



State Police Retirement System of New Jersey

**Actuarial Experience Study for
July 1, 2018 through June 30, 2021**

Produced by Cheiron

November 2022

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November 15, 2022

Board of Trustees
State Police Retirement System of New Jersey
State of New Jersey
Department of the Treasury
Division of Pension and Benefits, CN 295
Trenton, NJ 08625-0295

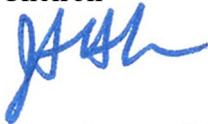
Dear Board Members:

The purpose of this report is to present the Actuarial Experience Study of the State Police Retirement System of New Jersey (SPRS, the System) in accordance with Title 53, Chapter 5A-32 of the NJ State Statute. This Statute requires the actuary to conduct an actuarial investigation into the mortality, service and salary experience of the members and beneficiaries of the System at least once every three years.

This study covers the actuarial experience from July 1, 2018 through June 30, 2021. The report includes analyses and results of our study as well as recommended assumptions for consideration by the Board to be used beginning with the July 1, 2022 actuarial valuation. It also includes the estimated financial impact of these assumption changes. The prior experience study was performed by Cheiron and covered the period July 1, 2014 through June 30, 2018.

If you have any questions about the report or would like additional information, please let us know.

Sincerely,
Cheiron



Janet Cranna, FSA, FCA, MAAA, EA
Principal Consulting Actuary



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Principal Consulting Actuary



Jonathan Chipko, FSA, MAAA, EA
Consulting Actuary

**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

SECTION I – EXECUTIVE SUMMARY

Actuarial assumptions (economic and demographic) are intended to be long-term in nature, and should be both individually reasonable and consistent in the aggregate. That is particularly important considering the major economic impact and consequential changes in membership behavior due to the COVID-19 pandemic which may be short term in nature. The purpose of this experience study is to evaluate whether or not the current assumptions adequately reflect the long-term expectations for SPRS, and if not, to recommend adjustments. It is important to note that frequent and significant changes in the actuarial assumptions are not typically recommended, unless there are known fundamental changes in expectations of the economy, or with respect to SPRS's membership or assets that would warrant such frequent or significant changes.

SUMMARY OF ASSUMPTION ANALYSIS

This experience study specifically analyzes and makes the following recommendations for the following assumptions.

- **Retirement rates** – Continue with the current assumption.
- **Termination rates** – Continue with the current assumption.
- **Disability rates** – Modify ordinary disability rates based on recent experience. Continue with current accidental disability rates.
- **Mortality rates** – Continue to use Pub-2010 base mortality tables. Update generational mortality improvement scale to MP-2021.
- **Family composition** – Continue with the current assumption for percent married. Modify the age difference between males and females based on recent experience.
- **Price and wage inflation rates** – Continue with the current assumptions.
- **Salary increases rates** – Modify rates based on recent experience.

The recommended changes to the assumptions in the aggregate will increase the actuarial liability and the Statutory Contributions.

Further information about the impact of these changes on the Statutory Contributions and funded status can be found on the next page.

**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

SECTION I – EXECUTIVE SUMMARY

Table I-1 Cost Impact of Assumption Changes		
	Current Assumptions	Recommended Assumptions
<u>Assets and Liabilities</u>		
Actuarial Liability	\$ 3,994,414,280	\$ 4,013,144,150
Actuarial Value of Assets (AVA) ¹	<u>2,173,817,051</u>	<u>2,173,817,051</u>
Unfunded Actuarial Liability/(Surplus)	\$ 1,820,597,229	\$ 1,839,327,099
Funded Ratio	54.4%	54.2%
<u>Contribution Amounts</u>		
State Normal Cost at End of Year	\$ 54,871,216	\$ 60,398,763
Amortization Payment of UAL	<u>150,002,516</u>	<u>151,545,706</u>
Total Statutory Contribution for FYE	\$ 204,873,732	\$ 211,944,469
<u>Difference due to assumption changes</u>		
Actuarial Liability		\$ 18,729,870
Actuarial Value of Assets (AVA) ¹		<u>0</u>
Unfunded Actuarial Liability/(Surplus)		\$ 18,729,870
Funded Ratio		-0.3%
State Normal Cost at End of Year		\$ 5,527,547
Amortization Payment of UAL		<u>1,543,190</u>
Total Statutory Contribution for FYE		\$ 7,070,737

¹ Includes discounted State appropriations receivable

The body of this report provides details and support for our conclusions and recommendations for the assumptions.

STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021

SECTION II – CERTIFICATION

The purpose of this report is to provide the results of an Actuarial Experience Study of the State Police Retirement System of New Jersey (SPRS) covering the three-year period from July 1, 2018 through June 30, 2021. This report is for the use of the Division of Pensions and Benefits and the SPRS Board of Trustees in selecting assumptions to be used in actuarial valuations beginning July 1, 2022. This experience study was completed in accordance with the provisions of Title 53, Chapter 5A-32 of the NJ State Statute which requires periodic review of the experience of the System.

In preparing our report, we relied on information (some oral and some written) supplied by the Division of Pensions and Benefits. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23, Data Quality.

Cheiron utilizes ProVal, an actuarial valuation software leased from Winklevoss Technologies (WinTech) to calculate liabilities and project benefit payments. We have relied on WinTech as the developer of ProVal. We have reviewed ProVal and have a basic understanding of it and have used ProVal in accordance with its original intended purpose. We have not identified any material inconsistencies in assumptions or output of ProVal that would affect this actuarial valuation.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared for the State Police Retirement System of New Jersey for the purposes described herein. This report is not intended to benefit any other party, and Cheiron assumes no duty or liability to any such party.

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**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

SECTION III – DEMOGRAPHIC ASSUMPTIONS

Demographic assumptions are used to predict membership behavior, including rates of retirement, termination, disability, and mortality. These assumptions are based primarily on the historical experience of SPRS, with some adjustments where future experience is expected to differ from historical experience and with deference to standard tables where SPRS experience is not fully credible, which means there is insufficient data to support an assumption, and a standard table is available.

ANALYSIS OF DEMOGRAPHIC ASSUMPTIONS

For all of the demographic assumptions, we determined the ratio of the actual number of decrements for each membership group compared to the expected number of decrements (A/E ratio or actual-to-expected ratio). Generally, the goal is to get as close as possible to an A/E ratio of 100%. Appropriate assumptions are often dependent on the amount of data available, and if there is insufficient data, then the best assumption may be a reflection of standard tables. For example, there are typically relatively low incidences of pre-retirement deaths, so using standard mortality tables may be more appropriate. This could result in the A/E ratio moving further away from 100%. Also, we aggregate members for demographic assumptions review when the data at individual ages is no longer credible. For example, we may reduce the number of service bands for an assumption with low incidences, if those service bands do not materially improve the quality of the results.

We also calculate an r-squared statistic for each assumption. R-squared measures how well the assumption fits the actual data and can be thought of as the percentage of the variation in actual data explained by the assumption. Ideally, r-squared would equal 1.000, although this is never the case in reality. Any recommended assumption change should increase the r-squared compared to the current assumption making it closer to 1.000 unless the pattern of future decrements is expected to be different from the pattern experienced during the period of study.

In addition, we calculate the 90% confidence interval, which represents the range within which the true decrement rate during the experience study period is expected to fall 90% of the time. In the graphs, the black squares represent the actual experience observed and the gray bars represent the 90% confidence interval around that experience. The red and green lines represent the current and recommended assumptions, respectively. When the recommended assumption is the same as the current assumption, the green line sits over the red line and the red line does not show. Where there is sufficient experience, the confidence interval is relatively narrow, and where there is little experience, the confidence interval can be very wide. We generally recommend assumption changes when the current assumption is outside the 90% confidence interval of the observed experience. However, adjustments are made to account for differences between future expectations and historical experience, to account for the past experience represented by the current assumption, and to maintain a neutral to slight conservative bias in the selection of the assumption. For mortality rates, we compare SPRS's experience to that of a standard table.

**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

RETIREMENT RATES

The current retirement rates vary by age and service and are applied to all members who are eligible to retire. As a result, a state police officer who is age 50 with 20 years of service, for example, is assumed to be less likely to retire than a police officer who is age 50 with 25 years of service. In reviewing the data for SPRS, we find that at many ages, members are most likely to retire with 25 years of service, and those with more or less than 25 years of service are less likely to retire. Mandatory retirement is age 55. SPRS is not large enough to justify assumptions for each age and service combination, so we recommend separate assumptions by service groups:

- Members with 20 to 24 years of service,
- Members with 25 years of service, and
- Members with 26 or more years of service.

**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

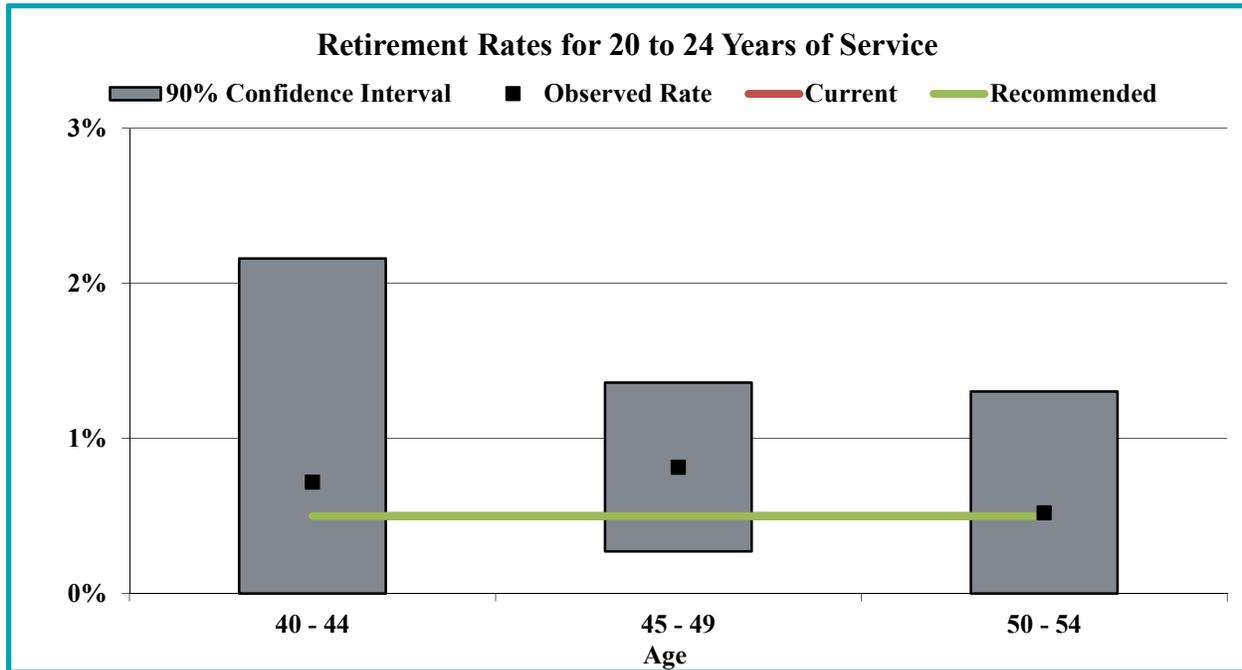
**SECTION III – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

In Table III-R1 we show the calculation of actual-to-expected ratios and the r-squared statistic for members with 20 to 24 years of service, and Chart III-R1 shows the information graphically along with the 90% confidence interval. For retirements with 20 to 24 years of service, we recommend keeping a flat rate of 0.50% for all ages.

Table III-R1

Retirement Rates for 20 to 24 Years of Service									
Age Band	Exposures	Retirements			Retirement Rates			A/E Ratios	
		Actual	Current	Recommended	Actual	Current	Recommended	Current	Recommended
40 - 44	139	1	0.7	0.7	0.72%	0.50%	0.50%	144%	144%
45 - 49	736	6	3.7	3.7	0.82%	0.50%	0.50%	163%	163%
50 - 54	384	2	1.9	1.9	0.52%	0.50%	0.50%	104%	104%
Total	1,259	9	6.3	6.3	0.71%	0.50%	0.50%	143%	143%
R-squared			0.153	0.153					

Chart III-R1



**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

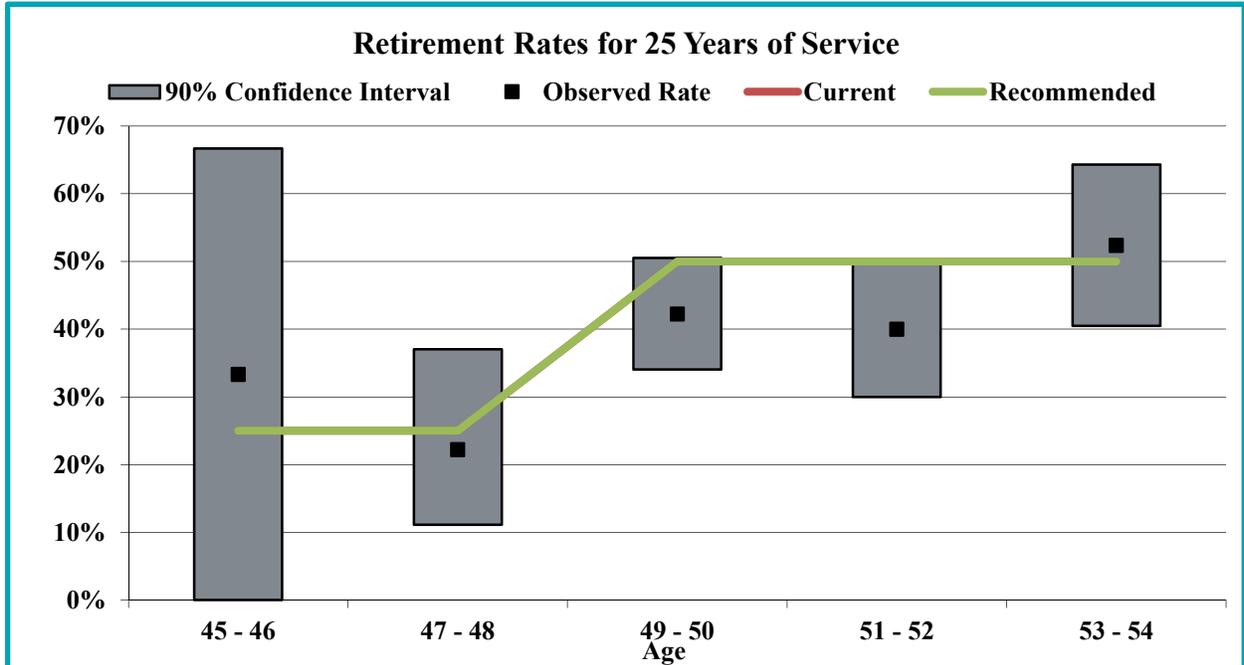
**SECTION III – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

Table III-R2 shows the calculation of actual-to-expected ratios and the r-squared statistic for members with 25 years of service, and Chart III-R2 shows the information graphically along with the 90% confidence interval. For retirements with 25 years of service, we recommend keeping the rates unchanged at 25% through age 48 and 50% thereafter.

Table III-R2

Retirement Rates for 25 Years of Service									
Age Band	Exposures	Retirements			Retirement Rates			A/E Ratios	
		Actual	Current	Recommended	Actual	Current	Recommended	Current	Recommended
45 - 46	3	1	0.8	0.8	33.33%	25.00%	25.00%	133%	133%
47 - 48	27	6	6.8	6.8	22.22%	25.00%	25.00%	89%	89%
49 - 50	97	41	48.5	48.5	42.27%	50.00%	50.00%	85%	85%
51 - 52	70	28	35.0	35.0	40.00%	50.00%	50.00%	80%	80%
53 - 54	42	22	21.0	21.0	52.38%	50.00%	50.00%	105%	105%
Total	239	98	112.0	112.0	41.00%	46.86%	46.86%	88%	88%
R-squared			0.964	0.964					

Chart III-R2



**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

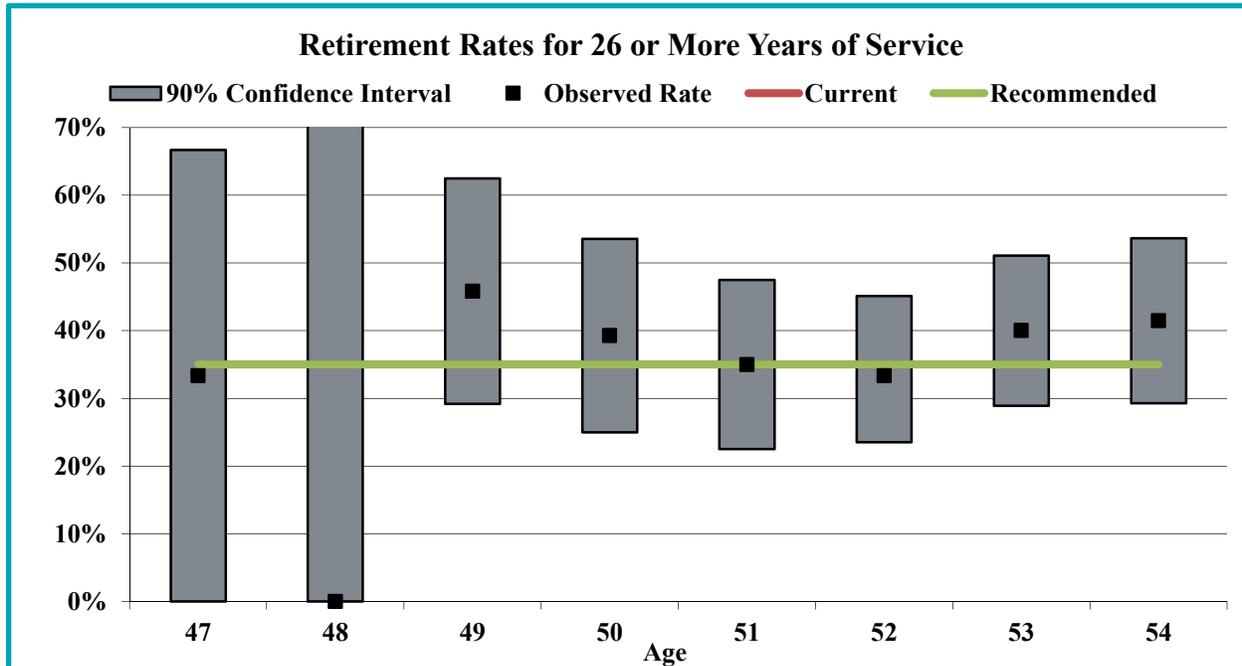
**SECTION III – DEMOGRAPHIC ASSUMPTIONS
RETIREMENT RATES**

Table III-R3 shows the calculation of actual-to-expected ratios and the r-squared statistic for members with 26 or more years of service, and Chart III-R3 shows the information graphically along with the 90% confidence interval. For retirements with 26 or more years of service, we recommend keeping a flat rate of 35% for all ages.

Table III-R3

Retirement Rates for 26 or More Years of Service									
Age	Exposures	Retirements			Retirement Rates			A/E Ratios	
		Actual	Current	Recommended	Actual	Current	Recommended	Current	Recommended
47	3	1	1.1	1.1	33.33%	35.00%	35.00%	95%	95%
48	7	0	2.5	2.5	0.00%	35.00%	35.00%	0%	0%
49	24	11	8.4	8.4	45.83%	35.00%	35.00%	131%	131%
50	28	11	9.8	9.8	39.29%	35.00%	35.00%	112%	112%
51	40	14	14.0	14.0	35.00%	35.00%	35.00%	100%	100%
52	51	17	17.9	17.9	33.33%	35.00%	35.00%	95%	95%
53	45	18	15.8	15.8	40.00%	35.00%	35.00%	114%	114%
54	41	17	14.4	14.4	41.46%	35.00%	35.00%	118%	118%
Total	239	89	83.7	83.7	37.24%	35.00%	35.00%	106%	106%
R-squared			0.943	0.943					

Chart III-R3



**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

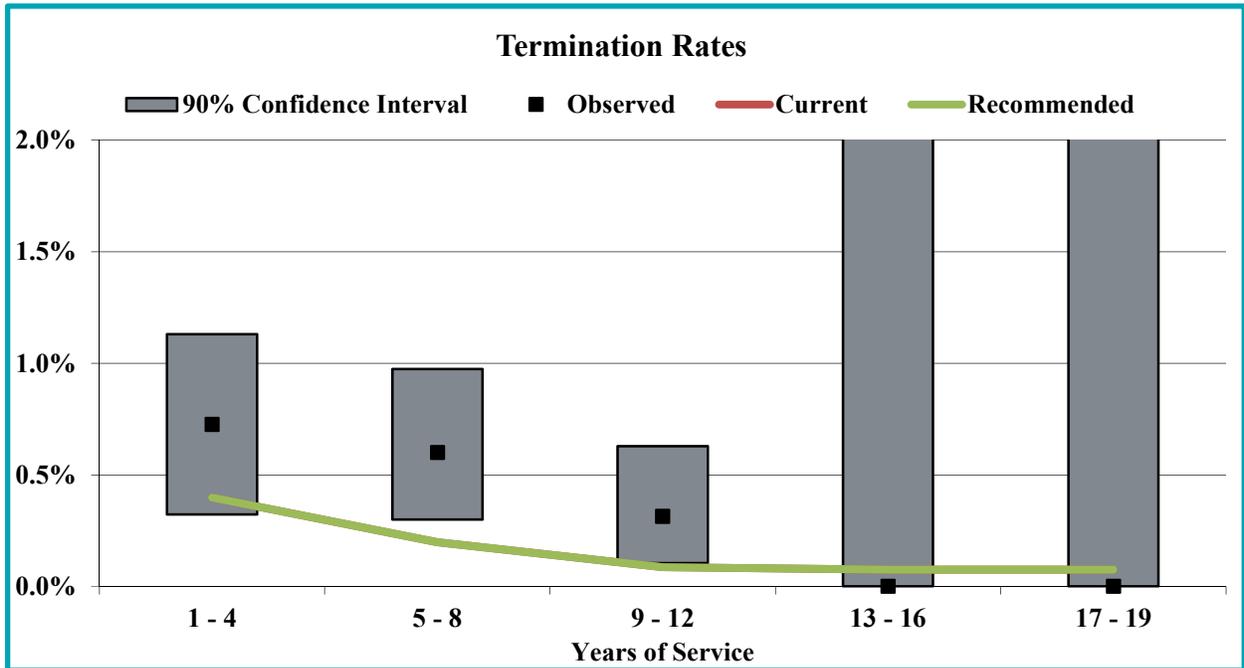
**SECTION III – DEMOGRAPHIC ASSUMPTIONS
TERMINATION RATES**

Termination rates reflect the frequency at which active members leave employment for reasons other than retirement, death, or disability. The current assumption varies by service, and the current rates imply very few members terminate. While the actual number of terminations was higher than expected during the period, overall terminations remain low. In the prior experience study, the actual number of terminations was in line with the termination rates. Since we do not yet know if this new trend will continue, as two of the last three years are affected by the COVID-19 pandemic, and given the low incidence of terminations, we recommend continuing the current assumption.

Table III-T1

Termination Rates										
Service Band	Exposures	Terminations			Termination Rates			A/E Ratios		
		Actual	Current	Recommended	Actual	Current	Recommended	Current	Recommended	
1 - 4	1,239	9	4.9	4.9	0.73%	0.40%	0.40%	182%	182%	
5 - 8	1,334	8	2.6	2.6	0.60%	0.20%	0.20%	302%	302%	
9 - 12	956	3	0.8	0.8	0.31%	0.09%	0.09%	366%	366%	
13 - 16	1,854	0	1.4	1.4	0.00%	0.08%	0.08%	0%	0%	
17 - 19	1,128	0	0.8	0.8	0.00%	0.08%	0.08%	0%	0%	
Total	6,511	20	10.6	10.6	0.31%	0.16%	0.16%	188%	188%	
R-squared			0.356	0.356						

Chart III-T1



**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
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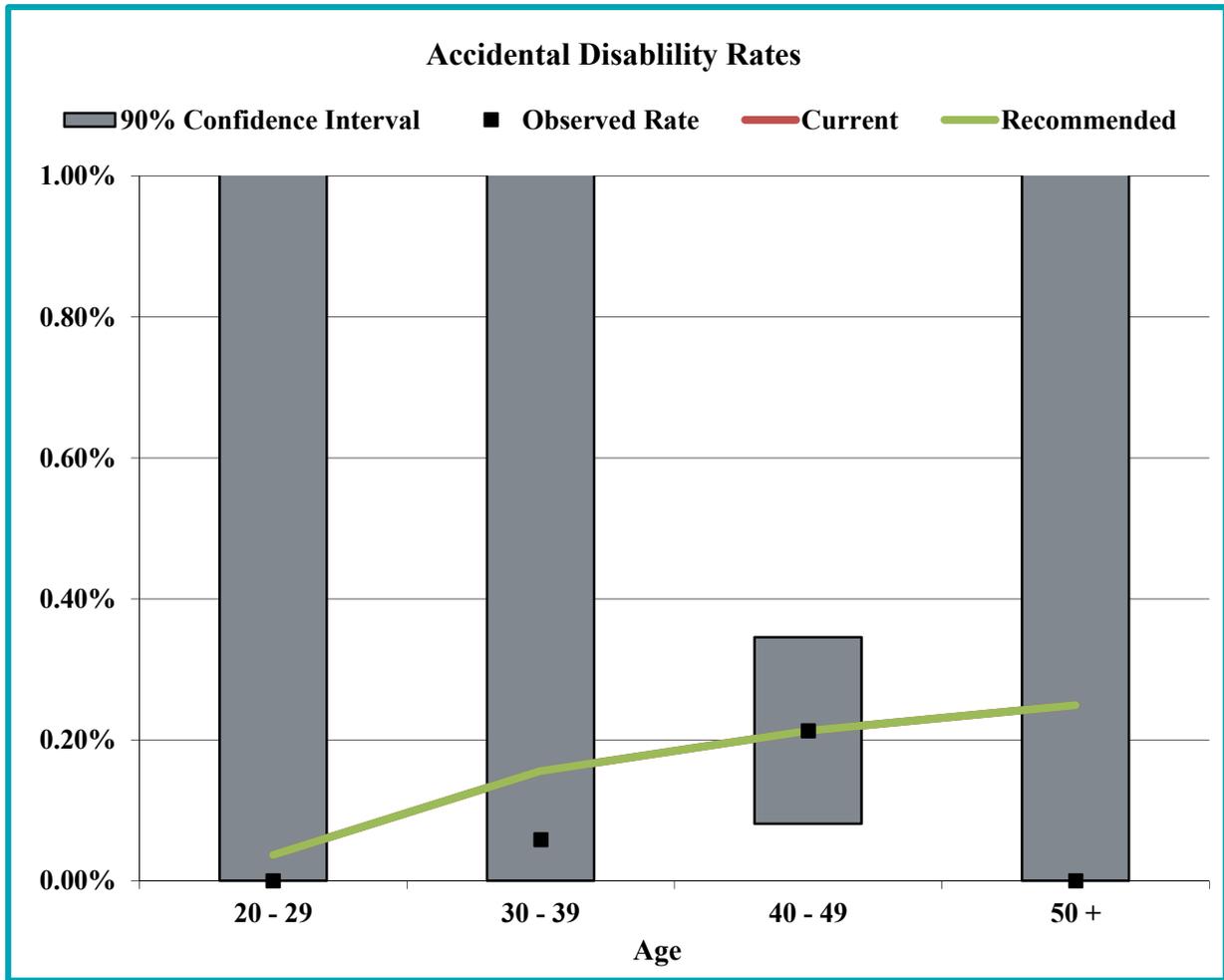
**SECTION III – DEMOGRAPHIC ASSUMPTIONS
DISABILITY RATES**

The following table shows the calculation of actual-to-expected ratios and the r-squared statistic for terminations due to accidental disability. The experience shows very low incidence of accidental disability and therefore we recommend continuing with the current assumption without any changes.

Table III-D1

Accidental Disability Rates									
Age Band	Exposures	Disabilities			Disability Rates			A/E Ratios	
		Actual	Current	Recommended	Actual	Current	Recommended	Current	Recommended
20 - 29	658	0	0.2	0.2	0.00%	0.04%	0.04%	0%	0%
30 - 39	3,421	2	5.3	5.3	0.06%	0.16%	0.16%	37%	37%
40 - 49	3,283	7	7.0	7.0	0.21%	0.21%	0.21%	100%	100%
50 +	889	0	2.2	2.2	0.00%	0.25%	0.25%	0%	0%
Total	8,251	9	14.8	14.8	0.11%	0.18%	0.18%	61%	61%
R-squared			0.1089	0.1089					

Chart III-D1



**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

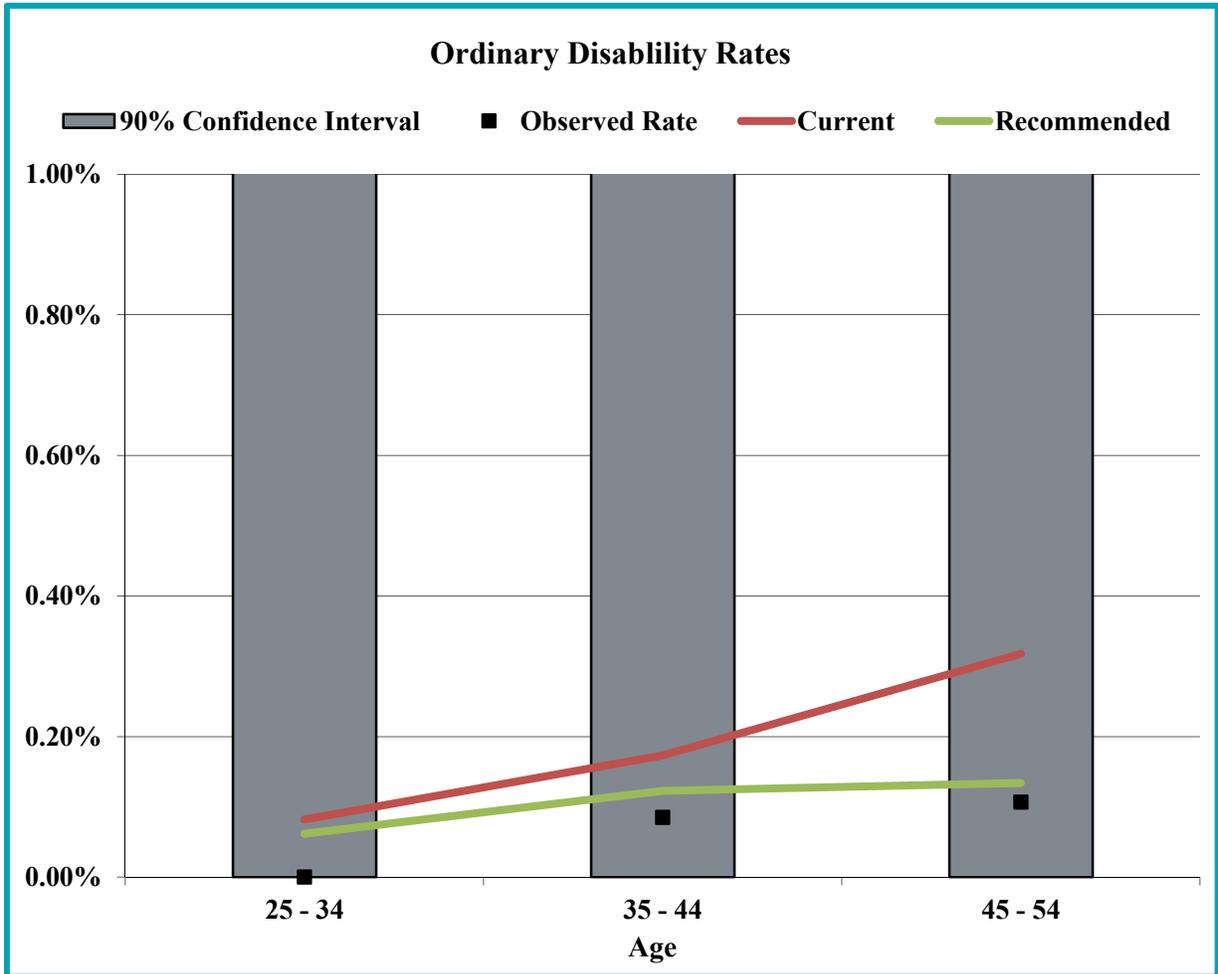
**SECTION III – DEMOGRAPHIC ASSUMPTIONS
DISABILITY RATES**

Table III-D2 shows the calculation of actual-to-expected ratios and the r-squared statistic for terminations due to ordinary disability, and Chart III-D2 shows the information graphically along with the 90% confidence interval. The experience shows very low incidence of ordinary disability. However, the current assumption has exceeded actual incidence during this experience period, as well as in the prior experience study. Therefore, we recommend lowering the ordinary disability rates at each age to more closely align with the experience.

Table III-D2

Ordinary Disability Rates									
Age Band	Exposures	Disabilities			Disability Rates			A/E Ratios	
		Actual	Current	Recommended	Actual	Current	Recommended	Current	Recommended
25 - 34	1,555	0	1.3	1.0	0.00%	0.08%	0.06%	0%	0%
35 - 44	3,531	3	6.1	4.3	0.08%	0.17%	0.12%	49%	69%
45 - 54	1,876	2	6.0	2.5	0.11%	0.32%	0.13%	34%	79%
Total	6,962	5	13.4	7.8	0.07%	0.19%	0.11%	37%	64%
R-squared			0.0933	0.1093					

Chart III-D2



**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Mortality assumptions are typically developed separately by gender. Unlike most of the other demographic assumptions that rely exclusively on the experience of the plan, for mortality, standard mortality tables and projection scales, reflecting future life expectancy improvements, serve as the primary basis for the assumption which is then modified to better reflect the System's experience.

The Society of Actuaries (SOA) completed an extensive mortality study of public pension plan experience and issued a set of mortality tables named the Pub-2010 mortality tables which provide insights into the composition of gender-specific pension mortality by factors such as job category (e.g. General Employees, Teachers, Public Safety), salary/benefit amount, health status (e.g. healthy or disabled), geographic region and duration since event.

In addition, there has been a long history of mortality improvement among pensioners in the U.S., and there is an expectation that mortality rates will continue to improve in the future. The SOA annually publishes a mortality improvement scale that reflects continued mortality improvement trends. The SOA's MP-2021 scale is the most recent mortality improvement projection scale at the time this analysis was prepared. However, the MP-2021 scale reflects historical mortality data through calendar year 2019. The COVID -19 pandemic may have caused a temporary change in mortality patterns.

The steps in our analysis of the mortality assumptions are as follows:

1. Select a standard mortality table that reflects the anticipated experience of the System.
2. Compare actual experience of the System to what would have been predicted by the selected standard table for the period of the experience study.
3. Adjust the standard table either fully or partially depending on the level of credibility for the System's experience. This adjusted table is called the base table.
4. Select an appropriate standard mortality improvement projection scale and apply it to the base table.

Similar to the methodology used to develop the Pub-2010 tables, when actual experience of the System is compared to that of the standard table, the experience is weighted based on the amount of income (salary for pre-retirement mortality and pension benefit for post-retirement mortality). Mortality studies in the U.S. have consistently shown that individuals with higher salaries if active or higher benefit income if retired have longer life expectancies than individuals with lower income. It is important for a pension plan to use assumptions that are weighted by income to reflect not just the incidence of a decrement but the impact on liabilities.

STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021

SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES

In the prior study, SPRS adopted the following assumptions:

Active Members (Non-Annuitants): The Pub-2010 Public Safety Above-Median Income Employee mortality table [*PubS-2010(A) Employee*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2018. 35% of the deaths are assumed to be accidental.

Healthy Retirees (Healthy Annuitants): The Pub-2010 Public Safety Above-Median Income Healthy Retiree mortality table [*PubS-2010(A) Healthy Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2018.

Beneficiaries (Contingent Annuitants): The Pub-2010 General Above-Median Income Healthy Retiree mortality table [*PubG-2010(A) Healthy Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2018.

Disabled Retirees (Disabled Annuitants): The Pub-2010 Public Safety Disabled Retiree mortality table [*PubS-2010 Disabled Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from a base year of 2010 on a generational basis using SOA's Scale MP-2018.

Deaths among active and inactive lives for SPRS in a three-year period represent a relatively small sample size and does not provide meaningful statistics. For healthy retirees there were 159 deaths over this period, for survivors there were 71 deaths, for disabled retirees there were 11 deaths, and for active members there were three deaths. For reference, a fully credible sample would include 1,082 deaths. We therefore recommend continuing to use the same standard Pub-2010 tables without any adjustments.

We note that the recommended standard tables do not always match the experience as well as in the prior experience study. However, the COVID-19 pandemic may have caused a temporary change in mortality patterns. Future mortality experience may be more similar to experience in the prior study.

We recommend no changes to the base mortality tables and updating the mortality improvement scale from MP-2018 to MP-2021 as described below:

Active Members (Non-Annuitants): The Pub-2010 Public Safety Above-Median Income Employee mortality table [*PubS-2010(A) Employee*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2021. 35% of the deaths are assumed to be accidental.

Healthy Retirees (Healthy Annuitants): The Pub-2010 Public Safety Above-Median Income Healthy Retiree mortality table [*PubS-2010(A) Healthy Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2021.

STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021

SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES

Beneficiaries (Contingent Annuitants): The Pub-2010 General Above-Median Income Healthy Retiree mortality table [*PubG-2010(A) Healthy Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2021. Mortality tables specifically designed for public safety employees may reflect higher mortality rates than expected for beneficiaries of public safety employees. We therefore recommend using mortality tables designed for general employees for the beneficiaries of safety employees.

Disabled Retirees (Disabled Annuitants): The Pub-2010 Public Safety Disabled Retiree mortality table [*PubS-2010 Disabled Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from a base year of 2010 on a generational basis using SOA's Scale MP-2021.

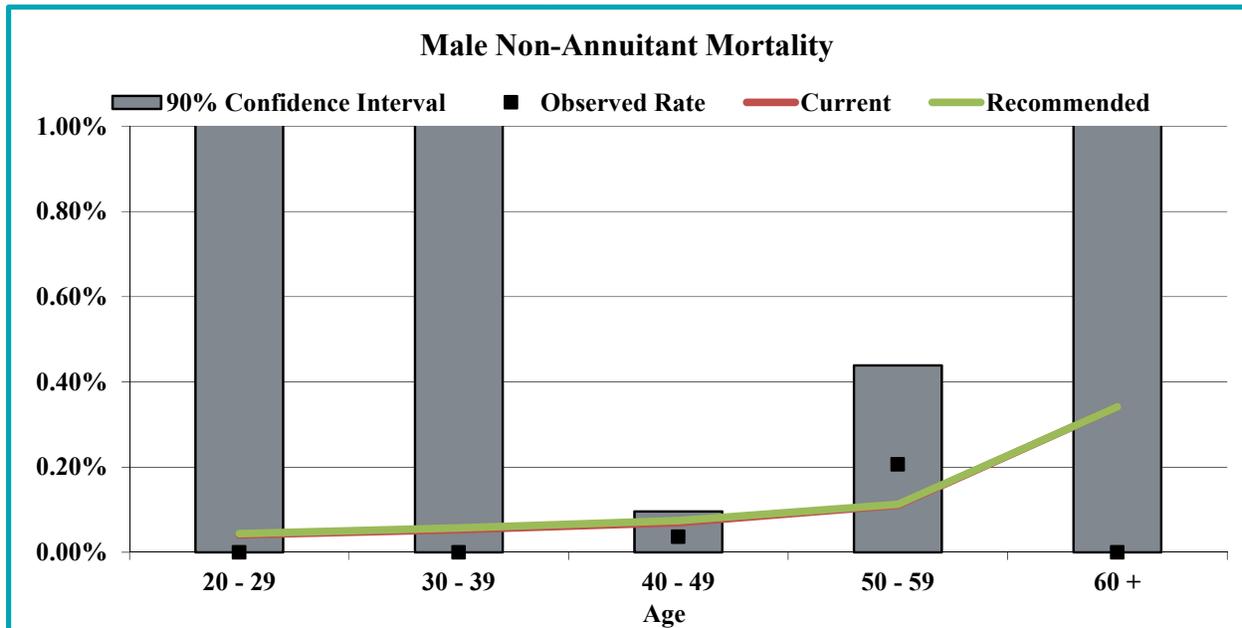
**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

**SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Table III-M1 – Active Males

Non-Annuitant Mortality - Base Table for Males								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratio	
				Actual	Current	Recommended	Current	Recommended
20 - 29	617	0	39,814,096	0	16,129	17,171	0%	0%
30 - 39	3,238	0	264,361,861	0	138,475	150,676	0%	0%
40 - 49	3,137	1	343,443,166	124,436	237,632	253,296	52%	49%
50 - 59	912	2	110,623,320	227,916	122,327	124,263	186%	183%
60 +	4	0	408,616	0	1,396	1,395	0%	0%
Total	7,908	3	758,651,059	352,352	515,958	546,801	68%	64%
R-Squared					0.077	0.069		

Chart III-M1



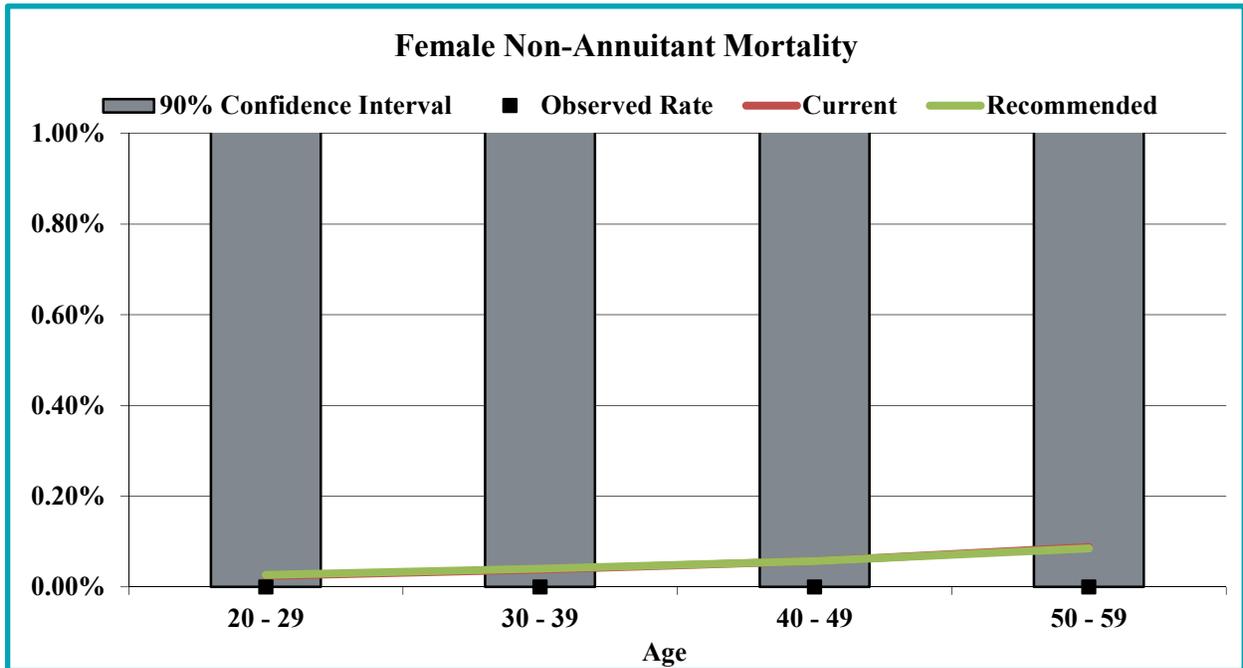
STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Table III-M2 – Active Females

Non-Annuitant Mortality - Base Table for Females								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratio	
				Actual	Current	Recommended	Current	Recommended
20 - 29	41	0	2,589,896	0	622	664	0%	0%
30 - 39	183	0	14,410,644	0	5,407	5,705	0%	0%
40 - 49	145	0	16,318,828	0	9,255	9,202	0%	0%
50 - 59	41	0	5,100,568	0	4,450	4,301	0%	0%
60 +	0	0	0	0	0	0	0%	0%
Total	410	0	38,419,936	0	19,734	19,872	0%	0%
R-Squared					0.000	0.000		

Chart III-M2



During the three-year period, there were three deaths in active service. Of these deaths, none were accidental. As of June 30, 2021, there were 35 survivors receiving ordinary death benefits and 21 survivors receiving accidental death benefits. We recommend keeping the current assumption that 35% of the deaths in active service are accidental deaths.

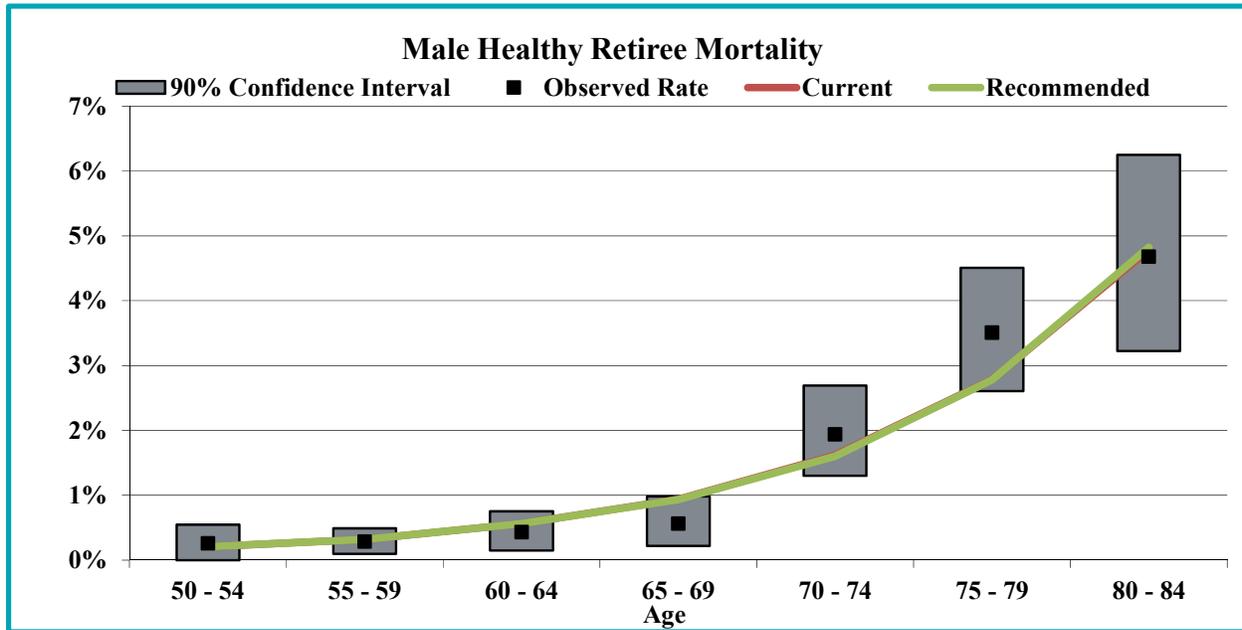
**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Table III-M3 – Healthy Retiree Males

Healthy Annuitant Mortality - Base Table for Males								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratios	
				Actual	Current	Recommended	Current	Recommended
50 - 54	732	2	61,439,294	160,659	126,113	127,280	127%	126%
55 - 59	2,031	7	164,258,309	478,955	523,048	524,939	92%	91%
60 - 64	1,327	6	103,762,371	449,407	583,708	585,317	77%	77%
65 - 69	918	5	69,606,345	393,541	653,045	649,815	60%	61%
70 - 74	1,078	23	75,678,563	1,468,287	1,222,096	1,211,206	120%	121%
75 - 79	998	36	63,176,757	2,217,478	1,757,310	1,754,850	126%	126%
80 - 84	496	24	29,448,561	1,378,298	1,409,456	1,419,919	98%	97%
85 - 89	219	27	11,944,446	1,548,034	1,085,996	1,102,045	143%	140%
90 - 94	122	22	5,863,562	1,188,288	854,821	870,525	139%	137%
95 +	14	7	633,060	315,678	135,960	138,638	232%	228%
Total	7,935	159	585,811,268	9,598,625	8,351,554	8,384,534	115%	114%
R-Squared					0.617	0.617		

Chart III-M3



With mandatory retirement at age 55, we focused our analysis on ages 50 to 84, the age range encompassing most of the retirees.

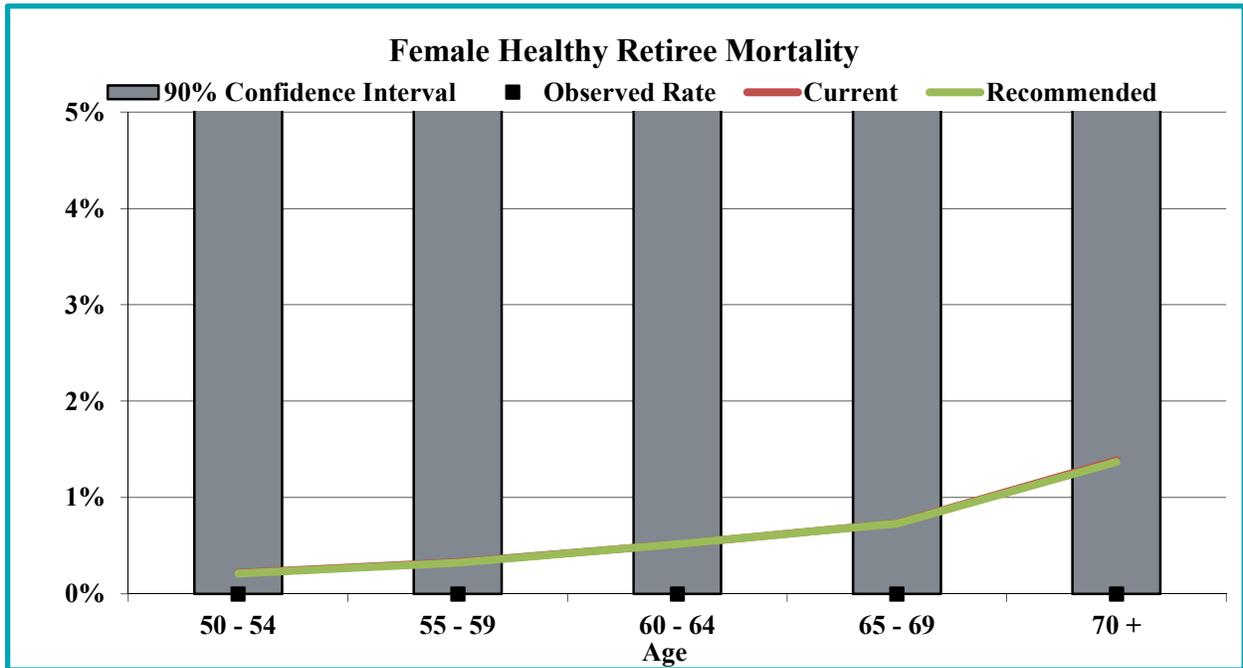
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Table III-M4 – Healthy Retiree Females

Healthy Annuitant Mortality - Base Table for Females								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratios	
				Actual	Current	Recommended	Current	Recommended
50 - 54	8	0	647,361	0	1,407	1,359	0%	0%
55 - 59	70	0	5,782,381	0	19,109	18,733	0%	0%
60 - 64	51	0	4,168,402	0	21,537	21,490	0%	0%
65 - 69	11	0	781,503	0	5,733	5,703	0%	0%
70 +	6	0	342,652	0	4,749	4,689	0%	0%
Total	146	0	11,722,299	0	52,537	51,974	0%	0%
R-Squared					0.000	0.000		

Chart III-M4



There is relatively little mortality data available for female healthy retirees. Therefore, we recommend the same table recommended for male healthy retirees.

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**SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

The Contingent Annuitant mortality assumption is used for beneficiaries both before and after retiree death. However, reliable mortality data is only available for survivors (i.e., those receiving a benefit after retiree death). We analyzed the survivor data using both the current and recommended assumptions for reasonability, but we did not rely solely on this data in setting the assumption. We do not necessarily expect to see an A/E ratio of 1.0 when comparing survivor data to the Contingent Annuitant mortality assumption. We have also considered the data for healthy retirees when recommending this assumption.

Table III-M5 – Male Survivors

Survivors Mortality - Base Table for Males								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratios	
				Actual	Current	Recommended	Current	Recommended
50 - 54	0	0	0	0	0	0	0%	0%
55 - 59	0	0	0	0	0	0	0%	0%
60 - 64	2	0	73,220	0	543	544	0%	0%
65 - 69	2	0	134,378	0	1,161	1,159	0%	0%
70 +	4	0	155,528	0	4,273	4,266	0%	0%
Total	8	0	363,126	0	5,977	5,968	0%	0%
R-Squared					0.000	0.000		

Mortality tables specifically designed for public safety employees may reflect higher mortality rates than expected for beneficiaries of public safety employees. We therefore recommend using mortality tables designed for general employees for the beneficiaries of public safety employees.

Given the limited data, we have omitted the chart.

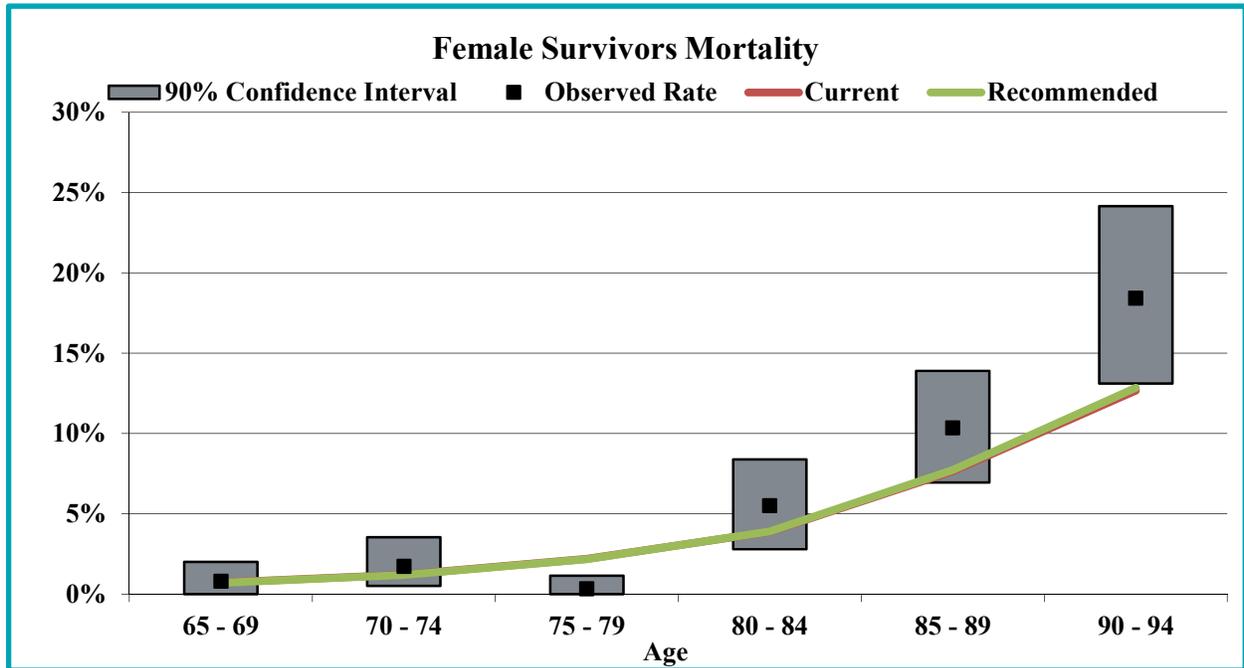
STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Table III-M6 –Female Survivors

Survivors Mortality - Base Table for Females								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratios	
				Actual	Current	Recommended	Current	Recommended
< 50	32	0	1,906,597	0	766	0	0%	0%
50 - 54	20	0	1,238,116	0	2,976	2,874	0%	0%
55 - 59	47	0	2,617,694	0	8,761	8,596	0%	0%
60 - 64	72	0	3,919,103	0	17,865	17,835	0%	0%
65 - 69	100	1	5,222,014	41,896	36,828	36,476	114%	115%
70 - 74	198	3	9,292,843	160,291	111,214	109,829	144%	146%
75 - 79	266	1	12,317,112	40,749	268,934	267,747	15%	15%
80 - 84	179	10	7,777,397	428,828	302,263	302,819	142%	142%
85 - 89	216	21	8,386,698	868,078	641,237	647,158	135%	134%
90 - 94	145	27	5,717,347	1,052,972	723,945	734,223	145%	143%
95 +	32	8	1,156,425	327,426	239,576	242,743	137%	135%
Total	1,307	71	59,551,346	2,920,240	2,354,365	2,370,300	124%	123%
R-Squared					0.762	0.763		

Chart III-M6



Mortality tables specifically designed for public safety employees may reflect higher mortality rates than expected for beneficiaries of public safety employees. We therefore recommend using mortality tables designed for general employees for the beneficiaries of public safety employees.

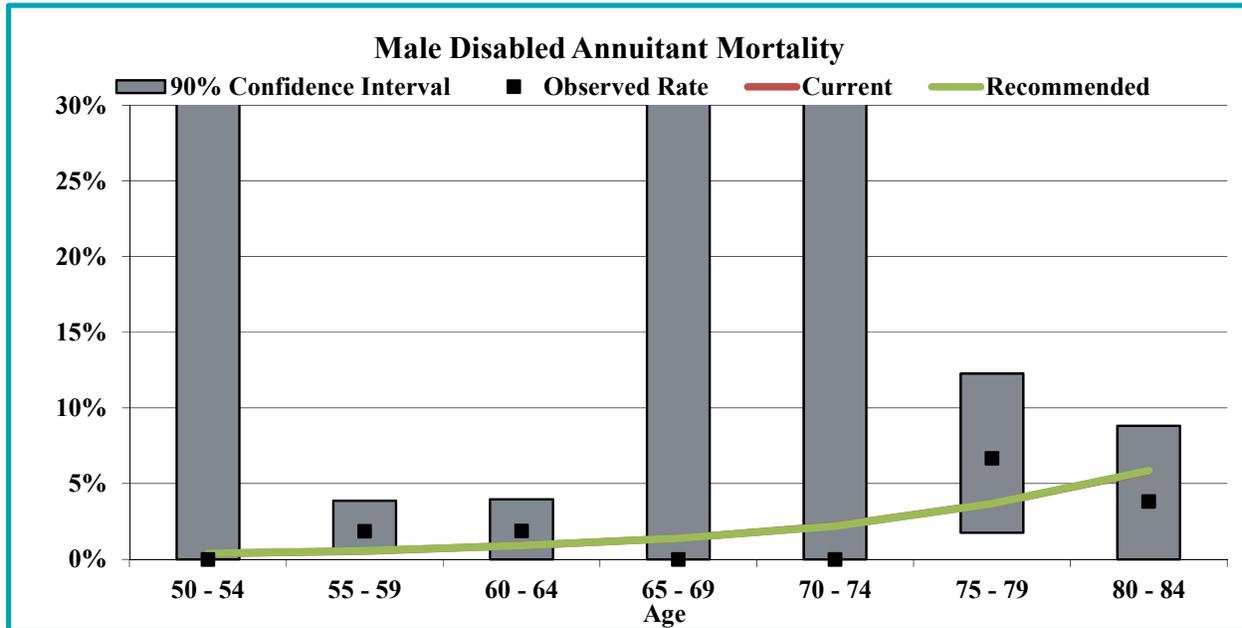
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Table III-M7 – Disabled Retiree Males

Disabled Annuitant Mortality - Base Table for Males								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratios	
				Actual	Current	Recommended	Current	Recommended
50 - 54	144	0	7,925,754	0	30,034	30,416	0%	0%
55 - 59	181	4	10,190,860	188,948	56,454	56,661	335%	333%
60 - 64	101	2	5,817,313	108,770	52,696	52,847	206%	206%
65 - 69	61	0	3,260,004	0	45,122	44,915	0%	0%
70 - 74	33	0	1,454,971	0	32,036	31,752	0%	0%
75 - 79	57	4	2,243,390	149,493	82,412	82,285	181%	182%
80 - 84	34	1	1,345,906	51,559	78,309	78,850	66%	65%
85 - 89	0	0	0	0	0	0	0%	0%
90 +	0	0	0	0	0	0	0%	0%
Total	611	11	32,238,198	498,770	377,062	377,727	132%	132%
R-Squared					0.085	0.086		

Chart III-M7



With limited experience at younger ages, we focused our analysis on ages 50 and above, the age range encompassing most of the expected deaths and all of the actual deaths.

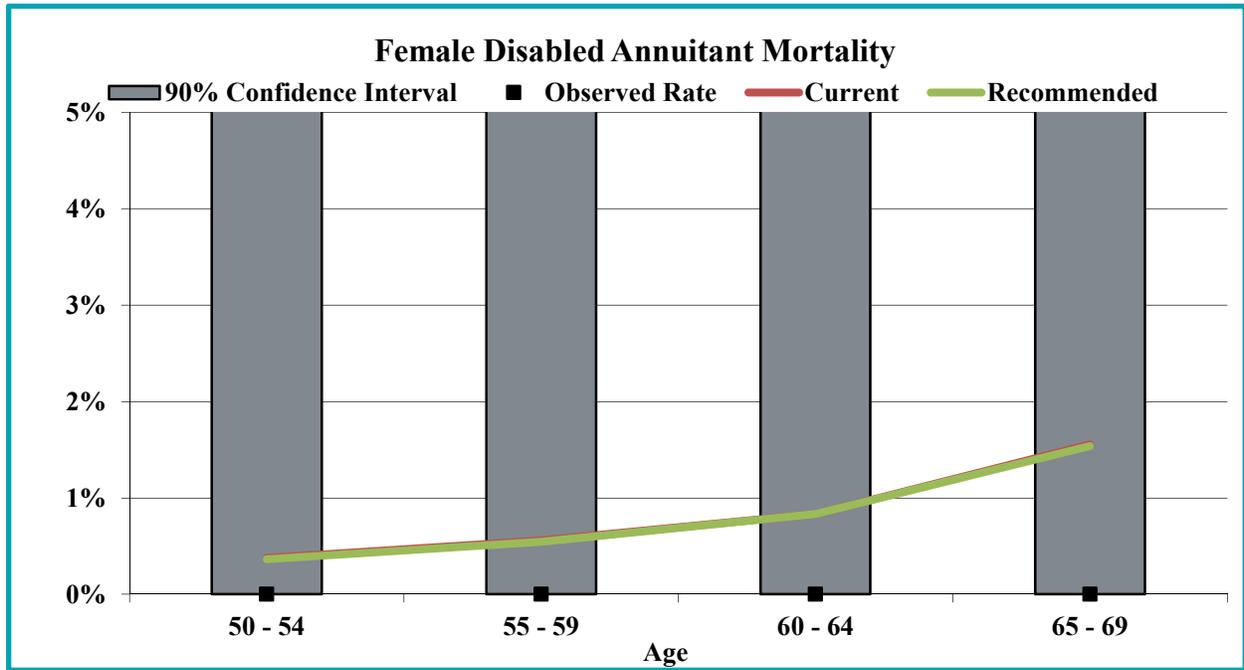
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**SECTION III – DEMOGRAPHIC ASSUMPTIONS
MORTALITY RATES**

Table III-M8 – Disabled Retiree Females

Disabled Annuitant Mortality - Base Table for Females								
Age Band	Exposures	Actual Deaths	Weighted Exposures	Weighted Deaths			A/E Ratios	
				Actual	Current	Recommended	Current	Recommended
50 - 54	10	0	674,742	0	2,538	2,451	0%	0%
55 - 59	29	0	1,353,785	0	7,536	7,359	0%	0%
60 - 64	23	0	1,049,473	0	8,748	8,732	0%	0%
65 +	6	0	286,928	0	4,465	4,409	0%	0%
Total	68	0	3,364,928	0	23,287	22,952	0%	0%
R-Squared					0.000	0.000		

Chart III-M8



With limited experience at younger ages, we focused our analysis on ages 50 and above, the age range encompassing most of the expected deaths.

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**SECTION III – DEMOGRAPHIC ASSUMPTIONS
FAMILY COMPOSITION**

In the event of a member death, pension benefits may extend to a surviving spouse. Spousal demographic information is important in determining the value of their potential future benefit. However, marital information is not always readily available. In the case of an unmarried active member, they could marry before commencing benefits. Even married retirees are sometimes reported without a beneficiary date of birth. With this uncertainty, we make assumptions regarding the frequency with which participants are married at the time of benefit commencement as well as the age difference between the retirees and their spouses.

We currently assume the following:

- For members not currently receiving a benefit, 83.3% of members are assumed married to spouses of the opposite sex.
- Males are assumed to be three years older than females.

Based on healthy and disabled retirees that have commenced benefits between July 1, 2018 and June 30, 2021, approximately 83.6% are married with males being older than females by an average of 1.7 years.

As a result, we recommend the following:

- The percent married assumption remains unchanged at 83.3%.
- The age difference between males and females is reduced from three years to two years.

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SECTION IV – ECONOMIC ASSUMPTIONS

The economic assumptions used in actuarial valuations are intended to be long-term in nature and should be both individually reasonable and consistent with each other. The specific assumptions analyzed in this report are:

- **Price inflation** – used to project increases in the 401(a)(17) pay limit. This assumption is also used indirectly as an underlying component of other economic assumptions.
- **Wage inflation** – across the board wage growth which is used to project the Social Security Wage Base.
- **Salary increase rate** – used to project expected increases in pay for active members in determining liabilities and costs of the System.

We have not studied the investment rate of return assumption since that assumption is set by the NJ State Treasurer.

In order to develop recommendations for each of these assumptions, we considered historical data, both nationally and for the System, expectations for the future and assumptions used by other public sector plans.

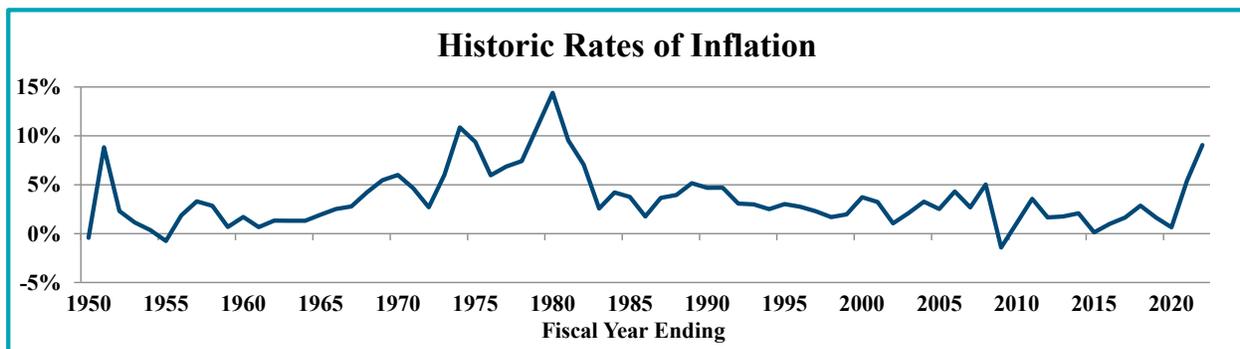
PRICE INFLATION

Long-term price inflation rates are the foundation of other economic assumptions. In a growing economy, wages and investments are expected to grow at the underlying inflation rate plus an additional real growth rate, whether it reflects productivity in terms of wages, or risk premiums in terms of investments.

Historical Data

Chart IV-1 below shows inflation based on CPI-U for the U.S. by individual year from 1950 through 2022.

Chart IV-1



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SECTION IV – ECONOMIC ASSUMPTIONS

Over the 50 years ending June 2022, the geometric average inflation rate for the U.S. has been about 4.0%, but this average is heavily influenced by the high inflation rates in the 1970s and early 1980s. Over the last 30 years, the geometric average inflation rate has been 2.5%, and it has been 2.6% over the last ten years.

Inflation broke from the recent long-term trend with annual rates of 5.4% and 9.1% for the years ending June 2021 and 2022, respectively. This short-term deviation bears monitoring but does not require an immediate revision to expectations. Economic assumptions frequently deviate significantly from expectations. Often those deviations are followed by offsetting deviations in the opposite direction. The assumptions used in actuarial valuations are long-term in nature and are not necessarily driven by the most recent events. That is particularly important considering the major economic impact of the recent COVID-19 pandemic.

Future Expectations

A measure of the market consensus of expected future inflation rates is the difference in yields between conventional Treasury bonds and Treasury inflation-protected securities (TIPS) at the same maturity. Table IV-1 shows the yields on both types of bonds and the break-even inflation rate as of August 2022. Break-even inflation is the level of inflation needed for an investment in TIPS to “break even” with an investment in conventional treasury bonds of the same maturity.

Table IV-1

Break-Even Inflation Based on Treasury Bond Yields			
Time to Maturity	Conventional Yield	TIPS Yield	Break Even Inflation
5 Years	3.03%	0.34%	2.69%
10 Years	2.90%	0.39%	2.51%
20 Years	3.35%	0.65%	2.70%

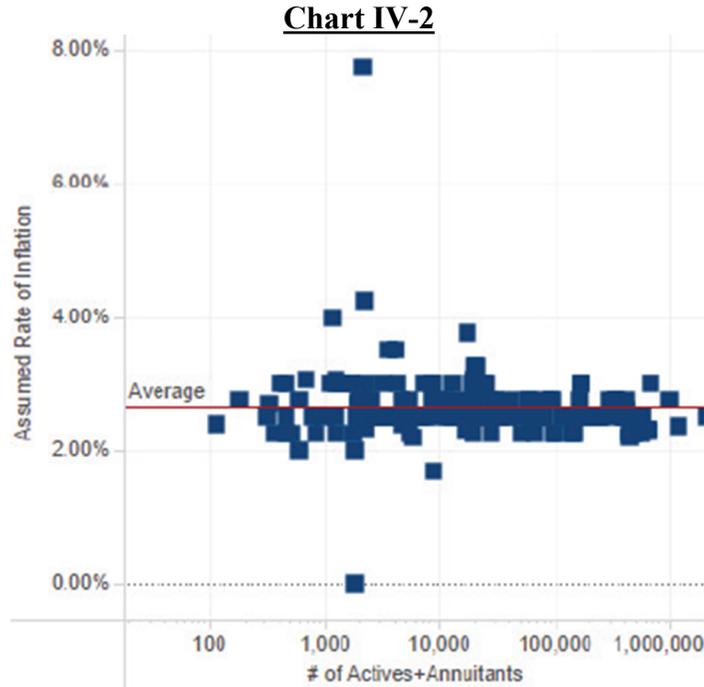
Data Source: Federal Reserve, Constant Maturity Yields, Monthly Series

The Federal Reserve Bank of Philadelphia publishes a quarterly survey of professional economic forecasters that includes their forecasts of inflation over the next 10 years. The survey for the third quarter of 2022 shows a median inflation forecast of 2.8%, a minimum forecast of about 2.1%, and a maximum forecast of 4.5%.

The National Conference on Public Employee Retirement Systems (NCPERS) February 2022 Public Retirement Systems Study includes the following graphic of respondents’ inflation assumptions:

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SECTION IV – ECONOMIC ASSUMPTIONS



The average inflation assumption among the 156 systems that responded to this study was 2.70%.

Based on all of these considerations, we believe a reasonable range for long-term price inflation for use in the System’s actuarial valuations is between 2.25% and 3.25%. Despite recent high inflation, we recommend keeping the current assumption of 2.75% as it aligns with longer term expectations from both markets and forecasters. If, at the time of the next review of economic assumptions, higher inflation persists and expectations for the future increase, increases to the assumption could be considered.

WAGE INFLATION

Wage inflation can be thought of as the annual across-the-board increase in wages. Individuals often receive salary increases in excess of the wage inflation rate, and we study these increases as a part of the merit salary scale assumption. Wage inflation generally exceeds price inflation by some margin reflecting the history of increased purchasing power.

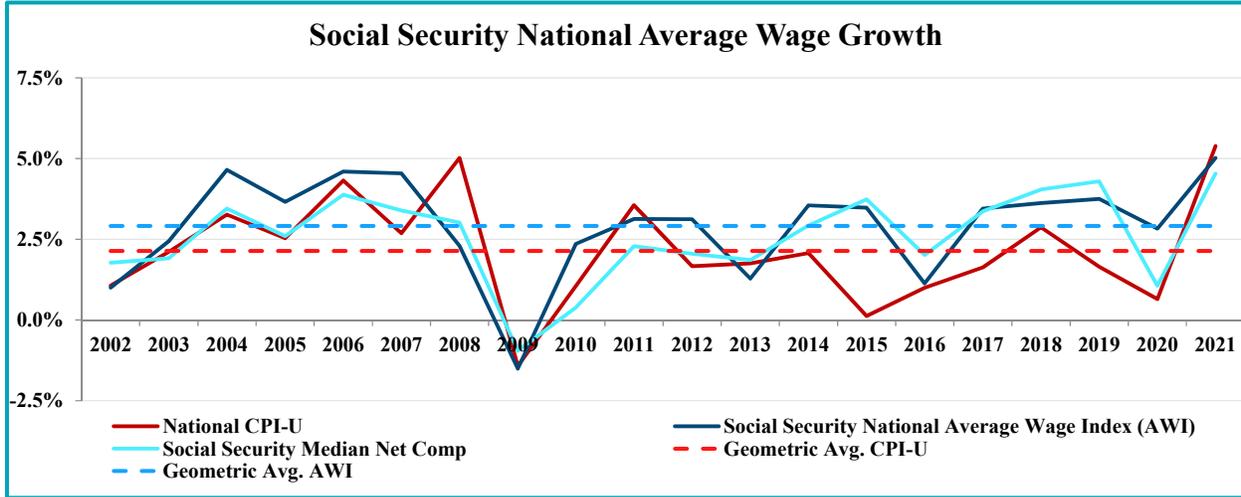
Wage inflation is used in the actuarial valuation to project the Social Security Wage Base in determining the actuarial liability.

Chart IV-3 shows the increase in national average wages (as reported by the Social Security Administration) compared to inflation from 2002 through 2021.

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SECTION IV – ECONOMIC ASSUMPTIONS

Chart IV`-3



Over this period, national wage inflation averaged approximately 2.9% compared to annual price inflation of 2.1%, making real wage increases about 0.8% above inflation. However, over the same time period, the increase in the median real wage was only 0.4% per year, as much of the growth in wages was clustered at the top end of the wage scale.

It is acceptable to assume some additional level of base payroll increase beyond general inflation. Potential reasons contributing to the increase may include the presence of strong union representation in the collective bargaining process, competition in hiring among other similar employers, and regional factors – such as the local inflation index exceeding the national average. Also, the Social Security Administration projects real wage growth of 0.5% to 1.8% going forward in their Social Security solvency projections included in the 2022 annual Trustees Report. However, recent higher rates of inflation have resulted in negative real wage growth for US workers, and the expectation of higher inflation in the short term is anticipated to continue to put downward pressure on real wages, at least in the short term.

We recommend maintaining a small non-inflationary base payroll growth assumption of 0.5% annually. As a result, after factoring in inflation, the annual expected wage base increase assumption remains at 3.25%.

SALARY INCREASE RATE

The salary increase rate represents the year over year increase in pay of continuing actives. Salary increases consist of three components: Increases due to cost of living maintenance (inflation), increases related to non-inflationary pressures on base pay (such as productivity increases), and increases in individual pay due to merit, promotion, and longevity.

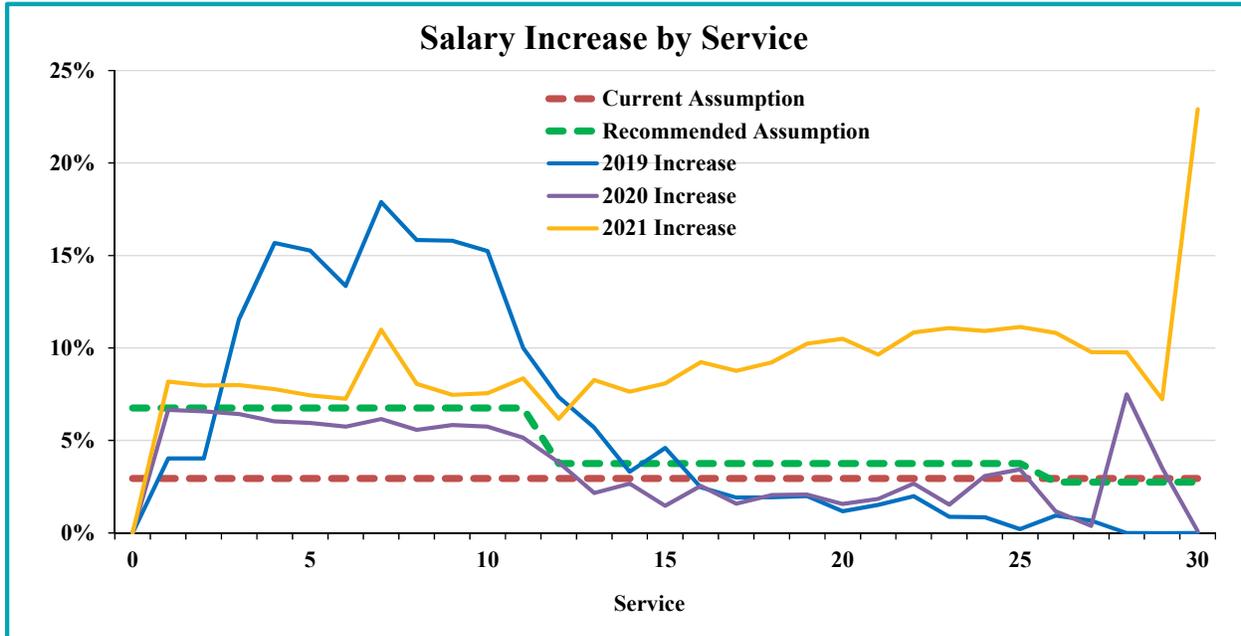
The current assumption is 2.95% per year through fiscal year 2025 and 3.95% per year thereafter. Salary increases are assumed to occur on January 1.

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SECTION IV – ECONOMIC ASSUMPTIONS

Generally, newer employees are more likely to earn a longevity increase or receive a promotion, so their salary increases tend to be greater than those for longer service employees. Chart IV-4 shows the salary increases based on years of service for continuing active members for FYE 2019 through FYE 2021 and the recommended assumption.

Chart IV-4



As can be seen from the chart, in general, salaries have been higher than expected, with a consistent relationship between salary increases and years of service. Salaries for continuing actives, on average, increased 5.67%, 3.40%, and 9.06%, for FYE 2019, FYE 2020, and FYE 2021, respectively. For shorter service members, salaries increased considerably more than expected in all years, with especially large increases in FYE 2019. Longer service members experienced lower salary increases in FYE 2019 and FYE 2020, generally in line with expectations. However, those individuals saw much higher salary increases in FYE 2021. In light of this experience along with recent high inflation, we recommend eliminating the select and ultimate period used for the current assumption, which assumed lower increases in the short-term relative to the long-term.

We do not have current union contract information for SPRS that would otherwise factor into our recommendation. Nonetheless, recent experience suggests a service-based assumption with higher salary increase rates for members with shorter service and lower salary increase rates for members with longer service. Our understanding is that the unusually high increases for shorter service members in FYE 2019 and for longer service members in FYE 2021 were one-time salary adjustments related to new union contracts. We have placed less emphasis on that specific experience in setting the proposed assumption. We recommend salary increases of 6.75% for participants with less than 12 years of service, 3.75% for participants between 12 and 25 years of service, and 2.75% for participants with at least 26 years of service. Should updated union contracts or additional salary information become available, we can provide an updated analysis, which may lead to a revised recommendation for the salary increase assumption.

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APPENDIX A – SUMMARY OF RECOMMENDED ASSUMPTIONS

The demographic assumptions are based on an experience study covering the period July 1, 2018 through June 30, 2021.

- 1. Salary Increases** Salaries are assumed to increase annually as follows:

Service	Rates
0-11	6.75%
12-25	3.75
26+	2.75

Salaries increases are assumed to occur on January 1

- 2. 401(a)(17) Pay Limit** \$290,000 in 2021 increasing 2.75% per annum, compounded annually.

- 3. Social Security Wage Base** \$142,800 in 2021 increasing 3.25% per annum, compounded annually.

- 4. Termination** Termination rates are as follows:

Service	Rates
0	0.450%
1	0.450
2	0.450
3	0.450
4	0.300
5	0.225
6	0.200
7	0.175
8	0.150
9	0.125
10	0.100
11	0.075
12	0.075
13	0.075
14	0.075
15	0.075
16	0.075
17	0.075
18	0.075
19	0.075
20	0.000

No termination is assumed after attainment of retirement eligibility.

All members with 10 or more years of service at termination are assumed to elect a deferred retirement benefit.

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APPENDIX A – SUMMARY OF RECOMMENDED ASSUMPTIONS

5. Disability

Disability rates are as follows:

Age	Ordinary Disability	Accidental Disability
20	0.009%	0.015%
21	0.009	0.015
22	0.012	0.020
23	0.012	0.020
24	0.012	0.020
25	0.015	0.025
26	0.015	0.025
27	0.015	0.025
28	0.027	0.045
29	0.027	0.045
30	0.032	0.053
31	0.032	0.053
32	0.036	0.060
33	0.113	0.188
34	0.115	0.191
35	0.116	0.194
36	0.118	0.196
37	0.119	0.199
38	0.121	0.202
39	0.123	0.205
40	0.125	0.208
41	0.125	0.209
42	0.126	0.210
43	0.127	0.211
44	0.127	0.212
45	0.128	0.214
46	0.129	0.215
47	0.130	0.216
48	0.130	0.217
49	0.131	0.218
50	0.132	0.220
51	0.144	0.240
52	0.156	0.260
53	0.165	0.275
54	0.177	0.295

No ordinary disability is assumed prior to attainment of ordinary disability retirement eligibility at four years of service or after attainment of special retirement eligibility at 25 years of service.

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APPENDIX A – SUMMARY OF RECOMMENDED ASSUMPTIONS

Accidental disability rates apply at all ages until the mandatory retirement age of 55.

Members retiring under the ordinary disability decrement with 20 or more years of service are assumed to receive the involuntary disability retirement benefit.

Members are assumed to receive the greater of the applicable disability benefit or the service or special retirement benefit, depending on eligibility.

6. Mortality

Pre-Retirement (Non-Annuitant): The Pub-2010 Public Safety Above-Median Income Employee mortality table [*PubS-2010(A) Employee*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2021.

35% of the deaths are assumed to be accidental.

For purposes of pre-retirement accidental death benefits based on Adjusted Final Compensation, the benefit is assumed to increase at 3.75% per year, consistent with the assumed salary increases for members with 12 to 25 years of service.

Healthy Retirees (Healthy Annuitants): The Pub-2010 Public Safety Above-Median Income Healthy Retiree mortality table [*PubS-2010(A) Healthy Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2021.

Beneficiaries (Contingent Annuitants): The Pub-2010 General Above-Median Income Healthy Retiree mortality table [*PubG-2010(A) Healthy Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2021.

Disabled Retirees (Disabled Annuitants): The Pub-2010 Public Safety Disabled Retiree mortality table [*PubS-2010 Disabled Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from a base year of 2010 on a generational basis using SOA's Scale MP-2021.

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APPENDIX A – SUMMARY OF RECOMMENDED ASSUMPTIONS

7. Retirement

For those with 24 years of service or less: 0.50%

For those with 25 years of service:

Age	Rates
48 or younger	25.00%
49-54	50.00

For those with 26 or more years of service: 35.00%

Mandatory retirement at age 55.

**8. Family
Composition
Assumptions**

For members not currently receiving benefits, 83.3% of members are assumed married to spouses of the opposite sex. Males are assumed to be two years older than females.

For purposes of the post-retirement death benefit for members currently in receipt, beneficiary status is based on the beneficiary allowance reported. If no beneficiary date of birth is provided, the beneficiary is assumed to be the member's spouse of the opposite sex with males assumed to be two years older than females.

No additional dependent children or parents are assumed.

For current dependents receiving a pre-retirement accidental death benefit, those under age 24 are assumed to receive a benefit until age 24 while those over age 24 are assumed to receive a benefit for the remainder of their lifetime.

For current dependents receiving a benefit other than a pre-retirement accidental death benefit, those under age 18 are assumed to receive a benefit until age 18 while those over age 18 are assumed to receive a benefit for the remainder of their lifetime.

**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

APPENDIX B – SUMMARY OF CURRENT ASSUMPTIONS

The following are the assumptions used in the actuarial valuation as of July 1, 2021. The economic and demographic assumptions and methods for that valuation were determined in the Actuarial Experience Study covering the period July 1, 2014 – June 30, 2018 and adopted by the Board on January 28, 2020.

- 1. Salary Increases** Salaries are assumed to increase by 2.95% per year through fiscal year 2025 and 3.95% per year for fiscal years 2026 and thereafter.

Salary increases are assumed to occur on January 1.

- 2. 401(a)(17) Pay Limit** \$290,000 in 2021 increasing 2.75% per annum, compounded annually.

- 3. Social Security Wage Base** \$142,800 in 2021 increasing 3.25% per annum, compounded annually.

- 4. Termination** Termination rates are as follows:

Service	Rates
0	0.450%
1	0.450
2	0.450
3	0.450
4	0.300
5	0.225
6	0.200
7	0.175
8	0.150
9	0.125
10	0.100
11	0.075
12	0.075
13	0.075
14	0.075
15	0.075
16	0.075
17	0.075
18	0.075
19	0.075
20	0.000

No termination is assumed after attainment of retirement eligibility.

All members with 10 or more years of service at termination are assumed to elect a deferred retirement benefit.

**STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021**

APPENDIX B – SUMMARY OF CURRENT ASSUMPTIONS

5. Disability

Disability rates are as follows:

Age	Ordinary Disability	Accidental Disability
20	0.027%	0.015%
21	0.027	0.015
22	0.035	0.020
23	0.035	0.020
24	0.035	0.020
25	0.041	0.025
26	0.041	0.025
27	0.048	0.025
28	0.048	0.045
29	0.055	0.045
30	0.061	0.053
31	0.061	0.053
32	0.069	0.060
33	0.102	0.188
34	0.136	0.191
35	0.169	0.194
36	0.170	0.196
37	0.171	0.199
38	0.172	0.202
39	0.172	0.205
40	0.172	0.208
41	0.172	0.209
42	0.172	0.210
43	0.172	0.211
44	0.191	0.212
45	0.218	0.214
46	0.252	0.215
47	0.281	0.216
48	0.314	0.217
49	0.342	0.218
50	0.375	0.220
51	0.410	0.240
52	0.443	0.260
53	0.470	0.275
54	0.505	0.295

No ordinary disability is assumed prior to attainment of ordinary disability retirement eligibility at four years of service or after attainment of special retirement eligibility at 25 years of service.

STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021

APPENDIX B – SUMMARY OF CURRENT ASSUMPTIONS

Accidental disability rates apply at all ages until the mandatory retirement age of 55.

Members retiring under the ordinary disability decrement with 20 or more years of service are assumed to receive the involuntary disability retirement benefit.

Members are assumed to receive the greater of the applicable disability benefit or the service or special retirement benefit, depending on eligibility.

6. Mortality

Pre-Retirement (Non-Annuitant): The Pub-2010 Public Safety Above-Median Income Employee mortality table [*PubS-2010(A) Employee*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2018.

35% of the deaths are assumed to be accidental.

For purposes of pre-retirement accidental death benefits based on Adjusted Final Compensation, the benefit is assumed to increase at the same rate as active salaries.

Healthy Retirees (Healthy Annuitants): The Pub-2010 Public Safety Above-Median Income Healthy Retiree mortality table [*PubS-2010(A) Healthy Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2018.

Beneficiaries (Contingent Annuitants): The Pub-2010 General Above-Median Income Healthy Retiree mortality table [*PubG-2010(A) Healthy Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from the base year of 2010 on a generational basis using SOA's Scale MP-2018.

Disabled Retirees (Disabled Annuitants): The Pub-2010 Public Safety Disabled Retiree mortality table [*PubS-2010 Disabled Retiree*] as published by the Society of Actuaries, unadjusted, and with future improvement from a base year of 2010 on a generational basis using SOA's Scale MP-2018.

STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY
EXPERIENCE STUDY AS OF JUNE 30, 2021

APPENDIX B – SUMMARY OF CURRENT ASSUMPTIONS

7. Retirement

For those with 24 years of service or less: 0.50%

For those with 25 years of service:

Age	Rates
48 or younger	25.00%
49-54	50.00

For those with 26 or more years of service: 35.00%

Mandatory retirement at age 55.

**8. Family
Composition
Assumptions**

For members not currently in receipt, 83.3% of members are assumed married to spouses of the opposite sex. Males are assumed to be three years older than females.

For purposes of the post-retirement death benefit for members currently in receipt, beneficiary status is based on the beneficiary allowance reported. If no beneficiary date of birth is provided, the beneficiary is assumed to be the member's spouse of the opposite sex with males assumed to be three years older than females.

No additional dependent children or parents are assumed.

For current dependents receiving a pre-retirement accidental death benefit, those under age 24 are assumed to receive a benefit until age 24 while those over age 24 are assumed to receive a benefit for the remainder of their lifetime.

For current dependents receiving a benefit other than a pre-retirement accidental death benefit, those under age 18 are assumed to receive a benefit until age 18 while those over age 18 are assumed to receive a benefit for the remainder of their lifetime.



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