17.19%	20.00%	0.86
26	102	\$10.3M	\$1.8M	\$2.1M	17.84%	20.00%	0.89
27	84	\$8.2M	\$1.8M	\$1.6M	21.31%	20.00%	1.07
28	116	\$11.3M	\$2.7M	\$2.3M	23.67%	20.00%	1.18
29	106	\$11.0M	\$2.2M	\$2.2M	19.82%	20.00%	0.99
30	35	\$3.4M	\$0.8M	\$0.7M	24.01%	20.00%	1.20
31	29	\$3.1M	\$0.5M	\$0.6M	17.64%	20.00%	0.88
32	14	\$1.6M	\$0.3M	\$0.3M	21.57%	20.00%	1.08
33	21	\$2.3M	\$0.5M	\$0.5M	21.91%	20.00%	1.10
34	10	\$1.0M	\$0.2M	\$0.2M	19.39%	20.00%	0.97
35	6	\$0.6M	\$0.1M	\$0.1M	18.46%	20.00%	0.92
36	3	\$0.3M	\$0.1M	\$0.1M	21.66%	20.00%	1.08
37	4	\$0.5M	\$0.0M	\$0.1M	11.01%	20.00%	0.55
38	2	\$0.2M	\$0.1M	\$0.0M	31.99%	20.00%	1.60
Total	1,286	\$127.1M	\$25.2M	\$25.4M	19.87%	20.00%	0.99

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



Overtime Assumption - Actual, Expected, and Ratio; by Service



Dual Disability

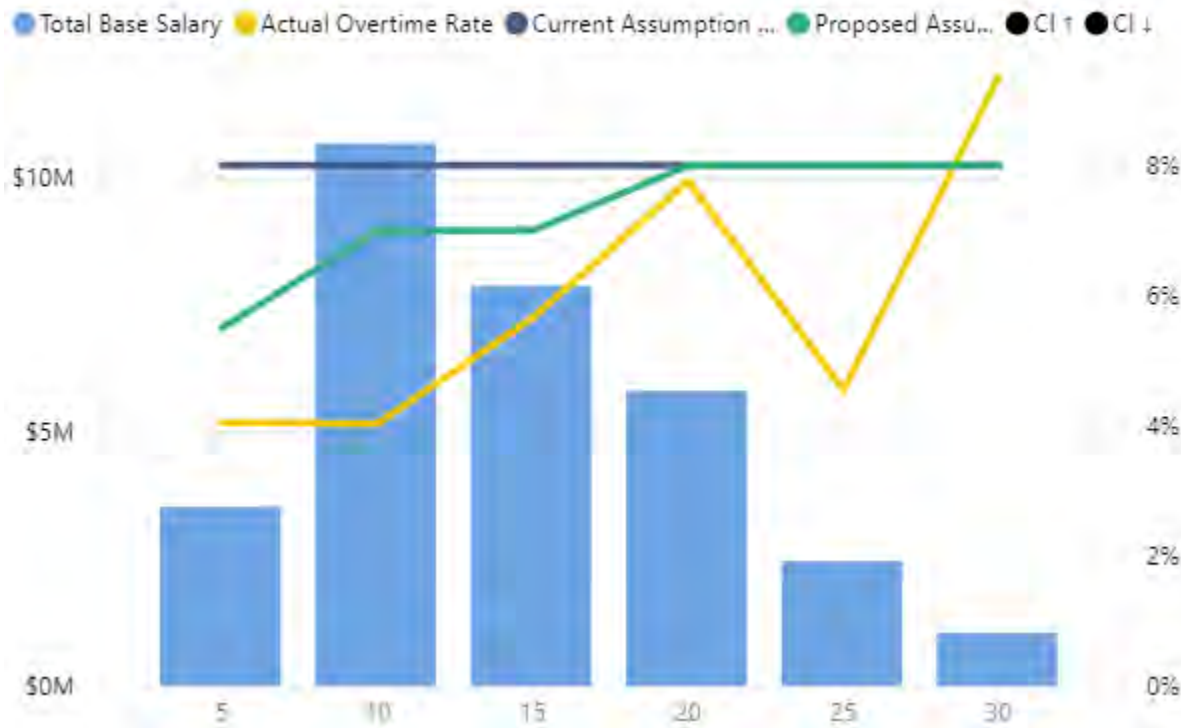
The current assumption does not vary by service. Similar to Baseline, the actual Dual Disability experience showed the overtime percentage was positively correlated with service. The proposed assumption is set to 40% of the proposed Baseline rates.

The following charts show the experience for Dual Disability overtime percentage by service, for the age range (22 to 69), and for the service range (5 to 34) from 2012 to 2020. The actual Dual Disability overtime percentage averaged 5.35% whereas the overall expected overtime percentage averaged 8.00% based on the current assumptions and 7.13% based on the proposed assumptions. This resulted in an increase in the A/E ratio from 0.67 to 0.75.

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
5	3	\$0.2M	\$0.0M	\$0.0M	0.65%	8.00%	0.08
6	3	\$0.2M	\$0.0M	\$0.0M	0.16%	8.00%	0.02
7	13	\$1.0M	\$0.0M	\$0.1M	4.64%	8.00%	0.58
8	11	\$0.9M	\$0.1M	\$0.1M	5.86%	8.00%	0.73
9	15	\$1.2M	\$0.0M	\$0.1M	3.51%	8.00%	0.44
10	22	\$1.7M	\$0.1M	\$0.1M	4.90%	8.00%	0.61
11	34	\$2.7M	\$0.1M	\$0.2M	3.14%	8.00%	0.39
12	22	\$1.8M	\$0.1M	\$0.1M	2.99%	8.00%	0.37
13	28	\$2.3M	\$0.1M	\$0.2M	5.17%	8.00%	0.65
14	22	\$1.9M	\$0.1M	\$0.1M	4.13%	8.00%	0.52
15	19	\$1.6M	\$0.1M	\$0.1M	3.85%	8.00%	0.48
16	19	\$1.6M	\$0.1M	\$0.1M	3.88%	8.00%	0.48
17	14	\$1.2M	\$0.1M	\$0.1M	4.26%	8.00%	0.53
18	22	\$1.9M	\$0.1M	\$0.2M	5.92%	8.00%	0.74
19	17	\$1.5M	\$0.2M	\$0.1M	10.42%	8.00%	1.30
20	12	\$1.0M	\$0.1M	\$0.1M	8.08%	8.00%	1.01
21	12	\$1.1M	\$0.1M	\$0.1M	4.67%	8.00%	0.58
22	10	\$0.9M	\$0.0M	\$0.1M	3.52%	8.00%	0.44
23	12	\$1.1M	\$0.1M	\$0.1M	7.24%	8.00%	0.91
24	17	\$1.6M	\$0.2M	\$0.1M	12.26%	8.00%	1.53
25	5	\$0.4M	\$0.0M	\$0.0M	5.25%	8.00%	0.66
26	5	\$0.5M	\$0.0M	\$0.0M	5.88%	8.00%	0.73
27	9	\$0.8M	\$0.0M	\$0.1M	4.92%	8.00%	0.61
28	6	\$0.6M	\$0.0M	\$0.0M	1.91%	8.00%	0.24
29	1	\$0.1M	\$0.0M	\$0.0M	6.96%	8.00%	0.87
30	2	\$0.2M	\$0.0M	\$0.0M	15.93%	8.00%	1.99
31	4	\$0.5M	\$0.0M	\$0.0M	5.92%	8.00%	0.74
32	3	\$0.3M	\$0.0M	\$0.0M	14.01%	8.00%	1.75
33	1	\$0.1M	\$0.0M	\$0.0M	0.00%	8.00%	0.00
Total	363	\$30.9M	\$1.7M	\$2.5M	5.35%	8.00%	0.67

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
5	3	\$0.2M	\$0.0M	\$0.0M	0.65%	5.50%	0.12
6	3	\$0.2M	\$0.0M	\$0.0M	0.16%	5.50%	0.03
7	13	\$1.0M	\$0.0M	\$0.1M	4.64%	5.50%	0.84
8	11	\$0.9M	\$0.1M	\$0.0M	5.86%	5.50%	1.07
9	15	\$1.2M	\$0.0M	\$0.1M	3.51%	5.50%	0.64
10	22	\$1.7M	\$0.1M	\$0.1M	4.90%	7.00%	0.70
11	34	\$2.7M	\$0.1M	\$0.2M	3.14%	7.00%	0.45
12	22	\$1.8M	\$0.1M	\$0.1M	2.99%	7.00%	0.43
13	28	\$2.3M	\$0.1M	\$0.2M	5.17%	7.00%	0.74
14	22	\$1.9M	\$0.1M	\$0.1M	4.13%	7.00%	0.59
15	19	\$1.6M	\$0.1M	\$0.1M	3.85%	7.00%	0.55
16	19	\$1.6M	\$0.1M	\$0.1M	3.88%	7.00%	0.55
17	14	\$1.2M	\$0.1M	\$0.1M	4.26%	7.00%	0.61
18	22	\$1.9M	\$0.1M	\$0.1M	5.92%	7.00%	0.85
19	17	\$1.5M	\$0.2M	\$0.1M	10.42%	7.00%	1.49
20	12	\$1.0M	\$0.1M	\$0.1M	8.08%	8.00%	1.01
21	12	\$1.1M	\$0.1M	\$0.1M	4.67%	8.00%	0.58
22	10	\$0.9M	\$0.0M	\$0.1M	3.52%	8.00%	0.44
23	12	\$1.1M	\$0.1M	\$0.1M	7.24%	8.00%	0.91
24	17	\$1.6M	\$0.2M	\$0.1M	12.26%	8.00%	1.53
25	5	\$0.4M	\$0.0M	\$0.0M	5.25%	8.00%	0.66
26	5	\$0.5M	\$0.0M	\$0.0M	5.88%	8.00%	0.73
27	9	\$0.8M	\$0.0M	\$0.1M	4.92%	8.00%	0.61
28	6	\$0.6M	\$0.0M	\$0.0M	1.91%	8.00%	0.24
29	1	\$0.1M	\$0.0M	\$0.0M	6.96%	8.00%	0.87
30	2	\$0.2M	\$0.0M	\$0.0M	15.93%	8.00%	1.99
31	4	\$0.5M	\$0.0M	\$0.0M	5.92%	8.00%	0.74
32	3	\$0.3M	\$0.0M	\$0.0M	14.01%	8.00%	1.75
33	1	\$0.1M	\$0.0M	\$0.0M	0.00%	8.00%	0.00
Total	363	\$30.9M	\$1.7M	\$2.2M	5.35%	7.13%	0.75

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



Overtime Assumption - Actual, Expected, and Ratio; by Service



Summary

In total, the proposed overtime percentages are anticipated to increase a member's anticipated pensionable earnings under the plan, which would increase plan liabilities. It would also increase the assumed amount of employee contributions received, especially for members with at least 20 years of service, which would partially offset the increase in the employer's portion of the normal cost. For disability benefits, the proposed overtime percentages are anticipated to decrease resulting in lower plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT ASSUMPTION OVERTIME AS A PERCENTAGE OF BASE PAY			
	SANITATION		
Years of Service	Baseline	Dual Retirement	Dual Disability
0	12.00%	16.00%	8.00%
1	12.00%	16.00%	8.00%
2	12.00%	16.00%	8.00%
3	12.00%	16.00%	8.00%
4	12.00%	16.00%	8.00%
5	12.00%	16.00%	8.00%
6	12.00%	16.00%	8.00%
7	12.00%	16.00%	8.00%
8	12.00%	16.00%	8.00%
9	12.00%	16.00%	8.00%
10	12.00%	16.00%	8.00%
11	12.00%	16.00%	8.00%
12	12.00%	16.00%	8.00%
13	12.00%	16.00%	8.00%
14	12.00%	16.00%	8.00%
15	12.00%	16.00%	8.00%
16	12.00%	16.00%	8.00%
17	12.00%	16.00%	8.00%
18	12.00%	16.00%	8.00%
19	12.00%	16.00%	8.00%
20	12.00%	16.00%	8.00%
21	12.00%	16.00%	8.00%
22	12.00%	16.00%	8.00%
23	12.00%	16.00%	8.00%
24	12.00%	16.00%	8.00%
25	12.00%	16.00%	8.00%
26	12.00%	16.00%	8.00%
27	12.00%	16.00%	8.00%
28	12.00%	16.00%	8.00%
29	12.00%	16.00%	8.00%
30+	12.00%	16.00%	8.00%

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED ASSUMPTION OVERTIME AS A PERCENTAGE OF BASE PAY		
	SANITATION	
Years of Service	Baseline and Dual Retirement ¹	Dual Disability ²
0	14.00%	5.50%
1	14.00%	5.50%
2	14.00%	5.50%
3	14.00%	5.50%
4	14.00%	5.50%
5	14.00%	5.50%
6	14.00%	5.50%
7	14.00%	5.50%
8	14.00%	5.50%
9	14.00%	5.50%
10	17.00%	7.00%
11	17.00%	7.00%
12	17.00%	7.00%
13	17.00%	7.00%
14	17.00%	7.00%
15	17.00%	7.00%
16	17.00%	7.00%
17	17.00%	7.00%
18	17.00%	7.00%
19	17.00%	7.00%
20	20.00%	8.00%
21	20.00%	8.00%
22	20.00%	8.00%
23	20.00%	8.00%
24	20.00%	8.00%
25	20.00%	8.00%
26	20.00%	8.00%
27	20.00%	8.00%
28	20.00%	8.00%
29	20.00%	8.00%
30+	20.00%	8.00%

¹ Dual retirement rate applies in year before assumed retirement

² Dual disability rate applies in year before assumed disability

Withdrawal

The current withdrawal assumption varies by service. No changes are proposed.

The analysis reflected years from 2012 - 2019 as the rate of termination during 2020 and 2021 may be artificially low due to members with a LOA status code. A record with a LOA status code is included as an exposure and not a decrement.

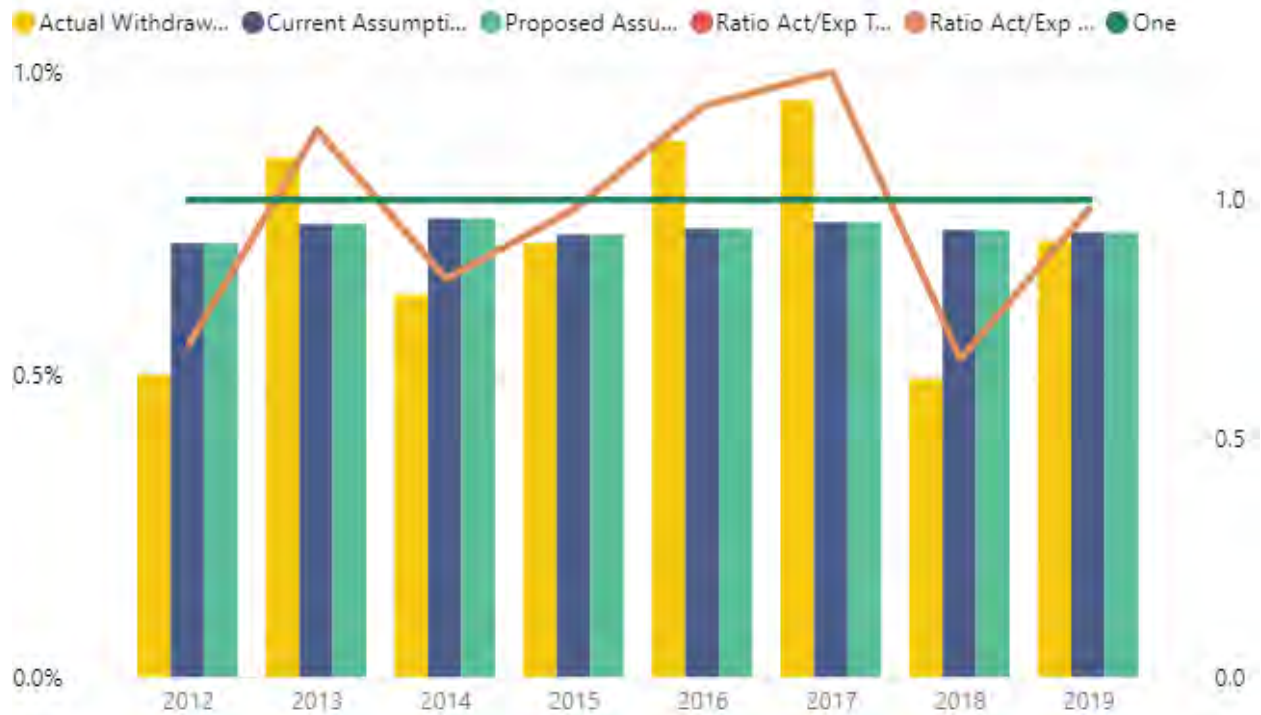
The following table shows the experience of withdrawal by year, for the age range (22 to 59) and service range (0 to 19 years). The actual rate of withdrawal averaged 0.72% whereas the overall expected rate of withdrawal averaged 0.74% based on the current and proposed assumptions.

Plan Year	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
2012	27	38.7	5,397	0.50%	0.72%	▲ 0.70
2013	48	41.8	5,590	0.86%	0.75%	▲ 1.15
2014	35	42.0	5,537	0.63%	0.76%	▲ 0.83
2015	42	42.8	5,855	0.72%	0.73%	● 0.98
2016	53	44.3	5,976	0.89%	0.74%	▲ 1.20
2017	60	47.3	6,295	0.95%	0.75%	▲ 1.27
2018	31	46.5	6,292	0.49%	0.74%	▲ 0.67
2019	46	46.9	6,378	0.72%	0.74%	● 0.98
Total	342	350.3	47,320	0.72%	0.74%	● 0.98

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Year



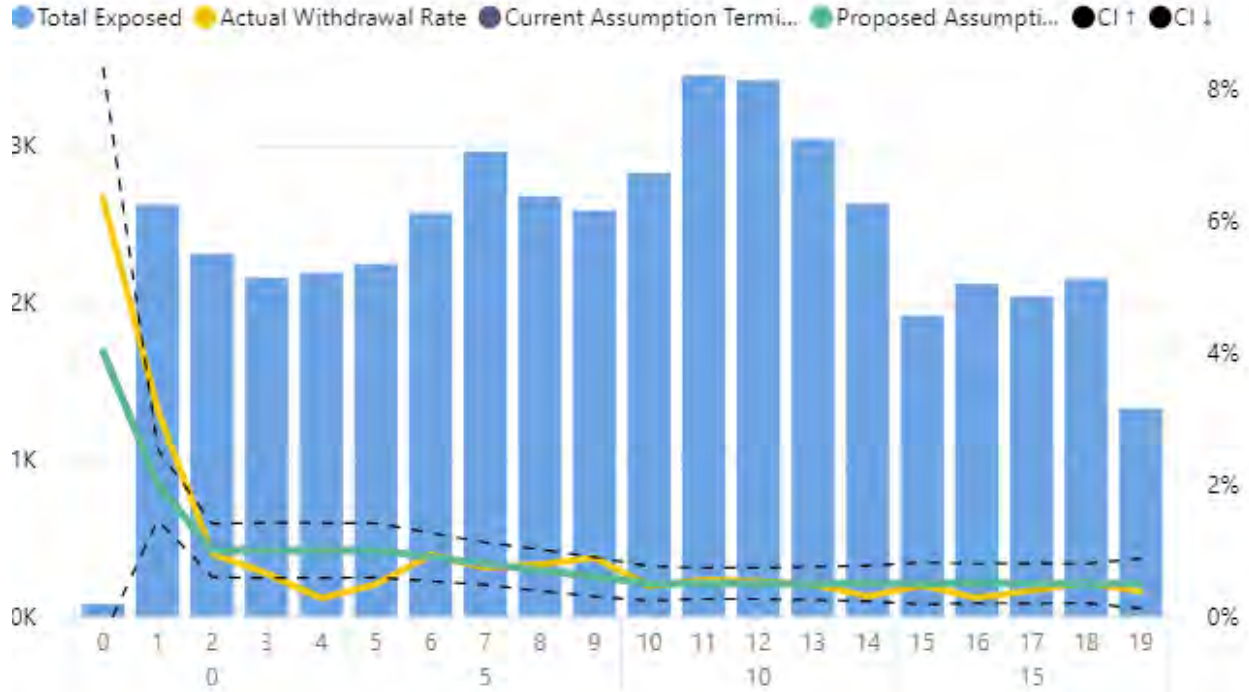
Withdrawal Rate - Actual, Expected, and Ratio; by Year



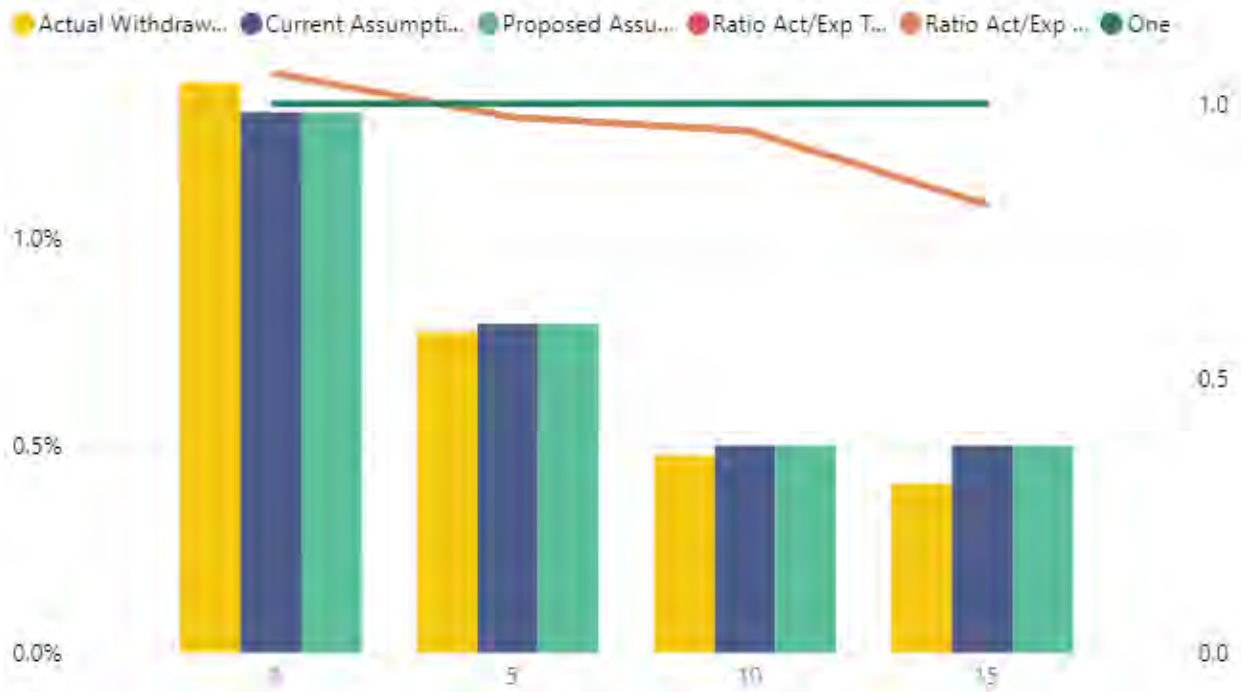
The following charts show the experience by service (0 to 19 years) in the experience study period first compared to the current and proposed assumption. This resulted in no change in the A/E ratio of 0.98 for ages 22 to 59.

Service	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
0	5	3.2	79	6.33%	4.00%	1.58
1	82	52.5	2,623	3.13%	2.00%	1.56
2	22	23.1	2,311	0.95%	1.00%	0.95
3	14	21.6	2,159	0.65%	1.00%	0.65
4	6	21.9	2,189	0.27%	1.00%	0.27
5	11	22.5	2,247	0.49%	1.00%	0.49
6	24	23.1	2,571	0.93%	0.90%	1.04
7	22	23.7	2,961	0.74%	0.80%	0.93
8	21	18.7	2,677	0.78%	0.70%	1.12
9	23	15.5	2,586	0.89%	0.60%	1.48
10	13	14.1	2,825	0.46%	0.50%	0.92
11	19	17.2	3,448	0.55%	0.50%	1.10
12	18	17.1	3,416	0.53%	0.50%	1.05
13	15	15.2	3,042	0.49%	0.50%	0.99
14	8	13.2	2,631	0.30%	0.50%	0.61
15	9	9.6	1,918	0.47%	0.50%	0.94
16	6	10.6	2,121	0.28%	0.50%	0.57
17	8	10.2	2,040	0.39%	0.50%	0.78
18	11	10.8	2,151	0.51%	0.50%	1.02
19	5	6.6	1,325	0.38%	0.50%	0.75
Total	342	350.3	47,320	0.72%	0.74%	0.98

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Service



Withdrawal Rate - Actual, Expected, and Ratio; by Service w/Proposed



Summary

The proposed rates of withdrawal have remained the same and no change in plan liabilities will result.

Assumption Tables

The following table shows the current assumptions. No change is proposed.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF TERMINATION	
	Probabilities of Termination
Years of Service	Sanitation
0	4.00%
1	2.00%
2	1.00%
3	1.00%
4	1.00%
5	1.00%
6	0.90%
7	0.80%
8	0.70%
9	0.60%
10	0.50%
11	0.50%
12	0.50%
13	0.50%
14	0.50%
15	0.50%
16	0.50%
17	0.50%
18	0.50%
19	0.50%
20	0.50%

Retirement

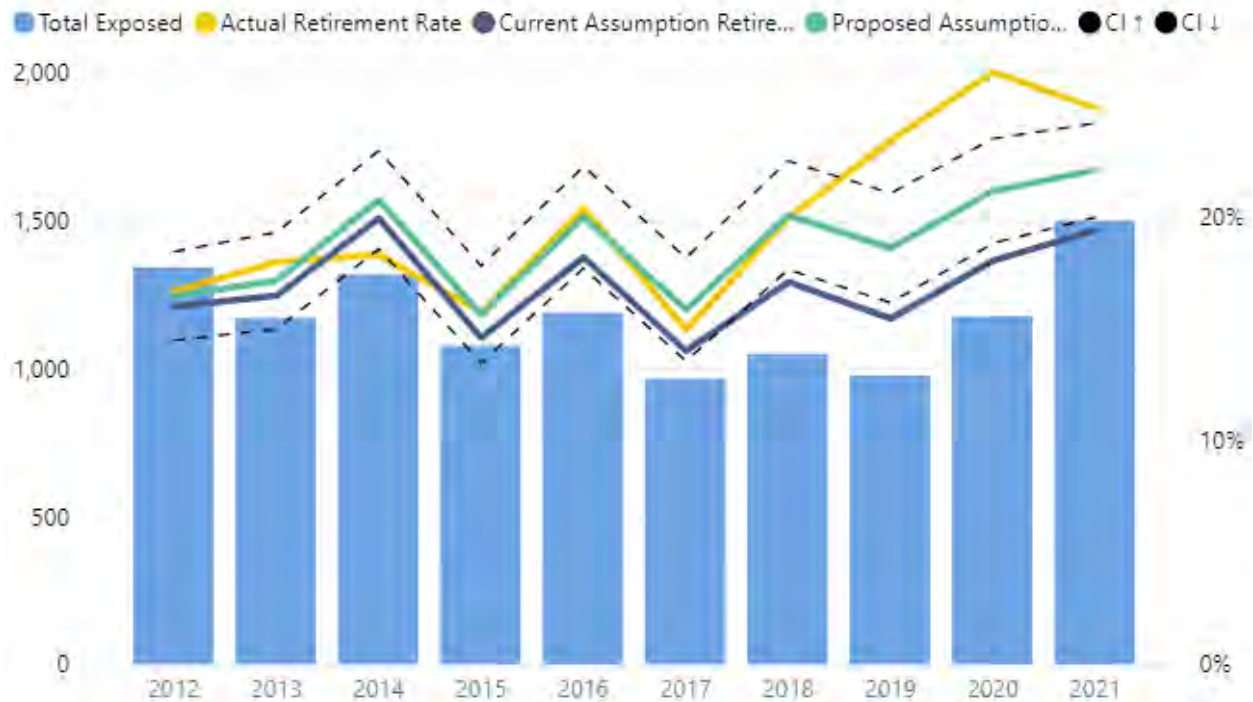
The current retirement assumption varies by age and eligibility for unreduced retirement with higher rates occurring at first eligibility. Furthermore, higher rates of retirement are assumed for members who had the option to elect an improved program. The proposed assumption maintains the same structure but reflects greater differences by age. Generally higher rates of retirement are proposed.

The following table shows the experience for retirement by year, for the age range (40 to 69), and for the service range (20 to 39) for all plans. The actual rate of retirement averaged 19.99% whereas the overall expected rate of retirement averaged 17.09% based on the current assumptions and 18.91% based on the proposed assumptions.

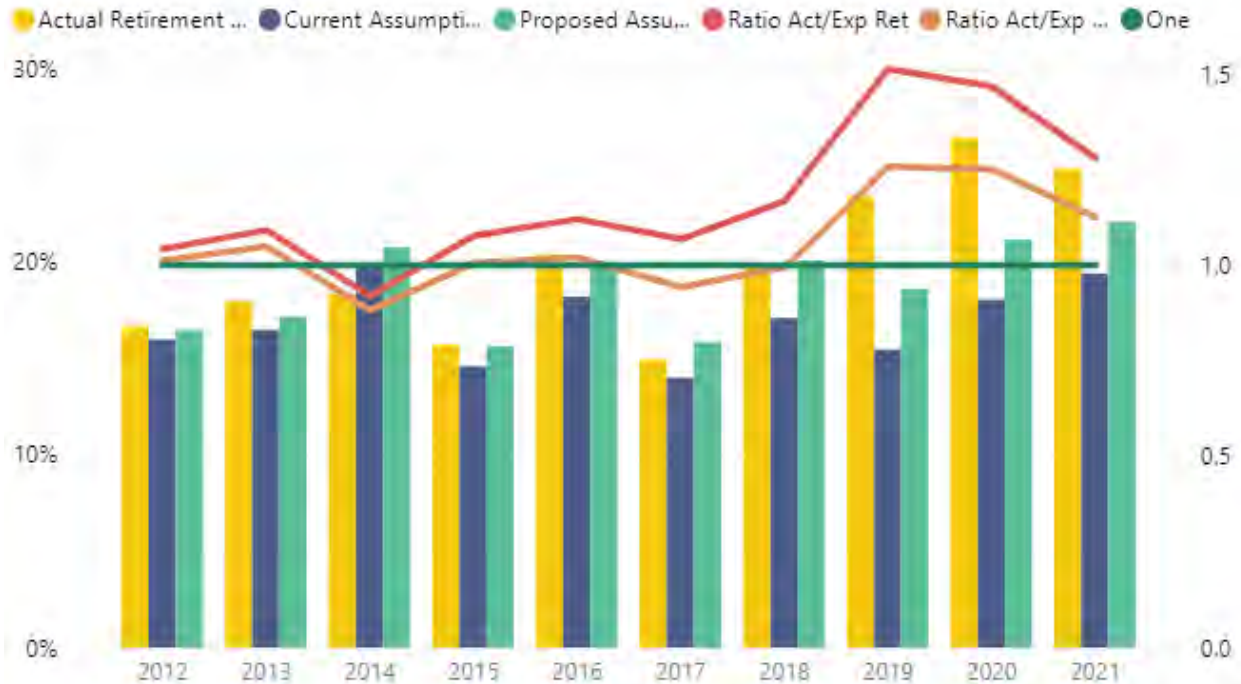
Plan Year	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
2012	223	213.9	1,340	16.64%	15.97%	1.04
2013	210	192.3	1,169	17.96%	16.45%	1.09
2014	241	262.4	1,317	18.30%	19.92%	0.92
2015	169	156.9	1,076	15.71%	14.58%	1.08
2016	242	216.0	1,188	20.37%	18.18%	1.12
2017	144	134.8	964	14.94%	13.98%	1.07
2018	209	178.9	1,048	19.94%	17.07%	1.17
2019	228	150.6	975	23.38%	15.44%	1.51
2020	311	211.9	1,176	26.45%	18.02%	1.47
2021	372	290.4	1,498	24.83%	19.39%	1.28
Total	2,349	2,008.1	11,751	19.99%	17.09%	1.17

Plan Year	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
2012	223	220.3	1,340	16.64%	16.44%	1.01
2013	210	200.3	1,169	17.96%	17.14%	1.05
2014	241	273.1	1,317	18.30%	20.74%	0.88
2015	169	168.0	1,076	15.71%	15.62%	1.01
2016	242	237.2	1,188	20.37%	19.97%	1.02
2017	144	152.8	964	14.94%	15.85%	0.94
2018	209	210.2	1,048	19.94%	20.05%	0.99
2019	228	181.3	975	23.38%	18.59%	1.26
2020	311	248.6	1,176	26.45%	21.14%	1.25
2021	372	330.5	1,498	24.83%	22.06%	1.13
Total	2,349	2,222.2	11,751	19.99%	18.91%	1.06

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Year



Retirement Rate - Actual, Expected, and Ratio; by Year



We will review the retirement experience split by mandated versus improved plan members.

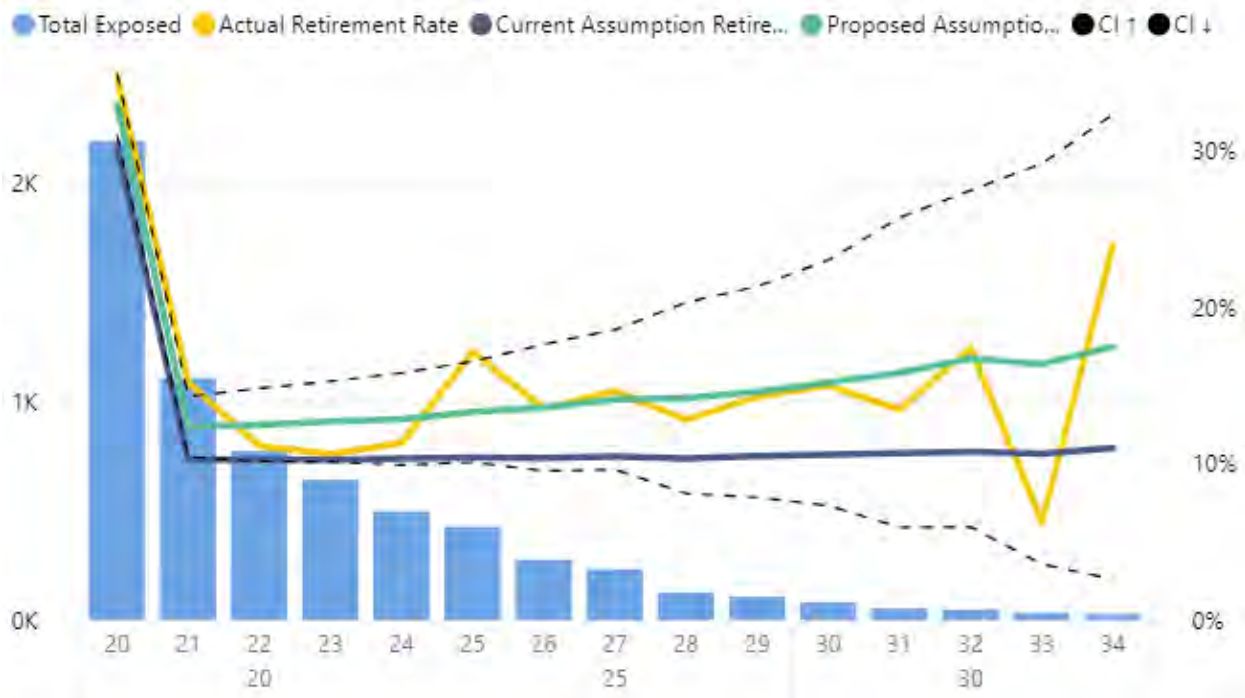
Mandated Plan

The following table shows the experience of mandated members by service based on the age range (40 to 69) and service range (20 to 34) for the period 2012 – 2021. The actual rate of retirement averaged 20.43% whereas the overall expected rate of retirement averaged 16.91% based on the current assumptions and 19.67% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.21 to 1.04. At first eligibility (20 years of service), the A/E ratio decreased from 1.15 to 1.05 and after first eligibility (21 or more years of service), the A/E ratio decreased from 1.29 to 1.02.

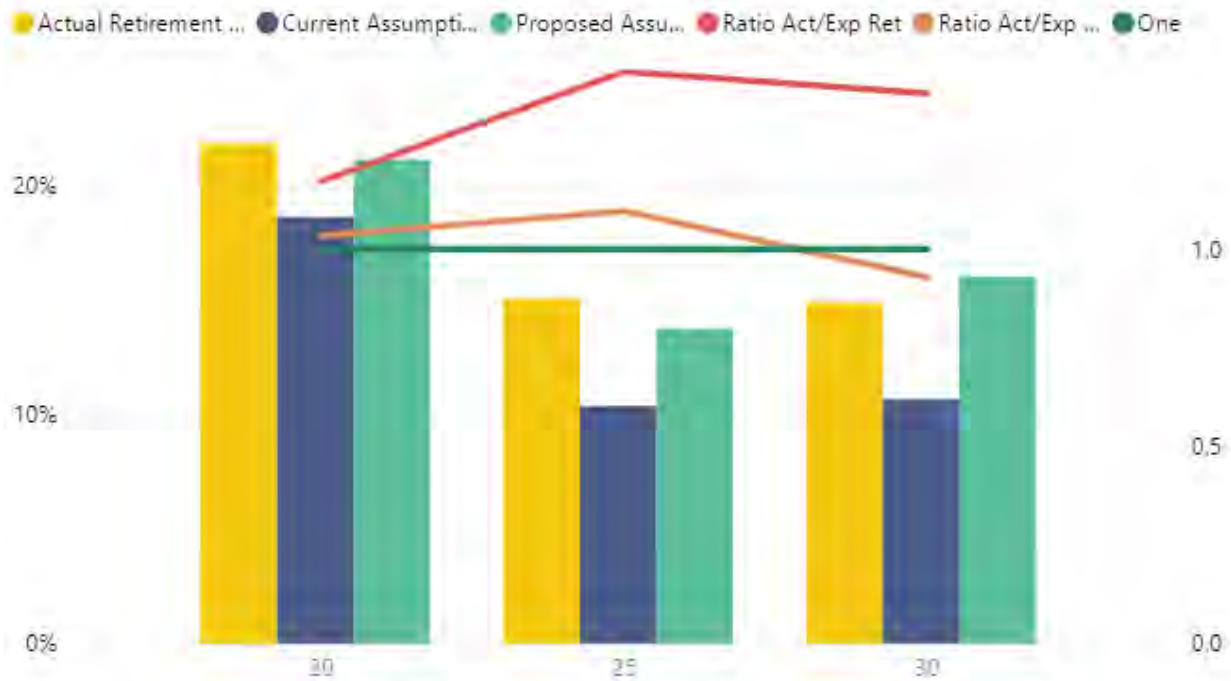
Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
20	761	661.4	2,192	34.72%	30.18%	▲ 1.15
21	168	113.5	1,107	15.18%	10.25%	▲ 1.48
22	86	79.3	773	11.13%	10.26%	● 1.08
23	68	65.7	641	10.61%	10.24%	● 1.04
24	56	51.2	495	11.31%	10.34%	● 1.09
25	73	44.1	425	17.18%	10.39%	◆ 1.65
26	37	28.3	274	13.50%	10.35%	▲ 1.31
27	34	24.2	232	14.66%	10.45%	▲ 1.40
28	16	12.9	125	12.80%	10.32%	▲ 1.24
29	15	11.0	105	14.29%	10.48%	▲ 1.36
30	12	8.5	80	15.00%	10.56%	▲ 1.42
31	7	5.6	52	13.46%	10.67%	▲ 1.26
32	8	5.0	46	17.39%	10.76%	◆ 1.62
33	2	3.4	32	6.25%	10.63%	▲ 0.59
34	6	2.8	25	24.00%	11.00%	◆ 2.18
Total	1,349	1,116.8	6,604	20.43%	16.91%	▲ 1.21

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
20	761	723.3	2,192	34.72%	33.00%	1.05
21	168	136.8	1,107	15.18%	12.36%	1.23
22	86	96.5	773	11.13%	12.49%	0.89
23	68	81.4	641	10.61%	12.69%	0.84
24	56	63.6	495	11.31%	12.86%	0.88
25	73	56.6	425	17.18%	13.32%	1.29
26	37	37.2	274	13.50%	13.59%	0.99
27	34	32.7	232	14.66%	14.10%	1.04
28	16	17.8	125	12.80%	14.21%	0.90
29	15	15.3	105	14.29%	14.60%	0.98
30	12	12.1	80	15.00%	15.18%	0.99
31	7	8.2	52	13.46%	15.84%	0.85
32	8	7.7	46	17.39%	16.72%	1.04
33	2	5.2	32	6.25%	16.39%	0.38
34	6	4.4	25	24.00%	17.48%	1.37
Total	1,349	1,299.0	6,604	20.43%	19.67%	1.04

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



Retirement Rate - Actual, Expected, and Ratio; by Service

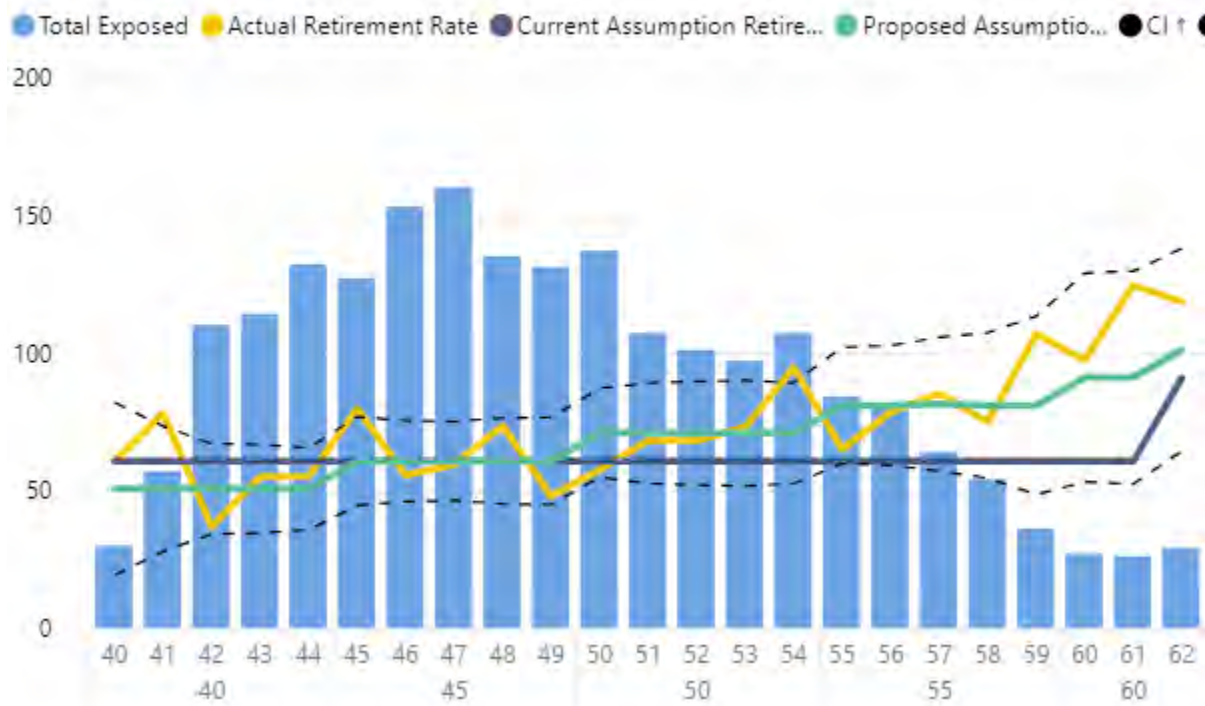


The following charts display the experience of first eligibility (20 years of service) by age based on the age range (40 to 69) for the current and proposed assumptions. The actual rate of retirement averaged 34.86% whereas the overall expected rate of retirement averaged 30.30% based on the current assumptions and 33.12% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.15 to 1.05.

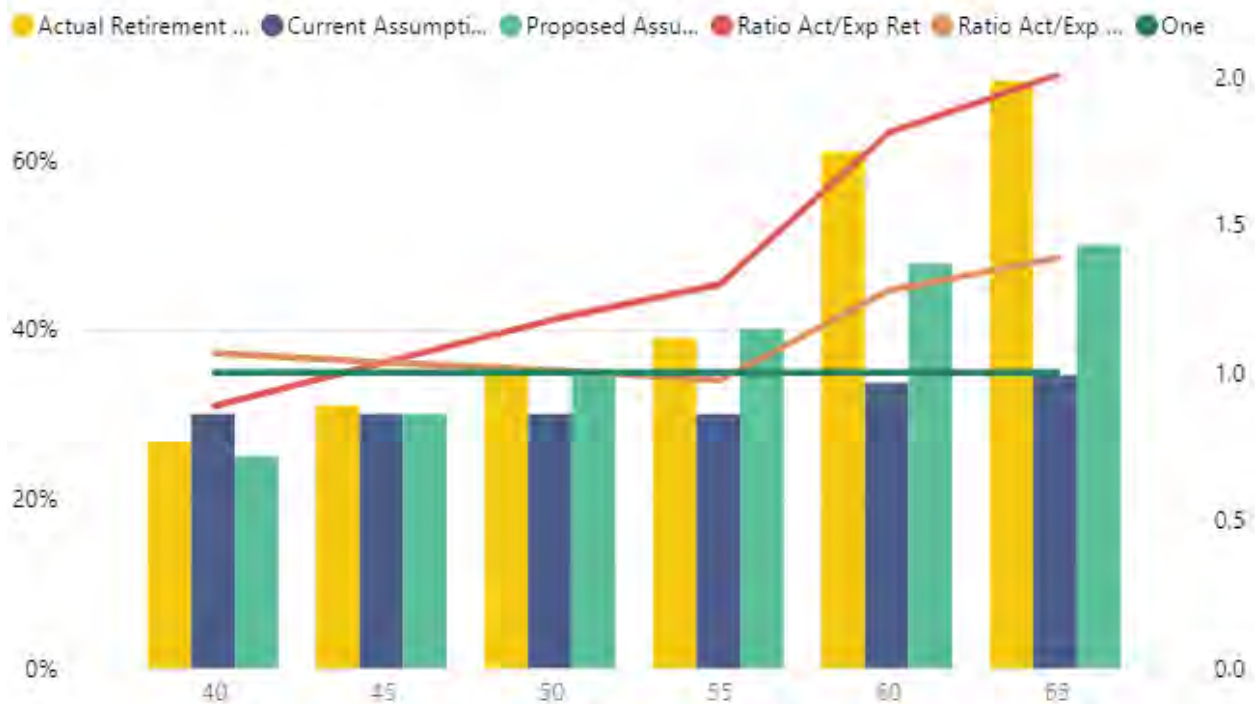
Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
40	9	9.0	30	30.00%	30.00%	1.00
41	22	17.1	57	38.60%	30.00%	1.29
42	20	33.0	110	18.18%	30.00%	0.61
43	31	34.2	114	27.19%	30.00%	0.91
44	36	39.6	132	27.27%	30.00%	0.91
45	50	38.1	127	39.37%	30.00%	1.31
46	42	45.9	153	27.45%	30.00%	0.92
47	47	48.0	160	29.38%	30.00%	0.98
48	49	40.5	135	36.30%	30.00%	1.21
49	31	39.3	131	23.66%	30.00%	0.79
50	39	41.1	137	28.47%	30.00%	0.95
51	36	32.1	107	33.64%	30.00%	1.12
52	34	30.3	101	33.66%	30.00%	1.12
53	35	29.1	97	36.08%	30.00%	1.20
54	50	32.1	107	46.73%	30.00%	1.56
55	27	25.2	84	32.14%	30.00%	1.07
56	31	24.0	80	38.75%	30.00%	1.29
57	27	19.2	64	42.19%	30.00%	1.41
58	20	16.2	54	37.04%	30.00%	1.23
59	19	10.8	36	52.78%	30.00%	1.76
60	13	8.1	27	48.15%	30.00%	1.60
61	16	7.8	26	61.54%	30.00%	2.05
62	17	13.1	29	58.62%	45.00%	1.30
63	13	5.7	19	68.42%	30.00%	2.28
64	13	5.1	17	76.47%	30.00%	2.55
65	11	6.8	15	73.33%	45.00%	1.63
66	12	4.8	16	75.00%	30.00%	2.50
67	5	2.7	9	55.56%	30.00%	1.85
68	2	1.2	4	50.00%	30.00%	1.67
69	4	1.5	5	80.00%	30.00%	2.67
Total	761	661.5	2,183	34.86%	30.30%	1.15

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
40	9	7.5	30	30.00%	25.00%	▲ 1.20
41	22	14.3	57	38.60%	25.00%	◆ 1.54
42	20	27.5	110	18.18%	25.00%	▲ 0.73
43	31	28.5	114	27.19%	25.00%	● 1.09
44	36	33.0	132	27.27%	25.00%	● 1.09
45	50	38.1	127	39.37%	30.00%	▲ 1.31
46	42	45.9	153	27.45%	30.00%	● 0.92
47	47	48.0	160	29.38%	30.00%	● 0.98
48	49	40.5	135	36.30%	30.00%	▲ 1.21
49	31	39.3	131	23.66%	30.00%	▲ 0.79
50	39	48.1	137	28.47%	35.09%	▲ 0.81
51	36	37.4	107	33.64%	35.00%	● 0.96
52	34	35.4	101	33.66%	35.00%	● 0.96
53	35	33.9	97	36.08%	35.00%	● 1.03
54	50	37.4	107	46.73%	35.00%	▲ 1.34
55	27	33.6	84	32.14%	40.00%	▲ 0.80
56	31	32.0	80	38.75%	40.00%	● 0.97
57	27	25.7	64	42.19%	40.21%	● 1.05
58	20	21.6	54	37.04%	40.00%	● 0.93
59	19	14.4	36	52.78%	40.00%	▲ 1.32
60	13	12.2	27	48.15%	45.00%	● 1.07
61	16	11.7	26	61.54%	45.00%	▲ 1.37
62	17	14.5	29	58.62%	50.00%	▲ 1.17
63	13	9.5	19	68.42%	50.00%	▲ 1.37
64	13	8.5	17	76.47%	50.00%	◆ 1.53
65	11	7.5	15	73.33%	50.00%	▲ 1.47
66	12	8.0	16	75.00%	50.00%	◆ 1.50
67	5	4.5	9	55.56%	50.00%	▲ 1.11
68	2	2.0	4	50.00%	50.00%	● 1.00
69	4	2.5	5	80.00%	50.00%	◆ 1.60
Total	761	723.0	2,183	34.86%	33.12%	● 1.05

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



Retirement Rate - Actual, Expected, and Ratio; by Age



The following charts display the experience after first eligibility by age based on the age range (40 to 69) and the service range (21 to 34) for the current and proposed assumptions. The actual rate of retirement averaged 13.33% whereas the overall expected rate of retirement averaged 10.31% based on the current assumptions and 13.03% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.29 to 1.02.

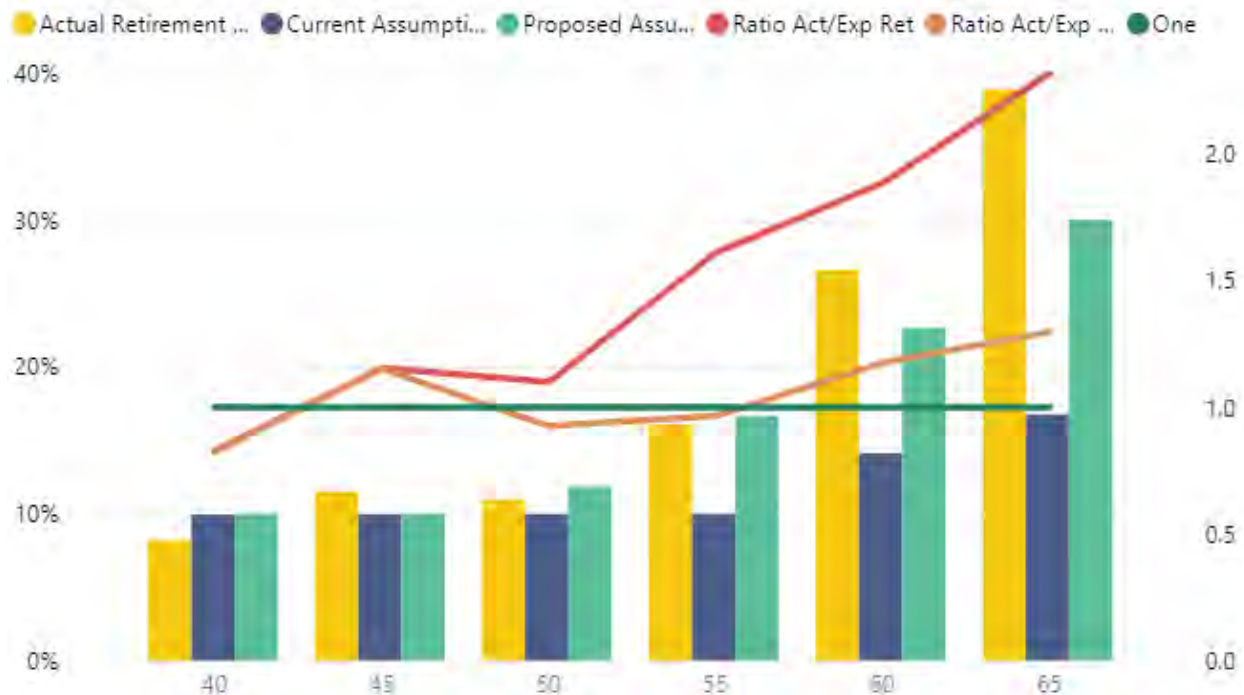
Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
40	0	0.8	8	0.00%	10.00%	0.00
41	1	2.6	26	3.85%	10.00%	0.38
42	2	3.7	37	5.41%	10.00%	0.54
43	10	8.4	84	11.90%	9.94%	1.20
44	10	12.3	125	8.00%	9.87%	0.81
45	17	17.4	176	9.66%	9.91%	0.97
46	28	22.6	227	12.33%	9.96%	1.24
47	29	28.9	290	10.00%	9.97%	1.00
48	43	34.9	350	12.29%	9.96%	1.23
49	42	33.8	339	12.39%	9.98%	1.24
50	28	33.1	332	8.43%	9.98%	0.85
51	39	33.8	339	11.50%	9.98%	1.15
52	39	30.5	307	12.70%	9.95%	1.28
53	29	26.9	270	10.74%	9.97%	1.08
54	31	26.5	266	11.65%	9.98%	1.17
55	40	24.4	245	16.33%	9.97%	1.64
56	35	20.4	205	17.07%	9.96%	1.71
57	23	17.8	178	12.92%	10.00%	1.29
58	21	14.9	149	14.09%	10.00%	1.41
59	26	12.5	125	20.80%	10.00%	2.08
60	21	9.4	94	22.34%	10.00%	2.23
61	24	11.1	74	32.43%	15.00%	2.16
62	9	9.0	45	20.00%	20.00%	1.00
63	9	5.6	37	24.32%	15.00%	1.62
64	11	4.2	28	39.29%	15.00%	2.62
65	4	3.8	19	21.05%	20.00%	1.05
66	10	2.3	15	66.67%	15.00%	4.44
67	2	0.9	6	33.33%	15.00%	2.22
68	3	1.1	7	42.86%	15.00%	2.86
69	2	1.1	7	28.57%	15.00%	1.90
Total	588	454.7	4,410	13.33%	10.31%	1.29

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
40	0	0.8	8	0.00%	10.00%	0.00
41	1	2.6	26	3.85%	10.00%	0.38
42	2	3.7	37	5.41%	10.00%	0.54
43	10	8.5	84	11.90%	10.06%	1.18
44	10	12.4	125	8.00%	9.94%	0.81
45	17	17.6	176	9.66%	9.97%	0.97
46	28	22.7	227	12.33%	10.00%	1.23
47	29	28.9	290	10.00%	9.98%	1.00
48	43	35.0	350	12.29%	9.99%	1.23
49	42	33.9	339	12.39%	9.99%	1.24
50	28	33.1	332	8.43%	9.98%	0.85
51	39	37.2	339	11.50%	10.99%	1.05
52	39	36.7	307	12.70%	11.96%	1.06
53	29	35.0	270	10.74%	12.96%	0.83
54	31	37.2	266	11.65%	14.00%	0.83
55	40	36.7	245	16.33%	14.96%	1.09
56	35	32.7	205	17.07%	15.97%	1.07
57	23	30.3	178	12.92%	17.00%	0.76
58	21	26.8	149	14.09%	18.00%	0.78
59	26	23.8	125	20.80%	19.00%	1.09
60	21	18.8	94	22.34%	20.00%	1.12
61	24	16.7	74	32.43%	22.50%	1.44
62	9	11.3	45	20.00%	25.00%	0.80
63	9	9.3	37	24.32%	25.00%	0.97
64	11	7.0	28	39.29%	25.00%	1.57
65	4	5.7	19	21.05%	30.00%	0.70
66	10	4.5	15	66.67%	30.00%	2.22
67	2	1.8	6	33.33%	30.00%	1.11
68	3	2.1	7	42.86%	30.00%	1.43
69	2	2.1	7	28.57%	30.00%	0.95
Total	588	574.7	4,410	13.33%	13.03%	1.02

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



Retirement Rate - Actual, Expected, and Ratio; by Age



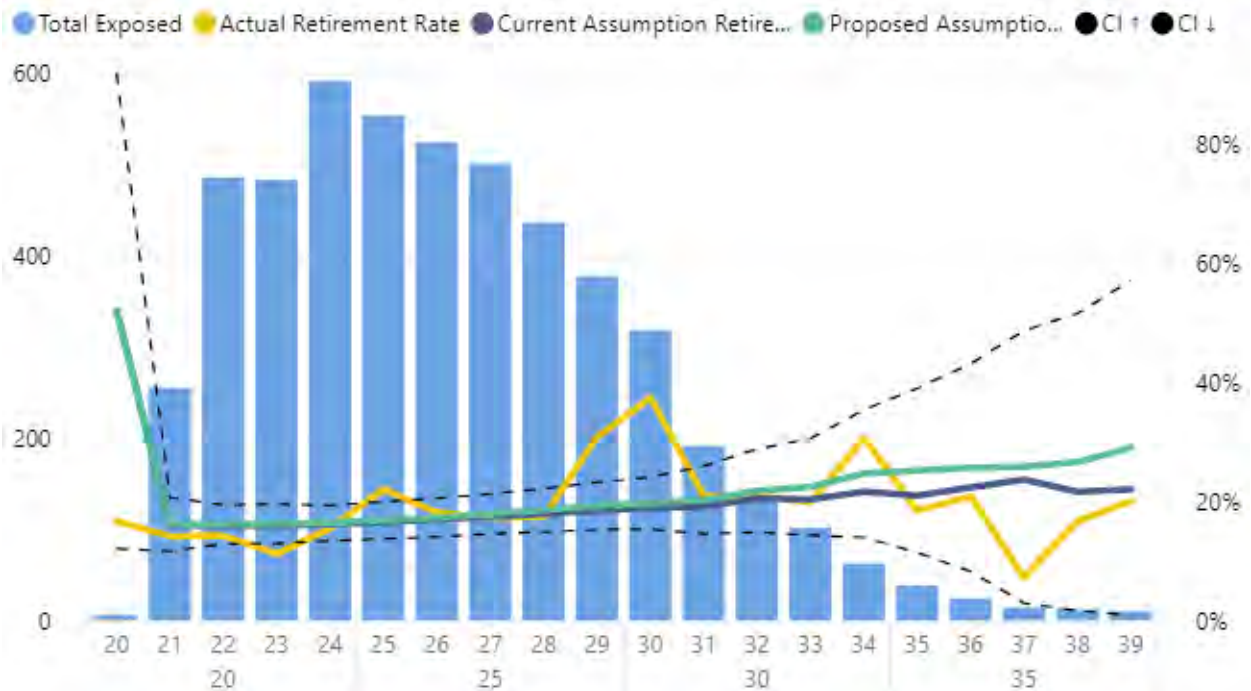
Improved Plan

The following table shows the experience of improved plan members by service based on the age range (40 to 69) and service range (20 to 39) for the period 2012 – 2021. The actual rate of retirement averaged 19.34% whereas the overall expected rate of retirement averaged 17.35% based on the current assumptions and 17.93% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.11 to 1.08. There was no experience during the study period of first eligibility so no change in those assumptions is proposed. After first eligibility, only proposed change in retirement rates is for older ages (64+) as experience was fairly consistent with the current assumption.

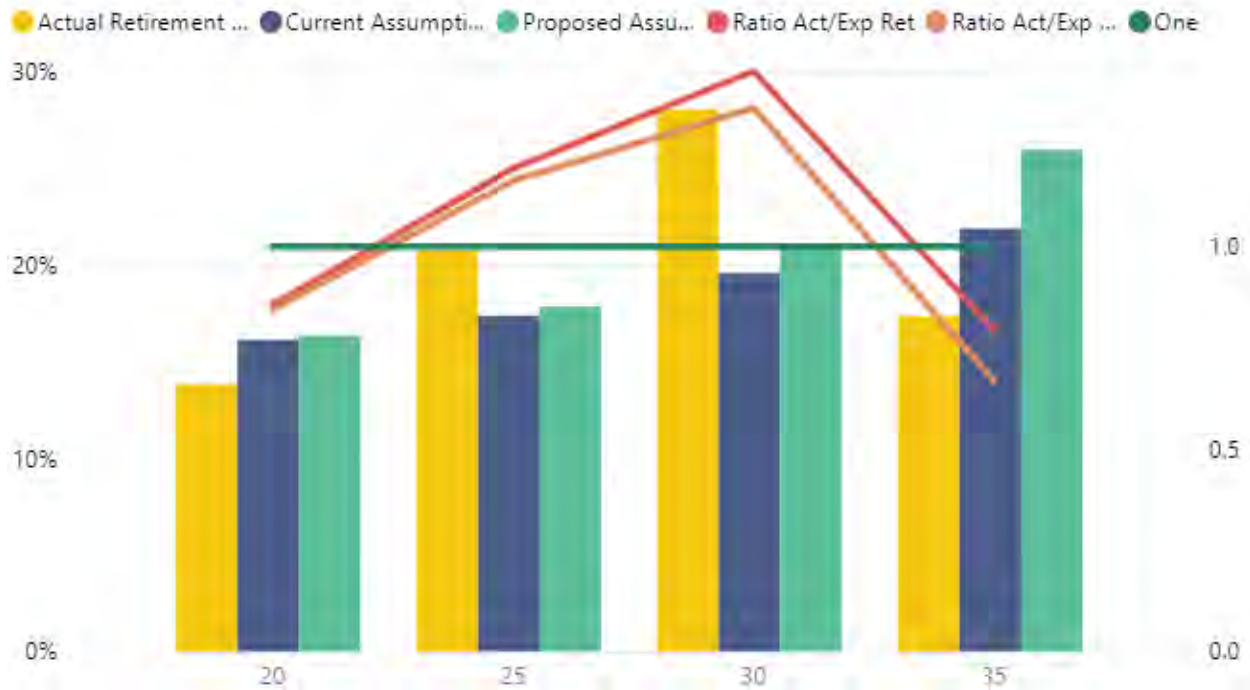
Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
20	1	3.1	6	16.67%	52.00%	0.32
21	36	40.6	255	14.12%	15.92%	0.89
22	69	77.4	485	14.23%	15.95%	0.89
23	54	77.1	483	11.18%	15.95%	0.70
24	91	95.1	591	15.40%	16.09%	0.96
25	122	91.1	553	22.06%	16.48%	1.34
26	95	88.9	524	18.13%	16.97%	1.07
27	86	87.2	500	17.20%	17.44%	0.99
28	76	78.1	436	17.43%	17.92%	0.97
29	116	69.7	377	30.77%	18.49%	1.66
30	119	59.9	318	37.42%	18.83%	1.99
31	40	36.5	191	20.94%	19.12%	1.10
32	28	27.4	134	20.90%	20.46%	1.02
33	20	20.5	101	19.80%	20.33%	0.97
34	19	13.4	62	30.65%	21.60%	1.42
35	7	8.0	38	18.42%	20.97%	0.88
36	5	5.4	24	20.83%	22.33%	0.93
37	1	3.3	14	7.14%	23.64%	0.30
38	2	2.6	12	16.67%	21.58%	0.77
39	2	2.2	10	20.00%	22.00%	0.91
Total	989	887.5	5,114	19.34%	17.35%	1.11

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
20	1	3.1	6	16.67%	52.00%	0.32
21	36	41.1	255	14.12%	16.12%	0.88
22	69	78.2	485	14.23%	16.12%	0.88
23	54	78.4	483	11.18%	16.22%	0.69
24	91	96.5	591	15.40%	16.33%	0.94
25	122	93.0	553	22.06%	16.82%	1.31
26	95	90.4	524	18.13%	17.25%	1.05
27	86	89.4	500	17.20%	17.88%	0.96
28	76	80.6	436	17.43%	18.49%	0.94
29	116	72.4	377	30.77%	19.21%	1.60
30	119	62.6	318	37.42%	19.68%	1.90
31	40	38.6	191	20.94%	20.21%	1.04
32	28	29.2	134	20.90%	21.80%	0.96
33	20	22.6	101	19.80%	22.41%	0.88
34	19	15.3	62	30.65%	24.66%	1.24
35	7	9.6	38	18.42%	25.18%	0.73
36	5	6.2	24	20.83%	25.67%	0.81
37	1	3.6	14	7.14%	25.79%	0.28
38	2	3.2	12	16.67%	26.58%	0.63
39	2	2.9	10	20.00%	29.00%	0.69
Total	989	916.9	5,114	19.34%	17.93%	1.08

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



Retirement Rate - Actual, Expected, and Ratio; by Service



The following charts display the experience by age based on the age range (40 to 69) and the service range (20 to 34) for the current and proposed assumptions.

Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
42	1	0.2	1	100.00%	15.00%	6.67
43	0	0.3	2	0.00%	15.00%	0.00
44	1	2.4	16	6.25%	15.00%	0.42
45	8	6.6	42	19.05%	15.60%	1.22
46	8	14.1	94	8.51%	15.00%	0.57
47	19	22.4	149	12.75%	15.00%	0.85
48	28	32.7	218	12.84%	15.00%	0.86
49	39	38.7	256	15.23%	15.13%	1.01
50	37	43.7	289	12.80%	15.12%	0.85
51	46	49.4	329	13.98%	15.00%	0.93
52	52	52.0	344	15.12%	15.11%	1.00
53	61	53.1	354	17.23%	15.00%	1.15
54	62	51.3	342	18.13%	15.00%	1.21
55	67	50.6	334	20.06%	15.13%	1.33
56	53	52.2	326	16.26%	16.00%	1.02
57	73	59.5	350	20.86%	17.00%	1.23
58	65	59.8	332	19.58%	18.00%	1.09
59	80	60.4	318	25.16%	19.00%	1.32
60	54	54.0	268	20.15%	20.15%	1.00
61	77	56.3	225	34.22%	25.00%	1.37
62	54	51.3	171	31.58%	30.00%	1.05
63	39	24.0	120	32.50%	20.00%	1.62
64	21	16.2	81	25.93%	20.00%	1.30
65	20	18.0	60	33.33%	30.00%	1.11
66	13	8.0	40	32.50%	20.00%	1.63
67	2	4.4	22	9.09%	20.00%	0.45
68	4	3.6	18	22.22%	20.00%	1.11
69	5	2.6	13	38.46%	20.00%	1.92
Total	989	887.5	5,114	19.34%	17.35%	1.11

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
42	1	0.2	1	100.00%	15.00%	6.67
43	0	0.3	2	0.00%	15.00%	0.00
44	1	2.4	16	6.25%	15.00%	0.42
45	8	6.6	42	19.05%	15.60%	1.22
46	8	14.1	94	8.51%	15.00%	0.57
47	19	22.4	149	12.75%	15.00%	0.85
48	28	32.7	218	12.84%	15.00%	0.86
49	39	38.7	256	15.23%	15.13%	1.01
50	37	43.7	289	12.80%	15.12%	0.85
51	46	49.4	329	13.98%	15.00%	0.93
52	52	52.0	344	15.12%	15.11%	1.00
53	61	53.1	354	17.23%	15.00%	1.15
54	62	51.3	342	18.13%	15.00%	1.21
55	67	50.6	334	20.06%	15.13%	1.33
56	53	52.2	326	16.26%	16.00%	1.02
57	73	59.5	350	20.86%	17.00%	1.23
58	65	59.8	332	19.58%	18.00%	1.09
59	80	60.4	318	25.16%	19.00%	1.32
60	54	54.0	268	20.15%	20.15%	1.00
61	77	56.3	225	34.22%	25.00%	1.37
62	54	51.3	171	31.58%	30.00%	1.05
63	39	36.0	120	32.50%	30.00%	1.08
64	21	24.3	81	25.93%	30.00%	0.86
65	20	18.0	60	33.33%	30.00%	1.11
66	13	12.0	40	32.50%	30.00%	1.08
67	2	6.6	22	9.09%	30.00%	0.30
68	4	5.4	18	22.22%	30.00%	0.74
69	5	3.9	13	38.46%	30.00%	1.28
Total	989	916.9	5,114	19.34%	17.93%	1.08

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



Retirement Rate - Actual, Expected, and Ratio; by Age



Tier R 22-Year Plan (Tier 3R)

Setting retirement rates for a new benefit tier is effectively a theoretical exercise. When setting the rates for the new tier we must consider how changes to eligibility requirements and benefit levels would impact member behavior and specifically rates of retirement, especially at certain service levels. In most situations, we can review the experience of prior membership tiers to determine how future membership tiers may act based on differences in the plan provisions.

The following items were reflected in our analysis in proposing modifications to the current assumptions:

- A Sanitation member can retire at 20 years of service under Tier 3R, although the benefit is lower than prior tier benefits. Experience has shown that a significant number of prior tier members retire at 20 years of service (assumption is approximately 30%). How significantly would this percentage drop due to the changes in plan provisions.
- At 22 years of service, Tier 3R members receive a benefit of 50% of final average salary, which equals the percentage provided under prior tiers, although the definition of final average salary is more stringent under Tier 3 than under the prior tiers.
- Beginning at 22 years of service, Tier 3R members can accrue credit towards full escalation of benefits. Providing a cost-of-living adjustment can be a fairly expensive benefit for sanitation members who retire earlier than other public employee groups.
- At 25 years of service, a Tier 3R member has fully accrued the full escalation benefit. Furthermore, there are no further accruals if the member works beyond 25 years of service. Under prior tiers, members continue to accrue benefits up to 30 years of service. This change could incentivize Tier 3R members to retire at 25 years of service.

Based on these points, we believe that the number of Sanitation members who will retire after 25 years of service would be similar under Tier 3R as compared to those who would retire under prior tiers. If there were 1,000 prior tier members eligible to retire at 20 years of service, we have estimated approximately 650 would retire by the time they would have completed 25 years of service. Under the current assumption for Tier 3R members, we have estimated that approximately 30% fewer retirements occur during this same time period. We propose rates for the Tier 3R members that would approximate the same number of 650 that are anticipated to retire under the prior tiers as we would not necessarily expect a significant reduction in the number Sanitation members retiring after completing 25 years of service.

The following table compares the current assumption to the proposed assumption.

Sanitation Tier 3R Comparison of Current and Proposed Retirement Assumption		
Years of Service	Current Assumption	Proposed Assumption
20	5.0%	12.0%
21	2.0%	3.0%
22	5.0%	15.0%
23	2.0%	6.0%
24	2.0%	9.0%
25	30.0%	40.0%

Summary

In total, the proposed rates of retirement have increased the anticipated number of retirements for mandated members, including Tier 3R members, which would increase plan liabilities. Very minor changes are proposed for improved plan members and anticipate an insignificant impact on plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF SERVICE RETIREMENT: SANITATION				
	Reduced Service Retirement Tiers 1-4		Reduced Service Retirement Tier 3R	
	Age	Rate	Service	Rate
	55	4.00%	20	5.00%
	56	4.00%	21	2.00%
	57	4.00%	22	5.00%
	58	4.00%	23	2.00%
	59	6.00%	24	2.00%
	60	8.00%	25	N/A
	61	10.00%		
	62	N/A		
Age	Unreduced Service Retirement For Members Mandated Into Their Retirement Program		Unreduced Service Retirement For Members Who Elected an Improved Retirement Program	
	Year 1	Ultimate	Year 1	Ultimate
45	30.00%	10.00%	40.00%	15.00%
46	30.00%	10.00%	42.00%	15.00%
47	30.00%	10.00%	44.00%	15.00%
48	30.00%	10.00%	46.00%	15.00%
49	30.00%	10.00%	48.00%	15.00%
50	30.00%	10.00%	50.00%	15.00%
51	30.00%	10.00%	52.00%	15.00%
52	30.00%	10.00%	54.00%	15.00%
53	30.00%	10.00%	56.00%	15.00%
54	30.00%	10.00%	58.00%	15.00%
55	30.00%	10.00%	60.00%	15.00%
56	30.00%	10.00%	60.00%	16.00%
57	30.00%	10.00%	60.00%	17.00%
58	30.00%	10.00%	60.00%	18.00%
59	30.00%	10.00%	60.00%	19.00%
60	30.00%	10.00%	60.00%	20.00%
61	30.00%	15.00%	60.00%	25.00%
62	45.00%	20.00%	60.00%	30.00%
63	30.00%	15.00%	40.00%	20.00%
64	30.00%	15.00%	40.00%	20.00%
65	45.00%	20.00%	60.00%	30.00%
66	30.00%	15.00%	40.00%	20.00%
67	30.00%	15.00%	40.00%	20.00%
68	30.00%	15.00%	40.00%	20.00%
69	30.00%	15.00%	40.00%	20.00%
70	100.00%	100.00%	100.00%	100.00%

¹ 45.00% for Tier 1-4 members and 30.00% for Tier 3R members.

² 20.00% for Tier 1-4 members and 15.00% for Tier 3R members.

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: SANITATION					
Age	Unreduced Service Retirement For Members Mandated Into Their Retirement Program			Unreduced Service Retirement For Members Who Elected an Improved Retirement Program	
	First Eligibility ¹	First Eligibility Tier 3R ²	Ultimate	First Eligibility ¹	Ultimate
40	25.00%	33.33%	10.00%	40.00%	15.00%
41	25.00%	33.33%	10.00%	40.00%	15.00%
42	25.00%	33.33%	10.00%	40.00%	15.00%
43	25.00%	33.33%	10.00%	40.00%	15.00%
44	25.00%	33.33%	10.00%	40.00%	15.00%
45	30.00%	40.00%	10.00%	40.00%	15.00%
46	30.00%	40.00%	10.00%	42.00%	15.00%
47	30.00%	40.00%	10.00%	44.00%	15.00%
48	30.00%	40.00%	10.00%	46.00%	15.00%
49	30.00%	40.00%	10.00%	48.00%	15.00%
50	35.00%	46.67%	10.00%	50.00%	15.00%
51	35.00%	46.67%	11.00%	52.00%	15.00%
52	35.00%	46.67%	12.00%	54.00%	15.00%
53	35.00%	46.67%	13.00%	56.00%	15.00%
54	35.00%	46.67%	14.00%	58.00%	15.00%
55	40.00%	53.33%	15.00%	60.00%	15.00%
56	40.00%	53.33%	16.00%	60.00%	16.00%
57	40.00%	53.33%	17.00%	60.00%	17.00%
58	40.00%	53.33%	18.00%	60.00%	18.00%
59	40.00%	53.33%	19.00%	60.00%	19.00%
60	45.00%	60.00%	20.00%	60.00%	20.00%
61	45.00%	60.00%	22.50%	60.00%	25.00%
62	50.00%	66.67%	25.00%	60.00%	30.00%
63	50.00%	66.67%	25.00%	40.00%	30.00%
64	50.00%	66.67%	25.00%	40.00%	30.00%
65	50.00%	66.67%	30.00%	60.00%	30.00%
66	50.00%	66.67%	30.00%	40.00%	30.00%
67	50.00%	66.67%	30.00%	40.00%	30.00%
68	50.00%	66.67%	30.00%	40.00%	30.00%
69	50.00%	66.67%	30.00%	40.00%	30.00%
70	100.00%	100.00%	100.00%	100.00%	100.00%

¹ First eligibility rates apply at 20 years of service

² First eligibility rates apply at 25 years of service for Tier 3R members

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: SANITATION			
Reduced Service Retirement Tiers 1-4		Reduced Service Retirement Tier 3R	
Age	Rate	Service	Rate
55	4.00%	20	12.00%
56	4.00%	21	3.00%
57	4.00%	22	15.00%
58	4.00%	23	6.00%
59	6.00%	24	9.00%
60	8.00%	25	N/A
61	10.00%		
62	N/A		

Disability

Current ordinary disability assumptions vary by age and do not apply during the 5-year eligibility service period. Furthermore, different rates apply to accidental disability; these rates depend on age and Tier and apply during all service periods. The ordinary disability benefit is equal to 1/60 times final average salary for each year of service accrued but no less than 1/3 of the member's final average salary. For accidental disability, a higher final average salary minimum applies; 50% for Tier 3 non-enhanced disability members and 75% for all other members. The benefit is payable during the lifetime of the member and members may select any optional forms of payment.

The member can elect a service retirement benefit instead of the ordinary disability benefit if eligible. However, the rate of Sanitation members who elected an ordinary disability retirement after completing 20 years of service was consistent with the rate of members with less than 20 years of service. Accordingly, we propose to apply the rates of ordinary disability throughout a member's career once eligible.

The rates of ordinary disability would not apply during the 5-year eligibility service period.

In performing the experience analysis, it is necessary to reassign disability retirement codes retroactively to reflect the eventual approval of a disability retirement. Members with a disability code in a given year had all inactive status codes in prior years changed to a disability status code. Adjustments were made as far back as 2012.

It is difficult to determine how future years would impact the experience during the study period as we believe that this type of retroactive adjustment will be required in subsequent iterations of this study. The consequence will be a restatement of the number of disability retirements experienced during this study period, specifically 2019 – 2021.

For this purpose, our analysis reflected years from 2012 – 2019.

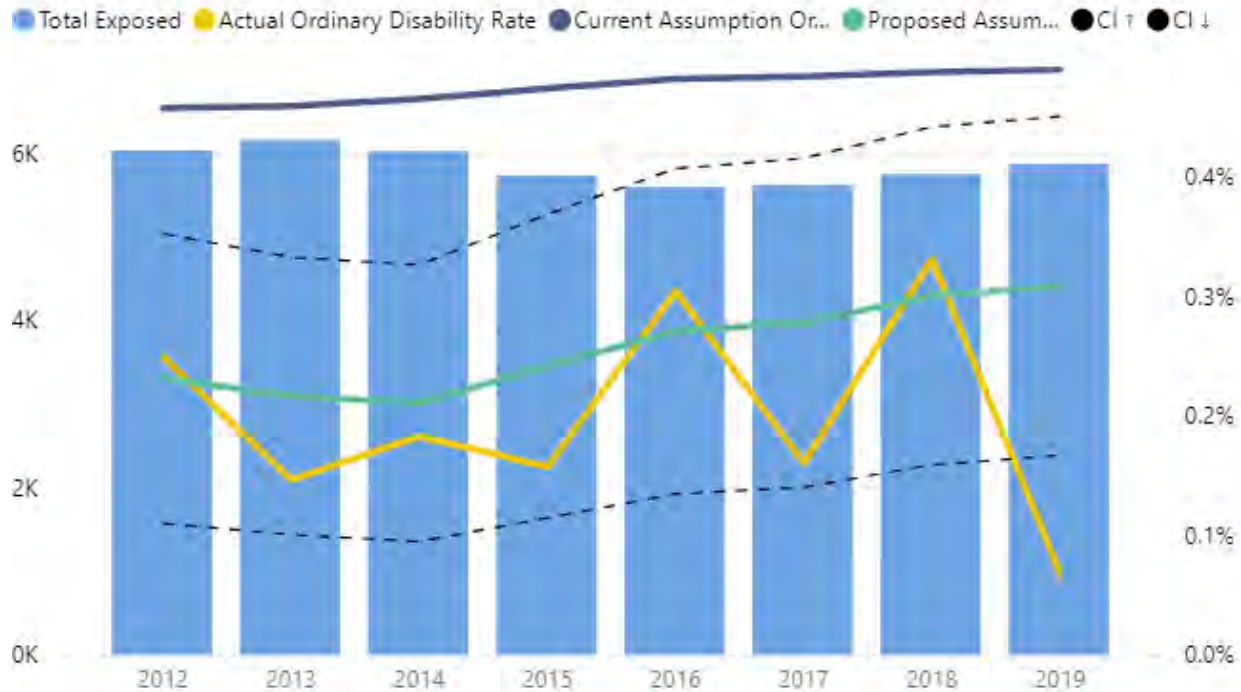
Ordinary Disability

The following charts show the experience of ordinary disability retirement by year, for the age range 25 to 64 and the service range 5 to 29 years during the period 2012 - 2019. The actual rate of ordinary disability averaged 0.1989% whereas the overall expected rate of ordinary disability averaged 0.4744% based on the current assumptions and 0.2563% based on the proposed assumptions.

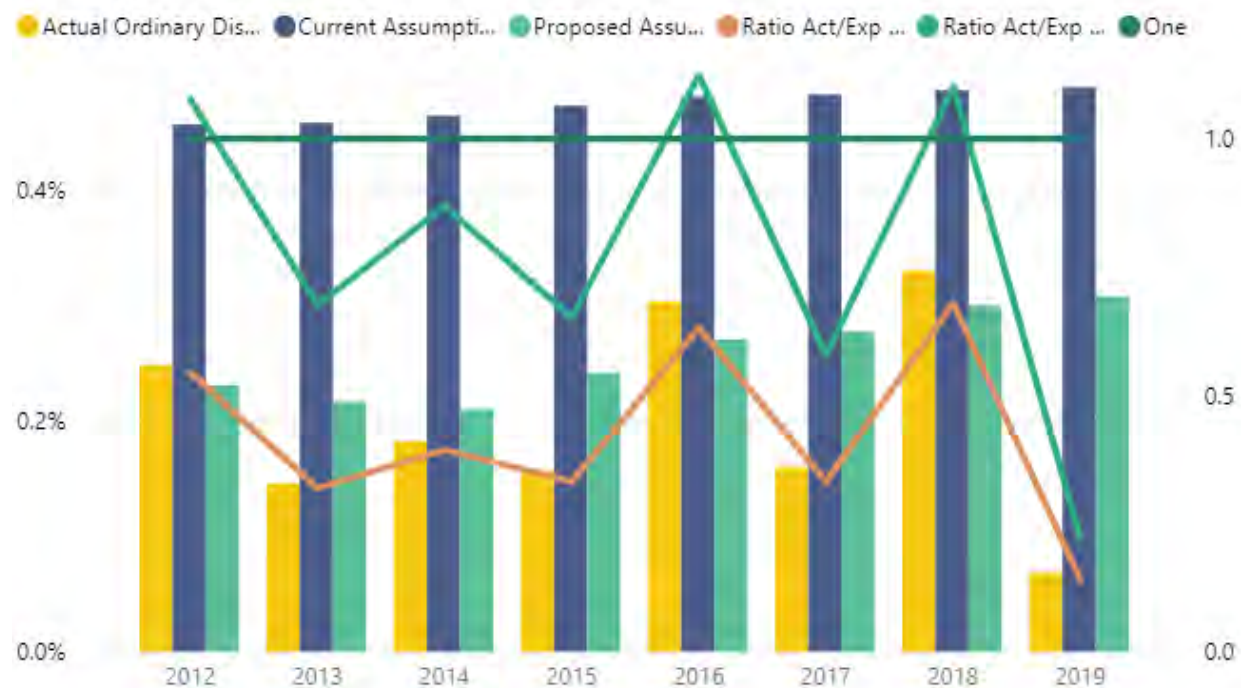
Plan Year	Actual Ordinary Disabilities	Expected Ordinary Disabilities	Total Exposed	Actual Ordinary Disability Rate	Current Assumption Ordinary Disability	Ratio Act/Exp Ordinary Disability
2012	15	27.6	6,026	0.2489%	0.4575%	▲ 0.54
2013	9	28.2	6,154	0.1462%	0.4590%	◆ 0.32
2014	11	28.0	6,020	0.1827%	0.4652%	◆ 0.39
2015	9	27.1	5,728	0.1571%	0.4738%	◆ 0.33
2016	17	26.9	5,593	0.3040%	0.4817%	▲ 0.63
2017	9	27.1	5,613	0.1603%	0.4836%	◆ 0.33
2018	19	28.0	5,746	0.3307%	0.4872%	▲ 0.68
2019	4	28.7	5,868	0.0682%	0.4899%	◆ 0.14
Total	93	221.8	46,748	0.1989%	0.4744%	◆ 0.42

Plan Year	Actual Ordinary Disabilities	Expected Ordinary Disabilities Proposed	Total Exposed	Actual Ordinary Disability Rate	Proposed Assumption Ordinary Disability	Ratio Act/Exp Proposed Ordinary Disability
2012	15	13.9	6,026	0.2489%	0.2310%	● 1.08
2013	9	13.3	6,154	0.1462%	0.2164%	▲ 0.68
2014	11	12.7	6,020	0.1827%	0.2103%	▲ 0.87
2015	9	13.8	5,728	0.1571%	0.2414%	▲ 0.65
2016	17	15.1	5,593	0.3040%	0.2706%	▲ 1.12
2017	9	15.6	5,613	0.1603%	0.2776%	▲ 0.58
2018	19	17.2	5,746	0.3307%	0.3002%	▲ 1.10
2019	4	18.1	5,868	0.0682%	0.3085%	◆ 0.22
Total	93	119.8	46,748	0.1989%	0.2563%	▲ 0.78

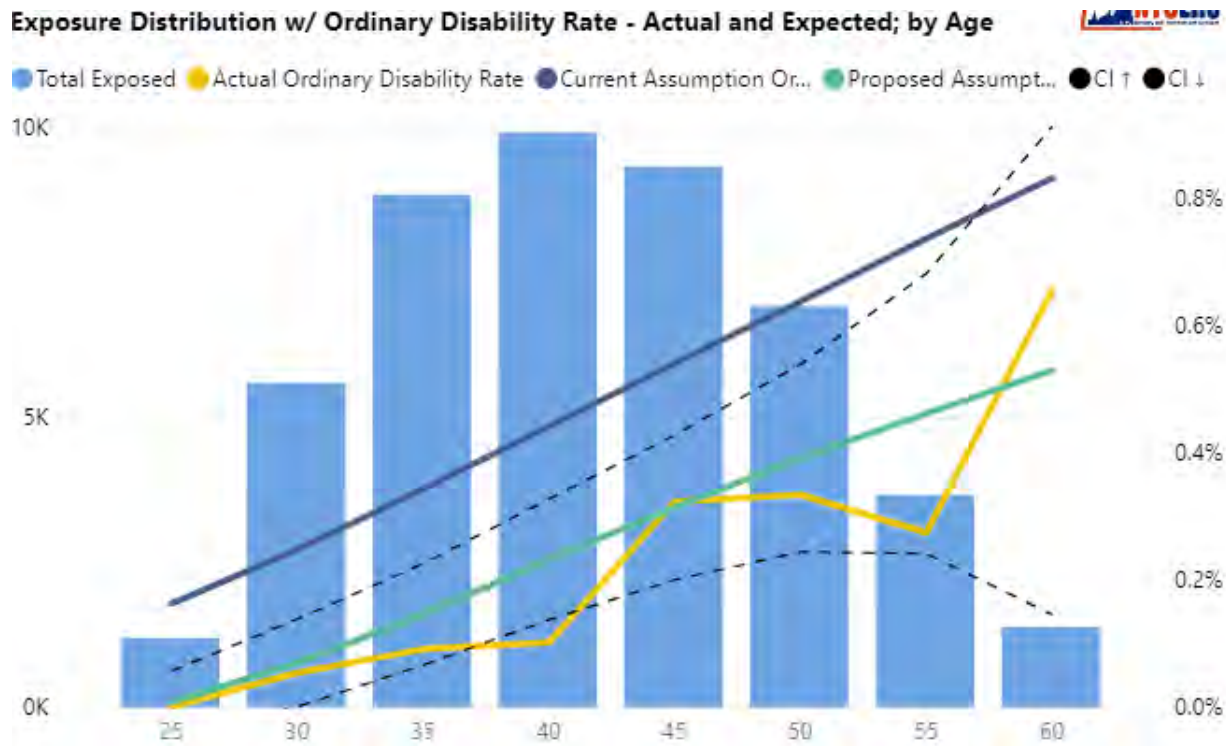
Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Year

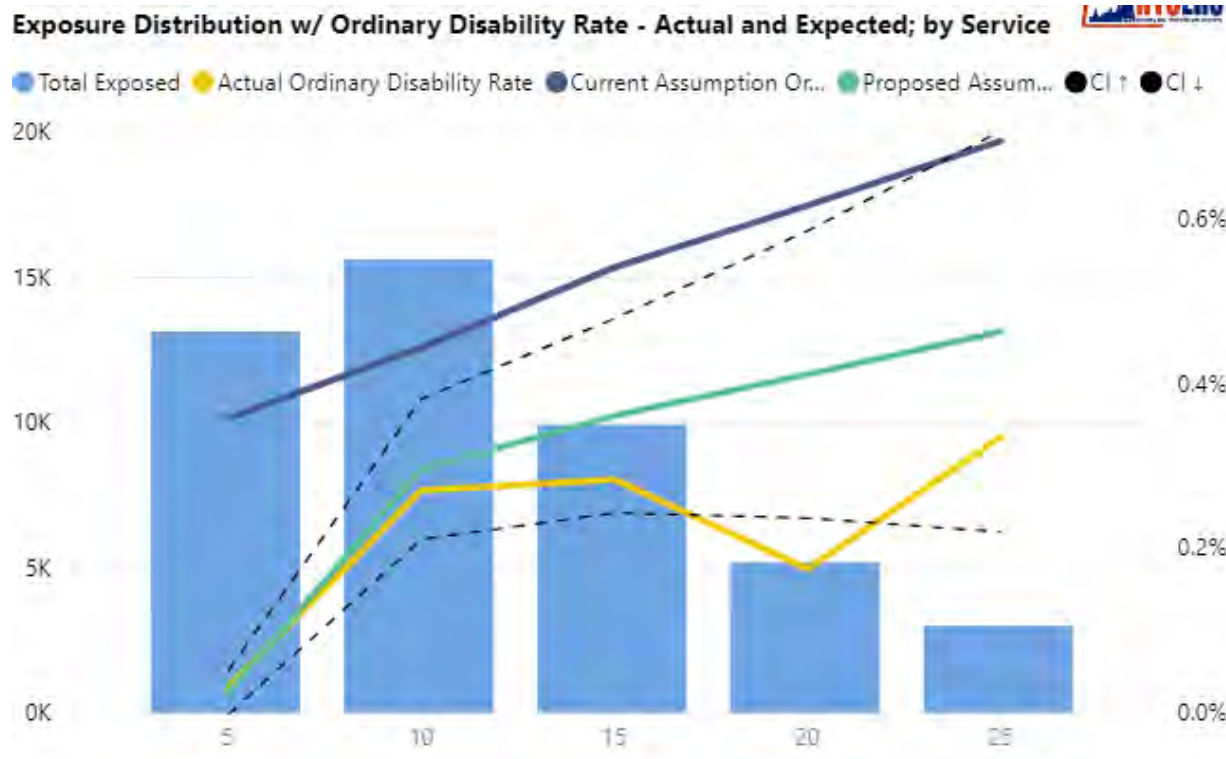


Ordinary Disability Rate - Actual, Expected, and Ratio; by Year



The following charts show the experience of ordinary disability retirement by age and then by service, for the age range 25 to 64 and the service range 5 to 29 years during the period 2012 - 2019. This resulted in an increase in the A/E ratio from 0.42 to 0.78.





Summary

The proposed assumptions decrease the anticipated number of ordinary disability retirements by approximately one-third, which would result in a decrease in plan liabilities.

Accidental Disability

The rates of accidental disability retirement vary by the following characteristics:

1. Tier 2 and Tier 3 22-year plan enhanced members
2. Tier 3 22-year plan non-enhanced members.

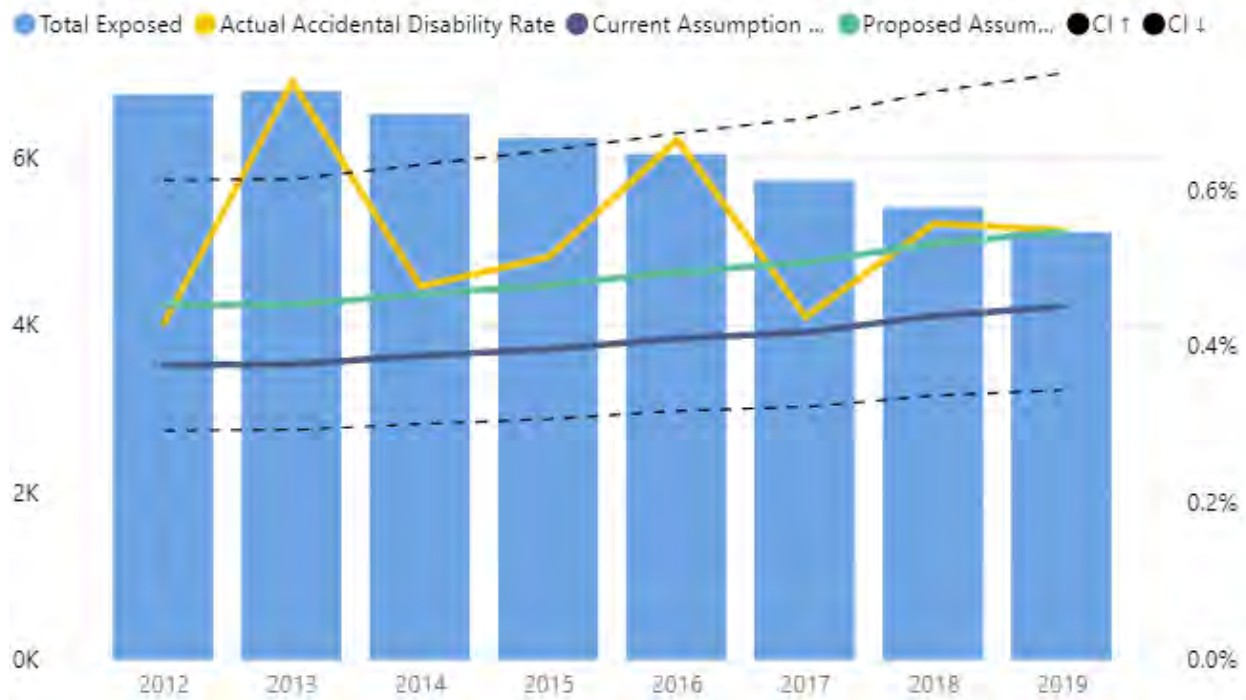
Records labeled as Tier 6 represents Tier 3 22-year plan non-enhanced members. There were very few accidental disability retirements and were eliminated from the analysis. Proposed assumptions were extrapolated based on the current tiers and set to 50% of the proposed rates for Tier 2 and Tier 3 22-year plan enhanced members. In addition, we propose the rates cease to apply once 22 years of service has been accrued.

The current accidental disability assumption varies by tier and age service. The proposed assumption also varies by these elements. The following charts show the experience of Tier 2 and Tier 3 22-Year plan enhanced members for accidental disability retirement by year, for the age range 25 to 64 and the service range 0 to 34. The actual rate of accidental disability averaged 0.5460% whereas the overall expected rate of accidental disability averaged 0.4039% based on the current assumptions and 0.4876% based on the proposed assumptions.

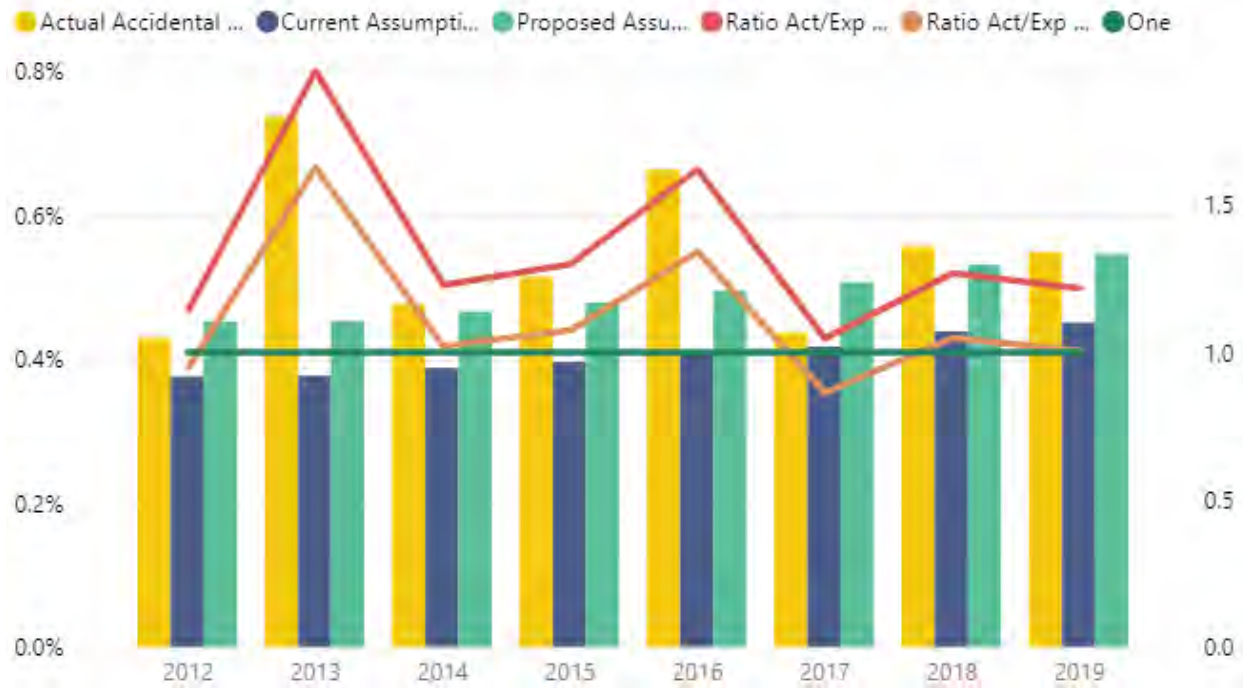
Plan Year	Actual Accidental Disabilities	Expected Accidental Disabilities	Total Exposed	Actual Accidental Disability Rate	Current Assumption Accidental Disability	Ratio Act/Exp Accidental Disability
2012	29	25.4	6,752	0.4295%	0.3758%	▲ 1.14
2013	50	25.6	6,788	0.7366%	0.3767%	◆ 1.96
2014	31	25.2	6,512	0.4760%	0.3874%	▲ 1.23
2015	32	24.6	6,226	0.5140%	0.3958%	▲ 1.30
2016	40	24.7	6,033	0.6630%	0.4092%	◆ 1.62
2017	25	23.9	5,719	0.4371%	0.4172%	● 1.05
2018	30	23.7	5,396	0.5560%	0.4384%	▲ 1.27
2019	28	23.0	5,108	0.5482%	0.4504%	▲ 1.22
Total	265	196.0	48,534	0.5460%	0.4039%	▲ 1.35

Plan Year	Actual Accidental Disabilities	Expected Accidental Disabilities Proposed	Total Exposed	Actual Accidental Disability Rate	Proposed Assumption Accidental Disability	Act/Exp Proposed Accidental Disability
2012	29	30.5	6,752	0.4295%	0.4520%	0.95
2013	50	30.7	6,788	0.7366%	0.4528%	1.63
2014	31	30.3	6,512	0.4760%	0.4658%	1.02
2015	32	29.8	6,226	0.5140%	0.4781%	1.08
2016	40	29.8	6,033	0.6630%	0.4943%	1.34
2017	25	29.0	5,719	0.4371%	0.5064%	0.86
2018	30	28.6	5,396	0.5560%	0.5305%	1.05
2019	28	27.9	5,108	0.5482%	0.5457%	1.00
Total	265	236.6	48,534	0.5460%	0.4876%	1.12

Exposure Distribution w/ Accidental Disability Rate - Actual and Expected; by Year



Accidental Disability Rate - Actual, Expected, and Ratio; by Year

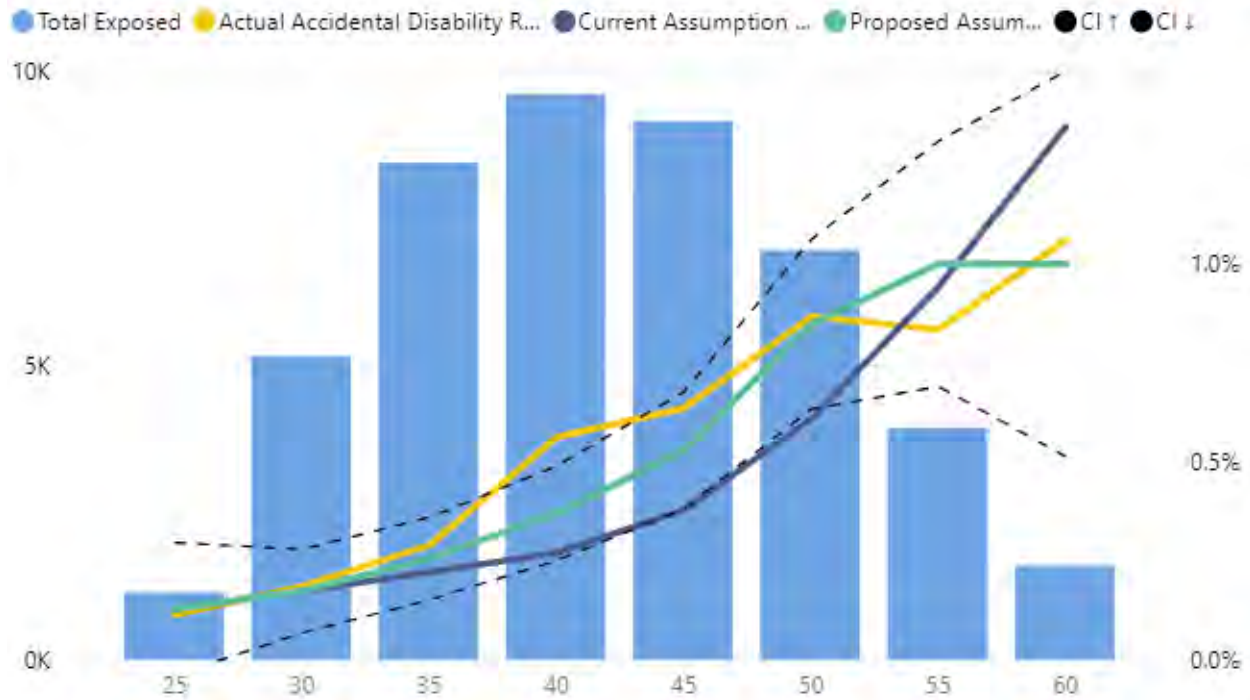


The following charts show the experience of Tier 2 and Tier 3 22-Year plan enhanced members for accidental disability retirement by age, for the age range 25 to 64 and the service range 0 to 34. This resulted in a decrease in the A/E ratio from 1.35 to 1.12.

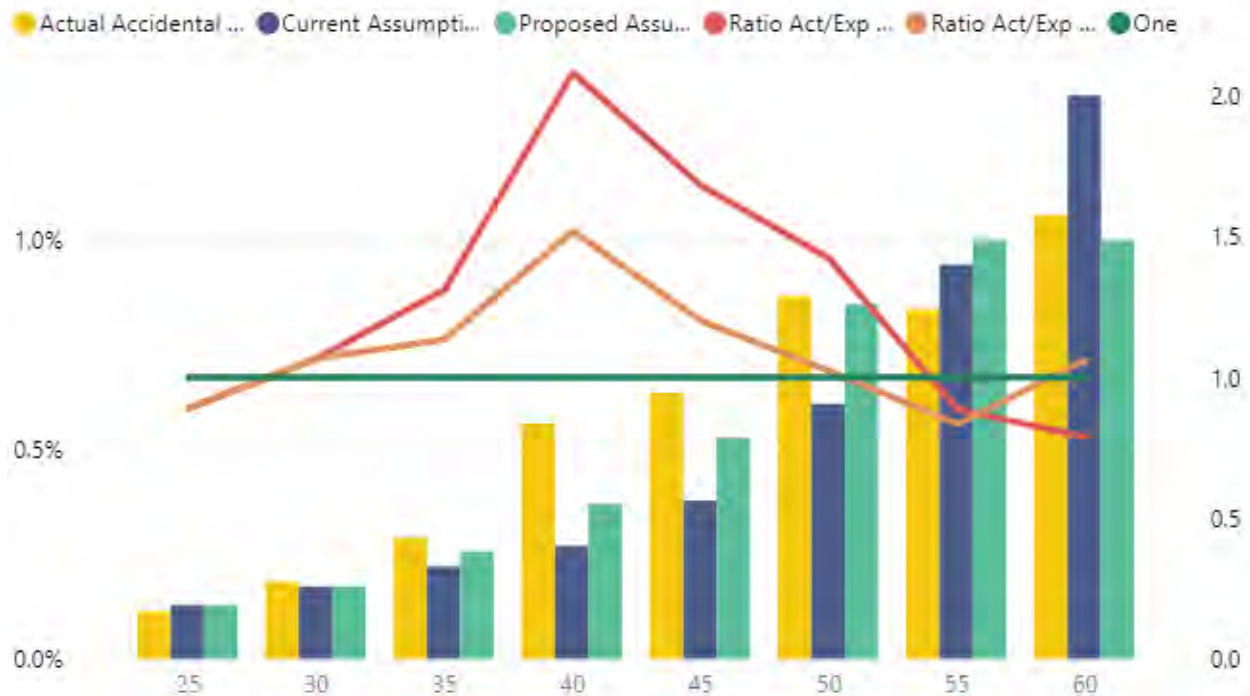
Age	Actual Accidental Disabilities	Expected Accidental Disabilities	Total Exposed	Actual Accidental Disability Rate	Current Assumption Accidental Disability	Ratio Act/Exp Accidental Disability
25	0	0.1	87	0.0000%	0.1000%	0.00
26	0	0.2	194	0.0000%	0.1100%	0.00
27	1	0.4	318	0.3145%	0.1200%	2.62
28	0	0.6	493	0.0000%	0.1300%	0.00
29	1	0.9	661	0.1513%	0.1400%	1.08
30	1	1.2	824	0.1214%	0.1500%	0.81
31	2	1.6	1,028	0.1946%	0.1600%	1.22
32	0	2.0	1,186	0.0000%	0.1700%	0.00
33	4	2.5	1,384	0.2890%	0.1800%	1.61
34	4	2.9	1,539	0.2599%	0.1900%	1.37
35	2	3.3	1,658	0.1206%	0.2000%	0.60
36	8	3.6	1,722	0.4646%	0.2100%	2.21
37	4	4.0	1,812	0.2208%	0.2200%	1.00
38	9	4.3	1,860	0.4839%	0.2300%	2.10
39	3	4.6	1,922	0.1561%	0.2400%	0.65
40	8	5.0	1,994	0.4012%	0.2500%	1.60
41	10	5.2	2,006	0.4985%	0.2600%	1.92
42	10	5.4	2,017	0.4958%	0.2700%	1.84
43	18	5.6	1,991	0.9041%	0.2800%	3.23
44	10	5.7	1,954	0.5118%	0.2900%	1.76
45	8	5.8	1,925	0.4156%	0.3000%	1.39
46	16	6.6	1,945	0.8226%	0.3400%	2.42
47	10	7.1	1,856	0.5388%	0.3800%	1.42
48	13	7.7	1,828	0.7112%	0.4200%	1.69
49	12	8.0	1,733	0.6924%	0.4600%	1.51
50	8	8.2	1,644	0.4866%	0.5000%	0.97
51	15	8.7	1,546	0.9702%	0.5600%	1.73
52	15	8.9	1,432	1.0475%	0.6200%	1.69
53	9	8.8	1,289	0.6982%	0.6800%	1.03
54	14	8.3	1,128	1.2411%	0.7400%	1.68
55	7	7.9	989	0.7078%	0.8000%	0.88
56	4	7.6	868	0.4608%	0.8800%	0.52
57	8	7.5	781	1.0243%	0.9600%	1.07
58	8	7.3	698	1.1461%	1.0400%	1.10
59	6	6.9	619	0.9693%	1.1200%	0.87
60	8	6.0	496	1.6129%	1.2000%	1.34
61	2	5.4	414	0.4831%	1.3000%	0.37
62	3	4.4	315	0.9524%	1.4000%	0.68
63	4	3.3	217	1.8433%	1.5000%	1.23
64	0	2.6	161	0.0000%	1.6000%	0.00
Total	265	196.0	48,534	0.5460%	0.4039%	1.35

Age	Actual Accidental Disabilities	Expected Accidental Disabilities Proposed	Total Exposed	Actual Accidental Disability Rate	Proposed Assumption Accidental Disability	Act/Exp Proposed Accidental Disability
25	0	0.1	87	0.0000%	0.1000%	0.00
26	0	0.2	194	0.0000%	0.1100%	0.00
27	1	0.4	318	0.3145%	0.1200%	2.62
28	0	0.6	493	0.0000%	0.1300%	0.00
29	1	0.9	661	0.1513%	0.1400%	1.08
30	1	1.2	824	0.1214%	0.1500%	0.81
31	2	1.6	1,028	0.1946%	0.1600%	1.22
32	0	2.0	1,186	0.0000%	0.1700%	0.00
33	4	2.5	1,384	0.2890%	0.1800%	1.61
34	4	2.9	1,539	0.2599%	0.1900%	1.37
35	2	3.5	1,658	0.1206%	0.2100%	0.57
36	8	4.0	1,722	0.4646%	0.2300%	2.02
37	4	4.6	1,812	0.2208%	0.2525%	0.87
38	9	5.1	1,860	0.4839%	0.2750%	1.76
39	3	5.8	1,922	0.1561%	0.3000%	0.52
40	8	6.5	1,994	0.4012%	0.3250%	1.23
41	10	7.0	2,006	0.4985%	0.3500%	1.42
42	10	7.6	2,017	0.4958%	0.3775%	1.31
43	18	7.8	1,991	0.9041%	0.3925%	2.30
44	10	7.9	1,954	0.5118%	0.4050%	1.26
45	8	8.1	1,925	0.4156%	0.4200%	0.99
46	16	9.2	1,945	0.8226%	0.4750%	1.73
47	10	9.9	1,856	0.5388%	0.5325%	1.01
48	13	10.7	1,828	0.7112%	0.5875%	1.21
49	12	11.2	1,733	0.6924%	0.6450%	1.07
50	8	11.5	1,644	0.4866%	0.7000%	0.70
51	15	12.1	1,546	0.9702%	0.7850%	1.24
52	15	12.4	1,432	1.0475%	0.8675%	1.21
53	9	12.3	1,289	0.6982%	0.9525%	0.73
54	14	11.3	1,128	1.2411%	1.0000%	1.24
55	7	9.9	989	0.7078%	1.0000%	0.71
56	4	8.7	868	0.4608%	1.0000%	0.46
57	8	7.8	781	1.0243%	1.0000%	1.02
58	8	7.0	698	1.1461%	1.0000%	1.15
59	6	6.2	619	0.9693%	1.0000%	0.97
60	8	5.0	496	1.6129%	1.0000%	1.61
61	2	4.1	414	0.4831%	1.0000%	0.48
62	3	3.2	315	0.9524%	1.0000%	0.95
63	4	2.2	217	1.8433%	1.0000%	1.84
64	0	1.6	161	0.0000%	1.0000%	0.00
Total	265	236.6	48,534	0.5460%	0.4876%	1.12

Exposure Distribution w/ Accidental Disability Rate - Actual and Expected; by Age



Accidental Disability Rate - Actual, Expected, and Ratio; by Age



Summary

The proposed rates have increased the anticipated number of accidental disability retirements, which will result in an increase in plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF DISABILITY FOR ACTIVE MEMBERS: UNIFORMED GROUPS			
	Sanitation		
Age	Ordinary Disability	Accidental Disability: Tier 3R Non- enhanced Plan	Accidental Disability: All Other Plans
15	0.100%	0.050%	0.100%
16	0.100%	0.050%	0.100%
17	0.100%	0.050%	0.100%
18	0.100%	0.050%	0.100%
19	0.100%	0.050%	0.100%
20	0.100%	0.050%	0.100%
21	0.100%	0.050%	0.100%
22	0.100%	0.050%	0.100%
23	0.100%	0.050%	0.100%
24	0.100%	0.050%	0.100%
25	0.100%	0.050%	0.100%
26	0.120%	0.055%	0.110%
27	0.140%	0.060%	0.120%
28	0.160%	0.065%	0.130%
29	0.180%	0.070%	0.140%
30	0.200%	0.075%	0.150%
31	0.220%	0.080%	0.160%
32	0.240%	0.085%	0.170%
33	0.260%	0.090%	0.180%
34	0.280%	0.095%	0.190%
35	0.300%	0.100%	0.200%
36	0.320%	0.105%	0.210%
37	0.340%	0.110%	0.220%
38	0.360%	0.115%	0.230%
39	0.380%	0.120%	0.240%
40	0.400%	0.125%	0.250%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF DISABILITY FOR ACTIVE MEMBERS: UNIFORMED GROUPS			
	Sanitation		
Age	Ordinary Disability	Accidental Disability: Tier 3R Non- enhanced Plan	Accidental Disability: All Other Plans
41	0.420%	0.130%	0.260%
42	0.440%	0.135%	0.270%
43	0.460%	0.140%	0.280%
44	0.480%	0.145%	0.290%
45	0.500%	0.150%	0.300%
46	0.520%	0.170%	0.340%
47	0.540%	0.190%	0.380%
48	0.560%	0.210%	0.420%
49	0.580%	0.230%	0.460%
50	0.600%	0.250%	0.500%
51	0.620%	0.280%	0.560%
52	0.640%	0.310%	0.620%
53	0.660%	0.340%	0.680%
54	0.680%	0.370%	0.740%
55	0.700%	0.400%	0.800%
56	0.720%	0.440%	0.880%
57	0.740%	0.480%	0.960%
58	0.760%	0.520%	1.040%
59	0.780%	0.560%	1.120%
60	0.800%	0.600%	1.200%
61	0.820%	0.650%	1.300%
62	0.840%	0.700%	1.400%
63	0.860%	0.750%	1.500%
64	0.880%	0.800%	1.600%
65	0.900%	0.850%	1.700%
66	0.920%	0.910%	1.820%
67	0.940%	0.970%	1.940%
68	0.960%	1.030%	2.060%
69	0.980%	1.090%	2.180%
70	N/A	N/A	N/A

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF DISABILITY RETIREMENT ¹ : UNIFORM GROUPS		
	Sanitation	
	Ordinary Disability	Accidental Disability ²
Age	Unisex	Unisex
20	0.1325%	0.1000%
21	0.1325%	0.1000%
22	0.1325%	0.1000%
23	0.1325%	0.1000%
24	0.1325%	0.1000%
25	0.1325%	0.1000%
26	0.1325%	0.1100%
27	0.1325%	0.1200%
28	0.1325%	0.1300%
29	0.1325%	0.1400%
30	0.1325%	0.1500%
31	0.1475%	0.1600%
32	0.1600%	0.1700%
33	0.1725%	0.1800%
34	0.1875%	0.1900%
35	0.2000%	0.2100%
36	0.2125%	0.2300%
37	0.2275%	0.2525%
38	0.2400%	0.2750%
39	0.2525%	0.3000%
40	0.2675%	0.3250%
41	0.2800%	0.3500%
42	0.2925%	0.3775%
43	0.3075%	0.3925%
44	0.3200%	0.4050%
45	0.3325%	0.4200%
46	0.3475%	0.4750%
47	0.3600%	0.5325%
48	0.3725%	0.5875%
49	0.3875%	0.6450%
50	0.4000%	0.7000%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF DISABILITY RETIREMENT ¹ : UNIFORM GROUPS		
	Sanitation	
	Ordinary Disability	Accidental Disability ²
Age	Unisex	Unisex
51	0.4125%	0.7850%
52	0.4275%	0.8675%
53	0.4400%	0.9525%
54	0.4525%	1.0000%
55	0.4675%	1.0000%
56	0.4800%	1.0000%
57	0.4925%	1.0000%
58	0.5075%	1.0000%
59	0.5200%	1.0000%
60	0.5325%	1.0000%
61	0.5475%	1.0000%
62	0.5600%	1.0000%
63	0.5725%	1.0000%
64	0.5875%	1.0000%
65	0.6000%	1.0000%
66	0.6125%	1.0000%
67	0.6275%	1.0000%
68	0.6400%	1.0000%
69	0.6525%	1.0000%
70	N/A	N/A

¹ Greater of disability benefit and retirement benefit is valued if eligible for early or service retirement

² For Tier 3R non-enhanced disability plan, multiply rates by 50% and no rates apply upon completion of 22 years of service.

Pre-retirement Death

Plan codes excluded in the analysis of other contingencies are part of the analysis of pre-retirement death.

Mortality assumptions involve two components: a base table and a mortality improvement scale. The mortality improvement scale adjusts the mortality rates of the base table to reflect that generally rates of mortality are anticipated to improve over time.

The Society of Actuaries (SOA) has published mortality improvement scales (MP scales) each year from 2014 to 2021. In the last several actuarial valuations, OA has used the mortality improvement scale that coincides with the valuation date. For example, OA used the MP-2020 scale in its June 30, 2020 lag actuarial valuation. In this analysis, we used the most recent improvement scale (MP-2021) published by the SOA as of the date of this analysis. Please note that the SOA has not published an updated MP scale due to the pandemic.

The SOA MP-2021 improvement scale is based on data through 2019 (before the onset of Covid) from the Social Security Administration (SSA). Even though the aggregate (for all ages) long-term trend has been towards mortality improvements, this is not always the case for each age. Therefore, there are situations where the expected mortality rate in a later year is higher than base rate.

There is much discussion in the actuarial profession and among retirement systems about the development of mortality tables and treatment of excess deaths due to the Covid pandemic, which occurred in 2020 – 2022. The analysis to develop our recommendations exclude the mortality experience of members during the pandemic and reflect the experience from 2012 - 2019.

In this study the base table of the current assumption corresponds to the year 2012; expected mortality rates in future years are obtained from the base table and the MP-2021 scale. For example, the 2017 (July 1, 2016 – June 30, 2017) mortality rates are derived from the base table (2012) adjusted with four years of improvements until 2016. This method links mortality rates across the years and, consequently, allows mortality comparisons from one year to another.

For the proposed assumption, proposed rates were initially determined as of the mid-year of the study period or fiscal year 2016. MP-2021 was then used to adjust those rates to earlier and later years. The proposed mortality rates shown in the following section have been adjusted to reflect a base year of 2019. We recommend that MP-2021 continue to be used to reflect mortality improvements both before and after the measurement date.

In reviewing the current assumption, we compared the actual experience to published tables from the SOA. The most recent tables published by the SOA reflected experience for public plan retirement systems separated into General employees (PubG), Teachers (PubT) and Public Safety (PubS) members. Adjustments were made to the standard SOA tables to match the experience of the system or the current tables, and for consistency with recommended postretirement mortality tables, to determine if the SOA tables provided a better fit.

Ordinary Death

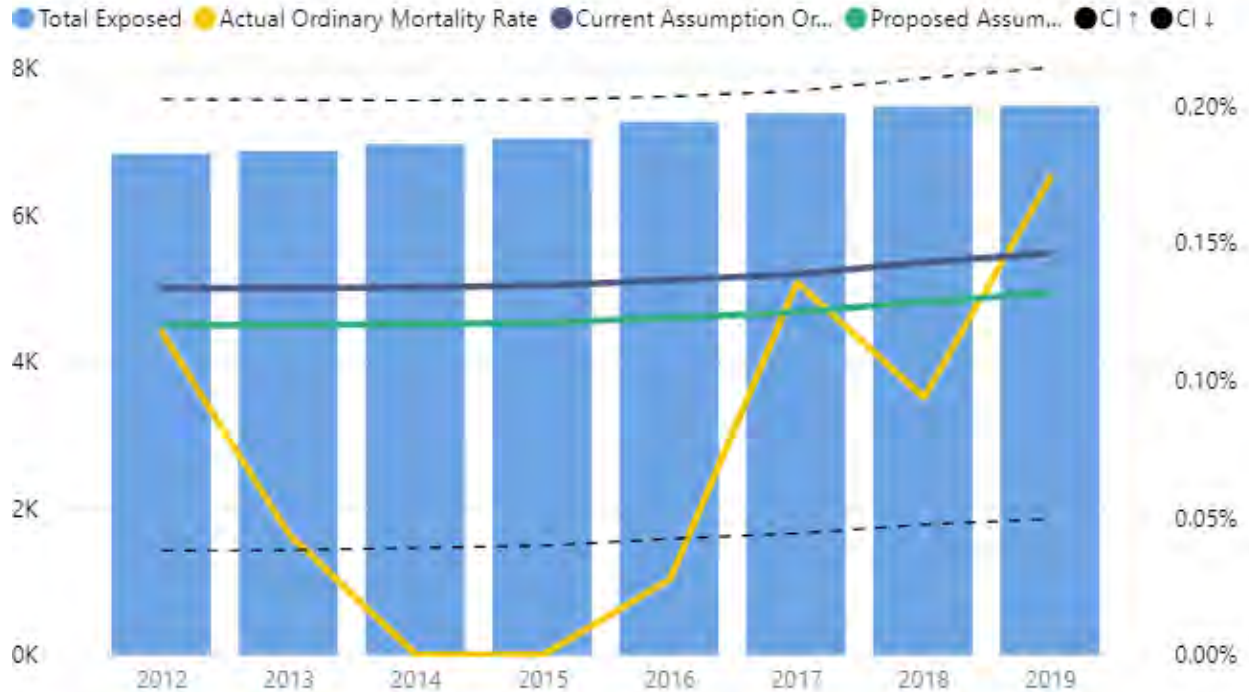
A separate assumption applies to Sanitation employees than for General employees. There is no credible experience to make any statistically based decision. Consistent with the proposed assumption for General employees, we reduced the current rates of ordinary death by 10%.

The following tables show the experience of ordinary death by year, for the age range (20 to 69) during the period 2012 – 2019 based on the current and proposed assumptions for both males and females. The A/E ratio increased from 0.55 to 0.61.

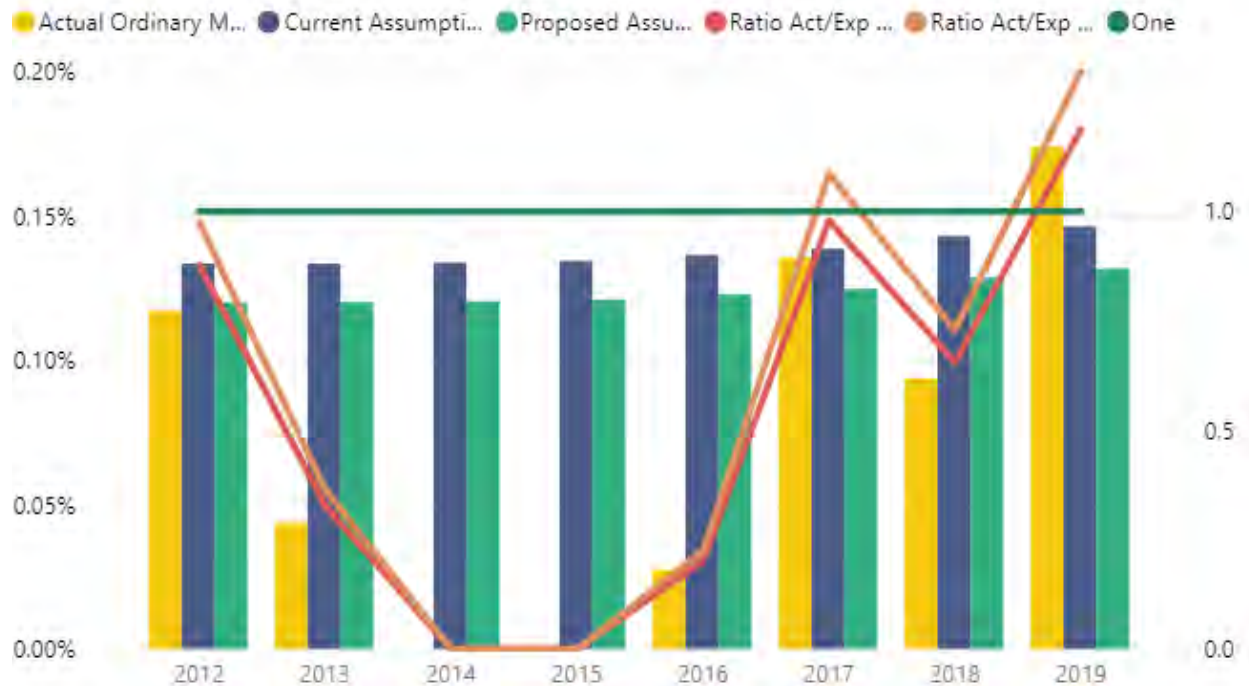
Plan Year	Actual Ordinary Deaths	Expected Ordinary Deaths	Total Exposed	Actual Ordinary Mortality Rate	Current Assumption Ordinary Mortality	Ratio Act/Exp Ordinary Mortality
2012	8	9.1	6,828	0.1172%	0.1334%	0.88
2013	3	9.2	6,863	0.0437%	0.1334%	0.33
2014	0	9.3	6,957	0.0000%	0.1337%	0.00
2015	0	9.5	7,038	0.0000%	0.1343%	0.00
2016	2	9.9	7,262	0.0275%	0.1364%	0.20
2017	10	10.2	7,378	0.1355%	0.1386%	0.98
2018	7	10.7	7,470	0.0937%	0.1429%	0.66
2019	13	10.9	7,481	0.1738%	0.1462%	1.19
Total	43	78.8	57,277	0.0751%	0.1375%	0.55

Plan Year	Actual Ordinary Deaths	Expected Ordinary Deaths Proposed	Total Exposed	Actual Ordinary Mortality Rate	Proposed Assumption Ordinary Mortality	Act/Exp Proposed Ordinary Mortality
2012	8	8.2	6,828	0.1172%	0.1201%	0.98
2013	3	8.2	6,863	0.0437%	0.1201%	0.36
2014	0	8.4	6,957	0.0000%	0.1204%	0.00
2015	0	8.5	7,038	0.0000%	0.1209%	0.00
2016	2	8.9	7,262	0.0275%	0.1227%	0.22
2017	10	9.2	7,378	0.1355%	0.1247%	1.09
2018	7	9.6	7,470	0.0937%	0.1287%	0.73
2019	13	9.8	7,481	0.1738%	0.1316%	1.32
Total	43	70.9	57,277	0.0751%	0.1238%	0.61

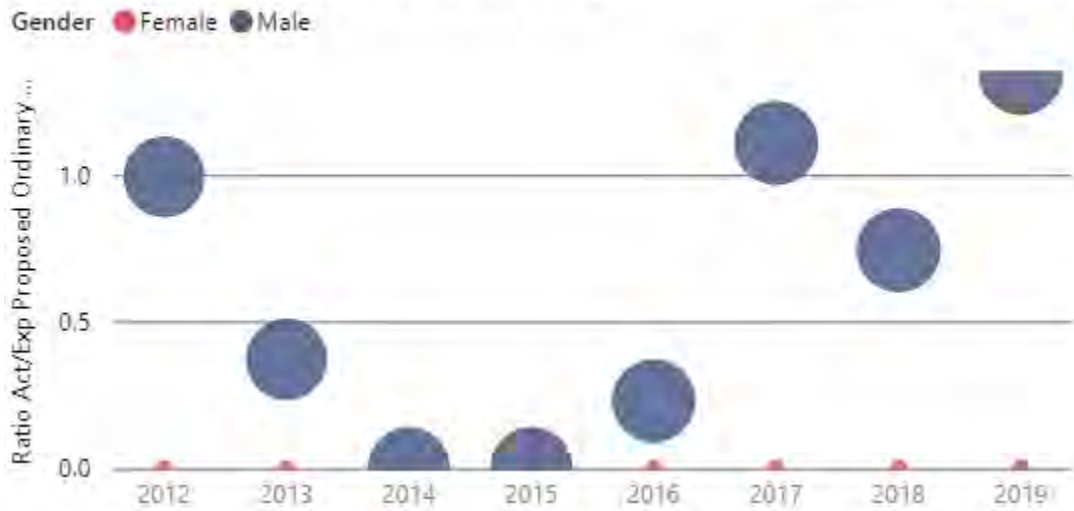
Exposure Distribution w/ Ordinary Mortality Rate - Actual and Expected; by Year



Ordinary Mortality Rate - Actual, Expected, and Ratio; by Year



Actual vs. Expected - Ordinary Mortality Proposed w/ Exposure Bubbles; by Year



The following section displays results by age for males and females combined since there is nearly no female experience.

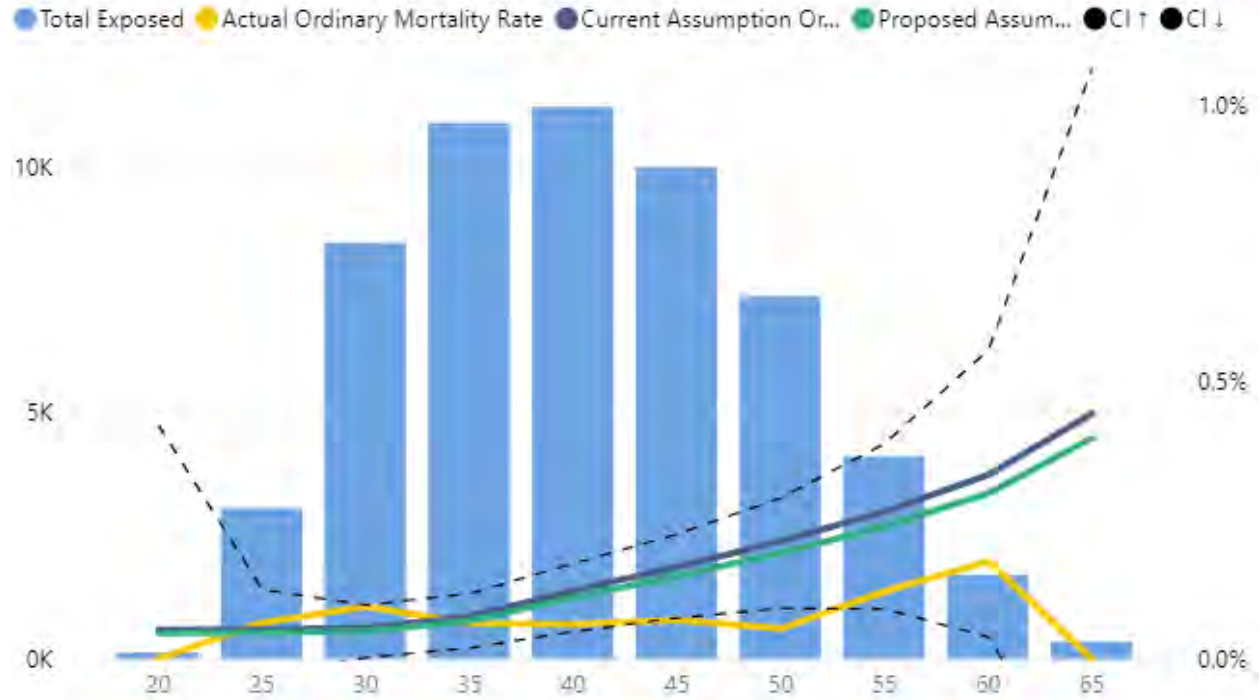
Males and Females

The following charts show the experience of ordinary death by age band, for the age range (20 to 69) during the period 2012 – 2019 based on the current and proposed assumption. The A/E ratio increased from 0.55 to 0.61. Please note that the charts by age are based on 5-year brackets. For example, the age bracket 45 should be interpreted as the interval 45 – 49.

Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths	Total Exposed	Actual Ordinary Mortality Rate	Current Assumption Ordinary Mortality	Ratio Act/Exp Ordinary Mortality
20	0	0.1	128	0.0000%	0.0521%	0.00
25	2	1.6	3,060	0.0654%	0.0529%	1.24
30	8	4.7	8,455	0.0946%	0.0550%	1.72
35	7	8.3	10,887	0.0643%	0.0764%	0.84
40	7	13.8	11,222	0.0624%	0.1229%	0.51
45	7	16.6	9,995	0.0700%	0.1659%	0.42
50	4	15.6	7,374	0.0542%	0.2121%	0.26
55	5	10.9	4,110	0.1217%	0.2659%	0.46
60	3	5.7	1,704	0.1761%	0.3317%	0.53
65	0	1.5	342	0.0000%	0.4428%	0.00
Total	43	78.8	57,277	0.0751%	0.1375%	0.55

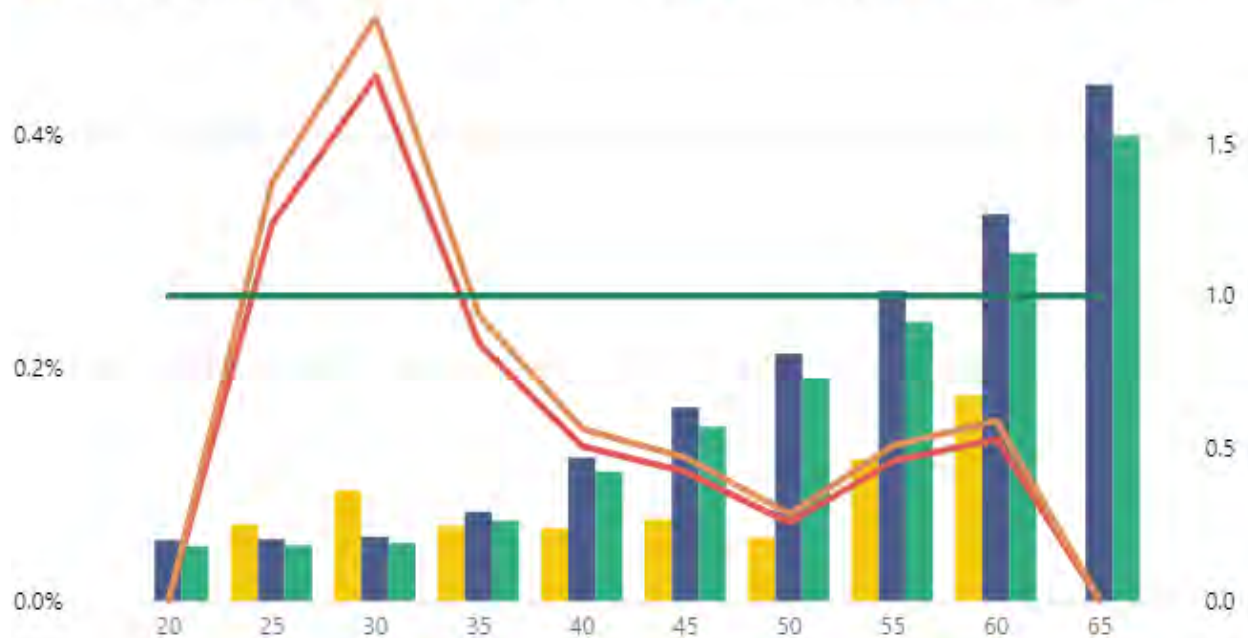
Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths Proposed	Total Exposed	Actual Ordinary Mortality Rate	Proposed Assumption Ordinary Mortality	Act/Exp Proposed Ordinary Mortality
20	0	0.1	128	0.0000%	0.0469%	0.00
25	2	1.5	3,060	0.0654%	0.0476%	1.37
30	8	4.2	8,455	0.0946%	0.0495%	1.91
35	7	7.5	10,887	0.0643%	0.0687%	0.94
40	7	12.4	11,222	0.0624%	0.1107%	0.56
45	7	14.9	9,995	0.0700%	0.1493%	0.47
50	4	14.1	7,374	0.0542%	0.1909%	0.28
55	5	9.8	4,110	0.1217%	0.2393%	0.51
60	3	5.1	1,704	0.1761%	0.2985%	0.59
65	0	1.4	342	0.0000%	0.3985%	0.00
Total	43	70.9	57,277	0.0751%	0.1238%	0.61

Exposure Distribution w/ Ordinary Mortality Rate - Actual and Expected; by Age



Ordinary Mortality Rate - Actual, Expected, and Ratio; by Age

Legend: Actual Ordinary M... (Yellow bars), Current Assumpti... (Dark Blue bars), Proposed Assu... (Green bars), Ratio Act/Exp ... (Red line), Ratio Act/Exp ... (Orange line), One (Green line).



Summary

The proposed assumption decreased the anticipated number of deaths occurring prior to retirement, which will result in an increase in plan liabilities.

Accidental Death

The accidental death rate assumption is a constant percentage (0.01%) that does not vary by gender nor age and is not subject to mortality improvements. During the Covid pandemic (2020 – 2021), there were deaths characterized as accidental deaths. The following table shows the experience of accidental death by year. While there was only 1 accidental death coded prior to the pandemic years, it is prudent to continue to have an assumption to vary this contingency. We recommend no change in the current assumption.

Plan Year	Actual Accidental Deaths	Expected Accidental Deaths	Total Exposed	Actual Accidental Mortality Rate	Current Assumption Accidental Mortality	Ratio Act/Exp Accidental Mortality
2012	0	0.7	6,831	0.0000%	0.0100%	0.00
2013	0	0.7	6,867	0.0000%	0.0100%	0.00
2014	0	0.7	6,962	0.0000%	0.0100%	0.00
2015	0	0.7	7,047	0.0000%	0.0100%	0.00
2016	0	0.7	7,273	0.0000%	0.0100%	0.00
2017	0	0.7	7,390	0.0000%	0.0100%	0.00
2018	0	0.7	7,481	0.0000%	0.0100%	0.00
2019	1	0.7	7,492	0.0133%	0.0100%	1.34
2020	2	0.8	7,810	0.0256%	0.0100%	2.56
2021	3	0.8	7,667	0.0391%	0.0100%	3.92
Total	6	7.3	72,820	0.0082%	0.0100%	0.82

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS			
	Sanitation		
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.050%	0.030%	0.010%
16	0.050%	0.030%	0.010%
17	0.050%	0.030%	0.010%
18	0.050%	0.030%	0.010%
19	0.050%	0.030%	0.010%
20	0.050%	0.030%	0.010%
21	0.050%	0.030%	0.010%
22	0.050%	0.030%	0.010%
23	0.050%	0.030%	0.010%
24	0.050%	0.030%	0.010%
25	0.050%	0.030%	0.010%
26	0.050%	0.030%	0.010%
27	0.050%	0.030%	0.010%
28	0.050%	0.030%	0.010%
29	0.050%	0.030%	0.010%
30	0.050%	0.030%	0.010%
31	0.050%	0.030%	0.010%
32	0.050%	0.030%	0.010%
33	0.050%	0.030%	0.010%
34	0.050%	0.030%	0.010%
35	0.050%	0.030%	0.010%
36	0.060%	0.036%	0.010%
37	0.070%	0.042%	0.010%
38	0.080%	0.048%	0.010%
39	0.090%	0.054%	0.010%
40	0.100%	0.060%	0.010%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT (continued) PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS			
	Sanitation		
	Ordinary Death		Accidental Death
Age	Males	Females	All
41	0.110%	0.066%	0.010%
42	0.120%	0.072%	0.010%
43	0.130%	0.078%	0.010%
44	0.140%	0.084%	0.010%
45	0.150%	0.090%	0.010%
46	0.160%	0.096%	0.010%
47	0.170%	0.102%	0.010%
48	0.180%	0.108%	0.010%
49	0.190%	0.114%	0.010%
50	0.200%	0.120%	0.010%
51	0.210%	0.128%	0.010%
52	0.220%	0.136%	0.010%
53	0.230%	0.144%	0.010%
54	0.240%	0.152%	0.010%
55	0.250%	0.160%	0.010%
56	0.260%	0.168%	0.010%
57	0.270%	0.176%	0.010%
58	0.280%	0.184%	0.010%
59	0.290%	0.192%	0.010%
60	0.300%	0.200%	0.010%
61	0.320%	0.210%	0.010%
62	0.340%	0.220%	0.010%
63	0.360%	0.230%	0.010%
64	0.380%	0.240%	0.010%
65	0.400%	0.250%	0.010%
66	0.440%	0.280%	0.010%
67	0.480%	0.310%	0.010%
68	0.520%	0.340%	0.010%
69	0.560%	0.370%	0.010%
70	N/A	N/A	N/A

The following table shows the proposed assumptions.

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NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: BASE YEAR 2019			
	Sanitation		
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.045%	0.027%	0.010%
16	0.045%	0.027%	0.010%
17	0.045%	0.027%	0.010%
18	0.045%	0.027%	0.010%
19	0.045%	0.027%	0.010%
20	0.048%	0.029%	0.010%
21	0.048%	0.030%	0.010%
22	0.049%	0.030%	0.010%
23	0.050%	0.031%	0.010%
24	0.051%	0.031%	0.010%
25	0.052%	0.031%	0.010%
26	0.053%	0.032%	0.010%
27	0.054%	0.033%	0.010%
28	0.056%	0.033%	0.010%
29	0.057%	0.034%	0.010%
30	0.058%	0.034%	0.010%
31	0.059%	0.034%	0.010%
32	0.059%	0.034%	0.010%
33	0.060%	0.034%	0.010%
34	0.060%	0.034%	0.010%
35	0.060%	0.034%	0.010%
36	0.072%	0.040%	0.010%
37	0.083%	0.046%	0.010%
38	0.093%	0.051%	0.010%
39	0.103%	0.056%	0.010%
40	0.111%	0.061%	0.010%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: BASE YEAR 2019			
	Sanitation		
	Ordinary Death		Accidental Death
Age	Males	Females	All
41	0.119%	0.065%	0.010%
42	0.125%	0.069%	0.010%
43	0.131%	0.072%	0.010%
44	0.137%	0.076%	0.010%
45	0.143%	0.080%	0.010%
46	0.148%	0.084%	0.010%
47	0.154%	0.088%	0.010%
48	0.160%	0.092%	0.010%
49	0.167%	0.097%	0.010%
50	0.174%	0.102%	0.010%
51	0.182%	0.110%	0.010%
52	0.190%	0.118%	0.010%
53	0.200%	0.127%	0.010%
54	0.210%	0.136%	0.010%
55	0.221%	0.145%	0.010%
56	0.232%	0.155%	0.010%
57	0.244%	0.164%	0.010%
58	0.256%	0.173%	0.010%
59	0.268%	0.181%	0.010%
60	0.279%	0.189%	0.010%
61	0.299%	0.197%	0.010%
62	0.318%	0.204%	0.010%
63	0.336%	0.210%	0.010%
64	0.352%	0.216%	0.010%
65	0.367%	0.221%	0.010%
66	0.399%	0.243%	0.010%
67	0.430%	0.265%	0.010%
68	0.460%	0.287%	0.010%
69	0.489%	0.310%	0.010%
70	N/A	N/A	N/A

Section I(D) – TBTA and Transit Employees of New York City Employees' Retirement System (NYCERS)

Exposures and Decrements

Since the same withdrawal and disability assumptions apply to TBTA and Transit Employees, we have combined their analysis into this section. Retirement experience will be reviewed independently by plan code.

To set the exposures and actual decrements for TBTA and Transit Employees, the following table details the age and service conditions for unreduced retirement and reduced retirement. If a member has not met any of these conditions for the indicated plan code by year, the member is considered a withdrawal exposure. Otherwise, if the member did meet any of these conditions, they would be considered a retirement exposure. Members with a status code of termination who, nonetheless, have met the conditions for retirement, are included as actual retirements.

NYCERS Retirement Eligibility Chart - TBTA

Plan Code	Plan Description	Mandated	Formula Bump at 20 YOS	Unreduced Retirement Condition 1		Unreduced Retirement Condition 2		Reduced Retirement Condition	
				Age 1	Service 1	Age 2	Service 2	Age	Service
F	Basic 62/5	TRUE	TRUE	62	5			55	5
I	57/5 Plan	TRUE	TRUE	57	5				
I	57/5 Plan - Physically Taxing	TRUE	TRUE	50	25	57	5		
N	55/25 Plan - Tier 4	FALSE	TRUE	55	25	62	5		
R	TBTA - 50/20 Plan	BOTH	FALSE	50	20				
Y	63/5 Plan	TRUE	TRUE	63	10			55	10

NYCERS Retirement Eligibility Chart - Transit

Plan Code	Plan Description	Mandated	Formula Bump at 20 YOS	Unreduced Retirement Condition 1		Unreduced Retirement Condition 2		Reduced Retirement Condition	
				Age 1	Service 1	Age 2	Service 2	Age	Service
F	Basic 62/5	TRUE	TRUE	62	5			55	5
I	57/5 Plan	TRUE	TRUE	57	5				
L	Special Officers - Tier 4	BOTH	Under Basic Tier 4	0	25	62	5		
L	Special Officers - Tier 6	BOTH	Under Basic Tier 6	0	25	63	10		
N	55/25 Plan - Tier 4	FALSE	TRUE	55	25	62	5		
T	Auto Workers - Tier 4	BOTH	Under Basic Tier 4	50	25	62	5		
T	Auto Workers - Tier 6	TRUE	Under Basic Tier 6	50	25	63	10		
U	Transit - Improved Plan - Tier 4	BOTH	Under Basic Tier 4	55	25	62	5		
U	Transit - Improved Plan - Tier 6	TRUE	Under Basic Tier 6	55	25	63	10		
Y	63/5 Plan	TRUE	TRUE	63	10			55	10

For TBTA employees in the Basic 62/5 Plan and Tier 6 63/5 Plan and Transit employees in all plans other than the Transit – Improved Plan, OA applies the General employee actuarial assumptions. Therefore, these members are included in the General employee experience in Section I(A).

For the various Tier 6 plans, the vesting requirement was reduced from 10 years to 5 years due to the passage of Chapter 56, Laws of 2022. Since 10-year vesting was required during the study period, we have used 10 years in this report.

OA's retirement assumptions depend on whether a member can choose a certain retirement plan. If a member had a choice and elected the improved plan, the assumed rates of retirement are higher than those in which the member was mandated into the specific retirement plan. Higher rates of retirement apply to the indicated plan when the Mandated column is set to False. All Tier 6 plans are considered Mandated plans.

Please note that TBTA and Transit members may elect to retire under the Basic Plan rather than their specific Plan. When a member is eligible for reduced retirement under the Basic Plan and not eligible for unreduced retirement under their specific plan, OA utilizes the rates of withdrawal

during this period, but values an immediate reduced early retirement benefit. The experience of these members during this period is included in the retirement analysis.

Rates of Salary Increase

The rates of salary increase reflect three components: 1) price inflation, 2) real wage inflation, and 3) merit increases. The combination of price inflation and real wage inflation is known as wage inflation. The current wage inflation is 3%, which reflects a price inflation assumption of 2.5% and 0.5% real wage inflation.

Based on the 2024 and 2023 OASDI Trustees report issued by Social Security, wage inflation from 2012 to 2020 had a cumulative compound average of 2.93%. Including the rate for 2021 of 9.04%, the average increased to 3.53%. However, in our analysis of the experience, we did not notice any large increases in wages during 2021. This is typical with government sector employees with union affiliations where salary increases are specified in contracts negotiated for a 3- to 5-year period. Thus, wage increases for these employees may not adjust as quickly as for other employment sectors included in the Social Security Trustees report.

For purposes of our analysis, we believe the 3% current wage inflation is representative of the actual experience during the study period. While inflation has been higher since 2021, we propose no changes to the inflation assumption of 2.5% and wage inflation assumptions of 3%. Therefore, we have developed proposed salary increases based on total salary increases during the indicated period. The merit portion is equal to the total less the 3% wage inflation.

For purposes of salary increases only members with a status code of A in consecutive years are included. Members with a LOA status code are excluded.

Although salary increases for government employees may respond less quickly to changes in inflation, using salary experience from many years in the past may not necessarily be indicative of future salary increases as they may not include changes negotiated in union contracts such as general increases, longevity payments, or other salary items. We reviewed the salary increases by year and determined what we believe was the most reasonable period to compare to the current assumption and develop proposed assumptions.

TBTA

The following chart shows the experience for by year for the age range 22 to 59 and for the service range 0 to 29.



Salary increases for TBTA 50 and 20 Plan R members varied significantly from one year to the next. There were much lower salary increases measured prior to 2014 and spikes in 2014 and 2020. For TBTA, we focused on the 7-year period from 2015 – 2021, which appears to be the most stable period.

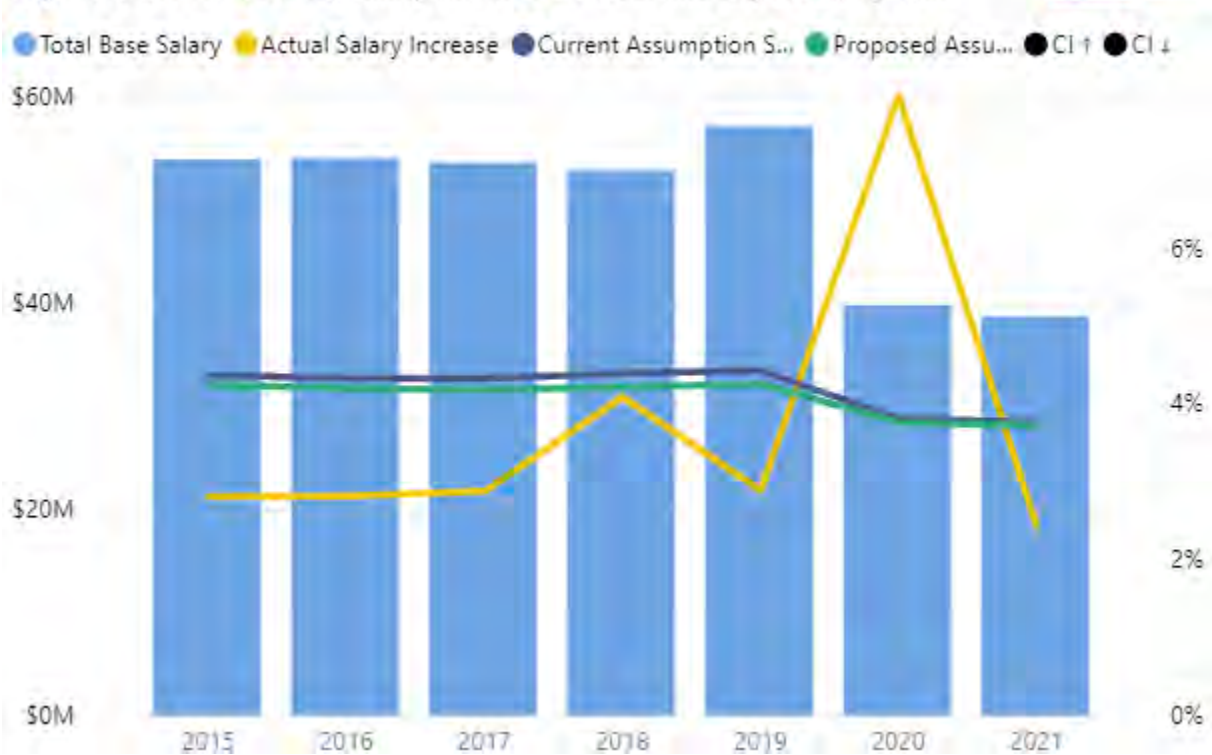
The current assumed rates of salary increases vary by service. The proposed assumption also varies by service. Overall, lower rates of salary increases are proposed.

The following table shows the experience for salary increases by year, for the age range (22 to 59), and for the service range (0 to 29) from 2015 to 2021. The actual rate of salary increases averaged 3.56% whereas the overall expected rate of increase averaged 4.23% based on the current assumptions and 4.10% based on the proposed assumptions.

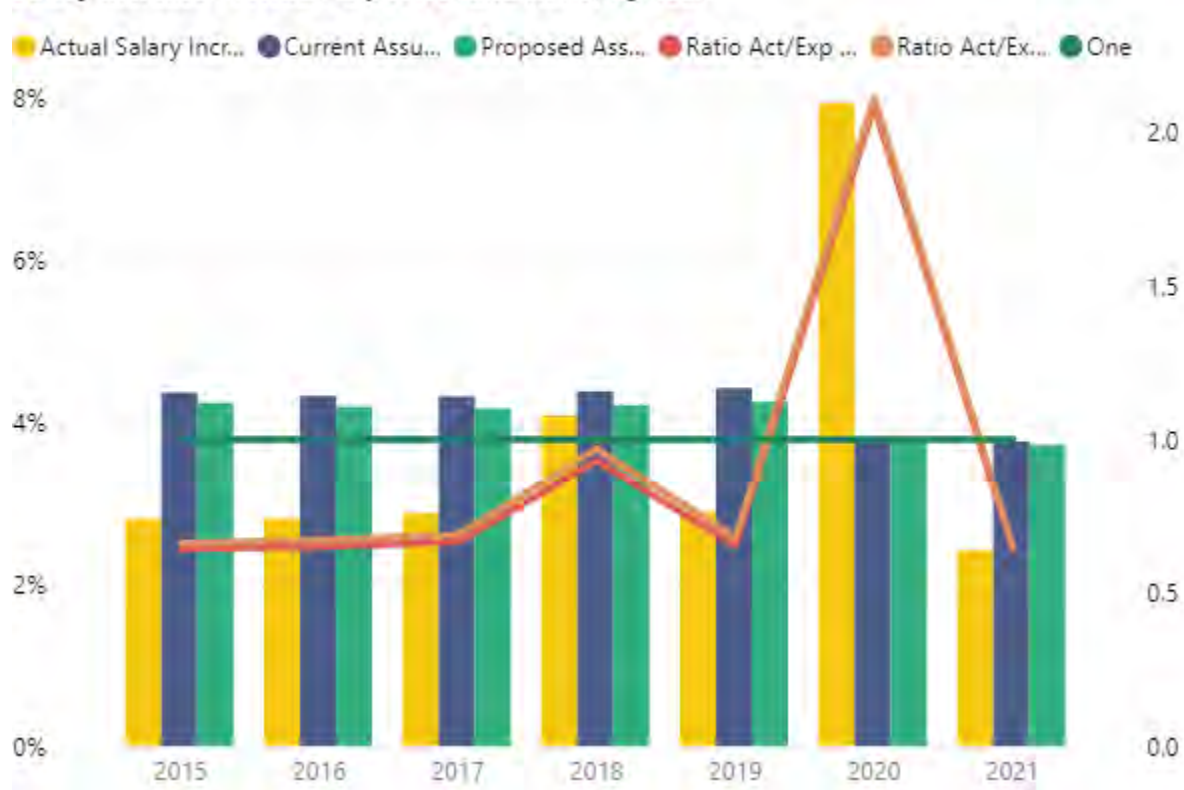
Plan Year	Exposed	Base Salary	Actual Salary	Expected Salary	Actual Salary Increase	Current Assumption Salary Increase	Ratio Act/Exp Salary Increase
2015	749	\$53.9M	\$55.4M	\$56.2M	2.80%	4.36%	▲ 0.64
2016	736	\$54.0M	\$55.5M	\$56.3M	2.81%	4.32%	▲ 0.65
2017	713	\$53.6M	\$55.1M	\$55.9M	2.87%	4.31%	▲ 0.67
2018	684	\$52.8M	\$55.0M	\$55.1M	4.08%	4.38%	● 0.93
2019	722	\$57.1M	\$58.7M	\$59.6M	2.88%	4.42%	▲ 0.65
2020	484	\$39.7M	\$42.9M	\$41.2M	7.94%	3.80%	◆ 2.09
2021	438	\$38.6M	\$39.6M	\$40.1M	2.42%	3.76%	▲ 0.64
Total	4,526	\$349.6M	\$362.1M	\$364.4M	3.56%	4.23%	▲ 0.84

Plan Year	Exposed	Base Salary	Actual Salary	Expected Salary Proposed	Actual Salary Increase	Proposed Assumption Salary Increase	Act/Exp Proposed Salary Increase
2015	749	\$53.9M	\$55.4M	\$56.2M	2.80%	4.24%	▲ 0.66
2016	736	\$54.0M	\$55.5M	\$56.3M	2.81%	4.19%	▲ 0.67
2017	713	\$53.6M	\$55.1M	\$55.8M	2.87%	4.17%	▲ 0.69
2018	684	\$52.8M	\$55.0M	\$55.0M	4.08%	4.21%	● 0.97
2019	722	\$57.1M	\$58.7M	\$59.5M	2.88%	4.25%	▲ 0.68
2020	484	\$39.7M	\$42.9M	\$41.2M	7.94%	3.75%	◆ 2.11
2021	438	\$38.6M	\$39.6M	\$40.1M	2.42%	3.72%	▲ 0.65
Total	4,526	\$349.6M	\$362.1M	\$364.0M	3.56%	4.10%	▲ 0.87

Exposure Distribution w/ Salary Increase - Actual and Expected; by Year



Salary Increase - Actual, Expected, and Ratio; by Year



The following charts show the experience by service (0 to 29 years) from 2015 to 2021 first compared to the current assumption and then to the proposed assumption. This resulted in an increase in the A/E ratio from 0.84 to 0.87 for ages 22 to 59.

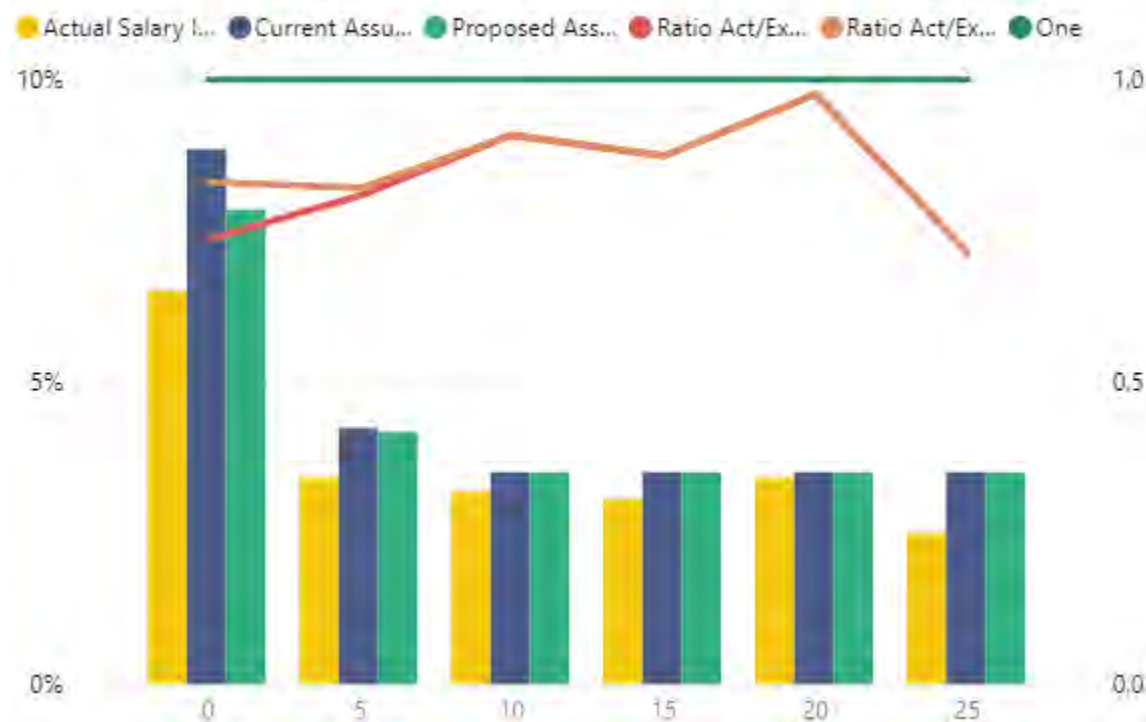
Service	Exposed	Base Salary	Actual Salary	Expected Salary	Actual Salary Increase	Current Assumption Salary Increase	Ratio Act/Exp Salary Increase
0	56	\$3.4M	\$3.5M	\$3.8M	4.04%	11.00%	0.37
1	158	\$10.3M	\$11.2M	\$11.4M	8.38%	10.00%	0.84
2	143	\$10.5M	\$11.1M	\$11.4M	6.54%	9.00%	0.73
3	114	\$8.3M	\$8.8M	\$8.9M	6.41%	8.00%	0.80
4	98	\$7.7M	\$8.0M	\$8.2M	5.09%	7.00%	0.73
5	95	\$7.4M	\$7.6M	\$7.8M	3.24%	6.00%	0.54
6	103	\$7.5M	\$7.7M	\$7.9M	2.66%	5.00%	0.53
7	147	\$11.3M	\$11.8M	\$11.8M	4.09%	4.00%	1.02
8	166	\$12.4M	\$12.8M	\$12.9M	3.20%	3.80%	0.84
9	225	\$17.0M	\$17.6M	\$17.6M	3.54%	3.60%	0.98
10	312	\$24.0M	\$24.9M	\$24.9M	3.43%	3.50%	0.98
11	358	\$27.6M	\$28.6M	\$28.6M	3.62%	3.50%	1.04
12	401	\$30.7M	\$31.6M	\$31.8M	2.98%	3.50%	0.85
13	407	\$31.3M	\$32.3M	\$32.4M	3.31%	3.50%	0.95
14	439	\$34.4M	\$35.4M	\$35.6M	2.68%	3.50%	0.77
15	359	\$28.5M	\$29.4M	\$29.5M	3.00%	3.50%	0.86
16	276	\$22.0M	\$22.7M	\$22.8M	3.03%	3.50%	0.86
17	207	\$16.8M	\$17.4M	\$17.4M	3.70%	3.50%	1.06
18	118	\$9.8M	\$10.0M	\$10.1M	2.27%	3.50%	0.65
19	57	\$4.8M	\$4.9M	\$4.9M	2.86%	3.50%	0.82
20	58	\$4.8M	\$4.9M	\$5.0M	3.21%	3.50%	0.92
21	39	\$3.2M	\$3.3M	\$3.3M	3.13%	3.50%	0.89
22	40	\$3.3M	\$3.4M	\$3.4M	3.77%	3.50%	1.08
23	29	\$2.4M	\$2.5M	\$2.5M	3.02%	3.50%	0.86
24	25	\$2.1M	\$2.2M	\$2.2M	4.20%	3.50%	1.20
25	30	\$2.4M	\$2.5M	\$2.5M	2.69%	3.50%	0.77
26	23	\$2.0M	\$2.0M	\$2.1M	2.33%	3.50%	0.67
27	17	\$1.5M	\$1.6M	\$1.6M	3.52%	3.50%	1.01
28	14	\$1.3M	\$1.4M	\$1.4M	1.36%	3.50%	0.39
29	12	\$0.9M	\$0.9M	\$1.0M	2.29%	3.50%	0.65
Total	4,526	\$349.6M	\$362.1M	\$364.4M	3.56%	4.23%	0.84

Service	Exposed	Base Salary	Actual Salary	Expected Salary Proposed	Actual Salary Increase	Proposed Assumption Salary Increase	Act/Exp Proposed Salary Increase
0	56	\$3.4M	\$3.5M	\$3.8M	4.04%	10.00%	0.40
1	158	\$10.3M	\$11.2M	\$11.3M	8.38%	9.00%	0.93
2	143	\$10.5M	\$11.1M	\$11.3M	6.54%	8.00%	0.82
3	114	\$8.3M	\$8.8M	\$8.9M	6.41%	7.00%	0.92
4	98	\$7.7M	\$8.0M	\$8.1M	5.09%	6.00%	0.85
5	95	\$7.4M	\$7.6M	\$7.8M	3.24%	5.50%	0.59
6	103	\$7.5M	\$7.7M	\$7.9M	2.66%	5.00%	0.53
7	147	\$11.3M	\$11.8M	\$11.8M	4.09%	4.00%	1.02
8	166	\$12.4M	\$12.8M	\$12.9M	3.20%	3.80%	0.84
9	225	\$17.0M	\$17.6M	\$17.6M	3.54%	3.60%	0.98
10	312	\$24.0M	\$24.9M	\$24.9M	3.43%	3.50%	0.98
11	358	\$27.6M	\$28.6M	\$28.6M	3.62%	3.50%	1.04
12	401	\$30.7M	\$31.6M	\$31.8M	2.98%	3.50%	0.85
13	407	\$31.3M	\$32.3M	\$32.4M	3.31%	3.50%	0.95
14	439	\$34.4M	\$35.4M	\$35.6M	2.68%	3.50%	0.77
15	359	\$28.5M	\$29.4M	\$29.5M	3.00%	3.50%	0.86
16	276	\$22.0M	\$22.7M	\$22.8M	3.03%	3.50%	0.86
17	207	\$16.8M	\$17.4M	\$17.4M	3.70%	3.50%	1.06
18	118	\$9.8M	\$10.0M	\$10.1M	2.27%	3.50%	0.65
19	57	\$4.8M	\$4.9M	\$4.9M	2.86%	3.50%	0.82
20	58	\$4.8M	\$4.9M	\$5.0M	3.21%	3.50%	0.92
21	39	\$3.2M	\$3.3M	\$3.3M	3.13%	3.50%	0.89
22	40	\$3.3M	\$3.4M	\$3.4M	3.77%	3.50%	1.08
23	29	\$2.4M	\$2.5M	\$2.5M	3.02%	3.50%	0.86
24	25	\$2.1M	\$2.2M	\$2.2M	4.20%	3.50%	1.20
25	30	\$2.4M	\$2.5M	\$2.5M	2.69%	3.50%	0.77
26	23	\$2.0M	\$2.0M	\$2.1M	2.33%	3.50%	0.67
27	17	\$1.5M	\$1.6M	\$1.6M	3.52%	3.50%	1.01
28	14	\$1.3M	\$1.4M	\$1.4M	1.36%	3.50%	0.39
29	12	\$0.9M	\$0.9M	\$1.0M	2.29%	3.50%	0.65
Total	4,526	\$349.6M	\$362.1M	\$364.0M	3.56%	4.10%	0.87

Exposure Distribution w/ Salary Increase - Actual and Expected; by Service

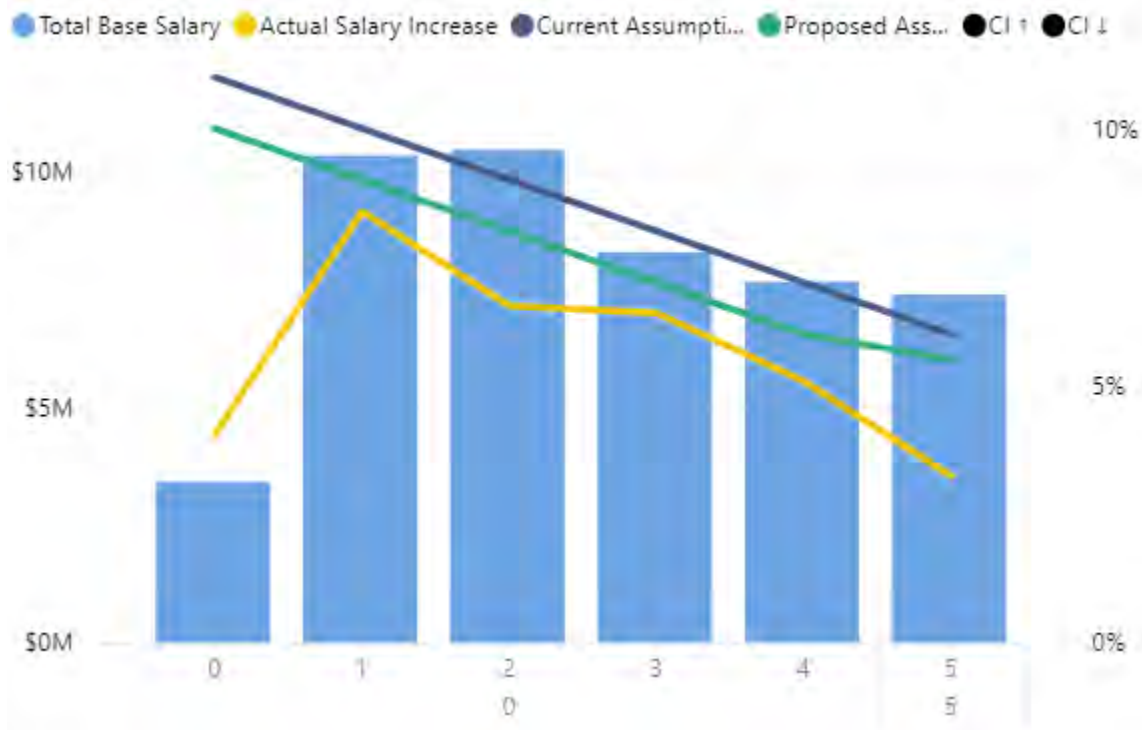


Salary Increase - Actual, Expected, and Ratio; by Service



This chart shows the results by service for the service range 0 to 5 years, which decreased the assumed rate of salary increases from 8.40% to 7.48% as compared to the actual rate of 5.99%. This resulted in an increase in the A/E ratio from 0.71 to 0.80 for ages 22 to 59.

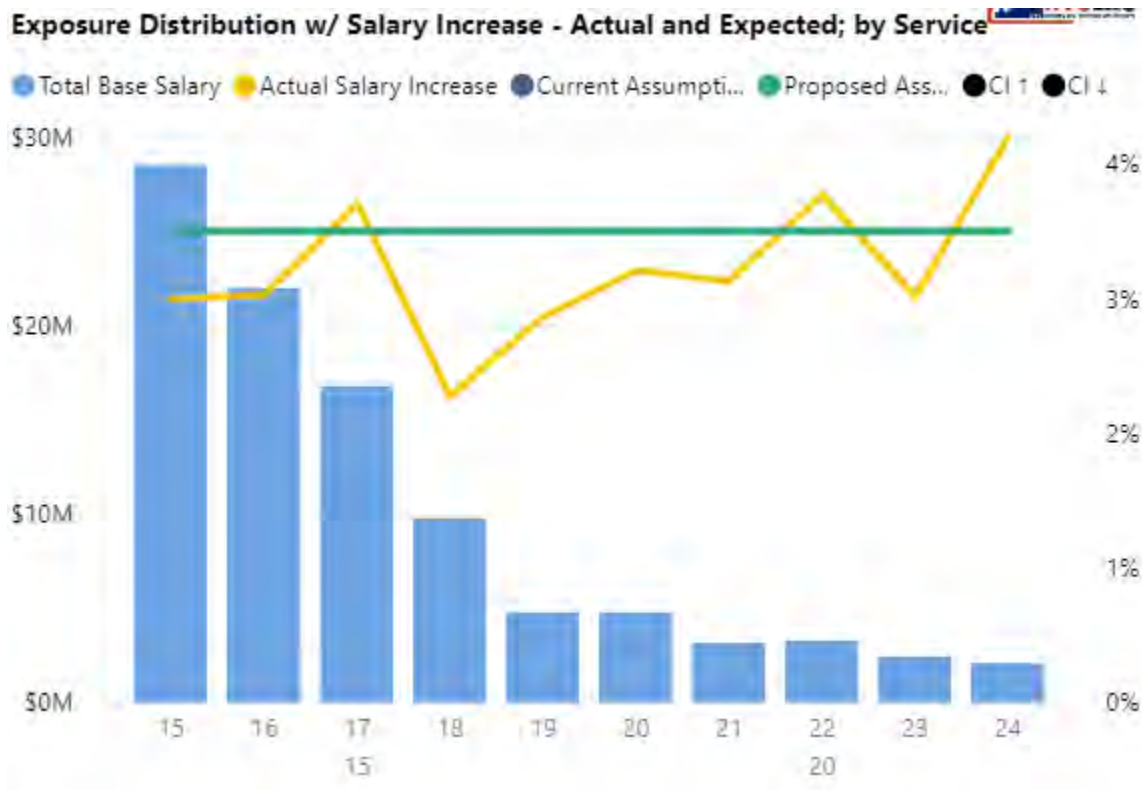
Exposure Distribution w/ Salary Increase - Actual and Expected; by Service



This chart shows the results by year for the service range 6 to 14 years, which maintained the assumed rate of salary increases of 3.61% as compared to the actual rate of 3.24%. This resulted in no change in the A/E ratio of 0.90 for ages 22 to 59.



This chart shows the results by service for the service range 15 to 24 years, which maintained the assumed rate of salary increases of 3.50% as compared to the actual rate of 3.11%. This resulted in no change in the A/E ratio of 0.89 for ages 22 to 59.



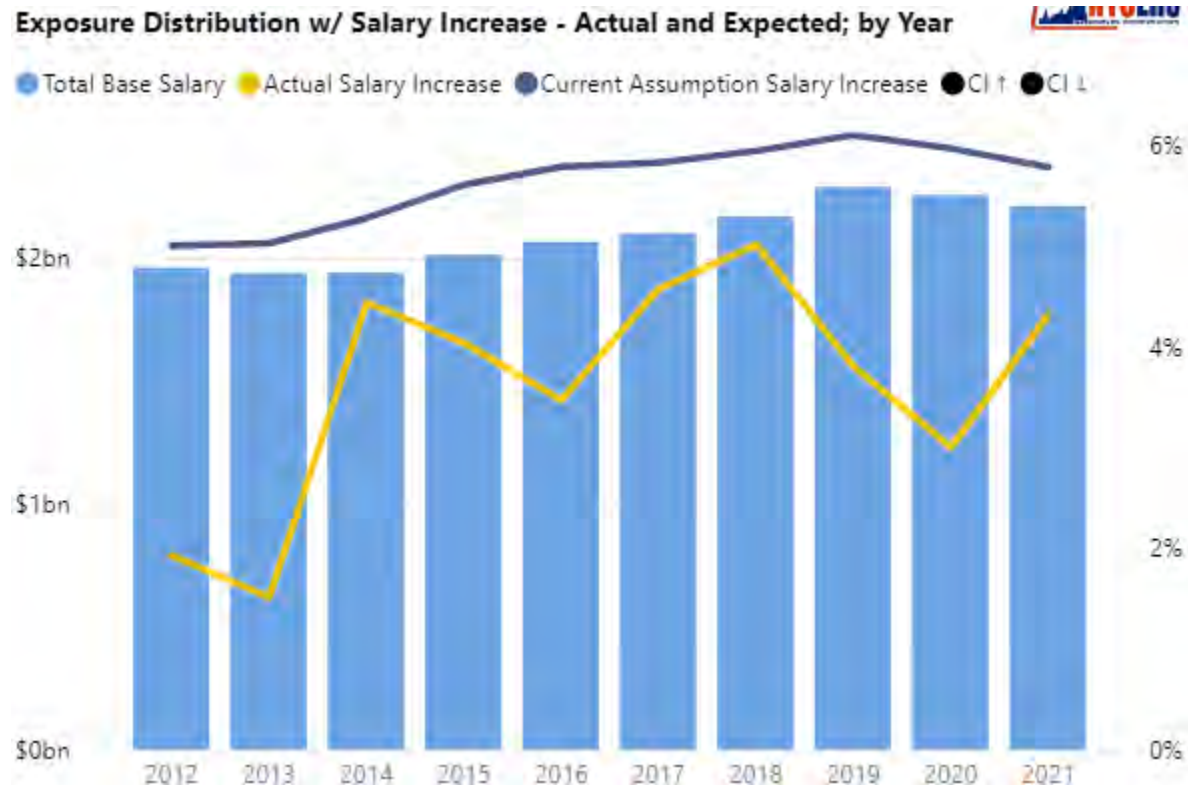
This chart shows the results by service for the service range 25 to 34 years, which maintained the assumed rate of salary increases of 3.50% as compared to the actual rate of 2.49%. This resulted in no change in the A/E ratio of 0.71 for ages 22 to 59.

Exposure Distribution w/ Salary Increase - Actual and Expected; by Service



Transit

The following chart shows the experience for by year for the age range 22 to 59 and for the service range 0 to 34.



Salary increases for Transit members varied significantly from one year to the next. There were much lower salary increases measured prior to 2014. For Transit, we focused on the 8-year period from 2014 – 2021, which appears to be the most stable period.

The current assumed rates of salary increases vary by service. The proposed assumption also varies by service. Overall, lower rates of salary increases are proposed.

The following table shows the experience for salary increases by year, for the age range (22 to 59), and for the service range (0 to 34) from 2014 to 2021. The actual rate of salary increases averaged 4.08% whereas the overall expected rate of increase averaged 5.80% based on the current assumptions and 4.95% based on the proposed assumptions.

Plan Year	Exposed	Base Salary	Actual Salary	Expected Salary	Actual Salary Increase	Current Assumption Salary Increase	Ratio Act/Exp Salary Increase
2014	28,348	\$1,941.3M	\$2,027.5M	\$2,043.8M	4.44%	5.28%	▲ 0.84
2015	28,633	\$2,012.2M	\$2,093.5M	\$2,125.1M	4.04%	5.61%	▲ 0.72
2016	28,890	\$2,064.8M	\$2,136.6M	\$2,184.4M	3.48%	5.79%	▲ 0.60
2017	28,947	\$2,099.5M	\$2,195.6M	\$2,221.9M	4.58%	5.83%	▲ 0.79
2018	29,320	\$2,168.5M	\$2,277.4M	\$2,297.5M	5.02%	5.95%	▲ 0.84
2019	30,385	\$2,289.4M	\$2,376.6M	\$2,429.3M	3.81%	6.11%	▲ 0.62
2020	29,375	\$2,255.7M	\$2,323.5M	\$2,390.5M	3.00%	5.97%	▲ 0.50
2021	28,370	\$2,211.2M	\$2,306.7M	\$2,339.2M	4.32%	5.79%	▲ 0.75
Total	232,268	\$17,042.7M	\$17,737.3M	\$18,031.6M	4.08%	5.80%	▲ 0.70

Plan Year	Exposed	Base Salary	Actual Salary	Expected Salary Proposed	Actual Salary Increase	Proposed Assumption Salary Increase	Act/Exp Proposed Salary Increase
2014	28,348	\$1,941.3M	\$2,027.5M	\$2,028.9M	4.44%	4.51%	● 0.98
2015	28,633	\$2,012.2M	\$2,093.5M	\$2,108.3M	4.04%	4.78%	▲ 0.85
2016	28,890	\$2,064.8M	\$2,136.6M	\$2,166.3M	3.48%	4.92%	▲ 0.71
2017	28,947	\$2,099.5M	\$2,195.6M	\$2,204.3M	4.58%	4.99%	● 0.92
2018	29,320	\$2,168.5M	\$2,277.4M	\$2,278.9M	5.02%	5.09%	● 0.99
2019	30,385	\$2,289.4M	\$2,376.6M	\$2,408.2M	3.81%	5.19%	▲ 0.73
2020	29,375	\$2,255.7M	\$2,323.5M	\$2,370.0M	3.00%	5.06%	▲ 0.59
2021	28,370	\$2,211.2M	\$2,306.7M	\$2,321.7M	4.32%	4.99%	▲ 0.86
Total	232,268	\$17,042.7M	\$17,737.3M	\$17,886.5M	4.08%	4.95%	▲ 0.82

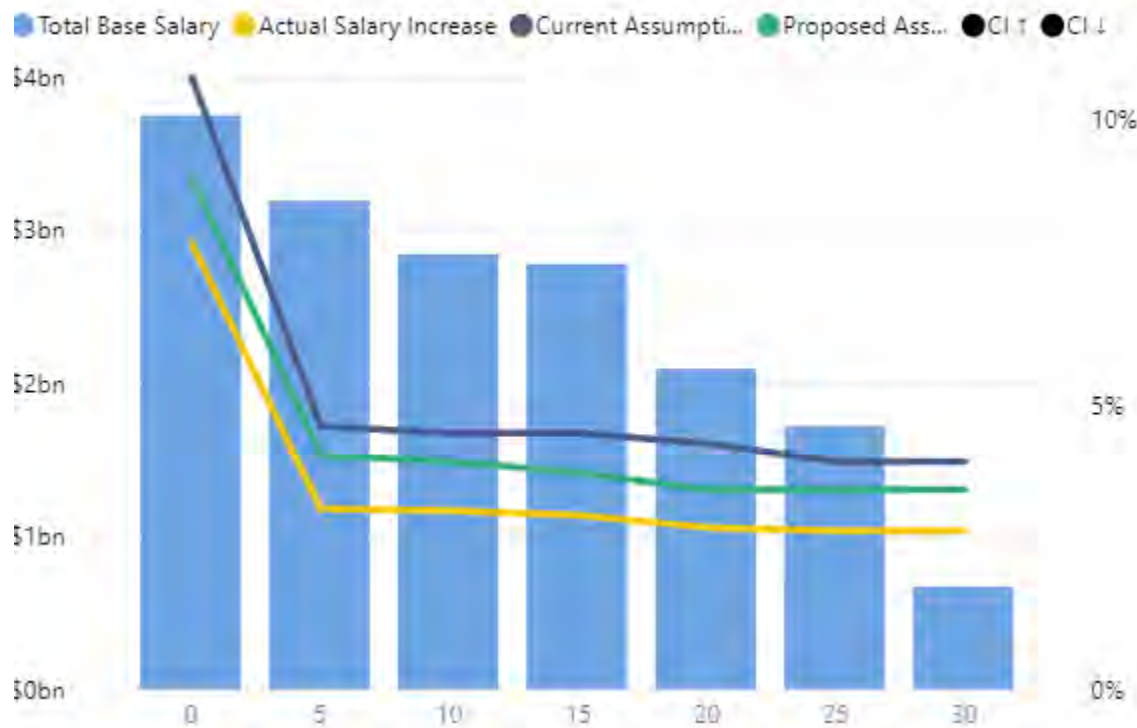


The following charts show the experience by service (0 to 34 years) from 2014 to 2021 first compared to the current assumption and then to the proposed assumption. This resulted in an increase in the A/E ratio from 0.70 to 0.82 for ages 22 to 59.

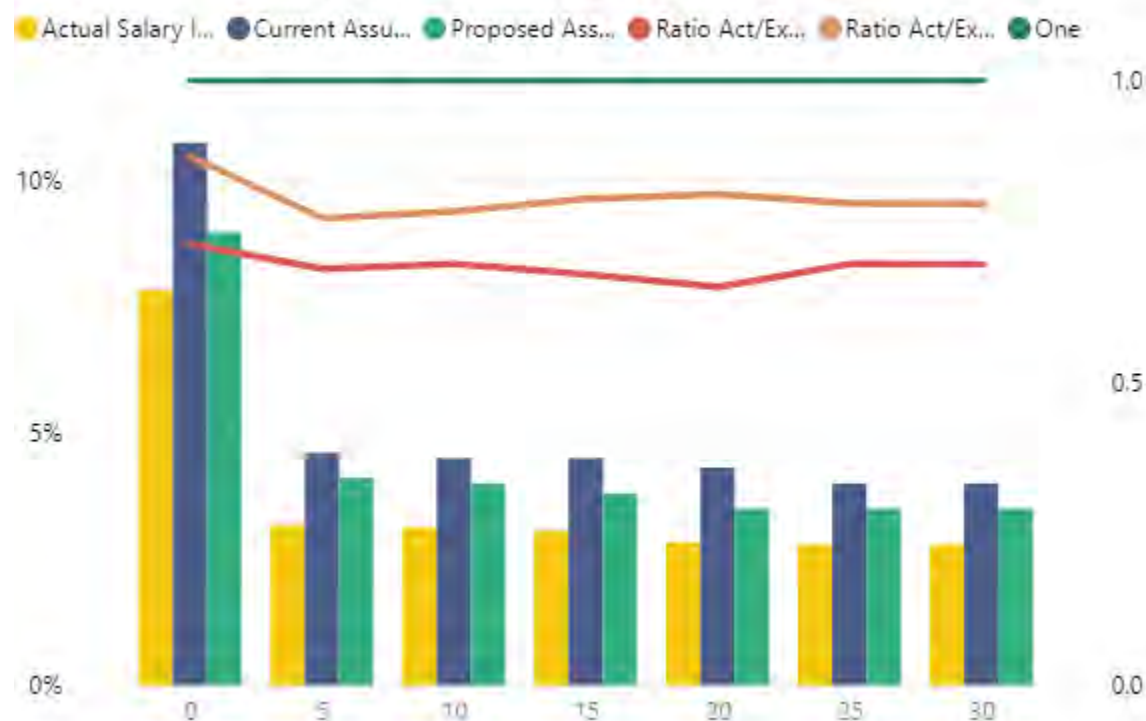
Service	Exposed	Base Salary	Actual Salary	Expected Salary	Actual Salary Increase	Current Assumption Salary Increase	Ratio Act/Exp Salary Increase
0	6,123	\$322.3M	\$363.5M	\$383.6M	12.76%	19.00%	▲ 0.67
1	16,339	\$946.6M	\$1,024.5M	\$1,079.1M	8.23%	14.00%	▲ 0.59
2	14,563	\$898.5M	\$980.1M	\$988.3M	9.08%	10.00%	● 0.91
3	12,207	\$816.3M	\$874.7M	\$889.7M	7.16%	9.00%	▲ 0.80
4	10,711	\$762.5M	\$796.8M	\$808.2M	4.50%	6.00%	▲ 0.75
5	9,783	\$713.3M	\$740.0M	\$748.9M	3.75%	5.00%	▲ 0.75
6	9,590	\$699.7M	\$720.7M	\$731.2M	3.00%	4.50%	▲ 0.67
7	8,559	\$621.4M	\$639.2M	\$649.4M	2.86%	4.50%	▲ 0.64
8	8,198	\$594.6M	\$612.2M	\$621.3M	2.96%	4.50%	▲ 0.66
9	7,670	\$562.7M	\$580.7M	\$588.0M	3.21%	4.50%	▲ 0.71
10	7,290	\$540.4M	\$557.9M	\$564.7M	3.25%	4.50%	▲ 0.72
11	7,268	\$547.7M	\$564.4M	\$572.4M	3.04%	4.50%	▲ 0.68
12	7,702	\$582.4M	\$600.3M	\$608.7M	3.06%	4.50%	▲ 0.68
13	7,727	\$585.3M	\$603.4M	\$611.6M	3.10%	4.50%	▲ 0.69
14	7,840	\$586.8M	\$605.6M	\$613.2M	3.21%	4.50%	▲ 0.71
15	7,824	\$590.9M	\$609.9M	\$617.5M	3.21%	4.50%	▲ 0.71
16	7,630	\$583.0M	\$600.8M	\$609.2M	3.05%	4.50%	▲ 0.68
17	7,257	\$565.7M	\$582.2M	\$591.2M	2.92%	4.50%	▲ 0.65
18	6,550	\$519.9M	\$535.7M	\$543.3M	3.05%	4.50%	▲ 0.68
19	6,482	\$519.7M	\$535.4M	\$543.1M	3.03%	4.50%	▲ 0.67
20	5,898	\$472.0M	\$484.9M	\$493.2M	2.73%	4.50%	▲ 0.61
21	5,596	\$448.3M	\$461.5M	\$468.4M	2.96%	4.50%	▲ 0.66
22	4,905	\$394.8M	\$404.9M	\$412.5M	2.58%	4.50%	▲ 0.57
23	4,789	\$383.1M	\$394.2M	\$398.5M	2.89%	4.00%	▲ 0.72
24	4,958	\$395.1M	\$407.1M	\$410.9M	3.04%	4.00%	▲ 0.76
25	5,027	\$403.1M	\$415.0M	\$419.3M	2.94%	4.00%	▲ 0.73
26	4,780	\$388.4M	\$398.8M	\$403.9M	2.69%	4.00%	▲ 0.67
27	4,167	\$341.8M	\$351.4M	\$355.4M	2.83%	4.00%	▲ 0.71
28	3,858	\$319.1M	\$327.3M	\$331.9M	2.58%	4.00%	▲ 0.64
29	3,206	\$267.1M	\$274.8M	\$277.7M	2.88%	4.00%	▲ 0.72
30	2,521	\$213.9M	\$219.7M	\$222.5M	2.72%	4.00%	▲ 0.68
31	2,011	\$173.0M	\$177.7M	\$179.9M	2.75%	4.00%	▲ 0.69
32	1,514	\$131.4M	\$135.0M	\$136.7M	2.72%	4.00%	▲ 0.68
33	1,063	\$93.1M	\$95.8M	\$96.8M	2.86%	4.00%	▲ 0.71
34	662	\$59.0M	\$60.9M	\$61.4M	3.09%	4.00%	▲ 0.77
Total	232,268	\$17,042.7M	\$17,737.3M	\$18,031.6M	4.08%	5.80%	▲ 0.70

Service	Exposed	Base Salary	Actual Salary	Expected Salary Proposed	Actual Salary Increase	Proposed Assumption Salary Increase	Act/Exp Proposed Salary Increase
0	6,123	\$322.3M	\$363.5M	\$370.7M	12.76%	15.00%	▲ 0.85
1	16,339	\$946.6M	\$1,024.5M	\$1,041.3M	8.23%	10.00%	▲ 0.82
2	14,563	\$898.5M	\$980.1M	\$988.3M	9.08%	10.00%	● 0.91
3	12,207	\$816.3M	\$874.7M	\$881.6M	7.16%	8.00%	▲ 0.89
4	10,711	\$762.5M	\$796.8M	\$800.6M	4.50%	5.00%	● 0.90
5	9,783	\$713.3M	\$740.0M	\$745.4M	3.75%	4.50%	▲ 0.83
6	9,590	\$699.7M	\$720.7M	\$727.7M	3.00%	4.00%	▲ 0.75
7	8,559	\$621.4M	\$639.2M	\$646.3M	2.86%	4.00%	▲ 0.72
8	8,198	\$594.6M	\$612.2M	\$618.3M	2.96%	4.00%	▲ 0.74
9	7,670	\$562.7M	\$580.7M	\$585.2M	3.21%	4.00%	▲ 0.80
10	7,290	\$540.4M	\$557.9M	\$562.0M	3.25%	4.00%	▲ 0.81
11	7,268	\$547.7M	\$564.4M	\$569.6M	3.04%	4.00%	▲ 0.76
12	7,702	\$582.4M	\$600.3M	\$605.7M	3.06%	4.00%	▲ 0.77
13	7,727	\$585.3M	\$603.4M	\$608.7M	3.10%	4.00%	▲ 0.77
14	7,840	\$586.8M	\$605.6M	\$610.2M	3.21%	4.00%	▲ 0.80
15	7,824	\$590.9M	\$609.9M	\$614.5M	3.21%	4.00%	▲ 0.80
16	7,630	\$583.0M	\$600.8M	\$604.9M	3.05%	3.75%	▲ 0.81
17	7,257	\$565.7M	\$582.2M	\$586.9M	2.92%	3.75%	▲ 0.78
18	6,550	\$519.9M	\$535.7M	\$539.4M	3.05%	3.75%	▲ 0.81
19	6,482	\$519.7M	\$535.4M	\$539.2M	3.03%	3.75%	▲ 0.81
20	5,898	\$472.0M	\$484.9M	\$488.5M	2.73%	3.50%	▲ 0.78
21	5,596	\$448.3M	\$461.5M	\$463.9M	2.96%	3.50%	▲ 0.85
22	4,905	\$394.8M	\$404.9M	\$408.6M	2.58%	3.50%	▲ 0.74
23	4,789	\$383.1M	\$394.2M	\$396.6M	2.89%	3.50%	▲ 0.83
24	4,958	\$395.1M	\$407.1M	\$408.9M	3.04%	3.50%	▲ 0.87
25	5,027	\$403.1M	\$415.0M	\$417.2M	2.94%	3.50%	▲ 0.84
26	4,780	\$388.4M	\$398.8M	\$402.0M	2.69%	3.50%	▲ 0.77
27	4,167	\$341.8M	\$351.4M	\$353.7M	2.83%	3.50%	▲ 0.81
28	3,858	\$319.1M	\$327.3M	\$330.3M	2.58%	3.50%	▲ 0.74
29	3,206	\$267.1M	\$274.8M	\$276.4M	2.88%	3.50%	▲ 0.82
30	2,521	\$213.9M	\$219.7M	\$221.4M	2.72%	3.50%	▲ 0.78
31	2,011	\$173.0M	\$177.7M	\$179.0M	2.75%	3.50%	▲ 0.79
32	1,514	\$131.4M	\$135.0M	\$136.0M	2.72%	3.50%	▲ 0.78
33	1,063	\$93.1M	\$95.8M	\$96.4M	2.86%	3.50%	▲ 0.82
34	662	\$59.0M	\$60.9M	\$61.1M	3.09%	3.50%	▲ 0.88
Total	232,268	\$17,042.7M	\$17,737.3M	\$17,886.5M	4.08%	4.95%	▲ 0.82

Exposure Distribution w/ Salary Increase - Actual and Expected; by Service



Salary Increase - Actual, Expected, and Ratio; by Service



This chart shows the results by service for the service range 0 to 5 years, which decreased the assumed rate of salary increases from 9.83% to 8.26% as compared to the actual rate of 7.18%. This resulted in an increase in the A/E ratio from 0.73 to 0.87 for ages 22 to 59.



This chart shows the results by year for the service range 6 to 14 years, which decreased the assumed rate of salary increases from 4.50% to 4.00% as compared to the actual rate of 3.07%. This resulted in an increase in the A/E ratio from 0.68 to 0.77 for ages 22 to 59.

Exposure Distribution w/ Salary Increase - Actual and Expected; by Service



This chart shows the results by service for the service range 15 to 24 years, which decreased the assumed rate of salary increases from 4.42% to 3.67% as compared to the actual rate of 2.96%. This resulted in an increase in the A/E ratio from 0.67 to 0.81 for ages 22 to 59.

Exposure Distribution w/ Salary Increase - Actual and Expected; by Service



This chart shows the results by service for the service range 25 to 34 years, decreased the assumed rate of salary increases from 4.00% to 3.50% as compared to the actual rate of 2.78%. This resulted in an increase in the A/E ratio from 0.70 to 0.80 for ages 22 to 59.



Summary

In total for TBTA and Transit, the proposed rates of salary increases are lower than the current assumptions, which would decrease plan liabilities.

Assumption Tables

The following table shows the current assumptions for TBTA and Transit.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT ASSUMPTION ANNUAL RATES OF MERIT AND SALARY INCREASE				
Years of Service	TRANSIT		TBTA	
	Merit Increase	Salary Increase ¹	Merit Increase	Salary Increase ¹
0	16.00%	19.00%	8.00%	11.00%
1	11.00%	14.00%	7.00%	10.00%
2	7.00%	10.00%	6.00%	9.00%
3	6.00%	9.00%	5.00%	8.00%
4	3.00%	6.00%	4.00%	7.00%
5	2.00%	5.00%	3.00%	6.00%
6	1.50%	4.50%	2.00%	5.00%
7	1.50%	4.50%	1.00%	4.00%
8	1.50%	4.50%	0.80%	3.80%
9	1.50%	4.50%	0.60%	3.60%
10	1.50%	4.50%	0.50%	3.50%
11	1.50%	4.50%	0.50%	3.50%
12	1.50%	4.50%	0.50%	3.50%
13	1.50%	4.50%	0.50%	3.50%
14	1.50%	4.50%	0.50%	3.50%
15	1.50%	4.50%	0.50%	3.50%
16	1.50%	4.50%	0.50%	3.50%
17	1.50%	4.50%	0.50%	3.50%
18	1.50%	4.50%	0.50%	3.50%
19	1.50%	4.50%	0.50%	3.50%
20	1.50%	4.50%	0.50%	3.50%
21	1.50%	4.50%	0.50%	3.50%
22	1.50%	4.50%	0.50%	3.50%
23	1.00%	4.00%	0.50%	3.50%
24	1.00%	4.00%	0.50%	3.50%
25	1.00%	4.00%	0.50%	3.50%
26	1.00%	4.00%	0.50%	3.50%
27	1.00%	4.00%	0.50%	3.50%
28	1.00%	4.00%	0.50%	3.50%
29	1.00%	4.00%	0.50%	3.50%
30+	1.00%	4.00%	0.50%	3.50%

¹ Salary increase is the general wage increase of 3% plus the merit increase

The following table shows the proposed assumptions for TBTA and Transit.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED ASSUMPTION ANNUAL RATES OF MERIT AND SALARY INCREASE				
Years of Service	TRANSIT		TBTA	
	Merit Increase	Salary Increase ¹	Merit Increase	Salary Increase ¹
0	12.00%	15.00%	7.00%	10.00%
1	7.00%	10.00%	6.00%	9.00%
2	7.00%	10.00%	5.00%	8.00%
3	5.00%	8.00%	4.00%	7.00%
4	2.00%	5.00%	3.00%	6.00%
5	1.00%	4.50%	2.50%	5.50%
6	1.00%	4.00%	2.00%	5.00%
7	1.00%	4.00%	1.00%	4.00%
8	1.00%	4.00%	0.80%	3.80%
9	1.00%	4.00%	0.60%	3.60%
10	1.00%	4.00%	0.50%	3.50%
11	1.00%	4.00%	0.50%	3.50%
12	1.00%	4.00%	0.50%	3.50%
13	1.00%	4.00%	0.50%	3.50%
14	1.00%	4.00%	0.50%	3.50%
15	1.00%	4.00%	0.50%	3.50%
16	0.75%	3.75%	0.50%	3.50%
17	0.75%	3.75%	0.50%	3.50%
18	0.75%	3.75%	0.50%	3.50%
19	0.75%	3.75%	0.50%	3.50%
20	0.50%	3.50%	0.50%	3.50%
21	0.50%	3.50%	0.50%	3.50%
22	0.50%	3.50%	0.50%	3.50%
23	0.50%	3.50%	0.50%	3.50%
24	0.50%	3.50%	0.50%	3.50%
25	0.50%	3.50%	0.50%	3.50%
26	0.50%	3.50%	0.50%	3.50%
27	0.50%	3.50%	0.50%	3.50%
28	0.50%	3.50%	0.50%	3.50%
29	0.50%	3.50%	0.50%	3.50%
30+	0.50%	3.50%	0.50%	3.50%

¹ Salary increase is the general wage increase of 3% plus the merit increase

Overtime TBTA

Overtime is considered pensionable earnings in determining a member's final average salary and benefit payable under the plan. OA applies a percentage increase to the member's base salary to account for assumed overtime. The percentage varies by years of service, tier, and whether the individual is expected to retire or become disabled within the next year.

The valuation data contains actual overtime earned during the prior year. For example, overtime contained in the 2019 data is for the year July 1, 2018 to June 30, 2019. We refer to this as 2019 overtime. The rate of overtime is defined as the amount of overtime for the year divided by the average of the member's base salary as of current year and the prior year. Therefore, 2019 overtime percentage is determined based on the average of the base salary as of July 1, 2018 and July 1, 2019.

The overtime percentage is only calculated for members with a status code of A in consecutive years. Members with a LOA status code are excluded.

Separate rates of overtime are applied if the member is expected to retire or become disabled in the following year. These are referred to as Dual Retirement or Dual Disability. We measured the rates of overtime in these situations for members who actually became disabled or retired the following year. For example, a dual overtime percentage applies in 2019 for a member who retired or became disabled in 2020. In the MEST, we developed codes S1 and D1 to identify these situations.

In addition, we also separately measured rates of overtime for those who were two years prior to retirement or disability. For example, we reviewed whether or not the 2019 overtime percentage was higher than otherwise for members who retired in 2021 or lower than otherwise for members who became disabled in 2021. In the MEST, we developed codes S2 and D2 to identify these situations.

These measures allowed us to determine if there was a spike in the amount of overtime just at the time of retirement relative to baseline (all other years). In all situations, we did not find that overtime was higher two years prior for retirement or lower two years prior for disability. For purposes of this report, the experience for members two years prior to retirement or disability is included in the Baseline analysis.

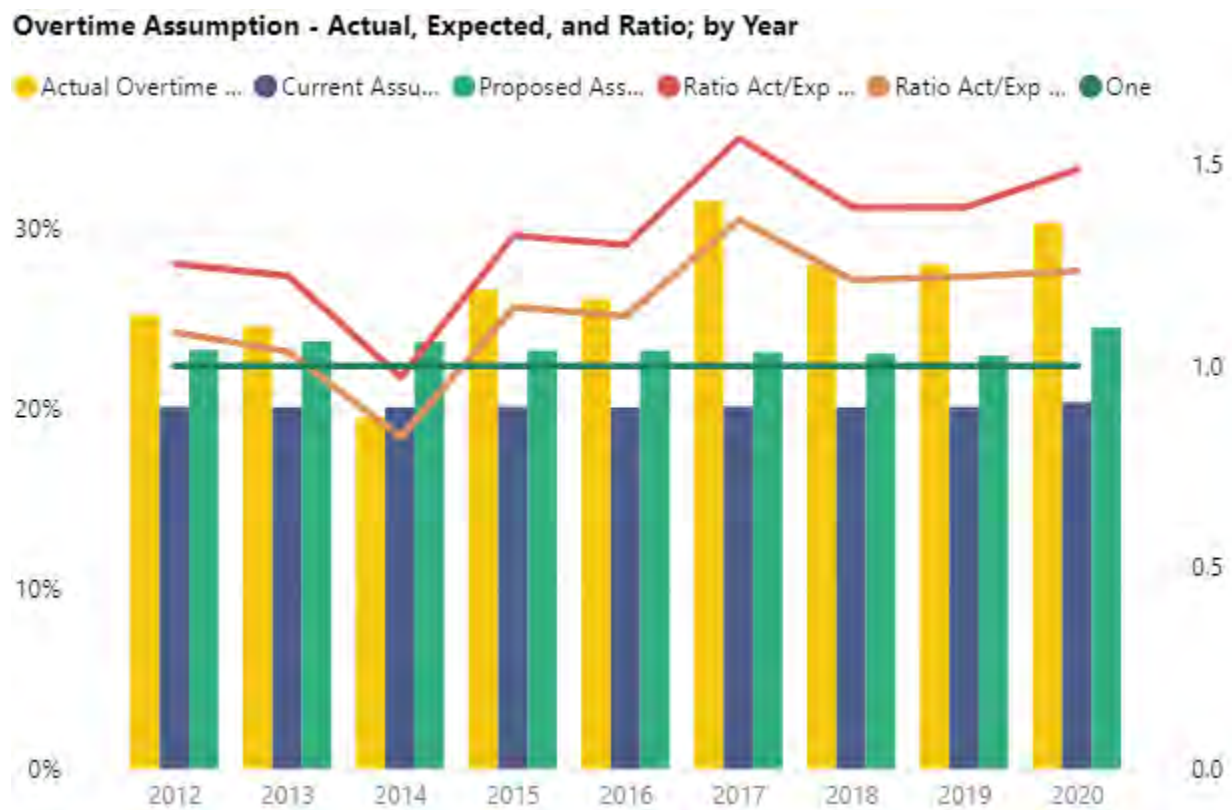
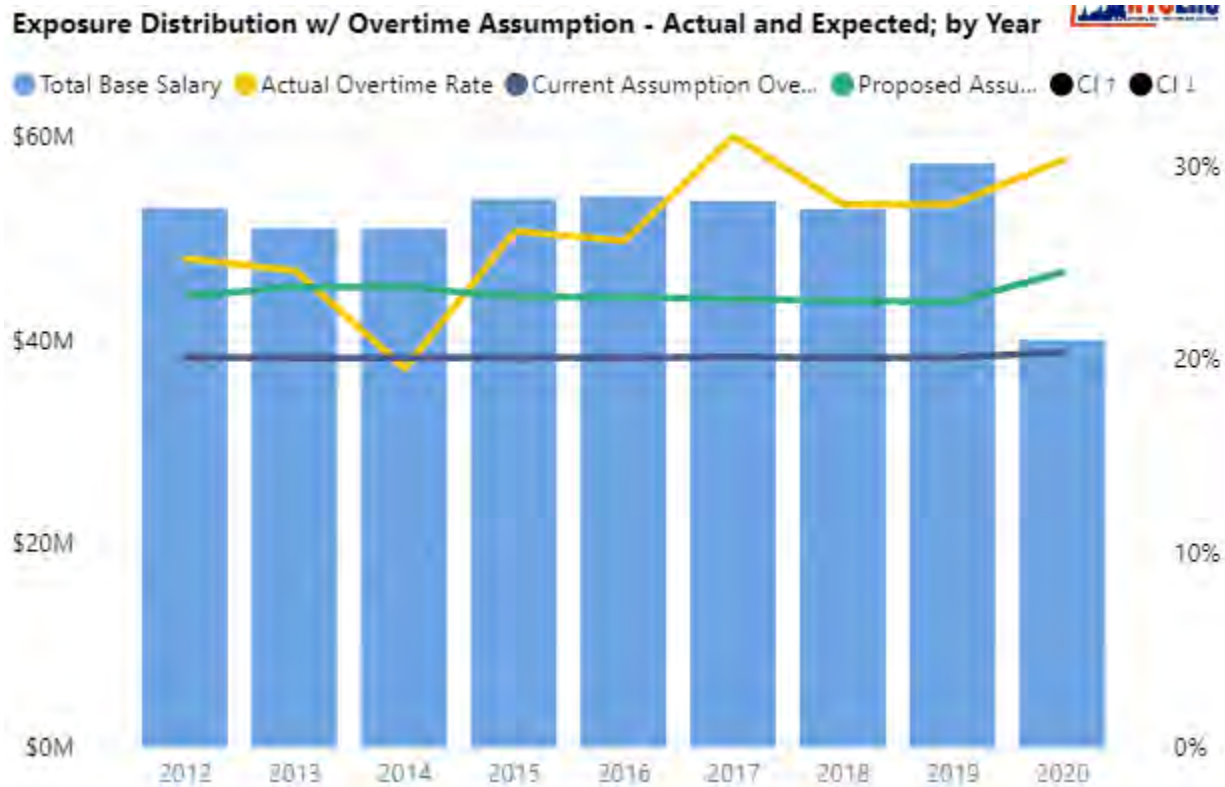
For TBTA (50 and 20 Plan R), we found that overtime one year prior for retirement was not higher than for members of the same service who did not retire. Therefore, the proposed assumption does not include a separate dual retirement assumption.

The proposed assumption includes a separate assumption for dual disability and only varies by service during the first years of a member's career.

The following charts show the experience for overtime percentage by year, for the age range (22 to 59), and for the service range (0 to 34) from 2012 to 2020. The actual overtime percentage for all types of overtime averaged 26.57% whereas the overall expected overtime percentage averaged 20.10% based on the current assumptions and 23.36% based on the proposed assumptions. Overtime during 2021 was much lower than other years, most likely due to the pandemic, and was excluded from the analysis.

Plan Year	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
2012	810	\$53.3M	\$13.4M	\$10.7M	25.19%	20.09%	▲ 1.25
2013	770	\$51.1M	\$12.5M	\$10.3M	24.56%	20.07%	▲ 1.22
2014	770	\$53.5M	\$10.4M	\$10.7M	19.51%	20.07%	● 0.97
2015	749	\$54.6M	\$14.5M	\$11.0M	26.58%	20.09%	▲ 1.32
2016	737	\$54.8M	\$14.3M	\$11.0M	26.09%	20.05%	▲ 1.30
2017	714	\$54.4M	\$17.1M	\$10.9M	31.50%	20.11%	◆ 1.57
2018	684	\$53.9M	\$15.1M	\$10.8M	27.95%	20.05%	▲ 1.39
2019	725	\$58.1M	\$16.3M	\$11.7M	27.98%	20.08%	▲ 1.39
2020	487	\$41.6M	\$12.6M	\$8.5M	30.27%	20.34%	▲ 1.49
Total	6,446	\$475.3M	\$126.3M	\$95.5M	26.57%	20.10%	▲ 1.32

Plan Year	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
2012	810	\$53.3M	\$13.4M	\$12.4M	25.19%	23.24%	● 1.08
2013	770	\$51.1M	\$12.5M	\$12.1M	24.56%	23.71%	● 1.04
2014	770	\$53.5M	\$10.4M	\$12.7M	19.51%	23.69%	▲ 0.82
2015	749	\$54.6M	\$14.5M	\$12.7M	26.58%	23.20%	▲ 1.15
2016	737	\$54.8M	\$14.3M	\$12.7M	26.09%	23.19%	▲ 1.13
2017	714	\$54.4M	\$17.1M	\$12.6M	31.50%	23.10%	▲ 1.36
2018	684	\$53.9M	\$15.1M	\$12.4M	27.95%	23.02%	▲ 1.21
2019	725	\$58.1M	\$16.3M	\$13.3M	27.98%	22.92%	▲ 1.22
2020	487	\$41.6M	\$12.6M	\$10.2M	30.27%	24.48%	▲ 1.24
Total	6,446	\$475.3M	\$126.3M	\$111.0M	26.57%	23.36%	▲ 1.14



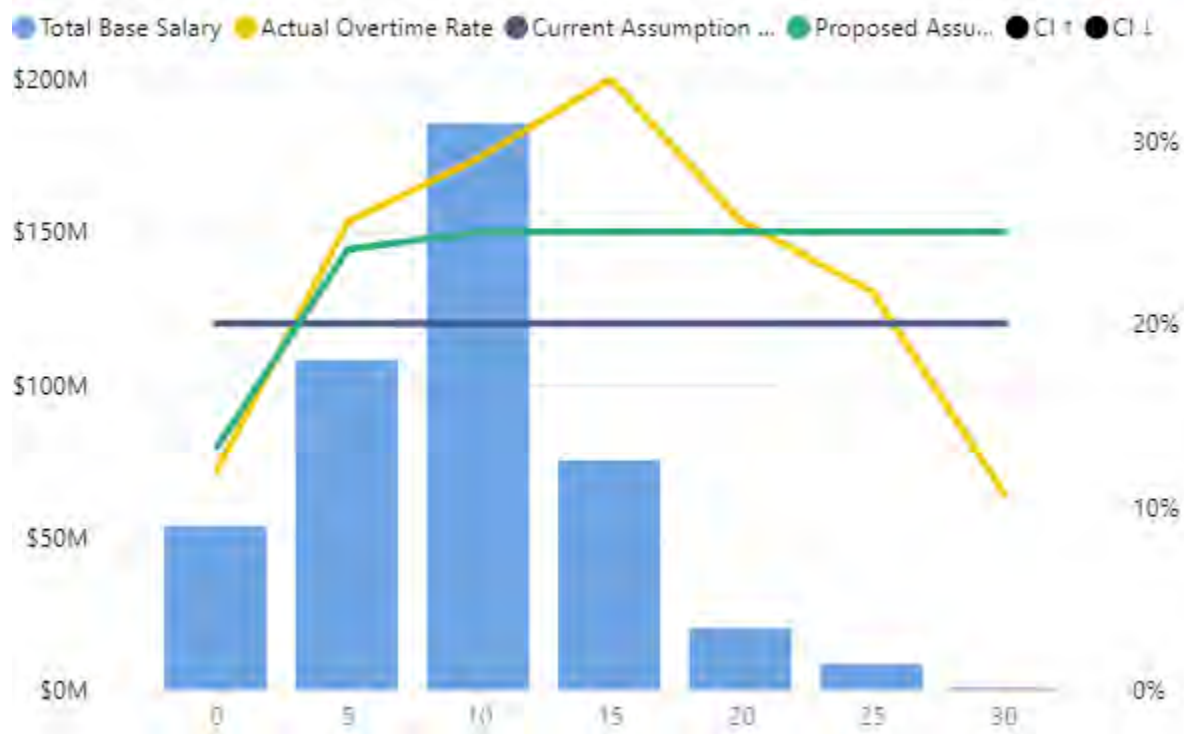
Baseline

The following charts show the experience for Baseline overtime percentage by service, for the age range (22 to 59), and for the service range (0 to 32) from 2012 to 2020. The actual Baseline overtime percentage averaged 26.52% whereas the overall expected overtime percentage averaged 20.00% based on the current assumptions and 23.35% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.33 to 1.14.

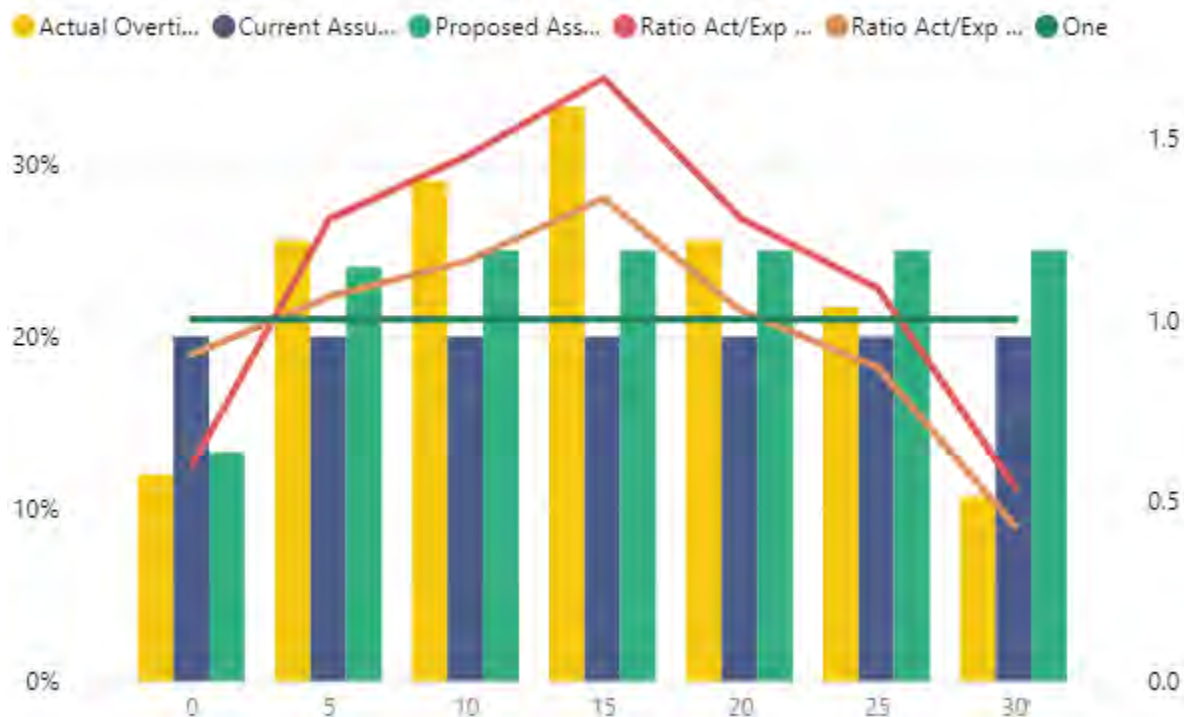
Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
0	72	\$4.4M	\$0.3M	\$0.9M	6.44%	20.00%	0.32
1	192	\$12.7M	\$1.1M	\$2.5M	8.47%	20.00%	0.42
2	185	\$12.8M	\$1.2M	\$2.6M	9.21%	20.00%	0.46
3	184	\$12.5M	\$1.8M	\$2.5M	14.55%	20.00%	0.73
4	193	\$13.4M	\$2.3M	\$2.7M	17.41%	20.00%	0.87
5	201	\$14.0M	\$2.8M	\$2.8M	20.23%	20.00%	1.01
6	212	\$14.5M	\$3.5M	\$2.9M	24.47%	20.00%	1.22
7	315	\$22.0M	\$5.8M	\$4.4M	26.43%	20.00%	1.32
8	369	\$25.7M	\$7.1M	\$5.1M	27.64%	20.00%	1.38
9	478	\$33.7M	\$8.8M	\$6.7M	26.05%	20.00%	1.30
10	511	\$36.8M	\$10.3M	\$7.4M	28.02%	20.00%	1.40
11	579	\$42.6M	\$11.4M	\$8.5M	26.76%	20.00%	1.34
12	529	\$39.8M	\$11.4M	\$8.0M	28.59%	20.00%	1.43
13	476	\$36.3M	\$10.7M	\$7.3M	29.46%	20.00%	1.47
14	425	\$33.2M	\$11.0M	\$6.6M	33.11%	20.00%	1.66
15	347	\$27.4M	\$9.2M	\$5.5M	33.43%	20.00%	1.67
16	266	\$21.0M	\$7.3M	\$4.2M	34.56%	20.00%	1.73
17	185	\$14.8M	\$4.9M	\$3.0M	33.25%	20.00%	1.66
18	113	\$9.1M	\$3.1M	\$1.8M	34.09%	20.00%	1.70
19	52	\$4.0M	\$1.0M	\$0.8M	25.05%	20.00%	1.25
20	59	\$4.6M	\$1.2M	\$0.9M	26.25%	20.00%	1.31
21	59	\$4.7M	\$1.3M	\$0.9M	27.48%	20.00%	1.37
22	60	\$4.7M	\$1.3M	\$0.9M	26.94%	20.00%	1.35
23	43	\$3.4M	\$0.8M	\$0.7M	22.24%	20.00%	1.11
24	41	\$3.2M	\$0.8M	\$0.6M	23.51%	20.00%	1.18
25	35	\$2.8M	\$0.6M	\$0.6M	20.56%	20.00%	1.03
26	28	\$2.3M	\$0.5M	\$0.5M	20.67%	20.00%	1.03
27	23	\$1.9M	\$0.5M	\$0.4M	25.47%	20.00%	1.27
28	14	\$1.3M	\$0.3M	\$0.3M	19.68%	20.00%	0.98
29	5	\$0.4M	\$0.1M	\$0.1M	23.28%	20.00%	1.16
30	5	\$0.5M	\$0.1M	\$0.1M	14.23%	20.00%	0.71
31	3	\$0.3M	\$0.0M	\$0.1M	8.85%	20.00%	0.44
32	1	\$0.1M	\$0.0M	\$0.0M	0.00%	20.00%	0.00
Total	6,260	\$460.8M	\$122.2M	\$92.2M	26.52%	20.00%	1.33

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
0	72	\$4.4M	\$0.3M	\$0.4M	6.44%	10.00%	▲ 0.64
1	192	\$12.7M	\$1.1M	\$1.4M	8.47%	11.00%	▲ 0.77
2	185	\$12.8M	\$1.2M	\$1.5M	9.21%	12.00%	▲ 0.77
3	184	\$12.5M	\$1.8M	\$1.7M	14.55%	14.00%	● 1.04
4	193	\$13.4M	\$2.3M	\$2.3M	17.41%	17.00%	● 1.02
5	201	\$14.0M	\$2.8M	\$2.8M	20.23%	20.00%	● 1.01
6	212	\$14.5M	\$3.5M	\$3.3M	24.47%	22.50%	● 1.09
7	315	\$22.0M	\$5.8M	\$5.5M	26.43%	25.00%	● 1.06
8	369	\$25.7M	\$7.1M	\$6.4M	27.64%	25.00%	▲ 1.11
9	478	\$33.7M	\$8.8M	\$8.4M	26.05%	25.00%	● 1.04
10	511	\$36.8M	\$10.3M	\$9.2M	28.02%	25.00%	▲ 1.12
11	579	\$42.6M	\$11.4M	\$10.7M	26.76%	25.00%	● 1.07
12	529	\$39.8M	\$11.4M	\$9.9M	28.59%	25.00%	▲ 1.14
13	476	\$36.3M	\$10.7M	\$9.1M	29.46%	25.00%	▲ 1.18
14	425	\$33.2M	\$11.0M	\$8.3M	33.11%	25.00%	▲ 1.32
15	347	\$27.4M	\$9.2M	\$6.8M	33.43%	25.00%	▲ 1.34
16	266	\$21.0M	\$7.3M	\$5.3M	34.56%	25.00%	▲ 1.38
17	185	\$14.8M	\$4.9M	\$3.7M	33.25%	25.00%	▲ 1.33
18	113	\$9.1M	\$3.1M	\$2.3M	34.09%	25.00%	▲ 1.36
19	52	\$4.0M	\$1.0M	\$1.0M	25.05%	25.00%	● 1.00
20	59	\$4.6M	\$1.2M	\$1.1M	26.25%	25.00%	● 1.05
21	59	\$4.7M	\$1.3M	\$1.2M	27.48%	25.00%	● 1.10
22	60	\$4.7M	\$1.3M	\$1.2M	26.94%	25.00%	● 1.08
23	43	\$3.4M	\$0.8M	\$0.9M	22.24%	25.00%	▲ 0.89
24	41	\$3.2M	\$0.8M	\$0.8M	23.51%	25.00%	● 0.94
25	35	\$2.8M	\$0.6M	\$0.7M	20.56%	25.00%	▲ 0.82
26	28	\$2.3M	\$0.5M	\$0.6M	20.67%	25.00%	▲ 0.83
27	23	\$1.9M	\$0.5M	\$0.5M	25.47%	25.00%	● 1.02
28	14	\$1.3M	\$0.3M	\$0.3M	19.68%	25.00%	▲ 0.79
29	5	\$0.4M	\$0.1M	\$0.1M	23.28%	25.00%	● 0.93
30	5	\$0.5M	\$0.1M	\$0.1M	14.23%	25.00%	▲ 0.57
31	3	\$0.3M	\$0.0M	\$0.1M	8.85%	25.00%	◆ 0.35
32	1	\$0.1M	\$0.0M	\$0.0M	0.00%	25.00%	◆ 0.00
Total	6,260	\$460.8M	\$122.2M	\$107.6M	26.52%	23.35%	▲ 1.14

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



Overtime Assumption - Actual, Expected, and Ratio; by Service

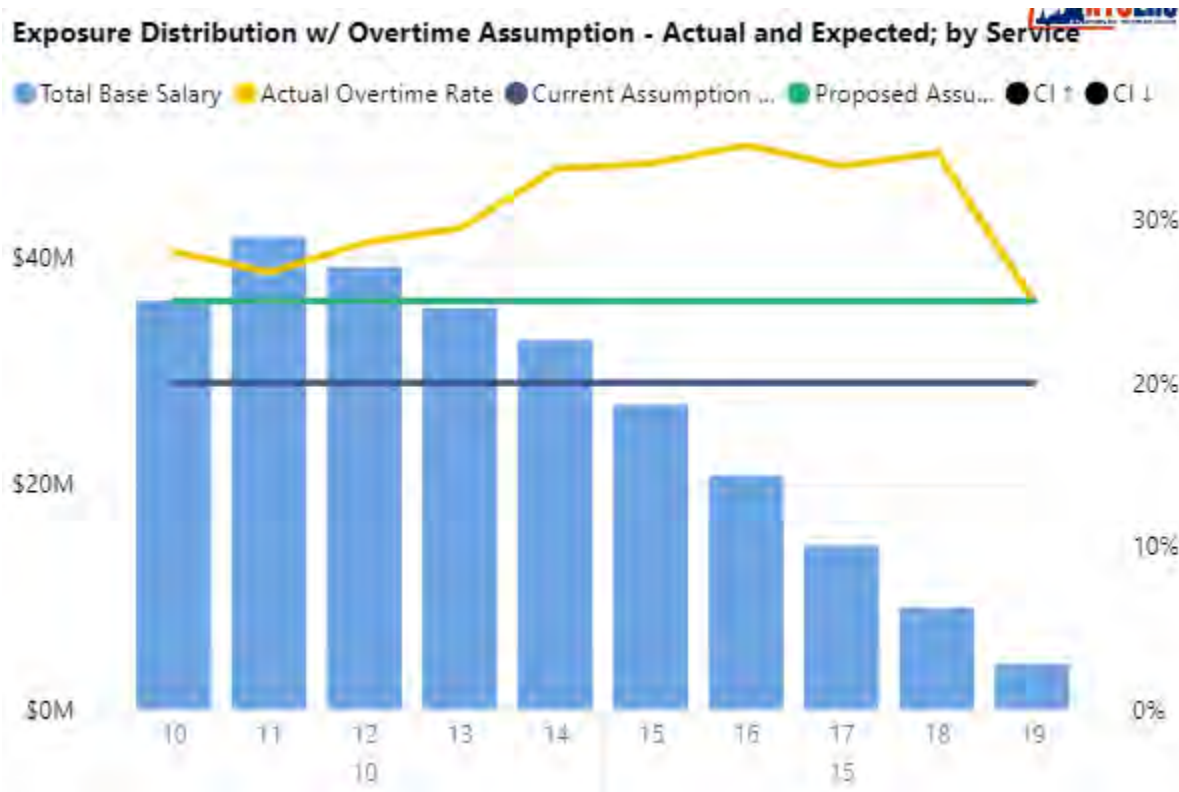


This chart shows the experience for Baseline overtime percentage by service for the service range 0 to 9 years, where the assumed overtime percentage increased from 20.00% to 20.41% as compared to the actual rate of 20.98%. The proposed assumption varies by service. This resulted in a decrease in the A/E ratio from 1.05 to 1.03 for ages 22 to 59.

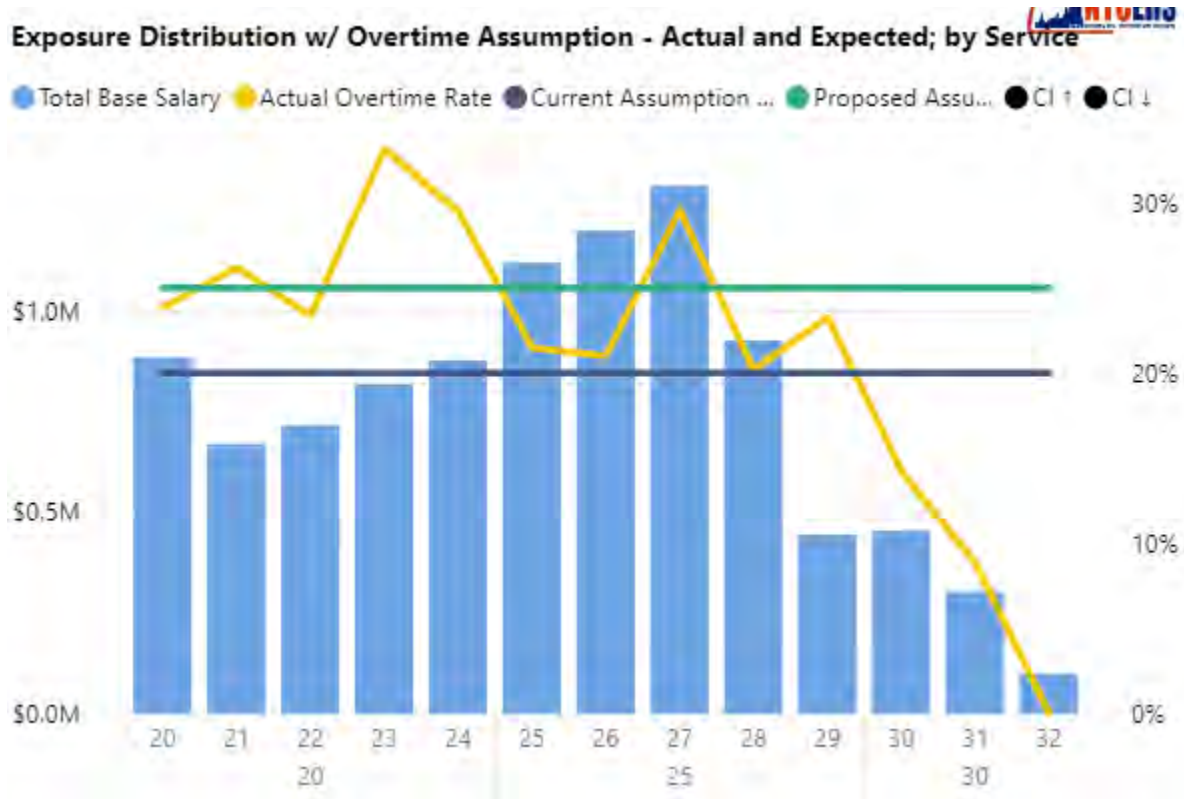
Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



This chart shows the experience for Baseline overtime percentage by service for the service range 10 to 19 years, where the assumed overtime percentage increased from 20.00% to 25.00% as compared to the actual rate of 30.27%. This resulted in a decrease in the A/E ratio from 1.51 to 1.21 for ages 22 to 59.

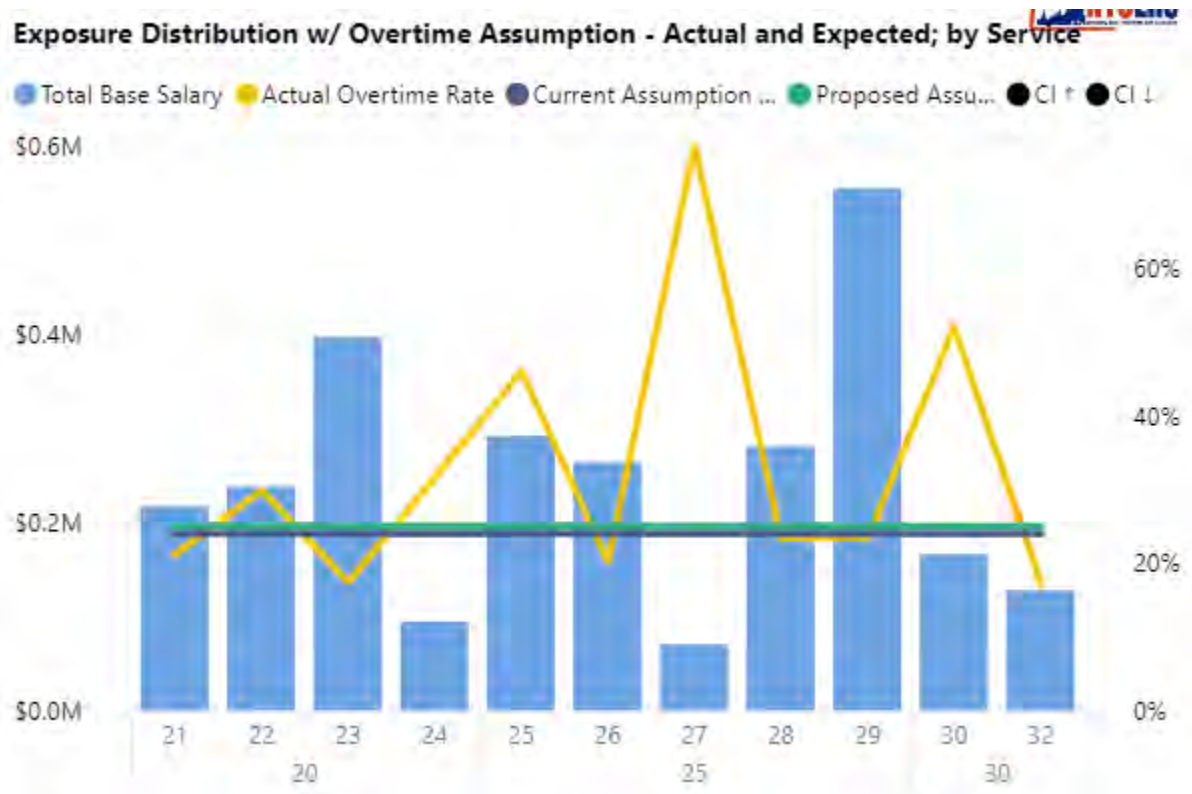


This chart shows the experience for Baseline overtime percentage by service for the service range 20 to 34 years, where the assumed overtime percentage increased from 20.00% to 25.00% as compared to the actual rate of 23.90%. This resulted in a decrease in the A/E ratio from 1.19 to 0.96 for ages 50 to 69.



Dual Retirement

This chart shows the experience for Dual Retirement overtime percentage by service, for the age range (50 to 59), and for the service range (20 to 34) from 2012 to 2020. The actual Dual Retirement overtime percentage averaged 28.19% as compared to Baseline overtime percentage of 23.90% and, compared to 30.27% for those with less than 20 years of service. Since these percentages were similar, we propose to use the Baseline assumption for Dual Retirement. This resulted in a decrease in the A/E ratio from 1.17 to 1.13.



Dual Disability

The current assumption for Dual Disability is 90% of the Baseline assumption. The proposed assumption is set to 60% of the proposed Baseline rates based on the experience for Transit. There is no credible experience for TBTA and so no charts are included.

Summary

In total, the proposed overtime percentages are anticipated to increase a member's anticipated pensionable earnings under the plan, which would increase plan liabilities. It would also increase the assumed amount of employee contributions received, which would partially offset the increase in the employer's portion of the normal cost.

Overtime Transit

For Transit, we found that overtime one year prior for retirement was not higher than for members of the same service who did not retire. Therefore, the proposed assumption does not include a separate dual retirement assumption.

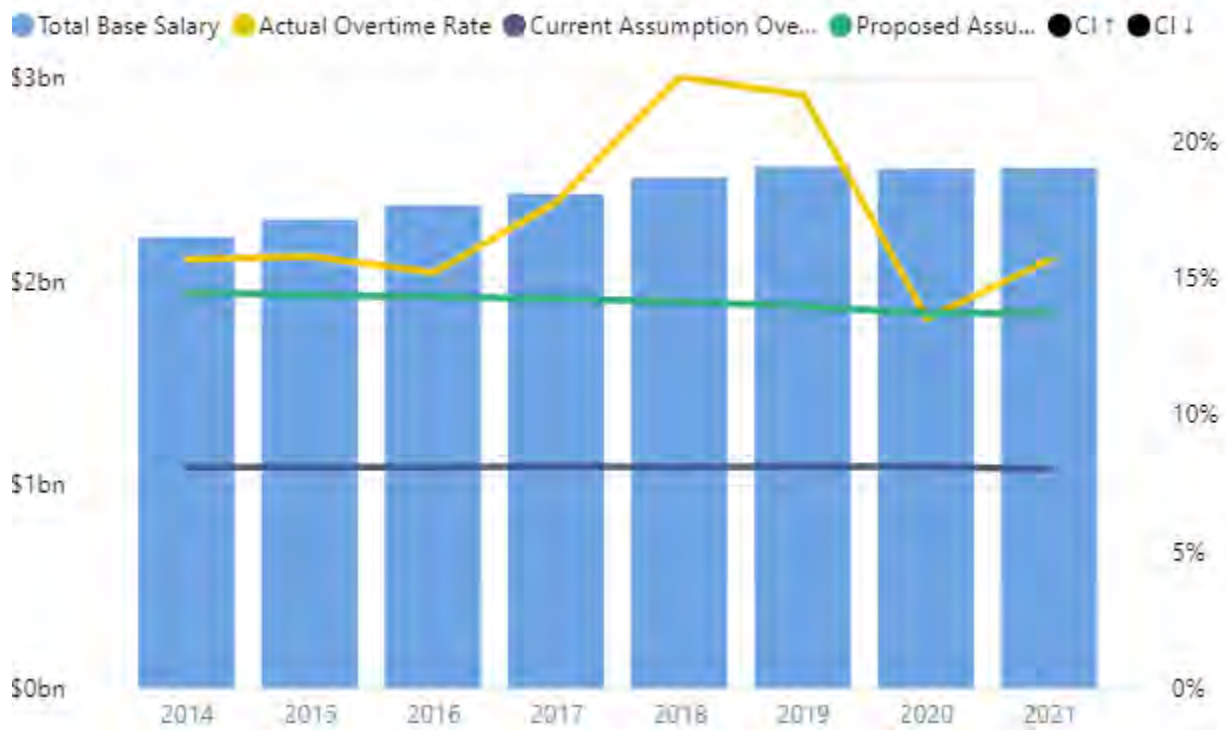
The proposed assumption varies by service period and dual disability. Overtime prior to 2014 was much lower than other years and was excluded from the analysis.

The following charts show the experience for overtime percentage by year, for the age range (22 to 69), and for the service range (0 to 34) from 2014 to 2021. The actual overtime percentage for all types of overtime averaged 17.24% whereas the overall expected overtime percentage averaged 8.07% based on the current assumptions and 14.08% based on the proposed assumptions.

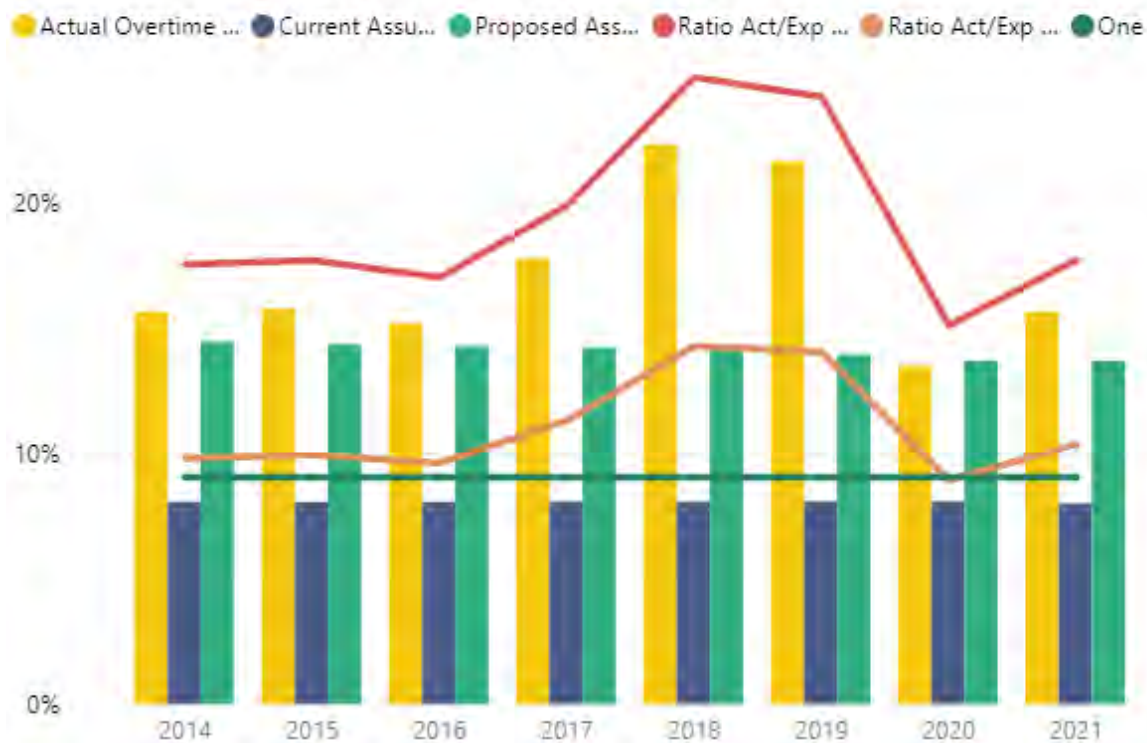
Plan Year	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
2014	32,230	\$2,267.7M	\$354.9M	\$183.0M	15.65%	8.07%	1.94
2015	32,584	\$2,343.6M	\$369.6M	\$189.0M	15.77%	8.07%	1.96
2016	33,016	\$2,410.6M	\$365.9M	\$194.4M	15.18%	8.07%	1.88
2017	33,248	\$2,477.0M	\$440.2M	\$200.1M	17.77%	8.08%	2.20
2018	33,686	\$2,565.3M	\$572.5M	\$207.2M	22.32%	8.08%	2.76
2019	34,150	\$2,605.7M	\$564.1M	\$210.7M	21.65%	8.09%	2.68
2020	33,298	\$2,586.2M	\$349.0M	\$209.1M	13.50%	8.08%	1.67
2021	32,683	\$2,608.0M	\$408.4M	\$208.6M	15.66%	8.00%	1.96
Total	264,895	\$19,864.2M	\$3,424.7M	\$1,602.2M	17.24%	8.07%	2.14

Plan Year	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
2014	32,230	\$2,267.7M	\$354.9M	\$327.7M	15.65%	14.45%	1.08
2015	32,584	\$2,343.6M	\$369.6M	\$336.3M	15.77%	14.35%	1.10
2016	33,016	\$2,410.6M	\$365.9M	\$344.3M	15.18%	14.28%	1.06
2017	33,248	\$2,477.0M	\$440.2M	\$352.1M	17.77%	14.21%	1.25
2018	33,686	\$2,565.3M	\$572.5M	\$362.5M	22.32%	14.13%	1.58
2019	34,150	\$2,605.7M	\$564.1M	\$363.3M	21.65%	13.94%	1.55
2020	33,298	\$2,586.2M	\$349.0M	\$354.0M	13.50%	13.69%	0.99
2021	32,683	\$2,608.0M	\$408.4M	\$356.8M	15.66%	13.68%	1.14
Total	264,895	\$19,864.2M	\$3,424.7M	\$2,796.9M	17.24%	14.08%	1.22

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Year



Overtime Assumption - Actual, Expected, and Ratio; by Year



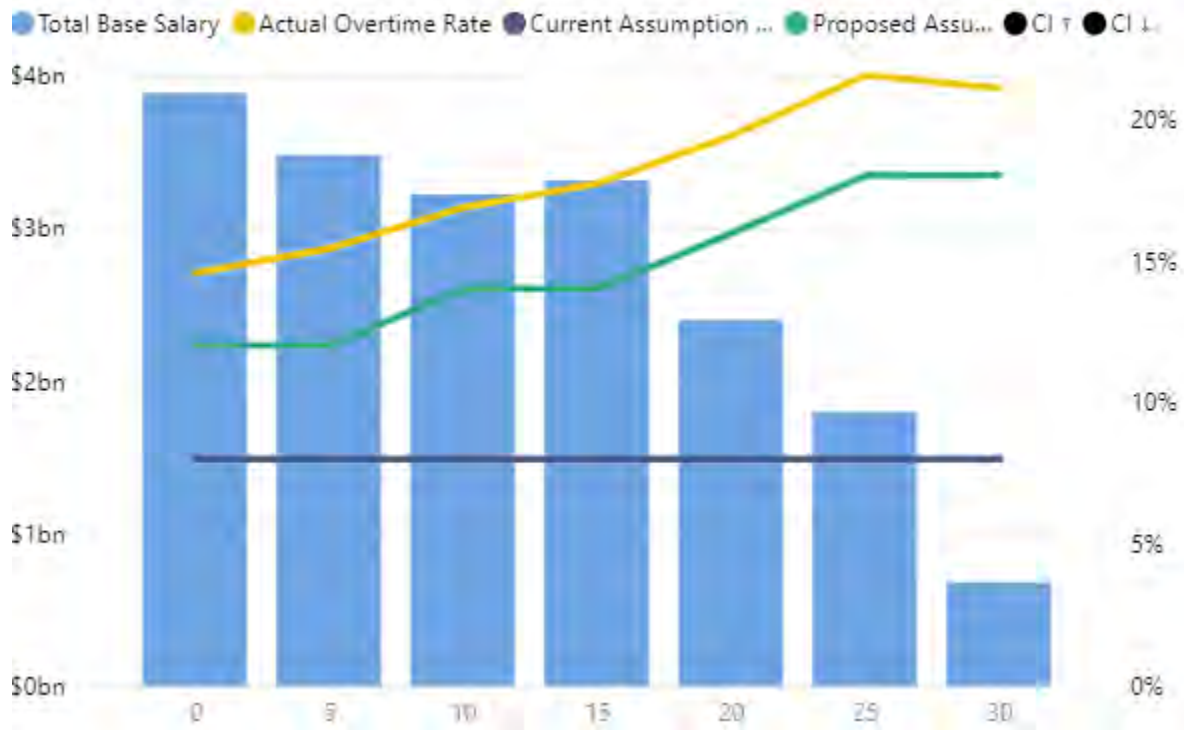
Baseline

The following charts show the experience for Baseline overtime percentage by service, for the age range (22 to 69), and for the service range (0 to 34) from 2014 to 2021. The actual Baseline overtime percentage averaged 17.19% whereas the overall expected overtime percentage averaged 8.00% based on the current assumptions and 13.98% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 2.15 to 1.23.

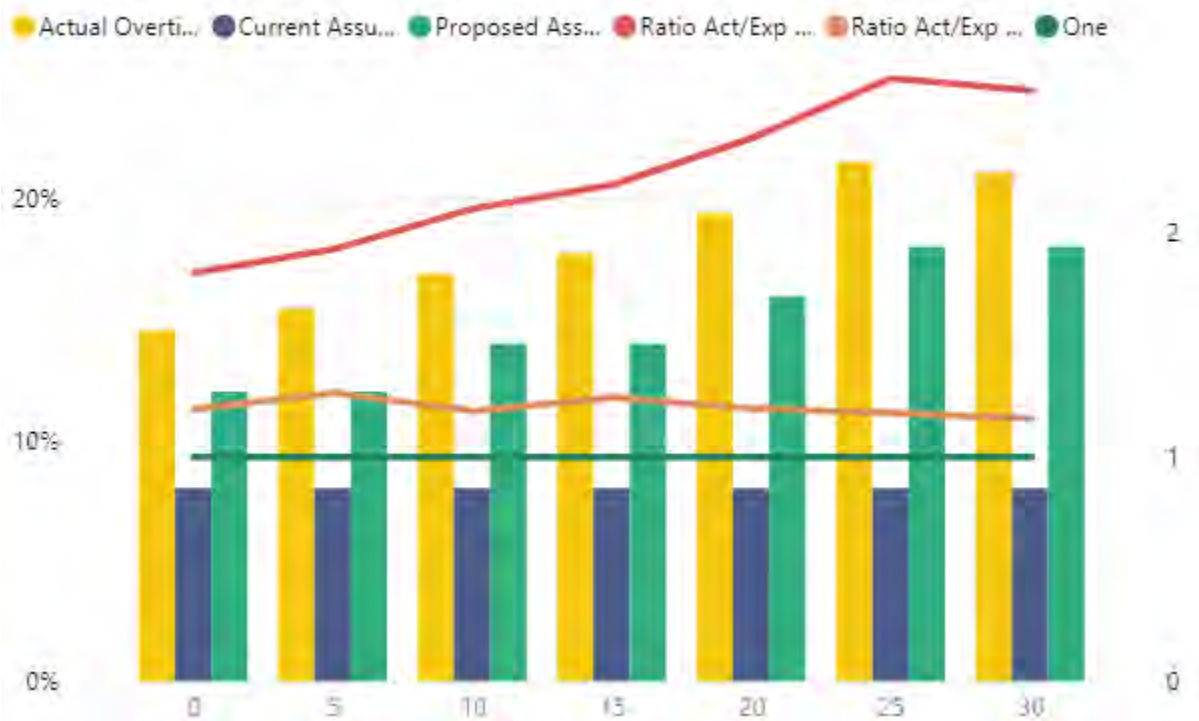
Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
0	6,224	\$347.6M	\$51.4M	\$27.8M	14.80%	8.00%	1.85
1	16,749	\$1,008.8M	\$136.4M	\$80.7M	13.52%	8.00%	1.69
2	15,078	\$971.6M	\$143.2M	\$77.7M	14.74%	8.00%	1.84
3	12,789	\$885.4M	\$133.8M	\$70.8M	15.11%	8.00%	1.89
4	11,292	\$821.9M	\$123.2M	\$65.8M	14.99%	8.00%	1.87
5	10,441	\$776.1M	\$113.6M	\$62.1M	14.64%	8.00%	1.83
6	10,369	\$768.3M	\$113.3M	\$61.5M	14.74%	8.00%	1.84
7	9,345	\$688.5M	\$104.6M	\$55.1M	15.19%	8.00%	1.90
8	9,038	\$665.6M	\$105.3M	\$53.2M	15.82%	8.00%	1.98
9	8,506	\$634.0M	\$108.1M	\$50.7M	17.06%	8.00%	2.13
10	8,152	\$614.1M	\$105.0M	\$49.1M	17.09%	8.00%	2.14
11	8,193	\$625.9M	\$107.2M	\$50.1M	17.12%	8.00%	2.14
12	8,714	\$667.5M	\$113.7M	\$53.4M	17.04%	8.00%	2.13
13	8,829	\$677.7M	\$113.5M	\$54.2M	16.75%	8.00%	2.09
14	9,037	\$685.8M	\$112.6M	\$54.9M	16.42%	8.00%	2.05
15	9,149	\$700.9M	\$119.9M	\$56.1M	17.10%	8.00%	2.14
16	8,982	\$695.9M	\$122.4M	\$55.7M	17.60%	8.00%	2.20
17	8,770	\$691.5M	\$123.2M	\$55.3M	17.82%	8.00%	2.23
18	8,030	\$643.9M	\$115.8M	\$51.5M	17.99%	8.00%	2.25
19	7,763	\$628.4M	\$114.1M	\$50.3M	18.16%	8.00%	2.27
20	6,973	\$562.5M	\$101.6M	\$45.0M	18.06%	8.00%	2.26
21	6,597	\$533.1M	\$96.3M	\$42.6M	18.07%	8.00%	2.26
22	5,788	\$469.7M	\$89.9M	\$37.6M	19.14%	8.00%	2.39
23	5,506	\$444.0M	\$90.2M	\$35.5M	20.31%	8.00%	2.54
24	5,230	\$420.6M	\$93.5M	\$33.7M	22.22%	8.00%	2.78
25	5,317	\$428.5M	\$95.3M	\$34.3M	22.25%	8.00%	2.78
26	5,104	\$415.5M	\$87.5M	\$33.2M	21.06%	8.00%	2.63
27	4,477	\$369.5M	\$77.1M	\$29.6M	20.87%	8.00%	2.61
28	4,050	\$335.2M	\$72.5M	\$26.8M	21.62%	8.00%	2.70
29	3,269	\$272.6M	\$59.7M	\$21.8M	21.92%	8.00%	2.74
30	2,581	\$217.8M	\$46.9M	\$17.4M	21.55%	8.00%	2.69
31	2,041	\$173.4M	\$35.5M	\$13.9M	20.49%	8.00%	2.56
32	1,605	\$138.1M	\$28.9M	\$11.0M	20.91%	8.00%	2.61
33	1,125	\$97.1M	\$20.5M	\$7.8M	21.11%	8.00%	2.64
34	747	\$64.9M	\$13.9M	\$5.2M	21.41%	8.00%	2.68
Total	255,860	\$19,141.7M	\$3,289.8M	\$1,531.3M	17.19%	8.00%	2.15

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
0	6,224	\$347.6M	\$51.4M	\$41.7M	14.80%	12.00%	▲ 1.23
1	16,749	\$1,008.8M	\$136.4M	\$121.1M	13.52%	12.00%	▲ 1.13
2	15,078	\$971.6M	\$143.2M	\$116.6M	14.74%	12.00%	▲ 1.23
3	12,789	\$885.4M	\$133.8M	\$106.2M	15.11%	12.00%	▲ 1.26
4	11,292	\$821.9M	\$123.2M	\$98.6M	14.99%	12.00%	▲ 1.25
5	10,441	\$776.1M	\$113.6M	\$93.1M	14.64%	12.00%	▲ 1.22
6	10,369	\$768.3M	\$113.3M	\$92.2M	14.74%	12.00%	▲ 1.23
7	9,345	\$688.5M	\$104.6M	\$82.6M	15.19%	12.00%	▲ 1.27
8	9,038	\$665.6M	\$105.3M	\$79.9M	15.82%	12.00%	▲ 1.32
9	8,506	\$634.0M	\$108.1M	\$76.1M	17.06%	12.00%	▲ 1.42
10	8,152	\$614.1M	\$105.0M	\$86.0M	17.09%	14.00%	▲ 1.22
11	8,193	\$625.9M	\$107.2M	\$87.6M	17.12%	14.00%	▲ 1.22
12	8,714	\$667.5M	\$113.7M	\$93.4M	17.04%	14.00%	▲ 1.22
13	8,829	\$677.7M	\$113.5M	\$94.9M	16.75%	14.00%	▲ 1.20
14	9,037	\$685.8M	\$112.6M	\$96.0M	16.42%	14.00%	▲ 1.17
15	9,149	\$700.9M	\$119.9M	\$98.1M	17.10%	14.00%	▲ 1.22
16	8,982	\$695.9M	\$122.4M	\$97.4M	17.60%	14.00%	▲ 1.26
17	8,770	\$691.5M	\$123.2M	\$96.8M	17.82%	14.00%	▲ 1.27
18	8,030	\$643.9M	\$115.8M	\$90.2M	17.99%	14.00%	▲ 1.28
19	7,763	\$628.4M	\$114.1M	\$88.0M	18.16%	14.00%	▲ 1.30
20	6,973	\$562.5M	\$101.6M	\$81.6M	18.06%	14.50%	▲ 1.25
21	6,597	\$533.1M	\$96.3M	\$80.0M	18.07%	15.00%	▲ 1.20
22	5,788	\$469.7M	\$89.9M	\$75.2M	19.14%	16.00%	▲ 1.20
23	5,506	\$444.0M	\$90.2M	\$75.5M	20.31%	17.00%	▲ 1.19
24	5,230	\$420.6M	\$93.5M	\$75.7M	22.22%	18.00%	▲ 1.23
25	5,317	\$428.5M	\$95.3M	\$77.1M	22.25%	18.00%	▲ 1.24
26	5,104	\$415.5M	\$87.5M	\$74.8M	21.06%	18.00%	▲ 1.17
27	4,477	\$369.5M	\$77.1M	\$66.5M	20.87%	18.00%	▲ 1.16
28	4,050	\$335.2M	\$72.5M	\$60.3M	21.62%	18.00%	▲ 1.20
29	3,269	\$272.6M	\$59.7M	\$49.1M	21.92%	18.00%	▲ 1.22
30	2,581	\$217.8M	\$46.9M	\$39.2M	21.55%	18.00%	▲ 1.20
31	2,041	\$173.4M	\$35.5M	\$31.2M	20.49%	18.00%	▲ 1.14
32	1,605	\$138.1M	\$28.9M	\$24.9M	20.91%	18.00%	▲ 1.16
33	1,125	\$97.1M	\$20.5M	\$17.5M	21.11%	18.00%	▲ 1.17
34	747	\$64.9M	\$13.9M	\$11.7M	21.41%	18.00%	▲ 1.19
Total	255,860	\$19,141.7M	\$3,289.8M	\$2,676.7M	17.19%	13.98%	▲ 1.23

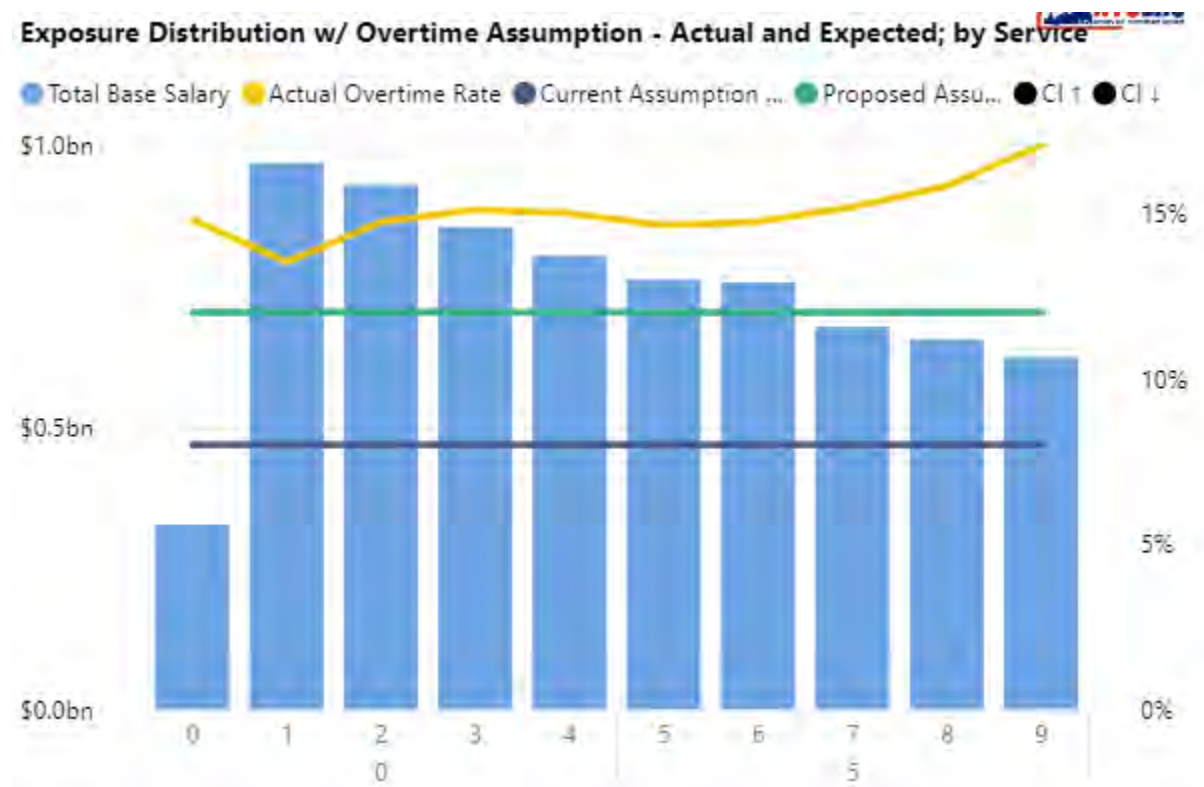
Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



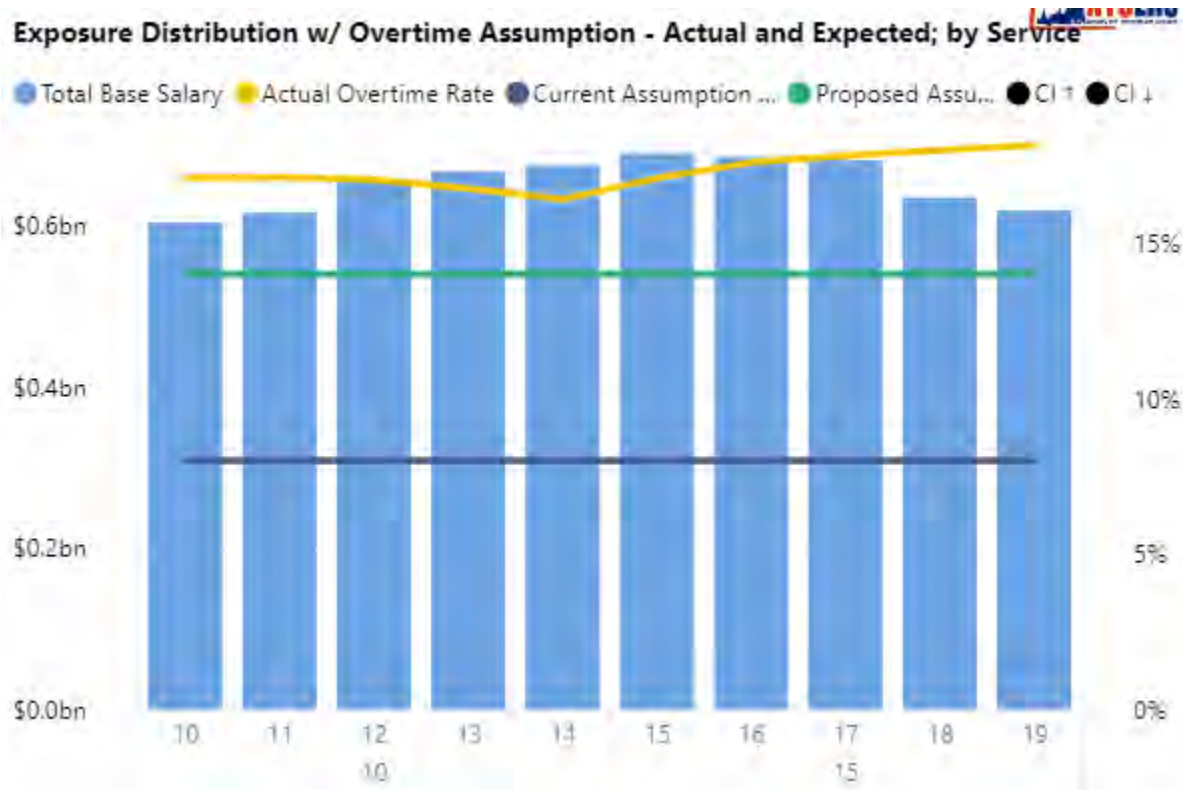
Overtime Assumption - Actual, Expected, and Ratio; by Service



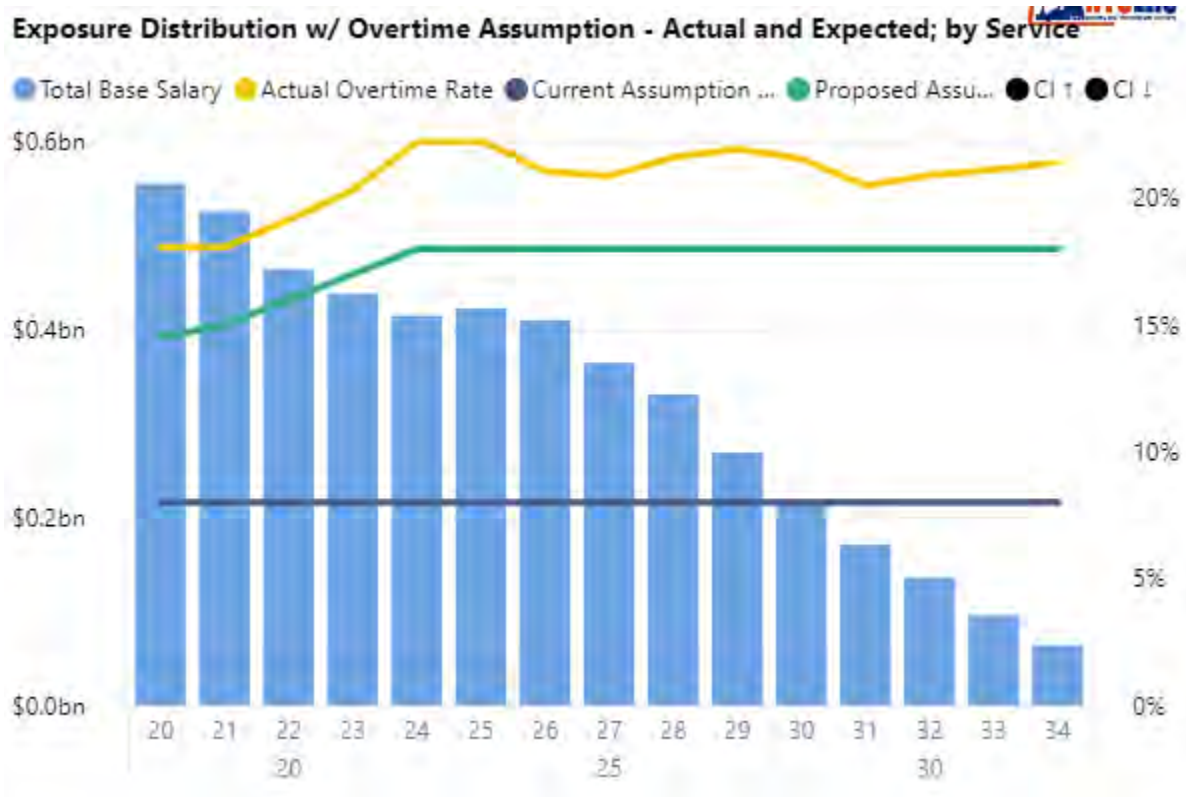
This chart shows the experience for Baseline overtime percentage by service for the service range 0 to 9 years, where the assumed overtime percentage increased from 8.00% to 12.00% as compared to the actual rate of 14.97%. This resulted in a decrease in the A/E ratio from 1.87 to 1.25 for ages 22 to 69.



This chart shows the experience for Baseline overtime percentage by service for the service range 10 to 19 years, where the assumed overtime percentage increased from 8.00% to 14.00% as compared to the actual rate of 17.30%. This resulted in a decrease in the A/E ratio from 2.16 to 1.24 for ages 22 to 69.



This chart shows the experience for Baseline overtime percentage by service for the service range 20 to 34 years, where the assumed overtime percentage increased from 8.00% to 17.00% as compared to the actual rate of 20.42%. This resulted in a decrease in the A/E ratio from 2.55 to 1.20 for ages 22 to 69.



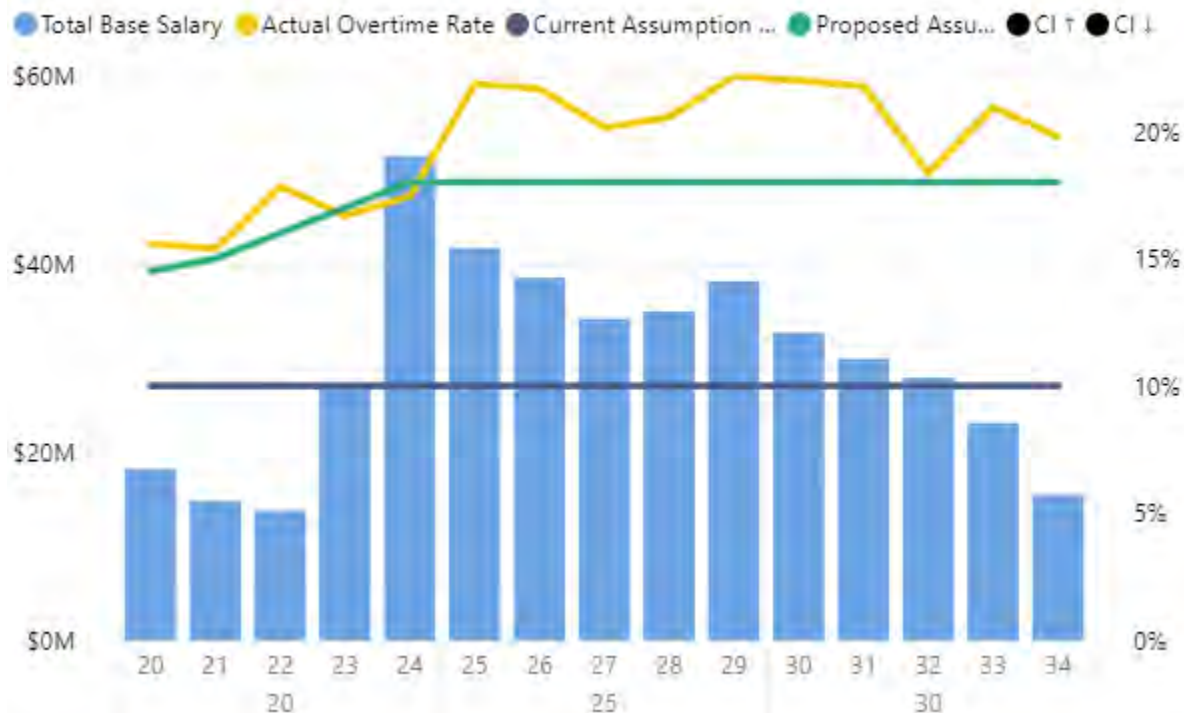
Dual Retirement

The following charts show the experience for Dual Retirement overtime percentage by service, for the age range (55 to 69), and for the service range (20 to 34) from 2014 to 2021. The actual Dual Retirement overtime percentage averaged 19.86% as compared to Baseline overtime percentage of 20.42%. Since these percentages were similar, we propose to use the Baseline assumption for Dual Retirement. This resulted in a decrease in the A/E ratio from 1.99 to 1.13.

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
20	234	\$18.3M	\$2.9M	\$1.8M	15.58%	10.00%	1.56
21	189	\$14.9M	\$2.3M	\$1.5M	15.39%	10.00%	1.54
22	178	\$14.0M	\$2.5M	\$1.4M	17.82%	10.00%	1.78
23	338	\$27.0M	\$4.5M	\$2.7M	16.68%	10.00%	1.67
24	656	\$52.1M	\$9.1M	\$5.2M	17.45%	10.00%	1.74
25	526	\$42.0M	\$9.2M	\$4.2M	21.85%	10.00%	2.19
26	479	\$38.7M	\$8.4M	\$3.9M	21.68%	10.00%	2.17
27	427	\$34.5M	\$6.9M	\$3.4M	20.13%	10.00%	2.01
28	431	\$35.2M	\$7.2M	\$3.5M	20.55%	10.00%	2.06
29	474	\$38.5M	\$8.5M	\$3.8M	22.17%	10.00%	2.22
30	397	\$33.0M	\$7.3M	\$3.3M	21.99%	10.00%	2.20
31	361	\$30.2M	\$6.6M	\$3.0M	21.77%	10.00%	2.18
32	337	\$28.1M	\$5.2M	\$2.8M	18.35%	10.00%	1.83
33	273	\$23.3M	\$4.9M	\$2.3M	20.94%	10.00%	2.09
34	185	\$15.7M	\$3.1M	\$1.6M	19.78%	10.00%	1.98
Total	5,485	\$445.5M	\$88.5M	\$44.6M	19.86%	10.00%	1.99

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
20	234	\$18.3M	\$2.9M	\$2.7M	15.58%	14.50%	1.07
21	189	\$14.9M	\$2.3M	\$2.2M	15.39%	15.00%	1.03
22	178	\$14.0M	\$2.5M	\$2.2M	17.82%	16.00%	1.11
23	338	\$27.0M	\$4.5M	\$4.6M	16.68%	17.00%	0.98
24	656	\$52.1M	\$9.1M	\$9.4M	17.45%	18.00%	0.97
25	526	\$42.0M	\$9.2M	\$7.6M	21.85%	18.00%	1.21
26	479	\$38.7M	\$8.4M	\$7.0M	21.68%	18.00%	1.20
27	427	\$34.5M	\$6.9M	\$6.2M	20.13%	18.00%	1.12
28	431	\$35.2M	\$7.2M	\$6.3M	20.55%	18.00%	1.14
29	474	\$38.5M	\$8.5M	\$6.9M	22.17%	18.00%	1.23
30	397	\$33.0M	\$7.3M	\$5.9M	21.99%	18.00%	1.22
31	361	\$30.2M	\$6.6M	\$5.4M	21.77%	18.00%	1.21
32	337	\$28.1M	\$5.2M	\$5.1M	18.35%	18.00%	1.02
33	273	\$23.3M	\$4.9M	\$4.2M	20.94%	18.00%	1.16
34	185	\$15.7M	\$3.1M	\$2.8M	19.78%	18.00%	1.10
Total	5,485	\$445.5M	\$88.5M	\$78.6M	19.86%	17.63%	1.13

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



Overtime Assumption - Actual, Expected, and Ratio; by Service



Dual Disability

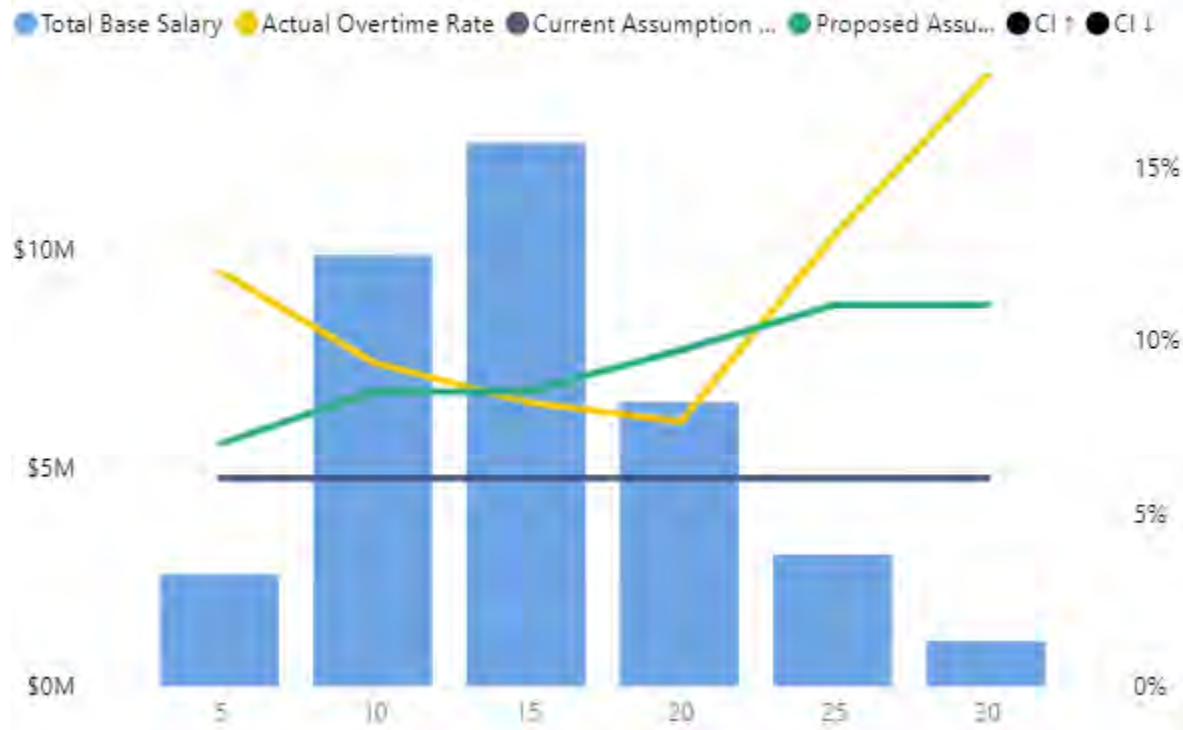
The current assumption for Dual Disability is 75% of the Baseline assumption. The proposed assumption is set to 60% of the proposed Baseline rates.

The following charts show the experience for Dual Disability overtime percentage by service, for the age range (22 to 69), and for the service range (5 to 34) from 2014 to 2021. The actual Dual Disability overtime percentage averaged 9.35% whereas the overall expected overtime percentage averaged 6.00% based on the current assumptions and 8.89% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.56 to 1.05.

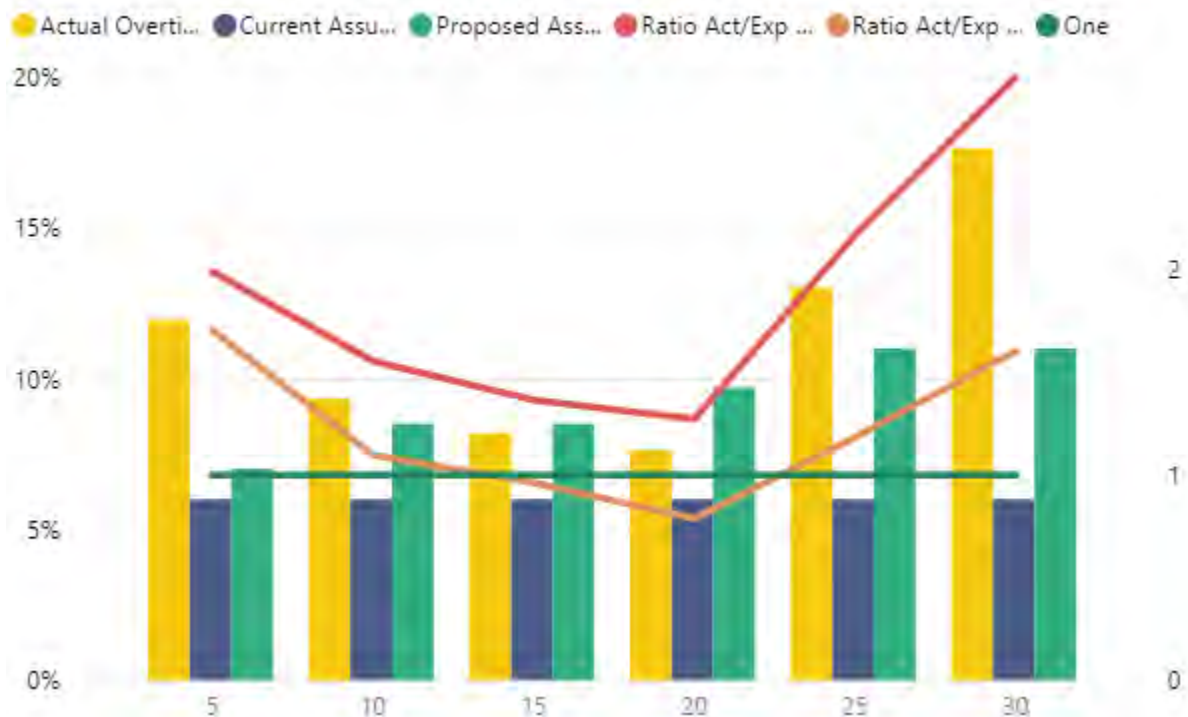
Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime	Actual Overtime Rate	Current Assumption Overtime Rate	Ratio Act/Exp Overtime Rate
6	4	\$0.2M	\$0.0M	\$0.0M	5.43%	6.00%	0.91
7	8	\$0.6M	\$0.1M	\$0.0M	9.50%	6.00%	1.58
8	8	\$0.6M	\$0.1M	\$0.0M	11.38%	6.00%	1.90
9	17	\$1.2M	\$0.2M	\$0.1M	14.74%	6.00%	2.46
10	24	\$1.7M	\$0.1M	\$0.1M	5.79%	6.00%	0.97
11	26	\$1.7M	\$0.1M	\$0.1M	5.42%	6.00%	0.90
12	30	\$2.0M	\$0.2M	\$0.1M	10.85%	6.00%	1.81
13	30	\$2.0M	\$0.2M	\$0.1M	9.32%	6.00%	1.55
14	33	\$2.2M	\$0.3M	\$0.1M	13.77%	6.00%	2.29
15	40	\$2.8M	\$0.2M	\$0.2M	7.73%	6.00%	1.29
16	46	\$2.9M	\$0.4M	\$0.2M	13.47%	6.00%	2.25
17	31	\$2.2M	\$0.1M	\$0.1M	4.97%	6.00%	0.83
18	34	\$2.4M	\$0.2M	\$0.1M	7.67%	6.00%	1.28
19	27	\$1.8M	\$0.1M	\$0.1M	4.99%	6.00%	0.83
20	14	\$0.9M	\$0.0M	\$0.1M	4.44%	6.00%	0.74
21	19	\$1.3M	\$0.1M	\$0.1M	8.32%	6.00%	1.39
22	23	\$1.5M	\$0.1M	\$0.1M	9.60%	6.00%	1.60
23	20	\$1.3M	\$0.1M	\$0.1M	9.42%	6.00%	1.57
24	23	\$1.4M	\$0.1M	\$0.1M	5.41%	6.00%	0.90
25	16	\$1.1M	\$0.1M	\$0.1M	11.75%	6.00%	1.96
26	9	\$0.5M	\$0.0M	\$0.0M	2.57%	6.00%	0.43
27	8	\$0.6M	\$0.1M	\$0.0M	19.27%	6.00%	3.21
28	7	\$0.5M	\$0.1M	\$0.0M	10.66%	6.00%	1.78
29	3	\$0.2M	\$0.1M	\$0.0M	30.95%	6.00%	5.16
30	5	\$0.4M	\$0.1M	\$0.0M	24.04%	6.00%	4.01
31	4	\$0.3M	\$0.0M	\$0.0M	6.29%	6.00%	1.05
32	2	\$0.1M	\$0.0M	\$0.0M	2.55%	6.00%	0.43
33	1	\$0.1M	\$0.0M	\$0.0M	15.44%	6.00%	2.57
34	1	\$0.1M	\$0.0M	\$0.0M	52.52%	6.00%	8.75
Total	513	\$34.6M	\$3.2M	\$2.1M	9.35%	6.00%	1.56

Service	Exposed	Average Base Salary	Actual Overtime	Expected Overtime Proposed	Actual Overtime Rate	Proposed Assumption Overtime Rate	Act/Exp Proposed Overtime Rate
6	4	\$0.2M	\$0.0M	\$0.0M	5.43%	7.00%	▲ 0.78
7	8	\$0.6M	\$0.1M	\$0.0M	9.50%	7.00%	▲ 1.36
8	8	\$0.6M	\$0.1M	\$0.0M	11.38%	7.00%	◆ 1.63
9	17	\$1.2M	\$0.2M	\$0.1M	14.74%	7.00%	◆ 2.11
10	24	\$1.7M	\$0.1M	\$0.1M	5.79%	8.50%	▲ 0.68
11	26	\$1.7M	\$0.1M	\$0.1M	5.42%	8.50%	▲ 0.64
12	30	\$2.0M	\$0.2M	\$0.2M	10.85%	8.50%	▲ 1.28
13	30	\$2.0M	\$0.2M	\$0.2M	9.32%	8.50%	● 1.10
14	33	\$2.2M	\$0.3M	\$0.2M	13.77%	8.50%	◆ 1.62
15	40	\$2.8M	\$0.2M	\$0.2M	7.73%	8.50%	● 0.91
16	46	\$2.9M	\$0.4M	\$0.3M	13.47%	8.50%	◆ 1.59
17	31	\$2.2M	\$0.1M	\$0.2M	4.97%	8.50%	▲ 0.58
18	34	\$2.4M	\$0.2M	\$0.2M	7.67%	8.50%	● 0.90
19	27	\$1.8M	\$0.1M	\$0.2M	4.99%	8.50%	▲ 0.59
20	14	\$0.9M	\$0.0M	\$0.1M	4.44%	8.50%	▲ 0.52
21	19	\$1.3M	\$0.1M	\$0.1M	8.32%	9.00%	● 0.92
22	23	\$1.5M	\$0.1M	\$0.1M	9.60%	9.50%	● 1.01
23	20	\$1.3M	\$0.1M	\$0.1M	9.42%	10.00%	● 0.94
24	23	\$1.4M	\$0.1M	\$0.2M	5.41%	11.00%	◆ 0.49
25	16	\$1.1M	\$0.1M	\$0.1M	11.75%	11.00%	● 1.07
26	9	\$0.5M	\$0.0M	\$0.1M	2.57%	11.00%	◆ 0.23
27	8	\$0.6M	\$0.1M	\$0.1M	19.27%	11.00%	◆ 1.75
28	7	\$0.5M	\$0.1M	\$0.1M	10.66%	11.00%	● 0.97
29	3	\$0.2M	\$0.1M	\$0.0M	30.95%	11.00%	◆ 2.81
30	5	\$0.4M	\$0.1M	\$0.0M	24.04%	11.00%	◆ 2.19
31	4	\$0.3M	\$0.0M	\$0.0M	6.29%	11.00%	▲ 0.57
32	2	\$0.1M	\$0.0M	\$0.0M	2.55%	11.00%	◆ 0.23
33	1	\$0.1M	\$0.0M	\$0.0M	15.44%	11.00%	▲ 1.40
34	1	\$0.1M	\$0.0M	\$0.0M	52.52%	11.00%	◆ 4.77
Total	513	\$34.6M	\$3.2M	\$3.1M	9.35%	8.89%	● 1.05

Exposure Distribution w/ Overtime Assumption - Actual and Expected; by Service



Overtime Assumption - Actual, Expected, and Ratio; by Service



Summary

In total, the proposed overtime percentages are anticipated to increase a member's anticipated pensionable earnings under the plan, which would increase plan liabilities. It would also increase the assumed amount of employee contributions received, which would partially offset the increase in the employer's portion of the normal cost.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT ASSUMPTION TRANSIT AND TBTA OVERTIME AS A PERCENTAGE OF BASE PAY						
Years of Service	TRANSIT			TBTA		
	Baseline	Dual Retirement	Dual Disability	Baseline	Dual Retirement	Dual Disability
0	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
1	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
2	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
3	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
4	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
5	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
6	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
7	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
8	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
9	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
10	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
11	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
12	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
13	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
14	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
15	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
16	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
17	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
18	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
19	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
20	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
21	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
22	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
23	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
24	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
25	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
26	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
27	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
28	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
29	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%
30+	8.00%	10.00%	6.00%	20.00%	24.00%	18.00%

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED ASSUMPTION TRANSIT AND TBTA OVERTIME AS A PERCENTAGE OF BASE PAY				
Years of Service	TRANSIT ¹		TBTA ²	
	Baseline and Dual Retirement ³	Dual Disability ⁴	Baseline and Dual Retirement ³	Dual Disability ⁴
0	12.00%	7.00%	10.00%	6.00%
1	12.00%	7.00%	11.00%	6.50%
2	12.00%	7.00%	12.00%	7.00%
3	12.00%	7.00%	14.00%	8.50%
4	12.00%	7.00%	17.00%	10.00%
5	12.00%	7.00%	20.00%	12.00%
6	12.00%	7.00%	22.50%	13.50%
7	12.00%	7.00%	25.00%	15.00%
8	12.00%	7.00%	25.00%	15.00%
9	12.00%	7.00%	25.00%	15.00%
10	14.00%	8.50%	25.00%	15.00%
11	14.00%	8.50%	25.00%	15.00%
12	14.00%	8.50%	25.00%	15.00%
13	14.00%	8.50%	25.00%	15.00%
14	14.00%	8.50%	25.00%	15.00%
15	14.00%	8.50%	25.00%	15.00%
16	14.00%	8.50%	25.00%	15.00%
17	14.00%	8.50%	25.00%	15.00%
18	14.00%	8.50%	25.00%	15.00%
19	14.00%	8.50%	25.00%	15.00%
20	14.50%	8.50%	25.00%	15.00%
21	15.00%	9.00%	25.00%	15.00%
22	16.00%	9.50%	25.00%	15.00%
23	17.00%	10.00%	25.00%	15.00%
24	18.00%	11.00%	25.00%	15.00%
25	18.00%	11.00%	25.00%	15.00%
26	18.00%	11.00%	25.00%	15.00%
27	18.00%	11.00%	25.00%	15.00%
28	18.00%	11.00%	25.00%	15.00%
29	18.00%	11.00%	25.00%	15.00%
30+	18.00%	11.00%	25.00%	15.00%

¹ Transit includes 55/25 Plan members (Plan U); other members are included as General employees

² TBTA includes 50/20 Plan members (Plan R); other members are included as General employees

³ Dual retirement rate applies in year before assumed retirement

⁴ Dual disability rate applies in year before assumed disability

Withdrawal

The current withdrawal assumption varies by service. The proposed assumption varies by gender in addition to service. Overall, this results in an increase in the assumed rates of withdrawal, especially at 15 or fewer years of service with slightly lower assumed rates of withdrawal at higher years of service.

The analysis reflected years from 2012 - 2019 as the rate of termination during 2020 and 2021 may be artificially low due to members with a LOA status code. A record with a LOA status code is included as an exposure and not a decrement.

The following table shows the experience for withdrawal by year, for the age range (22 to 59), and for the service range (0 to 29). The actual rate of withdrawal averaged 1.52% whereas the overall expected rate of withdrawal averaged 1.48% based on the current assumptions and 1.50% based on the proposed assumptions.

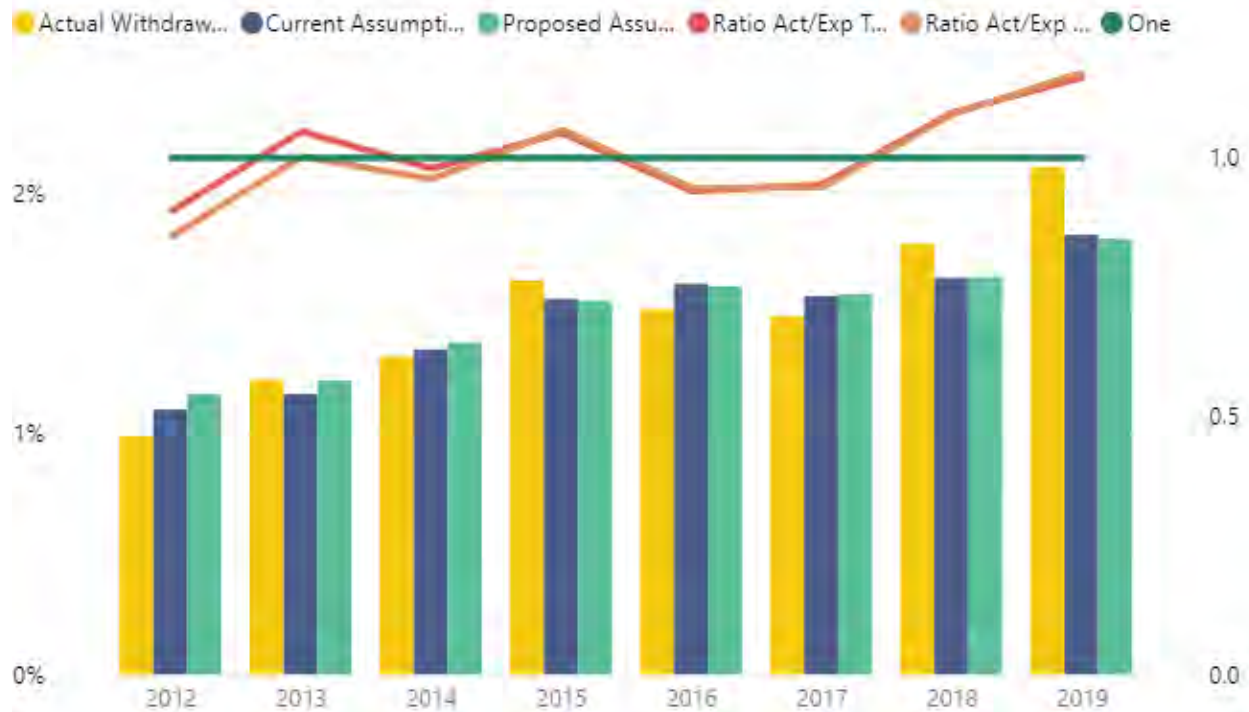
Plan Year	Actual Withdrawals	Expected Withdrawals	Total Exposed	Actual Withdrawal Rate	Current Assumption Termination	Ratio Act/Exp Term
2012	252	281.0	25,541	0.99%	1.10%	0.90
2013	302	287.4	24,683	1.22%	1.16%	1.05
2014	327	333.9	24,756	1.32%	1.35%	0.98
2015	411	391.9	25,138	1.63%	1.56%	1.05
2016	387	413.7	25,507	1.52%	1.62%	0.94
2017	382	402.9	25,659	1.49%	1.57%	0.95
2018	467	429.4	26,091	1.79%	1.65%	1.09
2019	569	492.5	26,986	2.11%	1.83%	1.16
Total	3,097	3,032.8	204,361	1.52%	1.48%	1.02

Plan Year	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
2012	252	296.9	25,541	0.99%	1.16%	0.85
2013	302	301.2	24,683	1.22%	1.22%	1.00
2014	327	341.0	24,756	1.32%	1.38%	0.96
2015	411	390.0	25,138	1.63%	1.55%	1.05
2016	387	411.0	25,507	1.52%	1.61%	0.94
2017	382	405.2	25,659	1.49%	1.58%	0.94
2018	467	430.7	26,091	1.79%	1.65%	1.08
2019	569	488.3	26,986	2.11%	1.81%	1.17
Total	3,097	3,064.2	204,361	1.52%	1.50%	1.01

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Year



Withdrawal Rate - Actual, Expected, and Ratio; by Year

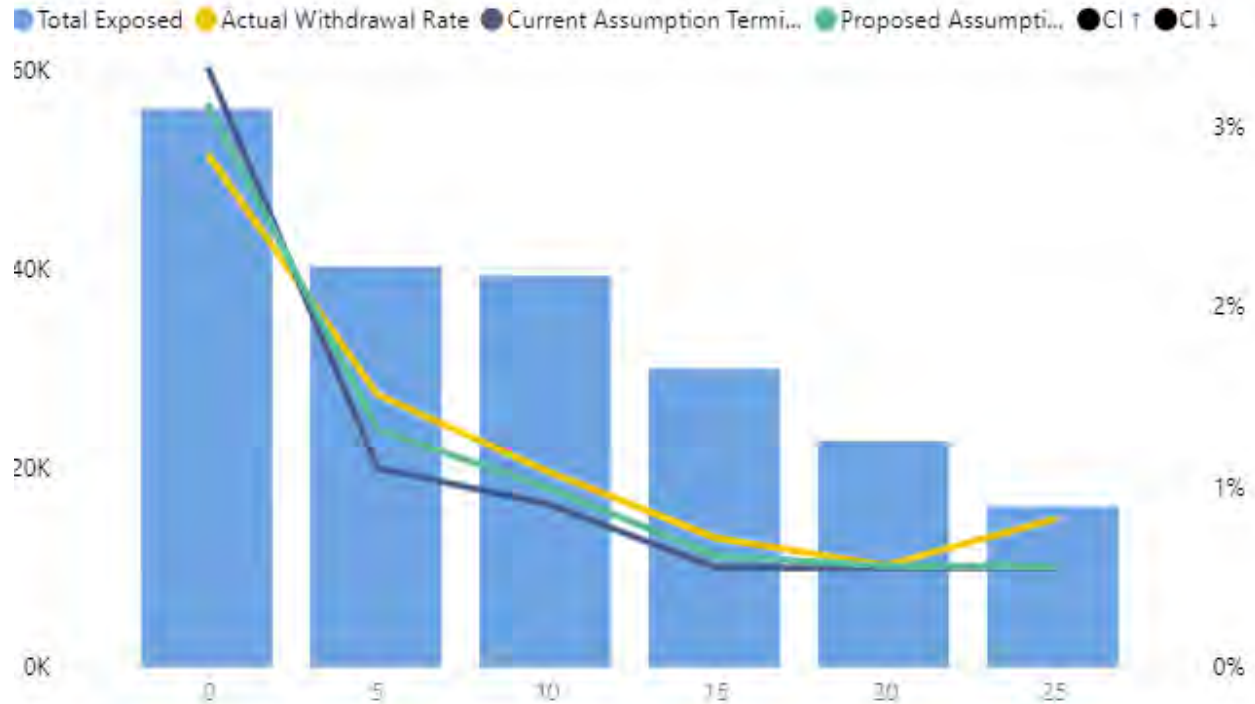


The following charts show the experience by service (0 to 29 years) in the experience study period first compared to the current assumption and then to the proposed assumption. This resulted in a decrease in the A/E ratio from 1.02 to 1.01 for ages 22 to 59.

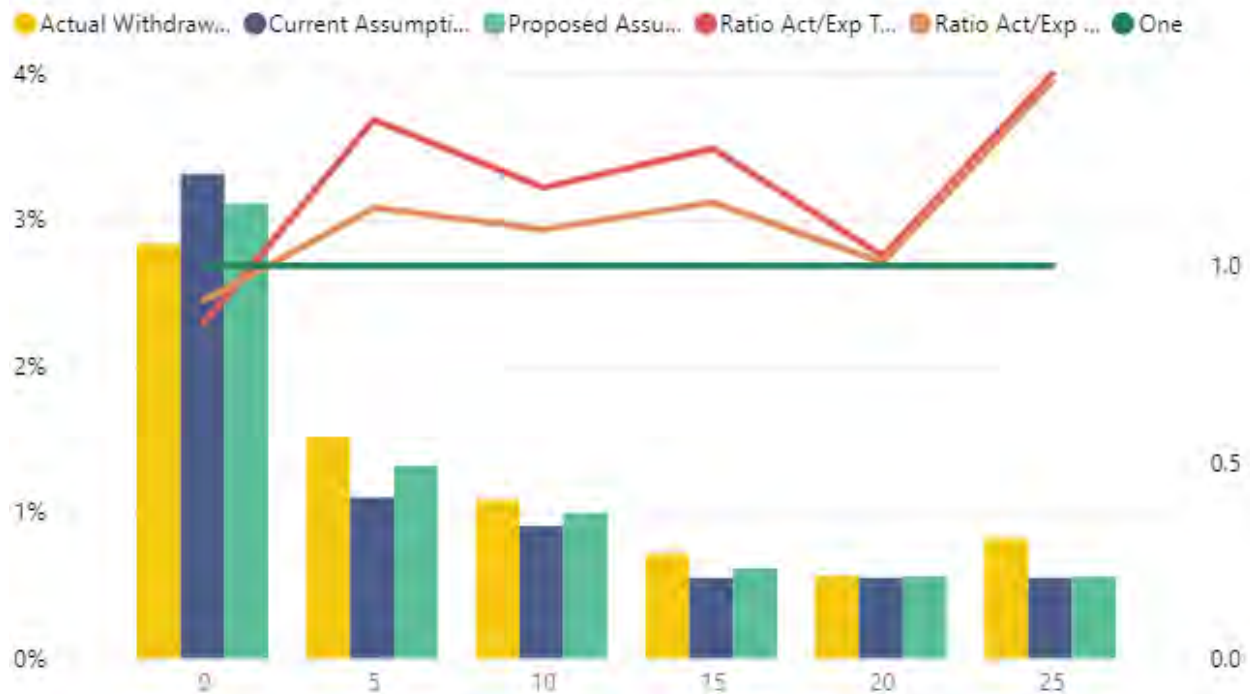
Service	Actual Withdrawals	Expected Withdrawals	Total Exposed	Actual Withdrawal Rate	Current Assumption Termination	Ratio Act/Exp Term
0	435	670.5	7,450	5.84%	9.00%	▲ 0.65
1	567	635.9	14,130	4.01%	4.50%	▲ 0.89
2	234	243.0	12,151	1.93%	2.00%	● 0.96
3	173	168.6	11,241	1.54%	1.50%	● 1.03
4	181	138.5	11,080	1.63%	1.25%	▲ 1.31
5	141	100.6	9,142	1.54%	1.10%	▲ 1.40
6	133	94.0	8,545	1.56%	1.10%	▲ 1.41
7	110	84.5	7,684	1.43%	1.10%	▲ 1.30
8	107	81.1	7,371	1.45%	1.10%	▲ 1.32
9	116	82.4	7,487	1.55%	1.10%	▲ 1.41
10	102	89.1	8,101	1.26%	1.10%	▲ 1.14
11	97	80.8	8,077	1.20%	1.00%	▲ 1.20
12	91	72.2	8,021	1.13%	0.90%	▲ 1.26
13	78	61.9	7,740	1.01%	0.80%	▲ 1.26
14	58	51.4	7,346	0.79%	0.70%	▲ 1.13
15	49	38.1	6,925	0.71%	0.55%	▲ 1.29
16	55	34.6	6,285	0.88%	0.55%	◆ 1.59
17	41	33.4	6,070	0.68%	0.55%	▲ 1.23
18	32	30.3	5,512	0.58%	0.55%	● 1.06
19	37	28.5	5,185	0.71%	0.55%	▲ 1.30
20	26	24.4	4,432	0.59%	0.55%	● 1.07
21	24	23.5	4,279	0.56%	0.55%	● 1.02
22	21	24.4	4,443	0.47%	0.55%	▲ 0.86
23	32	26.7	4,851	0.66%	0.55%	▲ 1.20
24	25	25.9	4,702	0.53%	0.55%	● 0.97
25	29	22.7	4,126	0.70%	0.55%	▲ 1.28
26	30	20.7	3,770	0.80%	0.55%	▲ 1.45
27	26	17.8	3,239	0.80%	0.55%	▲ 1.46
28	24	15.2	2,756	0.87%	0.55%	◆ 1.58
29	23	12.2	2,220	1.04%	0.55%	◆ 1.88
Total	3,097	3,032.8	204,361	1.52%	1.48%	● 1.02

Service	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
0	435	565.2	7,450	5.84%	7.59%	▲ 0.77
1	567	590.6	14,130	4.01%	4.18%	● 0.96
2	234	253.4	12,151	1.93%	2.09%	● 0.92
3	173	177.8	11,241	1.54%	1.56%	● 0.97
4	181	156.9	11,060	1.63%	1.42%	▲ 1.15
5	141	126.8	9,142	1.54%	1.39%	▲ 1.11
6	133	114.8	8,545	1.56%	1.34%	▲ 1.16
7	110	100.0	7,664	1.43%	1.30%	● 1.10
8	107	93.3	7,371	1.45%	1.27%	▲ 1.15
9	116	94.2	7,487	1.55%	1.26%	▲ 1.23
10	102	97.9	8,101	1.26%	1.21%	● 1.04
11	97	87.5	8,077	1.20%	1.08%	▲ 1.11
12	91	79.0	8,021	1.13%	0.99%	▲ 1.15
13	78	68.2	7,740	1.01%	0.88%	▲ 1.14
14	58	57.5	7,346	0.79%	0.78%	● 1.01
15	49	44.7	6,925	0.71%	0.65%	● 1.10
16	55	39.5	6,285	0.88%	0.63%	▲ 1.39
17	41	37.2	6,070	0.68%	0.61%	▲ 1.10
18	32	32.8	5,512	0.58%	0.60%	● 0.97
19	37	30.0	5,165	0.71%	0.58%	▲ 1.23
20	26	24.8	4,432	0.59%	0.56%	● 1.05
21	24	23.9	4,279	0.56%	0.56%	● 1.00
22	21	24.8	4,443	0.47%	0.56%	▲ 0.85
23	32	27.1	4,851	0.66%	0.56%	▲ 1.18
24	25	26.3	4,702	0.53%	0.56%	● 0.95
25	29	23.0	4,126	0.70%	0.56%	▲ 1.26
26	30	21.0	3,770	0.80%	0.56%	▲ 1.43
27	26	18.1	3,239	0.80%	0.56%	▲ 1.44
28	24	15.4	2,756	0.87%	0.56%	◆ 1.56
29	23	12.3	2,220	1.04%	0.56%	◆ 1.86
Total	3,097	3,064.2	204,361	1.52%	1.50%	● 1.01

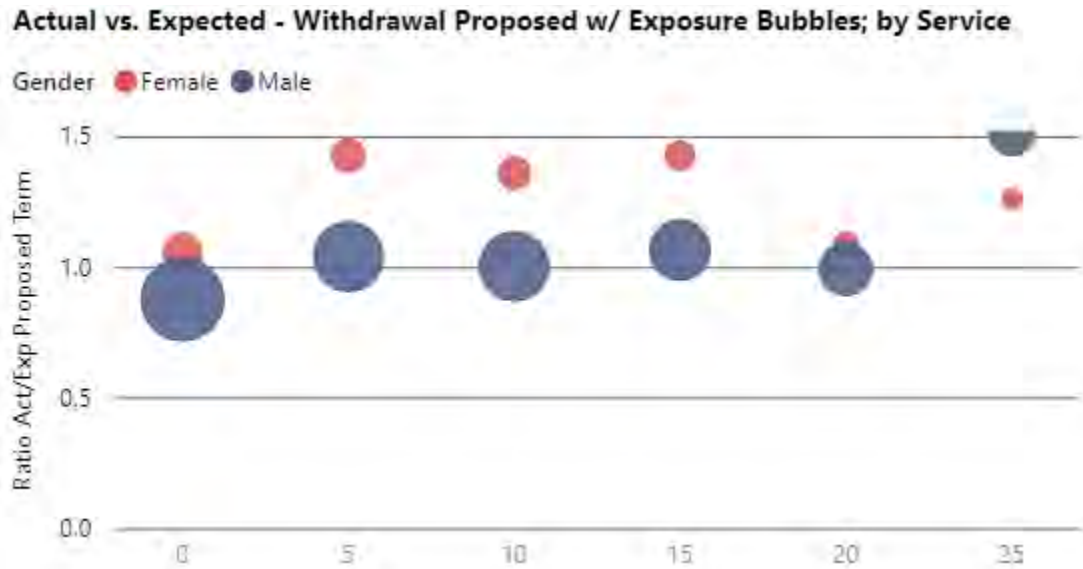
Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Service



Withdrawal Rate - Actual, Expected, and Ratio; by Service w/Proposed



The following chart shows the actual experience by gender versus the proposed assumption. As the experience for female members was consistently higher than male members, except for service in excess of 25 years, we are proposing service to vary by gender. For male members, the A/E ratio increased from 0.90 to 0.95 and for female members, the A/E ratio decreased from 1.56 to 1.21 for ages 22 to 59.



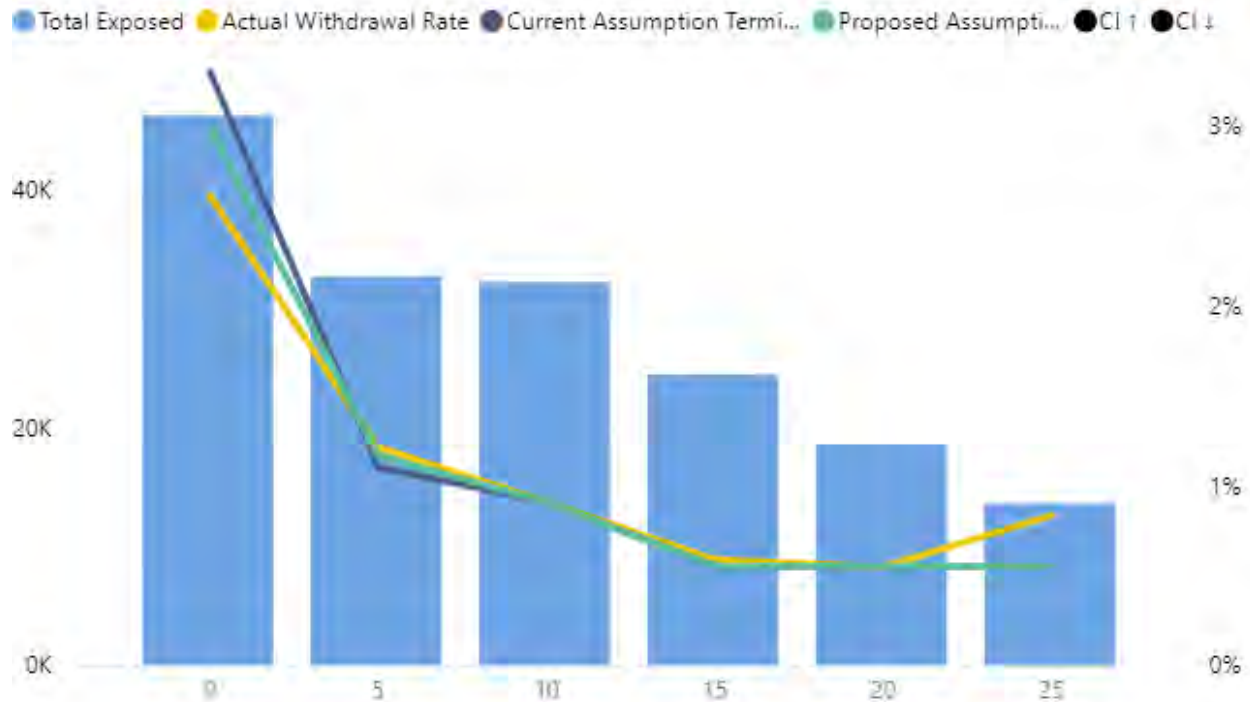
Males

The following charts show the experience of male members by service (0 to 29 years) in the experience study period first compared to the current assumption and then to the proposed assumption. This resulted in an increase in the A/E ratio from 0.90 to 0.95 for ages 22 to 59.

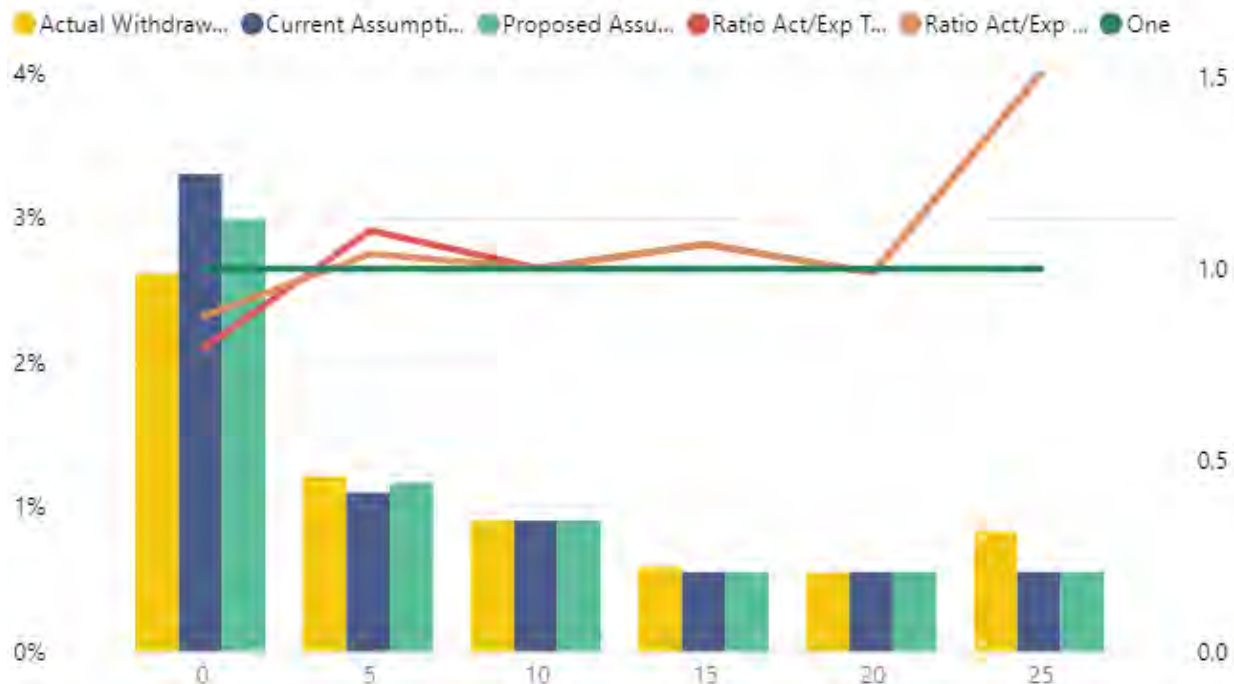
Service	Actual Withdrawals	Expected Withdrawals	Total Exposed	Actual Withdrawal Rate	Current Assumption Termination	Ratio Act/Exp Term
0	341	553.3	6,148	5.55%	9.00%	▲ 0.62
1	423	518.8	11,528	3.67%	4.50%	▲ 0.82
2	172	200.5	10,025	1.72%	2.00%	▲ 0.86
3	137	140.5	9,366	1.46%	1.50%	● 0.98
4	136	115.1	9,210	1.48%	1.25%	▲ 1.18
5	91	81.8	7,433	1.22%	1.10%	▲ 1.11
6	93	76.7	6,977	1.33%	1.10%	▲ 1.21
7	69	69.1	6,279	1.10%	1.10%	● 1.00
8	68	65.5	5,955	1.14%	1.10%	● 1.04
9	75	66.8	6,074	1.23%	1.10%	▲ 1.12
10	74	73.2	6,652	1.11%	1.10%	● 1.01
11	63	66.2	6,618	0.95%	1.00%	● 0.95
12	57	58.9	6,546	0.87%	0.90%	● 0.97
13	54	51.0	6,376	0.85%	0.80%	● 1.06
14	44	42.3	6,041	0.73%	0.70%	● 1.04
15	35	31.1	5,661	0.62%	0.55%	▲ 1.12
16	38	28.3	5,142	0.74%	0.55%	▲ 1.34
17	28	27.3	4,959	0.56%	0.55%	● 1.03
18	20	24.6	4,480	0.45%	0.55%	▲ 0.81
19	22	23.0	4,183	0.53%	0.55%	● 0.96
20	20	19.8	3,592	0.56%	0.55%	● 1.01
21	17	19.0	3,457	0.49%	0.55%	▲ 0.89
22	18	20.0	3,632	0.50%	0.55%	● 0.90
23	26	21.9	3,984	0.65%	0.55%	▲ 1.19
24	20	21.4	3,888	0.51%	0.55%	● 0.94
25	23	18.7	3,404	0.68%	0.55%	▲ 1.23
26	26	17.3	3,143	0.83%	0.55%	◆ 1.50
27	23	15.1	2,746	0.84%	0.55%	◆ 1.52
28	22	13.0	2,361	0.93%	0.55%	◆ 1.69
29	19	10.7	1,939	0.98%	0.55%	◆ 1.78
Total	2,254	2,490.8	167,799	1.34%	1.48%	● 0.90

Service	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
0	341	461.1	6,148	5.55%	7.50%	▲ 0.74
1	423	461.1	11,528	3.67%	4.00%	● 0.92
2	172	200.5	10,025	1.72%	2.00%	▲ 0.86
3	137	140.5	9,366	1.46%	1.50%	● 0.98
4	136	119.7	9,210	1.46%	1.30%	▲ 1.14
5	91	92.9	7,433	1.22%	1.25%	● 0.98
6	93	83.7	6,977	1.33%	1.20%	▲ 1.11
7	69	72.2	6,279	1.10%	1.15%	● 0.96
8	68	65.5	5,955	1.14%	1.10%	● 1.04
9	75	66.8	6,074	1.23%	1.10%	▲ 1.12
10	74	73.2	6,652	1.11%	1.10%	● 1.01
11	63	66.2	6,618	0.95%	1.00%	● 0.95
12	57	58.9	6,546	0.87%	0.90%	● 0.97
13	54	51.0	6,376	0.85%	0.80%	● 1.06
14	44	42.3	6,041	0.73%	0.70%	● 1.04
15	35	31.1	5,661	0.62%	0.55%	▲ 1.12
16	38	28.3	5,142	0.74%	0.55%	▲ 1.34
17	28	27.3	4,959	0.56%	0.55%	● 1.03
18	20	24.6	4,480	0.45%	0.55%	▲ 0.81
19	22	23.0	4,183	0.53%	0.55%	● 0.96
20	20	19.8	3,592	0.56%	0.55%	● 1.01
21	17	19.0	3,457	0.49%	0.55%	▲ 0.89
22	18	20.0	3,632	0.50%	0.55%	● 0.90
23	26	21.9	3,984	0.65%	0.55%	▲ 1.19
24	20	21.4	3,888	0.51%	0.55%	● 0.94
25	23	18.7	3,404	0.68%	0.55%	▲ 1.23
26	26	17.3	3,143	0.83%	0.55%	◆ 1.50
27	23	15.1	2,746	0.84%	0.55%	◆ 1.52
28	22	13.0	2,361	0.93%	0.55%	◆ 1.69
29	19	10.7	1,939	0.98%	0.55%	◆ 1.78
Total	2,254	2,366.8	167,799	1.34%	1.41%	● 0.95

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Service



Withdrawal Rate - Actual, Expected, and Ratio; by Service w/Proposed



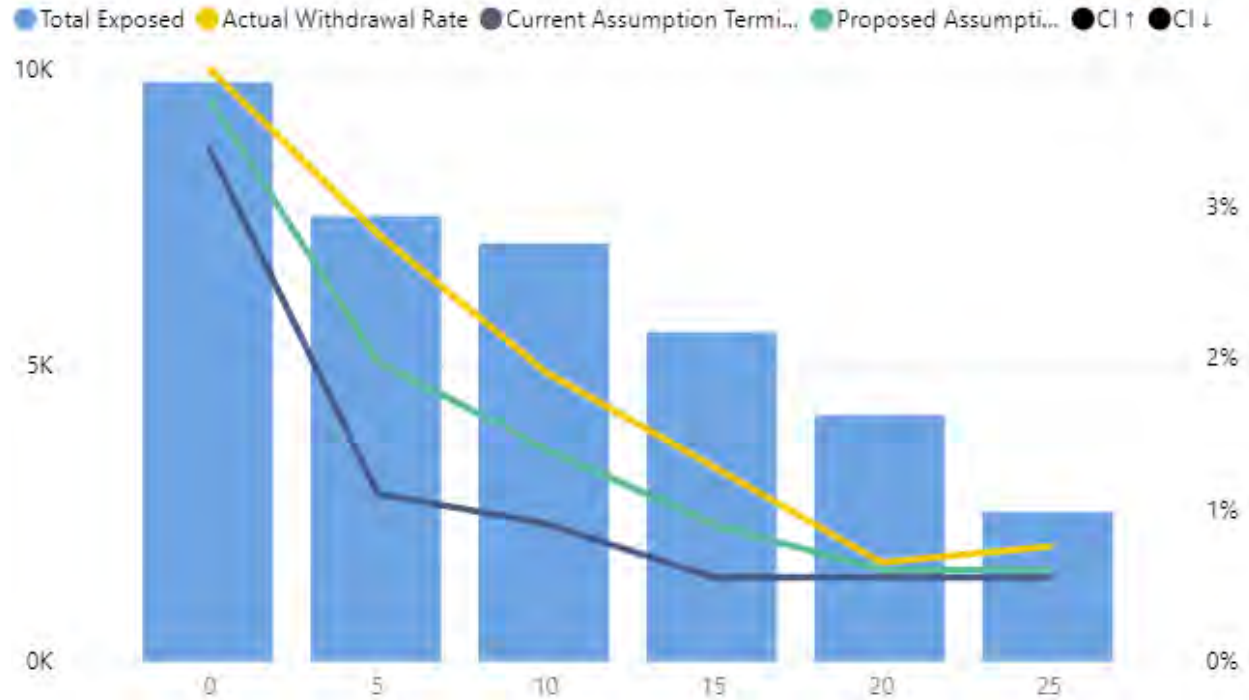
Females

The following charts show the experience of male members by service (0 to 29 years) in the experience study period first compared to the current assumption and then to the proposed assumption. This resulted in a decrease in the A/E ratio from 1.56 to 1.21 for ages 22 to 59.

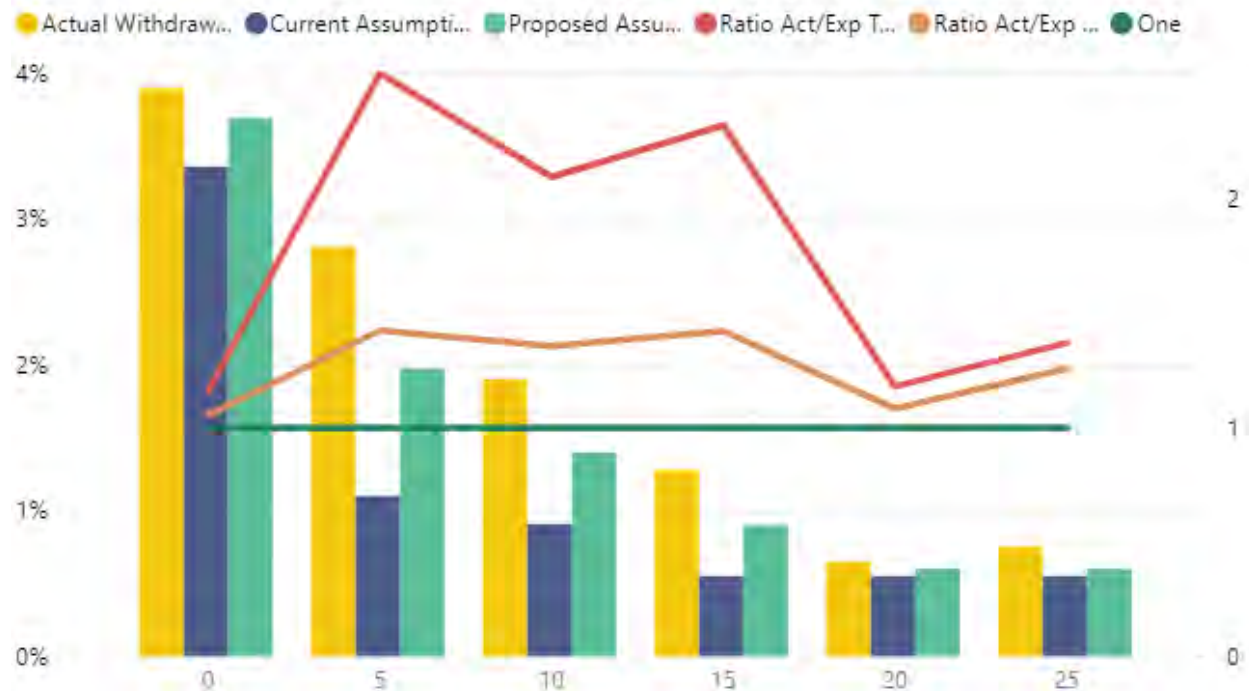
Service	Actual Withdrawals	Expected Withdrawals	Total Exposed	Actual Withdrawal Rate	Current Assumption Termination	Ratio Act/Exp Term
0	94	117.2	1,302	7.22%	9.00%	▲ 0.80
1	144	117.1	2,602	5.53%	4.50%	▲ 1.23
2	62	42.5	2,126	2.92%	2.00%	▲ 1.46
3	36	28.1	1,875	1.92%	1.50%	▲ 1.28
4	45	23.4	1,870	2.41%	1.25%	◆ 1.93
5	50	18.8	1,709	2.93%	1.10%	◆ 2.66
6	40	17.2	1,568	2.55%	1.10%	◆ 2.32
7	41	15.5	1,405	2.92%	1.10%	◆ 2.65
8	39	15.6	1,416	2.75%	1.10%	◆ 2.50
9	41	15.5	1,413	2.90%	1.10%	◆ 2.64
10	28	15.9	1,449	1.93%	1.10%	◆ 1.76
11	34	14.6	1,459	2.33%	1.00%	◆ 2.33
12	34	13.3	1,475	2.31%	0.90%	◆ 2.56
13	24	10.9	1,364	1.76%	0.80%	◆ 2.20
14	14	9.1	1,305	1.07%	0.70%	◆ 1.53
15	14	7.0	1,264	1.11%	0.55%	◆ 2.01
16	17	6.3	1,143	1.49%	0.55%	◆ 2.70
17	13	6.1	1,111	1.17%	0.55%	◆ 2.13
18	12	5.7	1,032	1.16%	0.55%	◆ 2.11
19	15	5.5	1,002	1.50%	0.55%	◆ 2.72
20	6	4.6	840	0.71%	0.55%	▲ 1.30
21	7	4.5	822	0.85%	0.55%	◆ 1.55
22	3	4.5	811	0.37%	0.55%	▲ 0.67
23	6	4.8	867	0.69%	0.55%	▲ 1.26
24	5	4.5	814	0.61%	0.55%	▲ 1.12
25	6	4.0	722	0.83%	0.55%	◆ 1.51
26	4	3.4	627	0.64%	0.55%	▲ 1.16
27	3	2.7	493	0.61%	0.55%	▲ 1.11
28	2	2.2	395	0.51%	0.55%	● 0.92
29	4	1.5	281	1.42%	0.55%	◆ 2.59
Total	843	542.0	36,562	2.31%	1.48%	◆ 1.56

Service	Actual Withdrawals	Expected Withdrawals Proposed	Total Exposed	Actual Withdrawal Rate	Proposed Assumption Termination	Act/Exp Proposed Term
0	94	104.1	1,302	7.22%	7.99%	0.90
1	144	129.5	2,602	5.53%	4.98%	1.11
2	62	52.9	2,126	2.92%	2.49%	1.17
3	36	37.3	1,875	1.92%	1.99%	0.97
4	45	37.1	1,870	2.41%	1.99%	1.21
5	50	33.9	1,709	2.93%	1.98%	1.47
6	40	31.1	1,568	2.55%	1.98%	1.29
7	41	27.8	1,405	2.92%	1.98%	1.47
8	39	27.8	1,416	2.75%	1.96%	1.40
9	41	27.4	1,413	2.90%	1.94%	1.50
10	28	24.7	1,449	1.93%	1.70%	1.13
11	34	21.3	1,459	2.33%	1.46%	1.60
12	34	20.1	1,475	2.31%	1.36%	1.69
13	24	17.2	1,364	1.76%	1.26%	1.39
14	14	15.3	1,305	1.07%	1.17%	0.92
15	14	13.5	1,264	1.11%	1.07%	1.03
16	17	11.2	1,143	1.49%	0.98%	1.52
17	13	9.9	1,111	1.17%	0.89%	1.31
18	12	8.2	1,032	1.16%	0.80%	1.46
19	15	7.0	1,002	1.50%	0.70%	2.14
20	6	5.0	840	0.71%	0.60%	1.19
21	7	4.9	822	0.85%	0.60%	1.42
22	3	4.9	811	0.37%	0.60%	0.62
23	6	5.2	867	0.69%	0.60%	1.15
24	5	4.9	814	0.61%	0.60%	1.02
25	6	4.3	722	0.83%	0.60%	1.39
26	4	3.8	627	0.64%	0.60%	1.06
27	3	3.0	493	0.61%	0.60%	1.01
28	2	2.4	395	0.51%	0.60%	0.84
29	4	1.7	281	1.42%	0.60%	2.37
Total	843	697.4	36,562	2.31%	1.91%	1.21

Exposure Distribution w/ Withdrawal Rate - Actual and Expected; by Service



Withdrawal Rate - Actual, Expected, and Ratio; by Service w/Proposed



Summary

In total, the proposed rates of withdrawal have slightly increased the anticipated number of terminations. This was primarily due to proposed increases among female members while decreases are proposed among male members. We believe the overall impact will be a slight decrease in plan liabilities, but the actual impact will depend on the demographics of the active membership.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF TERMINATION		
	Probabilities of Termination	
Years of Service	TBTA	Transit
0	9.00%	9.00%
1	4.50%	4.50%
2	2.00%	2.00%
3	1.50%	1.50%
4	1.25%	1.25%
5	1.10%	1.10%
6	1.10%	1.10%
7	1.10%	1.10%
8	1.10%	1.10%
9	1.10%	1.10%
10	1.10%	1.10%
11	1.00%	1.00%
12	0.90%	0.90%
13	0.80%	0.80%
14	0.70%	0.70%
15	0.55%	0.55%
16	0.55%	0.55%
17	0.55%	0.55%
18	0.55%	0.55%
19	0.55%	0.55%
20	0.55%	0.55%

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF TERMINATION		
	Probabilities of Termination	
Years of Service	Transit ¹ Male	Transit ¹ Female
0	7.50%	8.00%
1	4.00%	5.00%
2	2.00%	2.50%
3	1.50%	2.00%
4	1.30%	2.00%
5	1.25%	2.00%
6	1.20%	2.00%
7	1.15%	2.00%
8	1.10%	2.00%
9	1.10%	2.00%
10	1.10%	1.75%
11	1.00%	1.50%
12	0.90%	1.40%
13	0.80%	1.30%
14	0.70%	1.20%
15	0.55%	1.10%
16	0.55%	1.00%
17	0.55%	0.90%
18	0.55%	0.80%
19	0.55%	0.70%
20+	0.55%	0.60%

¹ Transit Improved Plan members and TBTA members

Retirement

We will review the retirement experience of TBTA members separately from Transit members. TBTA members include those in the Age 50 and 20 plan (Plan R) and Transit members include those in the Transit Improved Plan (Plan U).

The current retirement assumption for both TBTA and Transit varies by age and eligibility for unreduced retirement with higher rates occurring at first eligibility. Furthermore, higher rates of retirement are assumed for members who had the option to elect an improved program. For Transit, the rates are lower at younger ages.

The proposed assumptions vary by service in addition to these elements. Primarily lower rates of retirement are assumed prior to 20 years of service with even lower rates prior to 10 years of service. Lower rates of retirement are proposed for members with less than 10 years of service since these members are not eligible for retiree health benefits. Higher rates of retirement are proposed for members with at least 20 years of service to reflect the higher benefit accrual rate.

Please note that each of these members may elect to retire under the Basic Plan rather than this plan. When a member is eligible for reduced retirement under the Basic Plan and not eligible for unreduced retirement under their specific plan, OA utilizes the rates of withdrawal during this period, but values an immediate reduced early retirement benefit. The experience of these members during this period is included in the retirement analysis. We propose to use the proposed reduced retirement rates.

Since Tier 6 became effective on April 1, 2012, and required 10 years of service for vesting, there is little to no retirement experience associated with these plans. Chapter 56 Laws of 2022 changed the vesting requirements for the Tier 6 plans. Since the vesting requirement was 10 years during the study period, we used the 10-year requirement in this report.

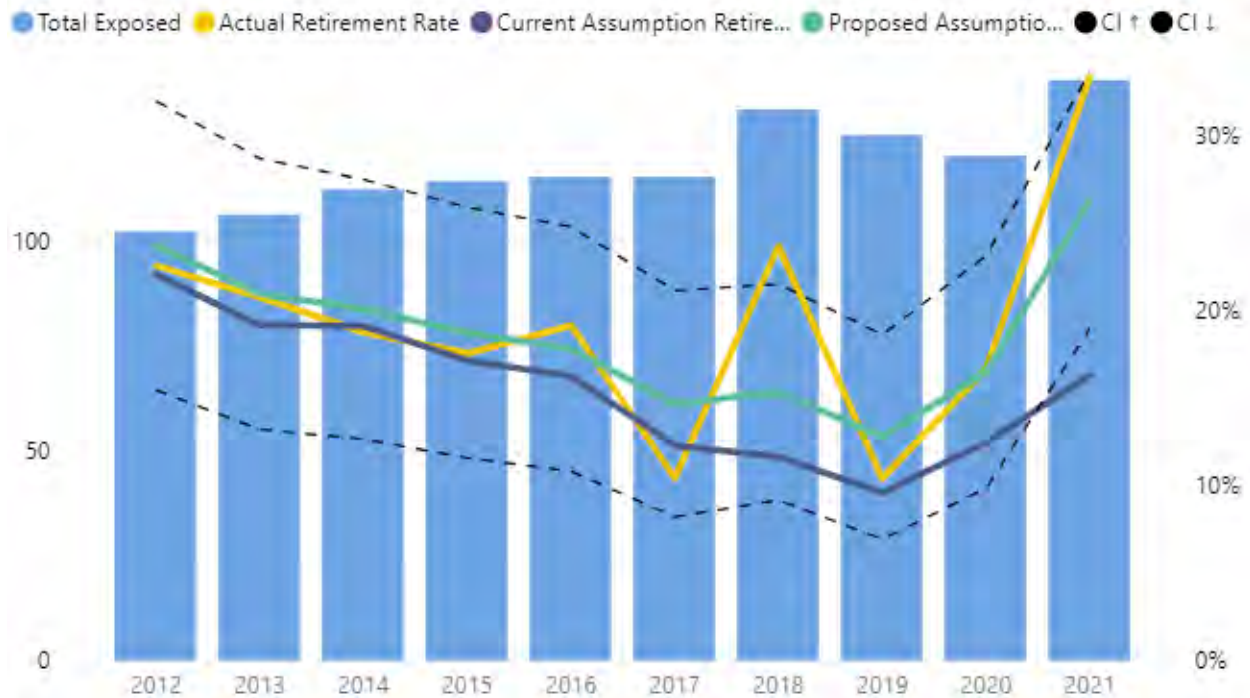
TBTA 50/20 Plan (20+ Years of Service)

The following table shows the experience of TBTA members for retirement by year, for the age range (50 to 69), and for the service range (5 to 34) for all plans and all types of retirement. The actual rate of retirement averaged 19.52% whereas the overall expected rate of retirement averaged 15.38% based on the current assumptions and 18.65% based on the proposed assumptions.

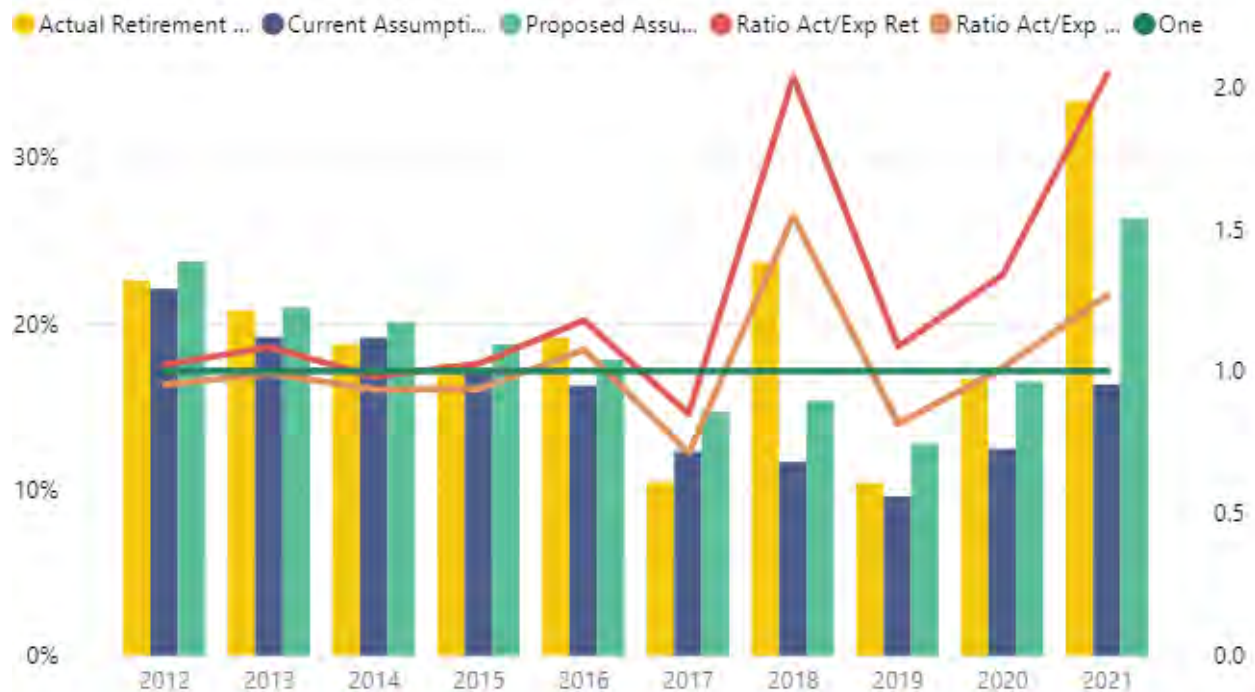
Plan Year	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
2012	23	22.5	102	22.55%	22.06%	1.02
2013	22	20.3	106	20.75%	19.16%	1.08
2014	21	21.4	112	18.75%	19.12%	0.98
2015	20	19.5	114	17.54%	17.12%	1.02
2016	22	18.7	115	19.13%	16.25%	1.18
2017	12	14.1	115	10.43%	12.28%	0.85
2018	31	15.3	131	23.66%	11.65%	2.03
2019	13	12.0	125	10.40%	9.58%	1.09
2020	20	14.9	120	16.67%	12.45%	1.34
2021	46	22.5	138	33.33%	16.30%	2.04
Total	230	181.2	1,178	19.52%	15.38%	1.27

Plan Year	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
2012	23	24.2	102	22.55%	23.70%	0.95
2013	22	22.2	106	20.75%	20.94%	0.99
2014	21	22.5	112	18.75%	20.06%	0.93
2015	20	21.4	114	17.54%	18.73%	0.94
2016	22	20.5	115	19.13%	17.79%	1.08
2017	12	16.9	115	10.43%	14.67%	0.71
2018	31	20.1	131	23.66%	15.33%	1.54
2019	13	16.0	125	10.40%	12.77%	0.81
2020	20	19.8	120	16.67%	16.48%	1.01
2021	46	36.3	138	33.33%	26.30%	1.27
Total	230	219.6	1,178	19.52%	18.65%	1.05

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Year



Retirement Rate - Actual, Expected, and Ratio; by Year

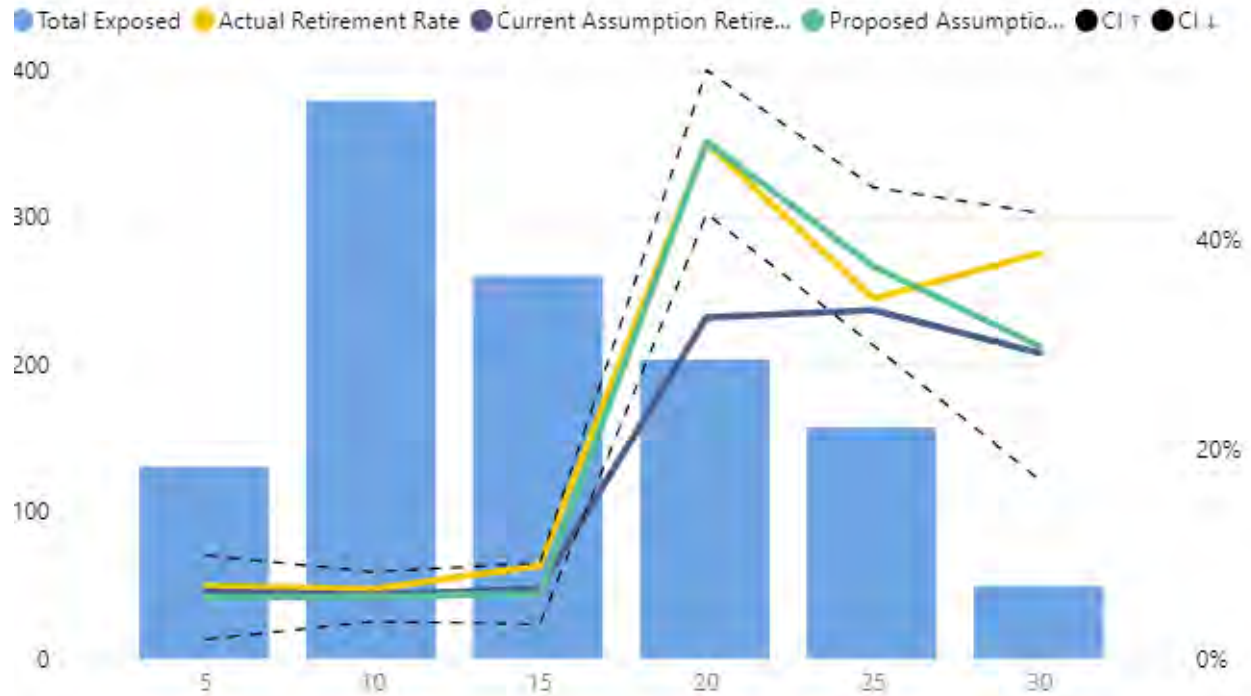


The following table shows the experience of TBTA members for retirement by service, for the age range (50 to 69), and for the service range (5 to 34) for all plans and all types of retirement.

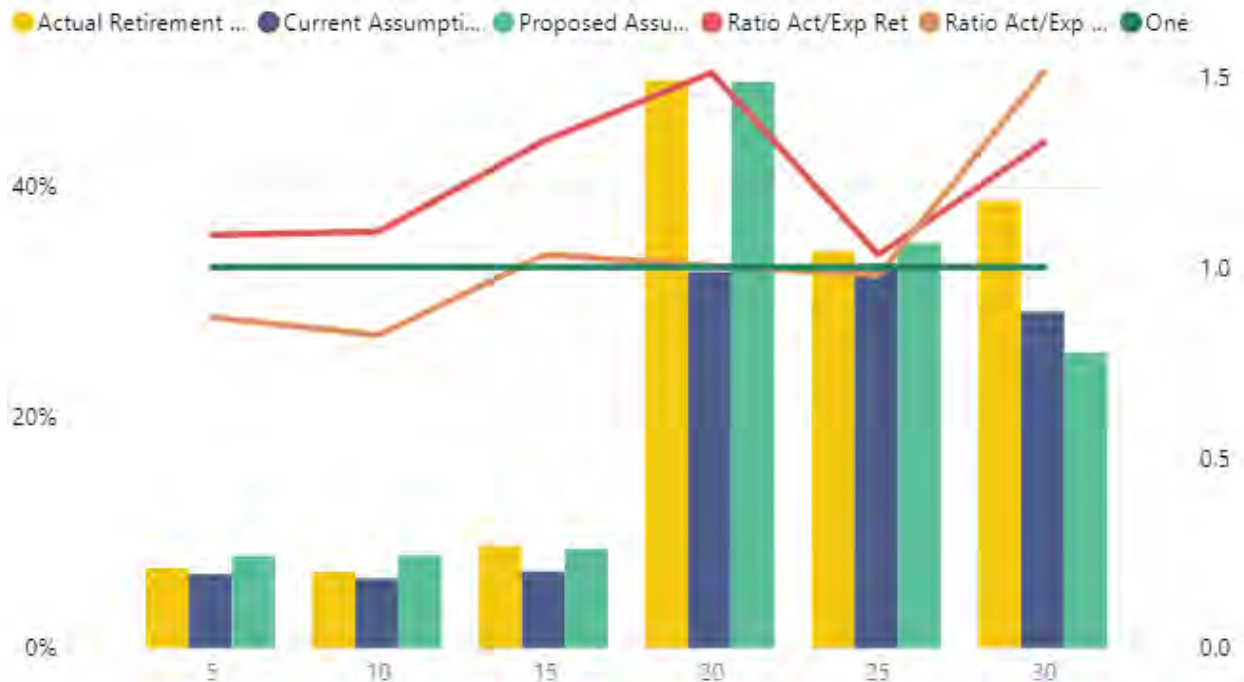
Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
5	1	0.7	12	8.33%	6.01%	▲ 1.39
6	0	0.1	13	0.00%	1.10%	◆ 0.00
7	3	1.8	28	10.71%	6.58%	◆ 1.63
8	1	2.4	34	2.94%	7.08%	◆ 0.42
9	4	3.2	43	9.30%	7.41%	▲ 1.26
10	7	4.3	52	13.46%	8.35%	◆ 1.61
11	7	5.0	73	9.59%	6.86%	▲ 1.40
12	3	3.9	78	3.85%	4.99%	▲ 0.77
13	5	4.2	79	6.33%	5.36%	▲ 1.18
14	3	5.4	97	3.09%	5.55%	▲ 0.56
15	7	4.7	87	8.05%	5.40%	▲ 1.49
16	4	3.6	75	5.33%	4.75%	▲ 1.12
17	6	5.2	56	10.71%	9.33%	▲ 1.15
18	4	2.4	30	13.33%	8.09%	◆ 1.65
19	2	1.3	12	16.67%	11.20%	▲ 1.49
20	51	25.8	73	69.86%	35.34%	◆ 1.98
21	8	7.9	28	28.57%	28.21%	● 1.01
22	9	8.0	28	32.14%	28.57%	▲ 1.13
23	16	13.0	40	40.00%	32.50%	▲ 1.23
24	16	11.5	34	47.06%	33.82%	▲ 1.39
25	10	11.6	33	30.30%	35.15%	▲ 0.86
26	18	15.2	41	43.90%	37.07%	▲ 1.18
27	11	10.7	34	32.35%	31.47%	● 1.03
28	8	8.5	27	29.63%	31.48%	● 0.94
29	7	6.3	22	31.82%	28.64%	▲ 1.11
30	11	6.1	20	55.00%	30.50%	◆ 1.80
31	2	2.1	8	25.00%	26.25%	● 0.95
32	1	2.4	9	11.11%	26.67%	◆ 0.42
33	5	2.5	8	62.50%	31.25%	◆ 2.00
34	0	1.2	4	0.00%	30.00%	◆ 0.00
Total	230	181.2	1,178	19.52%	15.38%	▲ 1.27

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
5	1	0.9	12	8.33%	7.17%	▲ 1.16
6	0	0.7	13	0.00%	5.23%	◆ 0.00
7	3	1.6	28	10.71%	5.75%	◆ 1.86
8	1	2.0	34	2.94%	5.87%	▲ 0.50
9	4	2.4	43	9.30%	5.60%	◆ 1.66
10	7	3.3	52	13.46%	6.38%	◆ 2.11
11	7	4.4	73	9.59%	6.08%	◆ 1.58
12	3	4.3	78	3.85%	5.56%	▲ 0.69
13	5	4.6	79	6.33%	5.85%	● 1.08
14	3	5.6	97	3.09%	5.74%	▲ 0.54
15	7	5.0	87	8.05%	5.70%	▲ 1.41
16	4	4.3	75	5.33%	5.77%	● 0.92
17	6	3.9	56	10.71%	6.88%	◆ 1.56
18	4	2.1	30	13.33%	7.03%	◆ 1.90
19	2	0.8	12	16.67%	6.75%	◆ 2.47
20	51	49.7	73	69.86%	68.08%	● 1.03
21	8	9.6	28	28.57%	34.29%	▲ 0.83
22	9	10.3	28	32.14%	36.61%	▲ 0.88
23	16	16.7	40	40.00%	41.63%	● 0.96
24	16	14.1	34	47.06%	41.47%	▲ 1.13
25	10	12.1	33	30.30%	36.67%	▲ 0.83
26	18	18.0	41	43.90%	43.90%	● 1.00
27	11	13.5	34	32.35%	39.71%	▲ 0.81
28	8	8.9	27	29.63%	32.78%	● 0.90
29	7	6.4	22	31.82%	29.09%	● 1.09
30	11	6.4	20	55.00%	32.00%	◆ 1.72
31	2	2.4	8	25.00%	29.38%	▲ 0.85
32	1	2.3	9	11.11%	25.00%	◆ 0.44
33	5	2.5	8	62.50%	30.63%	◆ 2.04
34	0	1.2	4	0.00%	28.75%	◆ 0.00
Total	230	219.6	1,178	19.52%	18.65%	● 1.05

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



Retirement Rate - Actual, Expected, and Ratio; by Service

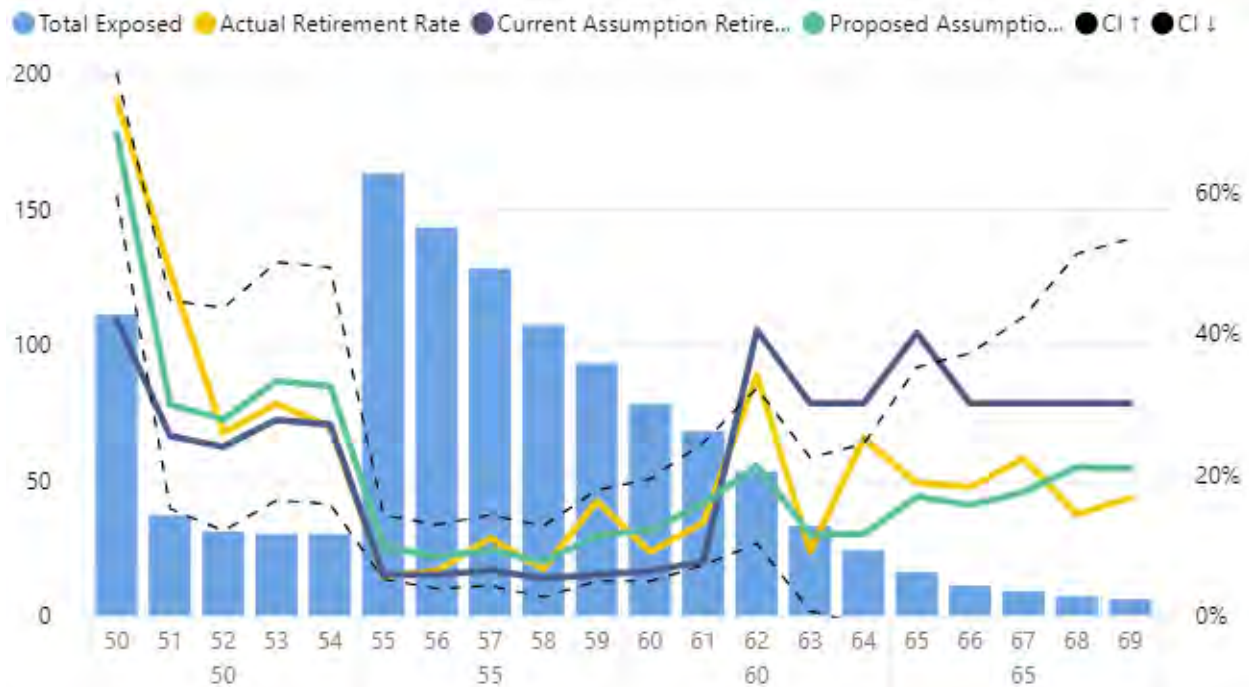


The following table shows the experience of TBTA members for retirement by age, for the age range (50 to 69), and for the service range (5 to 34) for all plans and all types of retirement. This resulted in a decrease in the A/E ratio from 1.27 to 1.05.

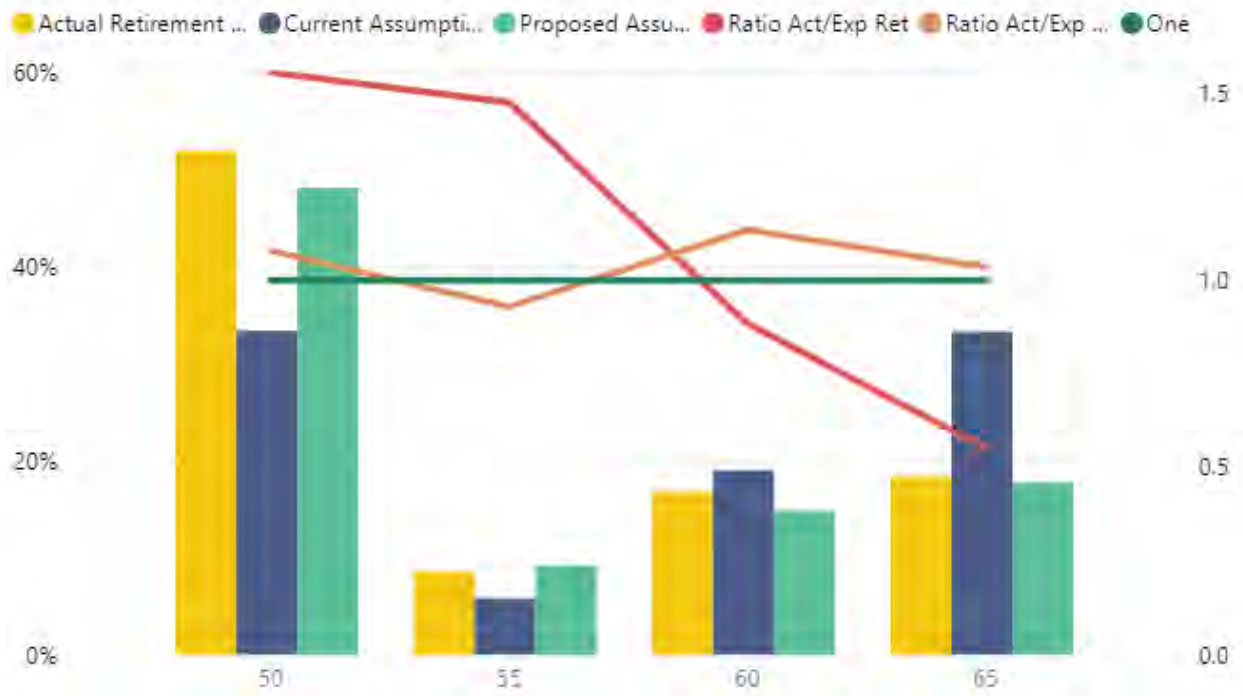
Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
50	81	46.5	111	72.97%	41.89%	1.74
51	18	9.4	37	48.65%	25.41%	1.91
52	8	7.4	31	25.81%	23.87%	1.08
53	9	8.3	30	30.00%	27.67%	1.08
54	8	8.1	30	26.67%	27.00%	0.99
55	9	9.3	163	5.52%	5.71%	0.97
56	9	8.2	143	6.29%	5.77%	1.09
57	14	8.1	128	10.94%	6.33%	1.73
58	7	5.6	107	6.54%	5.24%	1.25
59	15	5.3	93	16.13%	5.72%	2.82
60	7	4.9	78	8.97%	6.29%	1.43
61	9	5.2	68	13.24%	7.67%	1.73
62	18	21.4	53	33.96%	40.38%	0.84
63	3	9.9	33	9.09%	30.00%	0.30
64	6	7.2	24	25.00%	30.00%	0.83
65	3	6.4	16	18.75%	40.00%	0.47
66	2	3.3	11	18.18%	30.00%	0.61
67	2	2.7	9	22.22%	30.00%	0.74
68	1	2.1	7	14.29%	30.00%	0.48
69	1	1.8	6	16.67%	30.00%	0.56
Total	230	181.2	1,178	19.52%	15.38%	1.27

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
50	81	75.6	111	72.97%	68.11%	1.07
51	18	11.1	37	48.65%	29.86%	1.63
52	8	8.6	31	25.81%	27.74%	0.93
53	9	10.0	30	30.00%	33.17%	0.90
54	8	9.7	30	26.67%	32.50%	0.82
55	9	15.7	163	5.52%	9.66%	0.57
56	9	11.9	143	6.29%	8.32%	0.76
57	14	11.8	128	10.94%	9.20%	1.19
58	7	8.2	107	6.54%	7.63%	0.86
59	15	10.5	93	16.13%	11.29%	1.43
60	7	9.4	78	8.97%	12.06%	0.74
61	9	10.7	68	13.24%	15.79%	0.84
62	18	11.2	53	33.96%	21.17%	1.60
63	3	3.8	33	9.09%	11.45%	0.79
64	6	2.8	24	25.00%	11.50%	2.17
65	3	2.7	16	18.75%	16.81%	1.12
66	2	1.7	11	18.18%	15.64%	1.16
67	2	1.6	9	22.22%	17.44%	1.27
68	1	1.5	7	14.29%	21.00%	0.68
69	1	1.3	6	16.67%	20.83%	0.80
Total	230	219.6	1,178	19.52%	18.65%	1.05

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



Retirement Rate - Actual, Expected, and Ratio; by Age



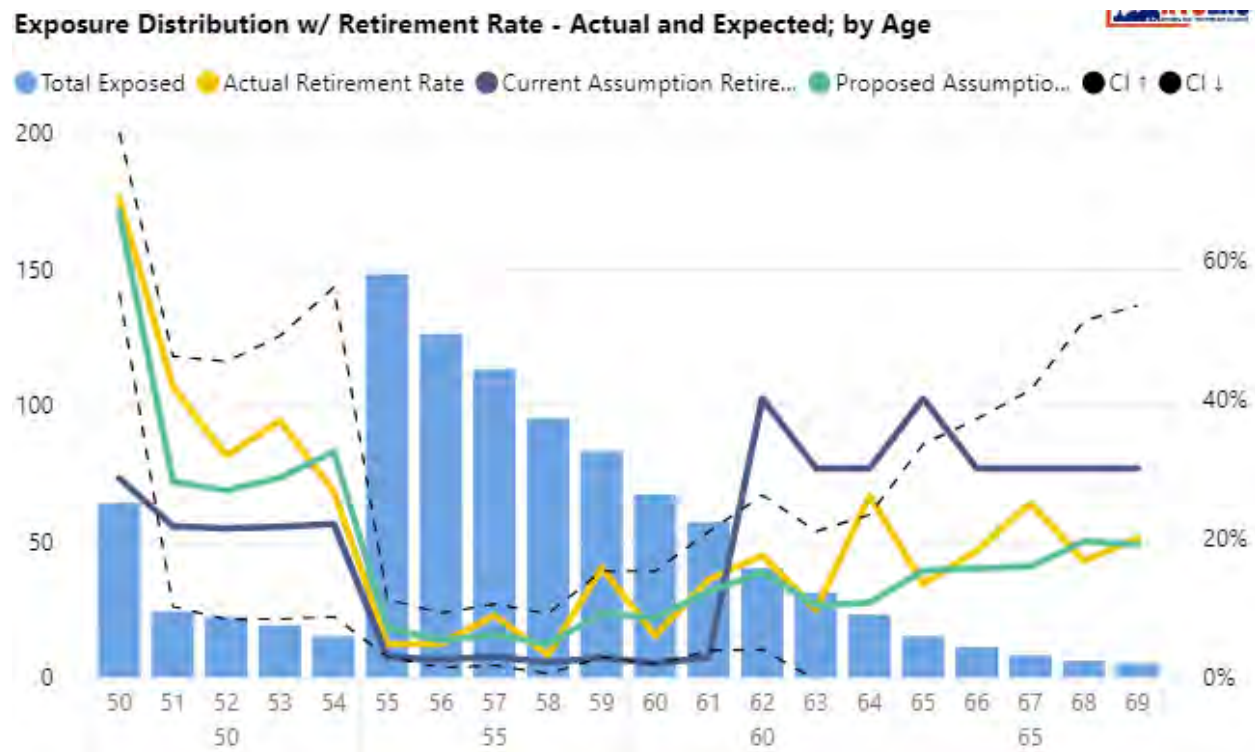
This chart shows the experience of TBTA improved plan members for retirement by age, for the age range (50 to 69), and for the service range (5 to 34) for all plans and all types of retirement. This resulted in a decrease in the A/E ratio from 1.03 to 0.96. At first eligibility, the A/E ratio decreased from 1.19 to 1.02 as we propose an increase in that rate. After first eligibility, the A/E ratio remained at 0.91.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



This chart shows the experience of TBTA mandated plan members for retirement by age, for the age range (50 to 69), and for the service range (5 to 34) for all plans and all types of retirement. This resulted in a decrease in the A/E ratio from 1.46 to 1.10. At first eligibility, the A/E ratio decreased from 1.75 to 1.04 as we propose an increase in that rate to be consistent with the assumption used for improved plan members. The rate of retirement at first eligibility is 67.21% for mandated members versus 78.72% for improved plan members at age 50. The proposed rate is 70%. After first eligibility, the A/E ratio decreased from 1.22 to 1.18.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



Summary

In total, the proposed rates of retirement have increased the anticipated number of retirements due to higher assumptions proposed at first eligibility for mandated members and for members with at least 20 years of service, which increase the number of members retiring with a 2% benefit accrual. We believe this would lead to higher plan liabilities. This will be offset by lower assumptions for members retiring with less than 20 years of service. The actual impact will depend on the demographics of the active membership.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF SERVICE RETIREMENT: TBTA					
Age	Reduced Service Retirement	Members Mandated Into Their Retirement Program		Members Who Elected an Improved Retirement Program	
		Unreduced Service Retirement		Unreduced Service Retirement	
		Year 1	Ultimate	Year 1	Ultimate
50	N/A	30.00%	20.00%	60.00%	30.00%
51	N/A	30.00%	20.00%	60.00%	30.00%
52	N/A	30.00%	20.00%	60.00%	30.00%
53	N/A	30.00%	20.00%	60.00%	30.00%
54	N/A	30.00%	20.00%	60.00%	30.00%
55	2.00%	30.00%	20.00%	60.00%	30.00%
56	2.00%	30.00%	20.00%	60.00%	30.00%
57	2.00%	30.00%	20.00%	60.00%	30.00%
58	2.00%	30.00%	20.00%	60.00%	30.00%
59	3.00%	30.00%	20.00%	60.00%	30.00%
60	4.00%	30.00%	20.00%	60.00%	30.00%
61	5.00%	30.00%	30.00%	60.00%	30.00%
62	0.00%	40.00%	40.00%	60.00%	40.00%
63	0.00%	30.00%	30.00%	40.00%	30.00%
64	0.00%	30.00%	30.00%	40.00%	30.00%
65	0.00%	40.00%	40.00%	60.00%	40.00%
66	0.00%	30.00%	30.00%	40.00%	30.00%
67	0.00%	30.00%	30.00%	40.00%	30.00%
68	0.00%	30.00%	30.00%	40.00%	30.00%
69	0.00%	30.00%	30.00%	40.00%	30.00%
70	0.00%	30.00%	30.00%	40.00%	30.00%
71	0.00%	30.00%	30.00%	40.00%	30.00%
72	0.00%	30.00%	30.00%	40.00%	30.00%
73	0.00%	30.00%	30.00%	40.00%	30.00%
74	0.00%	30.00%	30.00%	40.00%	30.00%
75	0.00%	30.00%	30.00%	40.00%	30.00%
76	0.00%	30.00%	30.00%	40.00%	30.00%
77	0.00%	30.00%	30.00%	40.00%	30.00%
78	0.00%	30.00%	30.00%	40.00%	30.00%
79	0.00%	30.00%	30.00%	40.00%	30.00%
80	N/A	100.00%	100.00%	100.00%	100.00%

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: TBTA								
Age	Reduced Service Retirement	Unreduced Service Retirement For Members Mandated Into Their Retirement Program				Service Retirement For Members Who Elected an Improved Retirement Program		
		< 10 YOS	10 - 19 YOS	First Eligibility ¹ >= 20 YOS	Ultimate >= 20 YOS	< 20 YOS	First Eligibility ¹ >= 20 YOS	Ultimate >= 20 YOS
50	N/A	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
51	N/A	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
52	N/A	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
53	N/A	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
54	N/A	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
55	5.00%	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
56	3.50%	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
57	3.50%	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
58	3.50%	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
59	5.00%	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
60	6.50%	N/A	N/A	70.00%	15.00%	N/A	70.00%	30.00%
61	8.00%	N/A	N/A	70.00%	20.00%	N/A	70.00%	30.00%
62	0.00%	12.00%	15.00%	70.00%	25.00%	40.00%	70.00%	40.00%
63	0.00%	8.00%	10.00%	20.00%	20.00%	17.50%	30.00%	30.00%
64	0.00%	8.00%	10.00%	20.00%	20.00%	17.50%	30.00%	30.00%
65	0.00%	12.00%	15.00%	25.00%	25.00%	25.00%	40.00%	40.00%
66	0.00%	12.00%	15.00%	25.00%	25.00%	25.00%	30.00%	30.00%
67	0.00%	12.00%	15.00%	25.00%	25.00%	25.00%	30.00%	30.00%
68	0.00%	12.00%	15.00%	25.00%	25.00%	25.00%	30.00%	30.00%
69	0.00%	12.00%	15.00%	25.00%	25.00%	25.00%	30.00%	30.00%
70	0.00%	17.50%	17.50%	25.00%	25.00%	25.00%	30.00%	30.00%
71	0.00%	17.50%	17.50%	25.00%	25.00%	25.00%	30.00%	30.00%
72	0.00%	17.50%	17.50%	25.00%	25.00%	25.00%	30.00%	30.00%
73	0.00%	17.50%	17.50%	25.00%	25.00%	25.00%	30.00%	30.00%
74	0.00%	17.50%	17.50%	25.00%	25.00%	25.00%	30.00%	30.00%
75	0.00%	17.50%	17.50%	25.00%	25.00%	25.00%	30.00%	30.00%
76	0.00%	17.50%	17.50%	25.00%	25.00%	25.00%	30.00%	30.00%
77	0.00%	17.50%	17.50%	25.00%	25.00%	25.00%	30.00%	30.00%
78	0.00%	17.50%	17.50%	25.00%	25.00%	25.00%	30.00%	30.00%
79	0.00%	17.50%	17.50%	25.00%	25.00%	25.00%	30.00%	30.00%
80	N/A	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

¹ First eligibility rates for TBTA 50/20 Plan members apply at age 50 / 20.

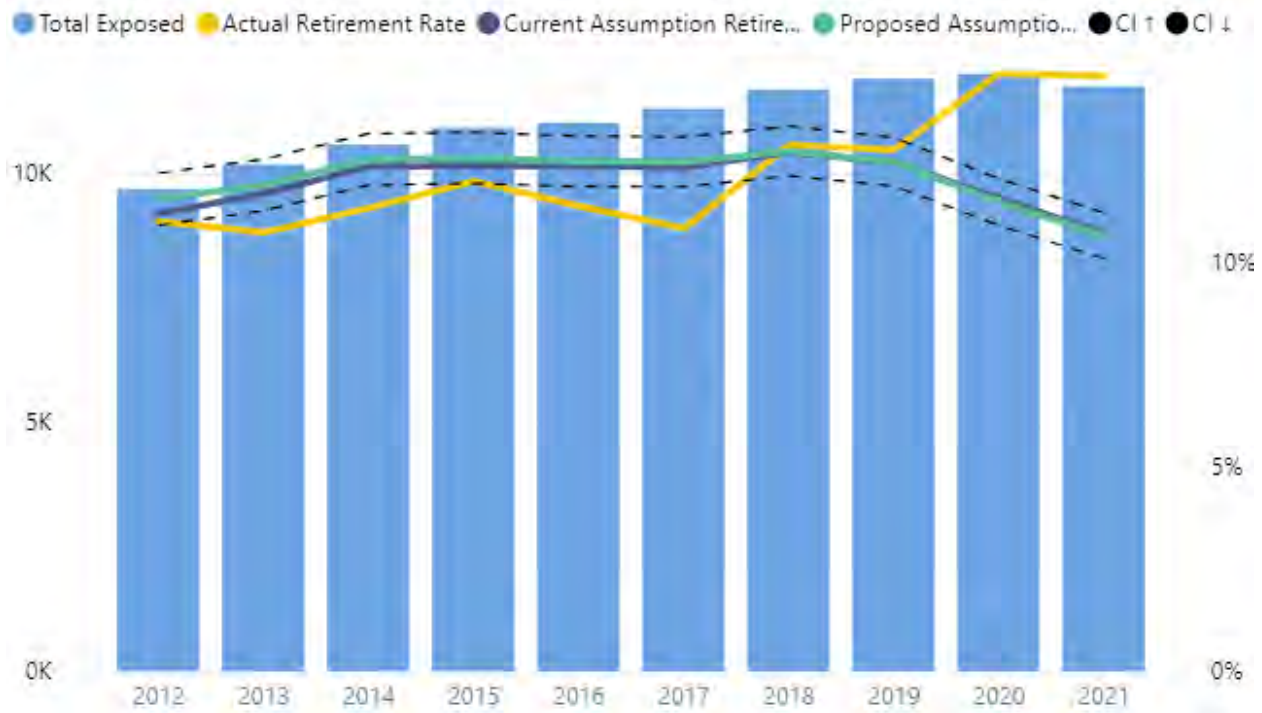
Transit Improved Plan (Age 55/25)

The following table shows the experience of Transit members for retirement by year, for the age range (55 to 79), and for the service range (5 to 39) for all plans and all types of retirement. The actual rate of retirement averaged 12.27% whereas the overall expected rate of retirement averaged 11.96% based on the current assumptions and 12.06% based on the proposed assumptions.

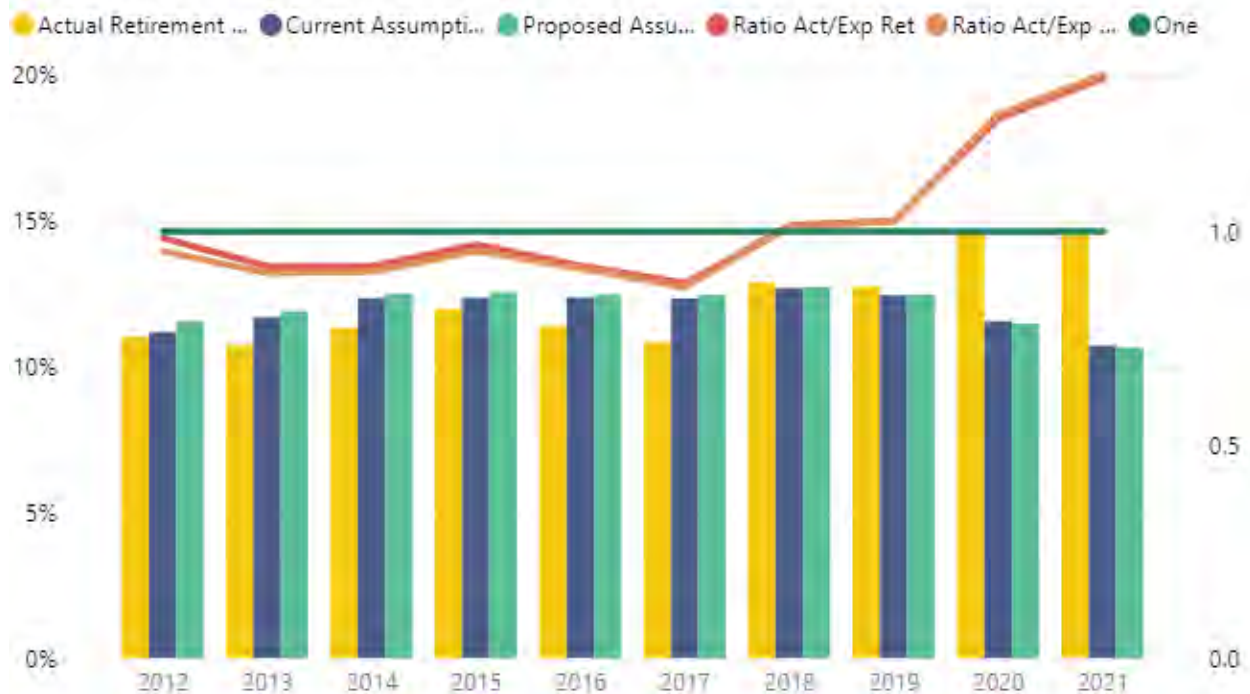
Plan Year	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
2012	1,064	1,081.2	9,672	11.00%	11.18%	0.98
2013	1,090	1,187.2	10,170	10.72%	11.67%	0.92
2014	1,197	1,303.8	10,570	11.32%	12.33%	0.92
2015	1,305	1,346.4	10,905	11.97%	12.35%	0.97
2016	1,251	1,359.9	11,006	11.37%	12.36%	0.92
2017	1,222	1,390.7	11,289	10.82%	12.32%	0.88
2018	1,501	1,480.0	11,674	12.86%	12.68%	1.01
2019	1,516	1,479.0	11,894	12.75%	12.43%	1.03
2020	1,752	1,384.3	11,991	14.61%	11.54%	1.27
2021	1,708	1,256.6	11,736	14.55%	10.71%	1.36
Total	13,606	13,269.0	110,907	12.27%	11.96%	1.03

Plan Year	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
2012	1,064	1,115.7	9,672	11.00%	11.54%	0.95
2013	1,090	1,208.5	10,170	10.72%	11.88%	0.90
2014	1,197	1,322.2	10,570	11.32%	12.51%	0.91
2015	1,305	1,367.8	10,905	11.97%	12.54%	0.95
2016	1,251	1,371.3	11,006	11.37%	12.46%	0.91
2017	1,222	1,405.1	11,289	10.82%	12.45%	0.87
2018	1,501	1,483.8	11,674	12.86%	12.71%	1.01
2019	1,516	1,480.4	11,894	12.75%	12.45%	1.02
2020	1,752	1,374.3	11,991	14.61%	11.46%	1.27
2021	1,708	1,248.5	11,736	14.55%	10.64%	1.37
Total	13,606	13,377.7	110,907	12.27%	12.06%	1.02

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Year



Retirement Rate - Actual, Expected, and Ratio; by Year



The following table shows the experience of Transit members for retirement by service, for the age range (55 to 79), and for the service range (5 to 39) for all plans and all types of retirement.

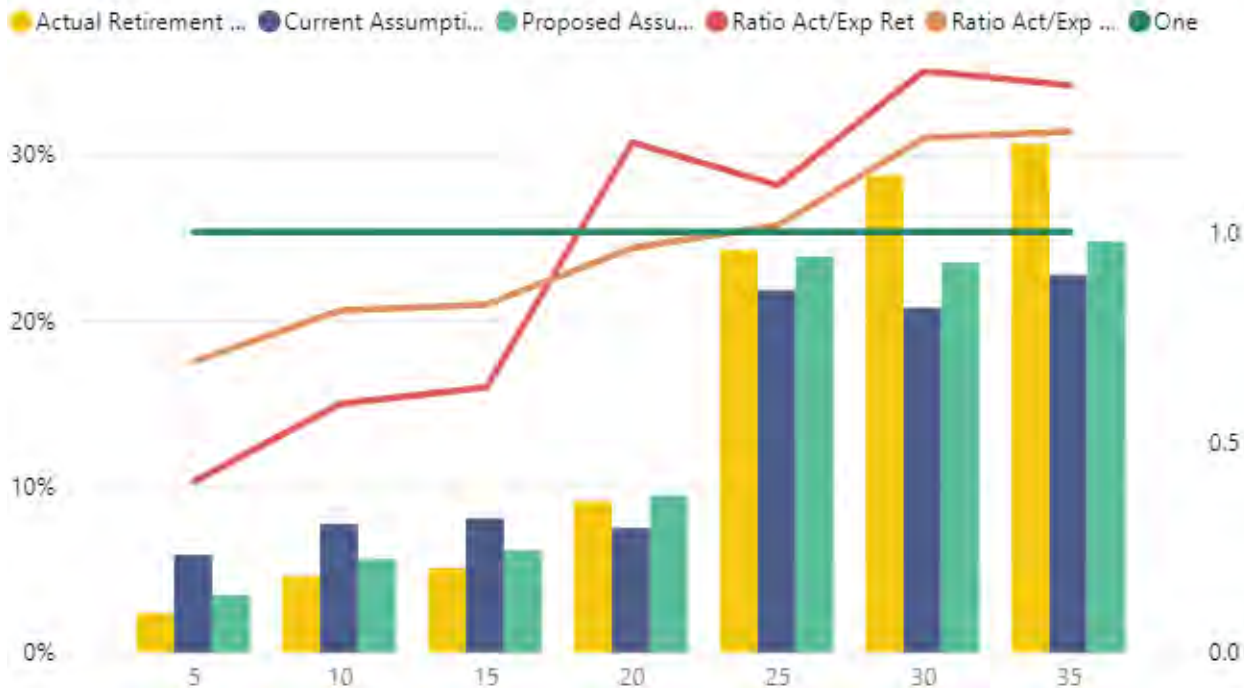
Service	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
5	47	90.2	2,330	2.02%	3.87%	▲ 0.52
6	51	119.2	2,496	2.04%	4.77%	◆ 0.43
7	44	138.8	2,374	1.85%	5.85%	◆ 0.32
8	52	171.9	2,457	2.12%	7.00%	◆ 0.30
9	101	204.9	2,695	3.75%	7.60%	◆ 0.49
10	166	236.5	3,045	5.45%	7.77%	▲ 0.70
11	162	259.6	3,432	4.72%	7.56%	▲ 0.62
12	166	301.7	3,907	4.25%	7.72%	▲ 0.55
13	169	323.0	4,158	4.06%	7.77%	▲ 0.52
14	190	319.8	4,085	4.65%	7.83%	▲ 0.59
15	209	327.6	4,145	5.04%	7.90%	▲ 0.64
16	219	333.6	4,173	5.25%	7.99%	▲ 0.66
17	222	351.3	4,456	4.98%	7.88%	▲ 0.63
18	180	382.9	4,729	3.81%	8.10%	◆ 0.47
19	316	423.4	5,067	6.24%	8.36%	▲ 0.75
20	546	380.8	4,651	11.74%	8.19%	▲ 1.43
21	384	321.0	4,333	8.86%	7.41%	▲ 1.20
22	358	290.2	4,078	8.78%	7.12%	▲ 1.23
23	381	309.7	4,316	8.83%	7.18%	▲ 1.23
24	307	327.0	4,367	7.03%	7.49%	● 0.94
25	1,554	1,420.8	5,105	30.44%	27.83%	● 1.09
26	961	846.2	4,360	22.04%	19.41%	▲ 1.14
27	857	783.7	3,964	21.62%	19.77%	● 1.09
28	819	748.2	3,754	21.82%	19.93%	● 1.09
29	850	738.2	3,633	23.40%	20.32%	▲ 1.15
30	1,001	718.6	3,485	28.72%	20.62%	▲ 1.39
31	815	625.0	3,002	27.15%	20.82%	▲ 1.30
32	720	523.0	2,533	28.42%	20.65%	▲ 1.38
33	585	408.6	1,958	29.88%	20.87%	▲ 1.43
34	428	290.7	1,384	30.92%	21.01%	▲ 1.47
35	287	209.0	965	29.74%	21.66%	▲ 1.37
36	214	150.2	677	31.61%	22.19%	▲ 1.42
37	136	99.2	420	32.38%	23.61%	▲ 1.37
38	77	60.6	245	31.43%	24.73%	▲ 1.27
39	32	34.1	128	25.00%	26.60%	● 0.94
Total	13,606	13,269.0	110,907	12.27%	11.96%	● 1.03

Service	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
5	47	49.2	2,330	2.02%	2.11%	0.96
6	51	67.2	2,496	2.04%	2.69%	0.76
7	44	81.8	2,374	1.85%	3.44%	0.54
8	52	103.6	2,457	2.12%	4.22%	0.50
9	101	124.5	2,695	3.75%	4.62%	0.81
10	166	168.2	3,045	5.45%	5.52%	0.99
11	162	190.2	3,432	4.72%	5.54%	0.85
12	166	221.0	3,907	4.25%	5.66%	0.75
13	169	235.2	4,158	4.06%	5.66%	0.72
14	190	233.4	4,085	4.65%	5.71%	0.81
15	209	244.5	4,145	5.04%	5.90%	0.85
16	219	251.9	4,173	5.25%	6.04%	0.87
17	222	268.4	4,456	4.98%	6.02%	0.83
18	180	293.6	4,729	3.81%	6.21%	0.61
19	316	326.6	5,067	6.24%	6.44%	0.97
20	546	457.3	4,651	11.74%	9.83%	1.19
21	384	394.5	4,333	8.86%	9.10%	0.97
22	358	368.0	4,078	8.78%	9.03%	0.97
23	381	403.0	4,316	8.83%	9.34%	0.95
24	307	431.6	4,367	7.03%	9.88%	0.71
25	1,554	1,412.5	5,105	30.44%	27.67%	1.10
26	961	963.0	4,360	22.04%	22.09%	1.00
27	857	891.8	3,964	21.62%	22.50%	0.96
28	819	852.5	3,754	21.82%	22.71%	0.96
29	850	841.8	3,633	23.40%	23.17%	1.01
30	1,001	816.2	3,485	28.72%	23.42%	1.23
31	815	711.2	3,002	27.15%	23.69%	1.15
32	720	593.1	2,533	28.42%	23.42%	1.21
33	585	457.5	1,958	29.88%	23.37%	1.28
34	428	321.7	1,384	30.92%	23.25%	1.33
35	287	229.9	965	29.74%	23.83%	1.25
36	214	165.4	677	31.61%	24.42%	1.29
37	136	107.3	420	32.38%	25.54%	1.27
38	77	64.3	245	31.43%	26.26%	1.20
39	32	35.6	128	25.00%	27.81%	0.90
Total	13,606	13,377.7	110,907	12.27%	12.06%	1.02

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Service



Retirement Rate - Actual, Expected, and Ratio; by Service



The following table shows the experience of Transit for retirement by age, for the age range (55 to 79), and for the service range (5 to 39) for all plans and all types of retirement. This resulted in a decrease in the A/E ratio from 1.03 to 1.02.

Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
55	2,270	1,510.8	14,424	15.74%	10.47%	1.50
56	929	746.1	12,365	7.51%	6.03%	1.25
57	843	687.3	11,518	7.32%	5.97%	1.23
58	776	646.1	10,791	7.19%	5.99%	1.20
59	786	608.7	9,938	7.91%	6.12%	1.29
60	719	577.4	9,167	7.84%	6.30%	1.25
61	1,010	703.2	8,390	12.04%	8.38%	1.44
62	1,503	1,794.3	7,318	20.54%	24.52%	0.84
63	858	1,223.3	5,705	15.04%	21.44%	0.70
64	663	1,007.9	4,787	13.85%	21.06%	0.66
65	675	1,058.7	4,038	16.72%	26.22%	0.64
66	732	662.2	3,213	22.78%	20.61%	1.11
67	466	479.9	2,350	19.83%	20.42%	0.97
68	291	362.0	1,790	16.26%	20.22%	0.80
69	258	287.4	1,426	18.09%	20.16%	0.90
70	244	270.4	1,096	22.26%	24.67%	0.90
71	181	191.8	774	23.39%	24.78%	0.94
72	119	136.5	550	21.64%	24.82%	0.87
73	87	98.1	396	21.97%	24.78%	0.89
74	64	71.4	288	22.22%	24.81%	0.90
75	35	48.7	196	17.86%	24.83%	0.72
76	34	36.1	145	23.45%	24.90%	0.94
77	25	27.1	108	23.15%	25.09%	0.92
78	21	19.6	78	26.92%	25.06%	1.07
79	17	14.1	56	30.36%	25.09%	1.21
Total	13,606	13,269.0	110,907	12.27%	11.96%	1.03

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
55	2,270	2,025.0	14,424	15.74%	14.04%	▲ 1.12
56	929	854.3	12,365	7.51%	6.91%	● 1.09
57	843	785.5	11,518	7.32%	6.82%	● 1.07
58	776	733.4	10,791	7.19%	6.80%	● 1.06
59	786	691.0	9,938	7.91%	6.95%	▲ 1.14
60	719	631.0	9,167	7.84%	6.88%	▲ 1.14
61	1,010	969.8	8,390	12.04%	11.56%	● 1.04
62	1,503	1,692.3	7,318	20.54%	23.13%	▲ 0.89
63	858	938.6	5,705	15.04%	16.45%	● 0.91
64	663	757.4	4,787	13.85%	15.82%	▲ 0.88
65	675	814.6	4,038	16.72%	20.17%	▲ 0.83
66	732	640.6	3,213	22.78%	19.94%	▲ 1.14
67	466	455.9	2,350	19.83%	19.40%	● 1.02
68	291	340.8	1,790	16.26%	19.04%	▲ 0.85
69	258	273.1	1,426	18.09%	19.15%	● 0.94
70	244	224.6	1,096	22.26%	20.49%	● 1.09
71	181	160.5	774	23.39%	20.73%	▲ 1.13
72	119	115.5	550	21.64%	21.00%	● 1.03
73	87	85.0	396	21.97%	21.46%	● 1.02
74	64	61.9	288	22.22%	21.48%	● 1.03
75	35	42.1	196	17.86%	21.45%	▲ 0.83
76	34	31.1	145	23.45%	21.48%	● 1.09
77	25	23.7	108	23.15%	21.90%	● 1.06
78	21	17.2	78	26.92%	22.08%	▲ 1.22
79	17	12.7	56	30.36%	22.68%	▲ 1.34
Total	13,606	13,377.7	110,907	12.27%	12.06%	● 1.02

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



Retirement Rate - Actual, Expected, and Ratio; by Age



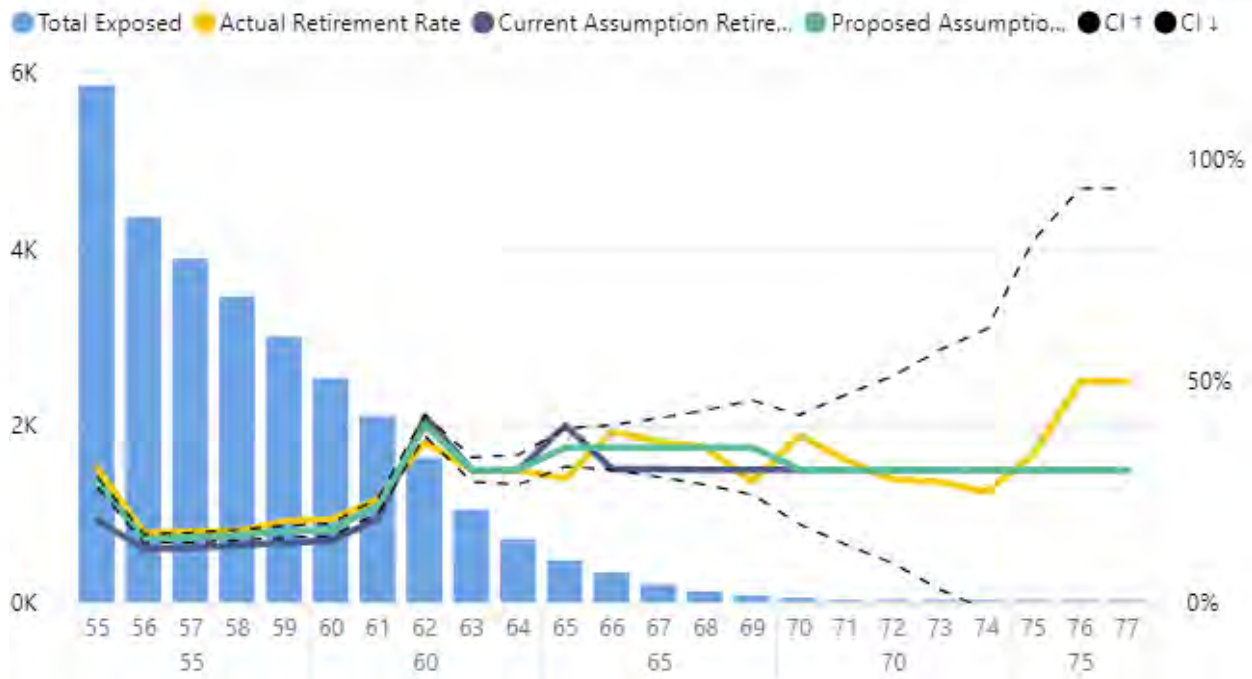
Improved Plan

The following table shows the experience of Transit members who elected the improved plan for retirement by age, for the age range (55 to 79), and for the service range (5 to 39) for all plans and all types of retirement. The actual rate of retirement averaged 22.41% whereas the overall expected rate of retirement averaged 17.89% based on the current assumptions and 21.09% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.25 to 1.06.

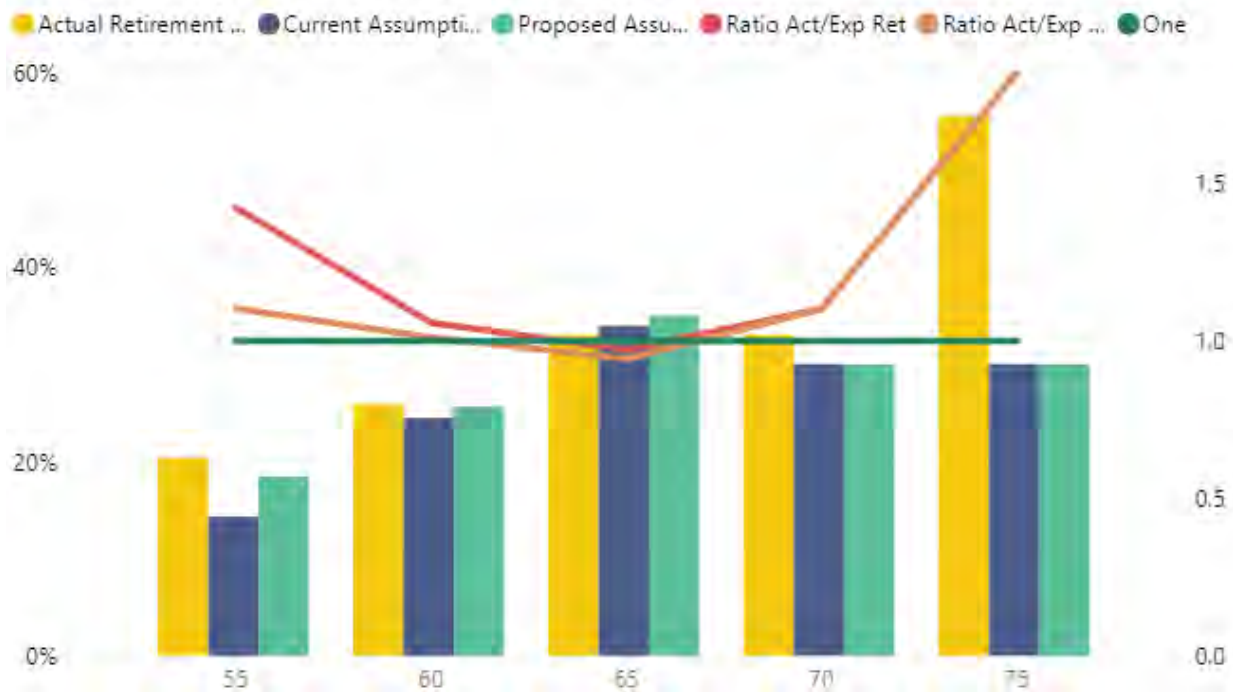
Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
55	1,768	1,090.5	5,853	30.21%	18.63%	1.62
56	686	523.8	4,361	15.73%	12.01%	1.31
57	626	478.8	3,894	16.08%	12.29%	1.31
58	557	445.8	3,461	16.09%	12.88%	1.25
59	551	403.2	3,010	18.31%	13.40%	1.37
60	475	355.2	2,538	18.72%	13.99%	1.34
61	491	399.2	2,108	23.29%	18.94%	1.23
62	591	686.2	1,636	36.12%	41.94%	0.86
63	315	316.3	1,054	29.89%	30.01%	1.00
64	213	214.5	715	29.79%	30.00%	0.99
65	133	189.7	474	28.06%	40.02%	0.70
66	130	101.2	337	38.58%	30.03%	1.28
67	72	59.5	198	36.36%	30.05%	1.21
68	43	36.9	123	34.96%	30.00%	1.17
69	21	23.1	77	27.27%	30.00%	0.91
70	20	15.9	53	37.74%	30.00%	1.26
71	9	8.4	28	32.14%	30.00%	1.07
72	5	5.4	18	27.78%	30.00%	0.93
73	3	3.3	11	27.27%	30.00%	0.91
74	2	2.4	8	25.00%	30.00%	0.83
75	1	0.9	3	33.33%	30.00%	1.11
76	1	0.6	2	50.00%	30.00%	1.67
77	1	0.6	2	50.00%	30.00%	1.67
78	1	0.3	1	100.00%	30.00%	3.33
79	1	0.3	1	100.00%	30.00%	3.33
Total	6,716	5,361.9	29,966	22.41%	17.89%	1.25

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
55	1,768	1,591.1	5,853	30.21%	27.18%	▲ 1.11
56	686	626.8	4,361	15.73%	14.37%	● 1.09
57	626	570.9	3,894	16.08%	14.66%	● 1.10
58	557	526.5	3,461	16.09%	15.21%	● 1.06
59	551	481.6	3,010	18.31%	16.00%	▲ 1.14
60	475	416.5	2,538	18.72%	16.41%	▲ 1.14
61	491	461.6	2,108	23.29%	21.90%	● 1.06
62	591	654.4	1,636	36.12%	40.00%	● 0.90
63	315	316.2	1,054	29.89%	30.00%	● 1.00
64	213	214.5	715	29.79%	30.00%	● 0.99
65	133	165.9	474	28.06%	35.00%	▲ 0.80
66	130	118.0	337	38.58%	35.00%	▲ 1.10
67	72	69.3	198	36.36%	35.00%	● 1.04
68	43	43.0	123	34.96%	35.00%	● 1.00
69	21	27.0	77	27.27%	35.00%	▲ 0.78
70	20	15.9	53	37.74%	30.00%	▲ 1.26
71	9	8.4	28	32.14%	30.00%	● 1.07
72	5	5.4	18	27.78%	30.00%	● 0.93
73	3	3.3	11	27.27%	30.00%	● 0.91
74	2	2.4	8	25.00%	30.00%	▲ 0.83
75	1	0.9	3	33.33%	30.00%	▲ 1.11
76	1	0.6	2	50.00%	30.00%	◆ 1.67
77	1	0.6	2	50.00%	30.00%	◆ 1.67
78	1	0.3	1	100.00%	30.00%	◆ 3.33
79	1	0.3	1	100.00%	30.00%	◆ 3.33
Total	6,716	6,321.3	29,966	22.41%	21.09%	● 1.06

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age

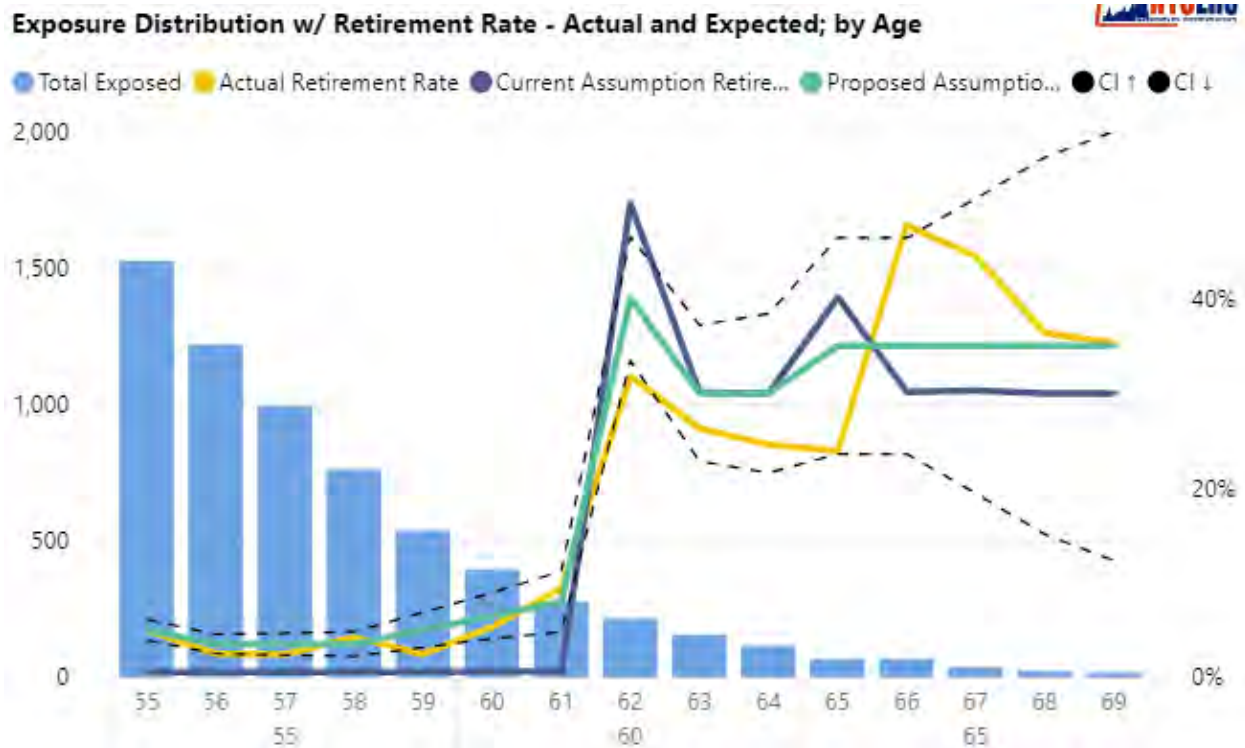


Retirement Rate - Actual, Expected, and Ratio; by Age



This chart shows the results of Transit Improved Plan members by age for the service range 5 to 24 years, which increased the assumed rate of retirement from 4.53% to 7.73% as compared to the actual rate of 6.83%. This resulted in a decrease in the A/E ratio from 1.51 to 0.88 for ages 55 to 69.

The increase in rates is primarily due to proposing reduced retirement rates used for General specialty plan members for early retirement rather than using withdrawal rates. For early retirement ages 55 to 61, the A/E ratio decreased from 6.96 to 0.87. For normal retirement ages 62 to 69, the A/E ratio increased from 0.83 to 0.90.



This chart shows the results of Transit Improved Plan members by age for the service range 25 to 39 years, which increased the assumed rate of retirement from 21.48% to 24.70% as compared to the actual rate of 26.60%. This resulted in a decrease in the A/E ratio from 1.24 to 1.08 for unreduced retirement ages 55 to 69.

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age



This chart shows the results of Transit Improved Plan members at first eligibility (55 and 25 or 62 and 20) by age, which increased the assumed rate of retirement from 26.57% to 32.69% as compared to the actual rate of 35.67%. This resulted in a decrease in the A/E ratio from 1.34 to 1.09.



Mandated Plan

The following table shows the experience of Transit members who were mandated into the plan for retirement by age, for the age range (55 to 79), and for the service range (5 to 39) for all plans and all types of retirement. The actual rate of retirement averaged 8.51% whereas the overall expected rate of retirement averaged 9.77% based on the current assumptions and 8.72% based on the proposed assumptions. This resulted in an increase in the A/E ratio from 0.87 to 0.98.

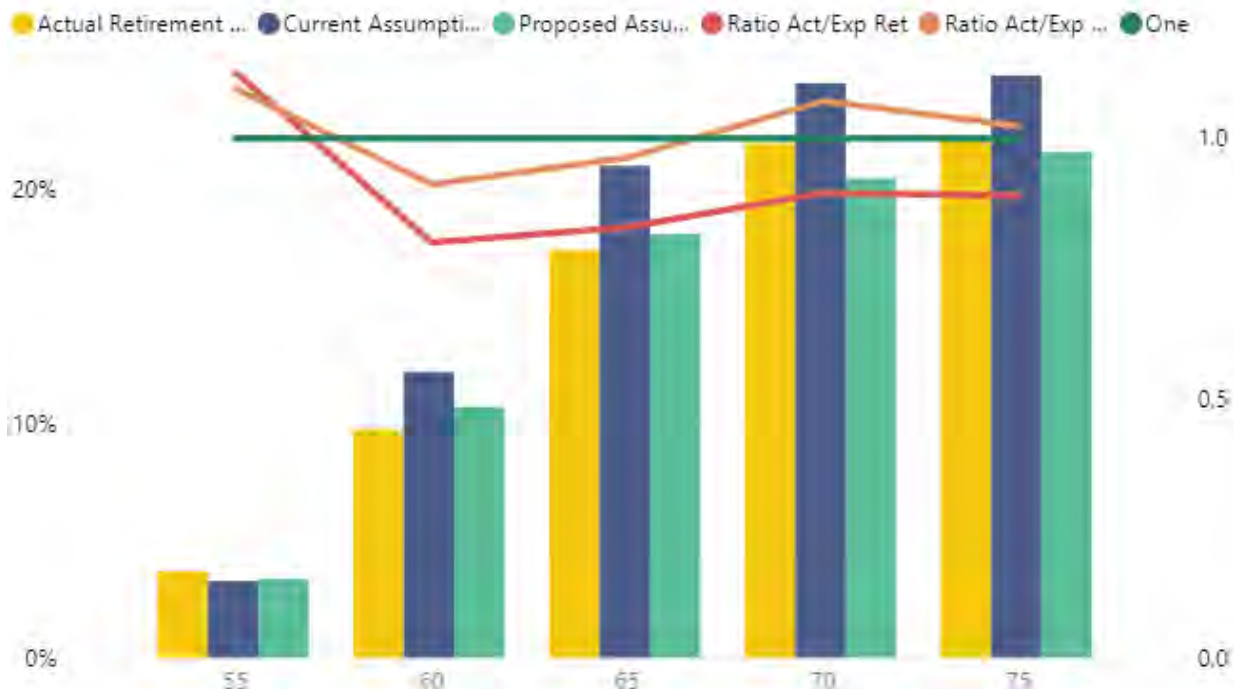
Age	Actual Retirements	Expected Retirements	Total Exposed	Actual Retirement Rate	Current Assumption Retirement	Ratio Act/Exp Ret
55	502	420.3	8,571	5.86%	4.90%	▲ 1.19
56	243	222.3	8,004	3.04%	2.78%	● 1.09
57	217	208.6	7,624	2.85%	2.74%	● 1.04
58	219	200.4	7,330	2.99%	2.73%	● 1.09
59	235	205.4	6,928	3.39%	2.97%	▲ 1.14
60	244	222.3	6,629	3.66%	3.35%	● 1.10
61	518	304.0	6,281	8.25%	4.84%	◆ 1.70
62	912	1,108.0	5,682	16.05%	19.50%	▲ 0.82
63	543	907.0	4,651	11.67%	19.50%	▲ 0.60
64	450	793.4	4,072	11.05%	19.48%	▲ 0.57
65	542	869.0	3,564	15.21%	24.38%	▲ 0.62
66	602	561.0	2,876	20.93%	19.51%	● 1.07
67	394	420.4	2,152	18.31%	19.53%	● 0.94
68	248	325.1	1,667	14.86%	19.50%	▲ 0.76
69	237	264.3	1,349	17.57%	19.59%	▲ 0.90
70	224	254.5	1,043	21.48%	24.40%	▲ 0.88
71	172	183.4	746	23.06%	24.58%	● 0.94
72	114	131.1	532	21.43%	24.64%	▲ 0.87
73	84	94.8	385	21.82%	24.63%	▲ 0.89
74	62	69.0	280	22.14%	24.66%	▲ 0.90
75	34	47.8	193	17.62%	24.75%	▲ 0.71
76	33	35.5	143	23.08%	24.83%	● 0.93
77	24	26.5	106	22.64%	25.00%	● 0.91
78	20	19.3	77	25.97%	25.00%	● 1.04
79	16	13.8	55	29.09%	25.00%	▲ 1.16
Total	6,889	7,907.1	80,940	8.51%	9.77%	▲ 0.87

Age	Actual Retirements	Expected Retirements Proposed	Total Exposed	Actual Retirement Rate	Proposed Assumption Retirement	Act/Exp Proposed Ret
55	502	434.0	8,571	5.86%	5.06%	▲ 1.16
56	243	227.5	8,004	3.04%	2.84%	● 1.07
57	217	214.6	7,624	2.85%	2.81%	● 1.01
58	219	206.9	7,330	2.99%	2.82%	● 1.06
59	235	209.4	6,928	3.39%	3.02%	▲ 1.12
60	244	214.5	6,629	3.68%	3.24%	▲ 1.14
61	518	508.2	6,281	8.25%	8.09%	● 1.02
62	912	1,037.9	5,682	16.05%	18.27%	▲ 0.88
63	543	622.4	4,651	11.67%	13.38%	▲ 0.87
64	450	542.9	4,072	11.05%	13.33%	▲ 0.83
65	542	648.7	3,564	15.21%	18.20%	▲ 0.84
66	602	522.7	2,876	20.93%	18.17%	▲ 1.15
67	394	386.6	2,152	18.31%	17.96%	● 1.02
68	248	297.8	1,667	14.88%	17.86%	▲ 0.83
69	237	246.2	1,349	17.57%	18.25%	● 0.96
70	224	208.7	1,043	21.48%	20.01%	● 1.07
71	172	152.1	746	23.06%	20.38%	▲ 1.13
72	114	110.1	532	21.43%	20.69%	● 1.04
73	84	81.7	385	21.82%	21.22%	● 1.03
74	62	59.5	280	22.14%	21.24%	● 1.04
75	34	41.2	193	17.62%	21.32%	▲ 0.83
76	33	30.6	143	23.08%	21.36%	● 1.08
77	24	23.1	106	22.64%	21.75%	● 1.04
78	20	16.9	77	25.97%	21.98%	▲ 1.18
79	16	12.4	55	29.09%	22.55%	▲ 1.29
Total	6,889	7,056.4	80,940	8.51%	8.72%	● 0.98

Exposure Distribution w/ Retirement Rate - Actual and Expected; by Age

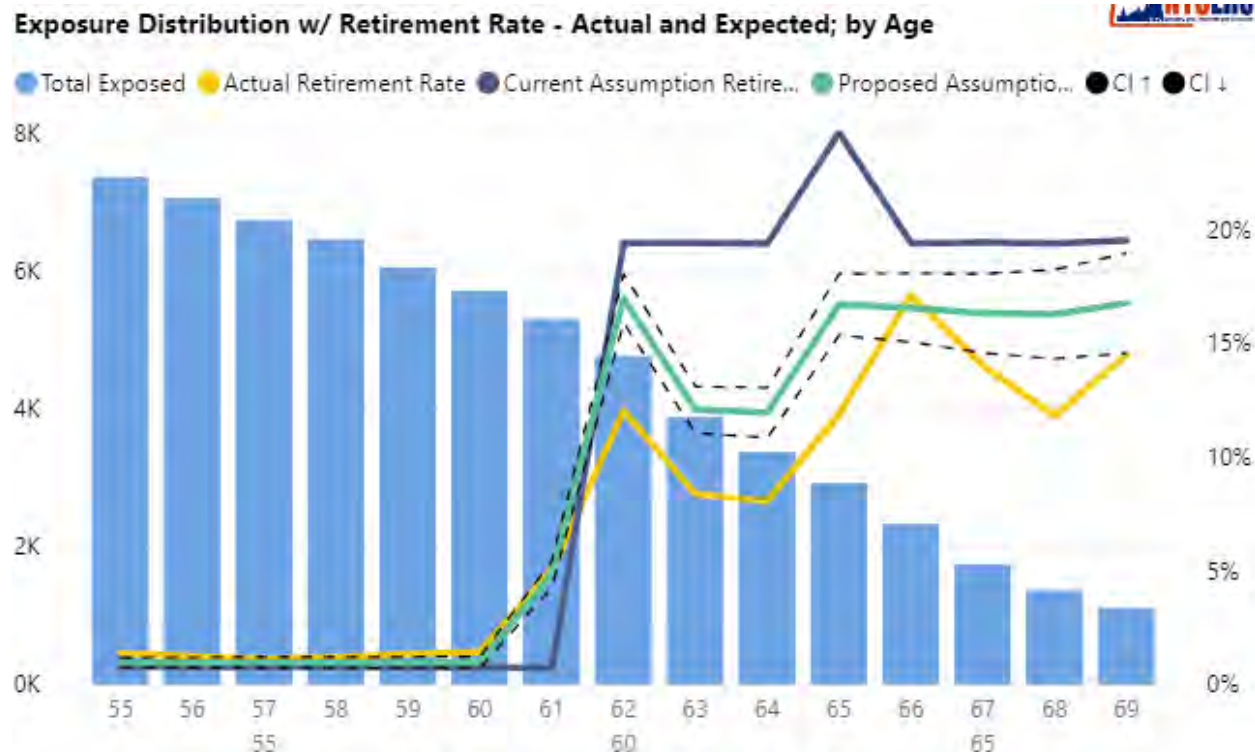


Retirement Rate - Actual, Expected, and Ratio; by Age



This chart shows the results of Transit Mandated Plan members by age for the service range 5 to 24 years, which decreased the assumed rate of retirement from 7.71% to 6.40% as compared to the actual rate of 5.54%. This resulted in an increase in the A/E ratio from 0.72 to 0.87 for ages 55 to 79.

Similar to the Improved Plan analysis, there was an increase in early retirement rates due to proposing reduced retirement rates used for General specialty plan members for early retirement rather than using withdrawal rates. For early retirement ages 55 to 61, the A/E ratio decreased from 2.30 to 1.21. For normal retirement ages 62 to 79, the A/E ratio increased from 0.61 to 0.81.



This chart shows the results of Transit Mandated Plan members by age for the service range 25 to 39 years, which increased the assumed rate of retirement from 21.48% to 21.92% as compared to the actual rate of 25.45%. This resulted in a decrease in the A/E ratio from 1.18 to 1.16 for unreduced retirement ages 55 to 79.



This chart shows the results of Transit Mandated Plan members at first eligibility (55 and 25 or 62 and 20) by age, which increased the assumed rate of retirement from 27.35% to 27.60% as compared to the actual rate of 28.31%. This resulted in no change in the A/E ratio at 1.03.



Summary

In total, the proposed rates of retirement have increased the anticipated number of retirements due to higher assumptions proposed for members with at least 20 years of service, especially for improved plan members, which increase the number of members retiring with a 2% benefit accrual. We believe this would lead to higher plan liabilities. This will be offset by lower assumptions for members retiring with less than 20 years of service. The actual impact will depend on the demographics of the active membership.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF SERVICE RETIREMENT: TRANSIT					
Age	Reduced Service Retirement	Unreduced Service Retirement For Members Mandated Into Their Retirement Program		Unreduced Service Retirement For Members Who Elected an Improved Retirement Program	
		Year 1	Ultimate	Year 1	Ultimate
50	0.00%	30.00%	15.00%	25.00%	15.00%
51	0.00%	30.00%	15.00%	25.00%	15.00%
52	0.00%	30.00%	15.00%	25.00%	15.00%
53	0.00%	30.00%	15.00%	25.00%	15.00%
54	0.00%	30.00%	15.00%	25.00%	15.00%
55	2.00%	30.00%	15.00%	25.00%	15.00%
56	2.00%	30.00%	15.00%	25.00%	15.00%
57	2.00%	30.00%	15.00%	25.00%	15.00%
58	2.00%	30.00%	15.00%	25.00%	15.00%
59	3.00%	30.00%	15.00%	25.00%	15.00%
60	4.00%	35.00%	15.00%	30.00%	15.00%
61	5.00%	45.00%	20.00%	40.00%	20.00%
62	0.00%	20.00%	20.00%	50.00%	40.00%
63	0.00%	20.00%	20.00%	40.00%	30.00%
64	0.00%	20.00%	20.00%	40.00%	30.00%
65	0.00%	25.00%	25.00%	50.00%	40.00%
66	0.00%	20.00%	20.00%	40.00%	30.00%
67	0.00%	20.00%	20.00%	40.00%	30.00%
68	0.00%	20.00%	20.00%	40.00%	30.00%
69	0.00%	20.00%	20.00%	40.00%	30.00%
70	0.00%	25.00%	25.00%	40.00%	30.00%
71	0.00%	25.00%	25.00%	40.00%	30.00%
72	0.00%	25.00%	25.00%	40.00%	30.00%
73	0.00%	25.00%	25.00%	40.00%	30.00%
74	0.00%	25.00%	25.00%	40.00%	30.00%
75	0.00%	25.00%	25.00%	40.00%	30.00%
76	0.00%	25.00%	25.00%	40.00%	30.00%
77	0.00%	25.00%	25.00%	40.00%	30.00%
78	0.00%	25.00%	25.00%	40.00%	30.00%
79	0.00%	25.00%	25.00%	40.00%	30.00%
80	N/A	100.00%	100.00%	100.00%	100.00%

¹ 5.00% only applies to Tier 6 members; 0.00% otherwise.

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: TRANSIT								
Age	Service Retirement For Members Mandated Into Their Retirement Program					Service Retirement For Members Who Elected An Improved Retirement Program		
	Reduced	< 10 YOS	10 - 19 YOS	First Eligibility ¹ >= 20 YOS	Ultimate >= 20 YOS	Reduced	First Eligibility ²	Ultimate
55	1.00%	N/A	N/A	30.00%	N/A	5.00%	35.00%	N/A
56	1.00%	N/A	N/A	25.00%	15.00%	3.50%	25.00%	17.50%
57	1.00%	N/A	N/A	25.00%	15.00%	3.50%	25.00%	17.50%
58	1.00%	N/A	N/A	25.00%	15.00%	3.50%	25.00%	17.50%
59	1.00%	N/A	N/A	25.00%	15.00%	5.00%	25.00%	17.50%
60	1.00%	N/A	N/A	25.00%	15.00%	6.50%	25.00%	17.50%
61 ³	5.00%	N/A	N/A	40.00%	20.00%	8.00%	40.00%	22.50%
62 ³	0.00%	12.00%	15.00%	25.00%	25.00%	0.00%	40.00%	40.00%
63 ³	0.00%	8.00%	10.00%	20.00%	20.00%	0.00%	30.00%	30.00%
64	0.00%	8.00%	10.00%	20.00%	20.00%	0.00%	30.00%	30.00%
65	0.00%	12.00%	15.00%	25.00%	25.00%	0.00%	35.00%	35.00%
66	0.00%	12.00%	15.00%	25.00%	25.00%	0.00%	35.00%	35.00%
67	0.00%	12.00%	15.00%	25.00%	25.00%	0.00%	35.00%	35.00%
68	0.00%	12.00%	15.00%	25.00%	25.00%	0.00%	35.00%	35.00%
69	0.00%	12.00%	15.00%	25.00%	25.00%	0.00%	35.00%	35.00%
70	0.00%	17.50%	17.50%	25.00%	25.00%	0.00%	30.00%	30.00%
71	0.00%	17.50%	17.50%	25.00%	25.00%	0.00%	30.00%	30.00%
72	0.00%	17.50%	17.50%	25.00%	25.00%	0.00%	30.00%	30.00%
73	0.00%	17.50%	17.50%	25.00%	25.00%	0.00%	30.00%	30.00%
74	0.00%	17.50%	17.50%	25.00%	25.00%	0.00%	30.00%	30.00%
75	0.00%	17.50%	17.50%	25.00%	25.00%	0.00%	30.00%	30.00%
76	0.00%	17.50%	17.50%	25.00%	25.00%	0.00%	30.00%	30.00%
77	0.00%	17.50%	17.50%	25.00%	25.00%	0.00%	30.00%	30.00%
78	0.00%	17.50%	17.50%	25.00%	25.00%	0.00%	30.00%	30.00%
79	0.00%	17.50%	17.50%	25.00%	25.00%	0.00%	30.00%	30.00%
80	N/A	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

¹ First eligibility rates for Transit Mandated Plan members apply at age 55 / 25 and age 62 / 20.

² First eligibility rates for Transit Improved Plan members apply at age 55 / 25 and age 62 / 5.

³ Refer to separate table of rates for Tier 6 members at ages 61 - 63

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF SERVICE RETIREMENT: TRANSIT				
Service Retirement for Tier 6 Members Mandated into Their Retirement Program at Selected Ages ¹				
Age	Reduced	< 20 YOS	First Eligibility ² ≥ 20 YOS	Ultimate ≥ 20 YOS
61	1.00%	N/A	25.00%	15.00%
62	5.00%	N/A	40.00%	20.00%
63	0.00%	15.00%	25.00%	25.00%

¹ This table only includes select ages 61 - 63. Please refer to primary table for rates at other ages.

² First eligibility rates for Transit Plan members apply at age 55 / 25 and age 63 / 20.

Disability

The current ordinary disability assumption varies by age but does not apply during the 10-year eligibility service period. Furthermore, a separate rate applies for accidental disability during all service periods. The ordinary and accidental disability benefit is equal to 1/60 times final average salary for each year of service accrued but no less than 1/3 of the member's final average salary. The benefit is payable during the lifetime of the member and members may select any optional forms of payment. For members who have accrued at least 20 years of service, the service retirement benefit is greater than the ordinary disability retirement benefit if the member has met the conditions for an unreduced retirement benefit.

Due to this fact, rates of ordinary disability were determined excluding the experience for members eligible for unreduced retirement and the 2% benefit accrual formula. Therefore, we propose the rates of ordinary disability do not apply upon attainment of age 62 and completion of 20 years of service or other criteria to receive an unreduced retirement benefit that varies by Plan (50 and 20 for TBTA Plan R members and 55 and 25 for Transit 55 and 25 Plan U members). If eligible for early retirement, we propose that the greater of the early retirement benefit and the ordinary disability retirement be valued.

In addition, the rates of ordinary disability would not apply during the 10-year eligibility service period.

In performing the experience analysis, it is necessary to reassign disability retirement codes retroactively to reflect the eventual approval of a disability retirement. Members with a disability code in a given year had all inactive status codes in prior years changed to a disability status code. Adjustments were made as far back as 2012.

It is difficult to determine how future years would impact the experience during the study period as we believe that this type of retroactive adjustment will be required in subsequent iterations of this study. The consequence will be a restatement of the number of disability retirements experienced during this study period, specifically 2019 – 2021.

For this purpose, our analysis reflected years from 2012 – 2019.

This analysis reflects the combined experience of TBTA and Transit members.

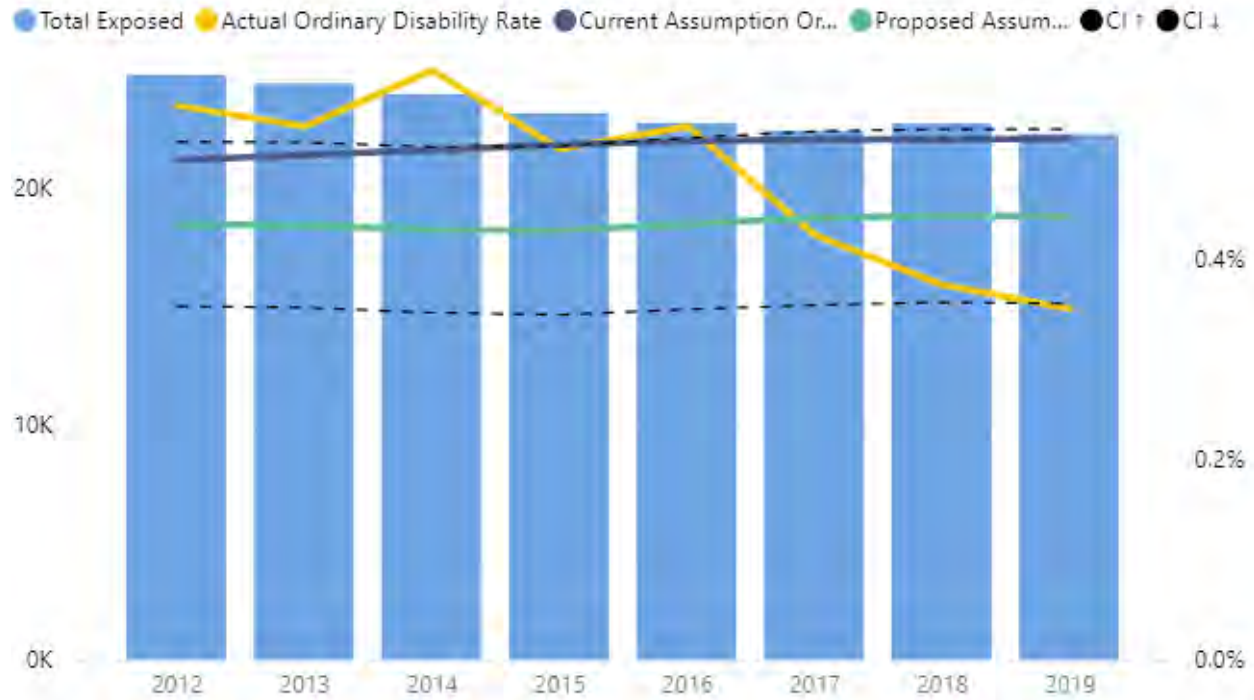
Ordinary Disability

The current ordinary disability assumption varies with age. The proposed assumption also varies by age as well as gender. The following table shows the experience for ordinary disability retirement by year, for the age range 30 to 69 and the service range 10 to 34. The actual rate of ordinary disability averaged 0.4850% whereas the overall expected rate of ordinary disability averaged 0.5120% based on the current assumptions and 0.4355% based on the proposed assumptions.

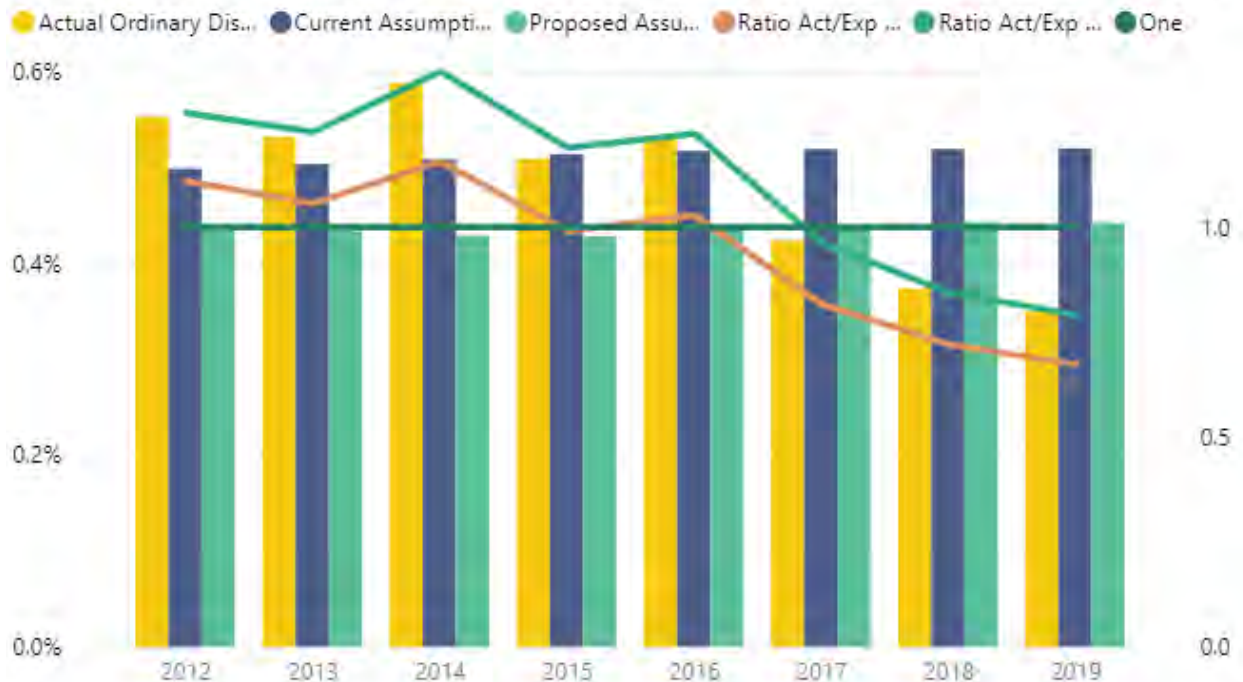
Plan Year	Actual Ordinary Disabilities	Expected Ordinary Disabilities	Total Exposed	Actual Ordinary Disability Rate	Current Assumption Ordinary Disability	Ratio Act/Exp Ordinary Disability
2012	137	123.5	24,793	0.5526%	0.4983%	▲ 1.11
2013	130	123.0	24,443	0.5318%	0.5033%	● 1.06
2014	141	121.9	23,979	0.5880%	0.5082%	▲ 1.16
2015	118	119.0	23,172	0.5092%	0.5137%	● 0.99
2016	121	117.7	22,756	0.5317%	0.5171%	● 1.03
2017	95	116.4	22,432	0.4235%	0.5189%	▲ 0.82
2018	85	118.0	22,745	0.3737%	0.5189%	▲ 0.72
2019	78	115.8	22,292	0.3499%	0.5196%	▲ 0.67
Total	905	955.4	186,612	0.4850%	0.5120%	● 0.95

Plan Year	Actual Ordinary Disabilities	Expected Ordinary Disabilities Proposed	Total Exposed	Actual Ordinary Disability Rate	Proposed Assumption Ordinary Disability	Act/Exp Proposed Ordinary Disability
2012	137	107.7	24,793	0.5526%	0.4344%	▲ 1.27
2013	130	105.9	24,443	0.5318%	0.4335%	▲ 1.23
2014	141	102.8	23,979	0.5880%	0.4288%	▲ 1.37
2015	118	99.2	23,172	0.5092%	0.4280%	▲ 1.19
2016	121	99.0	22,756	0.5317%	0.4348%	▲ 1.22
2017	95	98.7	22,432	0.4235%	0.4402%	● 0.96
2018	85	100.7	22,745	0.3737%	0.4428%	▲ 0.84
2019	78	98.6	22,292	0.3499%	0.4421%	▲ 0.79
Total	905	812.6	186,612	0.4850%	0.4355%	▲ 1.11

Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Year



Ordinary Disability Rate - Actual, Expected, and Ratio; by Year



The following chart shows the actual experience by gender versus the proposed assumption. As the experience varied by gender, separate tables are proposed.

Actual vs. Expected - Ordinary Disability Proposed w/ Exposure Bubbles; by Year



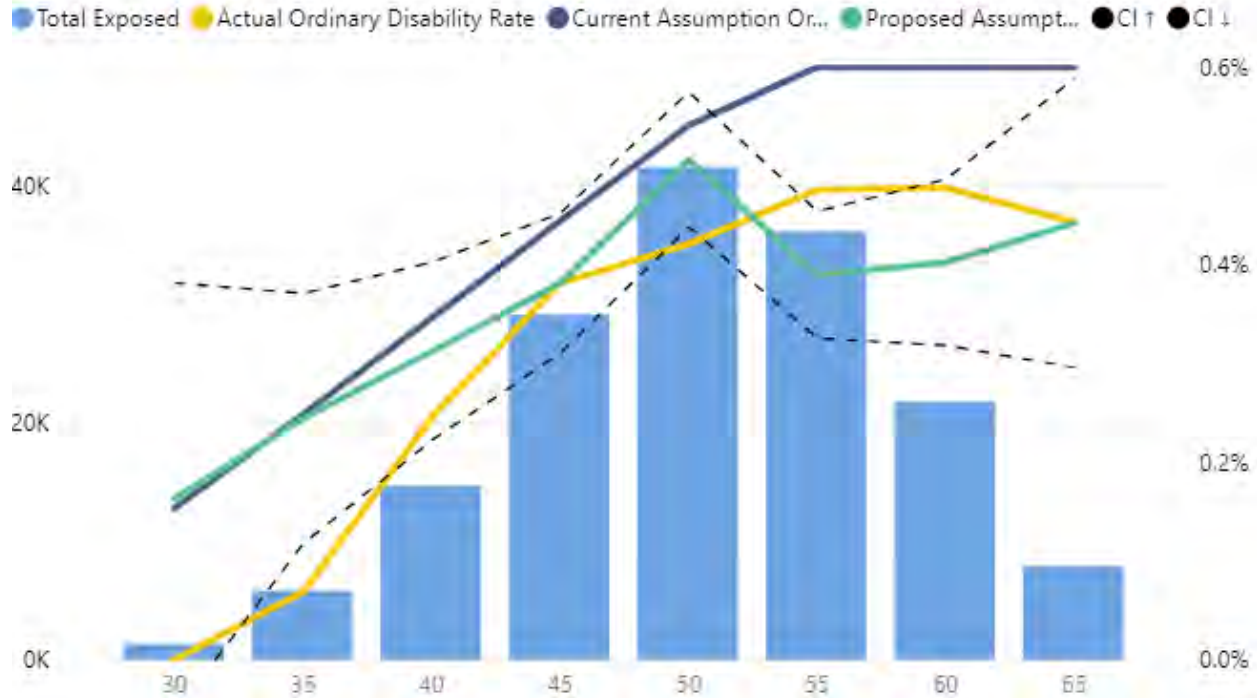
Males

The following table shows the experience of male members for ordinary disability retirement by age, for the age range 30 to 69 and the service range 10 to 34 for the period 2012 – 2019. The actual rate of ordinary disability averaged 0.4023% whereas the overall expected rate of ordinary disability averaged 0.5157% based on the current assumptions and 0.4087% based on the proposed assumptions. This resulted in an increase in the A/E ratio from 0.78 to 0.98.

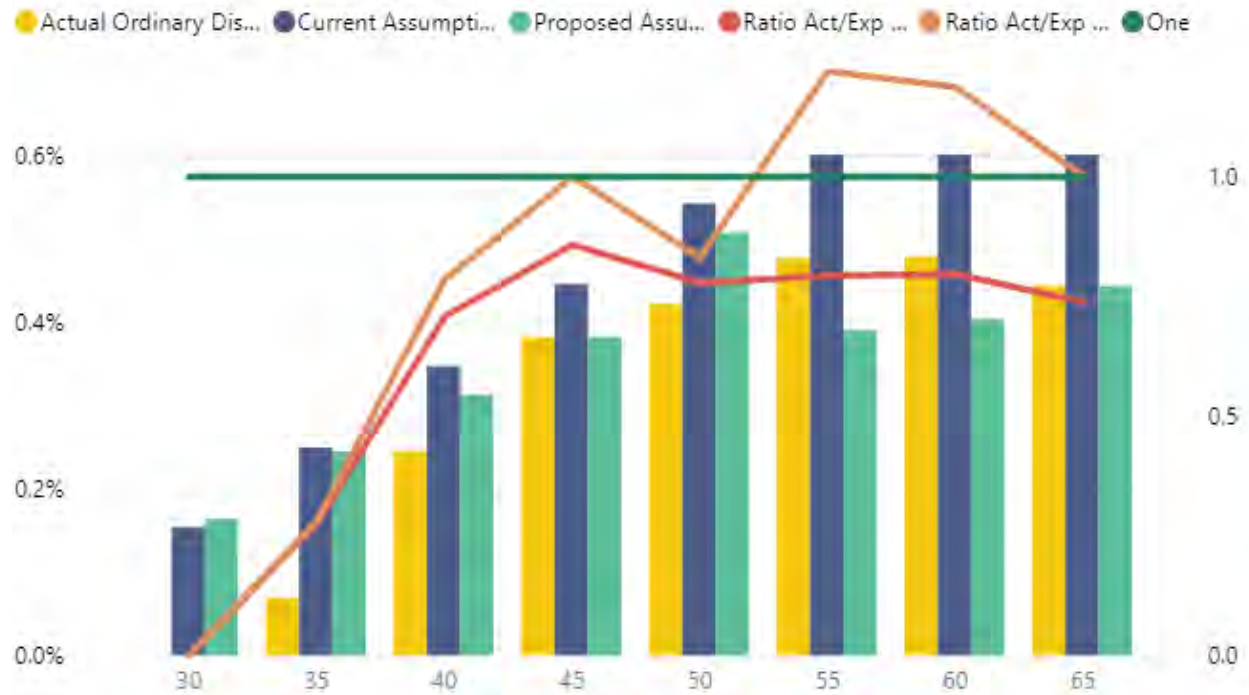
Age	Actual Ordinary Disabilities	Expected Ordinary Disabilities	Total Exposed	Actual Ordinary Disability Rate	Current Assumption Ordinary Disability	Ratio Act/Exp Ordinary Disability
30	0	0.1	133	0.0000%	0.1000%	0.00
31	0	0.2	156	0.0000%	0.1200%	0.00
32	0	0.3	217	0.0000%	0.1400%	0.00
33	0	0.5	319	0.0000%	0.1600%	0.00
34	0	0.9	494	0.0000%	0.1800%	0.00
35	0	1.4	677	0.0000%	0.2000%	0.00
36	0	2.0	892	0.0000%	0.2200%	0.00
37	1	2.7	1,142	0.0876%	0.2400%	0.36
38	0	3.7	1,404	0.0000%	0.2600%	0.00
39	3	4.8	1,712	0.1752%	0.2800%	0.63
40	8	6.2	2,066	0.3872%	0.3000%	1.29
41	9	7.9	2,473	0.3639%	0.3200%	1.14
42	7	9.9	2,925	0.2393%	0.3400%	0.70
43	4	12.1	3,370	0.1187%	0.3600%	0.33
44	8	14.7	3,861	0.2072%	0.3800%	0.55
45	14	17.8	4,461	0.3138%	0.4000%	0.78
46	27	21.8	5,180	0.5212%	0.4200%	1.24
47	12	25.5	5,800	0.2069%	0.4400%	0.47
48	27	30.0	6,529	0.4135%	0.4600%	0.90
49	31	34.3	7,143	0.4340%	0.4800%	0.90
50	32	38.6	7,723	0.4143%	0.5000%	0.83
51	33	42.2	8,109	0.4070%	0.5200%	0.78
52	43	46.1	8,536	0.5037%	0.5400%	0.93
53	33	48.8	8,718	0.3785%	0.5600%	0.68
54	34	49.2	8,487	0.4006%	0.5800%	0.69
55	20	52.9	8,817	0.2268%	0.6000%	0.38
56	31	45.4	7,562	0.4099%	0.6000%	0.68
57	32	42.3	7,043	0.4544%	0.6000%	0.76
58	52	39.8	6,638	0.7834%	0.6000%	1.31
59	37	36.6	6,094	0.6072%	0.6000%	1.01
60	31	33.9	5,642	0.5495%	0.6000%	0.92
61	24	31.2	5,205	0.4611%	0.6000%	0.77
62	24	27.0	4,504	0.5329%	0.6000%	0.89
63	15	20.9	3,489	0.4299%	0.6000%	0.72
64	10	17.5	2,919	0.3426%	0.6000%	0.57
65	13	14.7	2,453	0.5300%	0.6000%	0.88
66	10	12.0	1,999	0.5003%	0.6000%	0.83
67	3	8.9	1,479	0.2028%	0.6000%	0.34
68	6	6.6	1,104	0.5435%	0.6000%	0.91
69	3	5.2	868	0.3456%	0.6000%	0.58
Total	637	816.6	158,343	0.4023%	0.5157%	0.78

Age	Actual Ordinary Disabilities	Expected Ordinary Disabilities Proposed	Total Exposed	Actual Ordinary Disability Rate	Proposed Assumption Ordinary Disability	Act/Exp Proposed Ordinary Disability
30	0	0.1	133	0.0000%	0.1100%	0.00
31	0	0.2	156	0.0000%	0.1300%	0.00
32	0	0.3	217	0.0000%	0.1500%	0.00
33	0	0.5	319	0.0000%	0.1700%	0.00
34	0	0.9	494	0.0000%	0.1900%	0.00
35	0	1.4	677	0.0000%	0.2100%	0.00
36	0	2.0	892	0.0000%	0.2240%	0.00
37	1	2.7	1,142	0.0876%	0.2380%	0.37
38	0	3.5	1,404	0.0000%	0.2520%	0.00
39	3	4.6	1,712	0.1752%	0.2660%	0.66
40	8	5.8	2,066	0.3872%	0.2800%	1.38
41	9	7.3	2,473	0.3639%	0.2940%	1.24
42	7	9.0	2,925	0.2393%	0.3080%	0.78
43	4	10.9	3,370	0.1187%	0.3220%	0.37
44	8	13.0	3,861	0.2072%	0.3360%	0.62
45	14	15.6	4,461	0.3138%	0.3500%	0.90
46	27	18.9	5,180	0.5212%	0.3640%	1.43
47	12	21.9	5,800	0.2069%	0.3780%	0.55
48	27	25.6	6,529	0.4135%	0.3920%	1.05
49	31	29.0	7,143	0.4340%	0.4060%	1.07
50	32	32.6	7,723	0.4143%	0.4227%	0.98
51	33	37.7	8,109	0.4070%	0.4646%	0.88
52	43	43.1	8,536	0.5037%	0.5051%	1.00
53	33	47.5	8,718	0.3785%	0.5449%	0.69
54	34	49.6	8,487	0.4006%	0.5845%	0.69
55	20	30.0	8,817	0.2268%	0.3406%	0.67
56	31	29.0	7,562	0.4099%	0.3829%	1.07
57	32	28.2	7,043	0.4544%	0.4005%	1.13
58	52	27.7	6,638	0.7834%	0.4170%	1.88
59	37	26.0	6,094	0.6072%	0.4270%	1.42
60	31	25.2	5,642	0.5495%	0.4467%	1.23
61	24	24.2	5,205	0.4611%	0.4648%	0.99
62	24	14.3	4,504	0.5329%	0.3182%	1.67
63	15	12.4	3,489	0.4299%	0.3548%	1.21
64	10	11.4	2,919	0.3426%	0.3921%	0.87
65	13	10.1	2,453	0.5300%	0.4132%	1.28
66	10	8.6	1,999	0.5003%	0.4298%	1.16
67	3	6.8	1,479	0.2028%	0.4619%	0.44
68	6	5.3	1,104	0.5435%	0.4804%	1.13
69	3	4.1	868	0.3456%	0.4700%	0.74
Total	637	647.2	158,343	0.4023%	0.4087%	0.98

Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Age



Ordinary Disability Rate - Actual, Expected, and Ratio; by Age



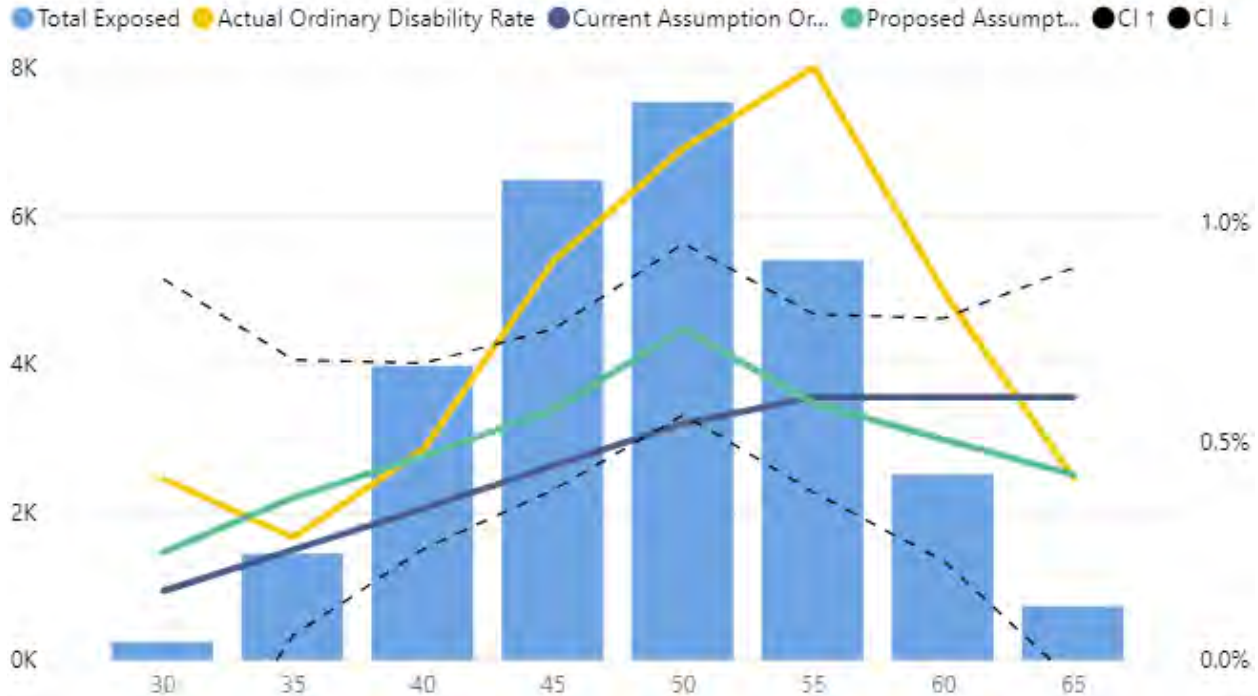
Females

The following table shows the experience of female members for ordinary disability retirement by age, for the age range 30 to 69 and the service range 10 to 34 for the period 2012 – 2019. The actual rate of ordinary disability averaged 0.9480% whereas the overall expected rate of ordinary disability averaged 0.4908% based on the current assumptions and 0.5852% based on the proposed assumptions. This resulted in a decrease in the A/E ratio from 1.93 to 1.62.

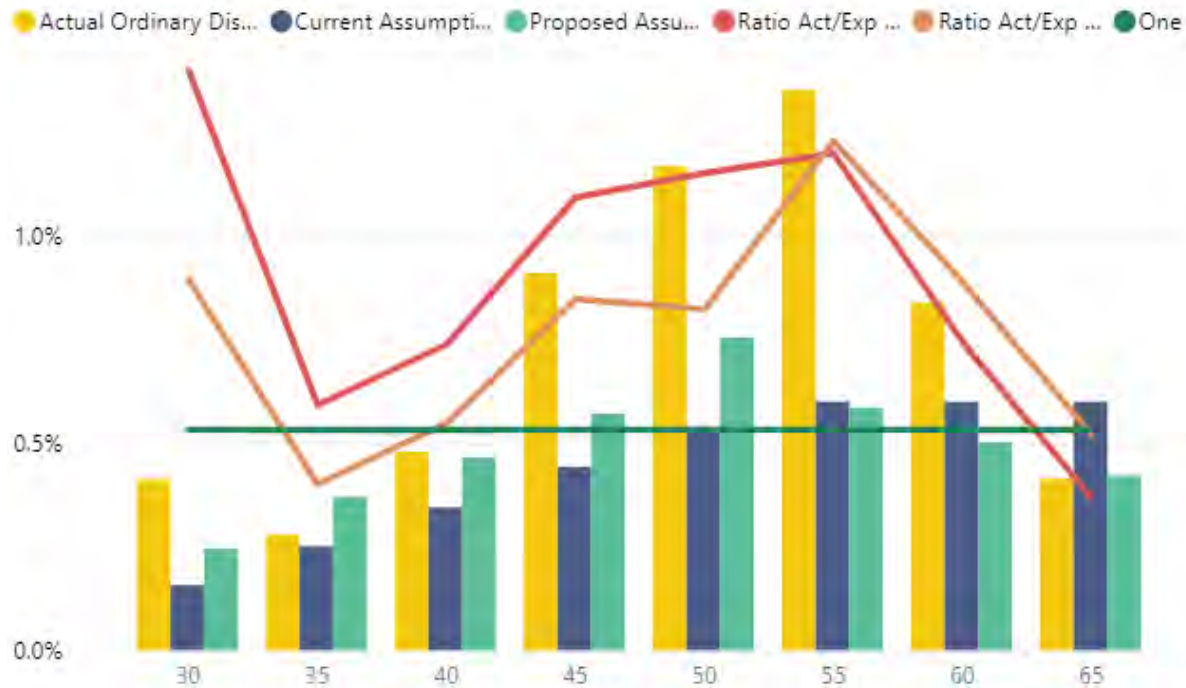
Age	Actual Ordinary Disabilities	Expected Ordinary Disabilities	Total Exposed	Actual Ordinary Disability Rate	Current Assumption Ordinary Disability	Ratio Act/Exp Ordinary Disability
30	0	0.0	15	0.0000%	0.1000%	0.00
31	0	0.0	22	0.0000%	0.1200%	0.00
32	0	0.1	43	0.0000%	0.1400%	0.00
33	1	0.1	66	1.5152%	0.1600%	9.47
34	0	0.2	96	0.0000%	0.1800%	0.00
35	0	0.3	145	0.0000%	0.2000%	0.00
36	0	0.4	195	0.0000%	0.2200%	0.00
37	1	0.7	275	0.3636%	0.2400%	1.52
38	2	0.9	363	0.5510%	0.2600%	2.12
39	1	1.3	455	0.2198%	0.2800%	0.78
40	2	1.7	575	0.3478%	0.3000%	1.16
41	3	2.2	694	0.4323%	0.3200%	1.35
42	6	2.7	802	0.7481%	0.3400%	2.20
43	5	3.3	906	0.5519%	0.3600%	1.53
44	3	3.7	986	0.3043%	0.3800%	0.80
45	11	4.3	1,080	1.0185%	0.4000%	2.55
46	9	5.0	1,183	0.7608%	0.4200%	1.81
47	8	5.8	1,321	0.6056%	0.4400%	1.38
48	18	6.6	1,433	1.2561%	0.4600%	2.73
49	13	7.0	1,462	0.8892%	0.4800%	1.85
50	18	7.6	1,520	1.1842%	0.5000%	2.37
51	20	7.7	1,490	1.3423%	0.5200%	2.58
52	20	8.3	1,528	1.3089%	0.5400%	2.42
53	17	8.7	1,554	1.0940%	0.5600%	1.95
54	13	8.3	1,438	0.9040%	0.5800%	1.56
55	21	8.6	1,428	1.4706%	0.6000%	2.45
56	12	6.9	1,157	1.0372%	0.6000%	1.73
57	16	6.3	1,052	1.5209%	0.6000%	2.53
58	19	5.6	926	2.0518%	0.6000%	3.42
59	5	5.0	833	0.6002%	0.6000%	1.00
60	9	4.4	729	1.2346%	0.6000%	2.06
61	6	3.7	617	0.9724%	0.6000%	1.62
62	5	3.1	513	0.9747%	0.6000%	1.62
63	0	2.1	350	0.0000%	0.6000%	0.00
64	1	1.8	293	0.3413%	0.6000%	0.57
65	2	1.4	239	0.8368%	0.6000%	1.39
66	0	1.1	182	0.0000%	0.6000%	0.00
67	1	0.8	134	0.7463%	0.6000%	1.24
68	0	0.6	98	0.0000%	0.6000%	0.00
69	0	0.4	71	0.0000%	0.6000%	0.00
Total	268	138.7	28,269	0.9480%	0.4908%	1.93

Age	Actual Ordinary Disabilities	Expected Ordinary Disabilities Proposed	Total Exposed	Actual Ordinary Disability Rate	Proposed Assumption Ordinary Disability	Act/Exp Proposed Ordinary Disability
30	0	0.0	15	0.0000%	0.1600%	◆ 0.00
31	0	0.0	22	0.0000%	0.1900%	◆ 0.00
32	0	0.1	43	0.0000%	0.2200%	◆ 0.00
33	1	0.2	66	1.5152%	0.2500%	◆ 6.06
34	0	0.3	96	0.0000%	0.2800%	◆ 0.00
35	0	0.4	145	0.0000%	0.3100%	◆ 0.00
36	0	0.7	195	0.0000%	0.3400%	◆ 0.00
37	1	1.0	275	0.3636%	0.3600%	● 1.01
38	2	1.4	363	0.5510%	0.3800%	▲ 1.45
39	1	1.8	455	0.2198%	0.4000%	▲ 0.55
40	2	2.4	575	0.3478%	0.4200%	▲ 0.83
41	3	3.1	694	0.4323%	0.4400%	● 0.98
42	6	3.7	802	0.7481%	0.4600%	◆ 1.63
43	5	4.3	906	0.5519%	0.4800%	▲ 1.15
44	3	4.9	986	0.3043%	0.5000%	▲ 0.61
45	11	5.6	1,080	1.0185%	0.5200%	◆ 1.96
46	9	6.5	1,183	0.7608%	0.5500%	▲ 1.38
47	8	7.5	1,321	0.6056%	0.5700%	● 1.06
48	18	8.5	1,433	1.2561%	0.5900%	◆ 2.13
49	13	8.9	1,462	0.8892%	0.6100%	▲ 1.46
50	18	9.6	1,520	1.1842%	0.6307%	◆ 1.88
51	20	10.4	1,490	1.3423%	0.6962%	◆ 1.93
52	20	11.6	1,528	1.3089%	0.7570%	◆ 1.73
53	17	12.7	1,554	1.0940%	0.8174%	▲ 1.34
54	13	12.6	1,438	0.9040%	0.8776%	● 1.03
55	21	7.5	1,428	1.4706%	0.5257%	◆ 2.80
56	12	6.6	1,157	1.0372%	0.5736%	◆ 1.81
57	16	6.4	1,052	1.5209%	0.6067%	◆ 2.51
58	19	5.8	926	2.0518%	0.6253%	◆ 3.28
59	5	5.3	833	0.6002%	0.6327%	● 0.95
60	9	4.6	729	1.2346%	0.6296%	◆ 1.96
61	6	3.7	617	0.9724%	0.5948%	◆ 1.63
62	5	1.9	513	0.9747%	0.3645%	◆ 2.67
63	0	1.3	350	0.0000%	0.3686%	◆ 0.00
64	1	1.2	293	0.3413%	0.3925%	▲ 0.87
65	2	1.0	239	0.8368%	0.4017%	◆ 2.08
66	0	0.8	182	0.0000%	0.4615%	◆ 0.00
67	1	0.6	134	0.7463%	0.4478%	◆ 1.67
68	0	0.4	98	0.0000%	0.3776%	◆ 0.00
69	0	0.3	71	0.0000%	0.4085%	◆ 0.00
Total	268	165.4	28,269	0.9480%	0.5852%	◆ 1.62

Exposure Distribution w/ Ordinary Disability Rate - Actual and Expected; by Age



Ordinary Disability Rate - Actual, Expected, and Ratio; by Age



Summary

Retirement eligibility and the change in the benefit accrual rate upon completing 20 years of service have a significant impact on the number of members who apply for disability retirement. By eliminating rates of ordinary disability retirement at these criteria, we believe it will increase plan liabilities. On the other hand, the proposed assumptions decreased the anticipated number of ordinary disability retirements. Overall, we believe this would result in a decrease in plan liabilities. The actual impact will depend on the demographics of the active membership.

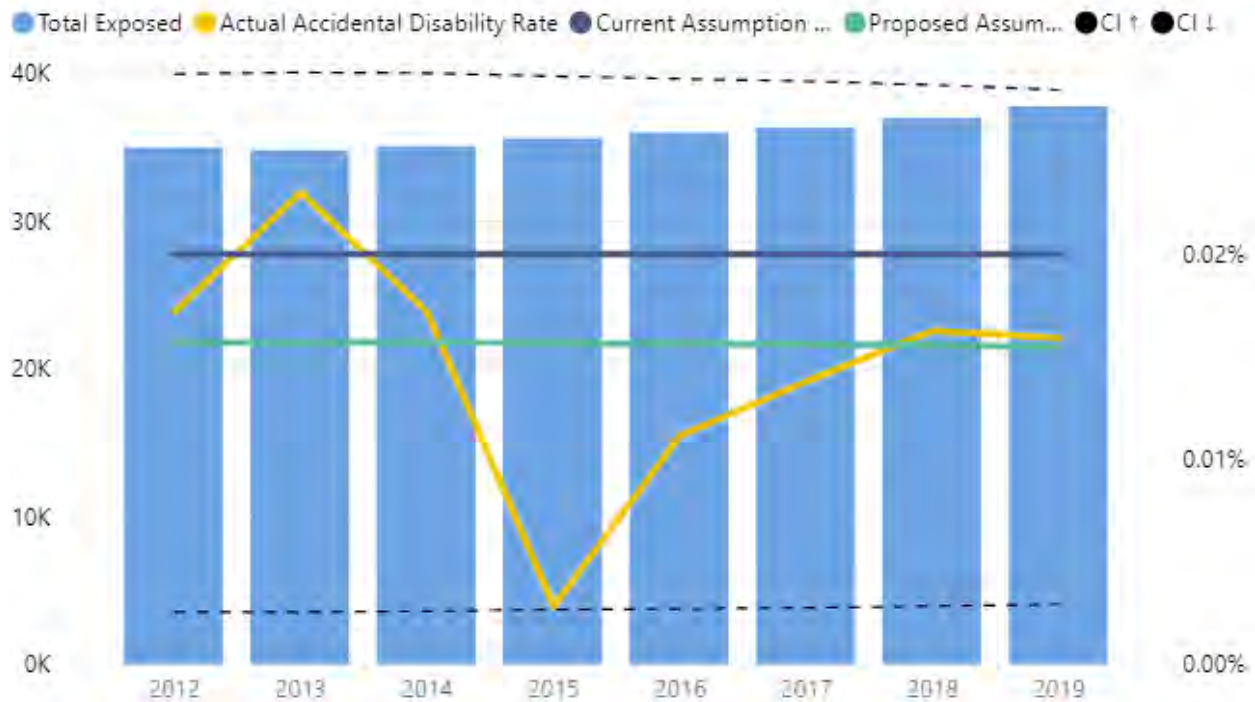
Accidental Disability

The current accidental assumption is a single rate that applies to all ages. The proposed assumption varies by age. The following table shows the experience for accidental disability retirement by year, for the age range 30 to 69 and the service range 0 to 34. The actual rate of accidental disability averaged 0.0146% whereas the overall expected rate of accidental disability averaged 0.0200% based on the current assumptions and 0.0156% based on the proposed assumptions.

Plan Year	Actual Accidental Disabilities	Expected Accidental Disabilities	Total Exposed	Actual Accidental Disability Rate	Current Assumption Accidental Disability	Ratio Act/Exp Accidental Disability
2012	6	7.0	34,926	0.0172%	0.0200%	▲ 0.86
2013	8	6.9	34,750	0.0230%	0.0200%	▲ 1.15
2014	6	7.0	35,003	0.0171%	0.0200%	▲ 0.86
2015	1	7.1	35,535	0.0028%	0.0200%	◆ 0.14
2016	4	7.2	35,923	0.0111%	0.0200%	▲ 0.56
2017	5	7.3	36,276	0.0138%	0.0200%	▲ 0.69
2018	6	7.4	36,909	0.0163%	0.0200%	▲ 0.81
2019	6	7.5	37,706	0.0159%	0.0200%	▲ 0.80
Total	42	57.4	287,028	0.0146%	0.0200%	▲ 0.73

Plan Year	Actual Accidental Disabilities	Expected Accidental Disabilities Proposed	Total Exposed	Actual Accidental Disability Rate	Proposed Assumption Accidental Disability	Act/Exp Proposed Accidental Disability
2012	6	5.5	34,926	0.0172%	0.0157%	● 1.10
2013	8	5.5	34,750	0.0230%	0.0157%	▲ 1.47
2014	6	5.5	35,003	0.0171%	0.0157%	● 1.09
2015	1	5.6	35,535	0.0028%	0.0157%	◆ 0.18
2016	4	5.6	35,923	0.0111%	0.0156%	▲ 0.71
2017	5	5.7	36,276	0.0138%	0.0156%	▲ 0.88
2018	6	5.7	36,909	0.0163%	0.0155%	● 1.05
2019	6	5.8	37,706	0.0159%	0.0155%	● 1.03
Total	42	44.8	287,028	0.0146%	0.0156%	● 0.94

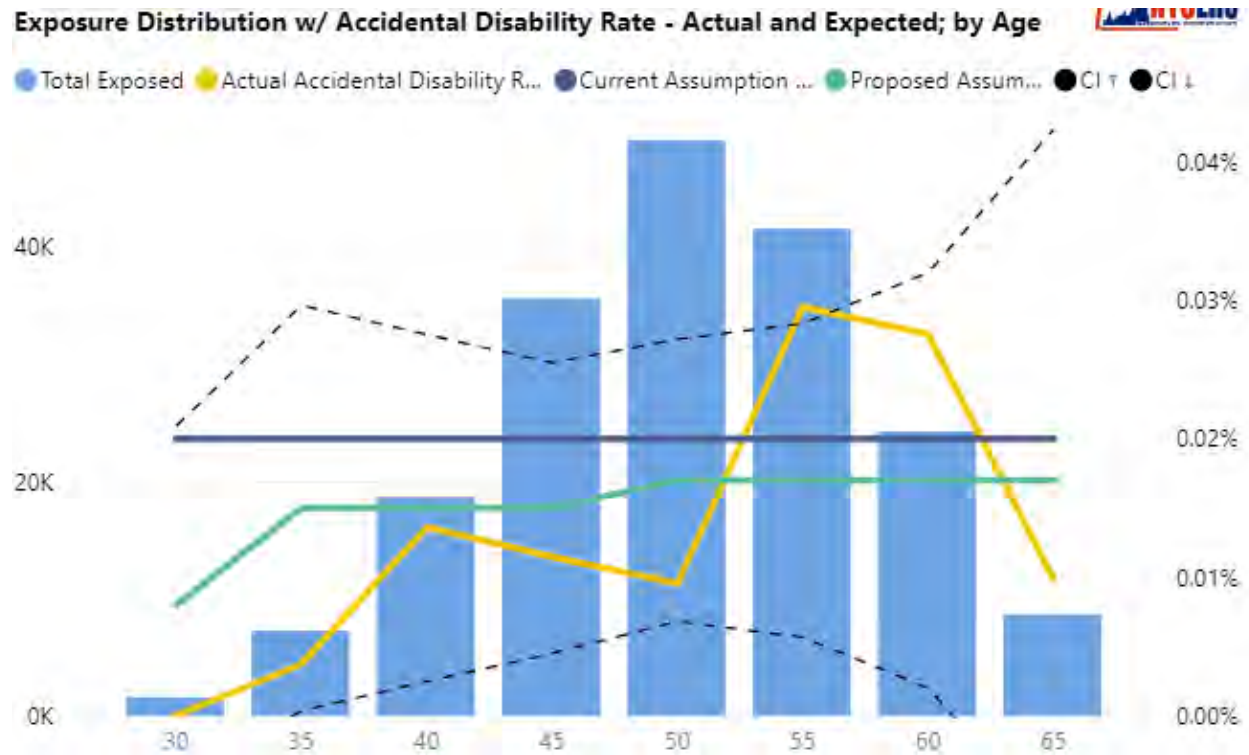
Exposure Distribution w/ Accidental Disability Rate - Actual and Expected; by Year



Accidental Disability Rate - Actual, Expected, and Ratio; by Year



This chart shows the results by age for the age range 30 to 69 and the service range 0 to 34. This resulted in an increase in the A/E ratio from 0.73 to 0.94.



Summary

The proposed rates have decreased the anticipated number of accidental disability retirements, which will result in a decrease in plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF DISABILITY FOR ACTIVE MEMBERS: OTHERS				
	TBTA		Transit	
Age	Ordinary Disability	Accidental Disability	Ordinary Disability	Accidental Disability
15	0.100%	0.020%	0.100%	0.020%
16	0.100%	0.020%	0.100%	0.020%
17	0.100%	0.020%	0.100%	0.020%
18	0.100%	0.020%	0.100%	0.020%
19	0.100%	0.020%	0.100%	0.020%
20	0.100%	0.020%	0.100%	0.020%
21	0.100%	0.020%	0.100%	0.020%
22	0.100%	0.020%	0.100%	0.020%
23	0.100%	0.020%	0.100%	0.020%
24	0.100%	0.020%	0.100%	0.020%
25	0.100%	0.020%	0.100%	0.020%
26	0.100%	0.020%	0.100%	0.020%
27	0.100%	0.020%	0.100%	0.020%
28	0.100%	0.020%	0.100%	0.020%
29	0.100%	0.020%	0.100%	0.020%
30	0.100%	0.020%	0.100%	0.020%
31	0.120%	0.020%	0.120%	0.020%
32	0.140%	0.020%	0.140%	0.020%
33	0.160%	0.020%	0.160%	0.020%
34	0.180%	0.020%	0.180%	0.020%
35	0.200%	0.020%	0.200%	0.020%
36	0.220%	0.020%	0.220%	0.020%
37	0.240%	0.020%	0.240%	0.020%
38	0.260%	0.020%	0.260%	0.020%
39	0.280%	0.020%	0.280%	0.020%
40	0.300%	0.020%	0.300%	0.020%
41	0.320%	0.020%	0.320%	0.020%
42	0.340%	0.020%	0.340%	0.020%
43	0.360%	0.020%	0.360%	0.020%
44	0.380%	0.020%	0.380%	0.020%
45	0.400%	0.020%	0.400%	0.020%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF DISABILITY FOR ACTIVE MEMBERS: OTHERS				
	TBTA		Transit	
Age	Ordinary Disability	Accidental Disability	Ordinary Disability	Accidental Disability
46	0.420%	0.020%	0.420%	0.020%
47	0.440%	0.020%	0.440%	0.020%
48	0.460%	0.020%	0.460%	0.020%
49	0.480%	0.020%	0.480%	0.020%
50	0.500%	0.020%	0.500%	0.020%
51	0.520%	0.020%	0.520%	0.020%
52	0.540%	0.020%	0.540%	0.020%
53	0.560%	0.020%	0.560%	0.020%
54	0.580%	0.020%	0.580%	0.020%
55	0.600%	0.020%	0.600%	0.020%
56	0.600%	0.020%	0.600%	0.020%
57	0.600%	0.020%	0.600%	0.020%
58	0.600%	0.020%	0.600%	0.020%
59	0.600%	0.020%	0.600%	0.020%
60	0.600%	0.020%	0.600%	0.020%
61	0.600%	0.020%	0.600%	0.020%
62	0.600%	0.020%	0.600%	0.020%
63	0.600%	0.020%	0.600%	0.020%
64	0.600%	0.020%	0.600%	0.020%
65	0.600%	0.020%	0.600%	0.020%
66	0.600%	0.020%	0.600%	0.020%
67	0.600%	0.020%	0.600%	0.020%
68	0.600%	0.020%	0.600%	0.020%
69	0.600%	0.020%	0.600%	0.020%
70	0.600%	0.020%	0.600%	0.020%
71	0.600%	0.020%	0.600%	0.020%
72	0.600%	0.020%	0.600%	0.020%
73	0.600%	0.020%	0.600%	0.020%
74	0.600%	0.020%	0.600%	0.020%
75	0.600%	0.020%	0.600%	0.020%
76	0.600%	0.020%	0.600%	0.020%
77	0.600%	0.020%	0.600%	0.020%
78	0.600%	0.020%	0.600%	0.020%
79	0.600%	0.020%	0.600%	0.020%
80	N/A	N/A	N/A	N/A

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF DISABILITY RETIREMENT ¹ : TRANSIT AND TBTA			
	Ordinary Disability ²		Accidental Disability
Age	Males	Females	Unisex
20	0.100%	0.020%	0.008%
21	0.100%	0.020%	0.008%
22	0.100%	0.020%	0.008%
23	0.100%	0.020%	0.008%
24	0.100%	0.020%	0.008%
25	0.100%	0.020%	0.008%
26	0.100%	0.020%	0.008%
27	0.100%	0.020%	0.008%
28	0.100%	0.020%	0.008%
29	0.100%	0.020%	0.008%
30	0.110%	0.160%	0.008%
31	0.130%	0.190%	0.008%
32	0.150%	0.220%	0.008%
33	0.170%	0.250%	0.008%
34	0.190%	0.280%	0.008%
35	0.210%	0.310%	0.015%
36	0.224%	0.340%	0.015%
37	0.238%	0.360%	0.015%
38	0.252%	0.380%	0.015%
39	0.266%	0.400%	0.015%
40	0.280%	0.420%	0.015%
41	0.294%	0.440%	0.015%
42	0.308%	0.460%	0.015%
43	0.322%	0.480%	0.015%
44	0.336%	0.500%	0.015%
45	0.350%	0.520%	0.015%
46	0.364%	0.550%	0.015%
47	0.378%	0.570%	0.015%
48	0.392%	0.590%	0.015%
49	0.406%	0.610%	0.015%
50	0.426%	0.640%	0.017%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF DISABILITY RETIREMENT ¹ : TRANSIT AND TBTA			
	Ordinary Disability ²		Accidental Disability
Age	Males	Females	Unisex
51	0.466%	0.700%	0.017%
52	0.506%	0.760%	0.017%
53	0.546%	0.820%	0.017%
54	0.586%	0.880%	0.017%
55	0.606%	0.910%	0.017%
56	0.626%	0.940%	0.017%
57	0.646%	0.970%	0.017%
58	0.666%	1.000%	0.017%
59	0.686%	1.000%	0.017%
60	0.706%	1.000%	0.017%
61	0.726%	1.000%	0.017%
62	0.746%	1.000%	0.017%
63	0.766%	1.000%	0.017%
64	0.786%	1.000%	0.017%
65	0.800%	1.000%	0.017%
66	0.800%	1.000%	0.017%
67	0.800%	1.000%	0.017%
68	0.800%	1.000%	0.017%
69	0.800%	1.000%	0.017%
70	0.800%	1.000%	0.017%
71	0.800%	1.000%	0.017%
72	0.800%	1.000%	0.017%
73	0.800%	1.000%	0.017%
74	0.800%	1.000%	0.017%
75	0.800%	1.000%	0.017%
76	0.800%	1.000%	0.017%
77	0.800%	1.000%	0.017%
78	0.800%	1.000%	0.017%
79	0.800%	1.000%	0.017%
80	N/A	N/A	N/A

¹ Greater of disability benefit and retirement benefit is valued if eligible for early or service retirement

² No rates of ordinary disability apply prior to completion of 10 years of service or upon attainment of the following age/service combinations:

Transit 55/25: Age 62 (Age 63 for Tier 6) and 20 years of service or Age 55 and 25 years of service
TBTA 50/20 Plan: Age 50 and 20 years of service

Pre-retirement Death

Plan codes excluded in the analysis of other contingencies are part of the analysis of pre-retirement death.

Mortality assumptions involve two components: a base table and a mortality improvement scale. The mortality improvement scale adjusts the mortality rates of the base table to reflect that generally rates of mortality are anticipated to improve over time.

The Society of Actuaries (SOA) has published mortality improvement scales (MP scales) each year from 2014 to 2021. In the last several actuarial valuations, OA has used the mortality improvement scale that coincides with the valuation date. For example, OA used the MP-2020 scale in its June 30, 2020 lag actuarial valuation. In this analysis, we used the most recent improvement scale (MP-2021) published by the SOA as of the date of this analysis. Please note that the SOA has not published an updated MP scale due to the pandemic.

The SOA MP-2021 improvement scale is based on data through 2019 (before the onset of Covid) from the Social Security Administration (SSA). Even though the aggregate (for all ages) long-term trend has been towards mortality improvements, this is not always the case for each age. Therefore, there are situations where the expected mortality rate in a later year is higher than base rate.

There is much discussion in the actuarial profession and among retirement systems about the development of mortality tables and treatment of excess deaths due to the Covid pandemic, which occurred in 2020 – 2022. The analysis to develop our recommendations exclude the mortality experience of members during the pandemic and reflect the experience from 2012 - 2019.

In this study the base table of the current assumption corresponds to the year 2012; expected mortality rates in future years are obtained from the base table and the MP-2021 scale. For example, the 2017 (July 1, 2016 – June 30, 2017) mortality rates are derived from the base table (2012) adjusted with four years of improvements until 2016. This method links mortality rates across the years and, consequently, allows mortality comparisons from one year to another.

For the proposed assumption, proposed rates were initially determined as of the mid-year of the study period or fiscal year 2016. MP-2021 was then used to adjust those rates to earlier and later years. The proposed mortality rates shown in the following section have been adjusted to reflect a base year of 2019. We recommend that MP-2021 continue to be used to reflect mortality improvements both before and after the measurement date.

In reviewing the current assumption, we compared the actual experience to published tables from the SOA. The most recent tables published by the SOA reflected experience for public plan retirement systems separated into General employees (PubG), Teachers (PubT) and Public Safety (PubS) members. Adjustments were made to the standard SOA tables to match the experience of the system or the current tables, and for consistency with recommended postretirement mortality tables, to determine if the SOA tables provided a better fit.

Ordinary Death

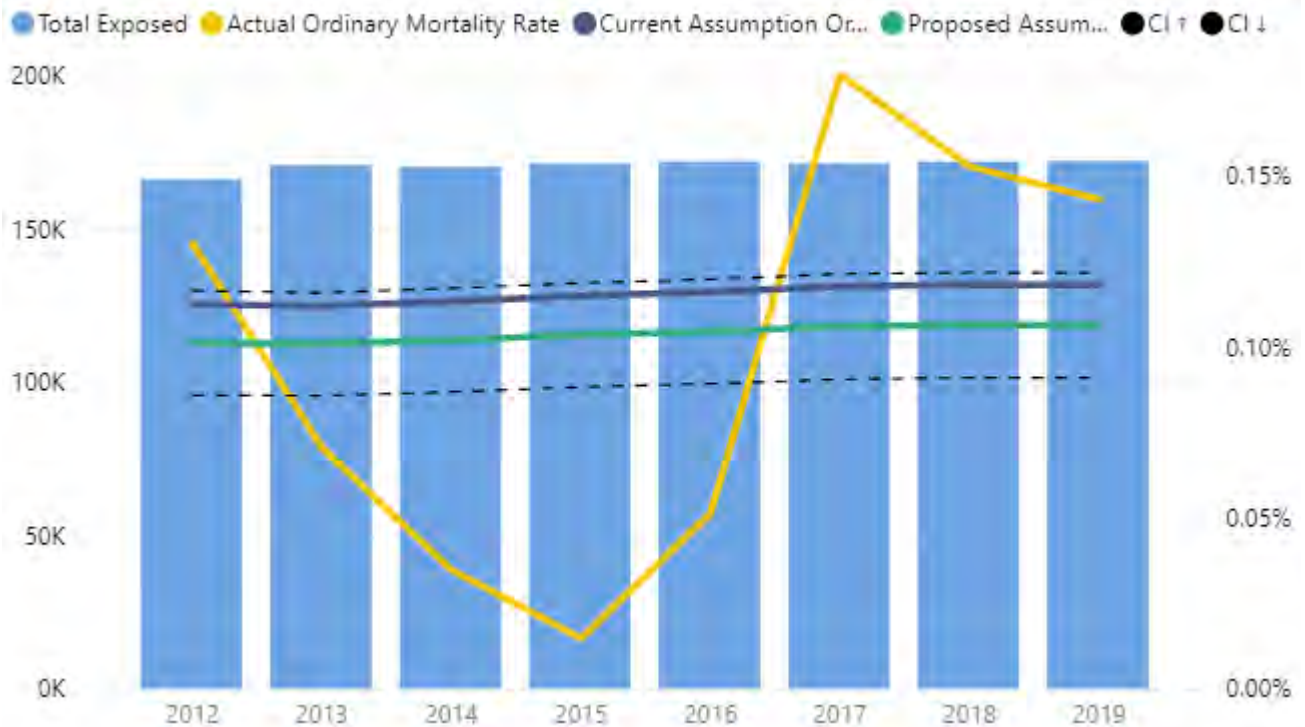
The current assumption is the same for General employees, Transit and TBTA. For these groups, we compared the experience to PubG tables and found the current assumption to provide a better fit. We proposed to reduce the current rates of ordinary death by 10% to account for recent experience.

The following tables show the experience of ordinary death by year, for the age range (20 to 69) during the period 2012 – 2019 based on the current and proposed assumptions for both males and females combined for General employees, Transit and TBTA members. The A/E ratio increased from 0.84 to 0.94 and from 0.82 to 0.91 for only TBTA and Transit employees.

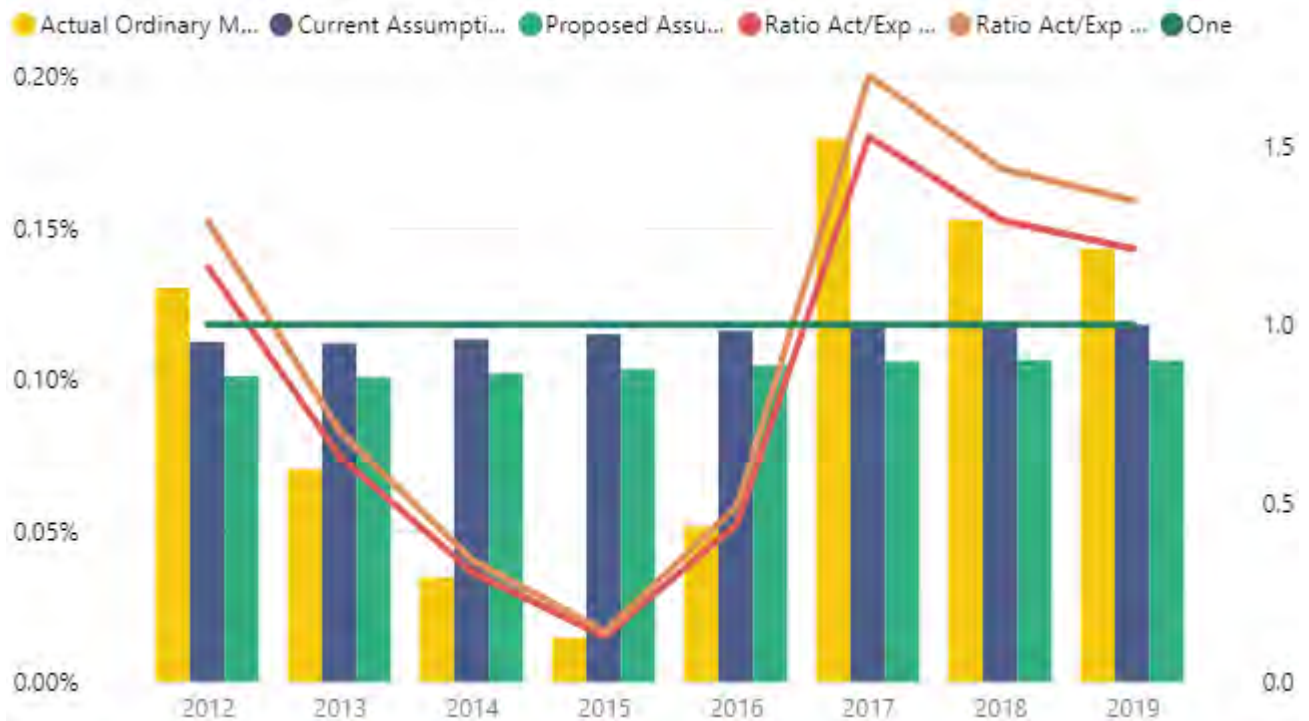
Plan Year	Actual Ordinary Deaths	Expected Ordinary Deaths	Total Exposed	Actual Ordinary Mortality Rate	Current Assumption Ordinary Mortality	Ratio Act/Exp Ordinary Mortality
2012	216	186.3	166,012	0.1301%	0.1122%	▲ 1.16
2013	120	190.8	170,644	0.0703%	0.1118%	▲ 0.63
2014	59	192.5	170,083	0.0347%	0.1132%	◆ 0.31
2015	25	196.4	171,062	0.0146%	0.1148%	◆ 0.13
2016	88	199.1	171,710	0.0512%	0.1160%	◆ 0.44
2017	307	201.2	171,172	0.1794%	0.1175%	◆ 1.53
2018	262	202.7	171,731	0.1526%	0.1180%	▲ 1.29
2019	246	202.9	172,007	0.1430%	0.1180%	▲ 1.21
Total	1,323	1,571.9	1,364,421	0.0970%	0.1152%	▲ 0.84

Plan Year	Actual Ordinary Deaths	Expected Ordinary Deaths Proposed	Total Exposed	Actual Ordinary Mortality Rate	Proposed Assumption Ordinary Mortality	Act/Exp Proposed Ordinary Mortality
2012	216	167.7	166,012	0.1301%	0.1010%	▲ 1.29
2013	120	171.7	170,644	0.0703%	0.1006%	▲ 0.70
2014	59	173.2	170,083	0.0347%	0.1018%	◆ 0.34
2015	25	176.7	171,062	0.0146%	0.1033%	◆ 0.14
2016	88	179.2	171,710	0.0512%	0.1044%	◆ 0.49
2017	307	181.1	171,172	0.1794%	0.1058%	◆ 1.70
2018	262	182.4	171,731	0.1526%	0.1062%	▲ 1.44
2019	246	182.6	172,007	0.1430%	0.1062%	▲ 1.35
Total	1,323	1,414.7	1,364,421	0.0970%	0.1037%	● 0.94

Exposure Distribution w/ Ordinary Mortality Rate - Actual and Expected; by Year



Ordinary Mortality Rate - Actual, Expected, and Ratio; by Year



Actual vs. Expected - Ordinary Mortality Proposed w/ Exposure Bubbles; by Year



The following section displays results by gender.

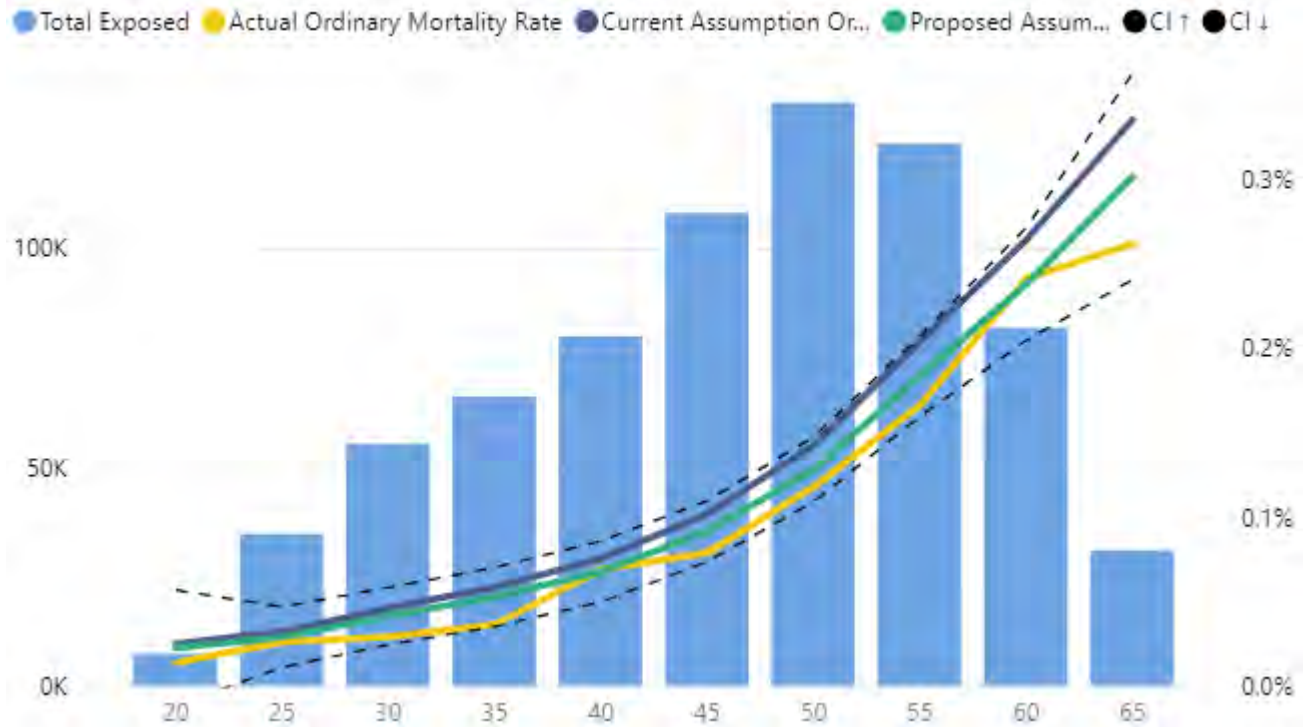
Males

The following charts show the experience of ordinary death by age band, for the age range (20 to 69) during the period 2012 – 2019 based on the current and proposed assumption for General employees, Transit and TBTA members. The A/E ratio increased from 0.82 to 0.92 and from 0.78 to 0.87 for only TBTA and Transit employees. Please note that the charts by age are based on 5-year brackets. For example, the age bracket 45 should be interpreted as the interval 45 – 49.

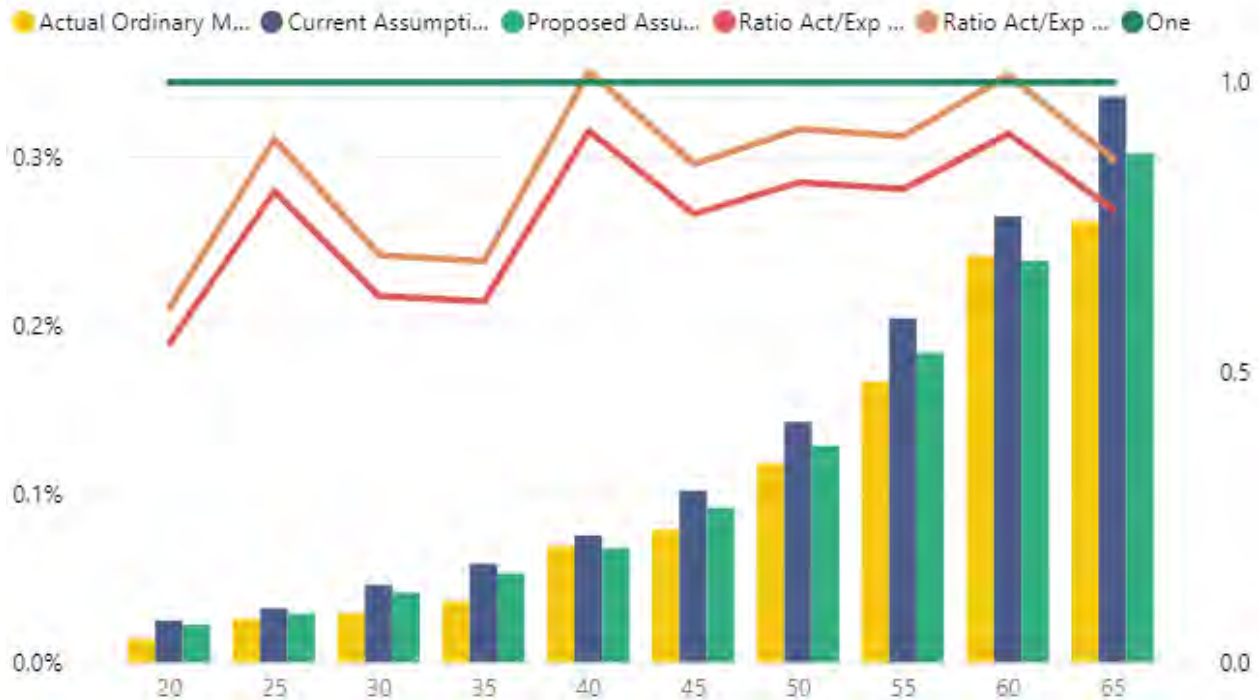
Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths	Total Exposed	Actual Ordinary Mortality Rate	Current Assumption Ordinary Mortality	Ratio Act/Exp Ordinary Mortality
20	1	1.8	7,319	0.0137%	0.0248%	▲ 0.55
25	9	11.1	34,642	0.0260%	0.0320%	▲ 0.81
30	16	25.3	55,237	0.0290%	0.0458%	▲ 0.63
35	24	38.6	66,049	0.0363%	0.0584%	▲ 0.62
40	55	60.0	79,816	0.0689%	0.0752%	● 0.92
45	85	109.9	108,025	0.0787%	0.1018%	▲ 0.77
50	157	189.8	133,203	0.1179%	0.1425%	▲ 0.83
55	206	252.3	123,812	0.1664%	0.2038%	▲ 0.82
60	197	216.1	81,739	0.2410%	0.2644%	● 0.91
65	81	103.7	30,949	0.2617%	0.3352%	▲ 0.78
Total	831	1,008.7	720,791	0.1153%	0.1399%	▲ 0.82

Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths Proposed	Total Exposed	Actual Ordinary Mortality Rate	Proposed Assumption Ordinary Mortality	Act/Exp Proposed Ordinary Mortality
20	1	1.6	7,319	0.0137%	0.0223%	▲ 0.61
25	9	10.0	34,642	0.0260%	0.0288%	● 0.90
30	16	22.8	55,237	0.0290%	0.0413%	▲ 0.70
35	24	34.7	66,049	0.0363%	0.0526%	▲ 0.69
40	55	54.0	79,816	0.0689%	0.0677%	● 1.02
45	85	98.9	108,025	0.0787%	0.0916%	▲ 0.86
50	157	170.8	133,203	0.1179%	0.1282%	● 0.92
55	206	227.1	123,812	0.1664%	0.1834%	● 0.91
60	197	194.5	81,739	0.2410%	0.2380%	● 1.01
65	81	93.4	30,949	0.2617%	0.3017%	▲ 0.87
Total	831	907.9	720,791	0.1153%	0.1260%	● 0.92

Exposure Distribution w/ Ordinary Mortality Rate - Actual and Expected; by Age



Ordinary Mortality Rate - Actual, Expected, and Ratio; by Age



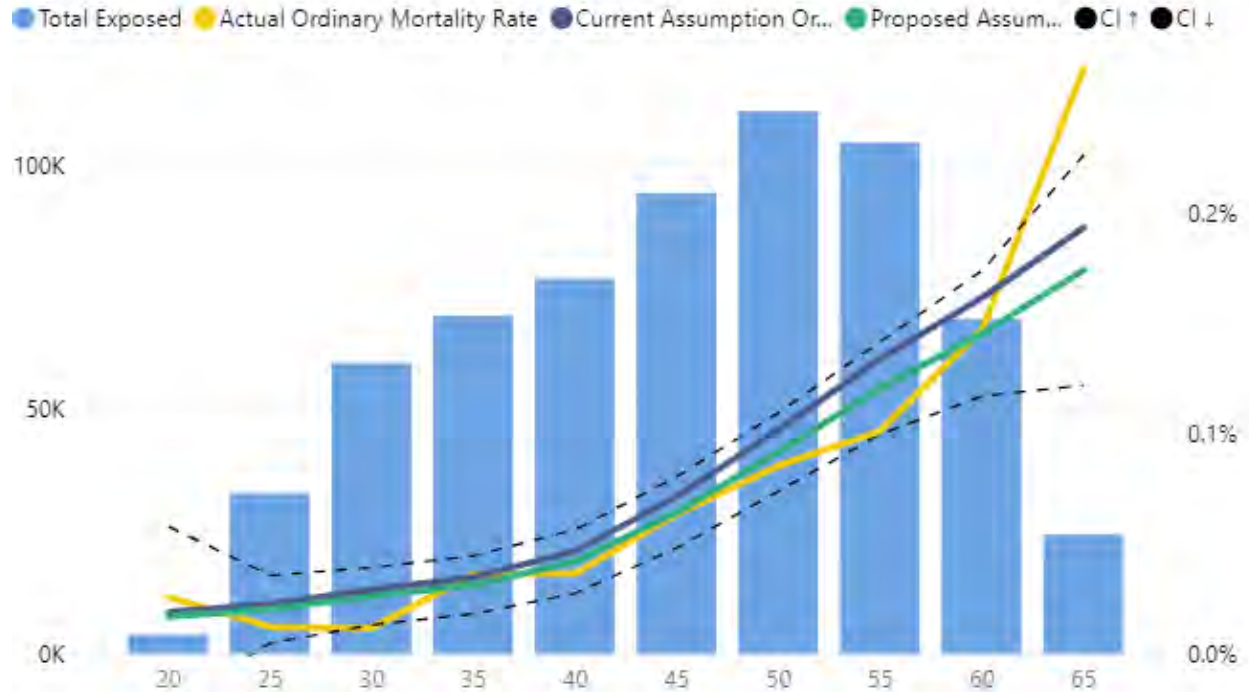
Females

The following charts show the experience of ordinary death by age band, for the age range (20 to 69) during the period 2012 – 2019 based on the current and proposed assumption for General employees, Transit and TBTA members. The A/E ratio increased from 0.87 to 0.97 and from 1.20 to 1.34 for only TBTA and Transit employees. Please note that the charts by age are based on 5-year brackets. For example, the age bracket 45 should be interpreted as the interval 45 – 49.

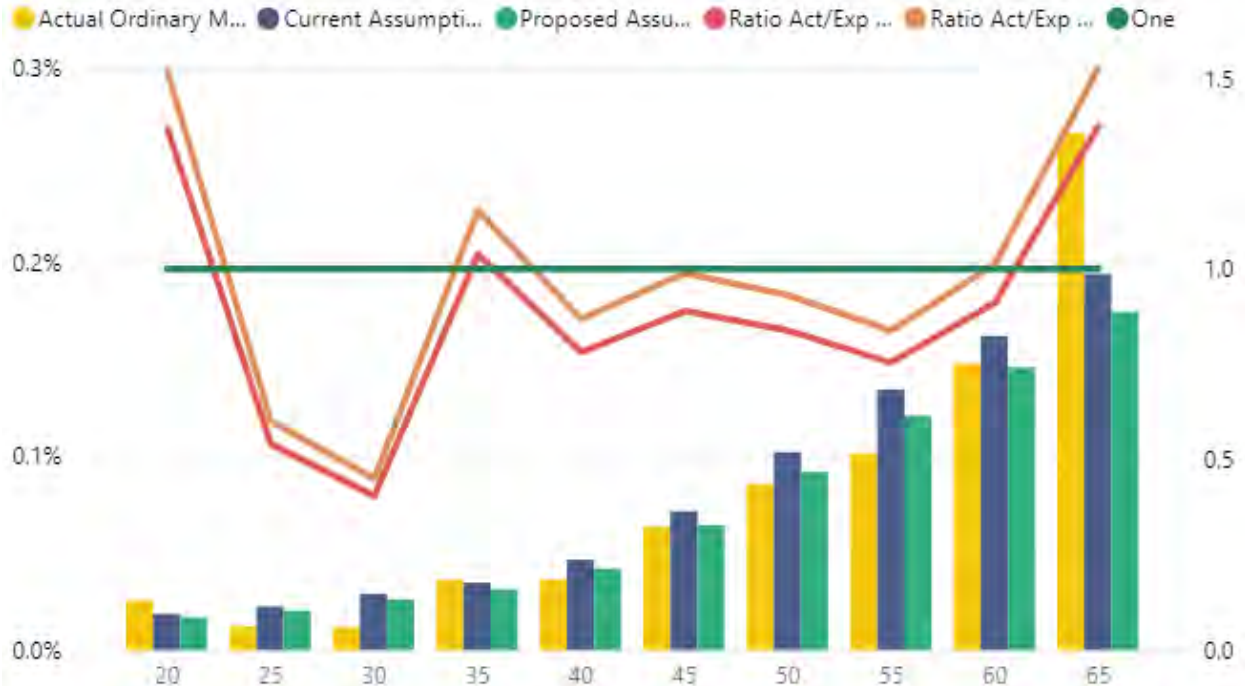
Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths	Total Exposed	Actual Ordinary Mortality Rate	Current Assumption Ordinary Mortality	Ratio Act/Exp Ordinary Mortality
20	1	0.7	3,892	0.0257%	0.0188%	▲ 1.37
25	4	7.4	32,821	0.0122%	0.0225%	▲ 0.54
30	7	17.2	59,340	0.0118%	0.0290%	◆ 0.41
35	25	23.9	68,862	0.0363%	0.0347%	● 1.05
40	28	35.6	76,464	0.0366%	0.0465%	▲ 0.79
45	60	67.2	94,013	0.0638%	0.0714%	▲ 0.89
50	95	113.0	110,839	0.0857%	0.1019%	▲ 0.84
55	106	140.3	104,543	0.1014%	0.1342%	▲ 0.76
60	101	110.7	68,457	0.1475%	0.1617%	● 0.91
65	65	47.3	24,399	0.2664%	0.1937%	▲ 1.38
Total	492	563.2	643,630	0.0764%	0.0875%	▲ 0.87

Age (bins)	Actual Ordinary Deaths	Expected Ordinary Deaths Proposed	Total Exposed	Actual Ordinary Mortality Rate	Proposed Assumption Ordinary Mortality	Act/Exp Proposed Ordinary Mortality
20	1	0.7	3,892	0.0257%	0.0169%	◆ 1.52
25	4	6.6	32,821	0.0122%	0.0202%	▲ 0.60
30	7	15.5	59,340	0.0118%	0.0261%	◆ 0.45
35	25	21.5	68,862	0.0363%	0.0313%	▲ 1.16
40	28	32.0	76,464	0.0366%	0.0419%	▲ 0.87
45	60	60.4	94,013	0.0638%	0.0643%	● 0.99
50	95	101.7	110,839	0.0857%	0.0917%	● 0.93
55	106	126.2	104,543	0.1014%	0.1207%	▲ 0.84
60	101	99.7	68,457	0.1475%	0.1456%	● 1.01
65	65	42.5	24,399	0.2664%	0.1743%	◆ 1.53
Total	492	506.9	643,630	0.0764%	0.0788%	● 0.97

Exposure Distribution w/ Ordinary Mortality Rate - Actual and Expected; by Age



Ordinary Mortality Rate - Actual, Expected, and Ratio; by Age



Summary

The proposed assumption decreased the anticipated number of deaths occurring prior to retirement, which will result in an increase in plan liabilities.

Accidental Death

The accidental death rate assumption is a constant percentage (0.01%) that does not vary by gender nor age and is not subject to mortality improvements. During the Covid pandemic (2020 – 2021), there were deaths characterized as accidental deaths. The following table shows the experience of accidental death by year. While there were only 4 accidental deaths coded prior to the pandemic years, it is prudent to continue to have an assumption to vary this contingency. We recommend no change in the current assumption.

Plan Year	Actual Accidental Deaths	Expected Accidental Deaths	Total Exposed	Actual Accidental Mortality Rate	Current Assumption Accidental Mortality	Ratio Act/Exp Accidental Mortality
2012	0	2.2	36,207	0.0000%	0.0060%	0.00
2013	1	2.2	36,022	0.0028%	0.0060%	0.46
2014	0	2.2	36,461	0.0000%	0.0060%	0.00
2015	0	2.2	37,236	0.0000%	0.0060%	0.00
2016	0	2.3	37,868	0.0000%	0.0060%	0.00
2017	0	2.3	38,316	0.0000%	0.0060%	0.00
2018	1	2.3	39,151	0.0026%	0.0060%	0.43
2019	2	2.4	40,361	0.0050%	0.0060%	0.83
2020	82	2.4	39,663	0.2067%	0.0060%	34.46
2021	20	2.3	38,443	0.0520%	0.0060%	8.67
Total	106	22.8	379,728	0.0279%	0.0060%	4.65

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: PLAN GROUPS OTHER THAN CORRECTION AND SANITATION			
	Transit and TBTA		
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.0240%	0.0180%	0.0060%
16	0.0240%	0.0180%	0.0060%
17	0.0240%	0.0180%	0.0060%
18	0.0240%	0.0180%	0.0060%
19	0.0240%	0.0180%	0.0060%
20	0.0240%	0.0180%	0.0060%
21	0.0240%	0.0180%	0.0060%
22	0.0240%	0.0180%	0.0060%
23	0.0240%	0.0180%	0.0060%
24	0.0240%	0.0180%	0.0060%
25	0.0240%	0.0180%	0.0060%
26	0.0264%	0.0192%	0.0060%
27	0.0288%	0.0204%	0.0060%
28	0.0312%	0.0216%	0.0060%
29	0.0336%	0.0228%	0.0060%
30	0.0360%	0.0240%	0.0060%
31	0.0384%	0.0252%	0.0060%
32	0.0408%	0.0264%	0.0060%
33	0.0432%	0.0276%	0.0060%
34	0.0456%	0.0288%	0.0060%
35	0.0480%	0.0300%	0.0060%
36	0.0504%	0.0312%	0.0060%
37	0.0528%	0.0324%	0.0060%
38	0.0552%	0.0336%	0.0060%
39	0.0576%	0.0348%	0.0060%
40	0.0600%	0.0360%	0.0060%
41	0.0660%	0.0408%	0.0060%
42	0.0720%	0.0456%	0.0060%
43	0.0780%	0.0504%	0.0060%
44	0.0840%	0.0552%	0.0060%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT (continued) PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: PLAN GROUPS OTHER THAN CORRECTION AND SANITATION			
	Transit and TBTA		
	Ordinary Death		Accidental Death
Age	Males	Females	All
45	0.0900%	0.0600%	0.0060%
46	0.0960%	0.0660%	0.0060%
47	0.1020%	0.0720%	0.0060%
48	0.1080%	0.0780%	0.0060%
49	0.1140%	0.0840%	0.0060%
50	0.1200%	0.0900%	0.0060%
51	0.1320%	0.0960%	0.0060%
52	0.1440%	0.1020%	0.0060%
53	0.1560%	0.1080%	0.0060%
54	0.1680%	0.1140%	0.0060%
55	0.1800%	0.1200%	0.0060%
56	0.1920%	0.1260%	0.0060%
57	0.2040%	0.1320%	0.0060%
58	0.2160%	0.1380%	0.0060%
59	0.2280%	0.1440%	0.0060%
60	0.2400%	0.1500%	0.0060%
61	0.2520%	0.1560%	0.0060%
62	0.2640%	0.1620%	0.0060%
63	0.2760%	0.1680%	0.0060%
64	0.2880%	0.1740%	0.0060%
65	0.3000%	0.1800%	0.0060%
66	0.3240%	0.1920%	0.0060%
67	0.3480%	0.2040%	0.0060%
68	0.3720%	0.2160%	0.0060%
69	0.3960%	0.2280%	0.0060%
70	0.4000%	0.2400%	0.0060%
71	0.4240%	0.2580%	0.0060%
72	0.4480%	0.2760%	0.0060%
73	0.4720%	0.2940%	0.0060%
74	0.4960%	0.3120%	0.0060%
75	0.5200%	0.3300%	0.0060%
76	0.5680%	0.3660%	0.0060%
77	0.6160%	0.4020%	0.0060%
78	0.6640%	0.4380%	0.0060%
79	0.7120%	0.4740%	0.0060%
80	N/A	N/A	N/A

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: PLAN GROUPS OTHER THAN CORRECTION AND BASE YEAR 2019			
	Transit and TBTA		
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.0216%	0.0162%	0.0060%
16	0.0216%	0.0162%	0.0060%
17	0.0216%	0.0162%	0.0060%
18	0.0216%	0.0162%	0.0060%
19	0.0216%	0.0162%	0.0060%
20	0.0229%	0.0176%	0.0060%
21	0.0231%	0.0178%	0.0060%
22	0.0234%	0.0180%	0.0060%
23	0.0238%	0.0183%	0.0060%
24	0.0243%	0.0186%	0.0060%
25	0.0249%	0.0189%	0.0060%
26	0.0280%	0.0205%	0.0060%
27	0.0313%	0.0221%	0.0060%
28	0.0346%	0.0238%	0.0060%
29	0.0381%	0.0255%	0.0060%
30	0.0416%	0.0271%	0.0060%
31	0.0450%	0.0288%	0.0060%
32	0.0484%	0.0303%	0.0060%
33	0.0517%	0.0317%	0.0060%
34	0.0548%	0.0329%	0.0060%
35	0.0577%	0.0339%	0.0060%
36	0.0603%	0.0348%	0.0060%
37	0.0625%	0.0354%	0.0060%
38	0.0643%	0.0359%	0.0060%
39	0.0656%	0.0362%	0.0060%
40	0.0666%	0.0364%	0.0060%
41	0.0711%	0.0401%	0.0060%
42	0.0752%	0.0435%	0.0060%
43	0.0789%	0.0468%	0.0060%
44	0.0823%	0.0500%	0.0060%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS: PLAN GROUPS OTHER THAN CORRECTION AND BASE YEAR 2019			
	Transit and TBTA		
	Ordinary Death		Accidental Death
Age	Males	Females	All
45	0.0856%	0.0532%	0.0060%
46	0.0889%	0.0575%	0.0060%
47	0.0923%	0.0619%	0.0060%
48	0.0960%	0.0665%	0.0060%
49	0.0999%	0.0714%	0.0060%
50	0.1042%	0.0767%	0.0060%
51	0.1142%	0.0824%	0.0060%
52	0.1245%	0.0885%	0.0060%
53	0.1354%	0.0950%	0.0060%
54	0.1468%	0.1018%	0.0060%
55	0.1588%	0.1089%	0.0060%
56	0.1713%	0.1160%	0.0060%
57	0.1842%	0.1230%	0.0060%
58	0.1974%	0.1297%	0.0060%
59	0.2105%	0.1359%	0.0060%
60	0.2233%	0.1414%	0.0060%
61	0.2356%	0.1461%	0.0060%
62	0.2470%	0.1501%	0.0060%
63	0.2575%	0.1534%	0.0060%
64	0.2669%	0.1563%	0.0060%
65	0.2754%	0.1589%	0.0060%
66	0.2940%	0.1666%	0.0060%
67	0.3118%	0.1745%	0.0060%
68	0.3290%	0.1826%	0.0060%
69	0.3461%	0.1911%	0.0060%
70	0.3458%	0.2001%	0.0060%
71	0.3633%	0.2146%	0.0060%
72	0.3812%	0.2296%	0.0060%
73	0.3998%	0.2451%	0.0060%
74	0.4190%	0.2610%	0.0060%
75	0.4388%	0.2773%	0.0060%
76	0.4794%	0.3090%	0.0060%
77	0.5206%	0.3411%	0.0060%
78	0.5621%	0.3736%	0.0060%
79	0.6040%	0.4063%	0.0060%
80	N/A	N/A	N/A

Section I(E) – Postretirement Mortality of New York City Employees' Retirement System (NYCERS)

Postretirement Mortality

In addition to gender, the post-retirement mortality assumption depends on the type of inactive member:

- 1) Service Retirees
- 2) Disabled Retirees
- 3) Contingent Beneficiaries

The MEST contains all retirees on one page and beneficiaries on another page. On the retiree page, the experience can be examined by status to review disabled retirees versus service retirees. Service retirees include members who have commenced their pension benefit from a terminated vested status in addition to members who have retired from active status. There is a separate MEST containing the postretirement mortality experience of members across all NYCERS systems, which allowed us to review experience and develop proposed assumptions over multiple systems where it was advantageous to do so.

There is much discussion in the actuarial profession and among retirement systems about the development of mortality tables and treatment of excess deaths due to the Covid pandemic, which occurred in 2020 – 2022. The analysis to develop our recommendations excludes the mortality experience of members during the pandemic and reflects the experience from 2015 - 2019. Experience prior to 2015 was excluded as benefit amounts were not available in the historical database prior to this period.

Most mortality studies have found that higher benefits are positively correlated with smaller mortality rates and longer life expectancy. Accordingly, the OA utilizes adjustment factors to convert post-retirement mortality weighted by headcounts to post-retirement mortality weighted by benefit amounts. The current assumption adjustment factors used by the OA are:

Post-Retirement Mortality Adjustment Factor To Convert from Headcount-Weighted to Amount-Weighted						
	Service Retiree		Disabled Retiree		Contingent Beneficiary	
	Males	Females	Males	Females	Males	Females
General	0.890	0.951	0.962	1.000	0.890	0.951
Correction	0.890	0.873	0.835	0.770	0.890	0.951
Sanitation	0.940	0.922	1.000	1.000	0.890	0.951
TBTA/Transit	0.950	1.098	1.010	0.900	0.890	0.951
Housing Police/ Transit Police	0.910	0.910	0.876	0.876	0.890	0.951

Mortality assumptions involve two components: a base table and a mortality improvement scale. The mortality improvement scale adjusts the mortality rates of the base table to reflect that generally rates of mortality are anticipated to improve over time. As noted in the pre-retirement death section, we used the most recent improvement scale (MP-2021) published by the SOA as of the date of this analysis. Please note that the SOA has not published an updated MP scale due to the pandemic.

In this study the base table of the current assumption corresponds to the year 2012; expected mortality rates in future years are obtained from the base table and the MP-2021 scale. For example, the 2017 (July 1, 2016 – June 30, 2017) mortality rates are derived from the base table (2012) adjusted with four years of improvements until 2016. This method links mortality rates across the years and, consequently, allows mortality comparisons from one year to another.

For the proposed assumption, proposed rates were initially determined as of the mid-year of the study period or fiscal year 2017. MP-2021 was then used to adjust those rates to earlier and later years. The proposed mortality rates shown in the following section have been adjusted to reflect a base year of 2019. We recommend that MP-2021 continue to be used to reflect mortality improvements both before and after the measurement date.

In reviewing the current assumption, we compared the actual experience to published tables from the SOA. The most recent tables published by the SOA reflected experience for public plan retirement systems separated into General employees (PubG), Teachers (PubT) and Public Safety (PubS) members. The SOA publishes versions of each of these tables where the mortality rates are weighted by the amount of the pension benefit (“amount-weighted”) or weighted by the number of members (headcount-weighted). We compared the amount-weighted experience to the amount-weighted SOA table and the headcount-weighted experience to the headcount-weighted SOA table. Adjustments were made to the applicable standard SOA tables to match the experience of the system to determine if the SOA tables provided a better statistical fit to the experience. For BERS, we used the PubG tables in our analysis.

The SOA combined the experience of teachers and general employees in developing disability annuity mortality tables. Due to lack of credibility, a relatively lower disability incidence rate and consistency with the SOA tables, we combined the experience of TRS, BERS and NYCERS (general, sanitation, transit, and TBTA) in proposing a recommended assumption.

The SOA also combined the experience of all contingent beneficiaries (teachers, general employees and public safety members) into a single table. We combined the experience of all NYCERS systems (NYCERS, TRS, BERS, POLICE and FIRE) in proposing a recommended assumption. The contingent survivor assumption would apply upon the death of the member. While both the member and contingent survivor are both alive, we propose the healthy annuitant mortality table apply.

In the actuarial valuation of pension benefits, we recommend that amount-weighted mortality rates be used. Headcount-weighted mortality rates may be used for other purposes, such as a retiree medical valuation.

Postretirement Mortality – Non-Public Safety Service Retirees

The current assumption is the same for all NYCERS members except for a closed group of Transit and Housing Police retirees. In our analysis, we separated the experience of Correction officers as their experience was more consistent with the SOA public safety tables. Therefore, we combined the experience of General employees, Sanitation employees, and Transit and TBTA members and referred to this group as “non-public safety members of NYCERS”. For these groups, we compared the experience to PubG tables and found the current assumption to provide a better statistical fit. We propose adjustments to the current amount-weighted assumption to reflect actual experience by age. Separate adjustments were then made to determine headcount-weighted proposed rates.

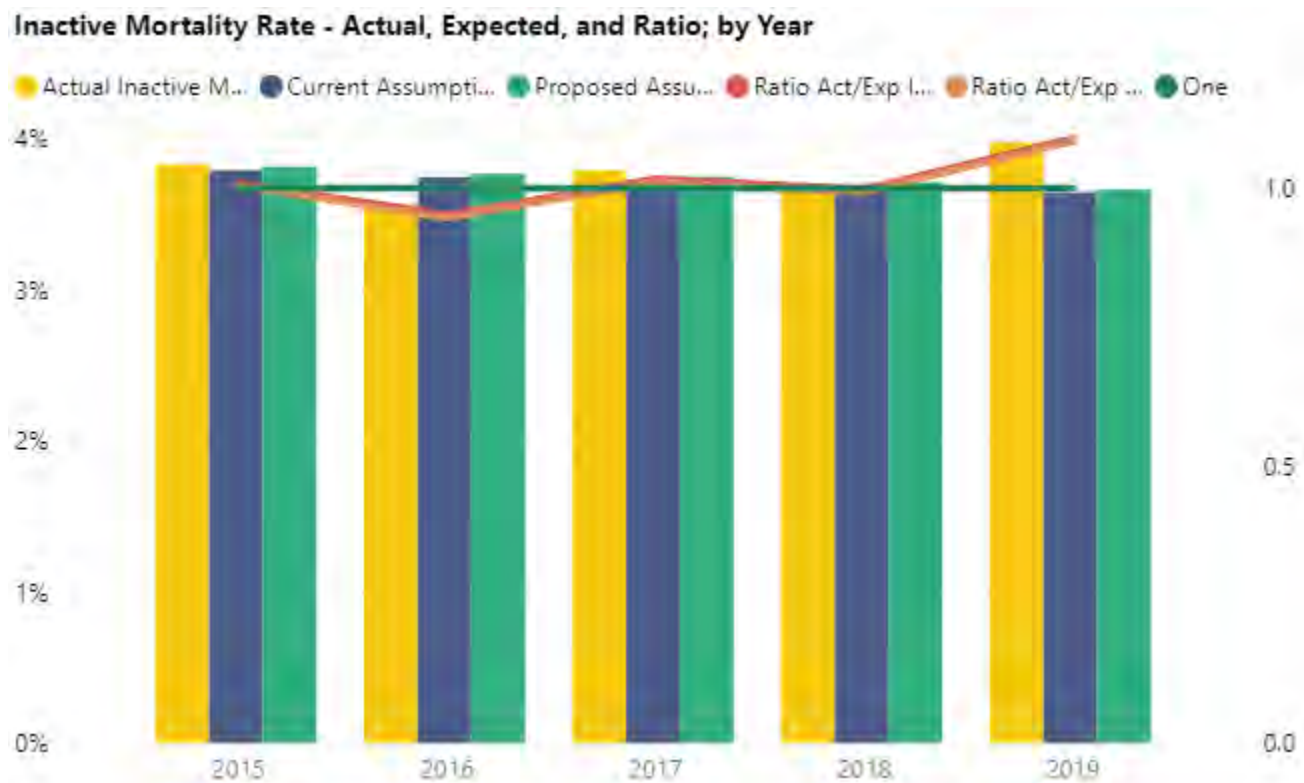
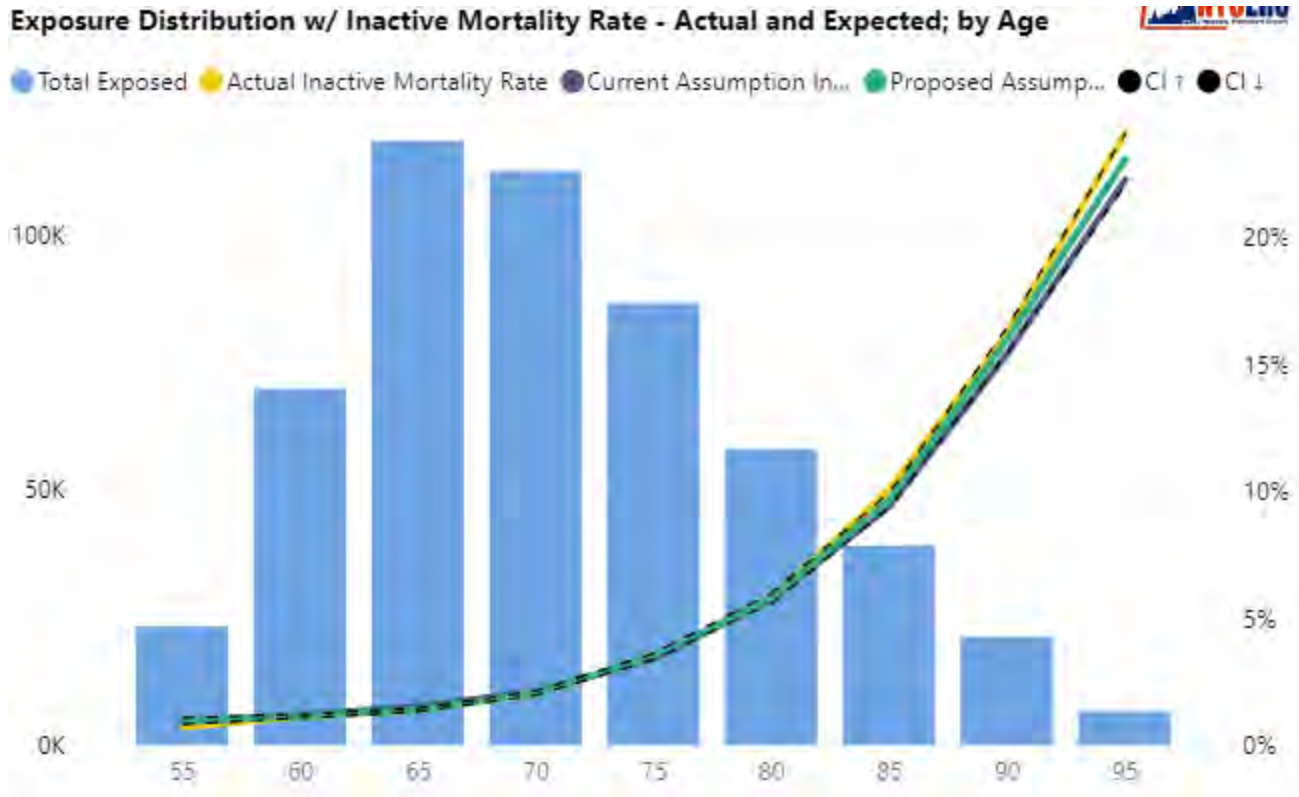
The following charts show postretirement mortality experience on a headcount-weighted basis by year for the age range (55 to 99) during the period 2015 – 2019 for both males and females combined on the current and proposed assumptions for all non-public safety members of NYCERS. The A/E remained at 1.01.

Current Assumption – Headcount-weighted

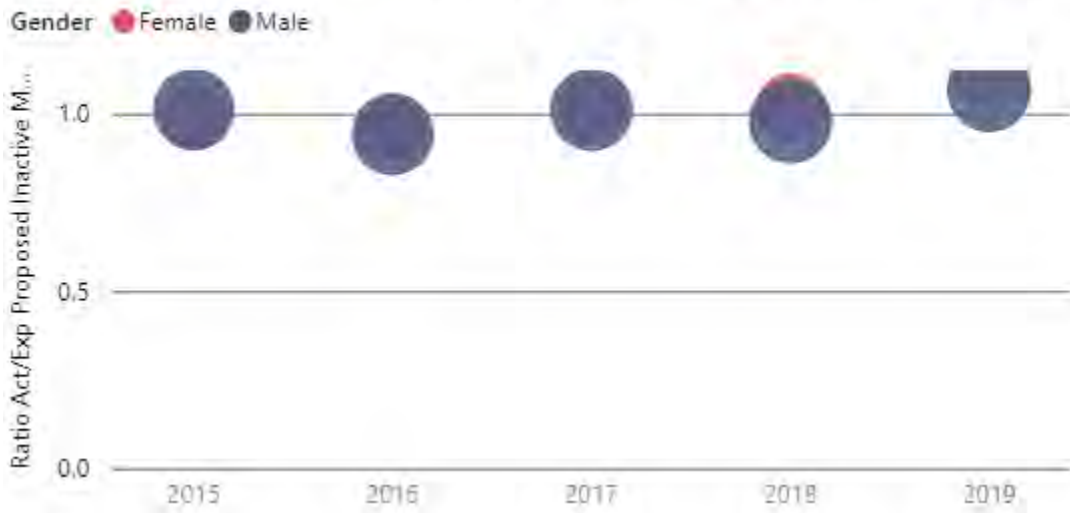
Plan Year	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
2015	3,917	3,879.9	102,486	3.8220%	3.7858%	1.01
2016	3,717	3,902.3	104,287	3.5642%	3.7419%	0.95
2017	4,046	3,977.8	106,875	3.7857%	3.7219%	1.02
2018	4,015	4,022.3	109,145	3.6786%	3.6853%	1.00
2019	4,462	4,091.5	112,420	3.9690%	3.6395%	1.09
Total	20,157	19,873.9	535,213	3.7662%	3.7133%	1.01

Proposed Assumption– Headcount-weighted

Plan Year	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
2015	3,917	3,903.9	102,486	3.8220%	3.8092%	1.00
2016	3,717	3,925.5	104,287	3.5642%	3.7641%	0.95
2017	4,046	4,001.8	106,875	3.7857%	3.7444%	1.01
2018	4,015	4,045.5	109,145	3.6786%	3.7065%	0.99
2019	4,462	4,114.0	112,420	3.9690%	3.6595%	1.08
Total	20,157	19,990.8	535,213	3.7662%	3.7351%	1.01



Actual vs. Expected - Inactive Mortality Proposed w/ Exposure Bubbles; by Year



The following charts show postretirement mortality experience on an amount-weighted basis by year for the age range (55 to 104) during the period 2015 – 2019 for both males and females combined on the current and proposed assumptions for all non-public safety members of NYCERS. The A/E remained at 1.01.

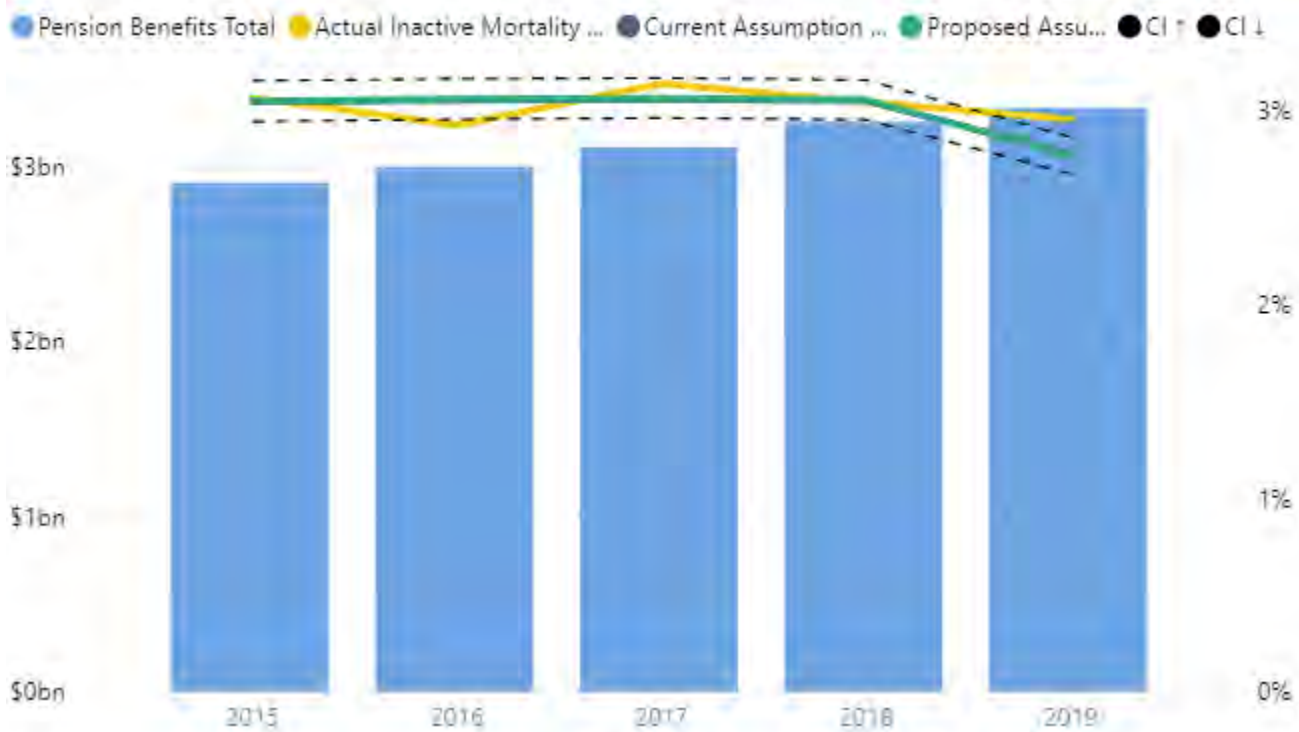
Current Assumption – Amount-weighted

Plan Year	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
2015	\$89.0M	\$88.4M	\$2,901.6M	3.0668%	3.0465%	1.01
2016	\$87.4M	\$91.3M	\$2,989.1M	2.9247%	3.0558%	0.96
2017	\$97.5M	\$95.0M	\$3,105.7M	3.1410%	3.0602%	1.03
2018	\$99.0M	\$99.1M	\$3,249.4M	3.0455%	3.0504%	1.00
2019	\$98.4M	\$92.4M	\$3,329.7M	2.9567%	2.7765%	1.06
Total	\$471.4M	\$466.3M	\$15,575.5M	3.0263%	2.9941%	1.01

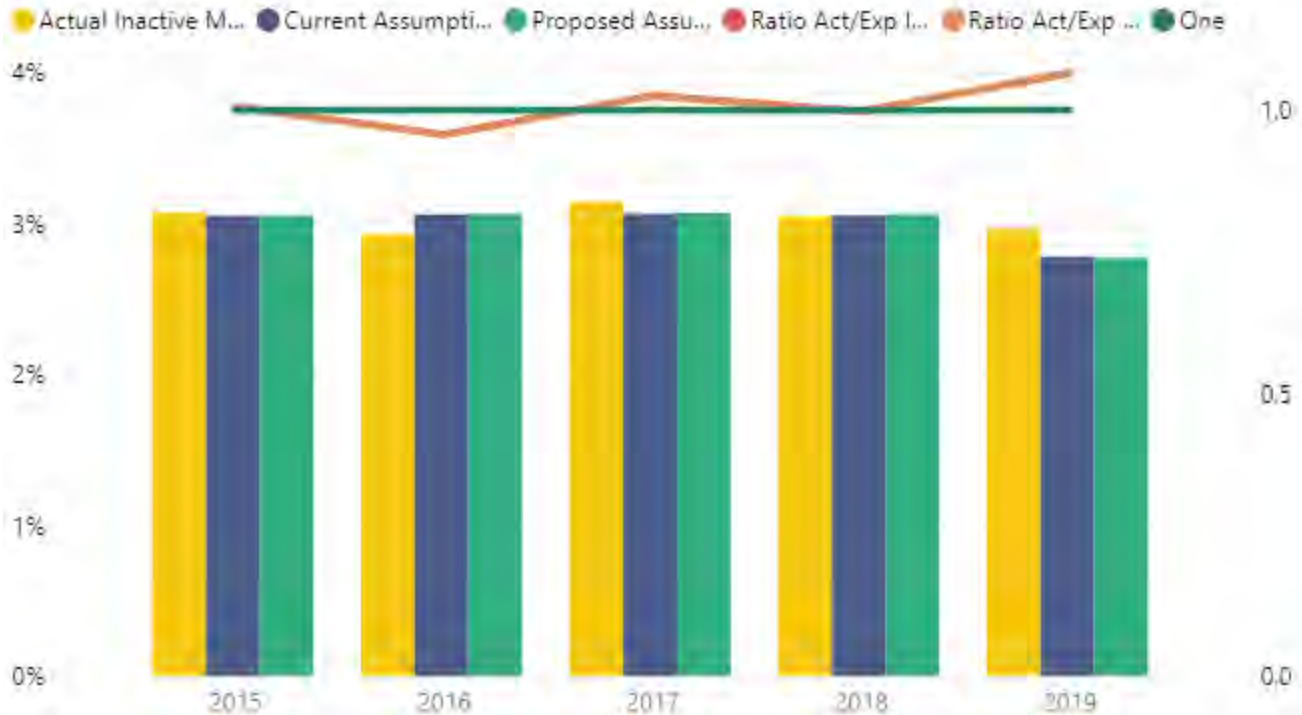
Proposed Assumption – Amount-weighted

Plan Year	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
2015	\$89.0M	\$88.5M	\$2,901.6M	3.0668%	3.0497%	1.01
2016	\$87.4M	\$91.5M	\$2,989.1M	2.9247%	3.0603%	0.96
2017	\$97.5M	\$95.2M	\$3,105.7M	3.1410%	3.0659%	1.02
2018	\$99.0M	\$99.3M	\$3,249.4M	3.0455%	3.0562%	1.00
2019	\$98.4M	\$92.2M	\$3,329.7M	2.9567%	2.7690%	1.07
Total	\$471.4M	\$466.7M	\$15,575.5M	3.0263%	2.9963%	1.01

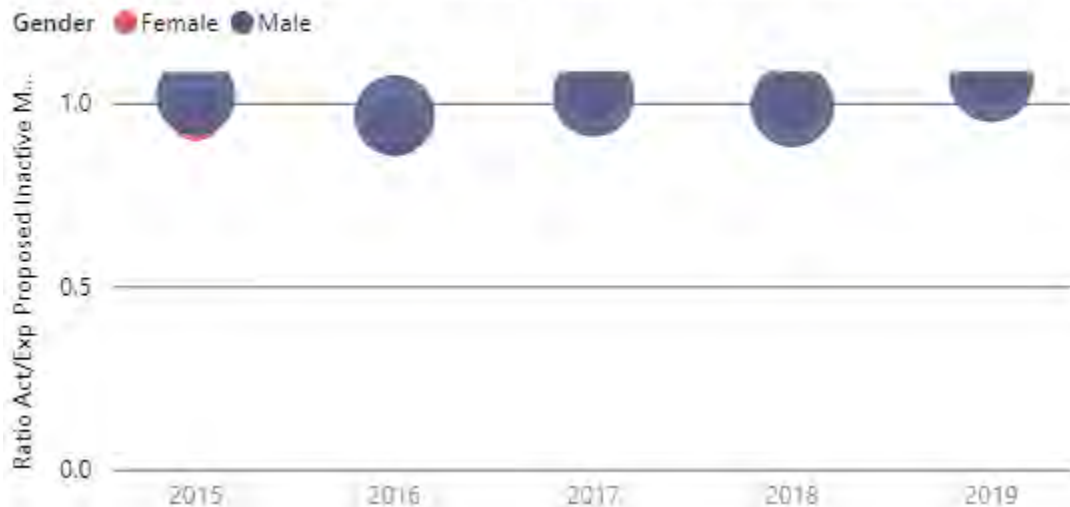
Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Year



Inactive Mortality Rate - Actual, Expected, and Ratio; by Year



Actual vs. Expected - Inactive Mortality Proposed w/ Benefit Bubbles; by Year



The following section displays results by gender.

Non-Public Safety Service Retirees - Males

The following charts show postretirement mortality experience on an amount-weighted basis by age band for the age range (55 to 99) during the period 2015 – 2019 for males on the current and proposed assumptions for all non-public safety members of NYCERS. While the A/E remained at 1.01, the overall fit improved. For ages 55 to 74, the A/E increased from 0.87 to 0.98 and for ages 75 – 99, the A/E decreased from 1.09 to 1.03.

For General employees, the AE decreased from 1.03 to 1.00. For Sanitation employees, the A/E increased from 0.98 to 1.01. For TBTA and Transit employees, the A/E increased from 1.00 to 1.04.

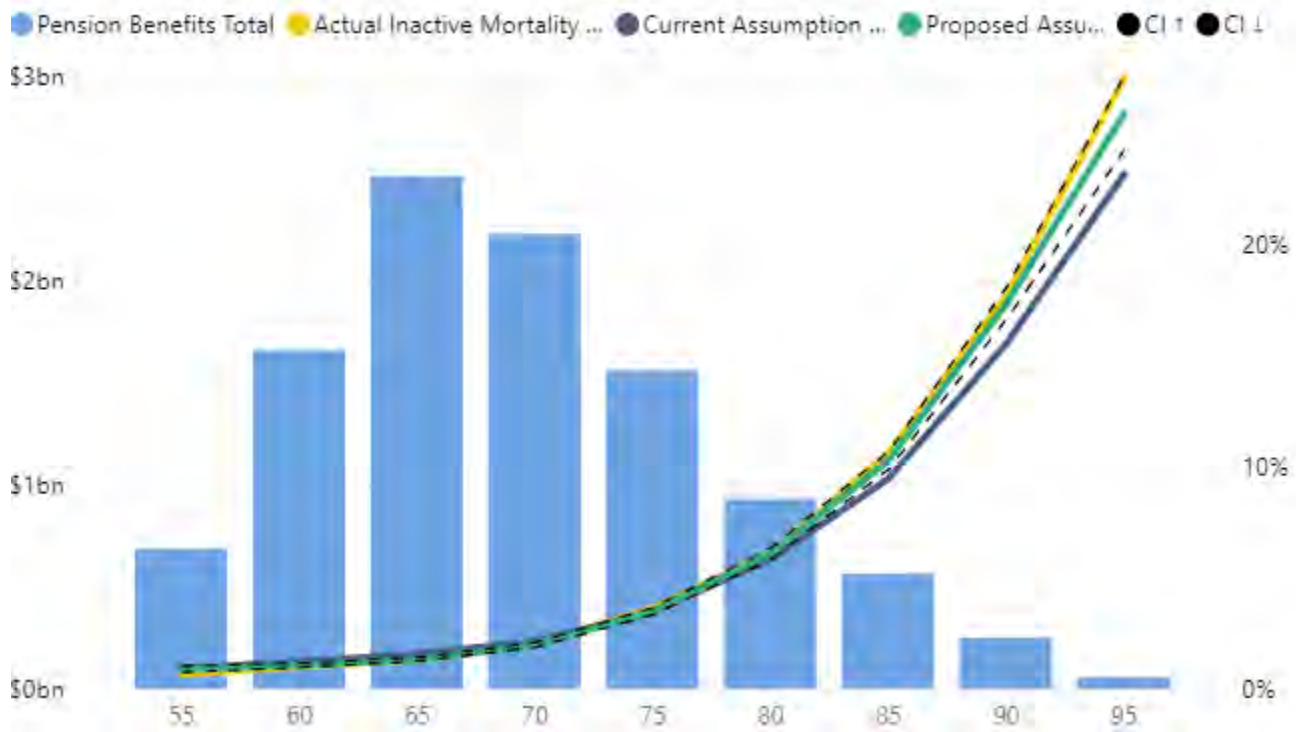
Please note that the charts by age are based on 5-year brackets. For example, the age bracket 75 should be interpreted as the interval 75 – 79.

Amount-weighted

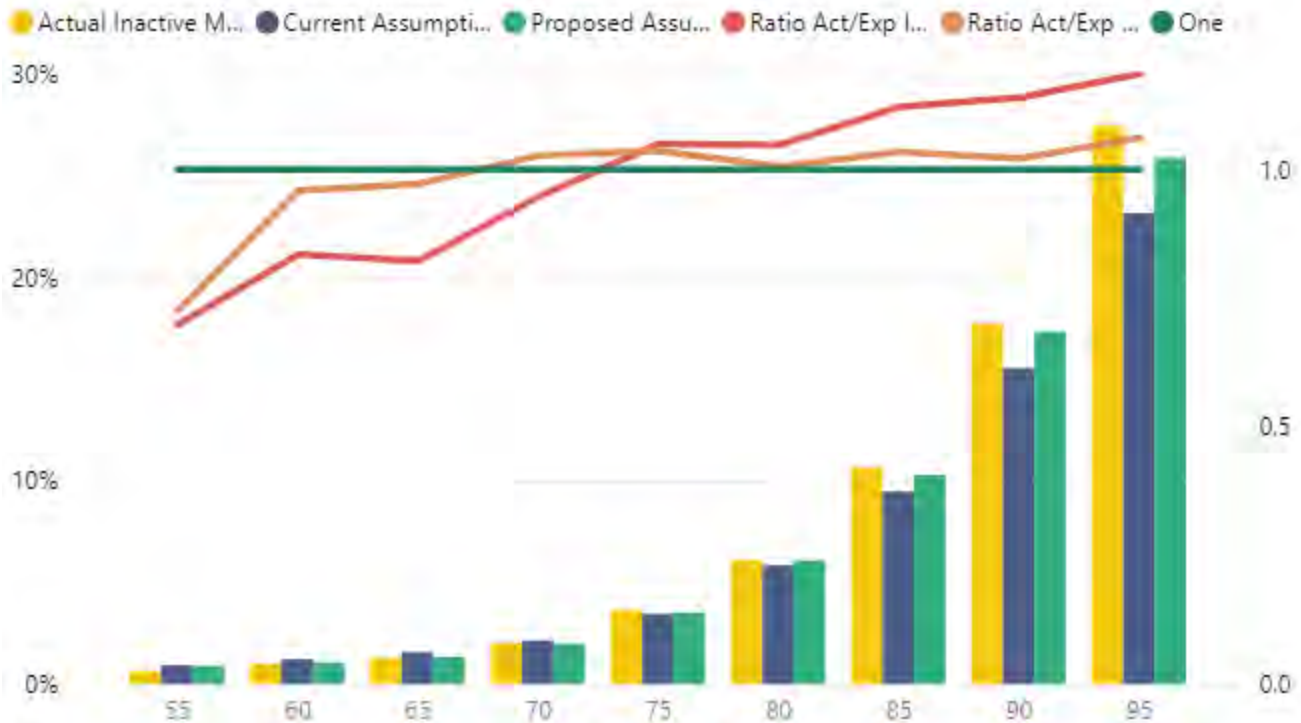
Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
55	\$4.4M	\$6.3M	\$684.7M	0.6388%	0.9137%	▲ 0.70
60	\$16.8M	\$20.1M	\$1,657.9M	1.0138%	1.2145%	▲ 0.83
65	\$32.3M	\$39.3M	\$2,509.1M	1.2875%	1.5654%	▲ 0.82
70	\$45.0M	\$47.5M	\$2,227.3M	2.0199%	2.1335%	● 0.95
75	\$56.4M	\$53.7M	\$1,558.5M	3.6183%	3.4462%	● 1.05
80	\$56.8M	\$54.2M	\$930.1M	6.1058%	5.8294%	● 1.05
85	\$59.7M	\$53.2M	\$562.2M	10.6217%	9.4677%	▲ 1.12
90	\$44.1M	\$38.7M	\$248.9M	17.7014%	15.5321%	▲ 1.14
95	\$15.3M	\$12.9M	\$55.9M	27.4554%	23.1514%	▲ 1.19
Total	\$330.8M	\$325.9M	\$10,434.5M	3.1699%	3.1236%	● 1.01

Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
55	\$4.4M	\$6.0M	\$684.7M	0.6388%	0.8800%	▲ 0.73
60	\$16.8M	\$17.5M	\$1,657.9M	1.0138%	1.0574%	● 0.96
65	\$32.3M	\$33.2M	\$2,509.1M	1.2875%	1.3243%	● 0.97
70	\$45.0M	\$43.8M	\$2,227.3M	2.0199%	1.9671%	● 1.03
75	\$56.4M	\$54.4M	\$1,558.5M	3.6183%	3.4937%	● 1.04
80	\$56.8M	\$56.5M	\$930.1M	6.1058%	6.0697%	● 1.01
85	\$59.7M	\$57.7M	\$562.2M	10.6217%	10.2708%	● 1.03
90	\$44.1M	\$43.1M	\$248.9M	17.7014%	17.3293%	● 1.02
95	\$15.3M	\$14.5M	\$55.9M	27.4554%	25.8726%	● 1.06
Total	\$330.8M	\$326.8M	\$10,434.5M	3.1699%	3.1321%	● 1.01

Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



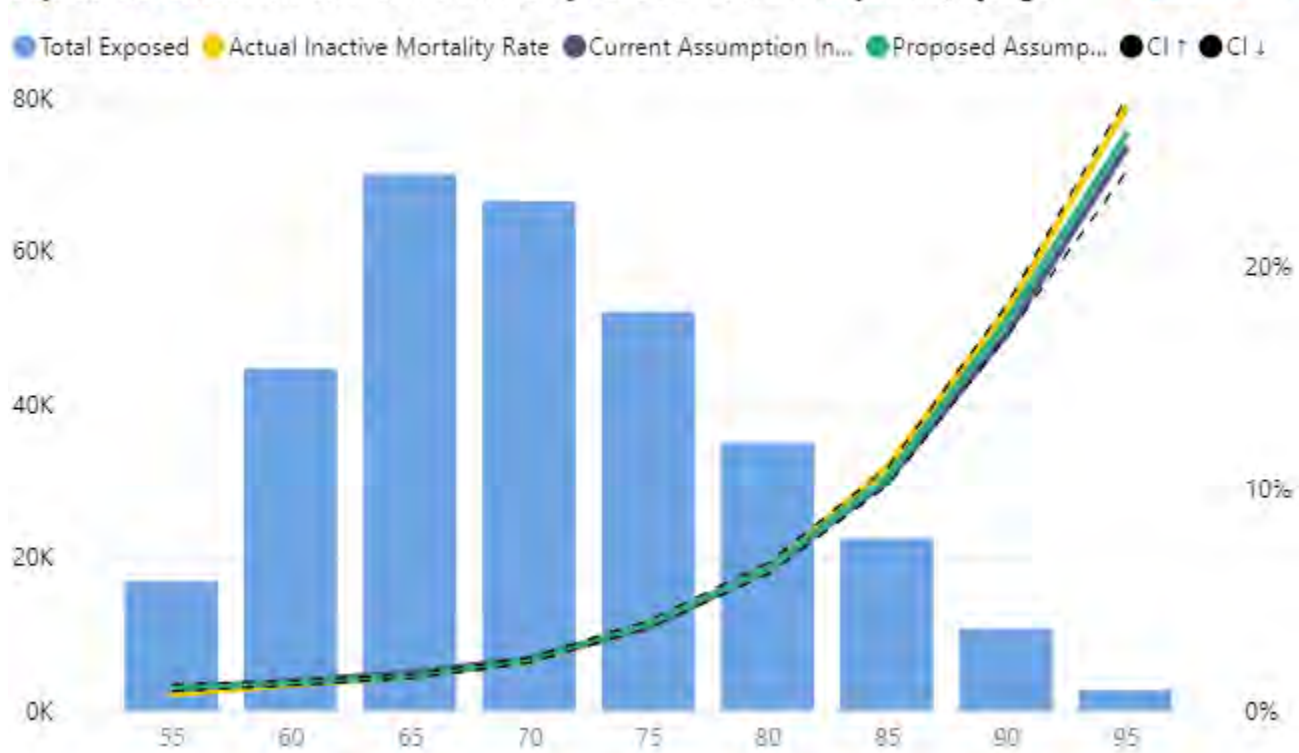
Headcount-weighted

The following charts show postretirement mortality experience on a headcount-weighted basis by age band for the age range (55 to 99) during the period 2015 – 2019 for males on the current and proposed assumptions for all non-public safety members of NYCERS. The A/E remained at 1.00.

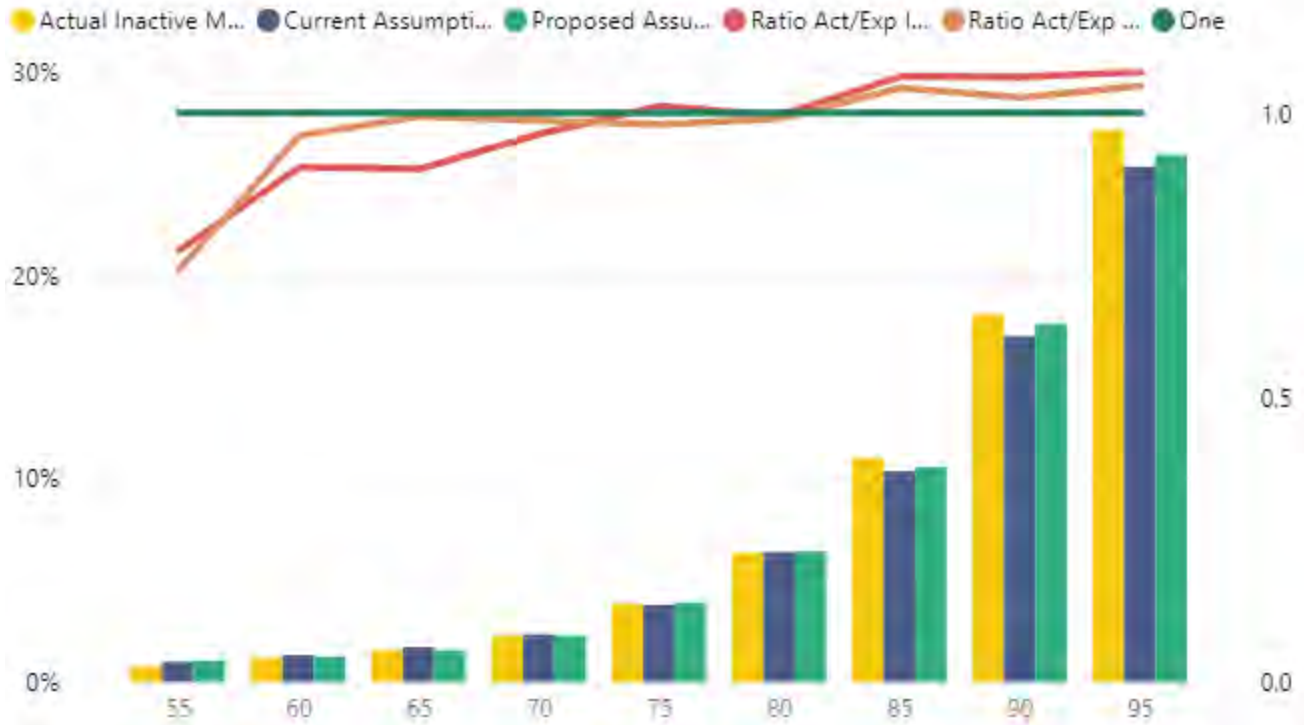
Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
55	127	167.5	16,903	0.7513%	0.9908%	0.76
60	534	590.3	44,651	1.1959%	1.3220%	0.90
65	1,079	1,196.9	70,048	1.5404%	1.7086%	0.90
70	1,495	1,552.3	66,534	2.2470%	2.3331%	0.96
75	1,994	1,970.3	52,099	3.8273%	3.7819%	1.01
80	2,222	2,231.4	34,958	6.3562%	6.3832%	1.00
85	2,478	2,329.7	22,482	11.0222%	10.3625%	1.06
90	1,936	1,821.6	10,715	18.0681%	17.0001%	1.06
95	722	673.4	2,658	27.1633%	25.3349%	1.07
Total	12,587	12,533.3	321,048	3.9206%	3.9039%	1.00

Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
55	127	175.1	16,903	0.7513%	1.0359%	▲ 0.73
60	534	556.3	44,651	1.1959%	1.2459%	● 0.96
65	1,079	1,085.5	70,048	1.5404%	1.5496%	● 0.99
70	1,495	1,515.0	66,534	2.2470%	2.2770%	● 0.99
75	1,994	2,034.9	52,099	3.8273%	3.9058%	● 0.98
80	2,222	2,243.7	34,958	6.3562%	6.4182%	● 0.99
85	2,478	2,373.9	22,482	11.0222%	10.5592%	● 1.04
90	1,936	1,885.3	10,715	18.0681%	17.5945%	● 1.03
95	722	689.2	2,658	27.1633%	25.9302%	● 1.05
Total	12,587	12,558.8	321,048	3.9206%	3.9118%	● 1.00

Exposure Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



Non-Public Safety Service Retirees - Females

The following charts show postretirement mortality experience on an amount-weighted basis by age band for the age range (55 to 99) during the period 2015 – 2019 for females on the current and proposed assumptions for all non-public safety members of NYCERS. While the A/E increased from 1.00 to 1.01, the overall fit improved. For ages 55 to 74, the A/E increased from 0.88 to 0.94 and for ages 75 – 99, the A/E decreased from 1.05 to 1.03.

For General employees, the AE decreased from 1.00 to 0.99. For Sanitation employees, the A/E decreased from 0.98 to 0.97. For TBTA and Transit employees, the A/E increased from 1.06 to 1.23. The data for Sanitation, TBTA and Transit had very little statistical credibility.

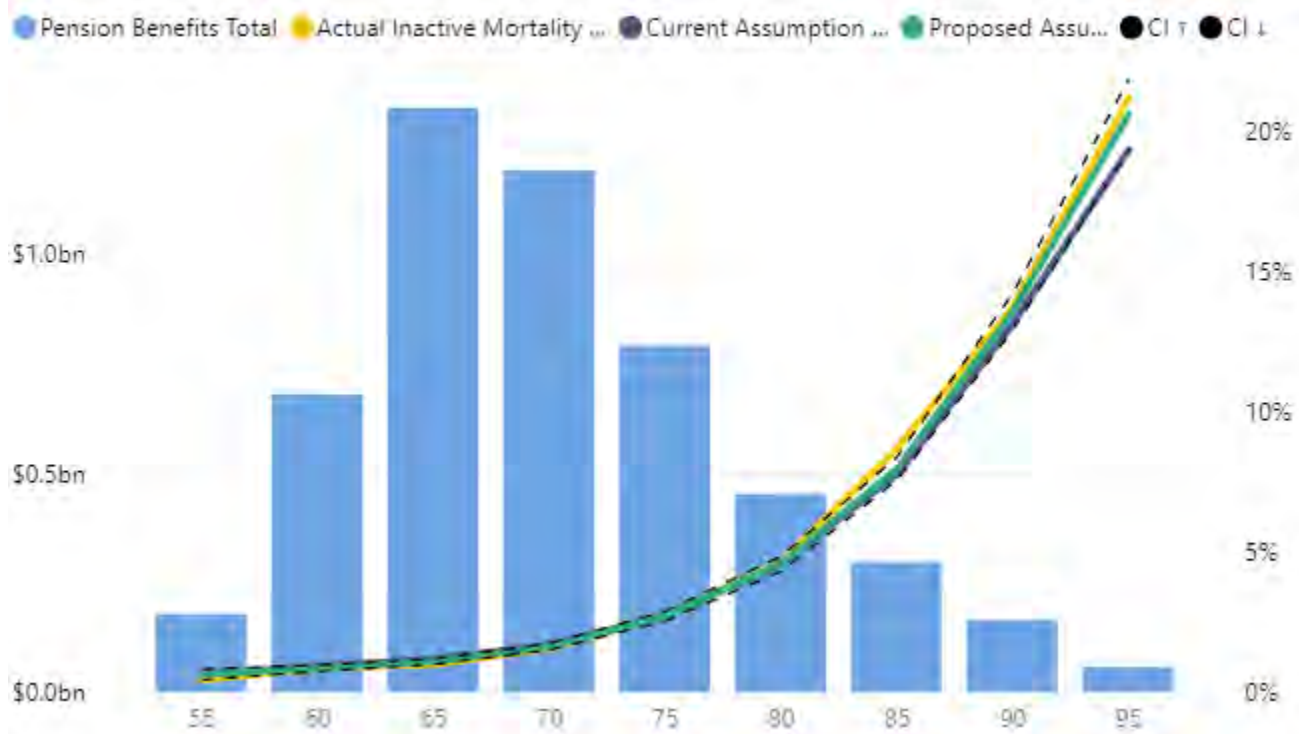
Please note that the charts by age are based on 5-year brackets. For example, the age bracket 75 should be interpreted as the interval 75 – 79.

Amount-weighted

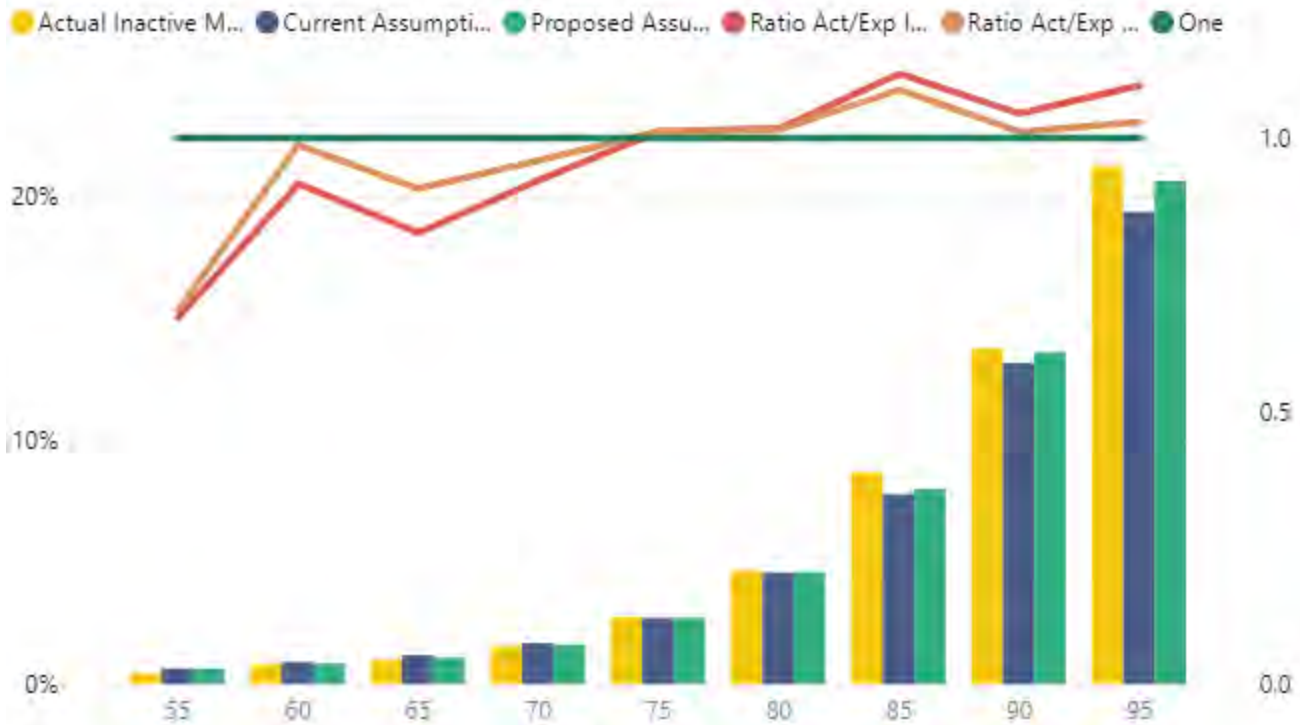
Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
55	\$0.8M	\$1.1M	\$177.1M	0.4237%	0.6317%	▲ 0.67
60	\$5.6M	\$6.1M	\$679.6M	0.8268%	0.9028%	● 0.92
65	\$13.0M	\$15.8M	\$1,333.9M	0.9762%	1.1809%	▲ 0.83
70	\$18.4M	\$19.9M	\$1,191.8M	1.5418%	1.6710%	● 0.92
75	\$21.6M	\$21.4M	\$790.1M	2.7393%	2.7060%	● 1.01
80	\$20.9M	\$20.6M	\$451.1M	4.6378%	4.5578%	● 1.02
85	\$25.8M	\$23.1M	\$296.8M	8.6834%	7.7694%	▲ 1.12
90	\$22.6M	\$21.6M	\$164.5M	13.7390%	13.1508%	● 1.04
95	\$11.9M	\$10.9M	\$56.1M	21.2173%	19.3529%	● 1.10
Total	\$140.6M	\$140.4M	\$5,140.9M	2.7350%	2.7312%	● 1.00

Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
55	\$0.8M	\$1.1M	\$177.1M	0.4237%	0.6182%	▲ 0.69
60	\$5.6M	\$5.7M	\$679.6M	0.8268%	0.8376%	● 0.99
65	\$13.0M	\$14.3M	\$1,333.9M	0.9762%	1.0757%	● 0.91
70	\$18.4M	\$19.2M	\$1,191.8M	1.5418%	1.6075%	● 0.96
75	\$21.6M	\$21.4M	\$790.1M	2.7393%	2.7062%	● 1.01
80	\$20.9M	\$20.6M	\$451.1M	4.6378%	4.5686%	● 1.02
85	\$25.8M	\$23.7M	\$296.8M	8.6834%	7.9779%	● 1.09
90	\$22.6M	\$22.3M	\$164.5M	13.7390%	13.5852%	● 1.01
95	\$11.9M	\$11.6M	\$56.1M	21.2173%	20.6089%	● 1.03
Total	\$140.6M	\$139.9M	\$5,140.9M	2.7350%	2.7207%	● 1.01

Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



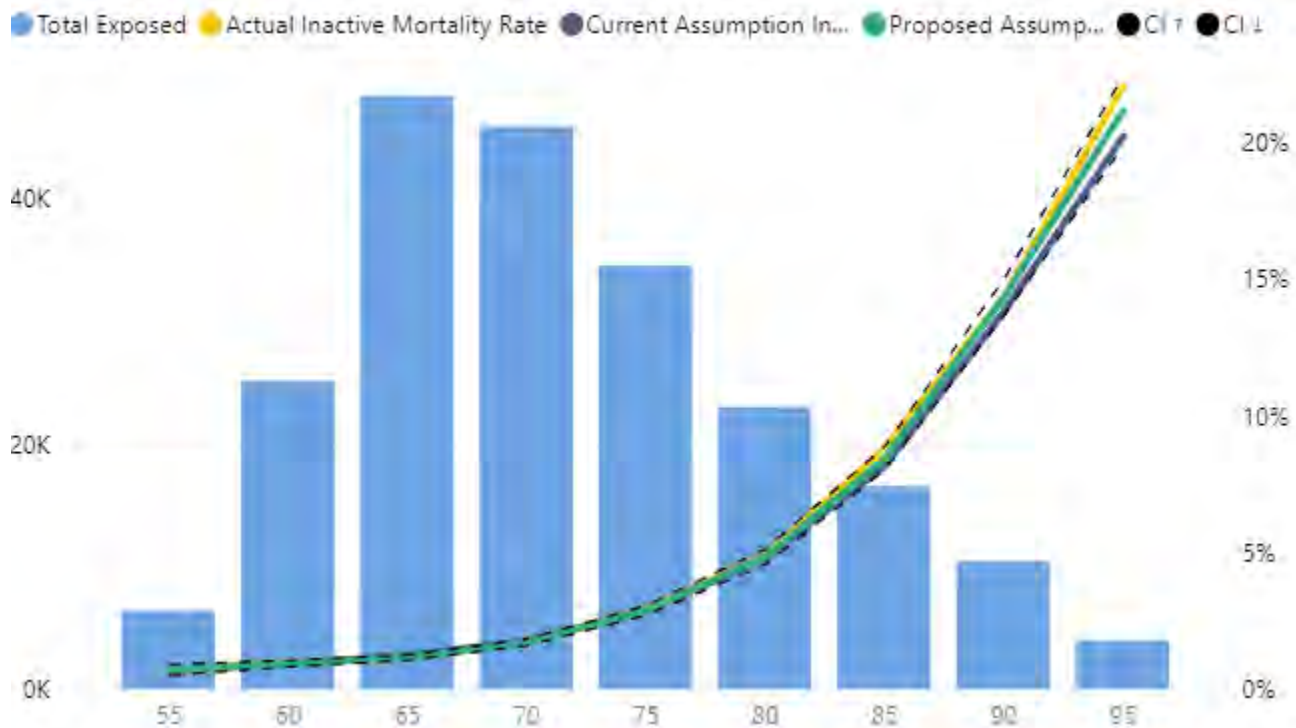
Headcount-weighted

The following charts show postretirement mortality experience on a headcount-weighted basis by age band for the age range (55 to 99) during the period 2015 – 2019 for females on the current and proposed assumptions for all non-public safety members of NYCERS. The A/E decreased from 1.03 to 1.02.

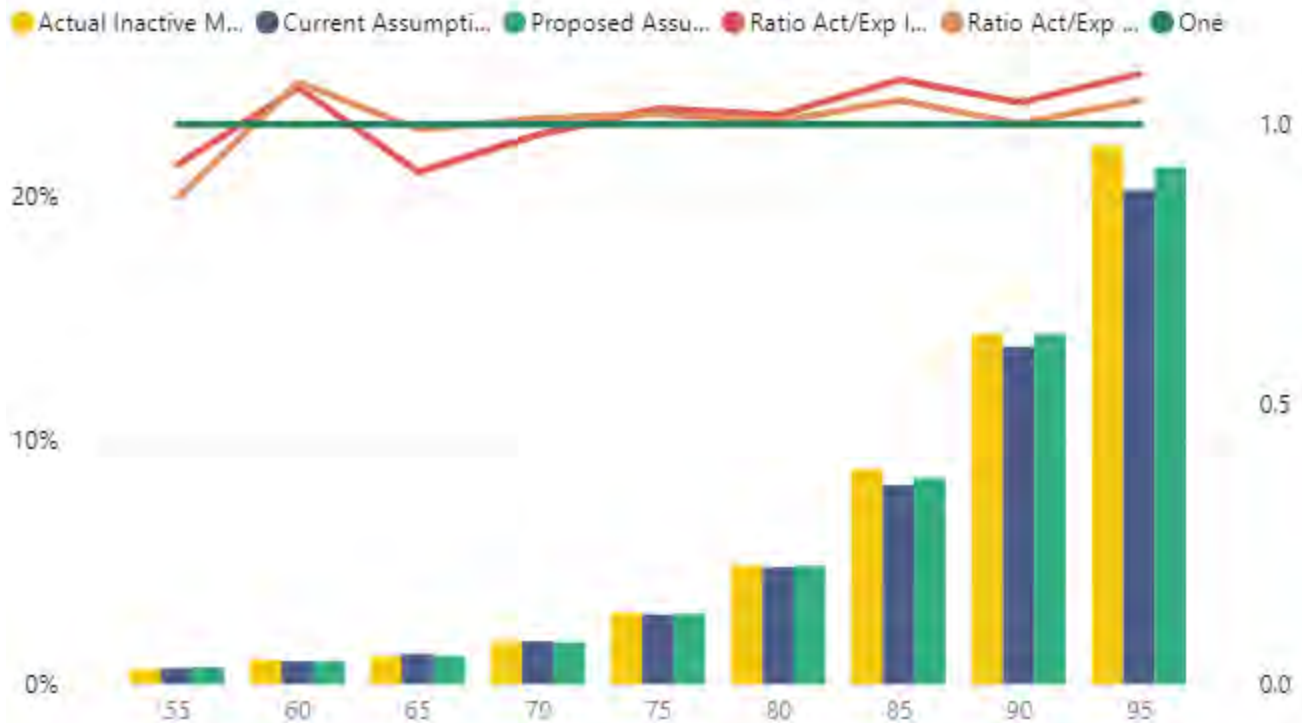
Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
55	38	40.9	6,348	0.5986%	0.6447%	0.93
60	249	233.7	25,115	0.9914%	0.9307%	1.07
65	544	594.6	48,394	1.1241%	1.2287%	0.91
70	788	802.4	45,896	1.7169%	1.7484%	0.98
75	1,009	981.3	34,519	2.9230%	2.8428%	1.03
80	1,117	1,098.6	22,977	4.8614%	4.7814%	1.02
85	1,454	1,346.4	16,526	8.7983%	8.1470%	1.08
90	1,499	1,442.8	10,438	14.3610%	13.8226%	1.04
95	872	799.8	3,952	22.0648%	20.2371%	1.09
Total	7,570	7,340.6	214,165	3.5347%	3.4275%	1.03

Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
55	38	43.7	6,348	0.5986%	0.6887%	0.87
60	249	231.6	25,115	0.9914%	0.9221%	1.08
65	544	548.9	48,394	1.1241%	1.1343%	0.99
70	788	779.9	45,896	1.7169%	1.6993%	1.01
75	1,009	990.4	34,519	2.9230%	2.8690%	1.02
80	1,117	1,110.8	22,977	4.8614%	4.8343%	1.01
85	1,454	1,394.3	16,526	8.7983%	8.4369%	1.04
90	1,499	1,496.1	10,438	14.3610%	14.3328%	1.00
95	872	836.4	3,952	22.0648%	21.1633%	1.04
Total	7,570	7,432.0	214,165	3.5347%	3.4702%	1.02

Exposure Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



Summary

We have proposed new assumptions to better reflect recent non-pandemic experience. In total, the proposed mortality tables are anticipated to increase plan liabilities for younger retirement ages up to about late-60s and then anticipated to decrease plan liabilities for older retirement ages. We would anticipate that this would increase plan liabilities for current active members but reduce liabilities for retirees. The actual impact will depend on the relative change for each group.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: PLAN GROUPS OTHER THAN HOUSING POLICE AND TRANSIT POLICE BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
15	0.0105%	0.0092%	68	1.8256%	1.3605%
16	0.0142%	0.0112%	69	1.9386%	1.4332%
17	0.0191%	0.0122%	70	2.0542%	1.5007%
18	0.0222%	0.0133%	71	2.2359%	1.6745%
19	0.0240%	0.0143%	72	2.4230%	1.8463%
20	0.0251%	0.0145%	73	2.6165%	2.0157%
21	0.0268%	0.0153%	74	2.8157%	2.1838%
22	0.0284%	0.0161%	75	3.0220%	2.3492%
23	0.0301%	0.0171%	76	3.4928%	2.6652%
24	0.0315%	0.0183%	77	3.9787%	2.9831%
25	0.0327%	0.0195%	78	4.4792%	3.3011%
26	0.0342%	0.0208%	79	4.9963%	3.6207%
27	0.0354%	0.0221%	80	5.5282%	3.9391%
28	0.0371%	0.0236%	81	6.1051%	4.4386%
29	0.0394%	0.0252%	82	6.6894%	4.9473%
30	0.0427%	0.0270%	83	7.2805%	5.4665%
31	0.0495%	0.0330%	84	7.8749%	5.9942%
32	0.0562%	0.0384%	85	8.4753%	6.5354%
33	0.0625%	0.0431%	86	9.6136%	7.4659%
34	0.0682%	0.0471%	87	10.8005%	8.3995%
35	0.0743%	0.0511%	88	12.0443%	9.3428%
36	0.0780%	0.0542%	89	13.3397%	10.2918%
37	0.0818%	0.0579%	90	14.6958%	11.2477%
38	0.0861%	0.0618%	91	16.4185%	12.8868%
39	0.0917%	0.0666%	92	18.1416%	14.4887%
40	0.0997%	0.0719%	93	19.8574%	16.0801%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
CURRENT (continued)
PROBABILITIES OF MORTALITY FOR SERVICE RETIREES:
PLAN GROUPS OTHER THAN HOUSING POLICE AND TRANSIT POLICE
BASE TABLE

Age	Males ¹	Females ²	Age	Males ¹	Females ²
41	0.1394%	0.0775%	94	21.6187%	17.5854%
42	0.1774%	0.0859%	95	23.5884%	19.0626%
43	0.2143%	0.0968%	96	25.4266%	20.2474%
44	0.2507%	0.1111%	97	27.2119%	21.2937%
45	0.2875%	0.1287%	98	29.0202%	22.0663%
46	0.3207%	0.1501%	99	30.6654%	22.5443%
47	0.3534%	0.1748%	100	32.1584%	22.6473%
48	0.3849%	0.2022%	101	33.7521%	23.5294%
49	0.4150%	0.2319%	102	35.1259%	24.5619%
50	0.4431%	0.2633%	103	36.3671%	25.7825%
51	0.5156%	0.2999%	104	37.3834%	27.1635%
52	0.5928%	0.3376%	105	38.1051%	28.6530%
53	0.6740%	0.3762%	106	38.4698%	30.2169%
54	0.7583%	0.4151%	107	38.6325%	31.8182%
55	0.8440%	0.4540%	108	38.8076%	33.4131%
56	0.9048%	0.5132%	109	38.9794%	34.9566%
57	0.9604%	0.5735%	110	50.0000%	50.0000%
58	1.0101%	0.6353%	111	50.0000%	50.0000%
59	1.0536%	0.6981%	112	50.0000%	50.0000%
60	1.0919%	0.7631%	113	50.0000%	50.0000%
61	1.1835%	0.8329%	114	50.0000%	50.0000%
62	1.2676%	0.8908%	115	50.0000%	50.0000%
63	1.3473%	0.9493%	116	50.0000%	50.0000%
64	1.4238%	1.0146%	117	50.0000%	50.0000%
65	1.4985%	1.0876%	118	50.0000%	50.0000%
66	1.6059%	1.1681%	119	50.0000%	50.0000%
67	1.7146%	1.2609%	120	100.0000%	100.0000%

¹ An adjustment factor of 0.89 is applied to the probabilities above to develop benefit weighted probabilities of mortality

² An adjustment factor of 0.951 is applied to the probabilities above to develop benefit weighted probabilities of mortality

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: NON-PUBLIC SAFETY ¹ BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0098%	0.0092%	68	1.4052%	1.1301%
16	0.0133%	0.0112%	69	1.4911%	1.1930%
17	0.0178%	0.0122%	70	1.5981%	1.2559%
18	0.0207%	0.0133%	71	1.7620%	1.4128%
19	0.0224%	0.0143%	72	1.9370%	1.5743%
20	0.0249%	0.0158%	73	2.1259%	1.7400%
21	0.0268%	0.0167%	74	2.3286%	1.9109%
22	0.0287%	0.0179%	75	2.5468%	2.0857%
23	0.0310%	0.0193%	76	3.0028%	2.4015%
24	0.0331%	0.0210%	77	3.4912%	2.7015%
25	0.0352%	0.0227%	78	3.9750%	3.0052%
26	0.0377%	0.0246%	79	4.4847%	3.3121%
27	0.0399%	0.0266%	80	4.9741%	3.6206%
28	0.0428%	0.0288%	81	5.5076%	4.0974%
29	0.0464%	0.0312%	82	6.0518%	4.5844%
30	0.0511%	0.0338%	83	6.6038%	5.0823%
31	0.0603%	0.0418%	84	7.2286%	5.5898%
32	0.0693%	0.0488%	85	7.8748%	6.1709%
33	0.0776%	0.0548%	86	9.0370%	7.1321%
34	0.0852%	0.0597%	87	10.2677%	8.1149%
35	0.0928%	0.0642%	88	11.6800%	9.0381%
36	0.0969%	0.0671%	89	13.1877%	9.9631%
37	0.1004%	0.0703%	90	14.5443%	10.8885%
38	0.1041%	0.0733%	91	16.2640%	12.4740%
39	0.1084%	0.0769%	92	17.9673%	14.0133%
40	0.1149%	0.0808%	93	19.6528%	15.5338%

¹ Includes General, Sanitation, TBTA, and Transit

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: NON-PUBLIC SAFETY ¹ BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
41	0.1560%	0.0845%	94	21.3680%	16.9539%
42	0.1924%	0.0910%	95	23.2588%	18.3338%
43	0.2250%	0.0997%	96	25.1066%	19.6764%
44	0.2550%	0.1116%	97	26.9100%	21.1107%
45	0.2839%	0.1266%	98	28.7444%	22.7286%
46	0.3084%	0.1450%	99	30.4381%	24.2986%
47	0.3321%	0.1667%	100	31.9810%	25.9216%
48	0.3551%	0.1913%	101	33.6300%	27.8462%
49	0.3777%	0.2189%	102	35.0621%	30.0228%
50	0.3996%	0.2490%	103	36.3740%	32.0472%
51	0.4630%	0.2856%	104	37.4618%	34.3197%
52	0.5323%	0.3249%	105	38.2502%	36.2561%
53	0.6074%	0.3671%	106	38.6977%	38.2886%
54	0.6882%	0.4114%	107	38.9316%	40.3742%
55	0.7732%	0.4571%	108	39.1825%	42.4618%
56	0.8224%	0.5143%	109	39.4349%	44.4900%
57	0.8664%	0.5761%	110	40.4743%	46.1729%
58	0.9037%	0.6374%	111	40.5799%	47.7496%
59	0.9330%	0.6961%	112	40.6815%	48.6280%
60	0.9544%	0.7525%	113	40.7834%	48.7450%
61	1.0174%	0.8080%	114	40.8979%	48.8622%
62	1.0672%	0.8373%	115	49.9850%	49.9900%
63	1.1060%	0.8612%	116	49.9950%	49.9950%
64	1.1352%	0.8858%	117	50.0000%	50.0000%
65	1.1563%	0.9129%	118	50.0000%	50.0000%
66	1.2394%	0.9749%	119	50.0000%	50.0000%
67	1.3219%	1.0483%	120	100.0000%	100.0000%

¹ Includes General, Sanitation, TBTA, and Transit

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: NON-PUBLIC SAFETY ¹ BASE YEAR 2019 COUNT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0115%	0.0102%	68	1.6387%	1.1895%
16	0.0156%	0.0124%	69	1.7338%	1.2557%
17	0.0210%	0.0135%	70	1.8528%	1.3220%
18	0.0244%	0.0148%	71	2.0370%	1.4872%
19	0.0264%	0.0159%	72	2.2329%	1.6572%
20	0.0292%	0.0174%	73	2.4435%	1.8317%
21	0.0315%	0.0186%	74	2.6688%	2.0115%
22	0.0338%	0.0199%	75	2.8941%	2.1954%
23	0.0365%	0.0214%	76	3.3739%	2.5279%
24	0.0389%	0.0233%	77	3.8791%	2.8437%
25	0.0414%	0.0253%	78	4.3681%	3.1635%
26	0.0443%	0.0274%	79	4.8746%	3.4865%
27	0.0469%	0.0295%	80	5.3486%	3.8111%
28	0.0503%	0.0320%	81	5.8592%	4.3130%
29	0.0545%	0.0347%	82	6.3703%	4.8257%
30	0.0602%	0.0376%	83	6.8790%	5.3498%
31	0.0709%	0.0464%	84	7.4908%	5.8839%
32	0.0815%	0.0543%	85	8.1183%	6.4957%
33	0.0914%	0.0610%	86	9.2926%	7.5076%
34	0.1001%	0.0663%	87	10.5310%	8.5420%
35	0.1091%	0.0713%	88	11.9488%	9.5138%
36	0.1139%	0.0745%	89	13.4568%	10.4874%
37	0.1182%	0.0781%	90	14.8034%	11.4615%
38	0.1224%	0.0814%	91	16.5117%	13.1304%
39	0.1276%	0.0855%	92	18.1488%	14.7508%
40	0.1352%	0.0897%	93	19.7515%	16.1810%

¹ Includes General, Sanitation, TBTA, and Transit

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: NON-PUBLIC SAFETY ¹ BASE YEAR 2019 COUNT WEIGHTED					
Age	Males	Females	Age	Males	Females
41	0.1836%	0.0938%	94	21.4216%	17.6603%
42	0.2263%	0.1011%	95	23.2588%	19.0977%
43	0.2647%	0.1108%	96	25.1066%	20.2849%
44	0.3000%	0.1240%	97	26.9100%	21.5415%
45	0.3340%	0.1406%	98	28.7444%	22.9582%
46	0.3628%	0.1611%	99	30.4381%	24.2986%
47	0.3907%	0.1852%	100	31.9810%	25.9216%
48	0.4178%	0.2125%	101	33.6300%	27.8462%
49	0.4444%	0.2431%	102	35.0621%	30.0228%
50	0.4701%	0.2767%	103	36.3740%	32.0472%
51	0.5447%	0.3173%	104	37.4618%	34.3197%
52	0.6262%	0.3610%	105	38.2502%	36.2561%
53	0.7146%	0.4079%	106	38.6977%	38.2886%
54	0.8096%	0.4571%	107	38.9316%	40.3742%
55	0.9097%	0.5079%	108	39.1825%	42.4618%
56	0.9675%	0.5715%	109	39.4349%	44.4900%
57	1.0191%	0.6402%	110	40.4743%	46.1729%
58	1.0632%	0.7082%	111	40.5799%	47.7496%
59	1.0977%	0.7735%	112	40.6815%	48.6280%
60	1.1229%	0.8362%	113	40.7834%	48.7450%
61	1.1969%	0.8978%	114	40.8979%	48.8622%
62	1.2554%	0.9303%	115	49.9850%	49.9900%
63	1.3013%	0.9569%	116	49.9950%	49.9950%
64	1.3355%	0.9577%	117	50.0000%	50.0000%
65	1.3604%	0.9610%	118	50.0000%	50.0000%
66	1.4538%	1.0261%	119	50.0000%	50.0000%
67	1.5461%	1.1035%	120	100.0000%	100.0000%

¹ Includes General, Sanitation, TBTA, and Transit

Postretirement Mortality – Public Safety Service Retirees

The current assumption is the same for all NYCERS members except for a closed group of Transit and Housing Police retirees. In our analysis, we separated the experience of Correction officers as their experience was more consistent with the SOA public safety tables.

For Correction Officers, we propose the Below Median PubS table without further adjustment. The SOA provides separate mortality tables for members who are above median or below median. Those below median have an average benefit less than the total group and have higher rates of mortality. For POLICE, the base PubS table is proposed and the average benefit for Correction officers is more than \$10,000 less than the average benefit for POLICE members. We found the Below Median PubS table to be the best fit to the experience of Correction officers, although that experience is only partially credible. Separate tables exist on a headcount-weighted and amount-weighted basis.

For Housing and Transit Police, we propose the PubS table without further adjustment. Separate tables exist on a headcount-weighted and amount-weighted basis.

The following charts show postretirement mortality experience on a headcount-weighted basis by year for the age range (50 to 99) during the period 2015 – 2019 for both males and females combined on the current and proposed assumptions for all public safety members of NYCERS. The A/E increased from 0.93 to 0.98. For Correction officers, it increased from 0.87 to 0.95 and for Housing and Transit Police, it decreased from 1.05 to 1.01.

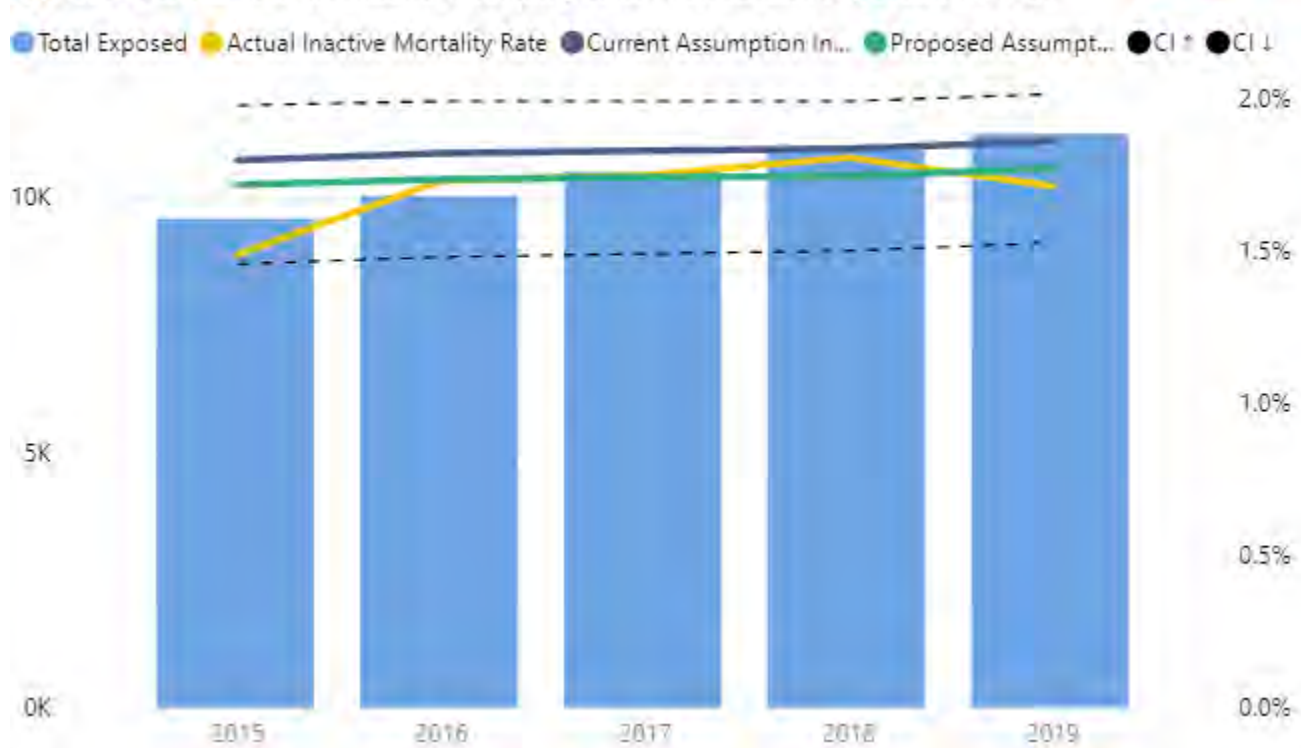
Current Assumption – Headcount-weighted

Plan Year	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
2015	142	171.7	9,555	1.4861%	1.7969%	0.83
2016	173	182.0	10,002	1.7297%	1.8197%	0.95
2017	183	191.6	10,478	1.7465%	1.8283%	0.96
2018	197	200.2	10,910	1.8057%	1.8346%	0.98
2019	192	208.6	11,222	1.7109%	1.8587%	0.92
Total	887	954.0	52,167	1.7003%	1.8287%	0.93

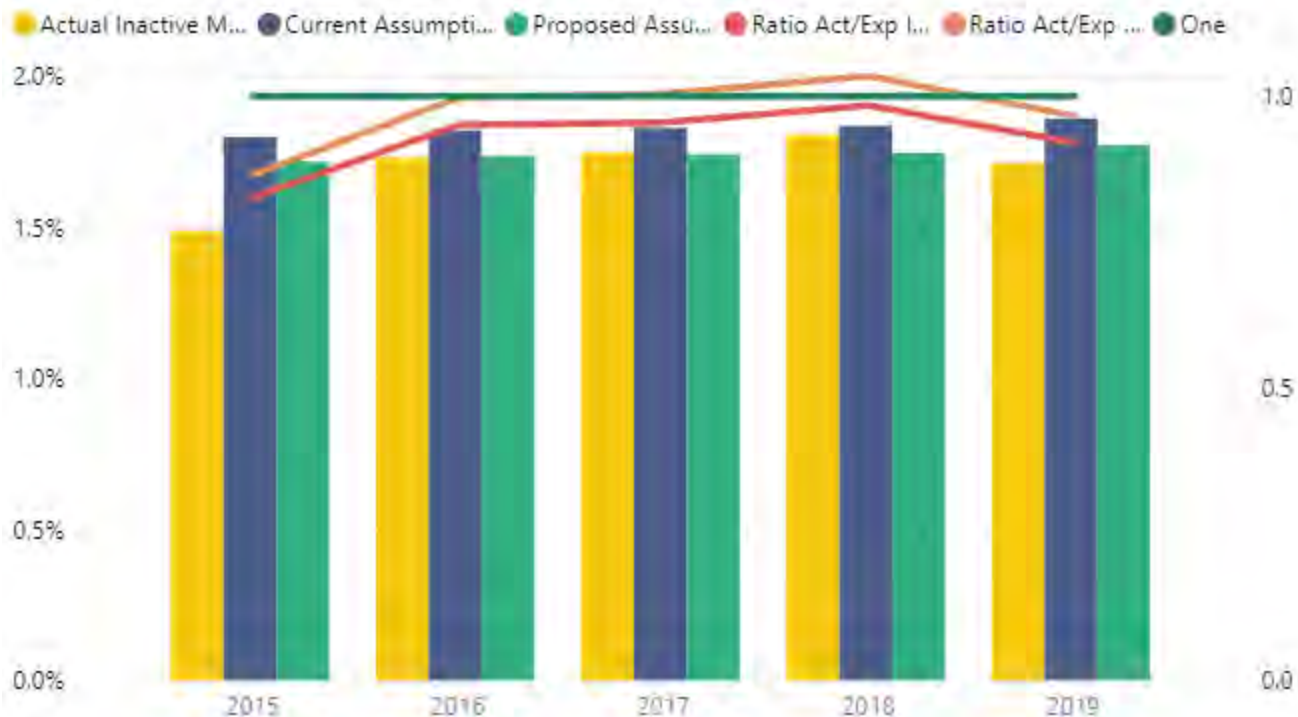
Proposed Assumption– Headcount-weighted

Plan Year	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
2015	142	164.0	9,555	1.4861%	1.7163%	0.87
2016	173	173.5	10,002	1.7297%	1.7346%	1.00
2017	183	182.3	10,478	1.7465%	1.7400%	1.00
2018	197	190.3	10,910	1.8057%	1.7447%	1.03
2019	192	198.6	11,222	1.7109%	1.7701%	0.97
Total	887	908.8	52,167	1.7003%	1.7421%	0.98

Exposure Distribution w/ Inactive Mortality Rate - Actual and Expected; by Year



Inactive Mortality Rate - Actual, Expected, and Ratio; by Year



Actual vs. Expected - Inactive Mortality Proposed w/ Exposure Bubbles; by Year



The following charts show postretirement mortality experience on an amount-weighted basis by year for the age range (50 to 99) during the period 2015 – 2019 for both males and females combined on the current and proposed assumptions for all public safety members of NYCERS. The A/E ratio increased from 0.97 to 1.03. For Correction officers, it increased from 0.91 to 1.00 and for Housing and Transit Police, it decreased from 1.12 to 1.10.

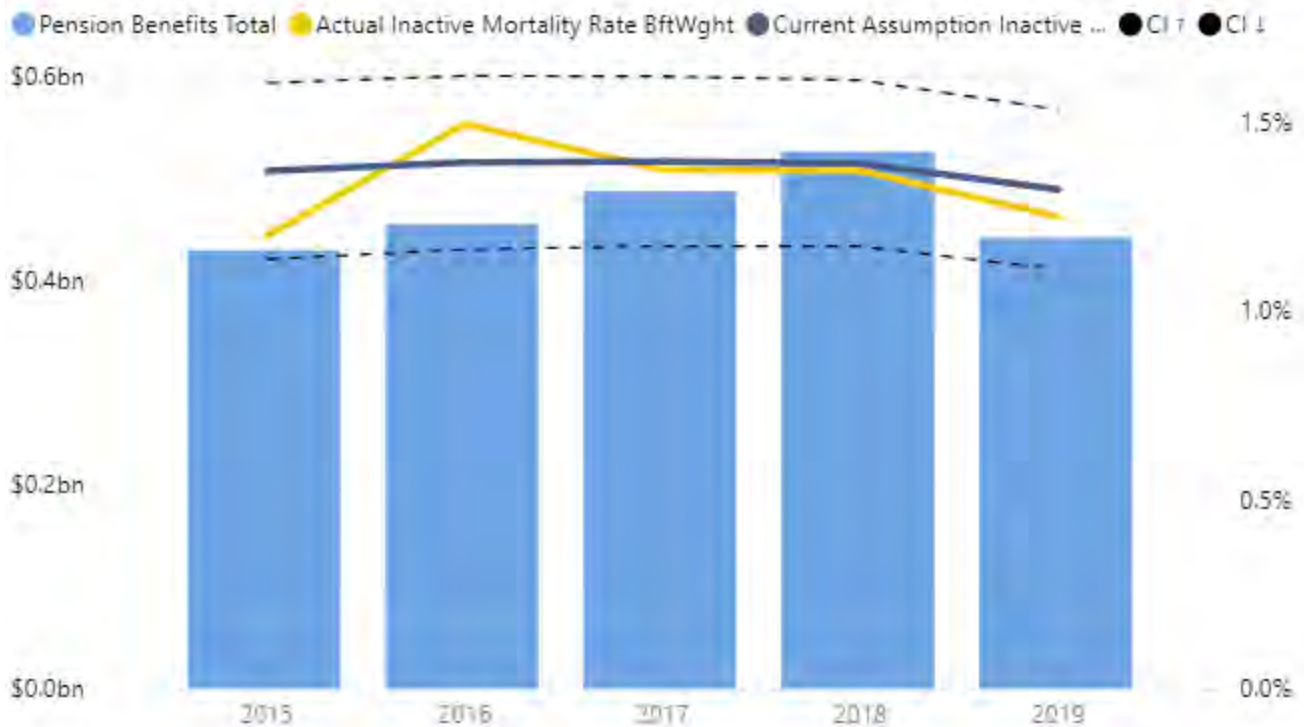
Current Assumption – Amount-weighted

Plan Year	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
2015	\$5.1M	\$5.9M	\$428.9M	1.1963%	1.3681%	0.87
2016	\$6.8M	\$6.3M	\$454.7M	1.4928%	1.3906%	1.07
2017	\$6.7M	\$6.8M	\$487.0M	1.3717%	1.3942%	0.98
2018	\$7.2M	\$7.3M	\$525.7M	1.3699%	1.3886%	0.99
2019	\$5.5M	\$5.8M	\$441.3M	1.2465%	1.3198%	0.94
Total	\$31.3M	\$32.1M	\$2,337.7M	1.3390%	1.3734%	0.97

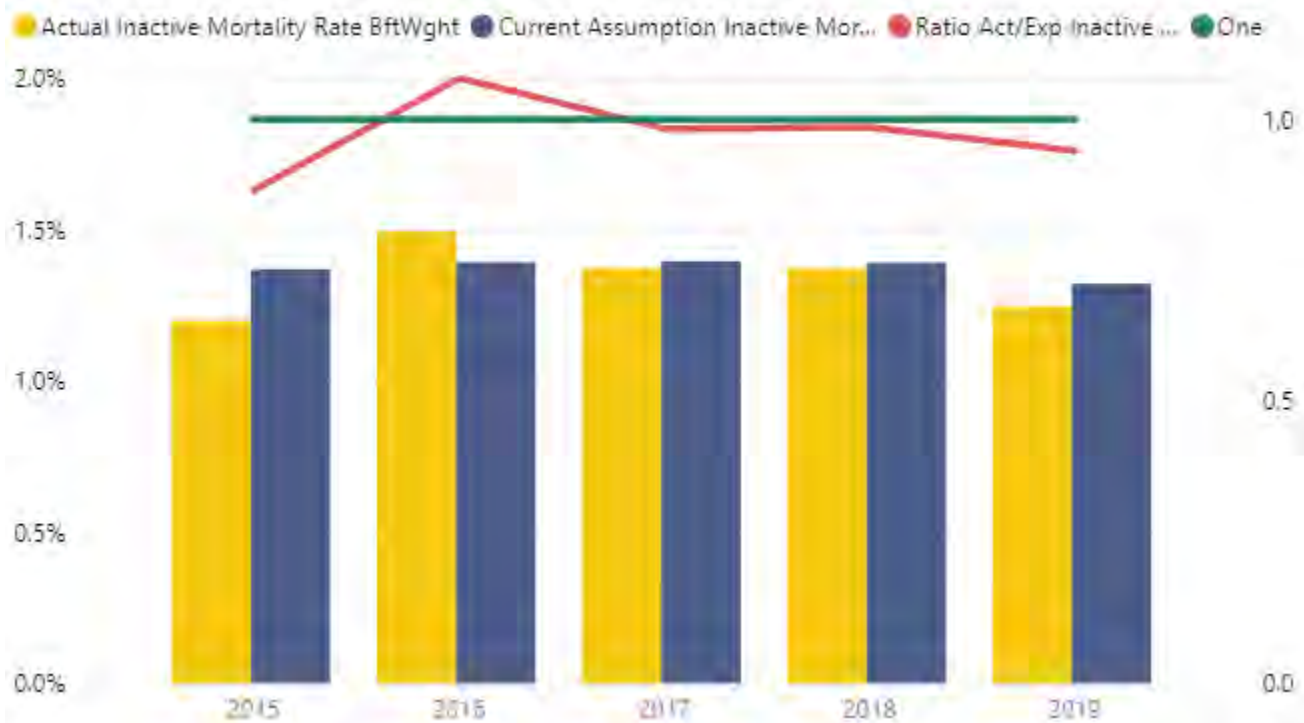
Proposed Assumption – Amount-weighted

Plan Year	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
2015	\$5.1M	\$5.6M	\$428.9M	1.1963%	1.2942%	0.92
2016	\$6.8M	\$6.0M	\$454.7M	1.4928%	1.3161%	1.13
2017	\$6.7M	\$6.4M	\$487.0M	1.3717%	1.3166%	1.04
2018	\$7.2M	\$6.9M	\$525.7M	1.3699%	1.3097%	1.05
2019	\$5.5M	\$5.4M	\$441.3M	1.2465%	1.2328%	1.01
Total	\$31.3M	\$30.3M	\$2,337.7M	1.3390%	1.2950%	1.03

Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Year



Inactive Mortality Rate - Actual, Expected, and Ratio; by Year



Actual vs. Expected - Inactive Mortality Rate w/ Benefit Bubbles; by Year



The following section displays results for Correction Officers separately from Transit and Housing Police.

Correction Officers – Males and Females

The following charts show postretirement mortality experience on an amount-weighted basis by age band for the age range (50 to 99) during the period 2015 – 2019 for males and females combined on the current and proposed assumptions for Correction officers. While the A/E increased from 0.91 to 1.00, the overall fit improved. For ages 50 to 69, the A/E increased from 0.74 to 0.96 and for ages 70 – 99, the A/E decreased from 1.23 to 1.04.

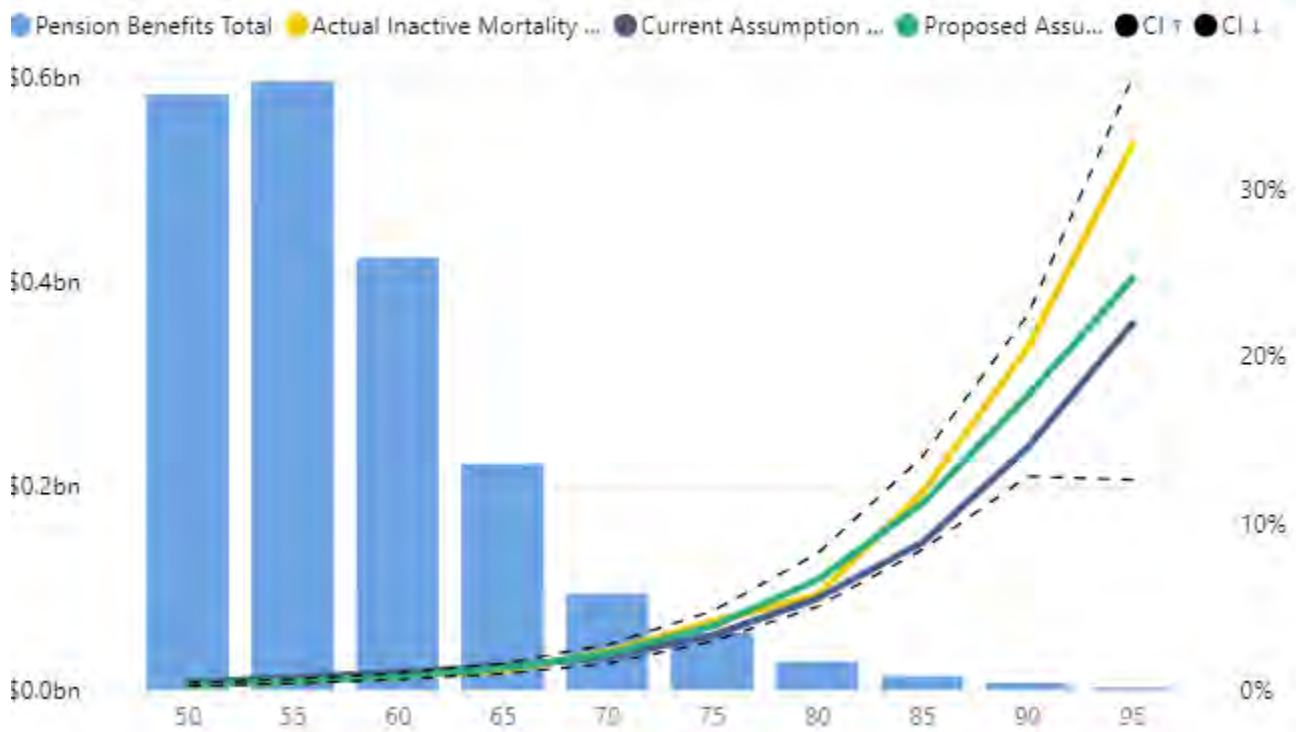
The following section displays results by age for males and females combined since there is nearly no female experience. Please note that the charts by age are based on 5-year brackets. For example, the age bracket 75 should be interpreted as the interval 75 – 79.

Amount-weighted

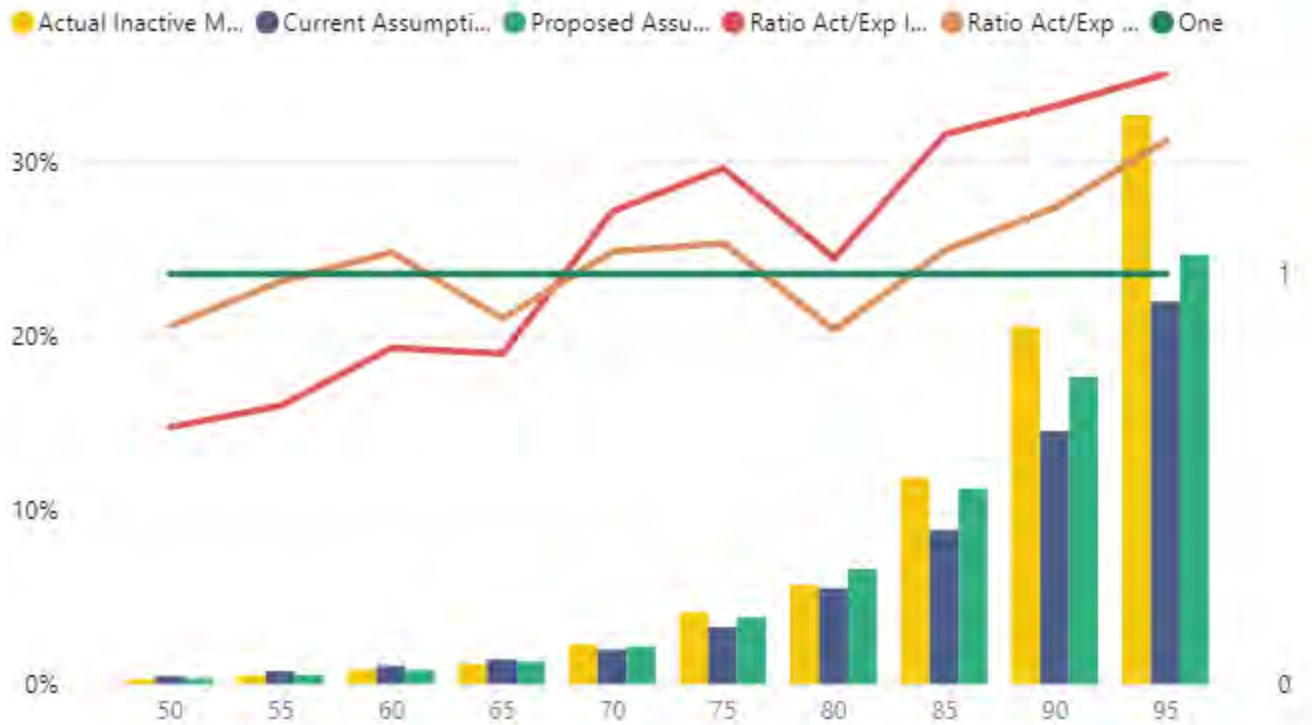
Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
50	\$1.6M	\$2.6M	\$582.9M	0.2811%	0.4492%	▲ 0.63
55	\$3.0M	\$4.4M	\$595.6M	0.4962%	0.7314%	▲ 0.68
60	\$3.6M	\$4.3M	\$423.2M	0.8417%	1.0274%	▲ 0.82
65	\$2.5M	\$3.1M	\$221.0M	1.1309%	1.4040%	▲ 0.81
70	\$2.1M	\$1.9M	\$94.5M	2.2576%	1.9579%	▲ 1.15
75	\$2.3M	\$1.8M	\$55.9M	4.0956%	3.2580%	▲ 1.26
80	\$1.6M	\$1.5M	\$27.8M	5.6832%	5.4759%	● 1.04
85	\$1.5M	\$1.2M	\$13.0M	11.8406%	8.8340%	▲ 1.34
90	\$1.4M	\$1.0M	\$6.8M	20.4632%	14.5165%	▲ 1.41
95	\$0.4M	\$0.3M	\$1.1M	32.6402%	21.9366%	▲ 1.49
Total	\$20.0M	\$22.0M	\$2,021.9M	0.9874%	1.0884%	● 0.91

Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
50	\$1.6M	\$1.9M	\$582.9M	0.2811%	0.3224%	▲ 0.87
55	\$3.0M	\$3.0M	\$595.6M	0.4962%	0.5050%	● 0.98
60	\$3.6M	\$3.4M	\$423.2M	0.8417%	0.7997%	● 1.05
65	\$2.5M	\$2.8M	\$221.0M	1.1309%	1.2688%	▲ 0.89
70	\$2.1M	\$2.0M	\$94.5M	2.2576%	2.1395%	● 1.06
75	\$2.3M	\$2.1M	\$55.9M	4.0956%	3.8118%	● 1.07
80	\$1.6M	\$1.8M	\$27.8M	5.6832%	6.5841%	▲ 0.86
85	\$1.5M	\$1.5M	\$13.0M	11.8406%	11.1970%	● 1.06
90	\$1.4M	\$1.2M	\$6.8M	20.4632%	17.6095%	▲ 1.16
95	\$0.4M	\$0.3M	\$1.1M	32.6402%	24.6220%	▲ 1.33
Total	\$20.0M	\$20.0M	\$2,021.9M	0.9874%	0.9889%	● 1.00

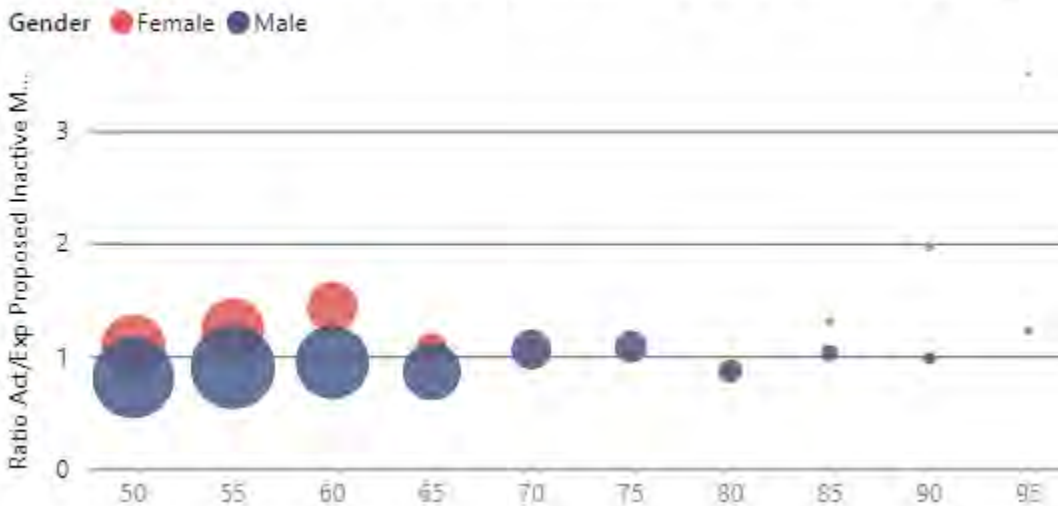
Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



Actual vs. Expected - Inactive Mortality Proposed w/ Benefit Bubbles; by Age



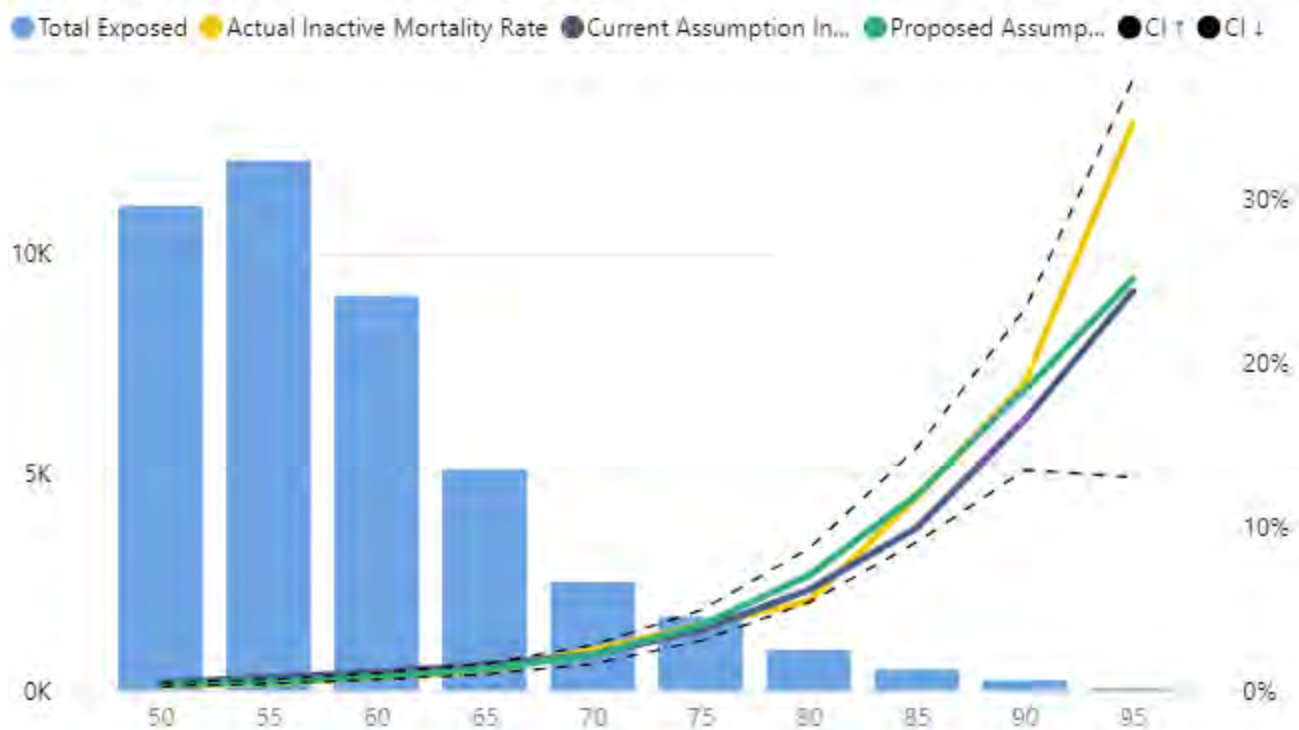
Headcount-weighted

The following charts show postretirement mortality experience on a headcount-weighted basis by age band for the age range (50 to 99) during the period 2015 – 2019 for males and females combined on the current and proposed assumptions for Correction officers. The A/E increased from 0.87 to 0.95.

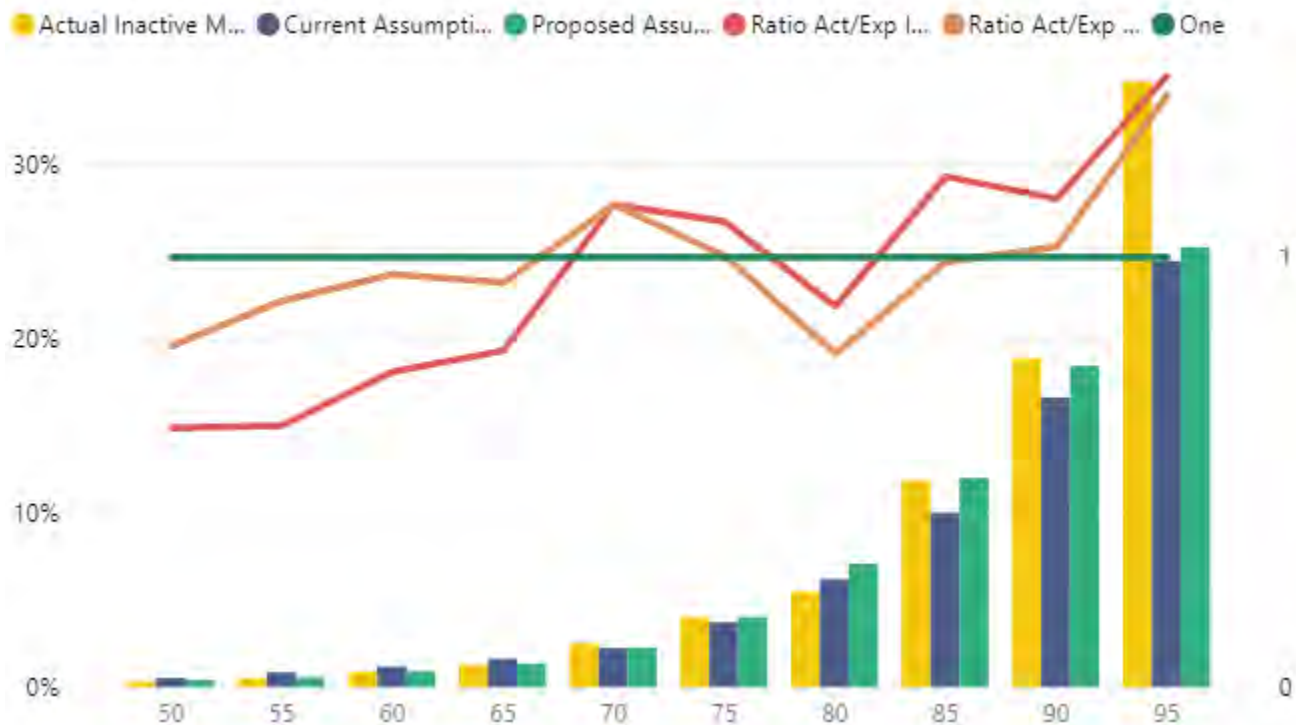
Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
50	34	56.5	11,088	0.3066%	0.5093%	▲ 0.60
55	61	100.3	12,126	0.5031%	0.8274%	▲ 0.61
60	77	105.0	9,038	0.8520%	1.1620%	▲ 0.73
65	63	80.5	5,065	1.2438%	1.5903%	▲ 0.78
70	62	55.3	2,489	2.4910%	2.2202%	▲ 1.12
75	68	62.8	1,697	4.0071%	3.6999%	● 1.08
80	51	57.5	933	5.4662%	6.1679%	▲ 0.89
85	58	48.8	490	11.8367%	9.9675%	▲ 1.19
90	45	39.6	239	18.8285%	16.5830%	▲ 1.14
95	17	12.0	49	34.6939%	24.4037%	▲ 1.42
Total	536	618.4	43,214	1.2403%	1.4310%	▲ 0.87

Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
50	34	42.9	11,088	0.3066%	0.3870%	▲ 0.79
55	61	67.9	12,126	0.5031%	0.5600%	▲ 0.90
60	77	80.2	9,038	0.8520%	0.8874%	● 0.96
65	63	67.0	5,065	1.2438%	1.3222%	● 0.94
70	62	55.3	2,489	2.4910%	2.2201%	▲ 1.12
75	68	67.8	1,697	4.0071%	3.9958%	● 1.00
80	51	65.8	933	5.4662%	7.0479%	▲ 0.78
85	58	58.6	490	11.8367%	11.9661%	● 0.99
90	45	44.0	239	18.8285%	18.3941%	● 1.02
95	17	12.3	49	34.6939%	25.1847%	▲ 1.38
Total	536	561.7	43,214	1.2403%	1.2999%	● 0.95

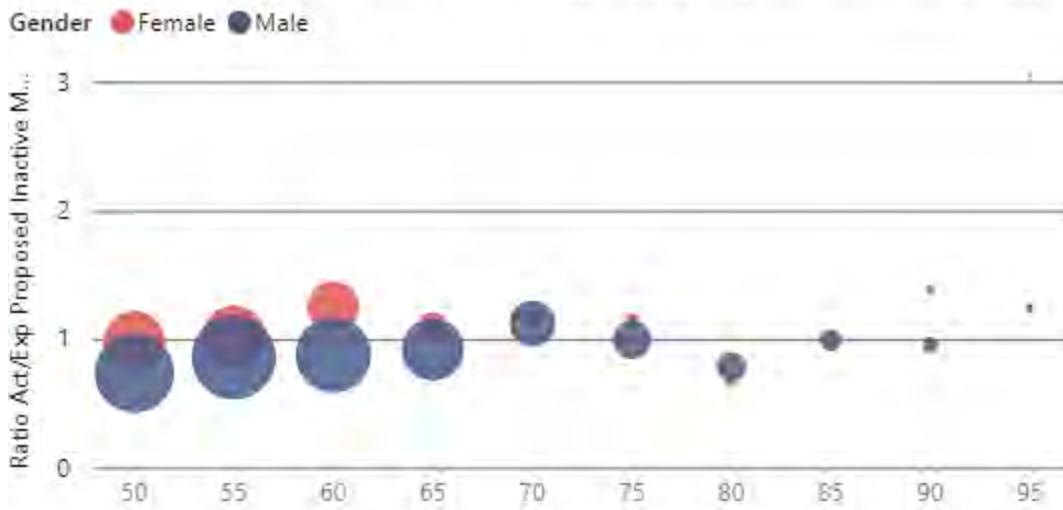
Exposure Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



Actual vs. Expected - Inactive Mortality Proposed w/ Exposure Bubbles; by Age



Summary

We have proposed new assumptions consistent with industry standards to better reflect recent non-pandemic experience. In total, the proposed mortality tables are anticipated to increase plan liabilities for younger retirement ages up to about age 60 for males, and then anticipated to decrease plan liabilities for older retirement ages. We would anticipate that this would increase plan liabilities for current active members but reduce liabilities for retirees. The actual impact will depend on the relative change for each group.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: PLAN GROUPS OTHER THAN HOUSING POLICE AND TRANSIT POLICE BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
15	0.0105%	0.0092%	68	1.8256%	1.3605%
16	0.0142%	0.0112%	69	1.9386%	1.4332%
17	0.0191%	0.0122%	70	2.0542%	1.5007%
18	0.0222%	0.0133%	71	2.2359%	1.6745%
19	0.0240%	0.0143%	72	2.4230%	1.8463%
20	0.0251%	0.0145%	73	2.6165%	2.0157%
21	0.0268%	0.0153%	74	2.8157%	2.1838%
22	0.0284%	0.0161%	75	3.0220%	2.3492%
23	0.0301%	0.0171%	76	3.4928%	2.6652%
24	0.0315%	0.0183%	77	3.9787%	2.9831%
25	0.0327%	0.0195%	78	4.4792%	3.3011%
26	0.0342%	0.0208%	79	4.9963%	3.6207%
27	0.0354%	0.0221%	80	5.5282%	3.9391%
28	0.0371%	0.0236%	81	6.1051%	4.4386%
29	0.0394%	0.0252%	82	6.6894%	4.9473%
30	0.0427%	0.0270%	83	7.2805%	5.4665%
31	0.0495%	0.0330%	84	7.8749%	5.9942%
32	0.0562%	0.0384%	85	8.4753%	6.5354%
33	0.0625%	0.0431%	86	9.6136%	7.4659%
34	0.0682%	0.0471%	87	10.8005%	8.3995%
35	0.0743%	0.0511%	88	12.0443%	9.3428%
36	0.0780%	0.0542%	89	13.3397%	10.2918%
37	0.0818%	0.0579%	90	14.6958%	11.2477%
38	0.0861%	0.0618%	91	16.4185%	12.8868%
39	0.0917%	0.0666%	92	18.1416%	14.4887%
40	0.0997%	0.0719%	93	19.8574%	16.0801%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
CURRENT (continued)
PROBABILITIES OF MORTALITY FOR SERVICE RETIREES:
PLAN GROUPS OTHER THAN HOUSING POLICE AND TRANSIT POLICE
BASE TABLE

Age	Males ¹	Females ²	Age	Males ¹	Females ²
41	0.1394%	0.0775%	94	21.6187%	17.5854%
42	0.1774%	0.0859%	95	23.5884%	19.0626%
43	0.2143%	0.0968%	96	25.4266%	20.2474%
44	0.2507%	0.1111%	97	27.2119%	21.2937%
45	0.2875%	0.1287%	98	29.0202%	22.0663%
46	0.3207%	0.1501%	99	30.6654%	22.5443%
47	0.3534%	0.1748%	100	32.1584%	22.6473%
48	0.3849%	0.2022%	101	33.7521%	23.5294%
49	0.4150%	0.2319%	102	35.1259%	24.5619%
50	0.4431%	0.2633%	103	36.3671%	25.7825%
51	0.5156%	0.2999%	104	37.3834%	27.1635%
52	0.5928%	0.3376%	105	38.1051%	28.6530%
53	0.6740%	0.3762%	106	38.4698%	30.2169%
54	0.7583%	0.4151%	107	38.6325%	31.8182%
55	0.8440%	0.4540%	108	38.8076%	33.4131%
56	0.9048%	0.5132%	109	38.9794%	34.9566%
57	0.9604%	0.5735%	110	50.0000%	50.0000%
58	1.0101%	0.6353%	111	50.0000%	50.0000%
59	1.0536%	0.6981%	112	50.0000%	50.0000%
60	1.0919%	0.7631%	113	50.0000%	50.0000%
61	1.1835%	0.8329%	114	50.0000%	50.0000%
62	1.2676%	0.8908%	115	50.0000%	50.0000%
63	1.3473%	0.9493%	116	50.0000%	50.0000%
64	1.4238%	1.0146%	117	50.0000%	50.0000%
65	1.4985%	1.0876%	118	50.0000%	50.0000%
66	1.6059%	1.1681%	119	50.0000%	50.0000%
67	1.7146%	1.2609%	120	100.0000%	100.0000%

¹ An adjustment factor of 0.89 is applied to the probabilities above to develop benefit weighted probabilities of mortality

² An adjustment factor of 0.951 is applied to the probabilities above to develop benefit weighted probabilities of mortality

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: CORRECTIONS BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0170%	0.0090%	68	1.5077%	1.0425%
16	0.0230%	0.0110%	69	1.6566%	1.1528%
17	0.0310%	0.0120%	70	1.8249%	1.2796%
18	0.0370%	0.0140%	71	2.0171%	1.4247%
19	0.0420%	0.0160%	72	2.2346%	1.5919%
20	0.0455%	0.0190%	73	2.4824%	1.7810%
21	0.0483%	0.0216%	74	2.7640%	1.9960%
22	0.0503%	0.0231%	75	3.0822%	2.2393%
23	0.0527%	0.0259%	76	3.4433%	2.5137%
24	0.0542%	0.0288%	77	3.8497%	2.8214%
25	0.0571%	0.0307%	78	4.3081%	3.1680%
26	0.0601%	0.0338%	79	4.8223%	3.5543%
27	0.0632%	0.0370%	80	5.4002%	3.9876%
28	0.0663%	0.0402%	81	6.0471%	4.4712%
29	0.0694%	0.0435%	82	6.7698%	5.0093%
30	0.0723%	0.0467%	83	7.5689%	5.6088%
31	0.0750%	0.0498%	84	8.4542%	6.2769%
32	0.0773%	0.0540%	85	9.4310%	7.0206%
33	0.0807%	0.0566%	86	10.5029%	7.8463%
34	0.0823%	0.0601%	87	11.6754%	8.7661%
35	0.0847%	0.0632%	88	12.9583%	9.7919%
36	0.0865%	0.0657%	89	14.3610%	10.9317%
37	0.0890%	0.0678%	90	15.8834%	12.1950%
38	0.0908%	0.0706%	91	17.4206%	13.5077%
39	0.0933%	0.0718%	92	18.9027%	14.8176%
40	0.0950%	0.0738%	93	20.3128%	16.1175%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: CORRECTIONS BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
41	0.0975%	0.0766%	94	21.6643%	17.4089%
42	0.0995%	0.0782%	95	22.9744%	18.7243%
43	0.1035%	0.0808%	96	24.4106%	20.1706%
44	0.1062%	0.0836%	97	25.9333%	21.7285%
45	0.2423%	0.0894%	98	27.5903%	23.4343%
46	0.2537%	0.0974%	99	29.4068%	25.2887%
47	0.2675%	0.1076%	100	31.3559%	27.2907%
48	0.2832%	0.1202%	101	33.3920%	29.3896%
49	0.3010%	0.1335%	102	35.4093%	31.5085%
50	0.3220%	0.1506%	103	37.4123%	33.6377%
51	0.3466%	0.1696%	104	39.3600%	35.7445%
52	0.3747%	0.1927%	105	41.2510%	37.8251%
53	0.4066%	0.2189%	106	43.0828%	39.8479%
54	0.4434%	0.2492%	107	44.8334%	41.8058%
55	0.4848%	0.2823%	108	46.4949%	43.6934%
56	0.5309%	0.3197%	109	48.0767%	45.4898%
57	0.5833%	0.3608%	110	49.3439%	47.1868%
58	0.6404%	0.4038%	111	49.4725%	48.7883%
59	0.7031%	0.4509%	112	49.5965%	49.6759%
60	0.7696%	0.4992%	113	49.7207%	49.7804%
61	0.8405%	0.5502%	114	49.8602%	49.8851%
62	0.9135%	0.6032%	115	49.9850%	49.9900%
63	0.9889%	0.6605%	116	49.9950%	49.9950%
64	1.0670%	0.7210%	117	50.0000%	50.0000%
65	1.1481%	0.7886%	118	50.0000%	50.0000%
66	1.2558%	0.8627%	119	50.0000%	50.0000%
67	1.3750%	0.9469%	120	100.0000%	100.0000%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: CORRECTIONS BASE YEAR 2019 COUNT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0170%	0.0090%	68	1.5231%	1.1301%
16	0.0230%	0.0110%	69	1.6727%	1.2423%
17	0.0310%	0.0120%	70	1.8492%	1.3696%
18	0.0380%	0.0140%	71	2.0560%	1.5154%
19	0.0430%	0.0160%	72	2.2944%	1.6810%
20	0.0465%	0.0190%	73	2.5628%	1.8694%
21	0.0503%	0.0216%	74	2.8607%	2.0812%
22	0.0535%	0.0243%	75	3.1943%	2.3195%
23	0.0559%	0.0259%	76	3.5700%	2.5871%
24	0.0587%	0.0288%	77	3.9977%	2.8851%
25	0.0617%	0.0319%	78	4.4875%	3.2182%
26	0.0648%	0.0350%	79	5.0545%	3.5871%
27	0.0681%	0.0370%	80	5.7086%	3.9989%
28	0.0726%	0.0402%	81	6.4544%	4.4712%
29	0.0758%	0.0435%	82	7.2907%	5.0093%
30	0.0789%	0.0480%	83	8.2087%	5.6088%
31	0.0830%	0.0511%	84	9.2018%	6.2769%
32	0.0855%	0.0540%	85	10.2581%	7.0206%
33	0.0889%	0.0579%	86	11.3742%	7.8463%
34	0.0905%	0.0614%	87	12.5560%	8.7661%
35	0.0929%	0.0645%	88	13.8167%	9.7919%
36	0.0960%	0.0670%	89	15.1725%	10.9317%
37	0.0970%	0.0703%	90	16.6347%	12.1950%
38	0.0999%	0.0718%	91	18.1246%	13.5077%
39	0.1008%	0.0741%	92	19.5853%	14.8176%
40	0.1035%	0.0771%	93	21.0059%	16.1175%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: CORRECTIONS BASE YEAR 2019 COUNT WEIGHTED					
Age	Males	Females	Age	Males	Females
41	0.1045%	0.0788%	94	22.3942%	17.5897%
42	0.1074%	0.0813%	95	23.7591%	19.1313%
43	0.1100%	0.0839%	96	25.2598%	20.8128%
44	0.1135%	0.0875%	97	26.8397%	22.5895%
45	0.3197%	0.1125%	98	28.5371%	24.4756%
46	0.3359%	0.1220%	99	30.3668%	26.4559%
47	0.3528%	0.1338%	100	32.3001%	28.5273%
48	0.3719%	0.1482%	101	34.2993%	30.6491%
49	0.3925%	0.1644%	102	36.2704%	32.7813%
50	0.4140%	0.1835%	103	38.2225%	34.9113%
51	0.4339%	0.2058%	104	40.1159%	37.0070%
52	0.4550%	0.2323%	105	41.9494%	39.0659%
53	0.4771%	0.2613%	106	43.7225%	41.0568%
54	0.5022%	0.2954%	107	45.4141%	42.9728%
55	0.5346%	0.3334%	108	47.0172%	44.8128%
56	0.5746%	0.3747%	109	48.5432%	46.5543%
57	0.6276%	0.4195%	110	49.3439%	48.1911%
58	0.6935%	0.4681%	111	49.4725%	49.5766%
59	0.7681%	0.5183%	112	49.5965%	49.6759%
60	0.8507%	0.5704%	113	49.7207%	49.7804%
61	0.9354%	0.6246%	114	49.8602%	49.8851%
62	1.0145%	0.6805%	115	49.9850%	49.9900%
63	1.0860%	0.7404%	116	49.9950%	49.9950%
64	1.1498%	0.8030%	117	50.0000%	50.0000%
65	1.2106%	0.8719%	118	50.0000%	50.0000%
66	1.2985%	0.9472%	119	50.0000%	50.0000%
67	1.4004%	1.0328%	120	100.0000%	100.0000%

Housing and Transit Police – Males and Females

The following charts show postretirement mortality experience on an amount-weighted basis by age band for the age range (60 to 99) during the period 2015 – 2019 for males and females combined on the current and proposed assumptions for Housing and Transit Police members. The A/E decreased from 1.12 to 1.10. The data for Housing and Transit Police retirees had little statistical credibility.

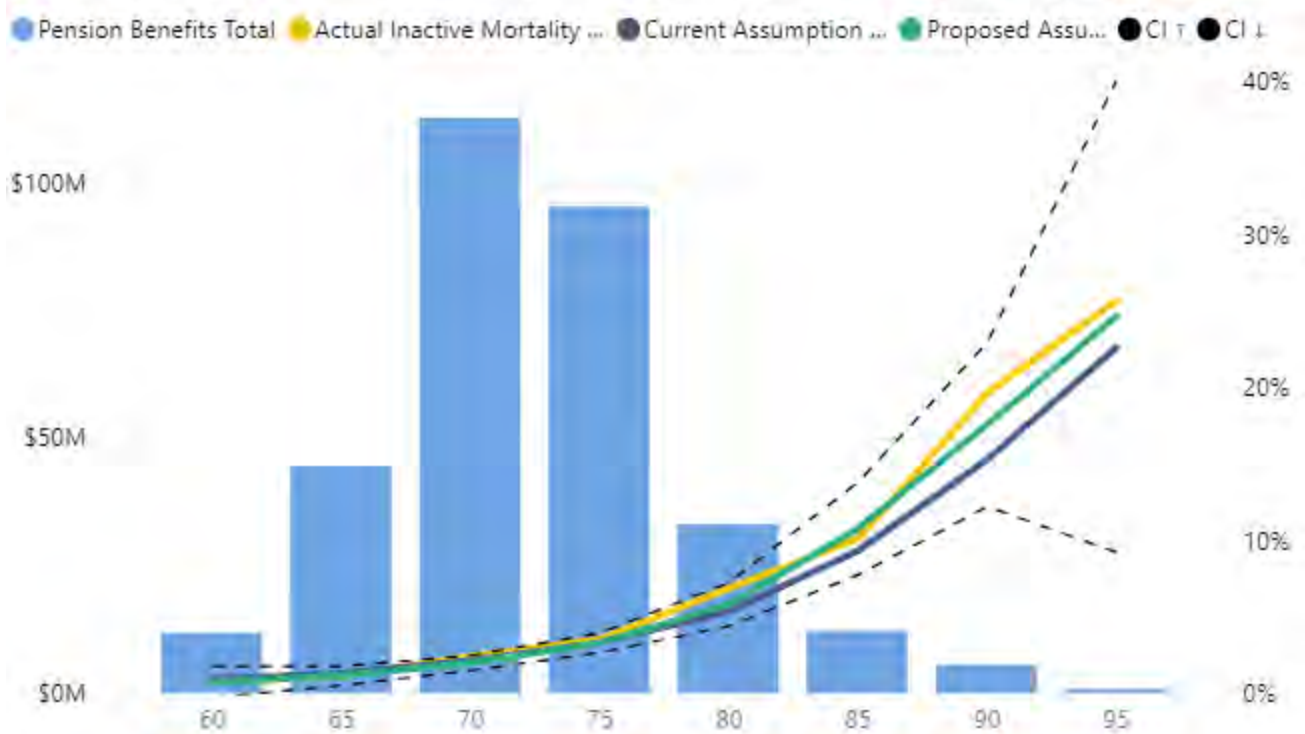
The following section displays results by age for males and females combined since there is nearly no female experience. Please note that the charts by age are based on 5-year brackets. For example, the age bracket 75 should be interpreted as the interval 75 – 79.

Amount-weighted

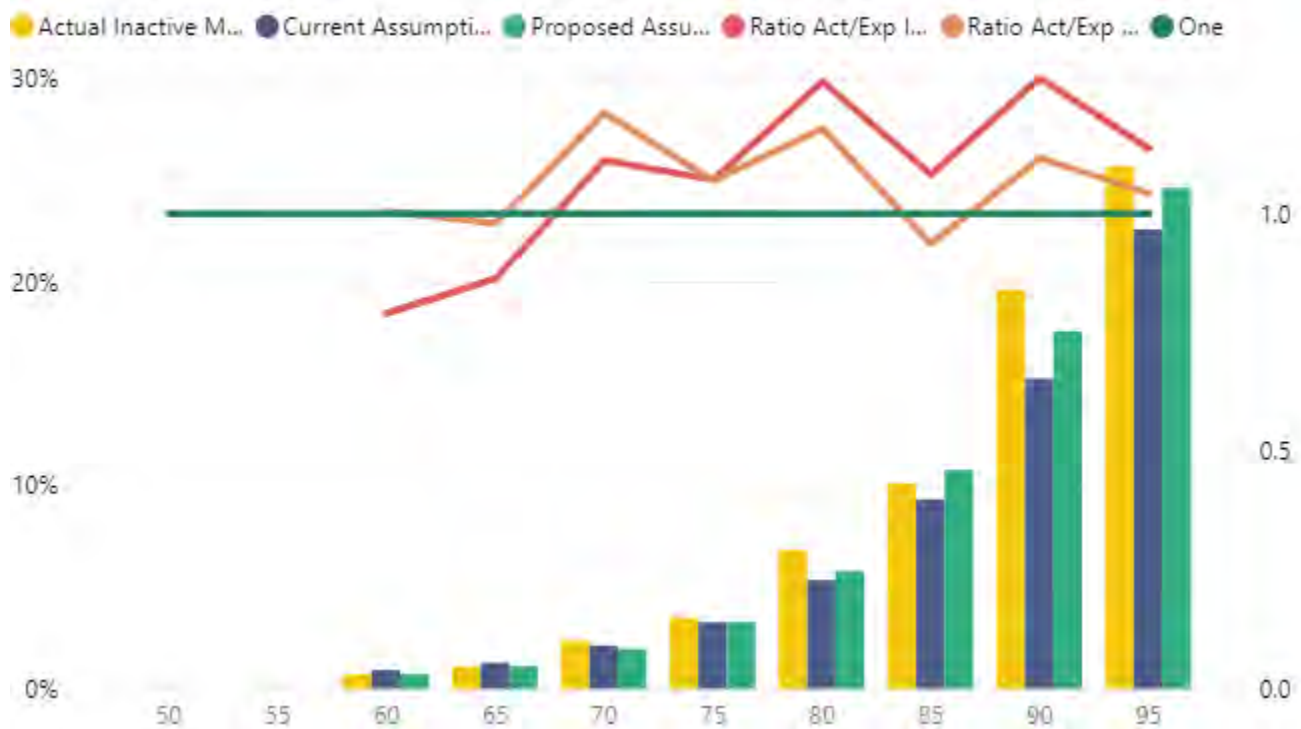
Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
60	\$0.1M	\$0.1M	\$11.8M	0.7268%	0.9202%	▲ 0.79
65	\$0.5M	\$0.6M	\$44.4M	1.0944%	1.2677%	▲ 0.86
70	\$2.7M	\$2.4M	\$112.8M	2.3688%	2.1292%	▲ 1.11
75	\$3.3M	\$3.1M	\$95.4M	3.5025%	3.2713%	● 1.07
80	\$2.3M	\$1.8M	\$33.1M	6.8236%	5.3397%	▲ 1.28
85	\$1.2M	\$1.1M	\$12.1M	10.0737%	9.3100%	● 1.08
90	\$1.1M	\$0.8M	\$5.5M	19.6013%	15.2492%	▲ 1.29
95	\$0.2M	\$0.2M	\$0.7M	25.6490%	22.5616%	▲ 1.14
Total	\$11.3M	\$10.1M	\$315.8M	3.5900%	3.1979%	▲ 1.12

Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
60	\$0.1M	\$0.1M	\$11.8M	0.7268%	0.7235%	● 1.00
65	\$0.5M	\$0.5M	\$44.4M	1.0944%	1.1175%	● 0.98
70	\$2.7M	\$2.2M	\$112.8M	2.3688%	1.9535%	▲ 1.21
75	\$3.3M	\$3.1M	\$95.4M	3.5025%	3.2755%	● 1.07
80	\$2.3M	\$1.9M	\$33.1M	6.8236%	5.7857%	▲ 1.18
85	\$1.2M	\$1.3M	\$12.1M	10.0737%	10.7474%	● 0.94
90	\$1.1M	\$1.0M	\$5.5M	19.6013%	17.5427%	▲ 1.12
95	\$0.2M	\$0.2M	\$0.7M	25.6490%	24.6011%	● 1.04
Total	\$11.3M	\$10.3M	\$315.8M	3.5900%	3.2548%	▲ 1.10

Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age

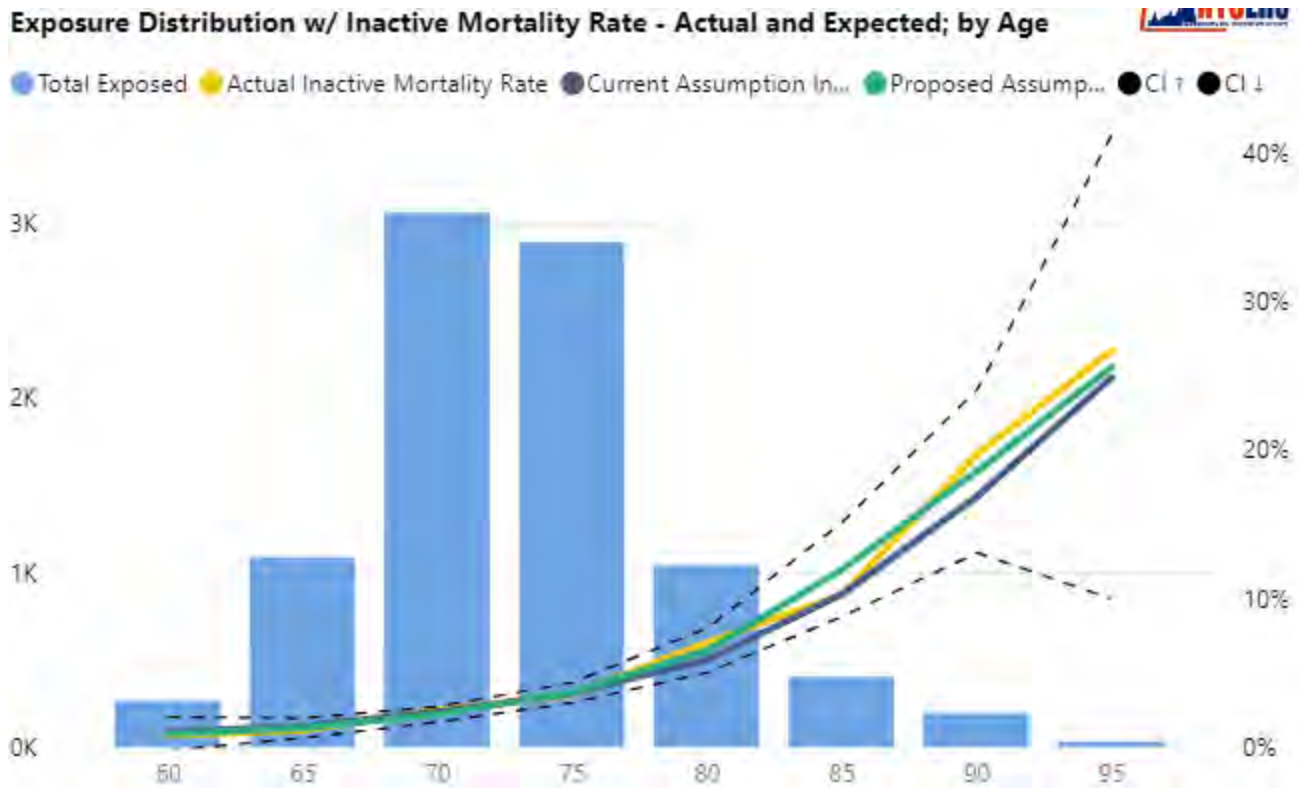


Headcount-weighted

The following charts show postretirement mortality experience on a headcount-weighted basis by age band for the age range (60 to 99) during the period 2015 – 2019 for males and females combined on the current and proposed assumptions for Housing and Transit Police members. The A/E decreased from 1.05 to 1.01.

Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
60	2	2.7	263	0.7605%	1.0111%	▲ 0.75
65	12	15.1	1,083	1.1080%	1.3968%	▲ 0.79
70	76	71.9	3,056	2.4869%	2.3517%	● 1.06
75	101	103.9	2,888	3.4972%	3.5993%	● 0.97
80	73	60.9	1,039	7.0260%	5.8569%	▲ 1.20
85	41	41.2	401	10.2244%	10.2760%	● 0.99
90	38	32.5	193	19.6891%	16.8312%	▲ 1.17
95	8	7.5	30	26.6667%	24.8430%	● 1.07
Total	351	335.6	8,953	3.9205%	3.7485%	● 1.05

Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
60	2	2.3	263	0.7605%	0.8770%	▲ 0.87
65	12	13.6	1,083	1.1080%	1.2596%	▲ 0.88
70	76	66.9	3,056	2.4869%	2.1903%	▲ 1.14
75	101	105.3	2,888	3.4972%	3.6453%	● 0.96
80	73	67.6	1,039	7.0260%	6.5047%	● 1.08
85	41	47.9	401	10.2244%	11.9405%	▲ 0.86
90	38	35.8	193	19.6891%	18.5282%	● 1.06
95	8	7.7	30	26.6667%	25.5477%	● 1.04
Total	351	347.0	8,953	3.9205%	3.8763%	● 1.01



Summary

We have proposed new assumptions consistent with industry standards to better reflect recent non-pandemic experience. In total, the proposed mortality tables are anticipated to increase plan liabilities for younger retirement ages up to about late 60s and then anticipated to decrease plan liabilities for older retirement ages. We would anticipate that this would reduce liabilities for retirees. There are no active Transit and Housing Police members.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: HOUSING POLICE AND TRANSIT POLICE BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
15	0.0100%	0.0084%	68	1.4988%	1.0632%
16	0.0135%	0.0103%	69	1.6917%	1.1644%
17	0.0181%	0.0112%	70	1.8929%	1.2629%
18	0.0217%	0.0131%	71	2.1028%	1.4563%
19	0.0240%	0.0140%	72	2.3212%	1.6586%
20	0.0251%	0.0142%	73	2.5833%	1.8689%
21	0.0268%	0.0150%	74	2.8558%	2.0889%
22	0.0284%	0.0158%	75	3.1397%	2.3314%
23	0.0301%	0.0168%	76	3.4343%	2.6045%
24	0.0315%	0.0179%	77	3.7415%	2.8700%
25	0.0327%	0.0191%	78	4.2304%	3.1787%
26	0.0342%	0.0204%	79	4.7399%	3.4795%
27	0.0354%	0.0217%	80	5.2682%	3.8105%
28	0.0371%	0.0231%	81	5.7202%	4.3289%
29	0.0394%	0.0247%	82	6.1782%	4.8678%
30	0.0427%	0.0265%	83	7.0179%	5.4288%
31	0.0492%	0.0316%	84	7.8631%	5.9122%
32	0.0556%	0.0360%	85	8.7167%	6.3661%
33	0.0616%	0.0398%	86	9.5810%	7.1650%
34	0.0669%	0.0427%	87	10.4516%	8.0050%
35	0.0724%	0.0455%	88	11.8437%	8.8541%
36	0.0755%	0.0474%	89	13.2486%	9.6498%
37	0.0779%	0.0497%	90	14.6752%	10.5687%
38	0.0808%	0.0521%	91	16.3354%	12.0267%
39	0.0845%	0.0551%	92	18.0374%	13.4340%
40	0.0901%	0.0588%	93	19.7642%	14.8636%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT (continued) PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: HOUSING POLICE AND TRANSIT POLICE BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
41	0.1003%	0.0633%	94	21.5622%	16.4543%
42	0.1106%	0.0702%	95	23.4692%	17.7952%
43	0.1212%	0.0792%	96	25.3619%	19.0707%
44	0.1323%	0.0907%	97	27.1816%	20.2419%
45	0.1439%	0.1052%	98	29.0095%	21.1759%
46	0.1563%	0.1228%	99	30.6920%	21.8544%
47	0.1693%	0.1427%	100	32.1584%	22.1859%
48	0.1827%	0.1652%	101	33.7521%	23.0680%
49	0.1964%	0.1865%	102	35.1259%	24.0803%
50	0.2104%	0.1992%	103	36.3671%	25.2770%
51	0.2802%	0.2104%	104	37.3834%	26.6309%
52	0.3506%	0.2186%	105	38.1051%	28.0912%
53	0.4209%	0.2250%	106	38.4698%	29.6244%
54	0.4903%	0.2863%	107	38.6325%	31.1943%
55	0.5297%	0.3409%	108	38.8076%	32.7579%
56	0.5857%	0.3910%	109	38.9794%	34.2712%
57	0.6387%	0.4376%	110	50.0000%	50.0000%
58	0.6875%	0.4613%	111	50.0000%	50.0000%
59	0.7316%	0.5005%	112	50.0000%	50.0000%
60	0.7720%	0.5393%	113	50.0000%	50.0000%
61	0.8439%	0.5785%	114	50.0000%	50.0000%
62	0.9155%	0.6152%	115	50.0000%	50.0000%
63	0.9888%	0.6536%	116	50.0000%	50.0000%
64	1.0644%	0.7279%	117	50.0000%	50.0000%
65	1.1433%	0.8032%	118	50.0000%	50.0000%
66	1.2263%	0.8884%	119	50.0000%	50.0000%
67	1.3135%	0.9736%	120	100.0000%	100.0000%

¹ An adjustment factor of 0.91 is applied to the probabilities above to develop benefit weighted probabilities of mortality

² An adjustment factor of 0.91 is applied to the probabilities above to develop benefit weighted probabilities of mortality

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: HOUSING POLICE AND TRANSIT POLICE BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0170%	0.0090%	68	1.1927%	0.9741%
16	0.0230%	0.0110%	69	1.3206%	1.0768%
17	0.0310%	0.0120%	70	1.4659%	1.1959%
18	0.0370%	0.0140%	71	1.6330%	1.3313%
19	0.0400%	0.0150%	72	1.8230%	1.4867%
20	0.0414%	0.0169%	73	2.0408%	1.6637%
21	0.0421%	0.0183%	74	2.2908%	1.8645%
22	0.0420%	0.0187%	75	2.5748%	2.0925%
23	0.0420%	0.0203%	76	2.8991%	2.3485%
24	0.0421%	0.0219%	77	3.2672%	2.6359%
25	0.0422%	0.0236%	78	3.6857%	2.9599%
26	0.0448%	0.0253%	79	4.1597%	3.3206%
27	0.0474%	0.0271%	80	4.6970%	3.7252%
28	0.0501%	0.0302%	81	5.3037%	4.1773%
29	0.0527%	0.0320%	82	5.9876%	4.6799%
30	0.0539%	0.0350%	83	6.7506%	5.2400%
31	0.0562%	0.0367%	84	7.6050%	5.8639%
32	0.0583%	0.0395%	85	8.5570%	6.5585%
33	0.0602%	0.0421%	86	9.6128%	7.3305%
34	0.0617%	0.0444%	87	10.7798%	8.1898%
35	0.0642%	0.0464%	88	12.0705%	9.1483%
36	0.0663%	0.0480%	89	13.4965%	10.2124%
37	0.0664%	0.0505%	90	15.0629%	11.3927%
38	0.0688%	0.0514%	91	16.6672%	12.6552%
39	0.0706%	0.0533%	92	18.2383%	13.9704%
40	0.0719%	0.0548%	93	19.7568%	15.3316%

<p>NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: HOUSING POLICE AND TRANSIT POLICE BASE YEAR 2019 BENEFIT WEIGHTED</p>					
Age	Males	Females	Age	Males	Females
41	0.0728%	0.0561%	94	21.2257%	16.7357%
42	0.0758%	0.0584%	95	22.6543%	18.1973%
43	0.0773%	0.0596%	96	24.1983%	19.7995%
44	0.0799%	0.0619%	97	25.8103%	21.5051%
45	0.1242%	0.0836%	98	27.5348%	23.3272%
46	0.1318%	0.0917%	99	29.3905%	25.2578%
47	0.1415%	0.1011%	100	31.3559%	27.2907%
48	0.1526%	0.1118%	101	33.3920%	29.3896%
49	0.1661%	0.1251%	102	35.4093%	31.5085%
50	0.1803%	0.1402%	103	37.4123%	33.6377%
51	0.1982%	0.1591%	104	39.3600%	35.7445%
52	0.2180%	0.1801%	105	41.2510%	37.8251%
53	0.2409%	0.2041%	106	43.0828%	39.8479%
54	0.2680%	0.2321%	107	44.8334%	41.8058%
55	0.2991%	0.2639%	108	46.4949%	43.6934%
56	0.3344%	0.2989%	109	48.0767%	45.4898%
57	0.3748%	0.3367%	110	49.3439%	47.1868%
58	0.4208%	0.3774%	111	49.4725%	48.7883%
59	0.4718%	0.4203%	112	49.5965%	49.6759%
60	0.5283%	0.4668%	113	49.7207%	49.7804%
61	0.5902%	0.5140%	114	49.8602%	49.8851%
62	0.6565%	0.5635%	115	49.9850%	49.9900%
63	0.7275%	0.6166%	116	49.9950%	49.9950%
64	0.8044%	0.6741%	117	50.0000%	50.0000%
65	0.8880%	0.7369%	118	50.0000%	50.0000%
66	0.9790%	0.8055%	119	50.0000%	50.0000%
67	1.0803%	0.8840%	120	100.0000%	100.0000%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: HOUSING POLICE AND TRANSIT POLICE BASE YEAR 2019 COUNT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0170%	0.0090%	68	1.3253%	1.0772%
16	0.0230%	0.0110%	69	1.4616%	1.1835%
17	0.0310%	0.0120%	70	1.6230%	1.3057%
18	0.0370%	0.0140%	71	1.8135%	1.4445%
19	0.0410%	0.0150%	72	2.0325%	1.6027%
20	0.0434%	0.0169%	73	2.2803%	1.7819%
21	0.0442%	0.0183%	74	2.5580%	1.9833%
22	0.0451%	0.0198%	75	2.8691%	2.2110%
23	0.0463%	0.0203%	76	3.2218%	2.4660%
24	0.0476%	0.0219%	77	3.6242%	2.7494%
25	0.0491%	0.0236%	78	4.0875%	3.0677%
26	0.0519%	0.0265%	79	4.6250%	3.4197%
27	0.0547%	0.0283%	80	5.2493%	3.8117%
28	0.0576%	0.0314%	81	5.9622%	4.2453%
29	0.0604%	0.0345%	82	6.7671%	4.7255%
30	0.0631%	0.0363%	83	7.6563%	5.2572%
31	0.0656%	0.0393%	84	8.6241%	5.8639%
32	0.0678%	0.0421%	85	9.6605%	6.5585%
33	0.0698%	0.0447%	86	10.7633%	7.3305%
34	0.0727%	0.0483%	87	11.9404%	8.1898%
35	0.0738%	0.0503%	88	13.2041%	9.1483%
36	0.0757%	0.0531%	89	14.5705%	10.2124%
37	0.0771%	0.0555%	90	16.0544%	11.3927%
38	0.0792%	0.0574%	91	17.5823%	12.6552%
39	0.0807%	0.0590%	92	19.0998%	13.9704%
40	0.0816%	0.0604%	93	20.5927%	15.3316%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR SERVICE RETIREES: HOUSING POLICE AND TRANSIT POLICE BASE YEAR 2019 COUNT WEIGHTED					
Age	Males	Females	Age	Males	Females
41	0.0834%	0.0626%	94	22.0630%	16.7357%
42	0.0848%	0.0647%	95	23.5149%	18.3451%
43	0.0871%	0.0667%	96	25.0951%	20.2533%
44	0.0904%	0.0688%	97	26.7443%	22.2486%
45	0.1832%	0.1067%	98	28.4931%	24.3115%
46	0.1952%	0.1163%	99	30.3543%	26.4075%
47	0.2094%	0.1282%	100	32.3001%	28.5273%
48	0.2241%	0.1407%	101	34.2993%	30.6491%
49	0.2406%	0.1569%	102	36.2704%	32.7813%
50	0.2582%	0.1750%	103	38.2225%	34.9113%
51	0.2761%	0.1963%	104	40.1159%	37.0070%
52	0.2945%	0.2207%	105	41.9494%	39.0659%
53	0.3152%	0.2495%	106	43.7225%	41.0568%
54	0.3383%	0.2814%	107	45.4141%	42.9728%
55	0.3665%	0.3181%	108	47.0172%	44.8128%
56	0.4029%	0.3570%	109	48.5432%	46.5543%
57	0.4493%	0.4007%	110	49.3439%	48.1911%
58	0.5066%	0.4459%	111	49.4725%	49.5766%
59	0.5740%	0.4941%	112	49.5965%	49.6759%
60	0.6500%	0.5432%	113	49.7207%	49.7804%
61	0.7299%	0.5957%	114	49.8602%	49.8851%
62	0.8105%	0.6490%	115	49.9850%	49.9900%
63	0.8876%	0.7054%	116	49.9950%	49.9950%
64	0.9628%	0.7649%	117	50.0000%	50.0000%
65	1.0392%	0.8307%	118	50.0000%	50.0000%
66	1.1199%	0.9031%	119	50.0000%	50.0000%
67	1.2130%	0.9847%	120	100.0000%	100.0000%

Postretirement Mortality – Non-Public Safety Disability Retirees

The SOA combined the experience of general employees and teachers in developing disability annuity mortality tables. Due to lack of credibility, a relatively lower disability incidence rate and consistency with the SOA tables, we combined the experience of TRS, BERS and NYCERS (general, sanitation, transit, and TBTA) in proposing a recommended assumption. We propose to use the PUB disabled annuitant non-public safety mortality table, without any adjustment. Separate tables exist on a headcount-weighted and amount-weighted basis.

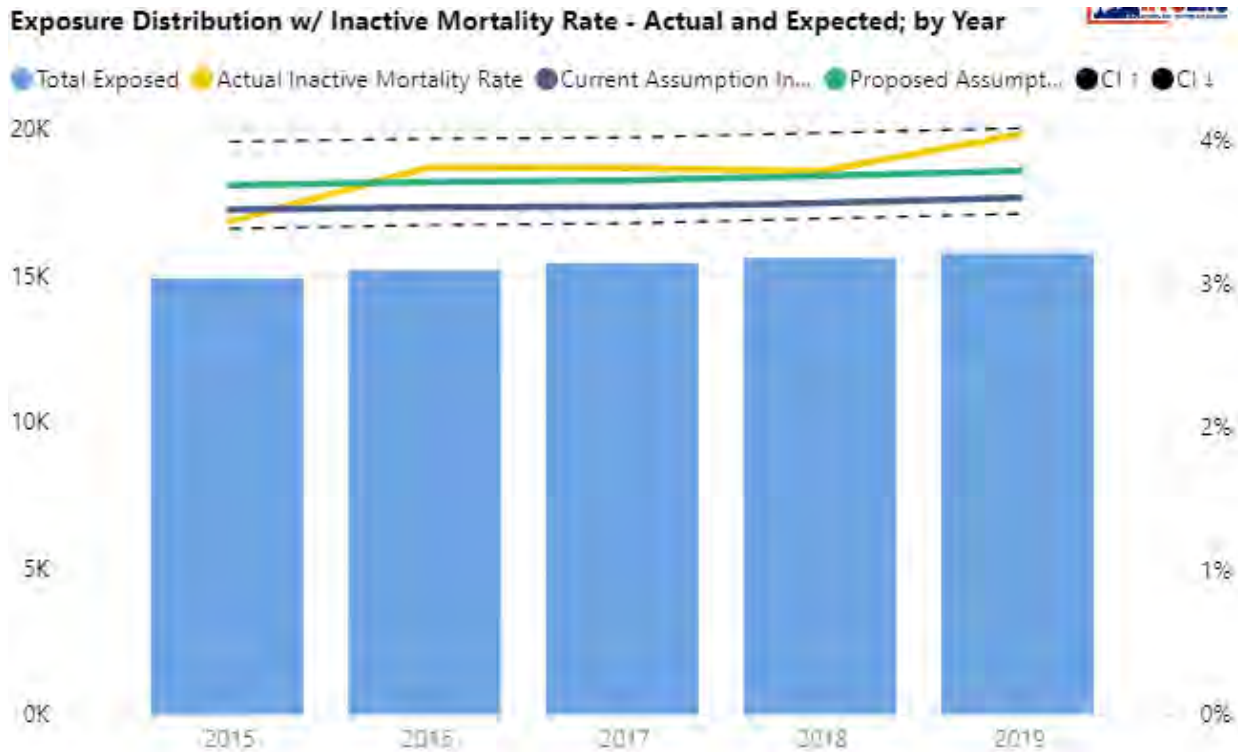
The following charts show postretirement mortality experience on a headcount-weighted basis by year for the age range (50 to 99) during the period 2015 – 2019 for both males and females combined on the current and proposed assumptions for all non-public safety members of NYCERS. The A/E decreased from 1.06 to 1.01 and increased from 1.05 to 1.06 for only non-public safety members of NYCERS.

Current Assumption – Headcount-weighted

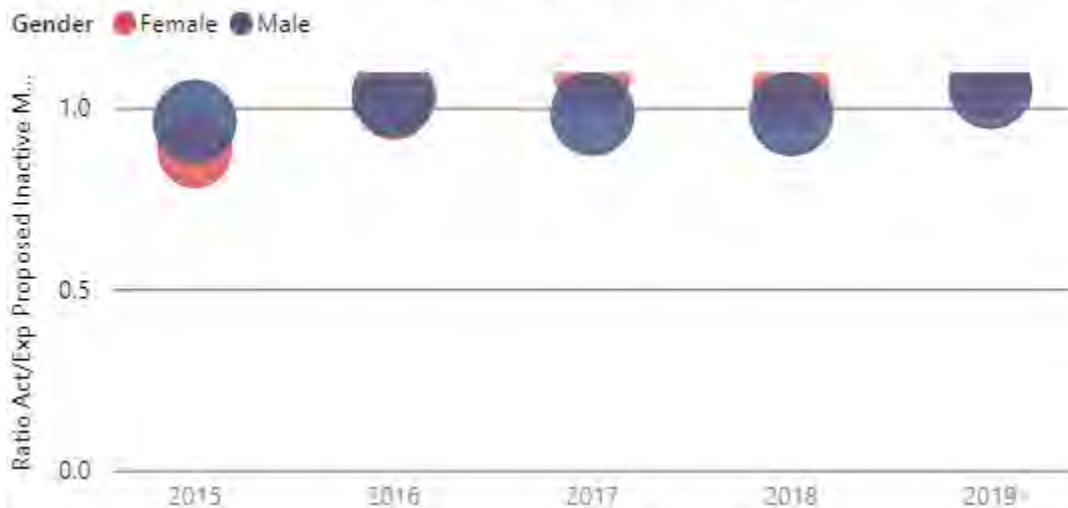
Plan Year	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
2015	510	522.3	14,868	3.4302%	3.5130%	0.98
2016	577	535.1	15,161	3.8058%	3.5298%	1.08
2017	585	543.9	15,390	3.8012%	3.5339%	1.08
2018	589	554.3	15,575	3.7817%	3.5591%	1.06
2019	636	566.1	15,749	4.0384%	3.5948%	1.12
Total	2,897	2,721.8	76,743	3.7749%	3.5466%	1.06

Proposed Assumption – Headcount-weighted

Plan Year	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
2015	510	547.7	14,868	3.4302%	3.6834%	0.93
2016	577	561.9	15,161	3.8058%	3.7061%	1.03
2017	585	571.9	15,390	3.8012%	3.7160%	1.02
2018	589	583.9	15,575	3.7817%	3.7491%	1.01
2019	636	595.6	15,749	4.0384%	3.7817%	1.07
Total	2,897	2,860.9	76,743	3.7749%	3.7279%	1.01



Actual vs. Expected - Inactive Mortality Proposed w/ Exposure Bubbles; by Year



The following charts show postretirement mortality experience on an amount-weighted basis by year for the age range (50 to 99) during the period 2015 – 2019 for both males and females combined on the current and proposed assumptions for all non-public safety members of NYCERS. The A/E decreased from 1.03 to 1.01 and increased from 1.01 to 1.06 for only all non-public safety members of NYCERS.

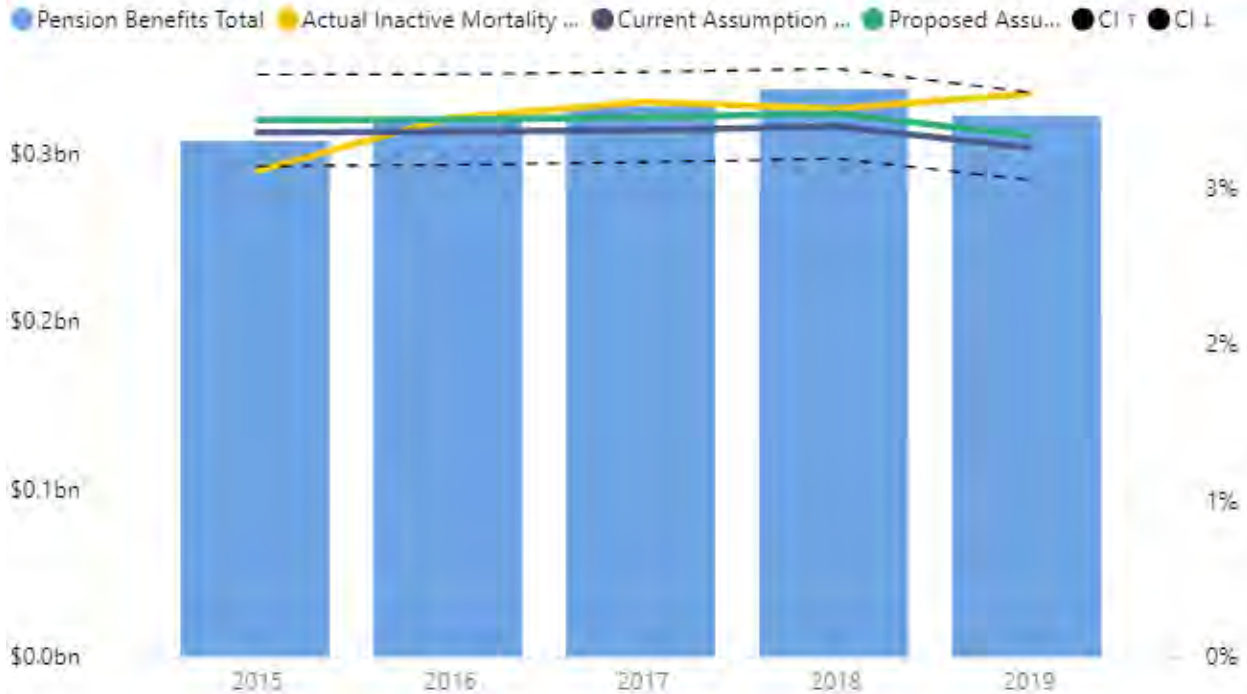
Current Assumption – Amount-weighted

Plan Year	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
2015	\$9.5M	\$10.3M	\$307.1M	3.1077%	3.3531%	0.93
2016	\$11.0M	\$10.8M	\$320.1M	3.4462%	3.3589%	1.03
2017	\$11.6M	\$11.0M	\$327.6M	3.5471%	3.3676%	1.05
2018	\$11.8M	\$11.5M	\$337.7M	3.5058%	3.3914%	1.03
2019	\$11.6M	\$10.5M	\$321.9M	3.6001%	3.2563%	1.11
Total	\$55.6M	\$54.0M	\$1,614.5M	3.4454%	3.3459%	1.03

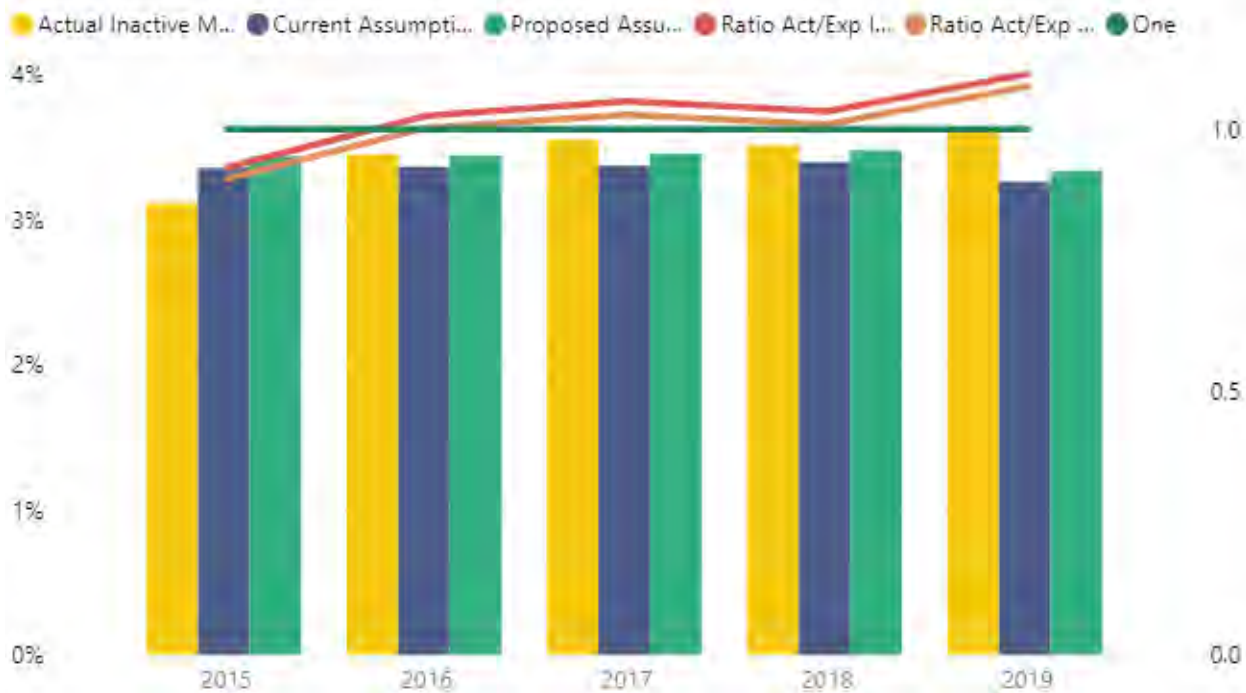
Proposed Assumption – Amount-weighted

Plan Year	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
2015	\$9.5M	\$10.5M	\$307.1M	3.1077%	3.4304%	0.91
2016	\$11.0M	\$11.0M	\$320.1M	3.4462%	3.4350%	1.00
2017	\$11.6M	\$11.3M	\$327.6M	3.5471%	3.4507%	1.03
2018	\$11.8M	\$11.7M	\$337.7M	3.5058%	3.4732%	1.01
2019	\$11.6M	\$10.7M	\$321.9M	3.6001%	3.3294%	1.08
Total	\$55.6M	\$55.3M	\$1,614.5M	3.4454%	3.4243%	1.01

Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Year



Inactive Mortality Rate - Actual, Expected, and Ratio; by Year



The following section displays results by gender.

Non-Public Safety Disabled Retirees - Males

The following charts show postretirement mortality experience on an amount-weighted basis by age band for the age range (50 to 99) during the period 2015 – 2019 for males on the current and proposed assumptions for all non-public safety members of NYCERS. The A/E decreased from 1.01 to 0.99 and increased from 1.00 to 1.01 for only non-public safety members of NYCERS.

For General employees, the AE increased from 0.99 to 1.13. For Sanitation employees, the A/E decreased from 0.93 to 0.75. For TBTA and Transit employees, the A/E increased from 1.10 to 1.28. The data for each individual employee group had partial or little statistical credibility.

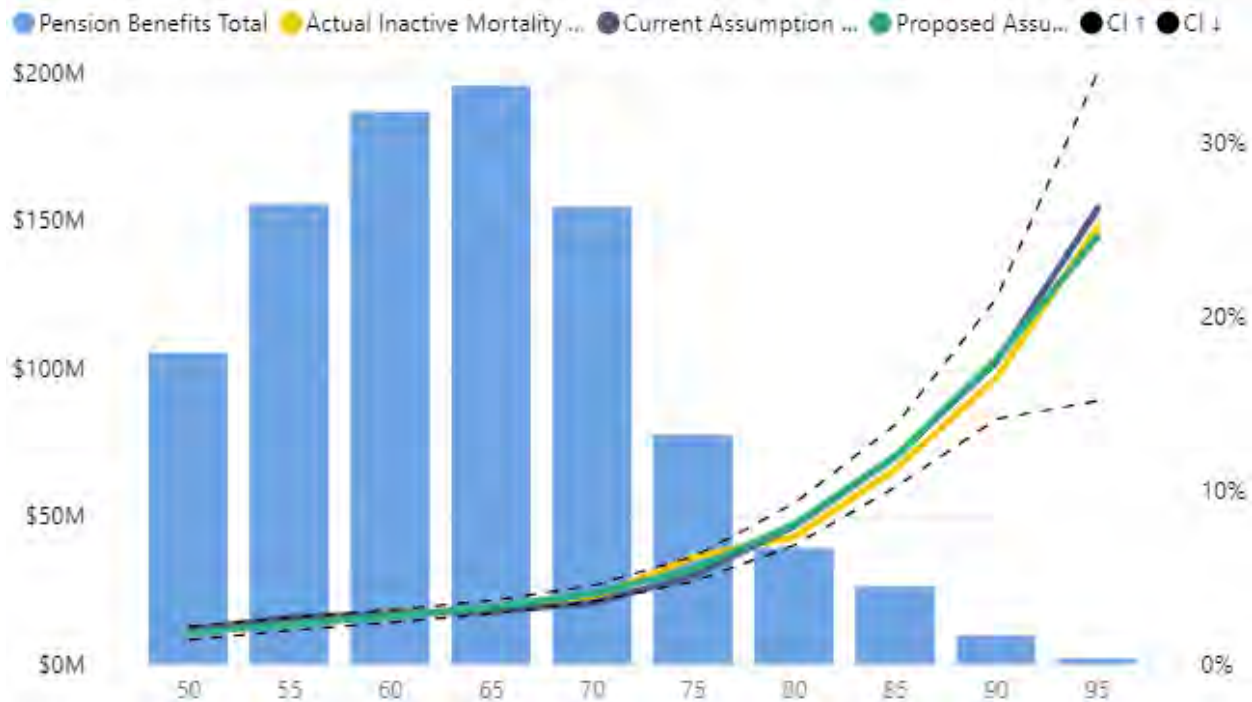
Please note that the charts by age are based on 5-year brackets. For example, the age bracket 75 should be interpreted as the interval 75 – 79.

Amount-weighted

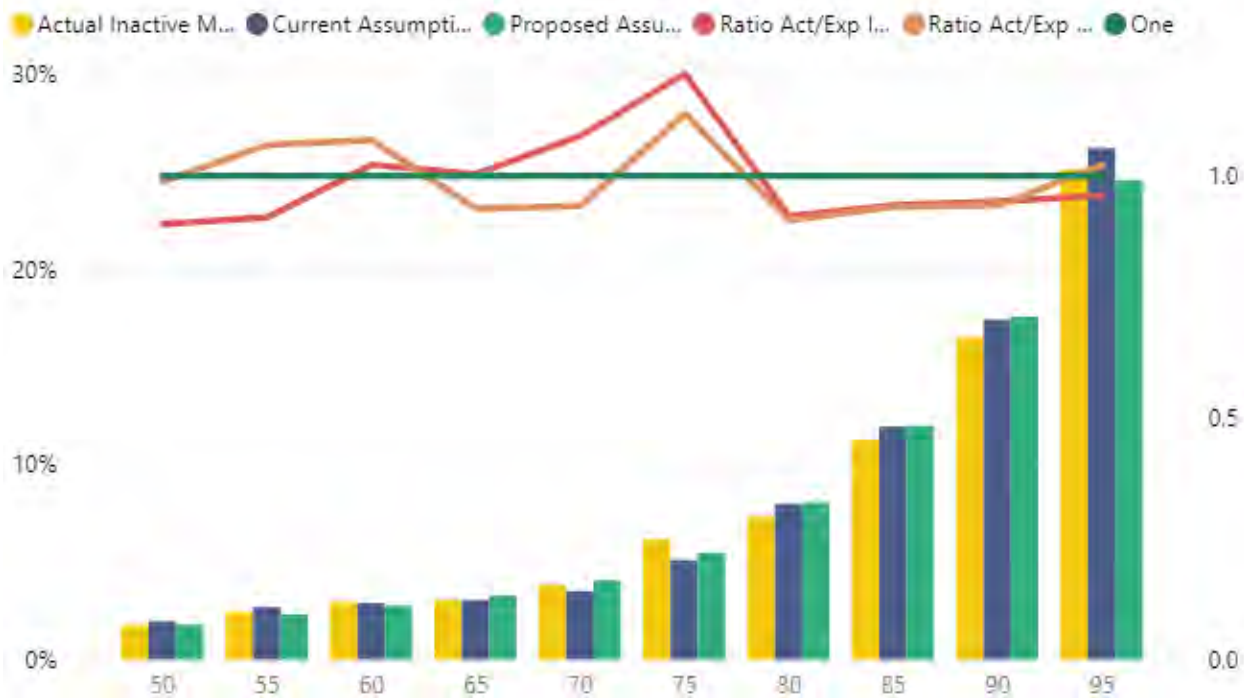
Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
50	\$1.9M	\$2.1M	\$105.3M	1.7623%	1.9566%	0.90
55	\$3.8M	\$4.2M	\$155.5M	2.4536%	2.6839%	0.91
60	\$5.5M	\$5.4M	\$186.8M	2.9593%	2.8932%	1.02
65	\$6.0M	\$6.0M	\$195.7M	3.0536%	3.0422%	1.00
70	\$5.9M	\$5.4M	\$154.7M	3.7998%	3.5101%	1.08
75	\$4.8M	\$3.9M	\$77.6M	6.1619%	5.0870%	1.21
80	\$2.9M	\$3.1M	\$39.3M	7.3109%	7.9752%	0.92
85	\$2.9M	\$3.1M	\$26.3M	11.1982%	11.9311%	0.94
90	\$1.6M	\$1.7M	\$9.8M	16.4765%	17.4047%	0.95
95	\$0.5M	\$0.5M	\$1.9M	25.1120%	26.1766%	0.96
Total	\$35.7M	\$35.4M	\$952.7M	3.7513%	3.7198%	1.01

Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght	
50	\$1.9M	\$1.9M	\$105.3M	1.7623%	1.7812%	●	0.99
55	\$3.8M	\$3.6M	\$155.5M	2.4536%	2.3066%	●	1.06
60	\$5.5M	\$5.1M	\$186.8M	2.9593%	2.7549%	●	1.07
65	\$6.0M	\$6.4M	\$195.7M	3.0536%	3.2756%	●	0.93
70	\$5.9M	\$6.3M	\$154.7M	3.7998%	4.0505%	●	0.94
75	\$4.8M	\$4.2M	\$77.6M	6.1619%	5.4621%	▲	1.13
80	\$2.9M	\$3.2M	\$39.3M	7.3109%	8.0491%	●	0.91
85	\$2.9M	\$3.1M	\$26.3M	11.1982%	11.9678%	●	0.94
90	\$1.6M	\$1.7M	\$9.8M	16.4765%	17.5516%	●	0.94
95	\$0.5M	\$0.5M	\$1.9M	25.1120%	24.5481%	●	1.02
Total	\$35.7M	\$36.0M	\$952.7M	3.7513%	3.7803%	●	0.99

Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age 



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



Headcount-weighted

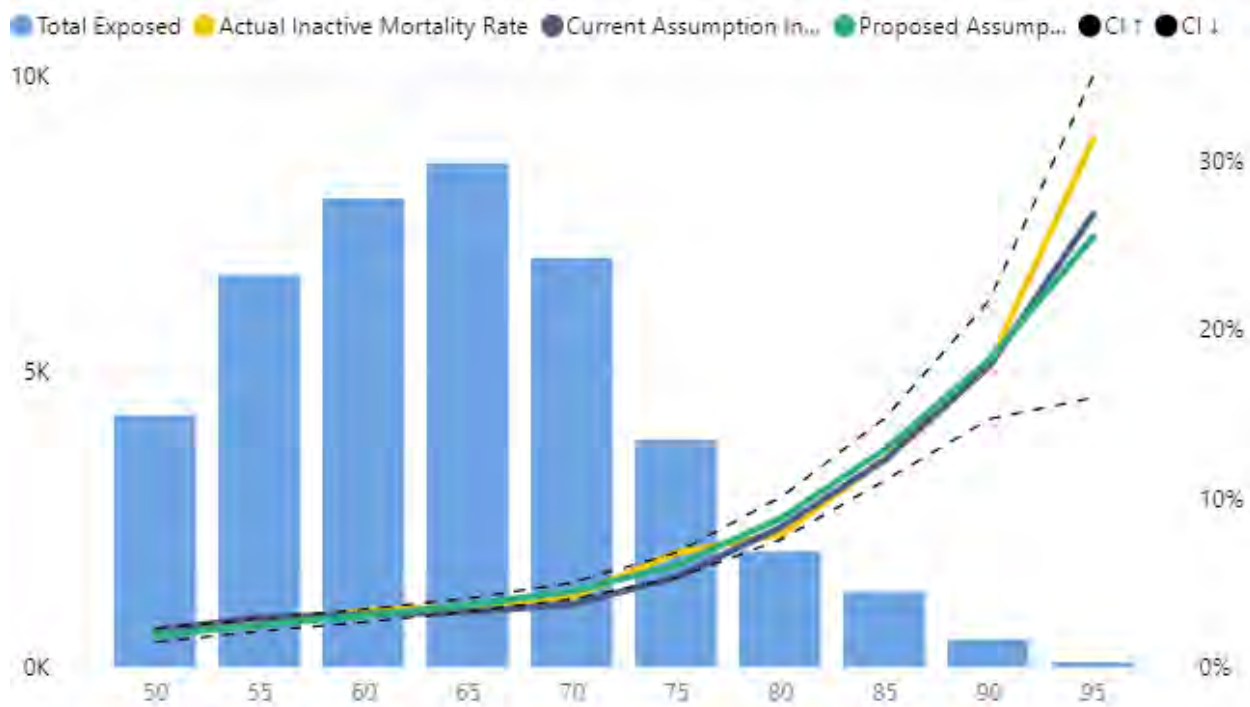
The following charts show postretirement mortality experience on a headcount-weighted basis by age band for the age range (50 to 99) during the period 2015 – 2019 for males on the current and proposed assumptions for all non-public safety members of NYCERS. The A/E decreased from 1.06 to 1.00 and decreased from 1.04 to 1.01 for only non-public safety members of NYCERS.

For General employees, the AE increased from 1.02 to 1.10. For Sanitation employees, the A/E decreased from 1.01 to 0.78. For TBTA and Transit employees, the A/E increased from 1.11 to 1.17.

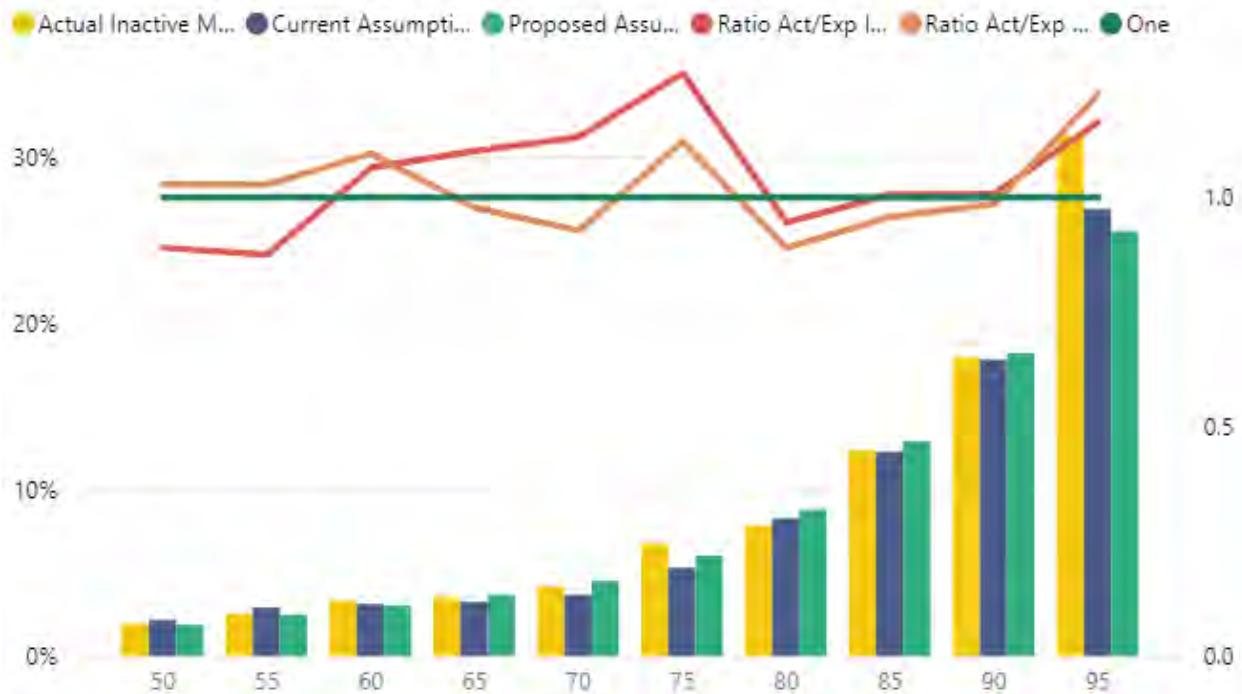
Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
50	82	92.1	4,254	1.9276%	2.1651%	▲ 0.89
55	168	192.0	6,622	2.5370%	2.8998%	▲ 0.87
60	263	247.0	7,922	3.3199%	3.1175%	● 1.06
65	304	276.1	8,515	3.5702%	3.2420%	▲ 1.10
70	288	254.4	6,911	4.1673%	3.6815%	▲ 1.13
75	259	203.7	3,838	6.7483%	5.3070%	▲ 1.27
80	153	161.8	1,955	7.8261%	8.2751%	● 0.95
85	156	155.0	1,264	12.3418%	12.2615%	● 1.01
90	83	82.4	463	17.9266%	17.7917%	● 1.01
95	25	21.5	80	31.2500%	26.8389%	▲ 1.16
Total	1,781	1,685.9	41,824	4.2583%	4.0309%	● 1.06

Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
50	82	79.7	4,254	1.9276%	1.8739%	● 1.03
55	168	163.4	6,622	2.5370%	2.4678%	● 1.03
60	263	240.0	7,922	3.3199%	3.0298%	● 1.10
65	304	311.1	8,515	3.5702%	3.6533%	● 0.98
70	288	310.4	6,911	4.1673%	4.4916%	● 0.93
75	259	231.0	3,838	6.7483%	6.0185%	▲ 1.12
80	153	171.9	1,955	7.8261%	8.7929%	▲ 0.89
85	156	162.9	1,264	12.3418%	12.8885%	● 0.96
90	83	84.2	463	17.9266%	18.1868%	● 0.99
95	25	20.4	80	31.2500%	25.4901%	▲ 1.23
Total	1,781	1,775.1	41,824	4.2583%	4.2441%	● 1.00

Exposure Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



Non-Public Safety Disabled Retirees - Females

The following charts show postretirement mortality experience on an amount-weighted basis by age band for the age range (50 to 99) during the period 2015 – 2019 for females on the current and proposed assumptions for all non-public safety members of NYCERS. The A/E decreased from 1.07 to 1.03 and increased from 1.05 to 1.22 for only non-public safety members of NYCERS.

For General employees, the AE increased from 1.09 to 1.29. For Sanitation employees, there is no experience to report. For TBTA and Transit employees, the A/E increased from 0.87 to 0.94. The data for all non-public safety members of NYCERS in total had only partial statistical credibility.

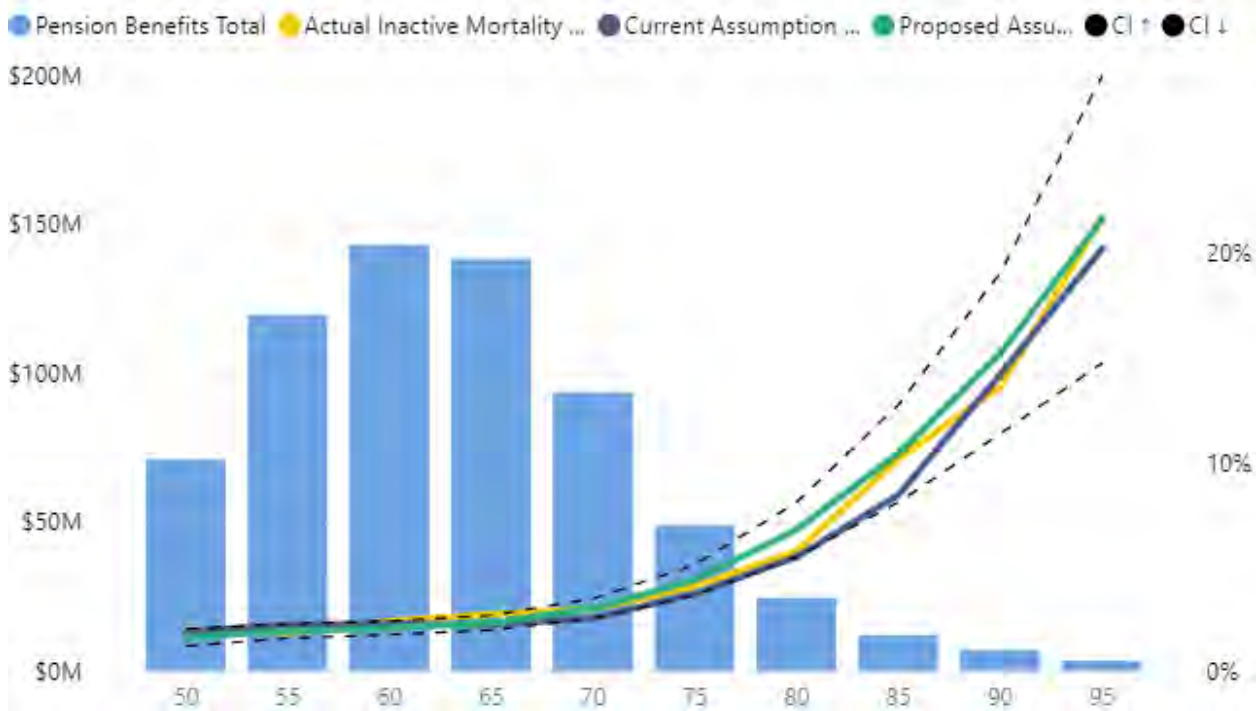
Please note that the charts by age are based on 5-year brackets. For example, the age bracket 75 should be interpreted as the interval 75 – 79.

Amount-weighted

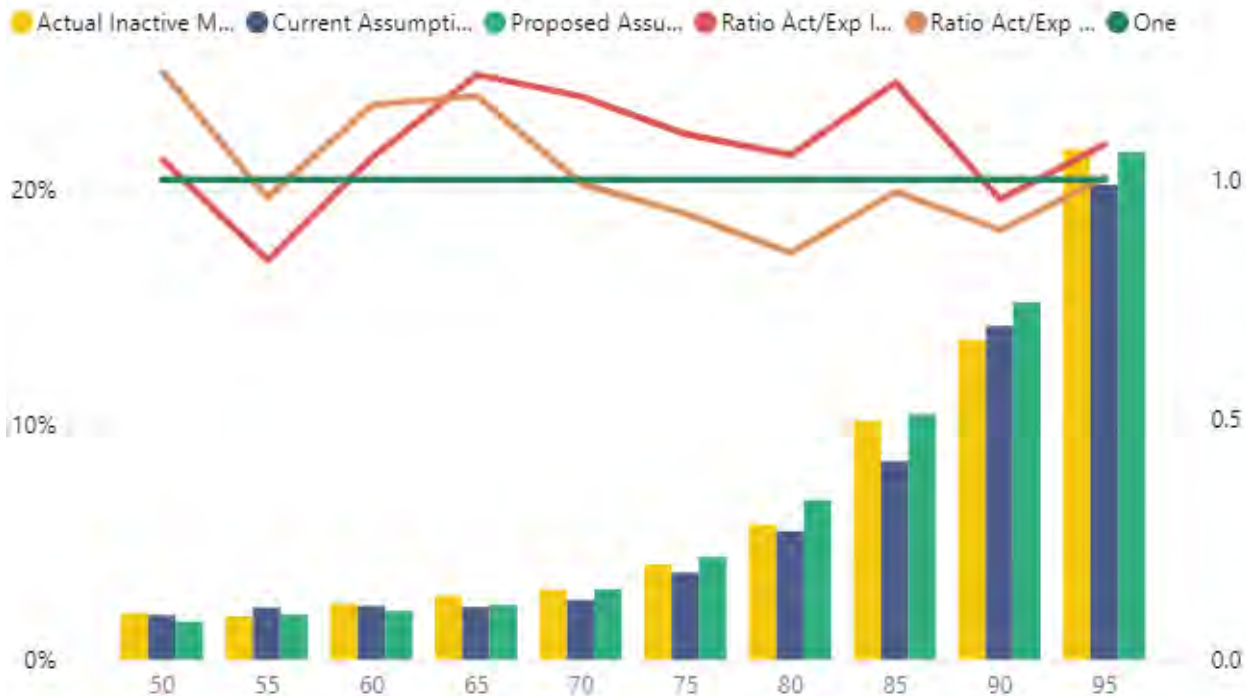
Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
50	\$1.4M	\$1.3M	\$71.0M	1.9696%	1.8904%	1.04
55	\$2.2M	\$2.6M	\$119.6M	1.8399%	2.2107%	0.83
60	\$3.4M	\$3.3M	\$143.1M	2.3825%	2.2775%	1.05
65	\$3.8M	\$3.1M	\$138.4M	2.7175%	2.2298%	1.22
70	\$2.8M	\$2.4M	\$93.6M	2.9685%	2.5294%	1.17
75	\$2.0M	\$1.8M	\$48.8M	4.0481%	3.6977%	1.09
80	\$1.4M	\$1.3M	\$24.6M	5.7461%	5.4637%	1.05
85	\$1.2M	\$1.0M	\$12.0M	10.1535%	8.4456%	1.20
90	\$1.0M	\$1.0M	\$7.0M	13.6074%	14.1951%	0.96
95	\$0.8M	\$0.7M	\$3.5M	21.7020%	20.2025%	1.07
Total	\$19.9M	\$18.6M	\$661.8M	3.0051%	2.8076%	1.07

Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
50	\$1.4M	\$1.1M	\$71.0M	1.9696%	1.6085%	▲ 1.22
55	\$2.2M	\$2.3M	\$119.6M	1.8399%	1.9113%	● 0.96
60	\$3.4M	\$3.0M	\$143.1M	2.3825%	2.0617%	▲ 1.16
65	\$3.8M	\$3.2M	\$138.4M	2.7175%	2.3137%	▲ 1.17
70	\$2.8M	\$2.8M	\$93.6M	2.9685%	2.9944%	● 0.99
75	\$2.0M	\$2.1M	\$48.8M	4.0481%	4.3597%	● 0.93
80	\$1.4M	\$1.7M	\$24.6M	5.7461%	6.7782%	▲ 0.85
85	\$1.2M	\$1.3M	\$12.0M	10.1535%	10.4182%	● 0.97
90	\$1.0M	\$1.1M	\$7.0M	13.6074%	15.2018%	▲ 0.90
95	\$0.8M	\$0.8M	\$3.5M	21.7020%	21.6034%	● 1.00
Total	\$19.9M	\$19.3M	\$661.8M	3.0051%	2.9116%	● 1.03

Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



Headcount-weighted

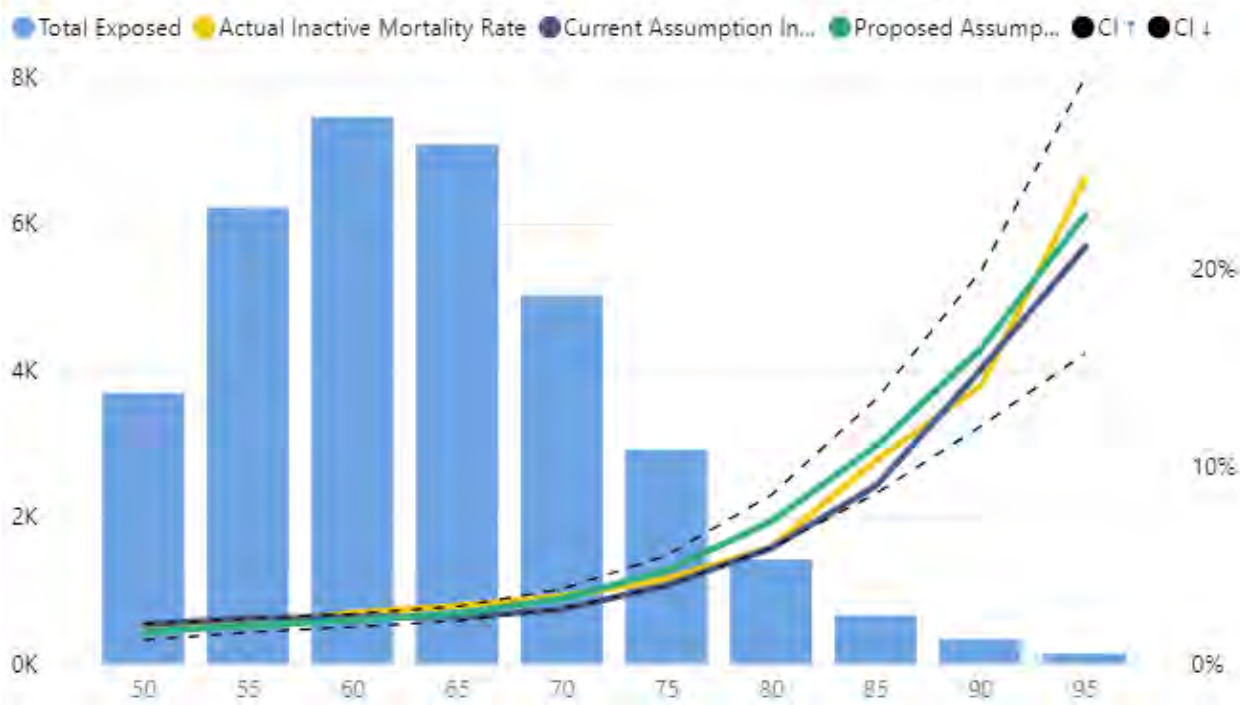
The following charts show postretirement mortality experience on a headcount-weighted basis by age band for the age range (50 to 99) during the period 2015 – 2019 for females on the current and proposed assumptions for all non-public safety members of NYCERS. The A/E decreased from 1.08 to 1.03 and increased from 1.08 to 1.18 for only non-public safety members of NYCERS.

For General employees, the AE increased from 1.11 to 1.22. For Sanitation employees, there is no experience to report. For TBTA and Transit employees, the A/E increased from 0.86 to 0.97.

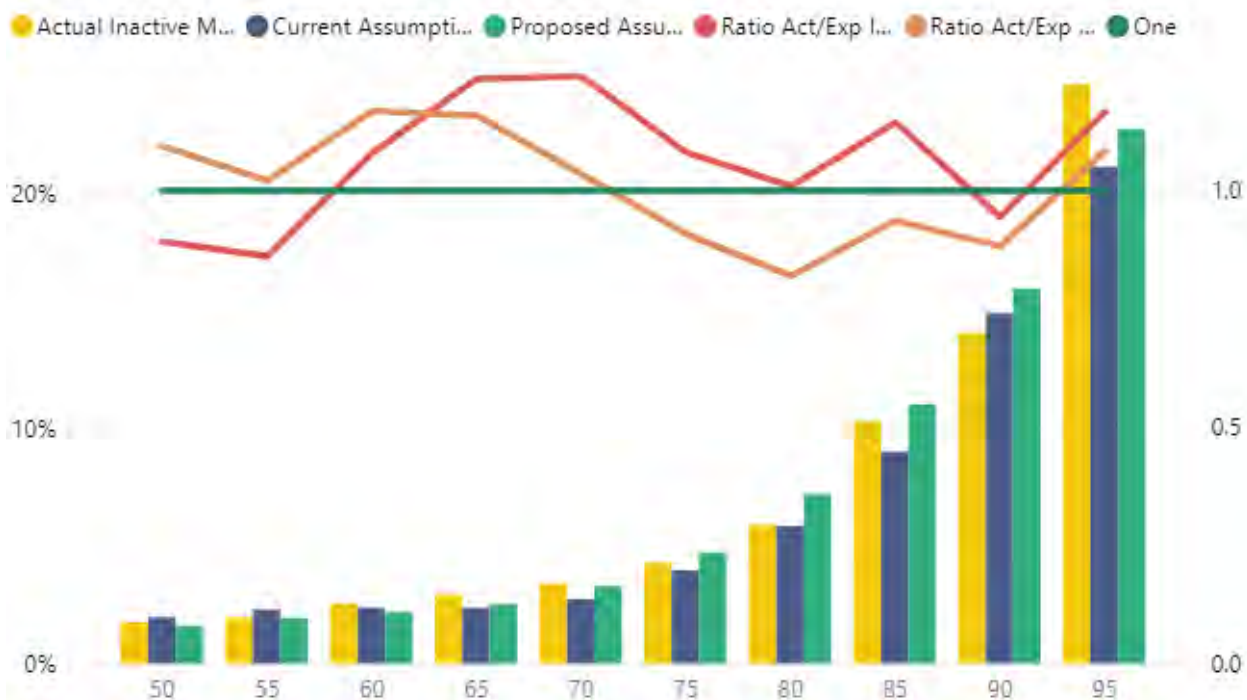
Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
50	65	72.9	3,693	1.7601%	1.9735%	▲ 0.89
55	123	142.8	6,212	1.9800%	2.2983%	▲ 0.86
60	191	177.0	7,452	2.5631%	2.3753%	● 1.08
65	208	168.3	7,077	2.9391%	2.3778%	▲ 1.24
70	171	137.7	5,017	3.4084%	2.7437%	▲ 1.24
75	125	115.7	2,916	4.2867%	3.9679%	● 1.08
80	84	83.2	1,421	5.9113%	5.8585%	● 1.01
85	68	59.4	659	10.3187%	9.0192%	▲ 1.14
90	47	49.8	334	14.0719%	14.9037%	● 0.94
95	34	29.2	138	24.6377%	21.1339%	▲ 1.17
Total	1,116	1,035.9	34,919	3.1960%	2.9666%	● 1.08

Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
50	65	59.4	3,693	1.7601%	1.6096%	● 1.09
55	123	120.5	6,212	1.9800%	1.9399%	● 1.02
60	191	163.5	7,452	2.5631%	2.1947%	▲ 1.17
65	208	179.6	7,077	2.9391%	2.5380%	▲ 1.16
70	171	165.3	5,017	3.4084%	3.2938%	● 1.03
75	125	137.7	2,916	4.2867%	4.7229%	● 0.91
80	84	102.5	1,421	5.9113%	7.2135%	▲ 0.82
85	68	72.6	659	10.3187%	11.0220%	● 0.94
90	47	53.3	334	14.0719%	15.9562%	▲ 0.88
95	34	31.4	138	24.6377%	22.7291%	● 1.08
Total	1,116	1,085.9	34,919	3.1960%	3.1097%	● 1.03

Exposure Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



Summary

We have proposed new assumptions consistent with industry standards. In total, the proposed mortality tables are anticipated to decrease plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: GENERAL PLANS BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
15	0.2163%	0.1980%	68	3.8171%	2.9280%
16	0.2927%	0.2680%	69	3.8682%	2.9997%
17	0.3945%	0.3612%	70	3.9318%	3.0865%
18	0.4581%	0.3913%	71	4.1518%	3.1548%
19	0.4963%	0.4214%	72	4.3957%	3.4254%
20	0.5178%	0.4416%	73	4.6660%	3.7295%
21	0.5589%	0.4807%	74	4.9632%	3.9658%
22	0.6029%	0.5231%	75	5.2904%	4.2453%
23	0.6500%	0.5662%	76	5.7355%	4.5234%
24	0.7005%	0.6186%	77	6.2253%	4.7961%
25	0.7524%	0.6680%	78	6.7606%	5.1502%
26	0.8054%	0.7165%	79	7.3471%	5.5873%
27	0.8591%	0.7727%	80	7.9843%	6.0964%
28	0.9126%	0.8346%	81	8.6745%	6.6521%
29	0.9647%	0.9008%	82	9.4240%	7.2551%
30	1.0136%	0.9373%	83	10.2386%	7.9112%
31	1.0584%	0.9629%	84	11.1186%	8.6209%
32	1.0978%	0.9955%	85	12.0742%	9.3370%
33	1.1310%	1.0289%	86	12.8184%	10.0511%
34	1.1597%	1.0577%	87	13.3550%	10.8029%
35	1.1838%	1.0841%	88	14.0470%	11.4531%
36	1.2035%	1.1092%	89	14.7705%	12.5564%
37	1.2211%	1.1344%	90	15.5356%	14.1031%
38	1.2388%	1.1618%	91	17.3803%	15.7291%
39	1.2591%	1.1939%	92	19.4620%	17.1860%
40	1.2846%	1.2249%	93	21.5002%	18.5029%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT (continued) PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: GENERAL PLANS BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
41	1.3114%	1.2570%	94	23.5320%	19.6588%
42	1.3750%	1.2982%	95	25.5906%	20.8223%
43	1.4416%	1.3497%	96	27.4494%	21.5778%
44	1.5115%	1.4058%	97	29.1839%	21.9133%
45	1.5849%	1.4809%	98	30.8635%	22.0663%
46	1.6617%	1.5639%	99	32.2842%	23.0087%
47	1.7422%	1.6535%	100	33.4447%	23.1230%
48	1.8267%	1.7359%	101	35.1022%	23.6022%
49	1.9153%	1.8218%	102	36.5309%	24.5619%
50	2.0462%	1.8919%	103	37.8218%	25.7825%
51	2.2291%	1.9830%	104	38.8787%	27.1635%
52	2.4215%	2.0502%	105	39.6293%	28.6530%
53	2.6231%	2.1047%	106	40.0086%	30.2169%
54	2.8293%	2.1904%	107	40.1778%	31.8182%
55	3.0344%	2.2636%	108	40.3599%	33.4131%
56	3.1146%	2.3429%	109	40.5386%	34.9566%
57	3.1774%	2.4285%	110	50.0000%	50.0000%
58	3.2218%	2.5412%	111	50.0000%	50.0000%
59	3.2493%	2.5588%	112	50.0000%	50.0000%
60	3.2648%	2.5795%	113	50.0000%	50.0000%
61	3.3472%	2.6067%	114	50.0000%	50.0000%
62	3.4295%	2.6272%	115	50.0000%	50.0000%
63	3.5199%	2.6579%	116	50.0000%	50.0000%
64	3.6208%	2.7759%	117	50.0000%	50.0000%
65	3.7368%	2.8107%	118	50.0000%	50.0000%
66	3.7511%	2.8328%	119	50.0000%	50.0000%
67	3.7776%	2.8725%	120	100.0000%	100.0000%

¹ An adjustment factor of 0.962 is applied to the probabilities above to develop benefit weighted probabilities of mortality

² An adjustment factor of 1.000 is applied to the probabilities above to develop benefit weighted probabilities of mortality

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
CURRENT
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: SANITATION
BASE TABLE

Age	Males ¹	Females ²	Age	Males ¹	Females ²
15	0.1891%	0.1809%	68	2.4678%	1.9435%
16	0.2558%	0.2447%	69	2.6254%	2.0901%
17	0.3448%	0.3299%	70	2.8020%	2.2370%
18	0.4004%	0.3831%	71	3.0322%	2.3979%
19	0.4338%	0.4126%	72	3.2880%	2.5741%
20	0.4426%	0.4240%	73	3.5729%	2.7665%
21	0.4674%	0.4530%	74	3.8887%	3.0122%
22	0.4935%	0.4755%	75	4.2391%	3.3026%
23	0.5209%	0.5033%	76	4.6469%	3.6022%
24	0.5498%	0.5381%	77	5.0995%	3.9080%
25	0.5788%	0.5685%	78	5.5986%	4.2919%
26	0.6074%	0.5972%	79	6.1505%	4.7080%
27	0.6355%	0.6308%	80	6.7568%	5.1937%
28	0.6623%	0.6535%	81	7.4618%	5.7290%
29	0.6871%	0.6771%	82	8.1760%	6.3165%
30	0.7089%	0.7014%	83	8.8984%	6.9627%
31	0.7269%	0.7267%	84	9.6249%	7.7122%
32	0.7408%	0.7374%	85	10.3588%	8.4245%
33	0.7501%	0.7484%	86	11.4945%	9.0849%
34	0.7561%	0.7555%	87	12.6389%	9.7986%
35	0.7710%	0.7607%	88	13.8008%	10.5221%
36	0.7862%	0.7652%	89	14.9732%	11.5771%
37	0.8017%	0.7692%	90	16.1654%	12.7805%
38	0.8175%	0.7745%	91	18.1783%	14.0140%
39	0.8336%	0.7829%	92	20.1433%	15.1826%
40	0.8500%	0.7904%	93	22.0331%	16.3730%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
CURRENT (continued)
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: SANITATION
BASE TABLE

Age	Males ¹	Females ²	Age	Males ¹	Females ²
41	0.8668%	0.7982%	94	23.8872%	18.3891%
42	0.8839%	0.8115%	95	25.7371%	20.4768%
43	0.9013%	0.8305%	96	27.1672%	21.5778%
44	0.9191%	0.8519%	97	28.5248%	21.9133%
45	0.9372%	0.8842%	98	29.8950%	22.0663%
46	0.9556%	0.9200%	99	31.1005%	23.0087%
47	0.9745%	0.9558%	100	32.1584%	23.1230%
48	0.9937%	0.9919%	101	33.7521%	23.6022%
49	1.0133%	1.0122%	102	35.1259%	24.5619%
50	1.0332%	1.0303%	103	36.3671%	25.7825%
51	1.0536%	1.0437%	104	37.3834%	27.1635%
52	1.1263%	1.0515%	105	38.1051%	28.6530%
53	1.2016%	1.0523%	106	38.4698%	30.2169%
54	1.2775%	1.0767%	107	38.6325%	31.8182%
55	1.3514%	1.0949%	108	38.8076%	33.4131%
56	1.4272%	1.1161%	109	38.9794%	34.9566%
57	1.4980%	1.1402%	110	50.0000%	50.0000%
58	1.5624%	1.1770%	111	50.0000%	50.0000%
59	1.6206%	1.2195%	112	50.0000%	50.0000%
60	1.6742%	1.2648%	113	50.0000%	50.0000%
61	1.7475%	1.3147%	114	50.0000%	50.0000%
62	1.8222%	1.3627%	115	50.0000%	50.0000%
63	1.9029%	1.4176%	116	50.0000%	50.0000%
64	1.9910%	1.5072%	117	50.0000%	50.0000%
65	2.0897%	1.5987%	118	50.0000%	50.0000%
66	2.2014%	1.7097%	119	50.0000%	50.0000%
67	2.3267%	1.8212%	120	100.0000%	100.0000%

¹ An adjustment factor of 1.000 is applied to the probabilities above to develop benefit weighted probabilities of mortality

² An adjustment factor of 1.000 is applied to the probabilities above to develop benefit weighted probabilities of mortality

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: TRANSIT AND TBTA BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
15	0.2122%	0.1981%	68	3.7437%	2.9280%
16	0.2871%	0.2680%	69	3.7938%	2.9997%
17	0.3869%	0.3612%	70	3.8562%	3.0865%
18	0.4493%	0.3913%	71	4.0719%	3.1548%
19	0.4867%	0.4214%	72	4.3111%	3.4254%
20	0.5079%	0.4416%	73	4.5762%	3.7295%
21	0.5481%	0.4807%	74	4.8677%	3.9658%
22	0.5913%	0.5231%	75	5.1886%	4.2453%
23	0.6375%	0.5662%	76	5.6252%	4.5234%
24	0.6871%	0.6186%	77	6.1056%	4.7961%
25	0.7380%	0.6680%	78	6.6306%	5.1502%
26	0.7899%	0.7165%	79	7.2058%	5.5873%
27	0.8426%	0.7727%	80	7.8307%	6.0964%
28	0.8951%	0.8346%	81	8.5077%	6.6521%
29	0.9462%	0.9008%	82	9.2427%	7.2551%
30	0.9941%	0.9373%	83	10.0417%	7.9112%
31	1.0381%	0.9629%	84	10.9048%	8.6209%
32	1.0767%	0.9955%	85	11.8420%	9.3370%
33	1.1093%	1.0289%	86	12.5719%	10.0511%
34	1.1374%	1.0577%	87	13.0981%	10.8029%
35	1.1611%	1.0841%	88	13.7768%	11.4531%
36	1.1803%	1.1092%	89	14.4864%	12.5564%
37	1.1976%	1.1344%	90	15.2369%	14.1031%
38	1.2150%	1.1618%	91	17.0460%	15.7291%
39	1.2349%	1.1939%	92	19.0878%	17.1860%
40	1.2599%	1.2249%	93	21.0868%	18.5029%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT (continued) PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: TRANSIT AND TBTA BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
41	1.2862%	1.2570%	94	23.0794%	19.6588%
42	1.3485%	1.2982%	95	25.0984%	21.1183%
43	1.4139%	1.3497%	96	26.9216%	22.4310%
44	1.4825%	1.4058%	97	28.6226%	23.5901%
45	1.5544%	1.4809%	98	30.2699%	24.4460%
46	1.6298%	1.5639%	99	31.6634%	24.9756%
47	1.7087%	1.6535%	100	32.8016%	25.0896%
48	1.7915%	1.7359%	101	34.4271%	26.0668%
49	1.8784%	1.8218%	102	35.8284%	27.2107%
50	2.0069%	1.8919%	103	37.0944%	28.5630%
51	2.1863%	1.9830%	104	38.1311%	30.0929%
52	2.3750%	2.0502%	105	38.8672%	31.7431%
53	2.5726%	2.1047%	106	39.2392%	33.4756%
54	2.7749%	2.1904%	107	39.4052%	35.2496%
55	2.9761%	2.2636%	108	39.5838%	37.0164%
56	3.0547%	2.3429%	109	39.7590%	38.7265%
57	3.1163%	2.4285%	110	50.0000%	50.0000%
58	3.1599%	2.5412%	111	50.0000%	50.0000%
59	3.1868%	2.5588%	112	50.0000%	50.0000%
60	3.2020%	2.5795%	113	50.0000%	50.0000%
61	3.2829%	2.6067%	114	50.0000%	50.0000%
62	3.3636%	2.6272%	115	50.0000%	50.0000%
63	3.4522%	2.6579%	116	50.0000%	50.0000%
64	3.5511%	2.7759%	117	50.0000%	50.0000%
65	3.6650%	2.8107%	118	50.0000%	50.0000%
66	3.6789%	2.8328%	119	50.0000%	50.0000%
67	3.7049%	2.8725%	120	100.0000%	100.0000%

¹ An adjustment factor of 1.01 is applied to the probabilities above to develop benefit weighted probabilities of mortality

² An adjustment factor of 0.9 is applied to the probabilities above to develop benefit weighted probabilities of mortality

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: NON-PUBLIC SAFETY PLANS BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0170%	0.0090%	68	3.3842%	2.3432%
16	0.0230%	0.0110%	69	3.5082%	2.4466%
17	0.0310%	0.0120%	70	3.6470%	2.5754%
18	0.4030%	0.2460%	71	3.8075%	2.7300%
19	0.4210%	0.2450%	72	3.9915%	2.9132%
20	0.4163%	0.2464%	73	4.2050%	3.1253%
21	0.3966%	0.2320%	74	4.4502%	3.3701%
22	0.3692%	0.2139%	75	4.7304%	3.6498%
23	0.3399%	0.1985%	76	5.0478%	3.9650%
24	0.3200%	0.1892%	77	5.4066%	4.3189%
25	0.3174%	0.1935%	78	5.8091%	4.7163%
26	0.3442%	0.2159%	79	6.2603%	5.1576%
27	0.3720%	0.2415%	80	6.7634%	5.6480%
28	0.4017%	0.2702%	81	7.3225%	6.1903%
29	0.4330%	0.3005%	82	7.9386%	6.7873%
30	0.4652%	0.3334%	83	8.6105%	7.4432%
31	0.4979%	0.3681%	84	9.3418%	8.1602%
32	0.5305%	0.4042%	85	10.1307%	8.9444%
33	0.5623%	0.4421%	86	10.9766%	9.7615%
34	0.5953%	0.4794%	87	11.8838%	10.5959%
35	0.6258%	0.5169%	88	12.8609%	11.4431%
36	0.6571%	0.5536%	89	14.0871%	12.2998%
37	0.6883%	0.5904%	90	15.4361%	13.1766%
38	0.7202%	0.6269%	91	16.8194%	14.0960%
39	0.7524%	0.6646%	92	18.2069%	15.0702%
40	0.7857%	0.7031%	93	19.6007%	16.1223%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: NON-PUBLIC SAFETY PLANS BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
41	0.8220%	0.7434%	94	21.0087%	17.2666%
42	0.8627%	0.7863%	95	22.4349%	18.5246%
43	0.9083%	0.8336%	96	24.0164%	19.9812%
44	0.9628%	0.8866%	97	25.6872%	21.6140%
45	1.0252%	0.9470%	98	27.4698%	23.3793%
46	1.0990%	1.0145%	99	29.3703%	25.2723%
47	1.1836%	1.0920%	100	31.3559%	27.2907%
48	1.2797%	1.1808%	101	33.3920%	29.3896%
49	1.3871%	1.2823%	102	35.4093%	31.5085%
50	1.5068%	1.3956%	103	37.4123%	33.6377%
51	1.6080%	1.4626%	104	39.3600%	35.7445%
52	1.7161%	1.5364%	105	41.2510%	37.8251%
53	1.8294%	1.6172%	106	43.0828%	39.8479%
54	1.9470%	1.7002%	107	44.8334%	41.8058%
55	2.0663%	1.7817%	108	46.4949%	43.6934%
56	2.1843%	1.8568%	109	48.0767%	45.4898%
57	2.2969%	1.9225%	110	49.3439%	47.1868%
58	2.4053%	1.9756%	111	49.4725%	48.7883%
59	2.5068%	2.0164%	112	49.5965%	49.6759%
60	2.6030%	2.0471%	113	49.7207%	49.7804%
61	2.6945%	2.0683%	114	49.8602%	49.8851%
62	2.7854%	2.0863%	115	49.9850%	49.9900%
63	2.8779%	2.1053%	116	49.9950%	49.9950%
64	2.9721%	2.1278%	117	50.0000%	50.0000%
65	3.0682%	2.1591%	118	50.0000%	50.0000%
66	3.1673%	2.2023%	119	50.0000%	50.0000%
67	3.2721%	2.2632%	120	100.0000%	100.0000%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: NON-PUBLIC SAFETY PLANS BASE YEAR 2019 COUNT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0170%	0.0090%	68	3.7760%	2.5785%
16	0.0230%	0.0110%	69	3.9086%	2.6943%
17	0.0310%	0.0120%	70	4.0556%	2.8354%
18	0.4030%	0.2460%	71	4.2241%	3.0021%
19	0.4210%	0.2450%	72	4.4187%	3.1983%
20	0.4163%	0.2464%	73	4.6447%	3.4221%
21	0.3966%	0.2320%	74	4.9089%	3.6783%
22	0.3755%	0.2139%	75	5.2124%	3.9698%
23	0.3625%	0.2007%	76	5.5593%	4.2971%
24	0.3565%	0.1995%	77	5.9509%	4.6633%
25	0.3631%	0.2088%	78	6.3903%	5.0750%
26	0.3937%	0.2316%	79	6.8806%	5.5325%
27	0.4255%	0.2575%	80	7.4270%	6.0439%
28	0.4593%	0.2865%	81	8.0308%	6.6090%
29	0.4960%	0.3172%	82	8.6949%	7.2335%
30	0.5323%	0.3502%	83	9.4149%	7.9215%
31	0.5689%	0.3839%	84	10.1938%	8.6755%
32	0.6051%	0.4187%	85	11.0300%	9.5023%
33	0.6416%	0.4539%	86	11.9194%	10.3647%
34	0.6776%	0.4899%	87	12.8652%	11.2472%
35	0.7133%	0.5246%	88	13.8754%	12.1426%
36	0.7463%	0.5599%	89	14.9554%	13.0490%
37	0.7800%	0.5929%	90	16.1047%	13.9740%
38	0.8136%	0.6269%	91	17.3340%	14.9427%
39	0.8469%	0.6646%	92	18.7571%	15.9646%
40	0.8808%	0.7031%	93	20.2661%	17.0643%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: NON-PUBLIC SAFETY PLANS BASE YEAR 2019 COUNT WEIGHTED					
Age	Males	Females	Age	Males	Females
41	0.9172%	0.7434%	94	21.7776%	18.2532%
42	0.9565%	0.7863%	95	23.2870%	19.5565%
43	1.0009%	0.8336%	96	24.9333%	21.0589%
44	1.0532%	0.8866%	97	26.6451%	22.7137%
45	1.1137%	0.9470%	98	28.4453%	24.5248%
46	1.1852%	1.0145%	99	30.3399%	26.4685%
47	1.2679%	1.0920%	100	32.3001%	28.5273%
48	1.3636%	1.1808%	101	34.2993%	30.6491%
49	1.4729%	1.2823%	102	36.2704%	32.7813%
50	1.5960%	1.3965%	103	38.2225%	34.9113%
51	1.6935%	1.4626%	104	40.1159%	37.0070%
52	1.8010%	1.5364%	105	41.9494%	39.0659%
53	1.9190%	1.6172%	106	43.7225%	41.0568%
54	2.0454%	1.7002%	107	45.4141%	42.9728%
55	2.1777%	1.7817%	108	47.0172%	44.8128%
56	2.3143%	1.8641%	109	48.5432%	46.5543%
57	2.4490%	1.9445%	110	49.3439%	48.1911%
58	2.5810%	2.0167%	111	49.4725%	49.5766%
59	2.7081%	2.0806%	112	49.5965%	49.6759%
60	2.8308%	2.1350%	113	49.7207%	49.7804%
61	2.9500%	2.1820%	114	49.8602%	49.8851%
62	3.0673%	2.2227%	115	49.9850%	49.9900%
63	3.1837%	2.2630%	116	49.9950%	49.9950%
64	3.3002%	2.3036%	117	50.0000%	50.0000%
65	3.4170%	2.3515%	118	50.0000%	50.0000%
66	3.5333%	2.4098%	119	50.0000%	50.0000%
67	3.6527%	2.4849%	120	100.0000%	100.0000%

Postretirement Mortality – Public Safety Disability Retirees

For consistency with the postretirement healthy mortality assumption, we propose separate assumptions for Correction Officers and Transit and Housing Police members. The SOA does not publish a below median version of the disability annuitant mortality table. To account for the difference in the healthy annuitant mortality table of using the below median version, we proposed to multiply the SOA public safety disabled annuitant table by an adjustment factor of 115%. For Housing and Transit Police, we propose the PubS disabled annuitant mortality table without further adjustment. Separate tables exist on a headcount-weighted and amount-weighted basis.

The following charts show postretirement mortality experience on a headcount-weighted basis by year for the age range (50 to 99) during the period 2015 – 2019 for both males and females combined on the current and proposed assumptions for all public safety members of NYCERS. The A/E increased from 0.98 to 1.06. For Correction officers, it increased from 0.99 to 1.11 and for Housing and Transit Police, it increased from 0.98 to 1.01.

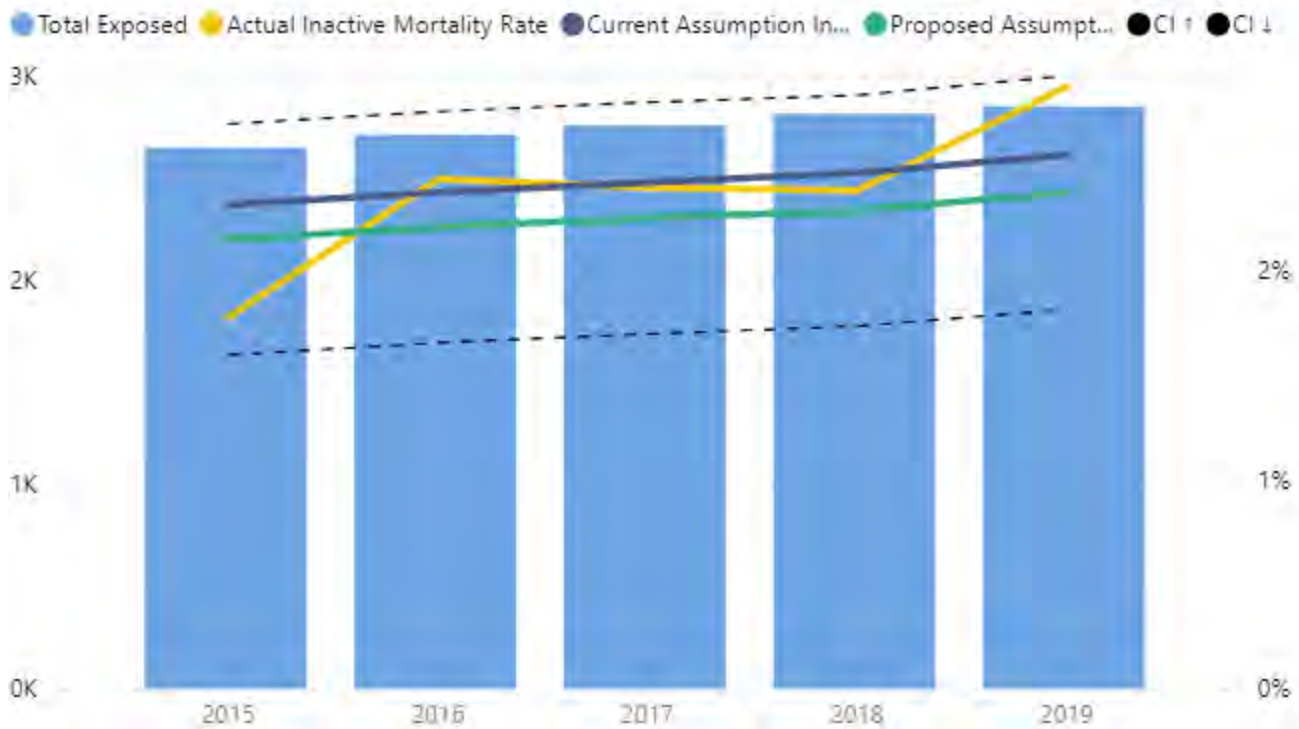
Current Assumption – Headcount-weighted

Plan Year	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
2015	47	61.3	2,649	1.7743%	2.3130%	0.77
2016	66	64.3	2,712	2.4336%	2.3692%	1.03
2017	66	66.7	2,757	2.3939%	2.4180%	0.99
2018	67	69.3	2,815	2.3801%	2.4623%	0.97
2019	82	72.7	2,850	2.8772%	2.5500%	1.13
Total	328	334.2	13,783	2.3797%	2.4246%	0.98

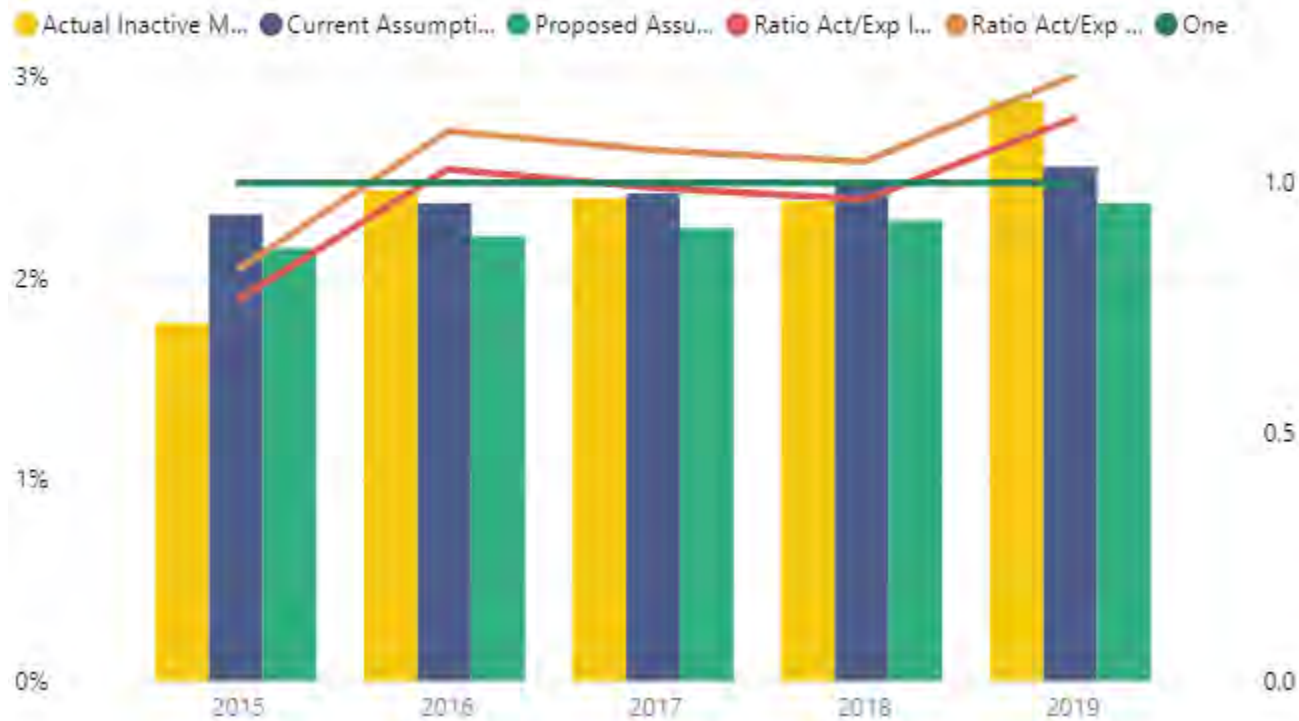
Proposed Assumption – Headcount-weighted

Plan Year	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
2015	47	56.8	2,649	1.7743%	2.1457%	0.83
2016	66	59.8	2,712	2.4336%	2.2048%	1.10
2017	66	62.0	2,757	2.3939%	2.2476%	1.07
2018	67	64.3	2,815	2.3801%	2.2831%	1.04
2019	82	67.5	2,850	2.8772%	2.3693%	1.21
Total	328	310.4	13,783	2.3797%	2.2520%	1.06

Exposure Distribution w/ Inactive Mortality Rate - Actual and Expected; by Year



Inactive Mortality Rate - Actual, Expected, and Ratio; by Year



Actual vs. Expected - Inactive Mortality Proposed w/ Exposure Bubbles; by Year



The following charts show postretirement mortality experience on an amount-weighted basis by year for the age range (50 to 99) during the period 2015 – 2019 for both males and females combined on the current and proposed assumptions for all public safety members of NYCERS. The A/E increased from 1.06 to 1.11. For Correction officers, it increased from 1.08 to 1.17 and for Housing and Transit Police, it increased from 1.04 to 1.05.

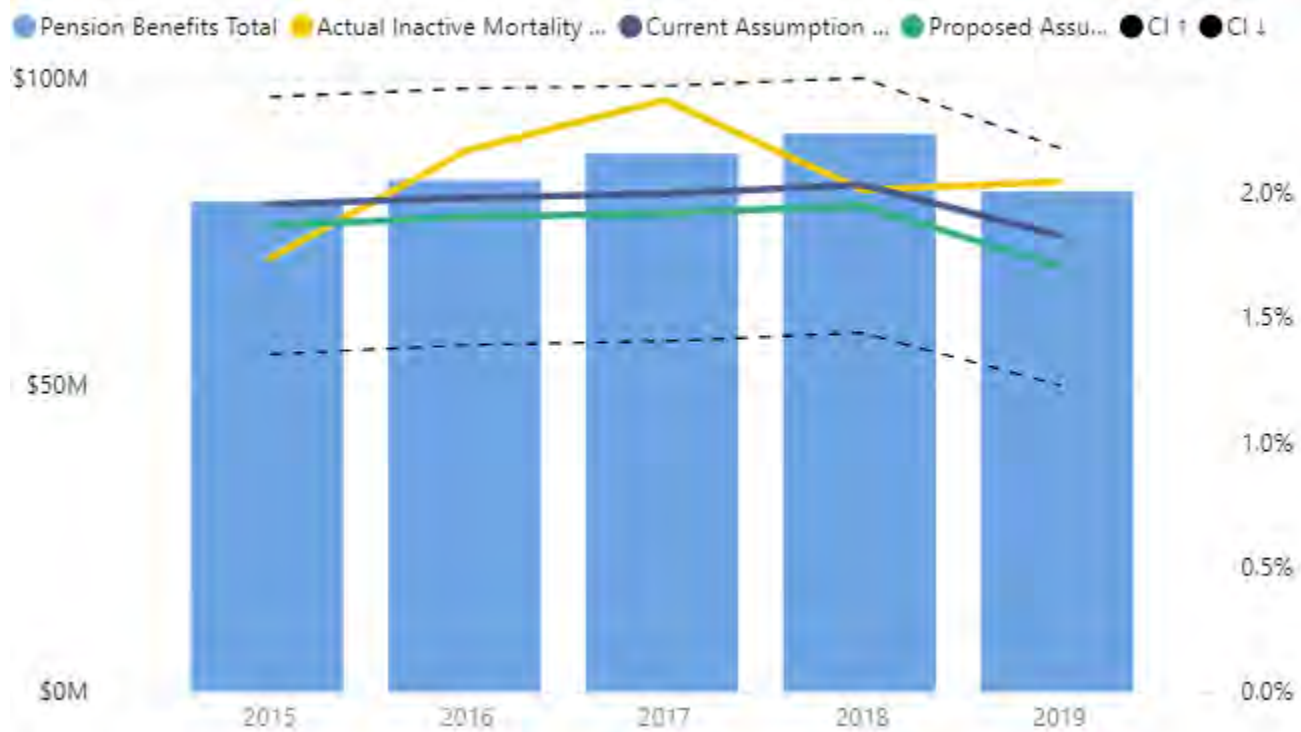
Current Assumption – Amount-weighted

Plan Year	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
2015	\$1.4M	\$1.6M	\$79.9M	1.7339%	1.9505%	0.89
2016	\$1.8M	\$1.6M	\$83.3M	2.1680%	1.9778%	1.10
2017	\$2.1M	\$1.7M	\$87.7M	2.3692%	1.9926%	1.19
2018	\$1.8M	\$1.8M	\$91.0M	2.0090%	2.0288%	0.99
2019	\$1.7M	\$1.5M	\$81.5M	2.0415%	1.8244%	1.12
Total	\$8.8M	\$8.3M	\$423.4M	2.0692%	1.9572%	1.06

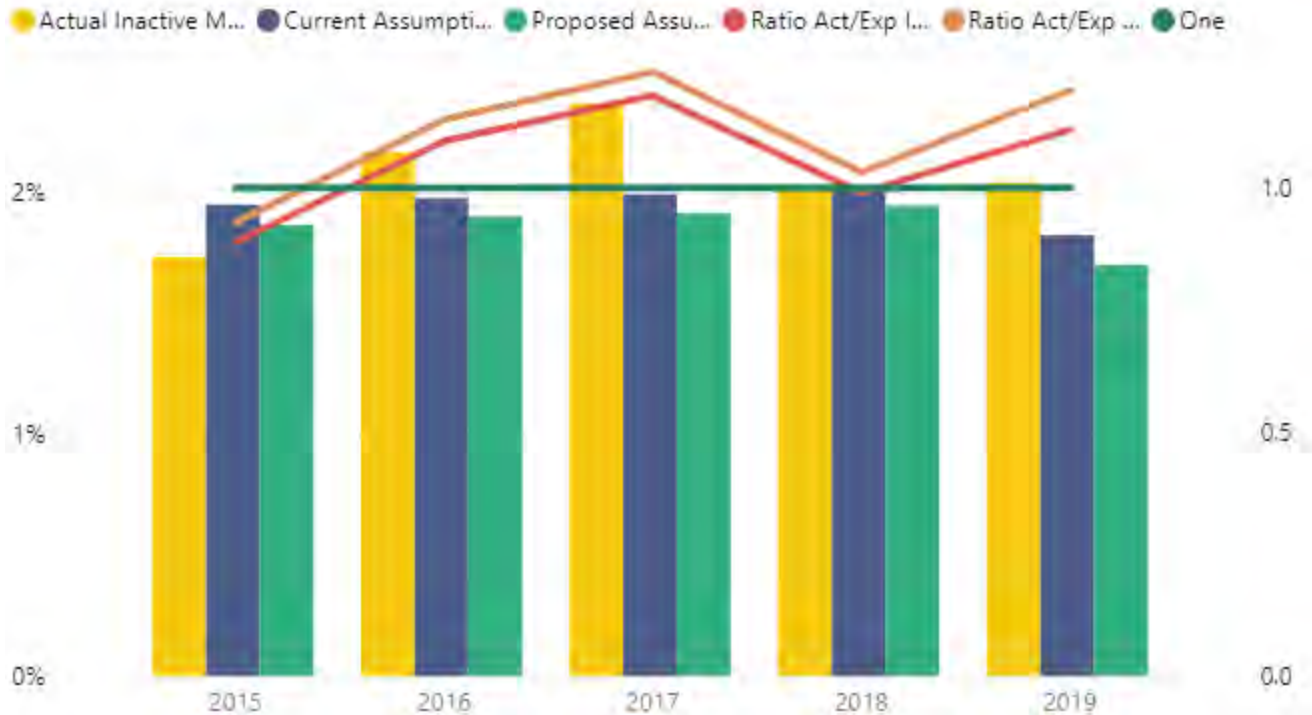
Proposed Assumption – Amount-weighted

Plan Year	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
2015	\$1.4M	\$1.5M	\$79.9M	1.7339%	1.8656%	0.93
2016	\$1.8M	\$1.6M	\$83.3M	2.1680%	1.9017%	1.14
2017	\$2.1M	\$1.7M	\$87.7M	2.3692%	1.9142%	1.24
2018	\$1.8M	\$1.8M	\$91.0M	2.0090%	1.9465%	1.03
2019	\$1.7M	\$1.4M	\$81.5M	2.0415%	1.7014%	1.20
Total	\$8.8M	\$7.9M	\$423.4M	2.0692%	1.8685%	1.11

Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Year



Inactive Mortality Rate - Actual, Expected, and Ratio; by Year



Actual vs. Expected - Inactive Mortality Proposed w/ Benefit Bubbles; by Year



The following section displays results for Correction Officers separately from Transit and Housing Police.

Correction Officers – Males and Females

The following charts show postretirement mortality experience on an amount-weighted basis by age band for the age range (50 to 99) during the period 2015 – 2019 for males and females combined on the current and proposed assumptions for Correction officers. The A/E increased from 1.08 to 1.17. The data for Correction officers had no statistical credibility.

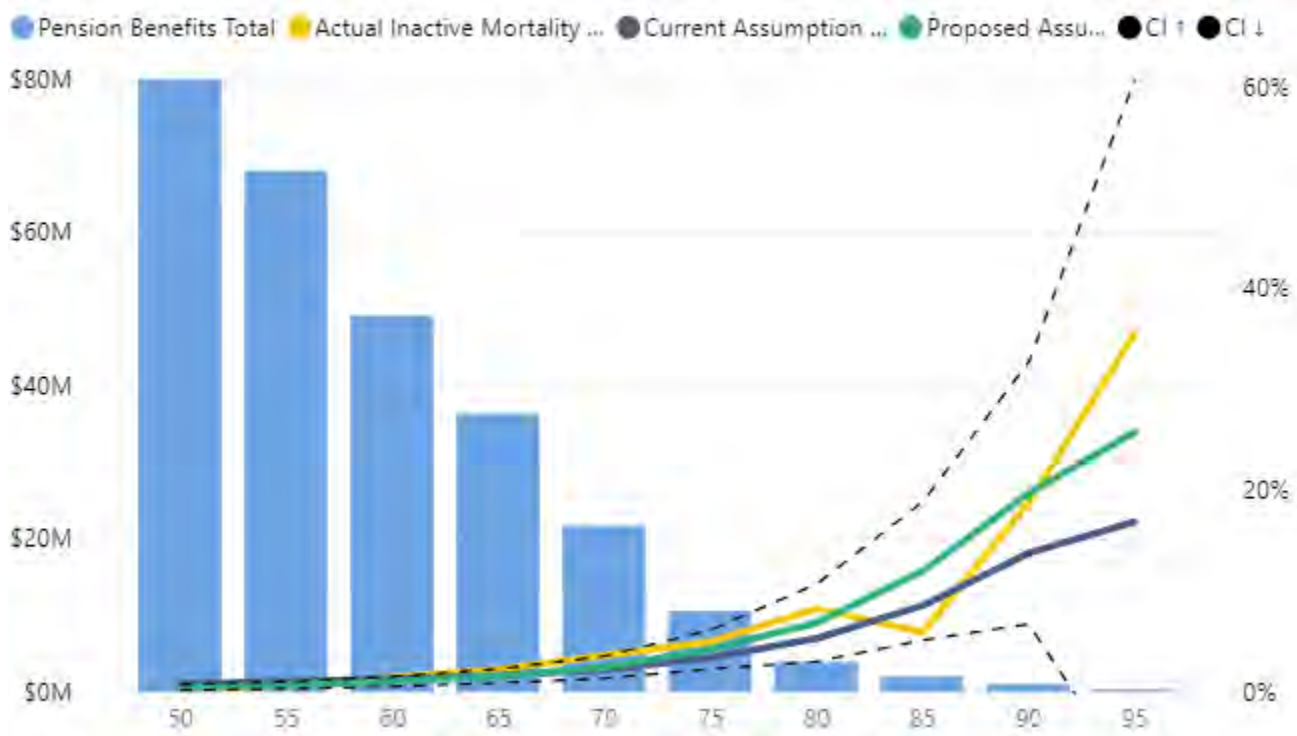
The following section displays results by age for males and females combined since there is nearly no female experience. Please note that the charts by age are based on 5-year brackets. For example, the age bracket 75 should be interpreted as the interval 75 – 79.

Amount-weighted

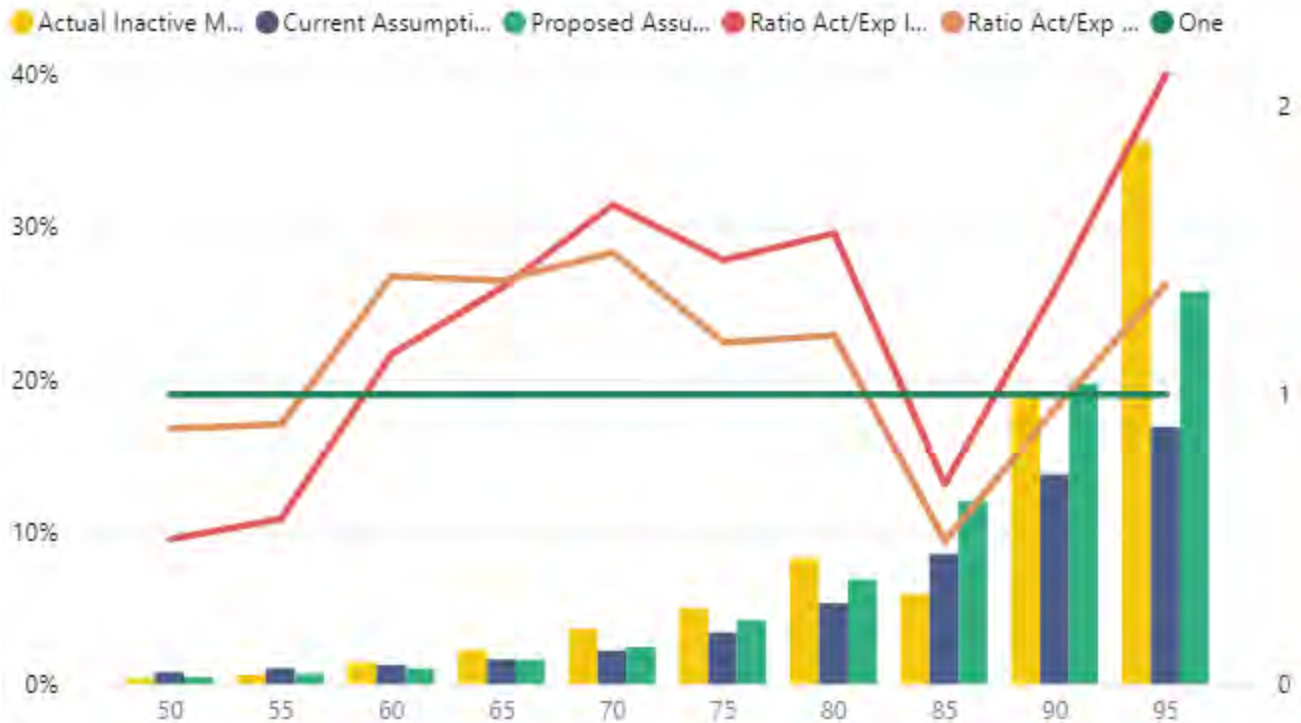
Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
50	\$0.3M	\$0.6M	\$79.9M	0.3851%	0.7705%	0.50
55	\$0.4M	\$0.7M	\$68.0M	0.5853%	1.0273%	0.57
60	\$0.7M	\$0.6M	\$49.1M	1.4233%	1.2490%	1.14
65	\$0.8M	\$0.6M	\$36.3M	2.2010%	1.6076%	1.37
70	\$0.8M	\$0.5M	\$21.7M	3.6110%	2.1814%	1.66
75	\$0.5M	\$0.4M	\$10.6M	4.9408%	3.3736%	1.46
80	\$0.3M	\$0.2M	\$3.9M	8.2366%	5.2900%	1.56
85	\$0.1M	\$0.2M	\$2.0M	5.8930%	8.5251%	0.69
90	\$0.2M	\$0.1M	\$1.0M	18.7622%	13.7376%	1.37
95	\$0.0M	\$0.0M	\$0.1M	35.5270%	16.8527%	2.11
Total	\$4.2M	\$3.9M	\$272.6M	1.5335%	1.4213%	1.08

Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
50	\$0.3M	\$0.3M	\$79.9M	0.3851%	0.4361%	▲ 0.88
55	\$0.4M	\$0.4M	\$68.0M	0.5853%	0.6534%	▲ 0.90
60	\$0.7M	\$0.5M	\$49.1M	1.4233%	1.0114%	▲ 1.41
65	\$0.8M	\$0.6M	\$36.3M	2.2010%	1.5782%	▲ 1.39
70	\$0.8M	\$0.5M	\$21.7M	3.6110%	2.4228%	▲ 1.49
75	\$0.5M	\$0.4M	\$10.6M	4.9408%	4.1857%	▲ 1.18
80	\$0.3M	\$0.3M	\$3.9M	8.2366%	6.8382%	▲ 1.20
85	\$0.1M	\$0.2M	\$2.0M	5.8930%	11.9577%	◆ 0.49
90	\$0.2M	\$0.2M	\$1.0M	18.7622%	19.6798%	● 0.95
95	\$0.0M	\$0.0M	\$0.1M	35.5270%	25.7219%	▲ 1.38
Total	\$4.2M	\$3.6M	\$272.6M	1.5335%	1.3069%	▲ 1.17

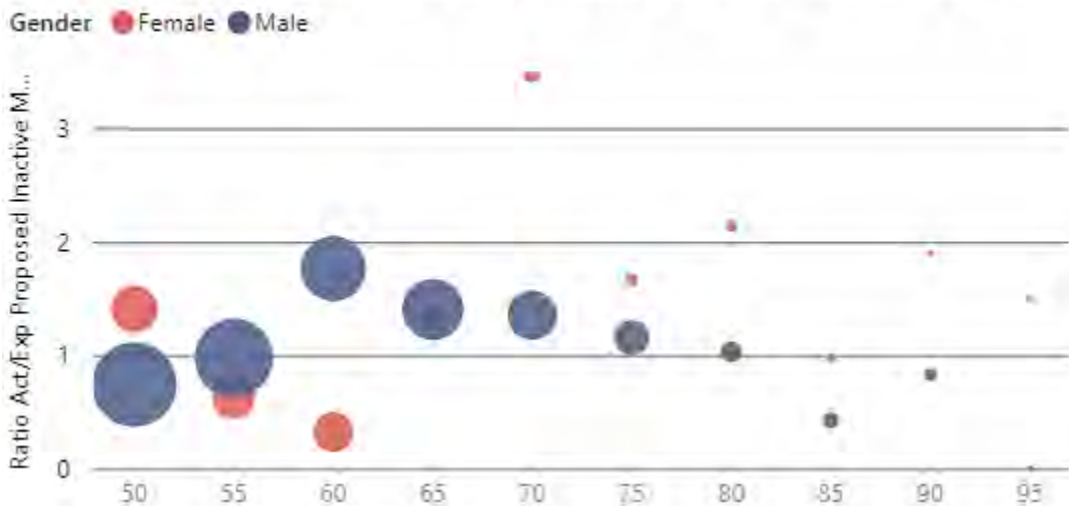
Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



Actual vs. Expected - Inactive Mortality Proposed w/ Benefit Bubbles; by Age



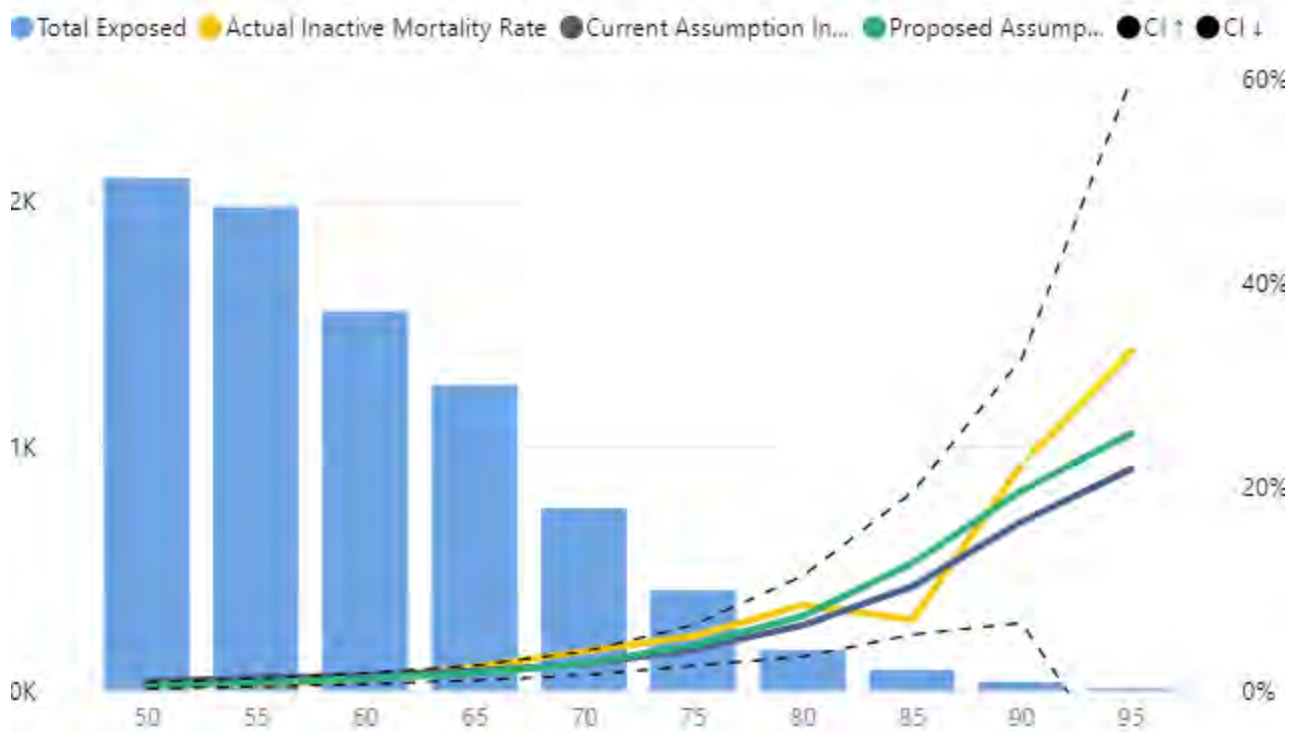
Headcount-weighted

The following charts show postretirement mortality experience on a headcount-weighted basis by age band for the age range (50 to 99) during the period 2015 – 2019 for males and females on the current and proposed assumptions for Correction officers. The A/E increased from 0.99 to 1.11.

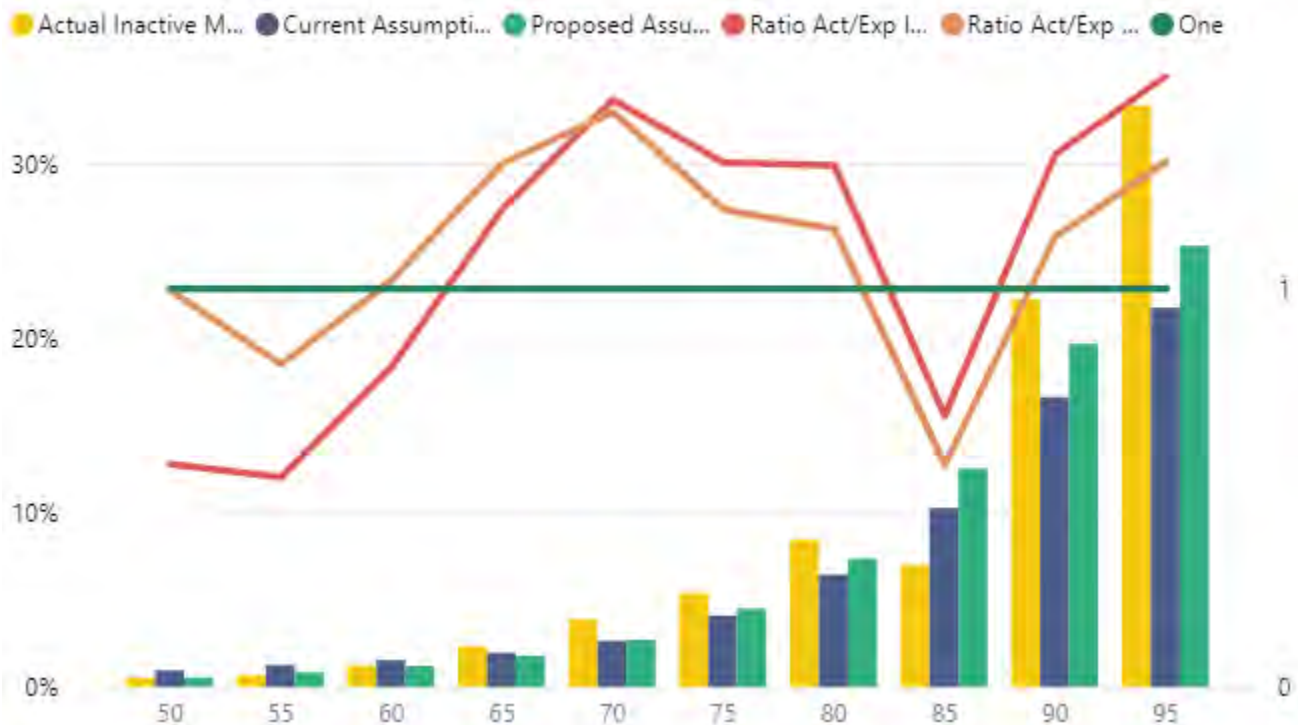
Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
50	11	19.7	2,094	0.5253%	0.9393%	▲ 0.56
55	13	24.7	1,975	0.6582%	1.2489%	▲ 0.53
60	19	23.7	1,550	1.2258%	1.5260%	▲ 0.80
65	29	24.2	1,248	2.3237%	1.9361%	▲ 1.20
70	29	19.7	747	3.8822%	2.6328%	▲ 1.47
75	22	16.7	410	5.3659%	4.0751%	▲ 1.32
80	14	10.7	166	8.4337%	6.4350%	▲ 1.31
85	6	8.8	86	6.9767%	10.2403%	▲ 0.68
90	8	6.0	36	22.2222%	16.6066%	▲ 1.34
95	2	1.3	6	33.3333%	21.7229%	◆ 1.53
Total	153	155.3	8,318	1.8394%	1.8670%	● 0.99

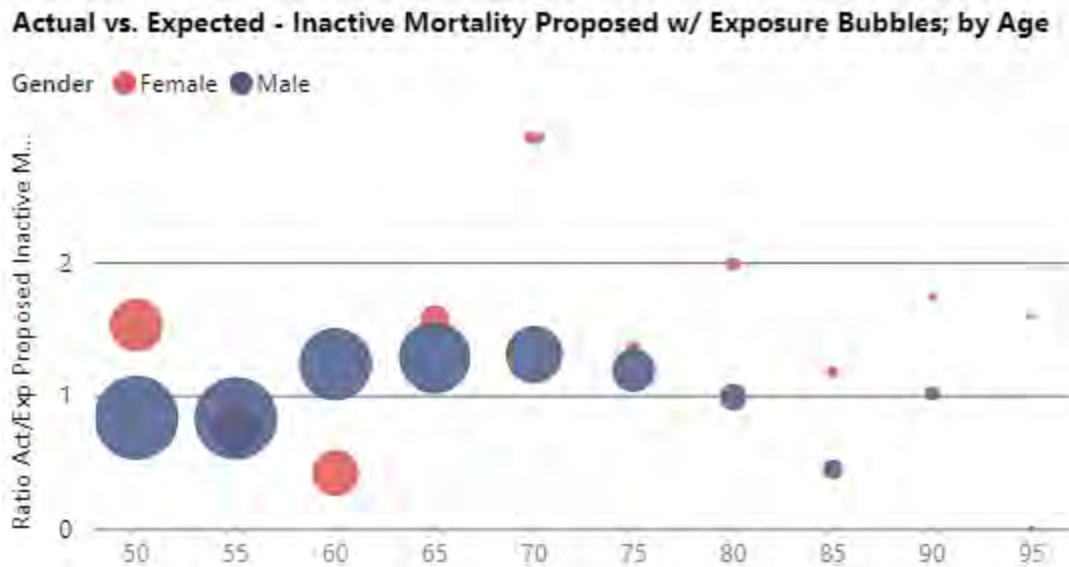
Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
50	11	11.1	2,094	0.5253%	0.5277%	● 1.00
55	13	16.0	1,975	0.6582%	0.8124%	▲ 0.81
60	19	18.6	1,550	1.2258%	1.2001%	● 1.02
65	29	22.0	1,248	2.3237%	1.7668%	▲ 1.32
70	29	20.1	747	3.8822%	2.6886%	▲ 1.44
75	22	18.4	410	5.3659%	4.4763%	▲ 1.20
80	14	12.2	166	8.4337%	7.3334%	▲ 1.15
85	6	10.8	86	6.9767%	12.5079%	▲ 0.56
90	8	7.1	36	22.2222%	19.6448%	▲ 1.13
95	2	1.5	6	33.3333%	25.2665%	▲ 1.32
Total	153	137.7	8,318	1.8394%	1.6554%	▲ 1.11

Exposure Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age





Summary

We have proposed new assumptions consistent with industry standards. In total, the proposed mortality tables are anticipated to increase plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: CORRECTION BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
15	0.1529%	0.1504%	68	2.0976%	1.9435%
16	0.2068%	0.2034%	69	2.2316%	2.0901%
17	0.2788%	0.2742%	70	2.3817%	2.2370%
18	0.3328%	0.3273%	71	2.5774%	2.3979%
19	0.3687%	0.3507%	72	2.7948%	2.5741%
20	0.3762%	0.3604%	73	3.0370%	2.7665%
21	0.3973%	0.3851%	74	3.3054%	3.0122%
22	0.4195%	0.4042%	75	3.6032%	3.3026%
23	0.4428%	0.4278%	76	3.9499%	3.6022%
24	0.4673%	0.4574%	77	4.3346%	3.9080%
25	0.4920%	0.4832%	78	4.7588%	4.2919%
26	0.5163%	0.5076%	79	5.2279%	4.7080%
27	0.5402%	0.5362%	80	5.7433%	5.1937%
28	0.5630%	0.5555%	81	6.3425%	5.7290%
29	0.5840%	0.5755%	82	6.9496%	6.3165%
30	0.6026%	0.5962%	83	7.5636%	6.9627%
31	0.6179%	0.6177%	84	8.1812%	7.7122%
32	0.6297%	0.6268%	85	8.8050%	8.4245%
33	0.6376%	0.6361%	86	9.7703%	9.0849%
34	0.6427%	0.6422%	87	10.8005%	9.7986%
35	0.6554%	0.6466%	88	12.0443%	10.5221%
36	0.6683%	0.6504%	89	13.3397%	11.5771%
37	0.6814%	0.6538%	90	14.6958%	12.7805%
38	0.6949%	0.6583%	91	16.4185%	14.0140%
39	0.7086%	0.6655%	92	18.1416%	15.1826%
40	0.7225%	0.6718%	93	19.8574%	16.3730%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
CURRENT (continued)
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: CORRECTION
BASE TABLE

Age	Males ¹	Females ²	Age	Males ¹	Females ²
41	0.7368%	0.6785%	94	21.6187%	18.3891%
42	0.7513%	0.6898%	95	23.5884%	20.4768%
43	0.7661%	0.7059%	96	25.4266%	21.5778%
44	0.7812%	0.7241%	97	27.2119%	21.9133%
45	0.7966%	0.7516%	98	29.0202%	22.0663%
46	0.8123%	0.7820%	99	30.6654%	23.0087%
47	0.8283%	0.8124%	100	32.1584%	23.1230%
48	0.8446%	0.8431%	101	33.7521%	23.6022%
49	0.8613%	0.8604%	102	35.1259%	24.5619%
50	0.8782%	0.8758%	103	36.3671%	25.7825%
51	0.8956%	0.8871%	104	37.3834%	27.1635%
52	0.9574%	0.8938%	105	38.1051%	28.6530%
53	1.0214%	0.8945%	106	38.4698%	30.2169%
54	1.0859%	0.9896%	107	38.6325%	31.8182%
55	1.1487%	1.0949%	108	38.8076%	33.4131%
56	1.2131%	1.1161%	109	38.9794%	34.9566%
57	1.2733%	1.1402%	110	50.0000%	50.0000%
58	1.3280%	1.1770%	111	50.0000%	50.0000%
59	1.3775%	1.2195%	112	50.0000%	50.0000%
60	1.4231%	1.2648%	113	50.0000%	50.0000%
61	1.4854%	1.3147%	114	50.0000%	50.0000%
62	1.5489%	1.3627%	115	50.0000%	50.0000%
63	1.6175%	1.4176%	116	50.0000%	50.0000%
64	1.6924%	1.5072%	117	50.0000%	50.0000%
65	1.7762%	1.5987%	118	50.0000%	50.0000%
66	1.8712%	1.7097%	119	50.0000%	50.0000%
67	1.9777%	1.8212%	120	100.0000%	100.0000%

¹ An adjustment factor of 0.835 is applied to the probabilities above to develop benefit weighted probabilities of mortality

² An adjustment factor of 0.77 is applied to the probabilities above to develop benefit weighted probabilities of mortality

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: CORRECTION BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0196%	0.0104%	68	1.7405%	1.4297%
16	0.0265%	0.0127%	69	1.8855%	1.5399%
17	0.0357%	0.0138%	70	2.0503%	1.6661%
18	0.1242%	0.0541%	71	2.2388%	1.8078%
19	0.1346%	0.0575%	72	2.4610%	1.9673%
20	0.1406%	0.0645%	73	2.7233%	2.1457%
21	0.1430%	0.0695%	74	3.0339%	2.3433%
22	0.1423%	0.0735%	75	3.3958%	2.5615%
23	0.1410%	0.0778%	76	3.8099%	2.8042%
24	0.1413%	0.0822%	77	4.2760%	3.0748%
25	0.1444%	0.0882%	78	4.7869%	3.4039%
26	0.1532%	0.0971%	79	5.3367%	3.8187%
27	0.1608%	0.1048%	80	5.9255%	4.2840%
28	0.1684%	0.1142%	81	6.5623%	4.8038%
29	0.1773%	0.1235%	82	7.2620%	5.3819%
30	0.1844%	0.1328%	83	8.0380%	6.0260%
31	0.1924%	0.1431%	84	8.9164%	6.7435%
32	0.1997%	0.1529%	85	9.9246%	7.5423%
33	0.2061%	0.1619%	86	11.0547%	8.4301%
34	0.2114%	0.1713%	87	12.3968%	9.4183%
35	0.2169%	0.1794%	88	13.8811%	10.5206%
36	0.2223%	0.1875%	89	15.5210%	11.7443%
37	0.2277%	0.1942%	90	17.3223%	13.1016%
38	0.2328%	0.1995%	91	19.1673%	14.5535%
39	0.2377%	0.2064%	92	20.9740%	16.0660%
40	0.2438%	0.2108%	93	22.7203%	17.6314%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: CORRECTION BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
41	0.2485%	0.2171%	94	24.4095%	19.2461%
42	0.2561%	0.2231%	95	26.0524%	20.9269%
43	0.2630%	0.2301%	96	27.8280%	22.7694%
44	0.2720%	0.2374%	97	29.6818%	24.7309%
45	0.2833%	0.2465%	98	31.6650%	26.8263%
46	0.2963%	0.2588%	99	33.7990%	29.0465%
47	0.3121%	0.2722%	100	36.0592%	31.3842%
48	0.3312%	0.2883%	101	38.4009%	33.7980%
49	0.3548%	0.3072%	102	40.7207%	36.2348%
50	0.3811%	0.3290%	103	43.0242%	38.6834%
51	0.4029%	0.3616%	104	45.2640%	41.1062%
52	0.4288%	0.3997%	105	47.4387%	43.4989%
53	0.4600%	0.4423%	106	49.5452%	45.8250%
54	0.4966%	0.4900%	107	51.5584%	48.0766%
55	0.5395%	0.5422%	108	53.4692%	50.2474%
56	0.5900%	0.5980%	109	55.2882%	52.3132%
57	0.6499%	0.6562%	110	56.7454%	54.2649%
58	0.7188%	0.7177%	111	56.8934%	56.1066%
59	0.7955%	0.7790%	112	57.0359%	57.1273%
60	0.8790%	0.8413%	113	57.1788%	57.2475%
61	0.9701%	0.9038%	114	57.3392%	57.3679%
62	1.0649%	0.9663%	115	57.4828%	57.4885%
63	1.1646%	1.0304%	116	57.4943%	57.4943%
64	1.2670%	1.0965%	117	57.5000%	57.5000%
65	1.3747%	1.1677%	118	57.5000%	57.5000%
66	1.4875%	1.2447%	119	57.5000%	57.5000%
67	1.6093%	1.3322%	120	100.0000%	100.0000%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
PROPOSED
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: CORRECTION
BASE YEAR 2019
COUNT WEIGHTED

Age	Males	Females	Age	Males	Females
15	0.0187%	0.0099%	68	1.9490%	1.5842%
16	0.0253%	0.0121%	69	2.1055%	1.7146%
17	0.0341%	0.0132%	70	2.2830%	1.8728%
18	0.1386%	0.0517%	71	2.4857%	2.0632%
19	0.1529%	0.0550%	72	2.7189%	2.2913%
20	0.1623%	0.0617%	73	2.9861%	2.5605%
21	0.1684%	0.0665%	74	3.2932%	2.8756%
22	0.1719%	0.0703%	75	3.6420%	3.2385%
23	0.1739%	0.0744%	76	4.0373%	3.6379%
24	0.1778%	0.0787%	77	4.4808%	4.0663%
25	0.1834%	0.0844%	78	4.9745%	4.5214%
26	0.1945%	0.0929%	79	5.5185%	4.9998%
27	0.2046%	0.1003%	80	6.1194%	5.5054%
28	0.2148%	0.1092%	81	6.7819%	6.0379%
29	0.2262%	0.1182%	82	7.5162%	6.6046%
30	0.2356%	0.1270%	83	8.4220%	7.2116%
31	0.2459%	0.1369%	84	9.4865%	7.8668%
32	0.2552%	0.1463%	85	10.6265%	8.5820%
33	0.2634%	0.1548%	86	11.8396%	9.3631%
34	0.2716%	0.1638%	87	13.1344%	10.2237%
35	0.2781%	0.1716%	88	14.5245%	11.1738%
36	0.2856%	0.1793%	89	16.0276%	12.2200%
37	0.2909%	0.1858%	90	17.6598%	13.3667%
38	0.2969%	0.1908%	91	19.3406%	14.6283%
39	0.3022%	0.1974%	92	21.0098%	16.0015%
40	0.3069%	0.2041%	93	22.6520%	17.4930%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
PROPOSED (continued)
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: CORRECTION
BASE YEAR 2019
COUNT WEIGHTED

Age	Males	Females	Age	Males	Females
41	0.3139%	0.2101%	94	24.2693%	19.0937%
42	0.3209%	0.2168%	95	25.8664%	20.8058%
43	0.3294%	0.2234%	96	27.6046%	22.7058%
44	0.3388%	0.2325%	97	29.4187%	24.7256%
45	0.3516%	0.2422%	98	31.3424%	26.8605%
46	0.3673%	0.2538%	99	33.3898%	29.0823%
47	0.3871%	0.2686%	100	35.5301%	31.3800%
48	0.4101%	0.2850%	101	37.7292%	33.7140%
49	0.4380%	0.3051%	102	39.8974%	36.0594%
50	0.4699%	0.3281%	103	42.0448%	38.4024%
51	0.5032%	0.3710%	104	44.1275%	40.7077%
52	0.5420%	0.4206%	105	46.1443%	42.9725%
53	0.5856%	0.4784%	106	48.0947%	45.1624%
54	0.6362%	0.5427%	107	49.9555%	47.2701%
55	0.6924%	0.6131%	108	51.7189%	49.2941%
56	0.7565%	0.6907%	109	53.3976%	51.2097%
57	0.8267%	0.7718%	110	54.2782%	53.0102%
58	0.9033%	0.8535%	111	54.4197%	54.5343%
59	0.9858%	0.9329%	112	54.5561%	54.6435%
60	1.0730%	1.0050%	113	54.6928%	54.7585%
61	1.1643%	1.0716%	114	54.8462%	54.8736%
62	1.2601%	1.1313%	115	54.9835%	54.9890%
63	1.3583%	1.1876%	116	54.9945%	54.9945%
64	1.4604%	1.2455%	117	55.0000%	55.0000%
65	1.5689%	1.3107%	118	55.0000%	55.0000%
66	1.6847%	1.3868%	119	55.0000%	55.0000%
67	1.8099%	1.4765%	120	100.0000%	100.0000%

Housing and Transit Police – Males and Females

The following charts show postretirement mortality experience on an amount-weighted basis by age band for the age range (50 to 99) during the period 2015 – 2019 for males and females combined on the current and proposed assumptions for Housing and Transit Police members. The A/E increased from 1.04 to 1.05. The data for Housing and Transit Police members had no statistical credibility.

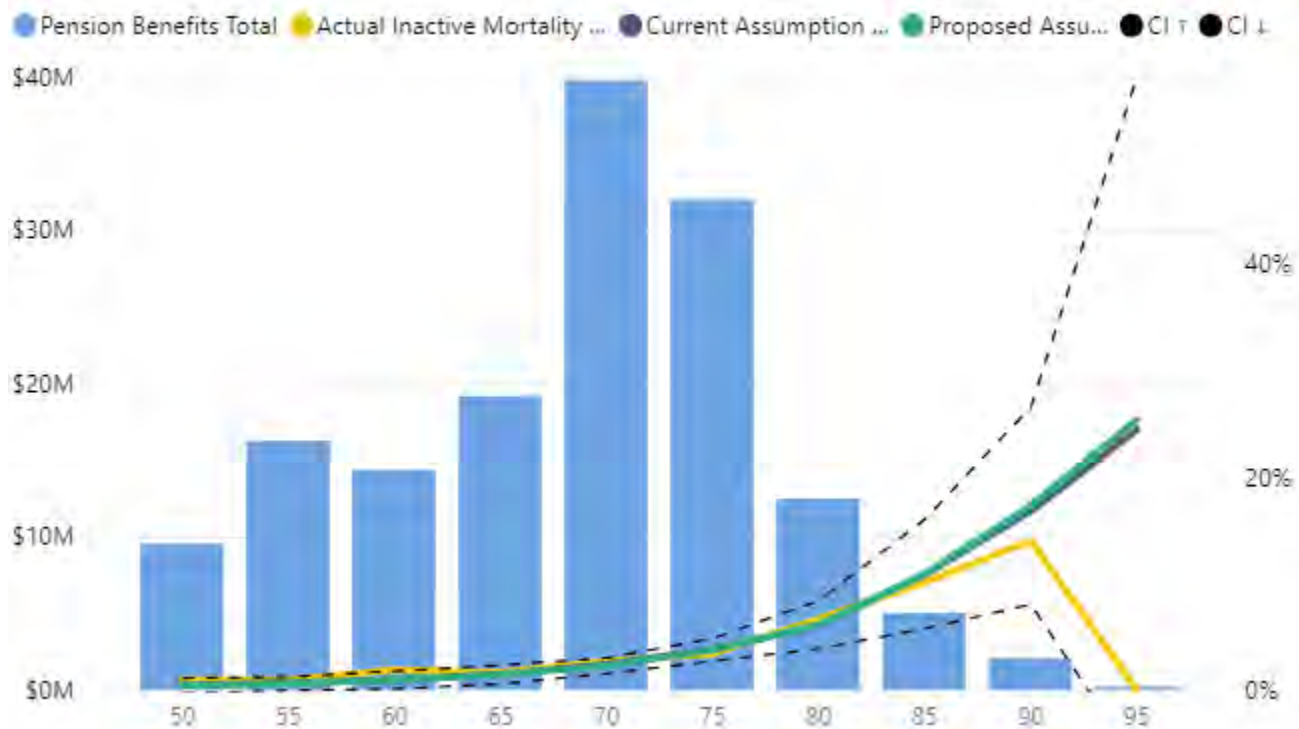
The following section displays results by age for males and females combined since there is nearly no female experience. Please note that the charts by age are based on 5-year brackets. For example, the age bracket 75 should be interpreted as the interval 75 – 79.

Amount-weighted

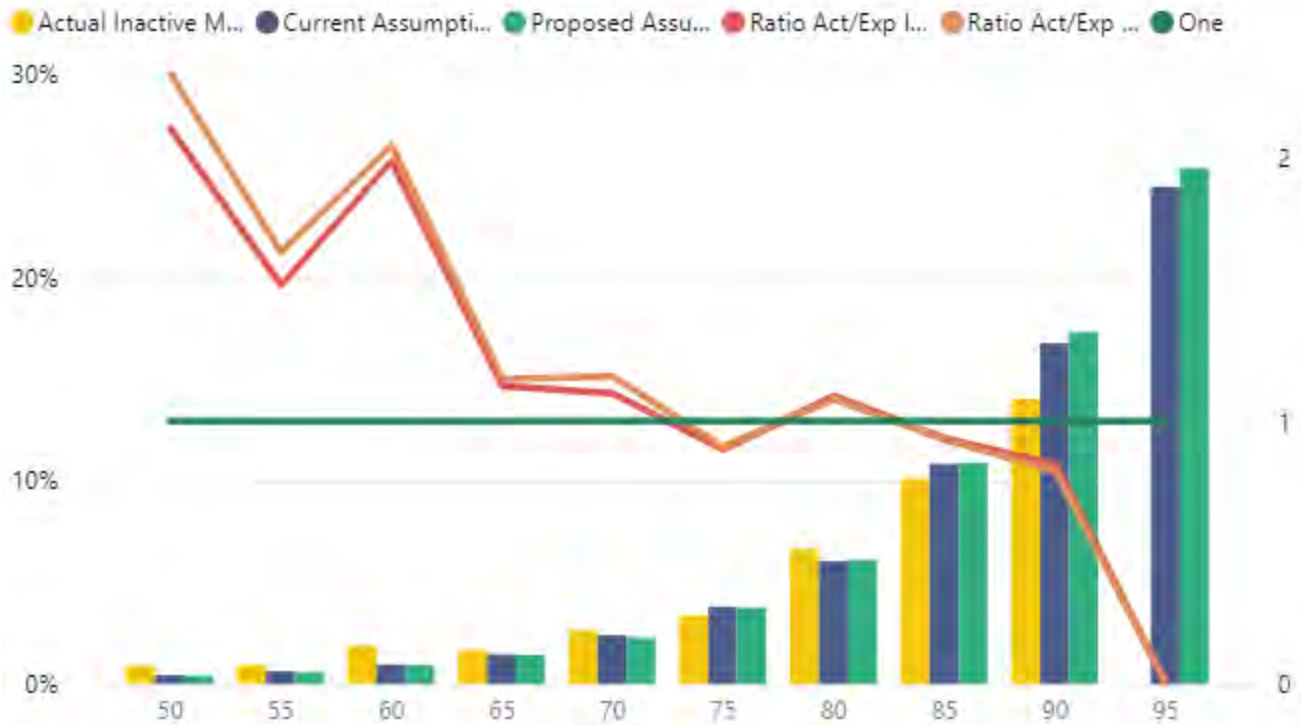
Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Current Assumption Inactive Mortality BftWght	Ratio Act/Exp Inactive Mortality BftWght
50	\$0.1M	\$0.0M	\$9.6M	0.9133%	0.4321%	2.11
55	\$0.2M	\$0.1M	\$16.3M	0.9457%	0.6232%	1.52
60	\$0.3M	\$0.1M	\$14.3M	1.8769%	0.9437%	1.99
65	\$0.3M	\$0.3M	\$19.2M	1.6496%	1.4561%	1.13
70	\$1.1M	\$1.0M	\$39.8M	2.6468%	2.3955%	1.10
75	\$1.1M	\$1.2M	\$32.0M	3.3849%	3.7987%	0.89
80	\$0.8M	\$0.8M	\$12.5M	6.6154%	6.0304%	1.10
85	\$0.5M	\$0.5M	\$5.0M	10.0988%	10.8076%	0.93
90	\$0.3M	\$0.3M	\$2.0M	14.0056%	16.7624%	0.84
95	\$0.0M	\$0.0M	\$0.2M	0.0000%	24.4376%	0.00
Total	\$4.6M	\$4.4M	\$150.9M	3.0373%	2.9254%	1.04

Age (bins)	Actual Inactive Benefits Released	Expected Inactive Benefits Released Proposed	Pension Benefits Total	Actual Inactive Mortality Rate BftWght	Proposed Assumption Inactive Mortality BftWght	Act/Exp Proposed Inactive Mortality BftWght
50	\$0.1M	\$0.0M	\$9.6M	0.9133%	0.3934%	2.32
55	\$0.2M	\$0.1M	\$16.3M	0.9457%	0.5754%	1.64
60	\$0.3M	\$0.1M	\$14.3M	1.8769%	0.9155%	2.05
65	\$0.3M	\$0.3M	\$19.2M	1.6496%	1.4215%	1.16
70	\$1.1M	\$0.9M	\$39.8M	2.6468%	2.2630%	1.17
75	\$1.1M	\$1.2M	\$32.0M	3.3849%	3.7533%	0.90
80	\$0.8M	\$0.8M	\$12.5M	6.6154%	6.1092%	1.08
85	\$0.5M	\$0.5M	\$5.0M	10.0988%	10.8765%	0.93
90	\$0.3M	\$0.4M	\$2.0M	14.0056%	17.2941%	0.81
95	\$0.0M	\$0.1M	\$0.2M	0.0000%	25.3672%	0.00
Total	\$4.6M	\$4.3M	\$150.9M	3.0373%	2.8834%	1.05

Pension Benefit Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



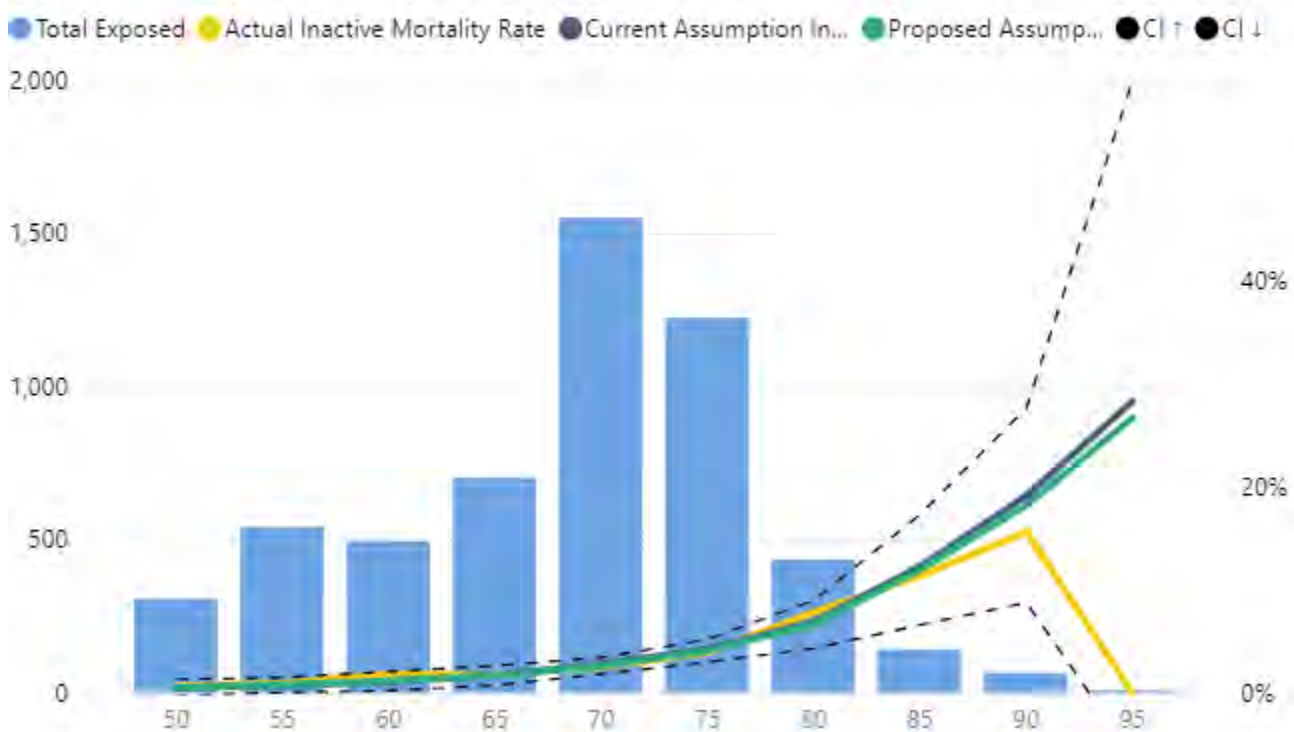
Headcount-weighted

The following charts show postretirement mortality experience on a headcount-weighted basis by age band for the age range (50 to 99) during the period 2015 – 2019 for males and females on the current and proposed assumptions for Housing and Transit Police members. The A/E increased from 0.98 to 1.01.

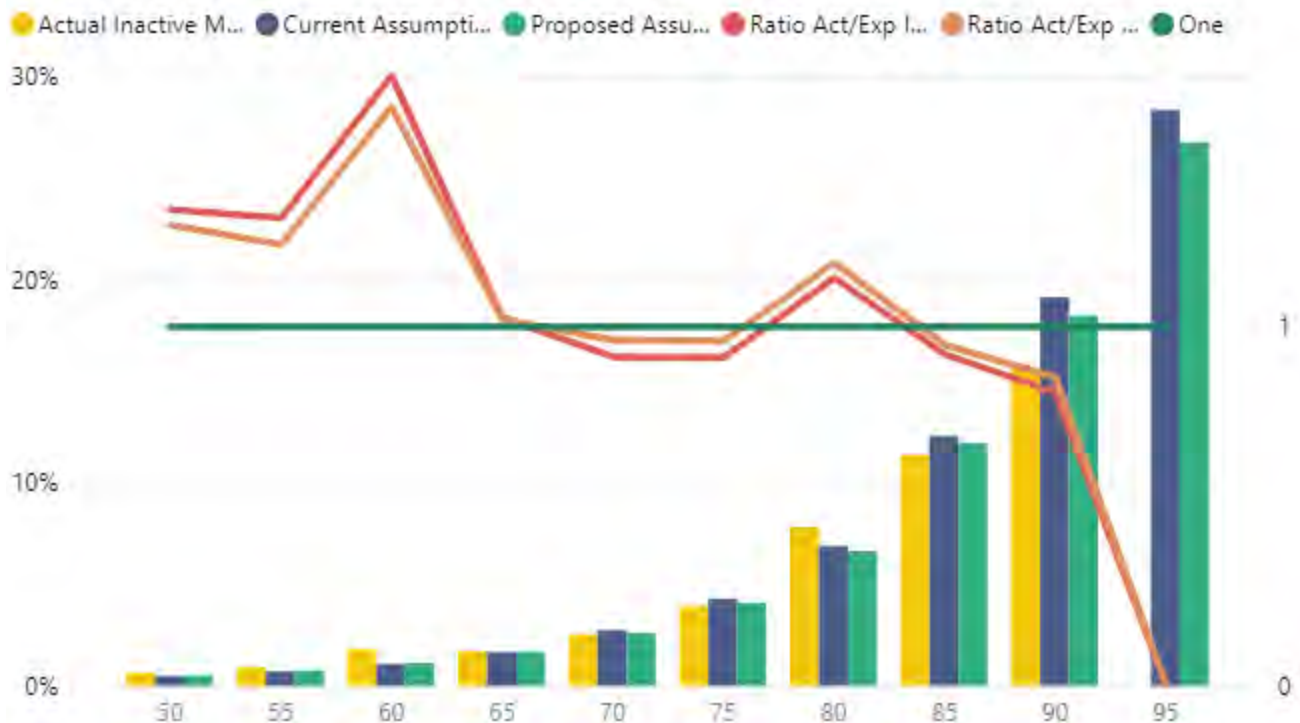
Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths	Total Exposed	Actual Inactive Mortality Rate	Current Assumption Inactive Mortality	Ratio Act/Exp Inactive Mortality
50	2	1.5	307	0.6515%	0.4910%	1.33
55	5	3.8	540	0.9259%	0.7106%	1.30
60	9	5.3	494	1.8219%	1.0725%	1.70
65	12	11.7	702	1.7094%	1.6662%	1.03
70	39	42.6	1,551	2.5145%	2.7442%	0.92
75	48	52.5	1,224	3.9216%	4.2906%	0.91
80	34	29.9	435	7.8161%	6.8779%	1.14
85	16	17.3	141	11.3475%	12.2886%	0.92
90	10	12.2	64	15.6250%	19.1146%	0.82
95	0	2.0	7	0.0000%	28.3240%	0.00
Total	175	178.9	5,465	3.2022%	3.2732%	0.98

Age (bins)	Actual Inactive Deaths	Expected Inactive Deaths Proposed	Total Exposed	Actual Inactive Mortality Rate	Proposed Assumption Inactive Mortality	Act/Exp Proposed Inactive Mortality
50	2	1.6	307	0.6515%	0.5078%	▲ 1.28
55	5	4.1	540	0.9259%	0.7533%	▲ 1.23
60	9	5.6	494	1.8219%	1.1300%	◆ 1.61
65	12	11.8	702	1.7094%	1.6745%	● 1.02
70	39	40.5	1,551	2.5145%	2.6110%	● 0.96
75	48	50.0	1,224	3.9216%	4.0854%	● 0.96
80	34	28.9	435	7.8161%	6.6326%	▲ 1.18
85	16	16.9	141	11.3475%	11.9553%	● 0.95
90	10	11.6	64	15.6250%	18.1978%	▲ 0.86
95	0	1.9	7	0.0000%	26.7292%	◆ 0.00
Total	175	172.7	5,465	3.2022%	3.1600%	● 1.01

Exposure Distribution w/ Inactive Mortality Rate - Actual and Expected; by Age



Inactive Mortality Rate - Actual, Expected, and Ratio; by Age



Summary

We have proposed new assumptions consistent with industry standards. In total, the proposed mortality tables are anticipated to increase plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: HOUSING POLICE AND TRANSIT POLICE BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
15	0.0138%	0.0095%	68	1.8368%	1.2141%
16	0.0187%	0.0117%	69	2.0342%	1.3912%
17	0.0252%	0.0127%	70	2.2544%	1.5837%
18	0.0301%	0.0148%	71	2.5045%	1.7848%
19	0.0334%	0.0159%	72	2.7644%	1.9944%
20	0.0347%	0.0168%	73	3.0535%	2.2258%
21	0.0371%	0.0185%	74	3.3359%	2.4880%
22	0.0402%	0.0205%	75	3.6300%	2.7766%
23	0.0431%	0.0227%	76	4.1253%	3.0785%
24	0.0467%	0.0251%	77	4.6178%	3.3525%
25	0.0503%	0.0274%	78	5.1289%	3.6752%
26	0.0544%	0.0298%	79	5.5682%	4.1794%
27	0.0586%	0.0322%	80	6.0116%	4.7030%
28	0.0633%	0.0348%	81	6.7832%	5.2484%
29	0.0681%	0.0374%	82	7.6009%	5.7185%
30	0.0730%	0.0400%	83	8.4279%	6.1948%
31	0.0781%	0.0425%	84	9.2040%	7.0110%
32	0.0830%	0.0450%	85	10.1002%	7.8321%
33	0.0898%	0.0476%	86	11.5115%	8.6046%
34	0.0933%	0.0491%	87	12.7944%	9.3702%
35	0.0972%	0.0512%	88	14.1662%	10.2595%
36	0.1019%	0.0534%	89	15.7578%	11.5941%
37	0.1080%	0.0563%	90	17.3856%	12.9378%
38	0.1153%	0.0590%	91	19.0388%	14.3081%
39	0.1286%	0.0629%	92	20.6360%	15.3704%
40	0.1417%	0.0688%	93	22.5718%	16.4875%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT (continued) PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: HOUSING POLICE AND TRANSIT POLICE BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
41	0.1550%	0.0766%	94	24.4562%	17.6613%
42	0.1690%	0.0865%	95	26.1404%	18.7606%
43	0.1838%	0.0992%	96	28.0695%	19.7397%
44	0.1997%	0.1148%	97	29.6855%	20.6328%
45	0.2170%	0.1330%	98	30.9177%	21.2676%
46	0.2279%	0.1538%	99	32.6552%	21.8544%
47	0.2387%	0.1769%	100	33.9880%	22.1859%
48	0.2492%	0.2017%	101	34.9681%	23.0680%
49	0.3237%	0.2316%	102	35.9346%	24.0803%
50	0.3948%	0.2637%	103	36.6434%	25.2770%
51	0.4620%	0.2870%	104	37.3834%	26.6309%
52	0.5249%	0.3323%	105	38.1051%	28.0912%
53	0.5528%	0.3677%	106	38.4698%	29.6244%
54	0.5891%	0.4196%	107	38.6325%	31.1943%
55	0.6260%	0.4722%	108	38.8076%	32.7579%
56	0.6814%	0.5135%	109	38.9794%	34.2712%
57	0.7288%	0.5258%	110	50.0000%	50.0000%
58	0.7710%	0.5452%	111	50.0000%	50.0000%
59	0.8525%	0.5823%	112	50.0000%	50.0000%
60	0.9273%	0.6153%	113	50.0000%	50.0000%
61	1.0007%	0.6486%	114	50.0000%	50.0000%
62	1.0735%	0.7169%	115	50.0000%	50.0000%
63	1.1411%	0.7851%	116	50.0000%	50.0000%
64	1.2250%	0.8630%	117	50.0000%	50.0000%
65	1.3055%	0.9419%	118	50.0000%	50.0000%
66	1.4653%	1.0252%	119	50.0000%	50.0000%
67	1.6473%	1.1204%	120	100.0000%	100.0000%

¹ An adjustment factor of 0.876 is applied to the probabilities above to develop benefit weighted probabilities of mortality

² An adjustment factor of 0.876 is applied to the probabilities above to develop benefit weighted probabilities of mortality

The following table shows the proposed assumptions.

Part II Experience Study Report – NYCERS
New York City Retirement Systems

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR DISABLED RETIREES: HOUSING POLICE AND TRANSIT POLICE BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0170%	0.0090%	68	1.5135%	1.2432%
16	0.0230%	0.0110%	69	1.6396%	1.3390%
17	0.0310%	0.0120%	70	1.7829%	1.4488%
18	0.1080%	0.0470%	71	1.9468%	1.5720%
19	0.1170%	0.0500%	72	2.1400%	1.7107%
20	0.1223%	0.0561%	73	2.3681%	1.8658%
21	0.1243%	0.0604%	74	2.6382%	2.0377%
22	0.1238%	0.0639%	75	2.9529%	2.2274%
23	0.1226%	0.0677%	76	3.3129%	2.4384%
24	0.1229%	0.0715%	77	3.7183%	2.6737%
25	0.1256%	0.0767%	78	4.1626%	2.9599%
26	0.1332%	0.0844%	79	4.6406%	3.3206%
27	0.1398%	0.0912%	80	5.1526%	3.7252%
28	0.1464%	0.0993%	81	5.7064%	4.1773%
29	0.1542%	0.1074%	82	6.3147%	4.6799%
30	0.1603%	0.1154%	83	6.9895%	5.2400%
31	0.1673%	0.1245%	84	7.7534%	5.8639%
32	0.1737%	0.1330%	85	8.6301%	6.5585%
33	0.1792%	0.1408%	86	9.6128%	7.3305%
34	0.1838%	0.1489%	87	10.7798%	8.1898%
35	0.1886%	0.1560%	88	12.0705%	9.1483%
36	0.1933%	0.1630%	89	13.4965%	10.2124%
37	0.1980%	0.1689%	90	15.0629%	11.3927%
38	0.2024%	0.1735%	91	16.6672%	12.6552%
39	0.2067%	0.1795%	92	18.2383%	13.9704%
40	0.2120%	0.1833%	93	19.7568%	15.3316%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
 PROPOSED (continued)
 PROBABILITIES OF MORTALITY FOR DISABLED RETIREES:
 HOUSING POLICE AND TRANSIT POLICE
 BASE YEAR 2019
 BENEFIT WEIGHTED

Age	Males	Females	Age	Males	Females
41	0.2161%	0.1888%	94	21.2257%	16.7357%
42	0.2227%	0.1940%	95	22.6543%	18.1973%
43	0.2287%	0.2001%	96	24.1983%	19.7995%
44	0.2365%	0.2064%	97	25.8103%	21.5051%
45	0.2464%	0.2144%	98	27.5348%	23.3272%
46	0.2576%	0.2250%	99	29.3905%	25.2578%
47	0.2714%	0.2367%	100	31.3559%	27.2907%
48	0.2880%	0.2507%	101	33.3920%	29.3896%
49	0.3086%	0.2671%	102	35.4093%	31.5085%
50	0.3314%	0.2861%	103	37.4123%	33.6377%
51	0.3503%	0.3144%	104	39.3600%	35.7445%
52	0.3729%	0.3476%	105	41.2510%	37.8251%
53	0.4000%	0.3846%	106	43.0828%	39.8479%
54	0.4318%	0.4260%	107	44.8334%	41.8058%
55	0.4692%	0.4715%	108	46.4949%	43.6934%
56	0.5131%	0.5200%	109	48.0767%	45.4898%
57	0.5652%	0.5706%	110	49.3439%	47.1868%
58	0.6251%	0.6241%	111	49.4725%	48.7883%
59	0.6917%	0.6774%	112	49.5965%	49.6759%
60	0.7644%	0.7316%	113	49.7207%	49.7804%
61	0.8436%	0.7859%	114	49.8602%	49.8851%
62	0.9260%	0.8402%	115	49.9850%	49.9900%
63	1.0127%	0.8960%	116	49.9950%	49.9950%
64	1.1018%	0.9535%	117	50.0000%	50.0000%
65	1.1954%	1.0154%	118	50.0000%	50.0000%
66	1.2935%	1.0824%	119	50.0000%	50.0000%
67	1.3994%	1.1584%	120	100.0000%	100.0000%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
 PROPOSED
 PROBABILITIES OF MORTALITY FOR DISABLED RETIREES:
 HOUSING POLICE AND TRANSIT POLICE
 BASE YEAR 2019
 COUNT WEIGHTED

Age	Males	Females	Age	Males	Females
15	0.0170%	0.0090%	68	1.7718%	1.4402%
16	0.0230%	0.0110%	69	1.9141%	1.5587%
17	0.0310%	0.0120%	70	2.0755%	1.7025%
18	0.1260%	0.0470%	71	2.2597%	1.8757%
19	0.1390%	0.0500%	72	2.4717%	2.0830%
20	0.1475%	0.0561%	73	2.7146%	2.3277%
21	0.1531%	0.0604%	74	2.9939%	2.6141%
22	0.1563%	0.0639%	75	3.3109%	2.9441%
23	0.1581%	0.0677%	76	3.6703%	3.3072%
24	0.1616%	0.0715%	77	4.0735%	3.6967%
25	0.1667%	0.0767%	78	4.5223%	4.1104%
26	0.1768%	0.0844%	79	5.0168%	4.5453%
27	0.1860%	0.0912%	80	5.5631%	5.0049%
28	0.1952%	0.0993%	81	6.1653%	5.4890%
29	0.2056%	0.1074%	82	6.8329%	6.0042%
30	0.2142%	0.1154%	83	7.6563%	6.5560%
31	0.2235%	0.1245%	84	8.6241%	7.1516%
32	0.2320%	0.1330%	85	9.6605%	7.8018%
33	0.2394%	0.1408%	86	10.7633%	8.5119%
34	0.2469%	0.1489%	87	11.9404%	9.2942%
35	0.2528%	0.1560%	88	13.2041%	10.1580%
36	0.2596%	0.1630%	89	14.5705%	11.1091%
37	0.2644%	0.1689%	90	16.0544%	12.1516%
38	0.2699%	0.1735%	91	17.5823%	13.2985%
39	0.2747%	0.1795%	92	19.0998%	14.5468%
40	0.2790%	0.1855%	93	20.5927%	15.9028%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
 PROPOSED (continued)
 PROBABILITIES OF MORTALITY FOR DISABLED RETIREES:
 HOUSING POLICE AND TRANSIT POLICE
 BASE YEAR 2019
 COUNT WEIGHTED

Age	Males	Females	Age	Males	Females
41	0.2854%	0.1910%	94	22.0630%	17.3579%
42	0.2917%	0.1971%	95	23.5149%	18.9143%
43	0.2995%	0.2031%	96	25.0951%	20.6416%
44	0.3080%	0.2113%	97	26.7443%	22.4778%
45	0.3197%	0.2202%	98	28.4931%	24.4187%
46	0.3339%	0.2307%	99	30.3543%	26.4385%
47	0.3519%	0.2442%	100	32.3001%	28.5273%
48	0.3728%	0.2591%	101	34.2993%	30.6491%
49	0.3982%	0.2774%	102	36.2704%	32.7813%
50	0.4272%	0.2983%	103	38.2225%	34.9113%
51	0.4574%	0.3373%	104	40.1159%	37.0070%
52	0.4927%	0.3824%	105	41.9494%	39.0659%
53	0.5324%	0.4349%	106	43.7225%	41.0568%
54	0.5783%	0.4934%	107	45.4141%	42.9728%
55	0.6295%	0.5574%	108	47.0172%	44.8128%
56	0.6877%	0.6279%	109	48.5432%	46.5543%
57	0.7515%	0.7017%	110	49.3439%	48.1911%
58	0.8212%	0.7759%	111	49.4725%	49.5766%
59	0.8962%	0.8481%	112	49.5965%	49.6759%
60	0.9755%	0.9137%	113	49.7207%	49.7804%
61	1.0584%	0.9742%	114	49.8602%	49.8851%
62	1.1456%	1.0284%	115	49.9850%	49.9900%
63	1.2348%	1.0796%	116	49.9950%	49.9950%
64	1.3277%	1.1323%	117	50.0000%	50.0000%
65	1.4263%	1.1915%	118	50.0000%	50.0000%
66	1.5316%	1.2608%	119	50.0000%	50.0000%
67	1.6453%	1.3422%	120	100.0000%	100.0000%

Postretirement Mortality – Contingent Beneficiaries

The SOA combined the experience of all contingent beneficiaries of teachers, general employees and public safety members in developing contingent survivor annuity mortality tables. We combined the experience of all NYCERS systems (NYCERS, TRS, BERS, POLICE and FIRE) in proposing a recommended assumption. We propose to use the PUB contingent survivor annuitant mortality tables, multiplied by adjustment factors. Separate tables exist on a headcount-weighted and amount-weighted basis in addition to gender.

For males, the proposed adjustment factors are 125% for amount-weighted and 120% for headcount-weighted. For females, the proposed adjustment factors are 120% for amount-weighted and 108% for headcount-weighted.

The contingent survivor assumption would apply upon the death of the member. While both the member and contingent survivor are both alive, we propose the healthy annuitant mortality table apply.

The following charts show postretirement mortality experience on a headcount-weighted basis by year for the age range (60 to 104) during the period 2015 – 2019 for both males and females combined on the current and proposed assumptions for all members of NYCERS. The A/E decreased from 1.12 to 1.00 and decreased from 1.14 to 1.02 for only NYCERS.

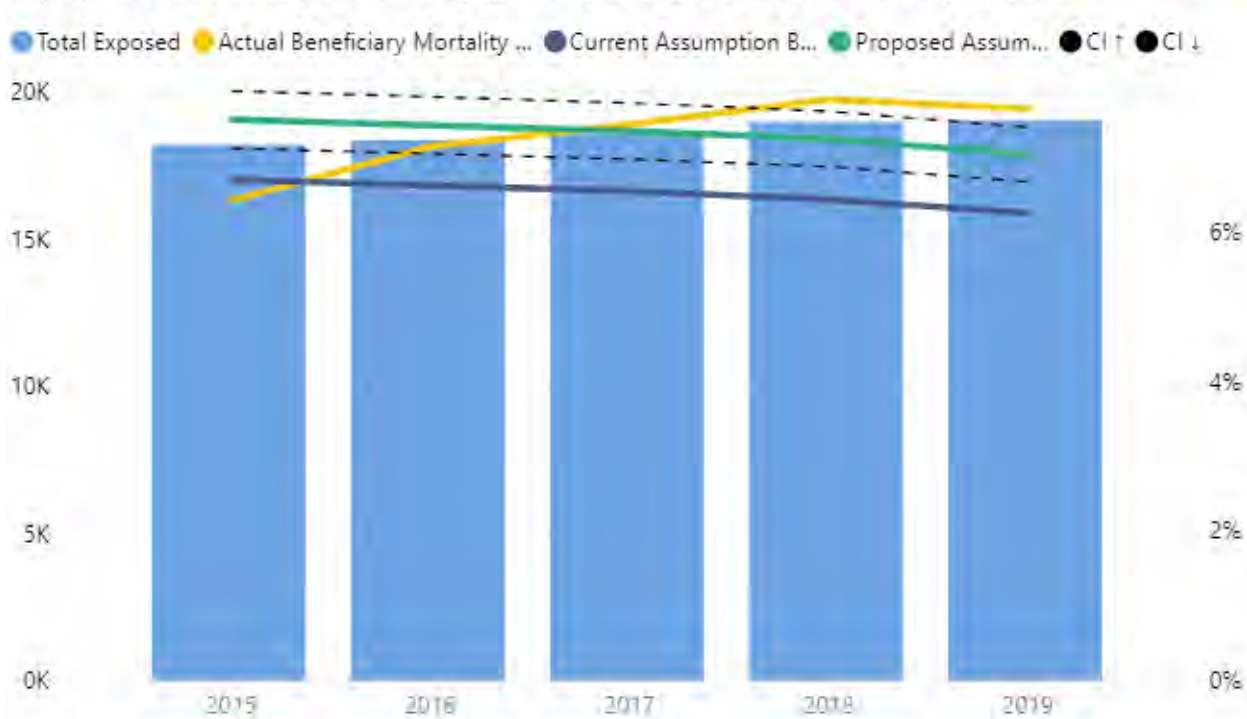
Current Assumption – Headcount-weighted

Plan Year	Actual Beneficiary Deaths	Expected Beneficiary Deaths	Total Exposed	Actual Beneficiary Mortality Rate	Current Assumption Beneficiary Mortality	Ratio Act/Exp Beneficiary Mortality
2015	1,163	1,213.4	18,168	6.4014%	6.6789%	0.96
2016	1,307	1,210.9	18,340	7.1265%	6.6027%	1.08
2017	1,376	1,210.4	18,541	7.4214%	6.5285%	1.14
2018	1,470	1,216.8	18,955	7.7552%	6.4197%	1.21
2019	1,450	1,184.7	19,001	7.6312%	6.2351%	1.22
Total	6,766	6,036.4	93,005	7.2749%	6.4904%	1.12

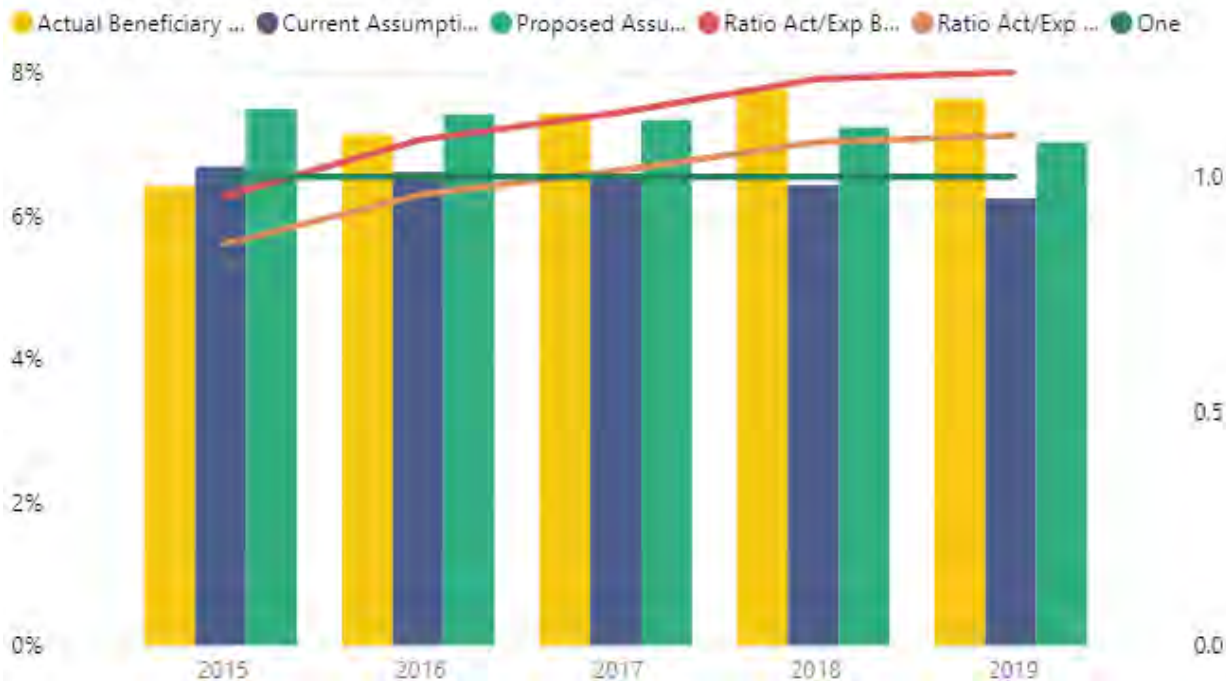
Proposed Assumption – Headcount-weighted

Plan Year	Actual Beneficiary Deaths	Expected Beneficiary Deaths Proposed	Total Exposed	Actual Beneficiary Mortality Rate	Proposed Assumption Beneficiary Mortality	Act/Exp Proposed Beneficiary Mortality
2015	1,163	1,359.3	18,168	6.4014%	7.4816%	▲ 0.86
2016	1,307	1,358.7	18,340	7.1265%	7.4084%	● 0.96
2017	1,376	1,359.0	18,541	7.4214%	7.3296%	● 1.01
2018	1,470	1,369.6	18,955	7.7552%	7.2257%	● 1.07
2019	1,450	1,333.4	19,001	7.6312%	7.0175%	● 1.09
Total	6,766	6,780.0	93,005	7.2749%	7.2899%	● 1.00

Exposure Distribution w/ Beneficiary Mortality Rate - Actual and Expected; by Year



Beneficiary Mortality Rate - Actual, Expected, and Ratio; by Year



Actual vs. Expected - Beneficiary Mortality Proposed w/ Exposure Bubbles; by ...



The following charts show postretirement mortality experience on an amount-weighted basis by year for the age range (60 to 104) during the period 2015 – 2019 for both males and females combined on the current and proposed assumptions for all members of NYCERS. The A/E decreased from 1.22 to 0.99 and decreased from 1.20 to 0.99 for only NYCERS.

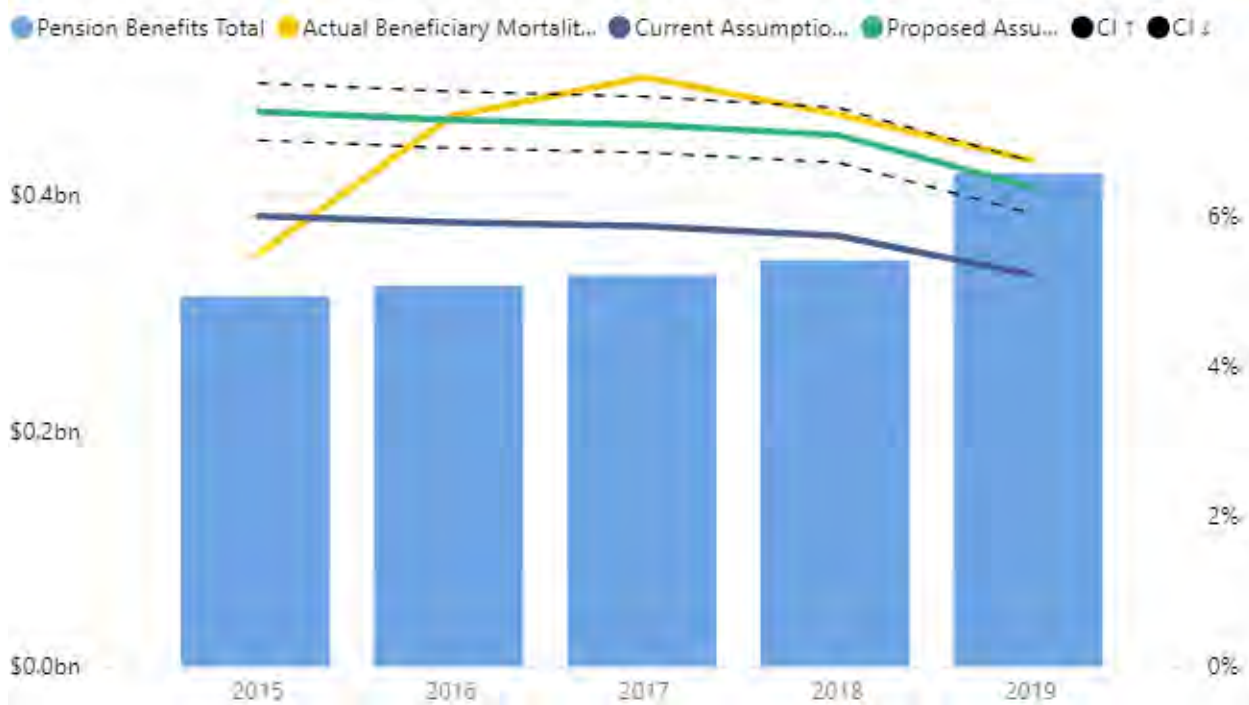
Current Assumption – Amount-weighted

Plan Year	Actual Beneficiary Benefits Released	Expected Beneficiary Benefits Released	Pension Benefits Total	Actual Beneficiary Mortality Rate BftWght	Current Assumption Beneficiary Mortality BftWght	Ratio Act/Exp Beneficiary Mortality BftWght
2015	\$17.2M	\$18.8M	\$314.1M	5.4787%	5.9868%	0.92
2016	\$23.6M	\$19.0M	\$322.7M	7.3093%	5.9014%	1.24
2017	\$26.0M	\$19.4M	\$331.8M	7.8345%	5.8502%	1.34
2018	\$25.3M	\$19.7M	\$344.3M	7.3366%	5.7247%	1.28
2019	\$28.1M	\$21.8M	\$418.3M	6.7269%	5.2026%	1.29
Total	\$120.2M	\$98.7M	\$1,731.3M	6.9425%	5.7031%	1.22

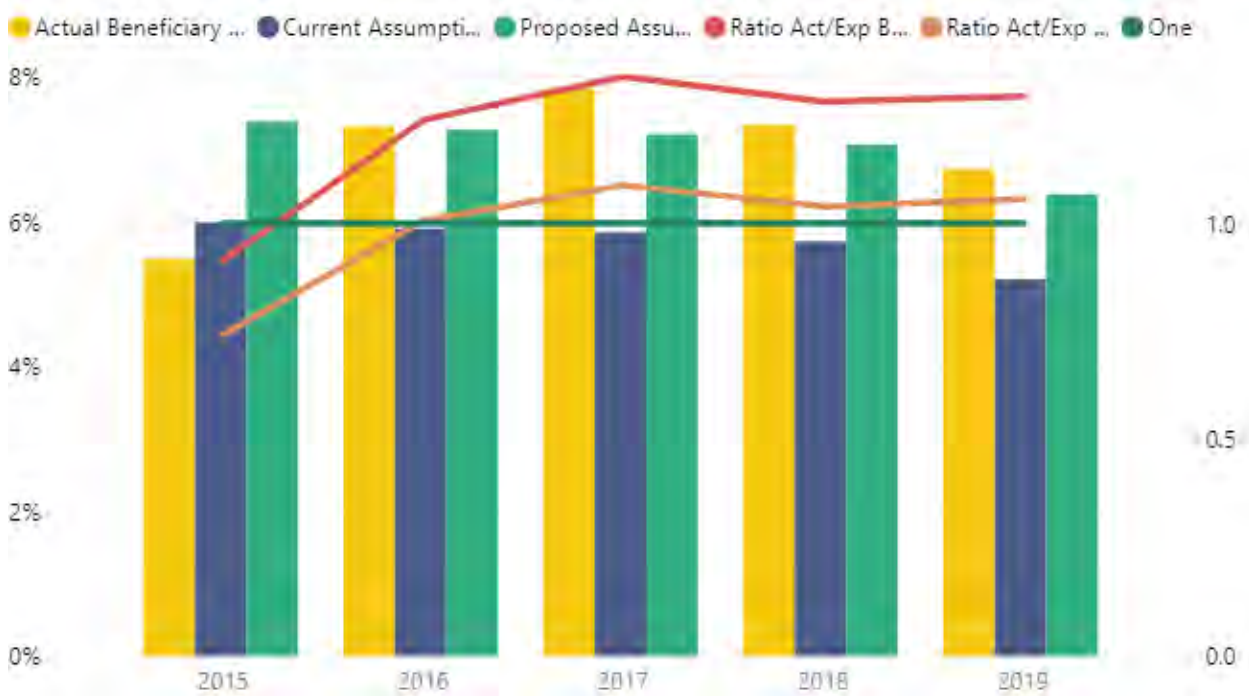
Proposed Assumption – Amount-weighted

Plan Year	Actual Beneficiary Benefits Released	Expected Beneficiary Benefits Released Proposed	Pension Benefits Total	Actual Beneficiary Mortality Rate BftWght	Proposed Assumption Beneficiary Mortality BftWght	Ratio Act/Exp Proposed Beneficiary Mortality BftWght
2015	\$17.2M	\$23.2M	\$314.1M	5.4787%	7.3734%	0.74
2016	\$23.6M	\$23.4M	\$322.7M	7.3093%	7.2656%	1.01
2017	\$26.0M	\$23.9M	\$331.8M	7.8345%	7.2019%	1.09
2018	\$25.3M	\$24.3M	\$344.3M	7.3366%	7.0609%	1.04
2019	\$28.1M	\$26.7M	\$418.3M	6.7269%	6.3717%	1.06
Total	\$120.2M	\$121.5M	\$1,731.3M	6.9425%	7.0162%	0.99

Pension Benefit Distribution w/ Beneficiary Mortality Rate - Actual and Expected; by Year



Beneficiary Mortality Rate - Actual, Expected, and Ratio; by Year



The following section displays results by gender.

Contingent Beneficiaries - Males

The following charts show postretirement mortality experience on an amount-weighted basis by age band for the age range (60 to 104) during the period 2015 – 2019 for males on the current and proposed assumptions for all members of NYCERS. The A/E decreased from 1.52 to 1.11 and decreased from 1.42 to 1.04 for only NYCERS.

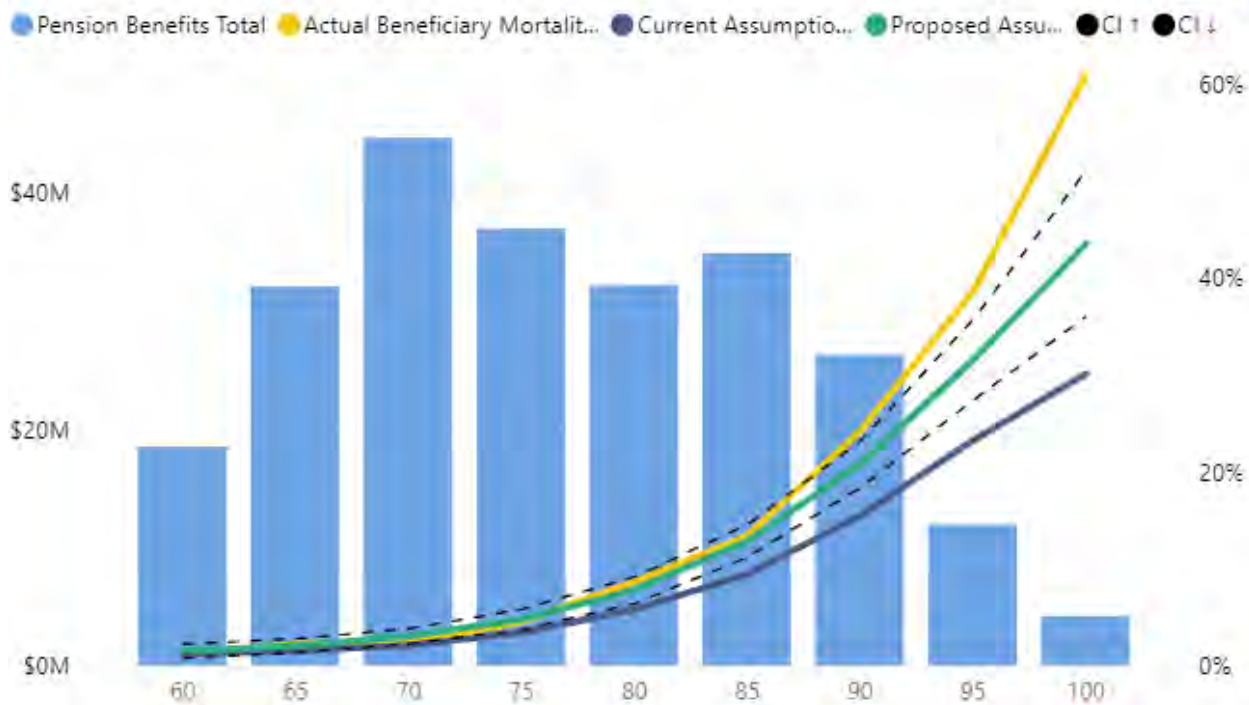
Please note that the charts by age are based on 5-year brackets. For example, the age bracket 75 should be interpreted as the interval 75 – 79.

Amount-weighted

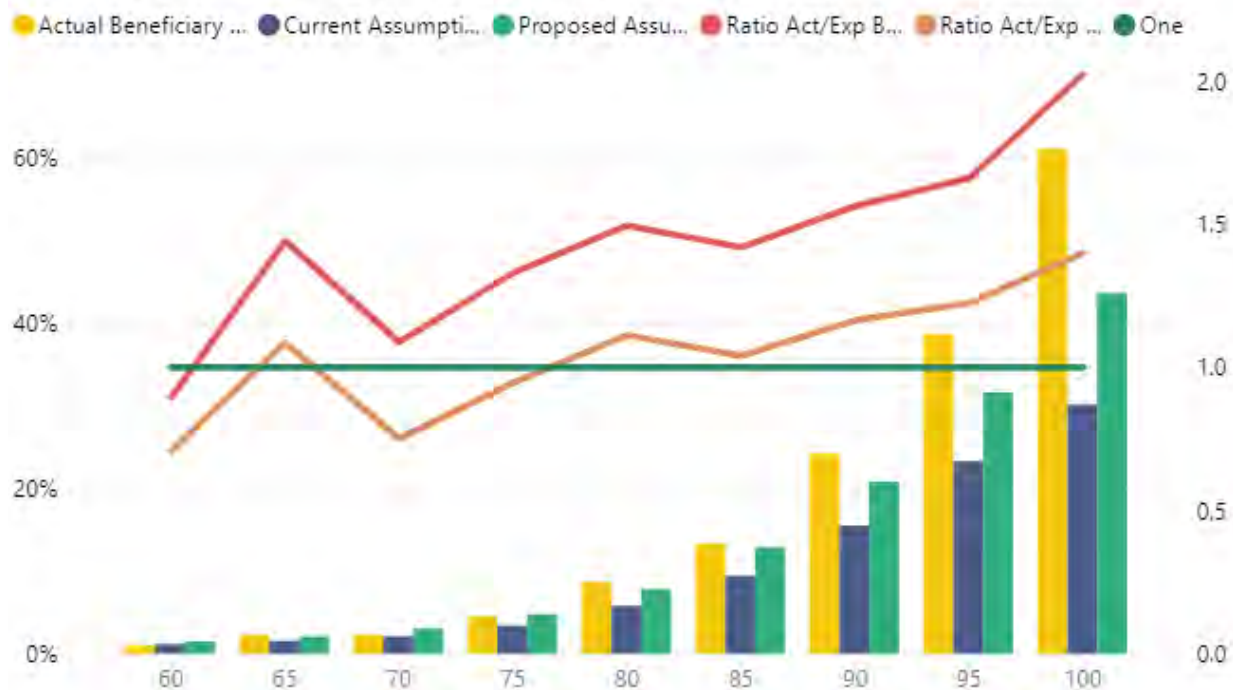
Age Bene (bins)	Actual Beneficiary Benefits Released	Expected Beneficiary Benefits Released	Pension Benefits Total	Actual Beneficiary Mortality Rate BftWght	Current Assumption Beneficiary Mortality BftWght	Ratio Act/Exp Beneficiary Mortality BftWght
60	\$0.2M	\$0.2M	\$18.5M	1.0416%	1.1637%	▲ 0.90
65	\$0.7M	\$0.5M	\$32.1M	2.2223%	1.5421%	▲ 1.44
70	\$1.0M	\$0.9M	\$44.7M	2.2615%	2.0760%	● 1.09
75	\$1.7M	\$1.3M	\$37.0M	4.4993%	3.3836%	▲ 1.33
80	\$2.8M	\$1.9M	\$32.2M	8.6385%	5.7759%	▲ 1.50
85	\$4.7M	\$3.3M	\$34.9M	13.3692%	9.4174%	▲ 1.42
90	\$6.4M	\$4.1M	\$26.3M	24.1876%	15.4684%	◆ 1.56
95	\$4.6M	\$2.8M	\$11.9M	38.6136%	23.2507%	◆ 1.66
100	\$2.5M	\$1.3M	\$4.2M	60.9581%	30.0988%	◆ 2.03
Total	\$24.5M	\$16.1M	\$241.6M	10.1452%	6.6706%	◆ 1.52

Age Bene (bins)	Actual Beneficiary Benefits Released	Expected Beneficiary Benefits Released Proposed	Pension Benefits Total	Actual Beneficiary Mortality Rate BftWght	Proposed Assumption Beneficiary Mortality BftWght	Act/Exp Proposed Beneficiary Mortality BftWght
60	\$0.2M	\$0.3M	\$18.5M	1.0416%	1.4728%	▲ 0.71
65	\$0.7M	\$0.7M	\$32.1M	2.2223%	2.0459%	● 1.09
70	\$1.0M	\$1.3M	\$44.7M	2.2615%	3.0124%	▲ 0.75
75	\$1.7M	\$1.8M	\$37.0M	4.4993%	4.7523%	● 0.95
80	\$2.8M	\$2.5M	\$32.2M	8.6385%	7.7645%	▲ 1.11
85	\$4.7M	\$4.5M	\$34.9M	13.3692%	12.8490%	● 1.04
90	\$6.4M	\$5.5M	\$26.3M	24.1876%	20.7707%	▲ 1.16
95	\$4.6M	\$3.8M	\$11.9M	38.6136%	31.5366%	▲ 1.22
100	\$2.5M	\$1.8M	\$4.2M	60.9581%	43.5346%	▲ 1.40
Total	\$24.5M	\$22.0M	\$241.6M	10.1452%	9.1203%	▲ 1.11

Pension Benefit Distribution w/ Beneficiary Mortality Rate - Actual and Expected; by Age



Beneficiary Mortality Rate - Actual, Expected, and Ratio; by Age



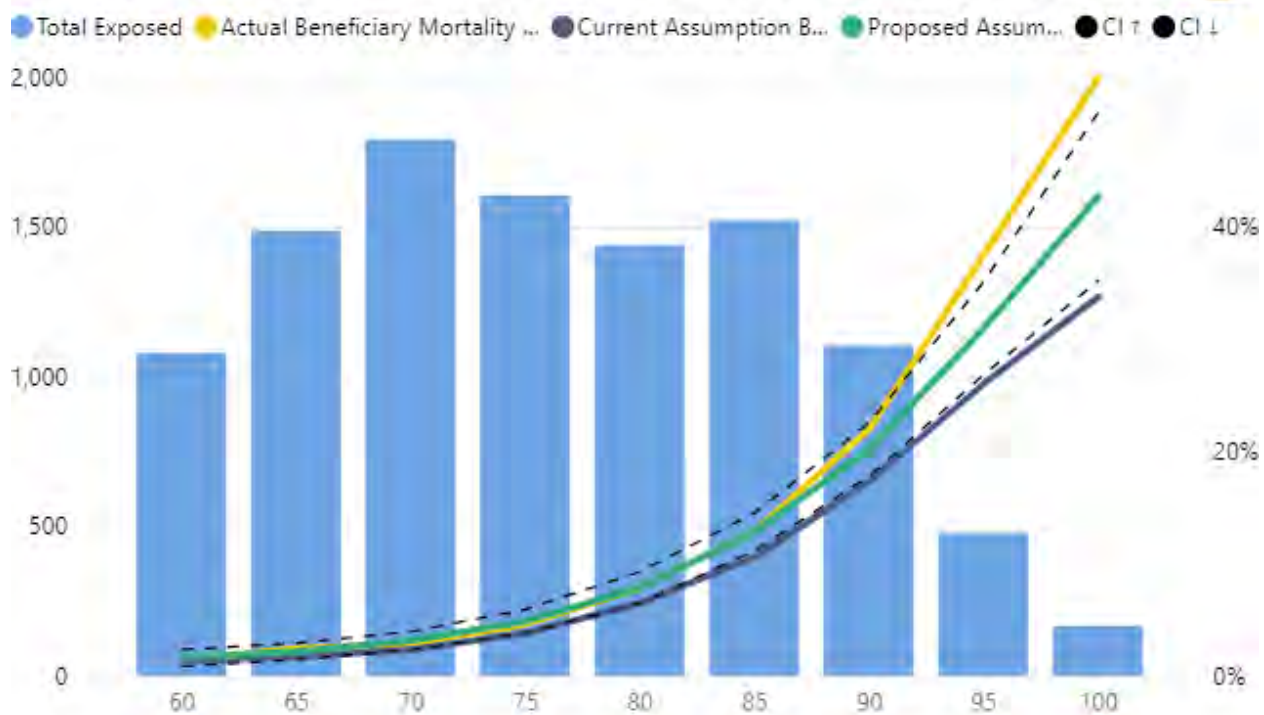
Headcount-weighted

The following charts show postretirement mortality experience on a headcount-weighted basis by age band for the age range (60 to 104) during the period 2015 – 2019 for males on the current and proposed assumptions for all members of NYCERS. The A/E decreased from 1.30 to 1.07 and decreased from 1.31 to 1.07 for only NYCERS.

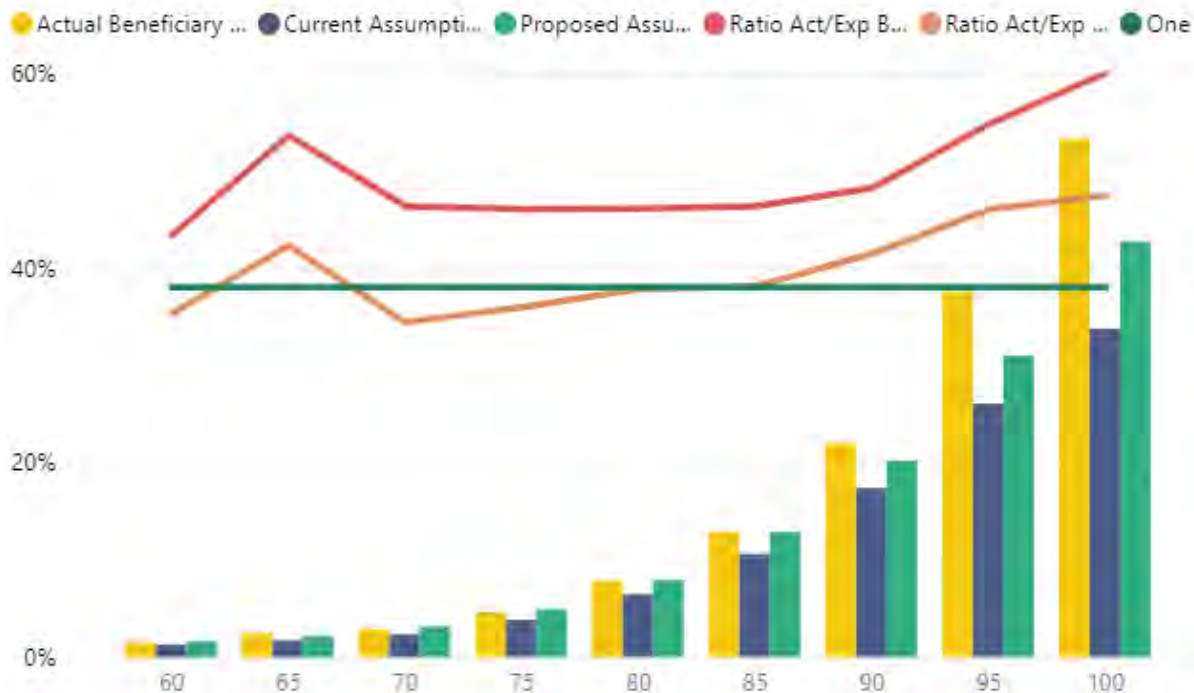
Age Bene (bins)	Actual Beneficiary Deaths	Expected Beneficiary Deaths	Total Exposed	Actual Beneficiary Mortality Rate	Current Assumption Beneficiary Mortality	Ratio Act/Exp Beneficiary Mortality
60	16	14.0	1,079	1.4829%	1.2992%	▲ 1.14
65	36	25.5	1,486	2.4226%	1.7181%	▲ 1.41
70	51	41.8	1,792	2.8460%	2.3340%	▲ 1.22
75	74	61.1	1,604	4.6135%	3.8106%	▲ 1.21
80	113	93.2	1,439	7.8527%	6.4733%	▲ 1.21
85	196	160.8	1,522	12.8778%	10.5664%	▲ 1.22
90	243	191.6	1,104	22.0109%	17.3553%	▲ 1.27
95	179	124.2	477	37.5262%	26.0300%	▲ 1.44
100	89	56.4	167	53.2934%	33.7478%	◆ 1.58
Total	997	768.6	10,670	9.3440%	7.2033%	▲ 1.30

Age Bene (bins)	Actual Beneficiary Deaths	Expected Beneficiary Deaths Proposed	Total Exposed	Actual Beneficiary Mortality Rate	Proposed Assumption Beneficiary Mortality	Act/Exp Proposed Beneficiary Mortality
60	16	17.2	1,079	1.4829%	1.5966%	● 0.93
65	36	32.3	1,486	2.4226%	2.1770%	▲ 1.11
70	51	56.3	1,792	2.8460%	3.1441%	● 0.91
75	74	78.2	1,604	4.6135%	4.8756%	● 0.95
80	113	113.6	1,439	7.8527%	7.8916%	● 1.00
85	196	195.5	1,522	12.8778%	12.8459%	● 1.00
90	243	222.8	1,104	22.0109%	20.1786%	● 1.09
95	179	147.8	477	37.5262%	30.9910%	▲ 1.21
100	89	71.3	167	53.2934%	42.7034%	▲ 1.25
Total	997	935.1	10,670	9.3440%	8.7639%	● 1.07

Exposure Distribution w/ Beneficiary Mortality Rate - Actual and Expected; by Age



Beneficiary Mortality Rate - Actual, Expected, and Ratio; by Age



Contingent Beneficiaries - Females

The following charts show postretirement mortality experience on an amount-weighted basis by age band for the age range (60 to 104) during the period 2015 – 2019 for females on the current and proposed assumptions for all members of NYCERS. The A/E decreased from 1.16 to 0.96 and decreased from 1.19 to 0.98 for only NYCERS.

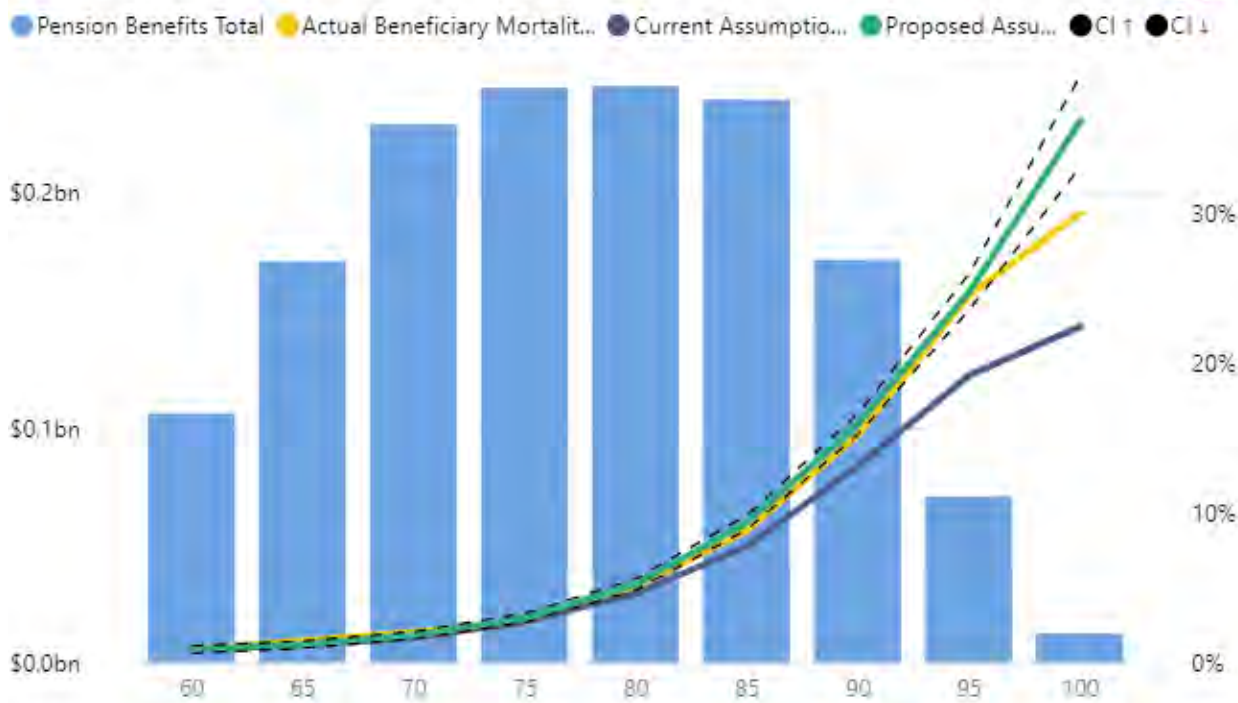
Please note that the charts by age are based on 5-year brackets. For example, the age bracket 75 should be interpreted as the interval 75 – 79.

Amount-weighted

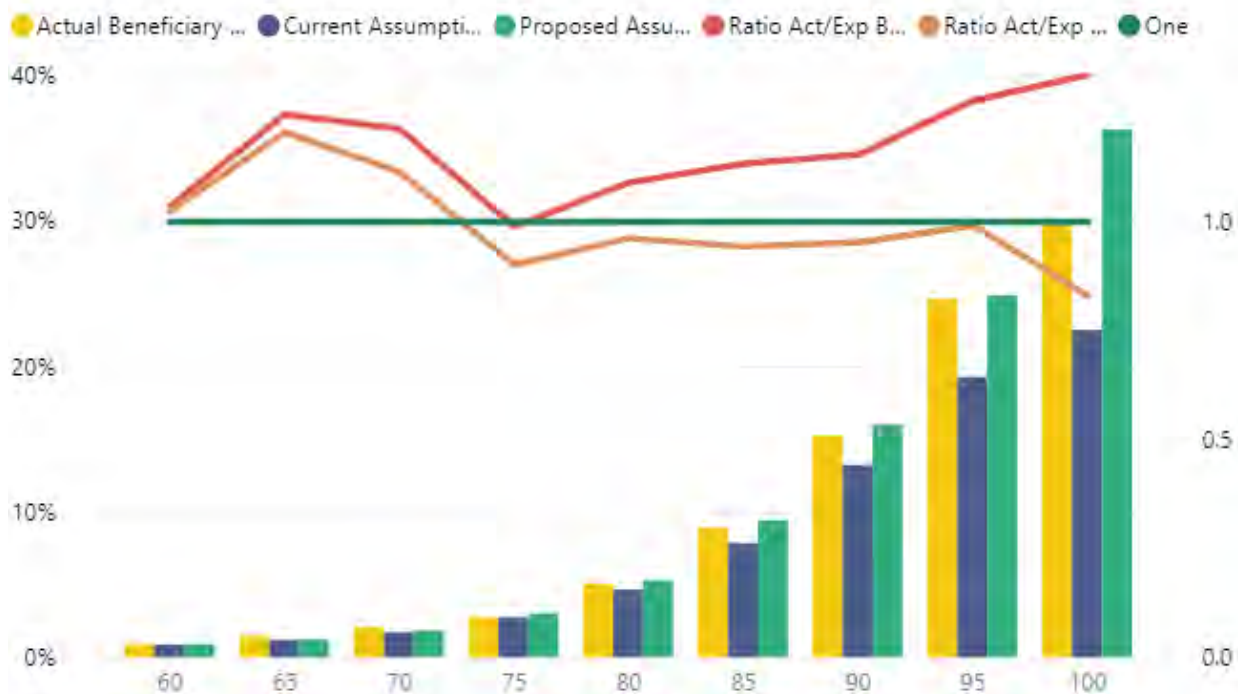
Age Bene (bins)	Actual Beneficiary Benefits Released	Expected Beneficiary Benefits Released	Pension Benefits Total	Actual Beneficiary Mortality Rate BftWght	Current Assumption Beneficiary Mortality BftWght	Ratio Act/Exp Beneficiary Mortality BftWght
60	\$1.0M	\$0.9M	\$106.0M	0.8984%	0.8666%	1.04
65	\$2.5M	\$2.0M	\$170.7M	1.4586%	1.1698%	1.25
70	\$4.7M	\$3.9M	\$229.0M	2.0543%	1.6923%	1.21
75	\$6.6M	\$6.7M	\$244.6M	2.7071%	2.7350%	0.99
80	\$12.4M	\$11.4M	\$245.3M	5.0535%	4.6336%	1.09
85	\$21.2M	\$18.7M	\$239.6M	8.8691%	7.8227%	1.13
90	\$26.1M	\$22.6M	\$171.3M	15.2405%	13.2015%	1.15
95	\$17.4M	\$13.6M	\$70.7M	24.6092%	19.2429%	1.28
100	\$3.8M	\$2.8M	\$12.5M	30.0705%	22.4709%	1.34
Total	\$95.7M	\$82.6M	\$1,489.6M	6.4231%	5.5462%	1.16

Age Bene (bins)	Actual Beneficiary Benefits Released	Expected Beneficiary Benefits Released Proposed	Pension Benefits Total	Actual Beneficiary Mortality Rate BftWght	Proposed Assumption Beneficiary Mortality BftWght	Act/Exp Proposed Beneficiary Mortality BftWght
60	\$1.0M	\$0.9M	\$106.0M	0.8984%	0.8763%	1.03
65	\$2.5M	\$2.1M	\$170.7M	1.4586%	1.2092%	1.21
70	\$4.7M	\$4.2M	\$229.0M	2.0543%	1.8436%	1.11
75	\$6.6M	\$7.3M	\$244.6M	2.7071%	3.0029%	0.90
80	\$12.4M	\$12.9M	\$245.3M	5.0535%	5.2520%	0.96
85	\$21.2M	\$22.5M	\$239.6M	8.8691%	9.3996%	0.94
90	\$26.1M	\$27.4M	\$171.3M	15.2405%	15.9868%	0.95
95	\$17.4M	\$17.6M	\$70.7M	24.6092%	24.8248%	0.99
100	\$3.8M	\$4.5M	\$12.5M	30.0705%	36.2393%	0.83
Total	\$95.7M	\$99.4M	\$1,489.6M	6.4231%	6.6750%	0.96

Pension Benefit Distribution w/ Beneficiary Mortality Rate - Actual and Expected; by Age



Beneficiary Mortality Rate - Actual, Expected, and Ratio; by Age



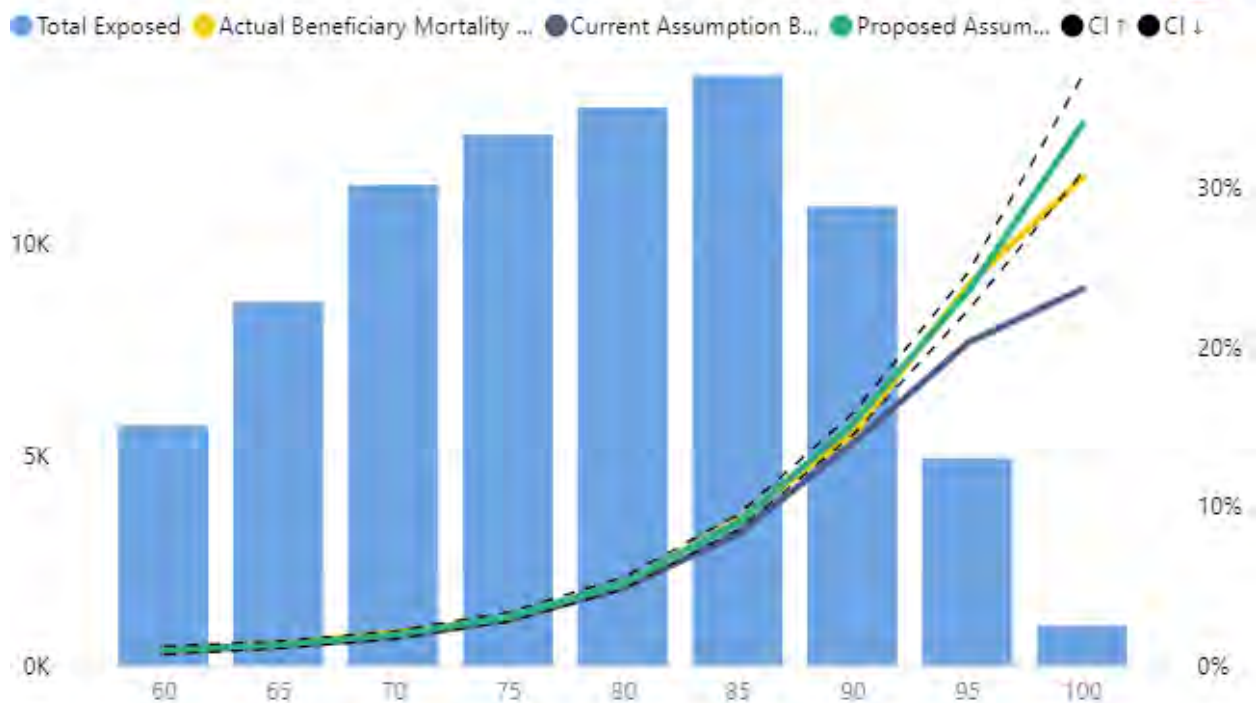
Headcount-weighted

The following charts show postretirement mortality experience on a headcount-weighted basis by age band for the age range (60 to 104) during the period 2015 – 2019 for females on the current and proposed assumptions for all members of NYCERS. The A/E decreased from 1.10 to 0.99 and decreased from 1.13 to 1.02 for only NYCERS.

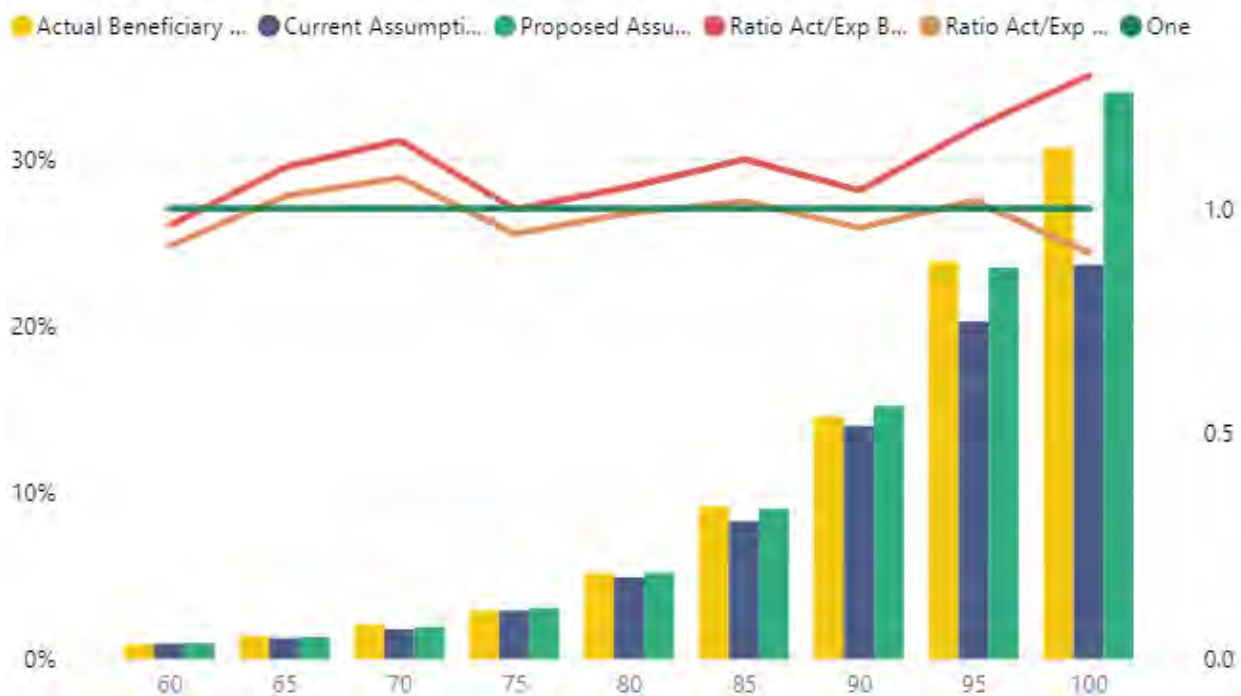
Age Bene (bins)	Actual Beneficiary Deaths	Expected Beneficiary Deaths	Total Exposed	Actual Beneficiary Mortality Rate	Current Assumption Beneficiary Mortality	Ratio Act/Exp Beneficiary Mortality
60	50	51.9	5,702	0.8769%	0.9101%	0.96
65	116	106.2	8,629	1.3443%	1.2311%	1.09
70	234	203.2	11,408	2.0512%	1.7814%	1.15
75	363	363.5	12,598	2.8814%	2.8857%	1.00
80	678	646.9	13,244	5.1193%	4.8841%	1.05
85	1,281	1,155.2	13,993	9.1546%	8.2556%	1.11
90	1,582	1,520.7	10,894	14.5218%	13.9588%	1.04
95	1,174	995.6	4,917	23.8763%	20.2491%	1.18
100	291	224.5	950	30.6316%	23.6325%	1.30
Total	5,769	5,267.8	82,335	7.0067%	6.3980%	1.10

Age Bene (bins)	Actual Beneficiary Deaths	Expected Beneficiary Deaths Proposed	Total Exposed	Actual Beneficiary Mortality Rate	Proposed Assumption Beneficiary Mortality	Act/Exp Proposed Beneficiary Mortality
60	50	54.5	5,702	0.8769%	0.9555%	0.92
65	116	112.8	8,629	1.3443%	1.3075%	1.03
70	234	219.0	11,408	2.0512%	1.9194%	1.07
75	363	384.6	12,598	2.8814%	3.0528%	0.94
80	678	684.0	13,244	5.1193%	5.1648%	0.99
85	1,281	1,260.9	13,993	9.1546%	9.0109%	1.02
90	1,582	1,652.4	10,894	14.5218%	15.1684%	0.96
95	1,174	1,153.7	4,917	23.8763%	23.4644%	1.02
100	291	322.9	950	30.6316%	33.9867%	0.90
Total	5,769	5,844.9	82,335	7.0067%	7.0989%	0.99

Exposure Distribution w/ Beneficiary Mortality Rate - Actual and Expected; by Age



Beneficiary Mortality Rate - Actual, Expected, and Ratio; by Age



Summary

We have proposed new assumptions consistent with industry standards. In total, the proposed mortality tables are anticipated to decrease plan liabilities.

Assumption Tables

The following table shows the current assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT PROBABILITIES OF MORTALITY FOR BENEFICIARIES: ALL PLAN GROUPS BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
15	0.0105%	0.0092%	68	1.8256%	1.3605%
16	0.0142%	0.0112%	69	1.9386%	1.4332%
17	0.0191%	0.0122%	70	2.0542%	1.5007%
18	0.0222%	0.0133%	71	2.2359%	1.6745%
19	0.0240%	0.0143%	72	2.4230%	1.8463%
20	0.0251%	0.0145%	73	2.6165%	2.0157%
21	0.0268%	0.0153%	74	2.8157%	2.1838%
22	0.0284%	0.0161%	75	3.0220%	2.3492%
23	0.0301%	0.0171%	76	3.4928%	2.6652%
24	0.0315%	0.0183%	77	3.9787%	2.9831%
25	0.0327%	0.0195%	78	4.4792%	3.3011%
26	0.0342%	0.0208%	79	4.9963%	3.6207%
27	0.0354%	0.0221%	80	5.5282%	3.9391%
28	0.0371%	0.0236%	81	6.1051%	4.4386%
29	0.0394%	0.0252%	82	6.6894%	4.9473%
30	0.0427%	0.0270%	83	7.2805%	5.4665%
31	0.0495%	0.0330%	84	7.8749%	5.9942%
32	0.0562%	0.0384%	85	8.4753%	6.5354%
33	0.0625%	0.0431%	86	9.6136%	7.4659%
34	0.0682%	0.0471%	87	10.8005%	8.3995%
35	0.0743%	0.0511%	88	12.0443%	9.3428%
36	0.0780%	0.0542%	89	13.3397%	10.2918%
37	0.0818%	0.0579%	90	14.6958%	11.2477%
38	0.0861%	0.0618%	91	16.4185%	12.8868%
39	0.0917%	0.0666%	92	18.1416%	14.4887%
40	0.0997%	0.0719%	93	19.8574%	16.0801%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM CURRENT (continued) PROBABILITIES OF MORTALITY FOR BENEFICIARIES: ALL PLAN GROUPS BASE TABLE					
Age	Males ¹	Females ²	Age	Males ¹	Females ²
41	0.1394%	0.0775%	94	21.6187%	17.5854%
42	0.1774%	0.0859%	95	23.5884%	19.0626%
43	0.2143%	0.0968%	96	25.4266%	20.2474%
44	0.2507%	0.1111%	97	27.2119%	21.2937%
45	0.2875%	0.1287%	98	29.0202%	22.0663%
46	0.3207%	0.1501%	99	30.6654%	22.5443%
47	0.3534%	0.1748%	100	32.1584%	22.6473%
48	0.3849%	0.2022%	101	33.7521%	23.5294%
49	0.4150%	0.2319%	102	35.1259%	24.5619%
50	0.4431%	0.2633%	103	36.3671%	25.7825%
51	0.5156%	0.2999%	104	37.3834%	27.1635%
52	0.5928%	0.3376%	105	38.1051%	28.6530%
53	0.6740%	0.3762%	106	38.4698%	30.2169%
54	0.7583%	0.4151%	107	38.6325%	31.8182%
55	0.8440%	0.4540%	108	38.8076%	33.4131%
56	0.9048%	0.5132%	109	38.9794%	34.9566%
57	0.9604%	0.5735%	110	50.0000%	50.0000%
58	1.0101%	0.6353%	111	50.0000%	50.0000%
59	1.0536%	0.6981%	112	50.0000%	50.0000%
60	1.0919%	0.7631%	113	50.0000%	50.0000%
61	1.1835%	0.8329%	114	50.0000%	50.0000%
62	1.2676%	0.8908%	115	50.0000%	50.0000%
63	1.3473%	0.9493%	116	50.0000%	50.0000%
64	1.4238%	1.0146%	117	50.0000%	50.0000%
65	1.4985%	1.0876%	118	50.0000%	50.0000%
66	1.6059%	1.1681%	119	50.0000%	50.0000%
67	1.7146%	1.2609%	120	100.0000%	100.0000%

¹ An adjustment factor of 0.89 is applied to the probabilities above to develop benefit weighted probabilities of mortality

² An adjustment factor of 0.951 is applied to the probabilities above to develop benefit weighted probabilities of mortality

The following table shows the proposed assumptions.

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR BENEFICIARIES: ALL PLAN GROUPS* BASE YEAR 2019 BENEFIT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0213%	0.0108%	68	2.1319%	1.2510%
16	0.0288%	0.0132%	69	2.2991%	1.3475%
17	0.0388%	0.0144%	70	2.4880%	1.4610%
18	0.0450%	0.0156%	71	2.7020%	1.5932%
19	0.0475%	0.0156%	72	2.9426%	1.7474%
20	0.0467%	0.0165%	73	3.2127%	1.9239%
21	0.0462%	0.0155%	74	3.5155%	2.1243%
22	0.0433%	0.0146%	75	3.8517%	2.3534%
23	0.0417%	0.0135%	76	4.2232%	2.6102%
24	0.0401%	0.0125%	77	4.6341%	2.9016%
25	0.0400%	0.0127%	78	5.0911%	3.2318%
26	0.0442%	0.0145%	79	5.5977%	3.6056%
27	0.0471%	0.0163%	80	6.1669%	4.0314%
28	0.0516%	0.0181%	81	6.8074%	4.5194%
29	0.0546%	0.0199%	82	7.5285%	5.0748%
30	0.0591%	0.0233%	83	8.3336%	5.7106%
31	0.0636%	0.0252%	84	9.2333%	6.4368%
32	0.0678%	0.0284%	85	10.2373%	7.2652%
33	0.0718%	0.0300%	86	11.3474%	8.2088%
34	0.0754%	0.0329%	87	12.5685%	9.2702%
35	0.0803%	0.0356%	88	13.9075%	10.4520%
36	0.0845%	0.0379%	89	15.3777%	11.7389%
37	0.0880%	0.0414%	90	17.1167%	13.1089%
38	0.0925%	0.0431%	91	18.9624%	14.5764%
39	0.0961%	0.0458%	92	20.8892%	16.1376%
40	0.1005%	0.0483%	93	22.8919%	17.7993%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM
PROPOSED (continued)
PROBABILITIES OF MORTALITY FOR BENEFICIARIES: ALL PLAN GROUPS*
BASE YEAR 2019
BENEFIT WEIGHTED

Age	Males	Females	Age	Males	Females
41	0.1042%	0.0518%	94	24.9620%	19.5555%
42	0.1088%	0.0538%	95	27.0734%	21.4140%
43	0.1130%	0.0570%	96	29.3636%	23.4560%
44	0.1183%	0.0602%	97	31.7238%	25.6189%
45	0.6986%	0.3023%	98	34.1591%	27.9023%
46	0.7085%	0.3098%	99	36.6614%	30.2827%
47	0.7222%	0.3189%	100	39.1948%	32.7488%
48	0.7402%	0.3310%	101	41.7401%	35.2675%
49	0.7619%	0.3452%	102	44.2616%	37.8102%
50	0.8227%	0.3614%	103	46.7654%	40.3653%
51	0.8500%	0.3910%	104	49.2000%	42.8934%
52	0.8814%	0.4252%	105	51.5638%	45.3902%
53	0.9178%	0.4627%	106	53.8534%	47.8174%
54	0.9603%	0.5028%	107	56.0417%	50.1669%
55	1.0067%	0.5474%	108	58.1186%	52.4321%
56	1.0594%	0.5928%	109	60.0958%	54.5877%
57	1.1170%	0.6394%	110	61.6798%	56.6242%
58	1.1797%	0.6869%	111	61.8406%	58.5460%
59	1.2454%	0.7345%	112	61.9956%	59.6111%
60	1.3156%	0.7812%	113	62.1509%	59.7365%
61	1.3908%	0.8277%	114	62.3252%	59.8621%
62	1.4697%	0.8752%	115	62.4813%	59.9880%
63	1.5526%	0.9244%	116	62.4938%	59.9940%
64	1.6430%	0.9765%	117	62.5000%	60.0000%
65	1.7438%	1.0325%	118	62.5000%	60.0000%
66	1.8562%	1.0961%	119	62.5000%	60.0000%
67	1.9859%	1.1673%	120	100.0000%	100.0000%

* This table is to be utilized for beneficiary mortality after the retiree's death. Service retirement mortality is used for the beneficiary while the retiree is alive

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED PROBABILITIES OF MORTALITY FOR BENEFICIARIES: ALL PLAN GROUPS* BASE YEAR 2019 COUNT WEIGHTED					
Age	Males	Females	Age	Males	Females
15	0.0204%	0.0097%	68	2.2864%	1.3446%
16	0.0276%	0.0119%	69	2.4491%	1.4354%
17	0.0372%	0.0130%	70	2.6331%	1.5423%
18	0.0432%	0.0140%	71	2.8383%	1.6697%
19	0.0468%	0.0151%	72	3.0697%	1.8184%
20	0.0473%	0.0160%	73	3.3299%	1.9907%
21	0.0481%	0.0151%	74	3.6244%	2.1879%
22	0.0466%	0.0155%	75	3.9545%	2.4115%
23	0.0465%	0.0146%	76	4.3256%	2.6622%
24	0.0465%	0.0149%	77	4.7424%	2.9435%
25	0.0480%	0.0166%	78	5.2081%	3.2609%
26	0.0523%	0.0182%	79	5.7273%	3.6176%
27	0.0569%	0.0200%	80	6.3080%	4.0192%
28	0.0616%	0.0217%	81	6.9573%	4.4737%
29	0.0663%	0.0235%	82	7.6811%	4.9877%
30	0.0710%	0.0266%	83	8.4812%	5.5718%
31	0.0771%	0.0283%	84	9.3690%	6.2370%
32	0.0814%	0.0313%	85	10.3482%	6.9994%
33	0.0870%	0.0341%	86	11.4214%	7.8703%
34	0.0922%	0.0367%	87	12.5930%	8.8554%
35	0.0967%	0.0390%	88	13.8708%	9.9520%
36	0.1022%	0.0423%	89	15.2597%	11.1439%
37	0.1068%	0.0439%	90	16.7591%	12.4051%
38	0.1106%	0.0465%	91	18.4162%	13.7635%
39	0.1149%	0.0488%	92	20.2341%	15.2202%
40	0.1184%	0.0519%	93	22.2115%	16.7860%

NEW YORK CITY EMPLOYEES' RETIREMENT SYSTEM PROPOSED (continued) PROBABILITIES OF MORTALITY FOR BENEFICIARIES: ALL PLAN GROUPS* BASE YEAR 2019 COUNT WEIGHTED					
Age	Males	Females	Age	Males	Females
41	0.1226%	0.0536%	94	24.3289%	18.4516%
42	0.1262%	0.0563%	95	26.5331%	20.2181%
43	0.1320%	0.0600%	96	28.9271%	22.1559%
44	0.1375%	0.0637%	97	31.3742%	24.1980%
45	0.7758%	0.3208%	98	33.8485%	26.3367%
46	0.7682%	0.3452%	99	36.3239%	28.5431%
47	0.7677%	0.3719%	100	38.7602%	30.8094%
48	0.7747%	0.4016%	101	41.1591%	33.1010%
49	0.7926%	0.4297%	102	43.5244%	35.4038%
50	0.8224%	0.4563%	103	45.8670%	37.7042%
51	0.8577%	0.4816%	104	48.1391%	39.9675%
52	0.8994%	0.5102%	105	50.3393%	42.1912%
53	0.9462%	0.5421%	106	52.4670%	44.3413%
54	0.9994%	0.5784%	107	54.4969%	46.4107%
55	1.0591%	0.6175%	108	56.4206%	48.3978%
56	1.1230%	0.6591%	109	58.2519%	50.2786%
57	1.1932%	0.7034%	110	59.2126%	52.0464%
58	1.2685%	0.7492%	111	59.3670%	53.5427%
59	1.3479%	0.7976%	112	59.5157%	53.6500%
60	1.4302%	0.8477%	113	59.6648%	53.7629%
61	1.5154%	0.9002%	114	59.8322%	53.8759%
62	1.6044%	0.9547%	115	59.9820%	53.9892%
63	1.6963%	1.0119%	116	59.9940%	53.9946%
64	1.7931%	1.0709%	117	60.0000%	54.0000%
65	1.8978%	1.1318%	118	60.0000%	54.0000%
66	2.0128%	1.1964%	119	60.0000%	54.0000%
67	2.1418%	1.2660%	120	100.0000%	100.0000%

* This table is to be utilized for beneficiary mortality after the retiree's death. Service retirement mortality is used for the beneficiary while the retiree is alive