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State Teachers Retirement System of Ohio

Three Year Experience Review
July 1, 2008 – June 30, 2011

February 16, 2012

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STRS Ohio Experience Study

I. Executive Summary
II. Experience Study Results
    a. Introduction
    b. Demographic Assumptions
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Executive Summary

Executive Summary

- An experience study is performed every three to five years for STRS Ohio to review the assumptions used in the annual actuarial valuation.
- Census data for the past three years (2008 – 2011) was collected and analyzed.
- Demographic assumptions:
  - Past experience tends to be a good indicator of future demographic experience.
- Economic assumptions:
  - Expert forecasts and observable expectations of future economic activity are more heavily relied upon for setting economic assumptions than past experience.
  - Economic expectations have changed significantly since the prior experience study.

Executive Summary

Summary of Recommended Changes

Based on the Plan's experience and current market conditions, we recommend changes to most of the current actuarial assumptions.

- **Mortality**:
  - Change healthy post-retirement mortality from RP 2000 Combined Mortality Table projected to 2018 (using Scale AA) with age setbacks for both males and females, to the RP 2000 Combined Mortality Table projected to 2022, (using Scale AA) with age setbacks for both males and females.
  - Decrease expected pre-retirement mortality rates.
  - Increase disability mortality rates for older ages.

Executive Summary

Summary of Recommended Changes

Retirement:

- Slight changes to reflect fewer retirements upon first eligibility for the age 60 with 5 years of service and age 55 with 25 years of service retirement eligibilities and minor modifications at other ages.
- Proposed Plan:
  - Expected retirement rates applied to the proposed plan differ from the expected retirement rates applied to the current plan to reflect the different retirement patterns expected under the new plan. However, the expected retirement rates for the current plan were used as the underlying basis for establishing the expected retirement rates for the proposed plan.
  - Therefore, the expected retirement rates used previously for the proposed plan have been updated, where necessary, to reflect the recommended changes listed above.

Executive Summary

Summary of Recommended Changes

- **Non-Vested Withdrawal:**
  - Implement rates based on service for participants with less than 5 years of service.
    - 35% expected to terminate in the first year of employment
    - 25% in the second year of employment
    - 15% in the third year of employment
    - 10% in the fourth and fifth years of employment
  - The change from age-based to service-based withdrawal assumptions, for participants with less than 5 years of service, is because we have observed that in certain professions, such as teaching, employees who leave the profession before retirement tend to do so very early in their careers, regardless of age.

Executive Summary

Summary of Recommended Changes

- **Vested Withdrawal:**
  - Decrease expected withdrawal rates for vested participants for males less than age 45 and females less than age 50.
  - Increase expected withdrawal rates for males age 45 or older and females age 50 or older.

- **Disability**: Decrease the likelihood of disability retirement at most ages.

Executive Summary

Summary of Recommended Changes

- **Dependent Assumptions**:
  - No change to the % married assumption.
  - Change the assumed age difference for female members to be 1 year younger than their spouses.

- **Inflation**: Reduce the inflation assumption from 3.00% to a rate in the range of 2.50% - 2.75%.

- **Interest Rate:** Reduce to 7.50% - 7.75% to reflect lower assumed inflation rate.

Executive Summary

Summary of Recommended Changes

- **Individual Salary Growth**: Modify the age-based salary growth assumptions to reflect the reduction in the inflation rate and slight increases in merit /promotional increases.
- **Payroll Growth**: No change.
  - Payroll growth, net of inflation, has increased on average less than 1% per year. Even though the merit pay experience analysis confirmed that those who remain employed are receiving merit increases greater than expected, the increase in total payroll has been minimal. This is due to the retirement of older, higher paid employees replaced by younger, lower paid employees. This decrease in payroll has offset the merit increases for continuing employees and thus, the total payroll has remained relatively unchanged.
  - Current data shows that the number of active employees with 30 or more years of service has declined almost 22% from 13,386 in 2008 to only 10,448 in 2011. Thus, the pattern of the last few years is not expected to continue.
  - Therefore, we recommend keeping the payroll growth assumption at the current 3.50%/4.00% rate.

Executive Summary

Impact on Funding

- The table below shows the total impact of instituting all of the assumptions recommended in this experience study on the current and proposed plans.

Measurement Date:	**7/1/2011**	**7/1/2011**	**7/1/2011**	**7/1/2011**	**7/1/2011**	**7/1/2011**	**7/1/2011**	**7/1/2011**
Plan Type:	**Current**	**Current**	**Current**	**Proposed**	**Proposed**	**Proposed**	**Proposed - Delay COLA and Cont.**	**Proposed - Delay COLA and Cont.**
Assumption Type:	**Current**	**Proposed**	**Proposed**	**Current**	**Proposed**	**Proposed**	**Proposed**	**Proposed**
Discount Rate:	**8.00%**	**7.50%**	**7.75%**	**8.00%**	**7.50%**	**7.75%**	**7.50%**	**7.75%**
	(000's)	(000's)	(000's)	(000's)	(000's)	(000's)	(000's)	(000's)
Total Present Value of Benefits	111,595,480	121,216,137	117,965,828	95,821,497	101,869,119	99,472,762	102,329,191	99,922,666
Actuarial Accrued Liability (AAL)	98,766,204	105,154,272	102,665,349	87,008,853	91,453,270	89,376,474	91,905,880	89,819,129
Normal Cost as a % of Compensation	13.77%	15.67%	15.08%	9.76%	10.56%	10.27%	10.58%	10.29%
Assets	58,110,495	58,110,495	58,110,495	58,110,495	58,110,495	58,110,495	58,110,495	58,110,495
Unfunded AAL	40,655,709	47,043,777	44,554,854	28,898,358	33,342,775	31,265,979	33,795,385	31,708,634
Funded %	58.8%	55.3%	56.6%	66.8%	63.5%	65.0%	63.2%	64.7%
Total Funding Period	Infinite	Infinite	Infinite	29.0	37.2	33.7	38.9	35.4

Executive Summary

Impact on Funding

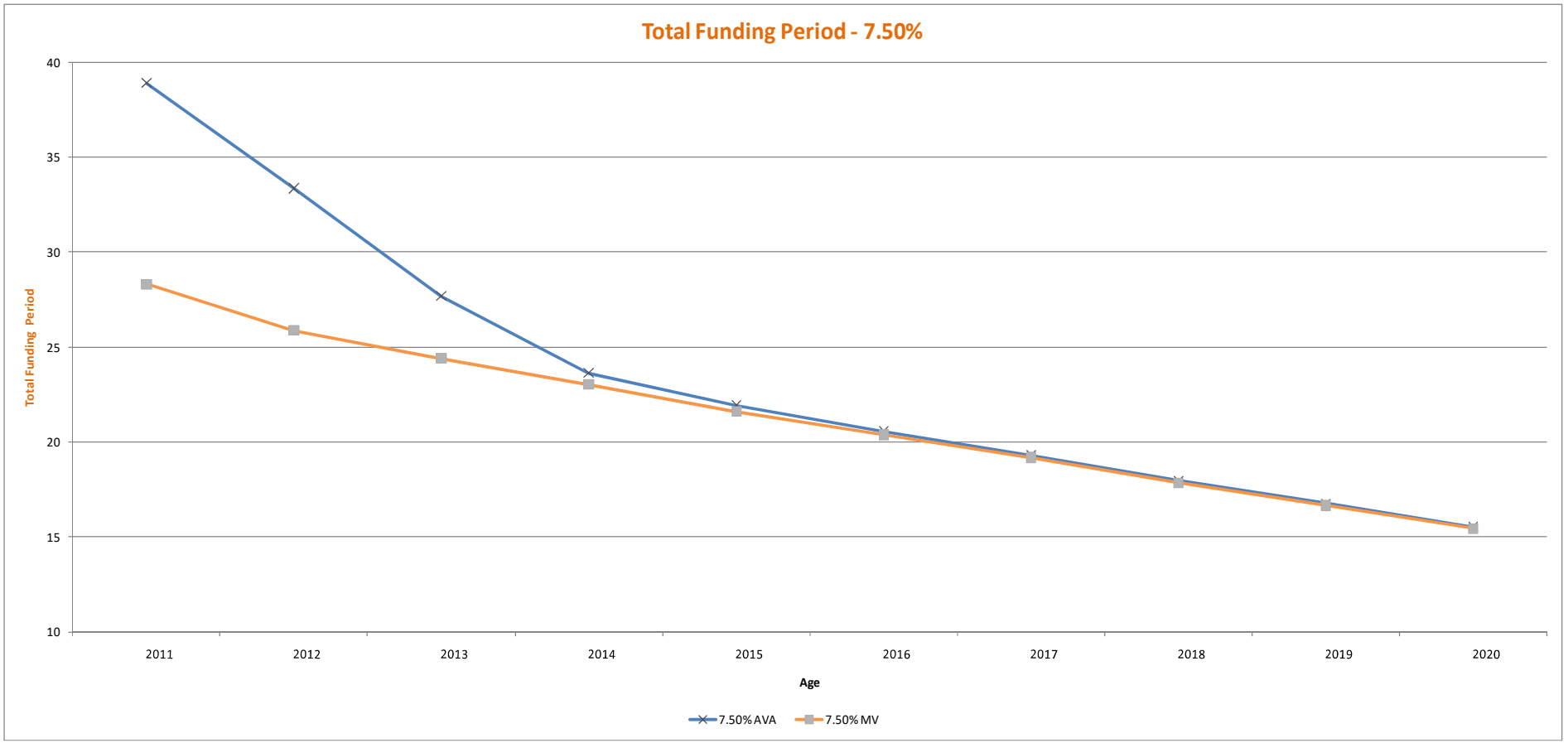
- The table below shows the impact of instituting each assumption recommended in this experience study on the proposed plan.

Proposed Plan					
	Funding Period (years)	**Funded Ratio**	**Unfunded Accrued Liability (000's)**	**Normal Cost Rate**	**Recognition of Market Value Funding Period (years)**
Current Assumptions	29.00	66.80%	28,898,358	9.76%	
Impact of moving from 8.0% to 7.5% Discount Rate	8.00	-2.50%	3,305,883	1.30%	
Impact of Post-retirement Mortality	2.70	-0.80%	1,134,201	0.01%	
Impact of Other Assumptions	-1.80	-0.20%	330,556	-0.50%	
Impact of Salary Increases	-0.70	0.20%	-326,224	-0.01%	
Impact of Delay in COLA and Contributions	1.70	-0.30%	452,610	0.02%	
After Proposed Changes (at 7.50%)	38.90	63.20%	33,795,385	10.58%	28.30
Impact of moving from 7.5% to 7.75% Discount Rate	-3.50	1.50%	-2,086,751	-0.29%	
After Proposed Changes (at 7.75%)	35.40	64.70%	31,708,634	10.29%	25.30

Impact on Funding

Impact Projection

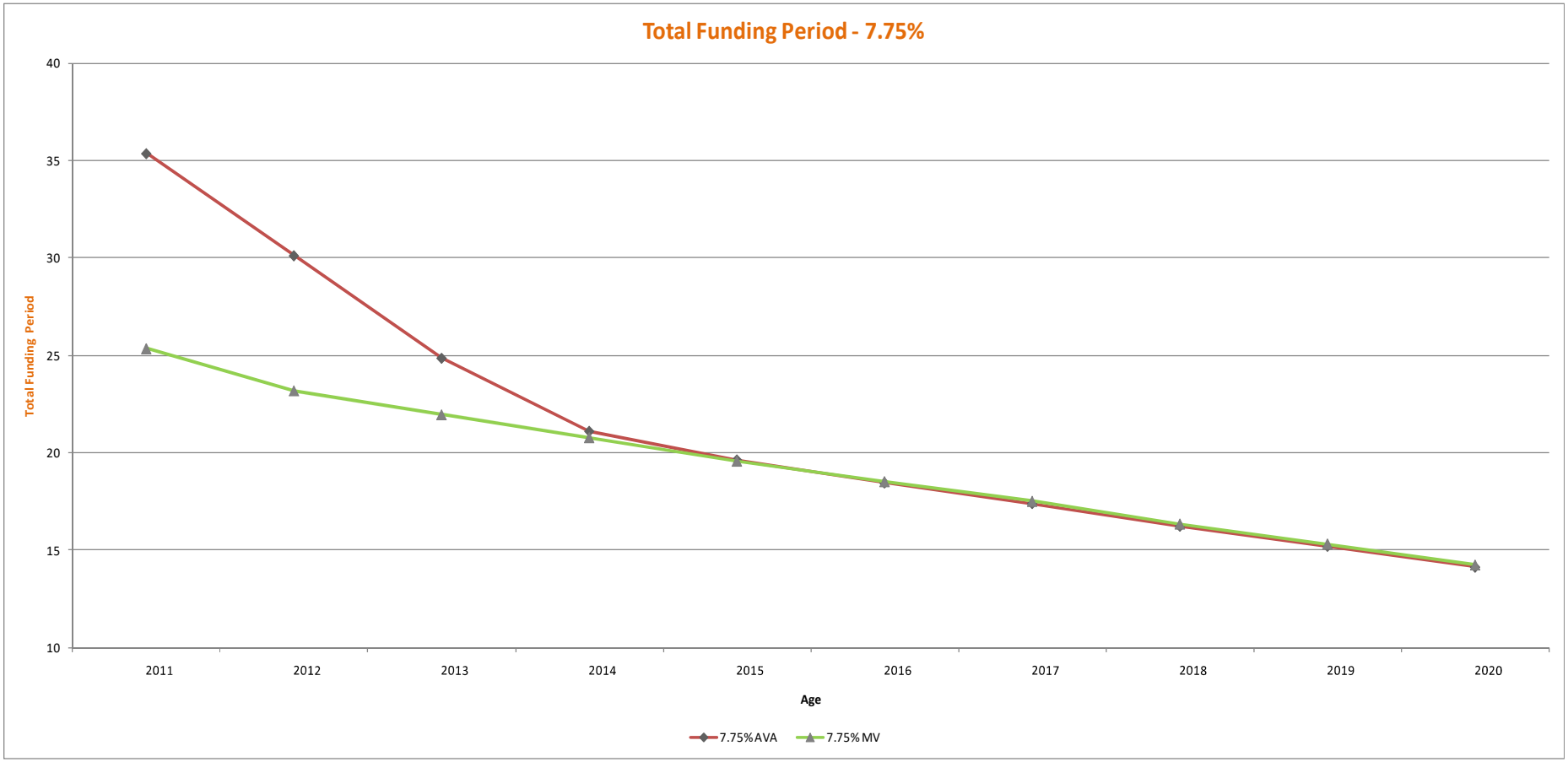
- The table below shows the projection of the total funding period based on 7.50%



Impact on Funding

Impact Projection

- The table below shows the projection of the total funding period based on 7.75%



Experience Study Results

- Introduction
- Demographic Assumptions
  - Mortality
  - Retirement
  - Withdrawal
  - Disability
  - Dependent Assumptions
- Economic Assumptions
  - Inflation
  - Expected Return on Assets
  - Individual Salary Growth
  - Payroll Growth

Introduction

What is an experience study?

- A comparison of the actual demographic and economic experience of a plan to the current assumptions used in the actuarial valuation.

What is the purpose of an experience study?

- To ensure that the the actuarial assumptions used in the annual valuations are:
  - Reflective of the actual demographics and behaviors of the members, to the extent historical experience is measurable and expected to be an indicator of future experience, and
  - Reflective of current market conditions affecting members and their benefits.

How often is an experience study completed?

- Every 3 to 5 years.

Introduction

Are the assumption recommendations based strictly on past experience?

- Past experience is generally combined with expectations about the future for recommending assumptions.
- Past experience tends to be relied upon for setting demographic assumptions (i.e. retirement, withdrawal, disability, death, etc.), provided there is enough historical data to be credible.
  - Known aberrations are removed from the data if they do not reflect the actuary's best estimate of future experience.
- Future expectations tend to be relied upon for setting economic assumptions (i.e. inflation, asset returns, etc.)
  - Expert opinions and observable market data are considered.

Introduction

How is the past experience determined?

- Historical data, including status, age, service, and salary, for several years is collected.
  - PwC collected member census data from STRS staff for the past 3 years (July 1, 2008 – June 30, 2011).
- Past "actual" experience is compared to the "expected" experience based on the current assumptions.
  - The status of each member is tracked throughout the experience period in one-year increments, allowing us to determine the number of expected decrements and actual decrements that occurred during the period.
  - For example, if there were 5,000 members that were age 55 during the experience period ("exposed") and 1,000 of them retired ("decremented"), the retirement experience at age 55 showed 20% likelihood of retirement.
- We also collected current and historical economic data to assist with our review of the economic assumptions.

Introduction

How is the past experience determined ?

- Keep in mind:
  - Setting assumptions is not an exact science. Data is analyzed for patterns and trends that are likely to continue in the future.
  - Assumptions are meant to be long-term expectations.

Were any modifications made to the data during the study?

- The historical data is reviewed to identify:
  - Bad data, such as errors, missing data, outliers, etc.
  - Significant events that could have caused temporary aberrations in the experience.
- Judgment is used to alter the data or weight the experience to best capture representative experience.

Demographic Assumptions – Mortality

Description

- The mortality assumption represents the probability of death and is generally an age and gender based table of rates.
- There are often separate mortality assumptions for:
  - Retirees and beneficiaries versus active and inactive members
  - Healthy members versus disabled members
- The mortality assumption for retirees and beneficiaries determines how long such members are expected to live and collect benefits.
- The mortality assumption for active and inactive members determines the likelihood of dying before retirement and receiving pre-retirement death benefits.

Demographic Assumptions – Mortality

Description

- Mortality has been consistently improving in the U.S. for generations (i.e. people are living longer), though some studies show that the trend is slowing.
  - Mortality assumptions that include projections of future mortality improvement are very common. This avoids the need to periodically update the assumption, which creates actuarial losses.
  - A fully generational table could create administrative complexity for STRS Ohio staff if internal benefit calculations would need to be updated annually.

Demographic Assumptions – Mortality

Current Assumption

- Current STRS Ohio healthy lives mortality assumption:
  - The RP 2000 Combined Mortality Table Projected to 2018 by Scale AA.
  - Males ages are set-back 2 years.
  - Females younger than 85 are set back 3 years , while females age 85 or older are set back 2 years.
- The RP 2000 Mortality Table is an industry standard table that is based on nationwide experience.
- Projection beyond 2000 to 2018 reflects expected future improvements in mortality since 2000.

Demographic Assumptions – Mortality

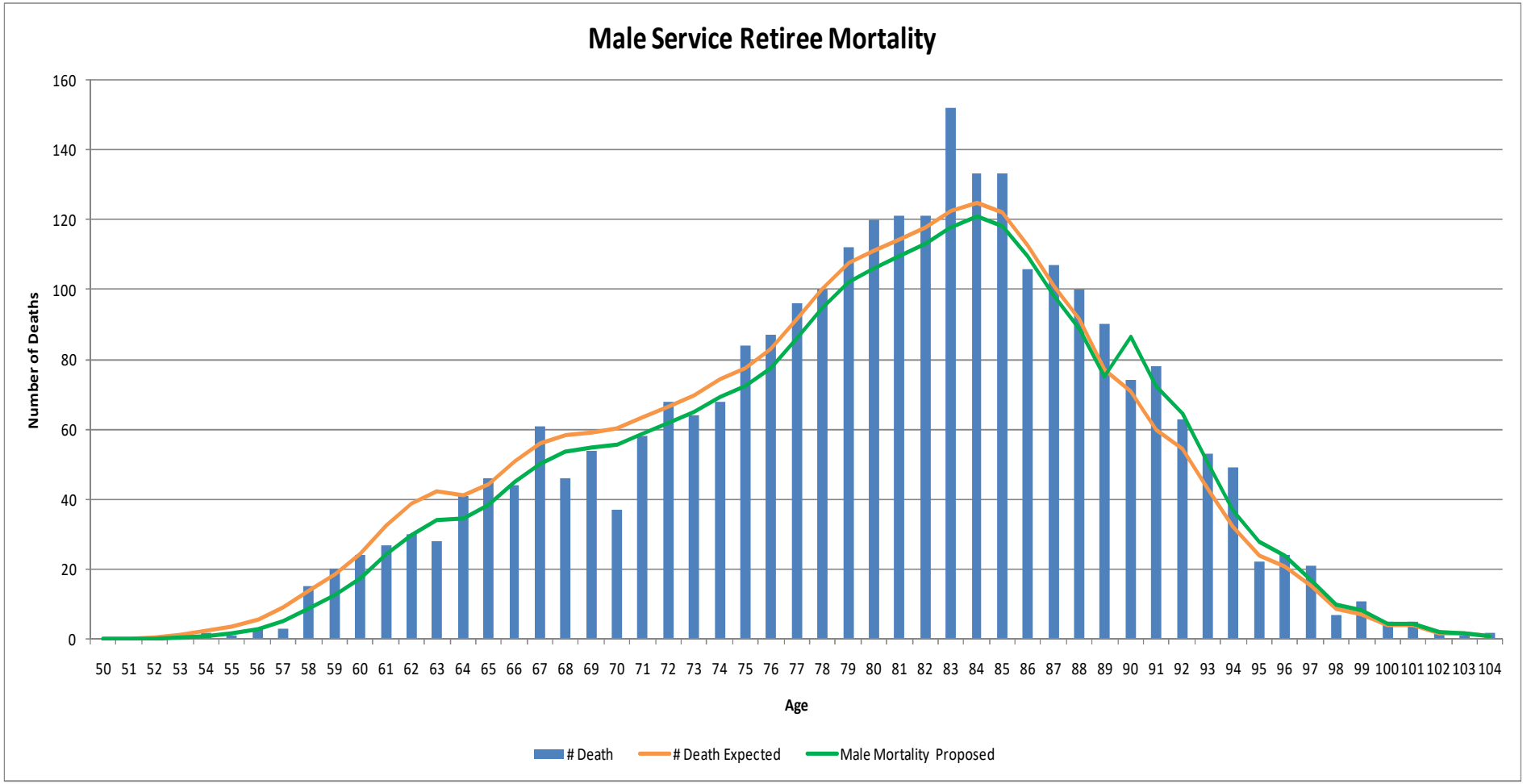
Current Assumption

- Having a *Combined* table refers to establishing one table which combines experience of annuitants and non-annuitants into one table rather than having separate tables for annuitants and non-annuitants.
  - The combined table includes adjustments at earlier ages to reflect the fact that many younger members are actively employed.
- Set-backs, set-forwards and multipliers are methods for adjusting a standard table to more closely match experience.
  - A 2-year set back means the assumed rate of mortality for a 60 year old male member is assumed to be that of a 58 year old male member.
- Special mortality tables are used for the period after disability retirement.

Demographic Assumptions – Mortality

Experience and Analysis

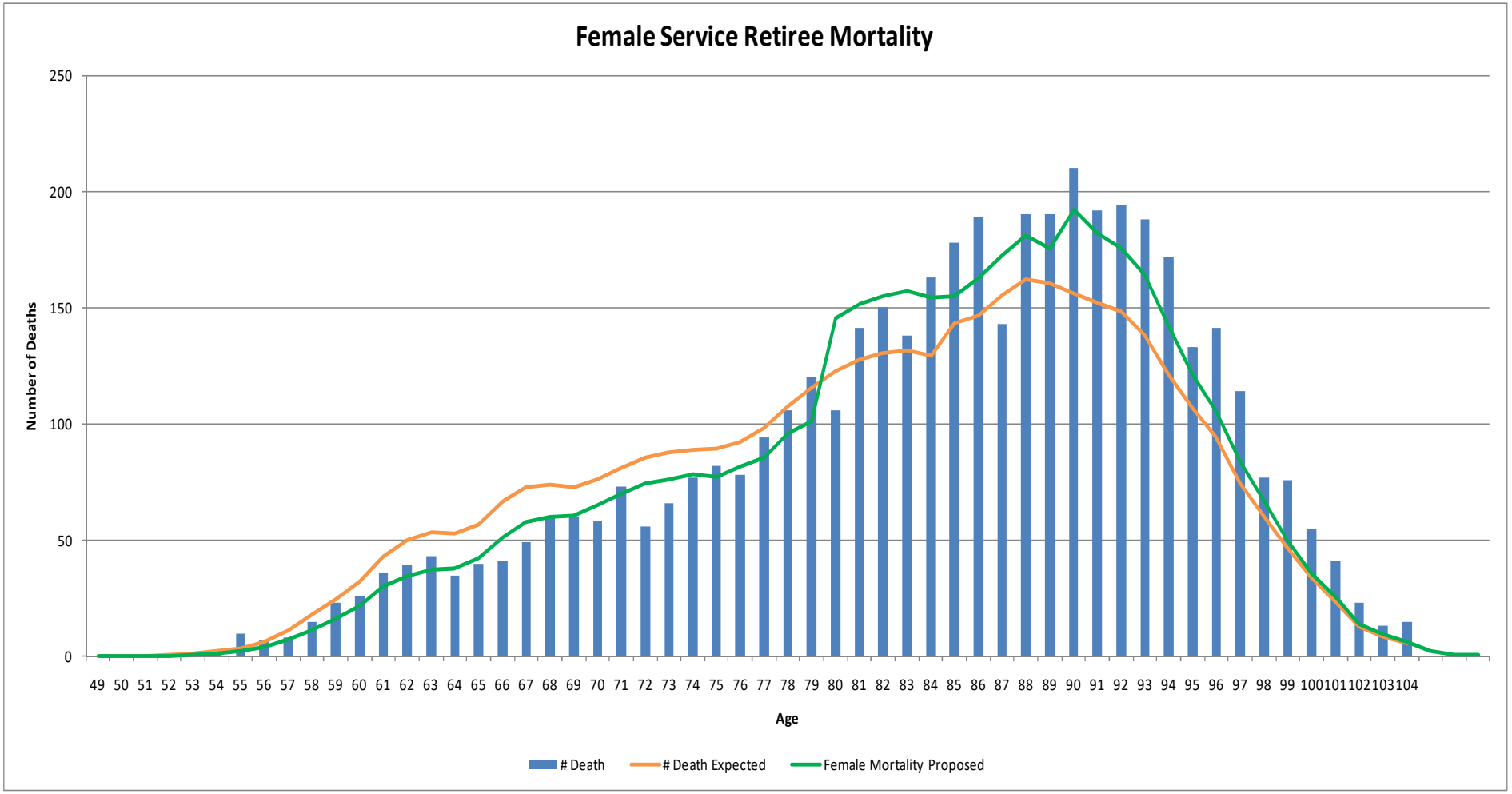
Service Retiree Mortality - Male



Demographic Assumptions – Mortality

Experience and Analysis

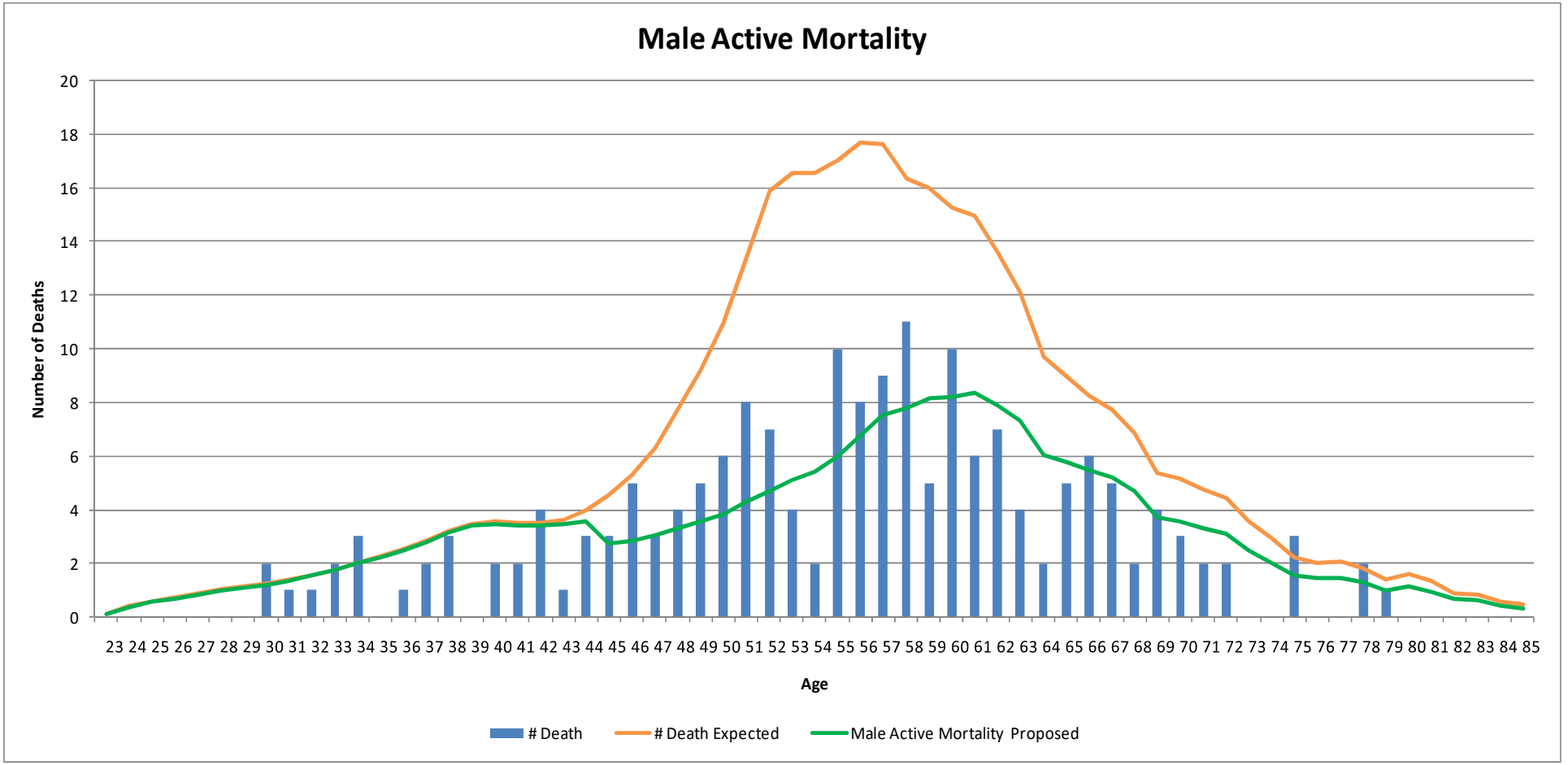
Service Retiree Mortality - Female



Demographic Assumptions – Mortality

Experience and Analysis

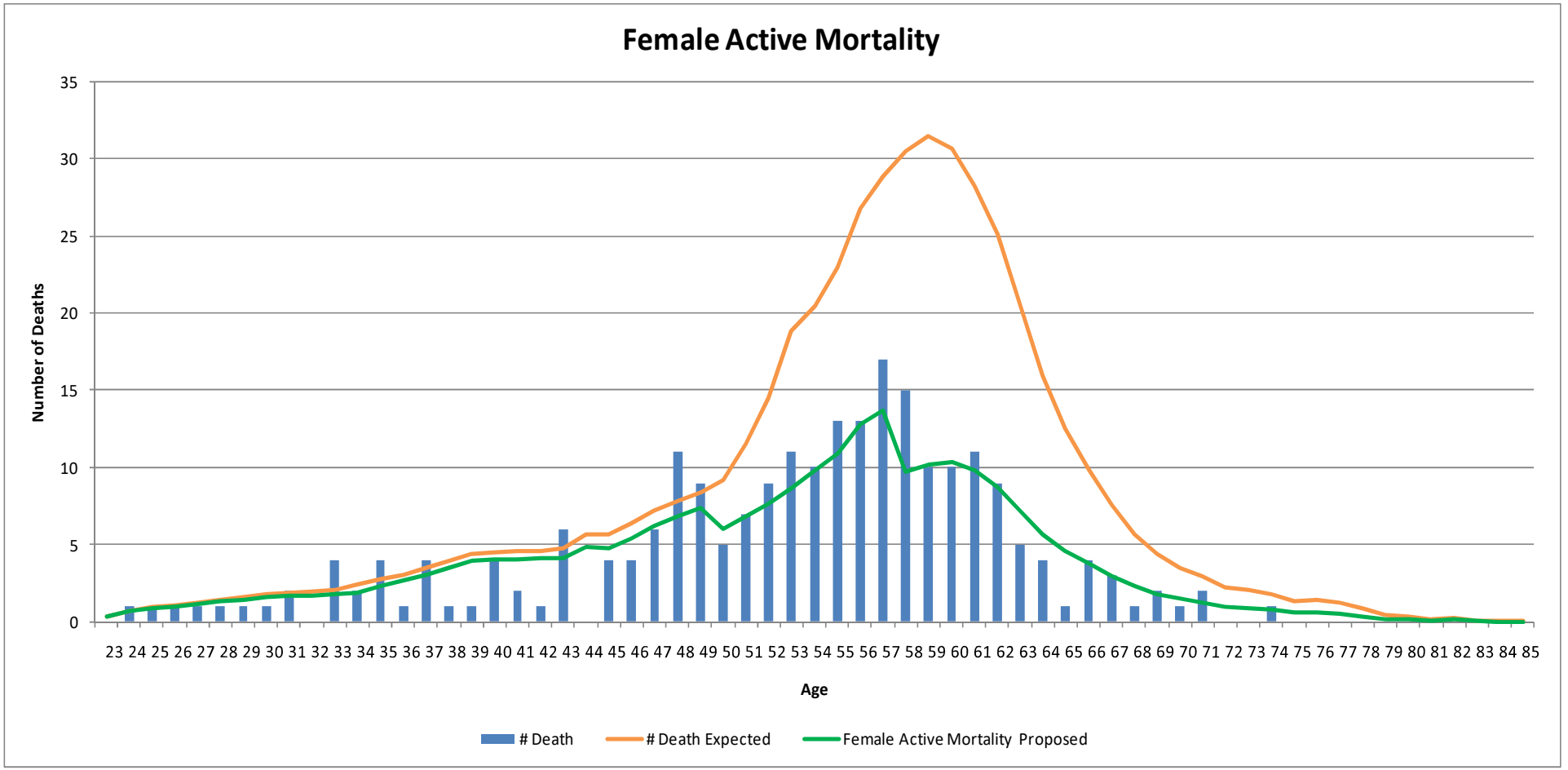
Male Active



Demographic Assumptions – Mortality

Experience and Analysis

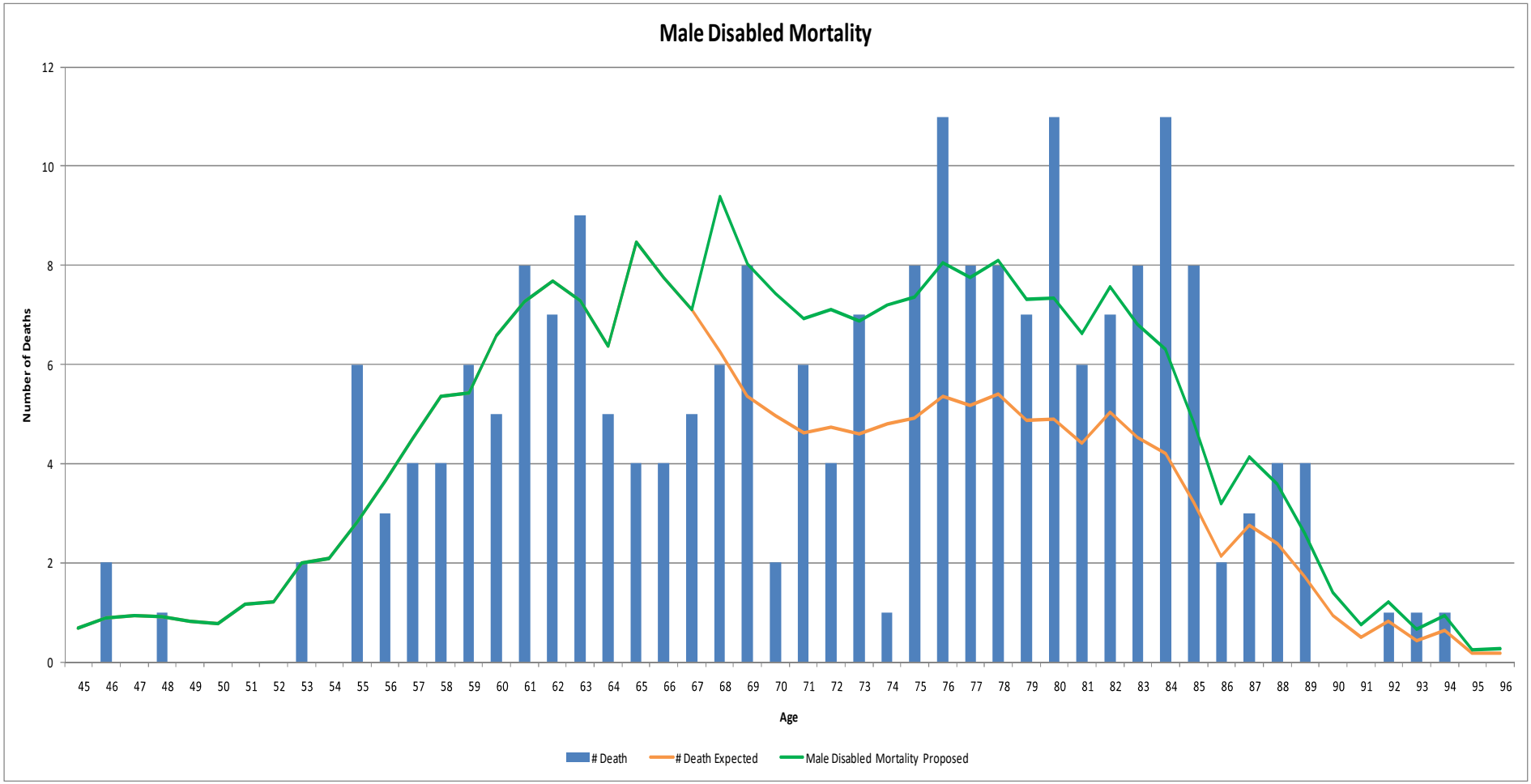
Female Active



Demographic Assumptions – Mortality

Experience and Analysis

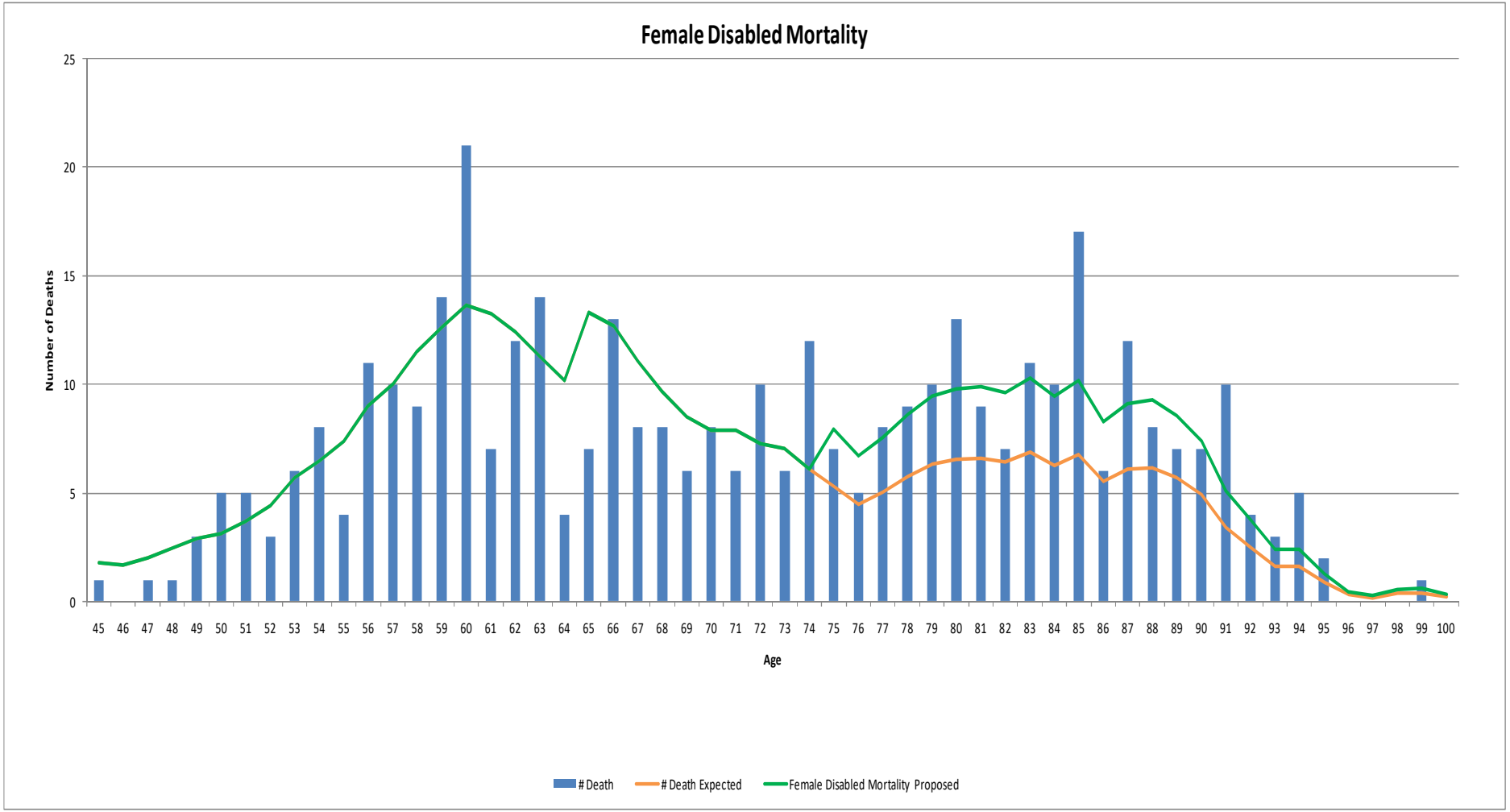
Disabled Mortality Male



Demographic Assumptions – Mortality

Experience and Analysis

Disabled Mortality Female



Demographic Assumptions – Mortality

Summary

- Actual post-retirement healthy mortality experience for males is close to expected.
- For females, actual post-retirement mortality at younger ages is less than expected and at older ages is more than expected.
- Actual pre-retirement mortality, for both males and females, is significantly less than expected.
- Actual disabled mortality is more than expected at older ages.
- The mortality assumptions should continue to factor future improvements in mortality.

Demographic Assumptions – Mortality

Recommendations

- Update to the RP 2000 Combined Mortality Table projected to 2022 (maintain 10 year mortality improvement projection).
- Post-retirement Healthy Mortality:
  - Male retirees – continue with 2 year age set-back up to age 90
  - Female retirees – change age set-backs:
    - Females younger than age 80 are set-back 4 years (as compared to current assumption of 3 year age setback)
    - Females age 80 to 89 are set-back 1 year (as compared to current assumption of 2/3 year age setbacks)
  - Males and females age 90 or older, no setback (as compared to current assumptions of 2 year age setback)
- Use same mortality assumptions for beneficiaries.

Demographic Assumptions – Mortality

Recommendations

- Pre-retirement healthy mortality (for actives and inactives) requires updating to align expected mortality with actual mortality (actual deaths were less than expected).
  - Use the same mortality table as for post-retirement with the following adjustments.:
    - Males: Rates for ages 45 and above are reduced 25%.
    - Females: Rates are reduced 25% from ages 50 – 57 and reduced 50% thereafter.
- Disability Mortality:
  - Mortality for older ages should be increased.
  - Mortality rates for males age 68 and above and females age 75 and above are increased by 50%.
- Use same mortality assumptions for the Combined Plan.

Demographic Assumptions – Retirement

Description

- The retirement assumption is used to estimate the timing of retirement.
- Retirement assumptions are generally based on age and service to reflect the eligibility requirements for retirement.
- Retirement assumptions may also be sex distinct even though the same retirement incentives apply to both males and females.

Demographic Assumptions – Retirement

Description

- The eligibility for, and value of, retirement benefits depend on a member's age and service at retirement.
  - Members of STRS Ohio Defined Benefit Plan are eligible for retirement benefits at:
    - Age 60 with 5 years of service, or
    - Age 55 with 25 years of service, or
    - 30 years of service regardless of age.
  - Members receive reduced benefits if have less than 30 years of service and are younger than age 65.
  - The retirement formula multiplier is increased for members with 31 or more years of Ohio contributing service or if have 35 or more years of service credit.

Demographic Assumptions – Retirement

Current Assumption

Males

Retirement Rates - Male Rates			
Age	Under 25 Years of Service	25-29 Years of Service	30-34 Years of Service	35 or More Years of Service
52	0 %	0 %	20 %	40 %
53	0	0	15	40
54	0	0	14	60
55	0	18	12	60
56	0	6	14	60
57	0	6	14	55
58	0	6	15	50
59	0	6	16	45
60	13	9	15	45
61	7	9	15	40
62	7	8	15	35
63	7	8	10	30
64	9	14	10	30
65	17	20	10	30
66	15	20	10	30
67	12	15	10	25
68	12	15	10	20
69	12	15	10	20
70	12	15	10	20
71	12	15	10	20
72	12	15	10	20
73	12	15	10	20
74	12	15	10	20
75	100	100	100	100

Demographic Assumptions – Retirement

Current Assumption

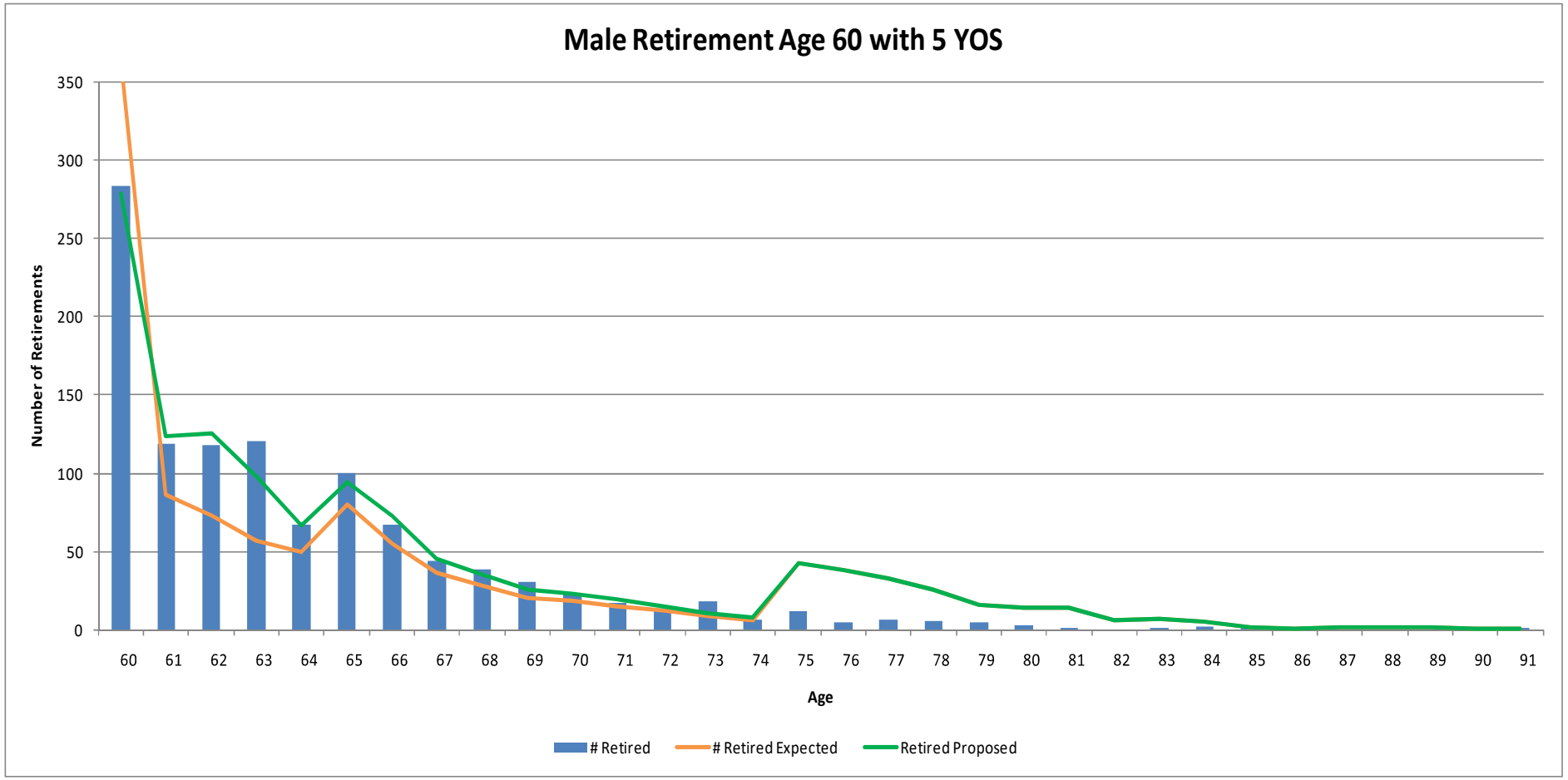
Females

Retirement Rates - Female Rates							
Age	Under 25 Years of Service		25-29 Years of Service		30-34 Years of Service		35 or More Years of Service	
52	0	%	0	%	20	%	80	%
53	0		0		15		50	
54	0		0		12		50	
55	0		14		12		50	
56	0		9		15		50	
57	0		9		15		50	
58	0		9		15		40	
59	0		13		20		40	
60	22		15		25		40	
61	9		15		25		40	
62	9		15		25		45	
63	9		15		25		45	
64	15		30		25		45	
65	20		32		25		45	
66	13		22		25		40	
67	13		20		25		35	
68	12		20		15		35	
69	12		20		15		35	
70	12		20		15		35	
71	12		20		15		35	
72	12		20		15		35	
73	12		20		15		35	
74	12		20		15		35	
75	100		100		100		100	

Demographic Assumptions – Retirement

Experience and Analysis

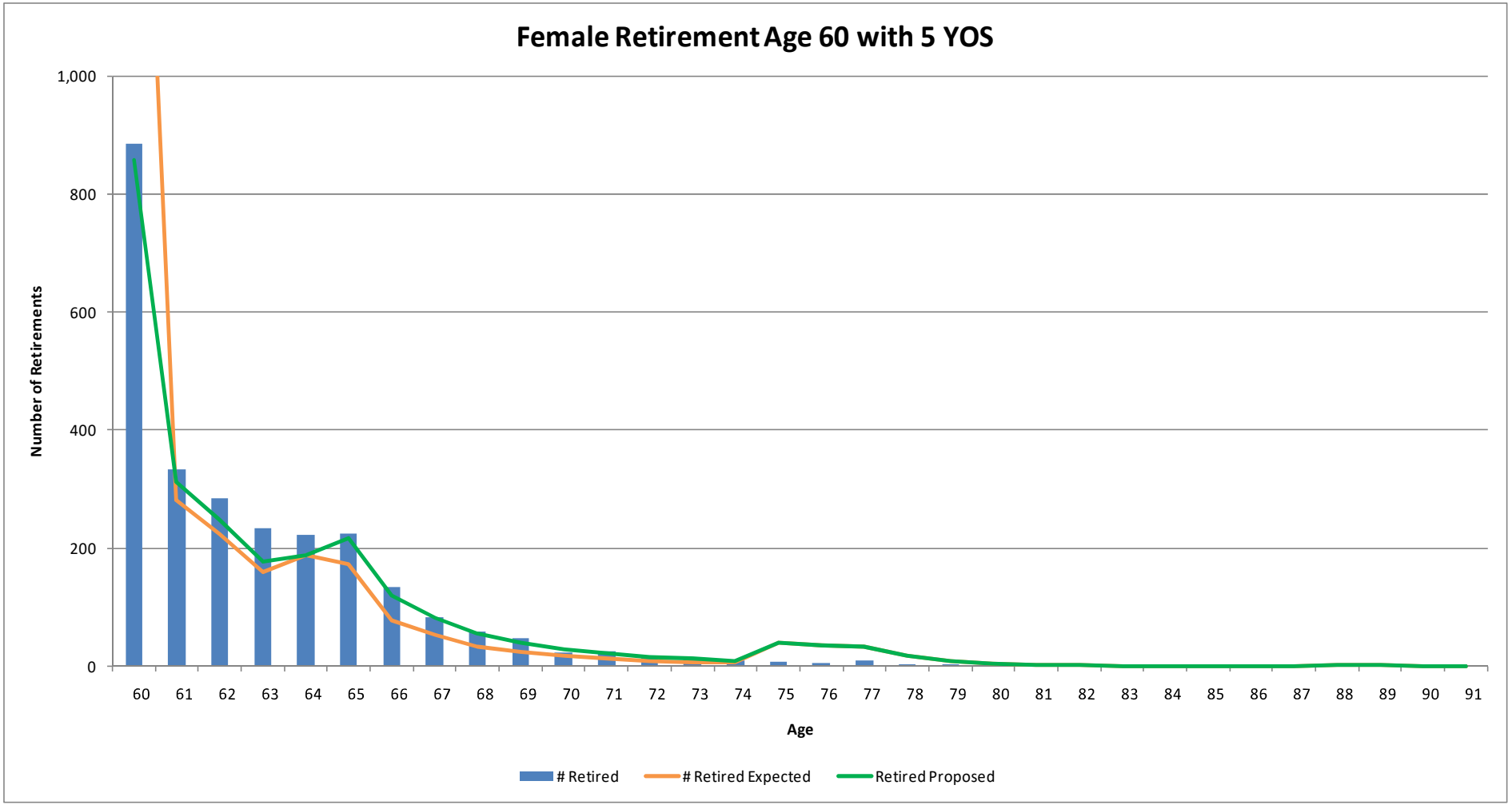
Service Retirement – Male Age 60 with 5 Years of Service



Demographic Assumptions – Retirement

Experience and Analysis

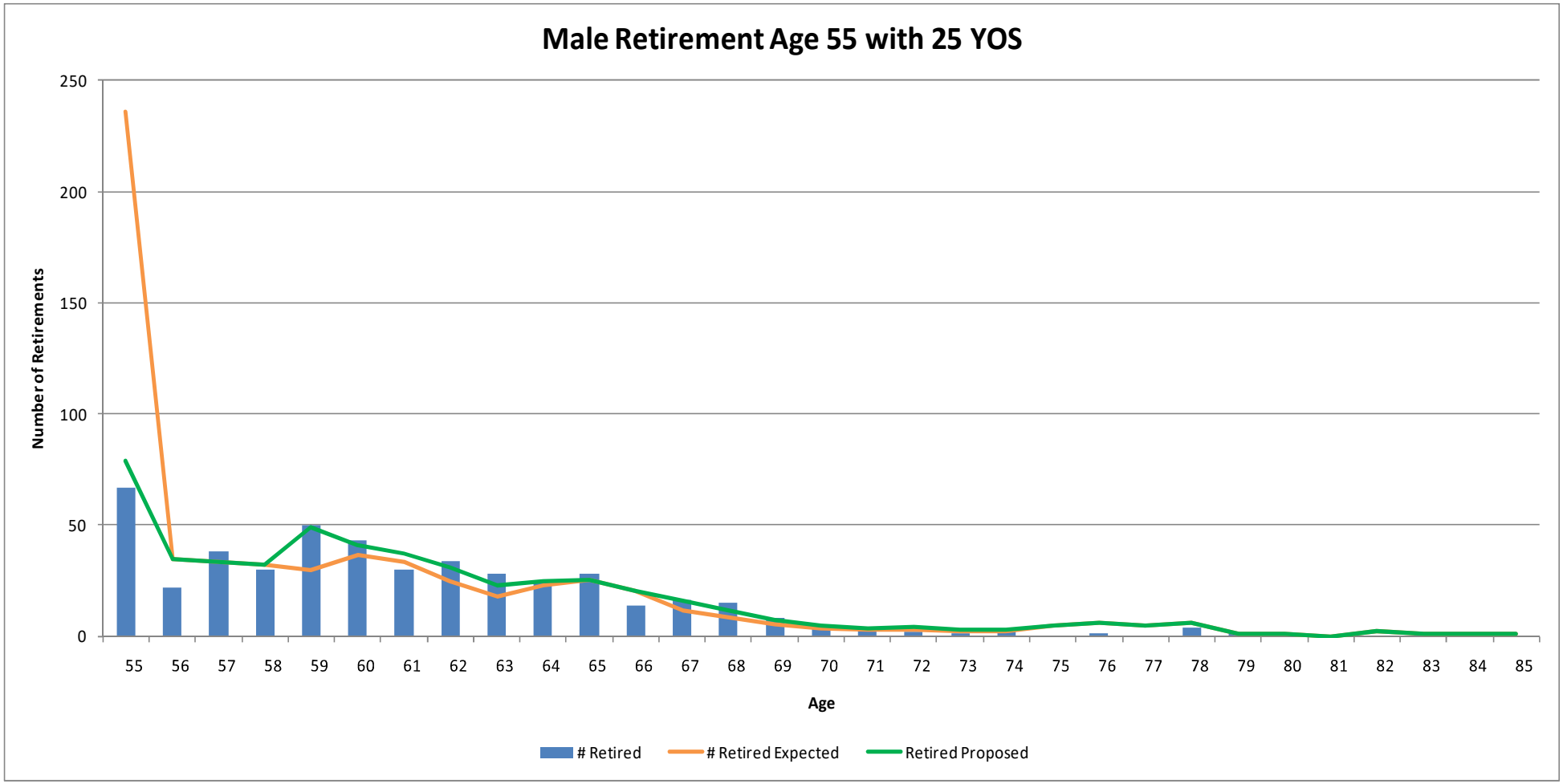
Service Retirement – Female Age 60 with 5 Years of Service



Demographic Assumptions – Retirement

Experience and Analysis

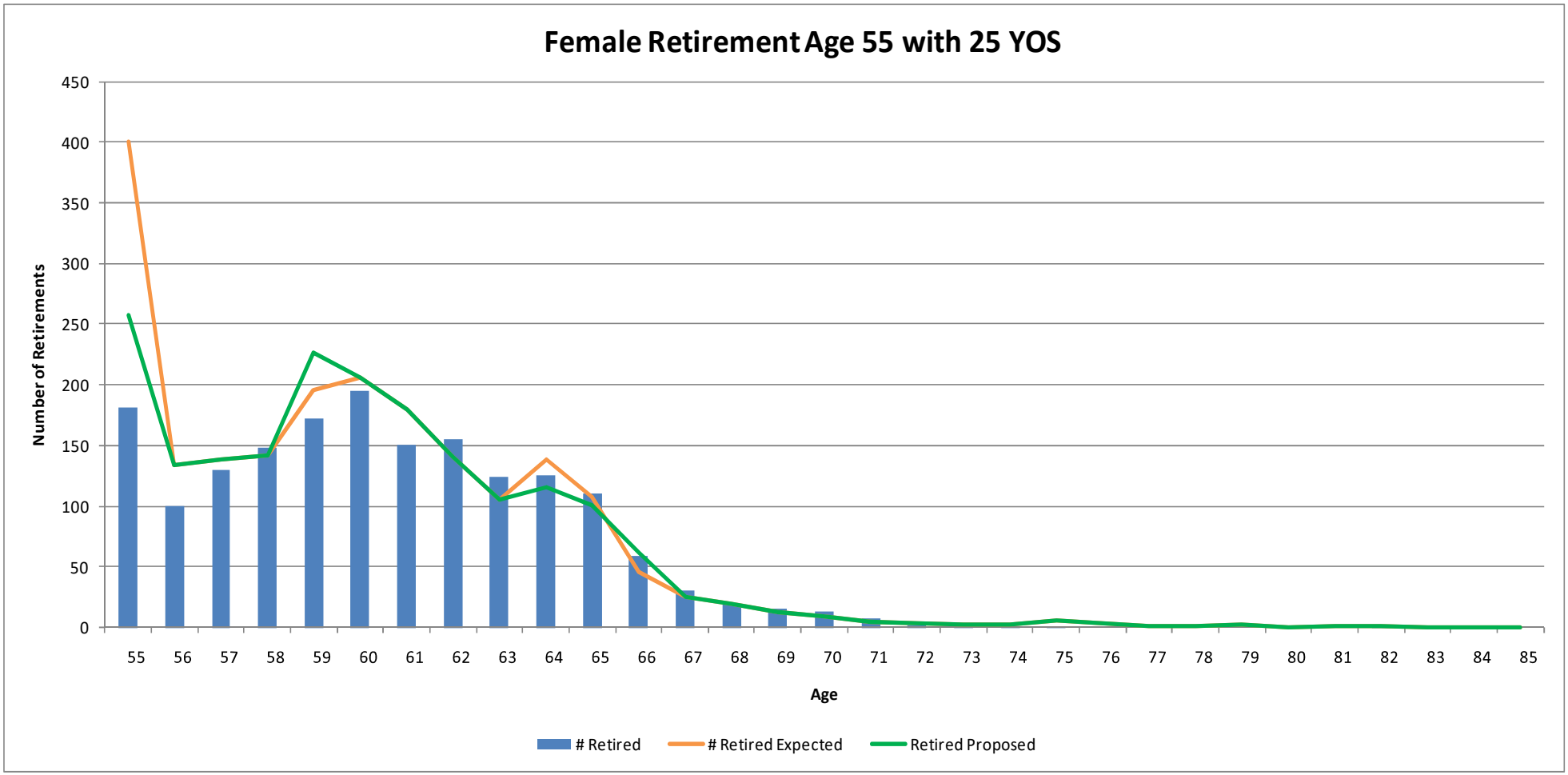
Service Retirement – Male Age 55 with 25 Years of Service



Demographic Assumptions – Retirement

Experience and Analysis

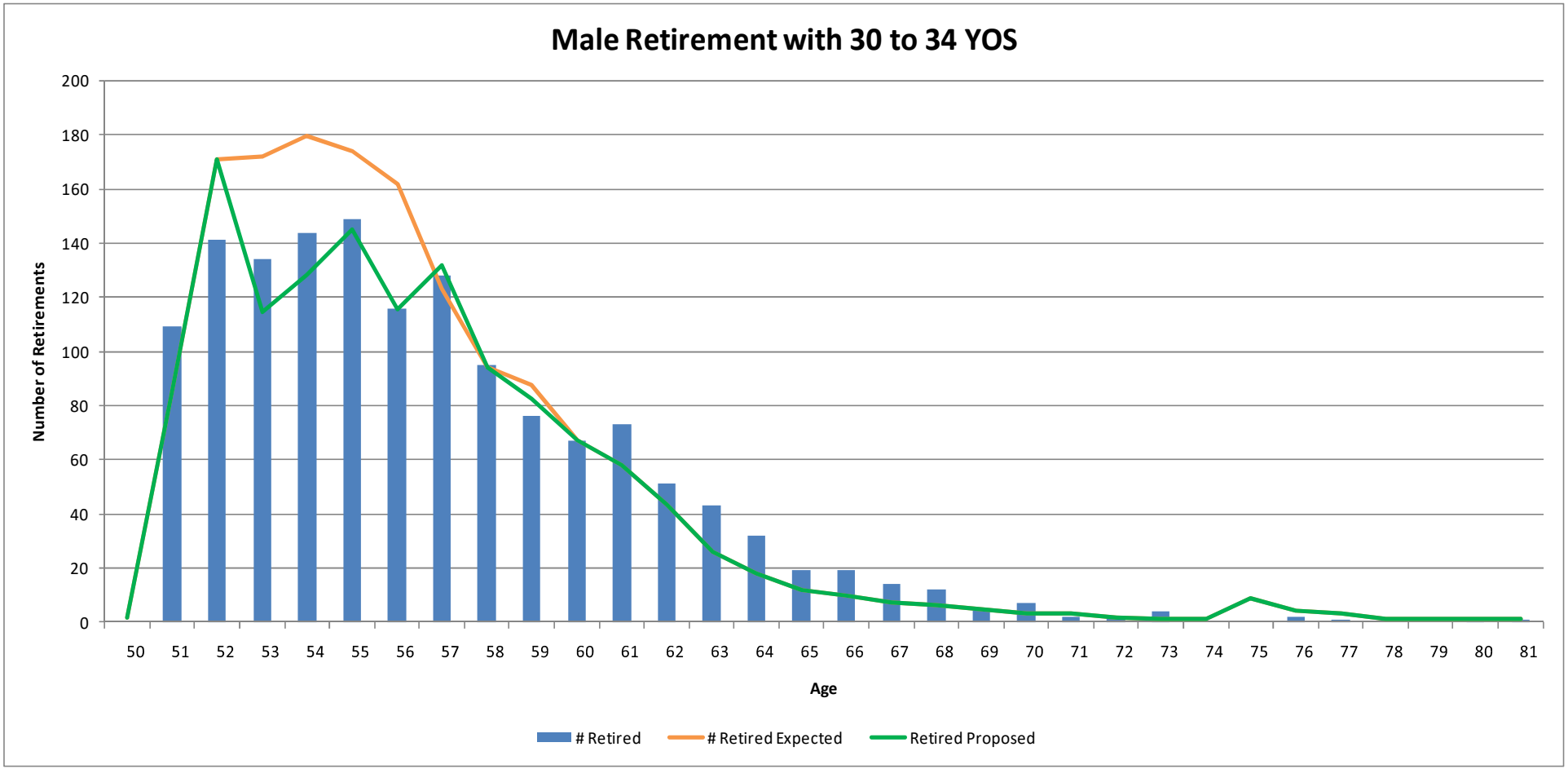
Service Retirement – Female Age 55 with 25 Years of Service



Demographic Assumptions – Retirement

Experience and Analysis

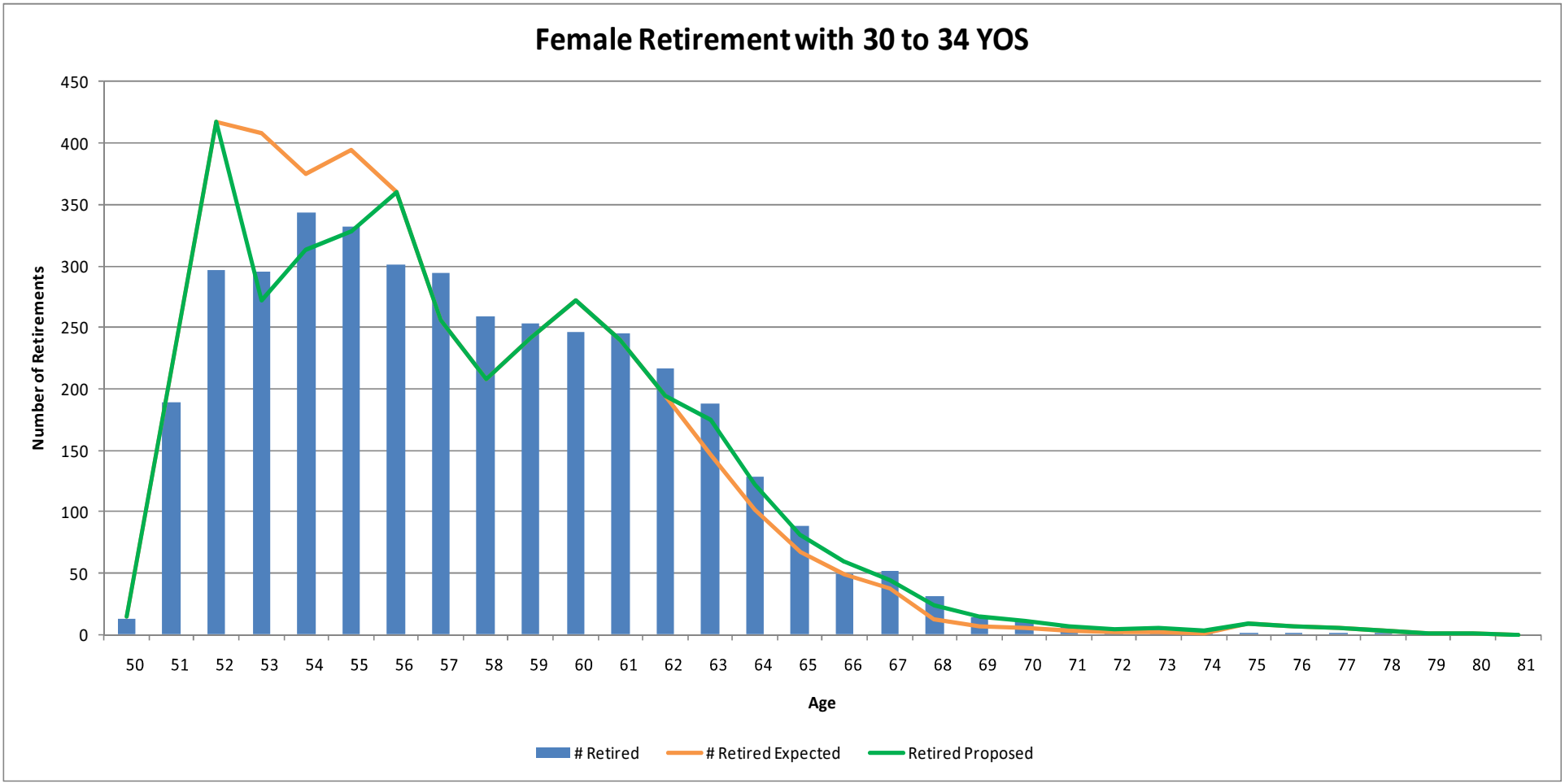
Service Retirement – Male with 30 – 34 Years of Service



Demographic Assumptions – Retirement

Experience and Analysis

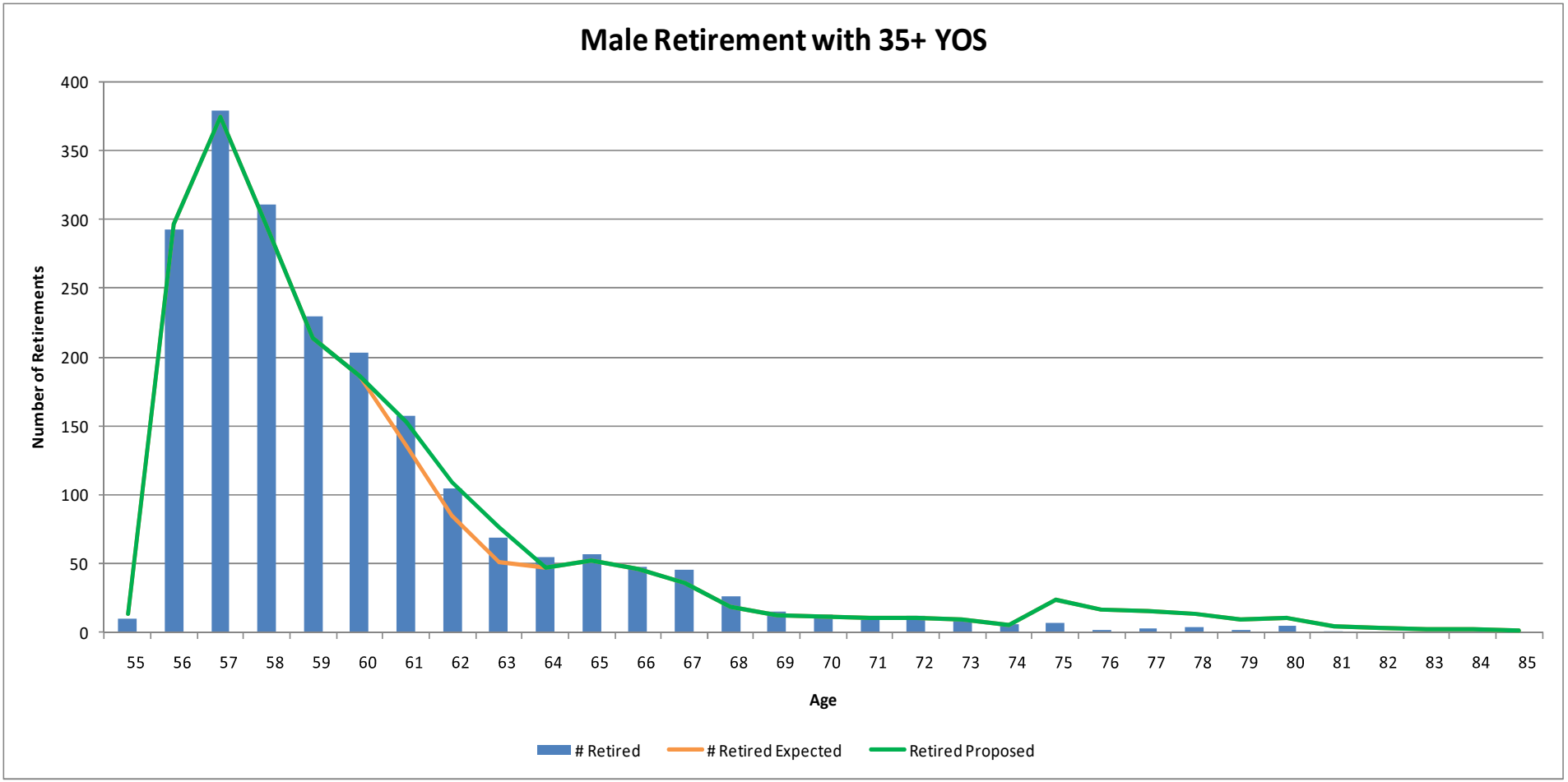
Service Retirement – Female with 30 - 34 Years of Service



Demographic Assumptions – Retirement

Experience and Analysis

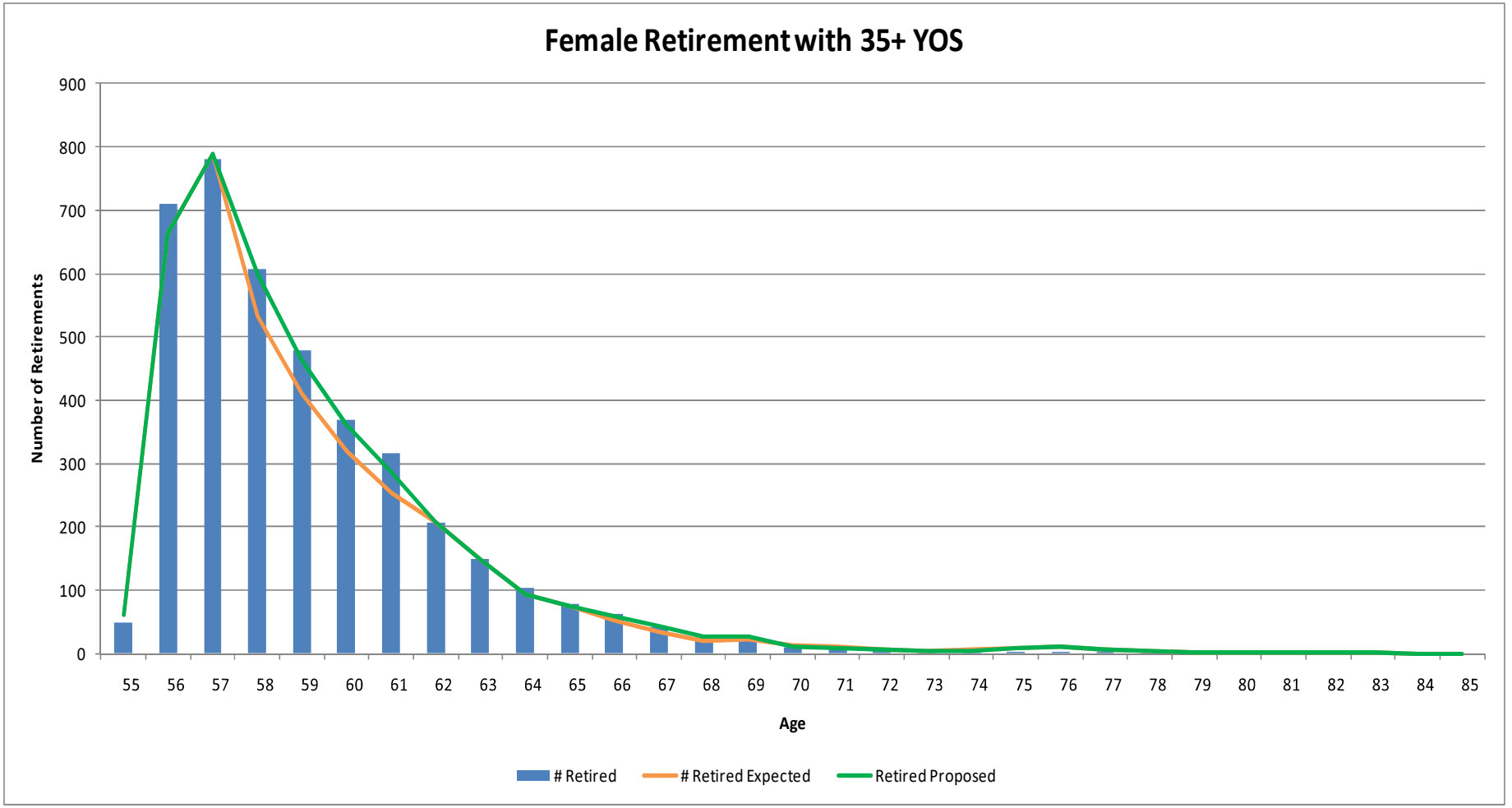
Service Retirement – Male with 35 or More Years of Service



Demographic Assumptions – Retirement

Experience and Analysis

Service Retirement – Female with 35 or More Years of Service



Demographic Assumptions – Retirement

Summary

- As expected, participants are waiting until they complete 35 years of service before retiring:
  - Only 15% of persons eligible to retire with less than 35 years of service do so.
  - Whereas, 47% of participants eligible to retire with 35 years of service do so.
- Actual retirements when first eligible at age 60 with 5 years of service and at age 55 with 25 years of service less than expected. Not observing as large a spike in retirement as expected.
- For participants eligible to retire with 30 years of service – less retirements than expected prior to age 57 and more retirements than expected for females above age 63.

Demographic Assumptions – Retirement

Summary

- For participants eligible to retire with 35 or more years of service – slightly more retirements than expected between the ages of 58 – 69 for both males and females.

Demographic Assumptions – Retirement

Recommendations

- For participants eligible to retire at age 60 with 5 years of service – decrease expected retirement at age 60 and increase expected retirements slightly after age 60.
  - Apply these same rates for the Combined Plan.
- For participants eligible to retire at age 55 with 25 years of service - decrease expected retirement at age 55 and make minor adjustments to expected rates at later ages.
- For participants eligible to retire with 30 years of service - decrease expected retirement for ages prior to 55 and make minor adjustments to expected rates at later ages.
- For participants eligible to retire with 35 years of service - make minor adjustments to table.
- See Appendix A for a complete list of current and proposed retirement rates.

Demographic Assumptions – Retirement

Recommendations

- Proposed Plan:
  - Expected retirement rates applied to the proposed plan differ from the expected retirement rates applied to the current plan to reflect the different retirement patterns expected under the new plan. However, the expected retirement rates for the current plan were used as the underlying basis for establishing the expected retirement rates for the proposed plan.
  - Therefore, the expected retirement rates used previously for the proposed plan have been updated, where necessary, to reflect the recommended changes listed above.

Demographic Assumptions – Withdrawal

Description

- The withdrawal assumption is used to estimate the number of members that will terminate membership prior to retirement eligibility for all causes other than death or disability.
- In general, employees are more likely to withdraw early in their careers before they are vested in their retirement benefits.
  - Withdrawal assumptions are often based on age and/or service
- The withdrawal patterns of males and females can be different for various reasons, so actuarial assumptions are often sex distinct.

Demographic Assumptions – Withdrawal

Description

- STRS Ohio members who withdraw prior to vesting (five years of service) receive a refund of the contributions they paid into the system.
- STRS members who withdraw after vesting, but before retirement eligibility, have the choice of :
  1. Taking a refund of their contributions and forfeiting the vested retirement annuity benefit that is payable at retirement age, or
  2. Leaving their contributions in the fund and receiving a lifetime annuity benefit when they reach retirement age/eligibility.

Demographic Assumptions – Withdrawal

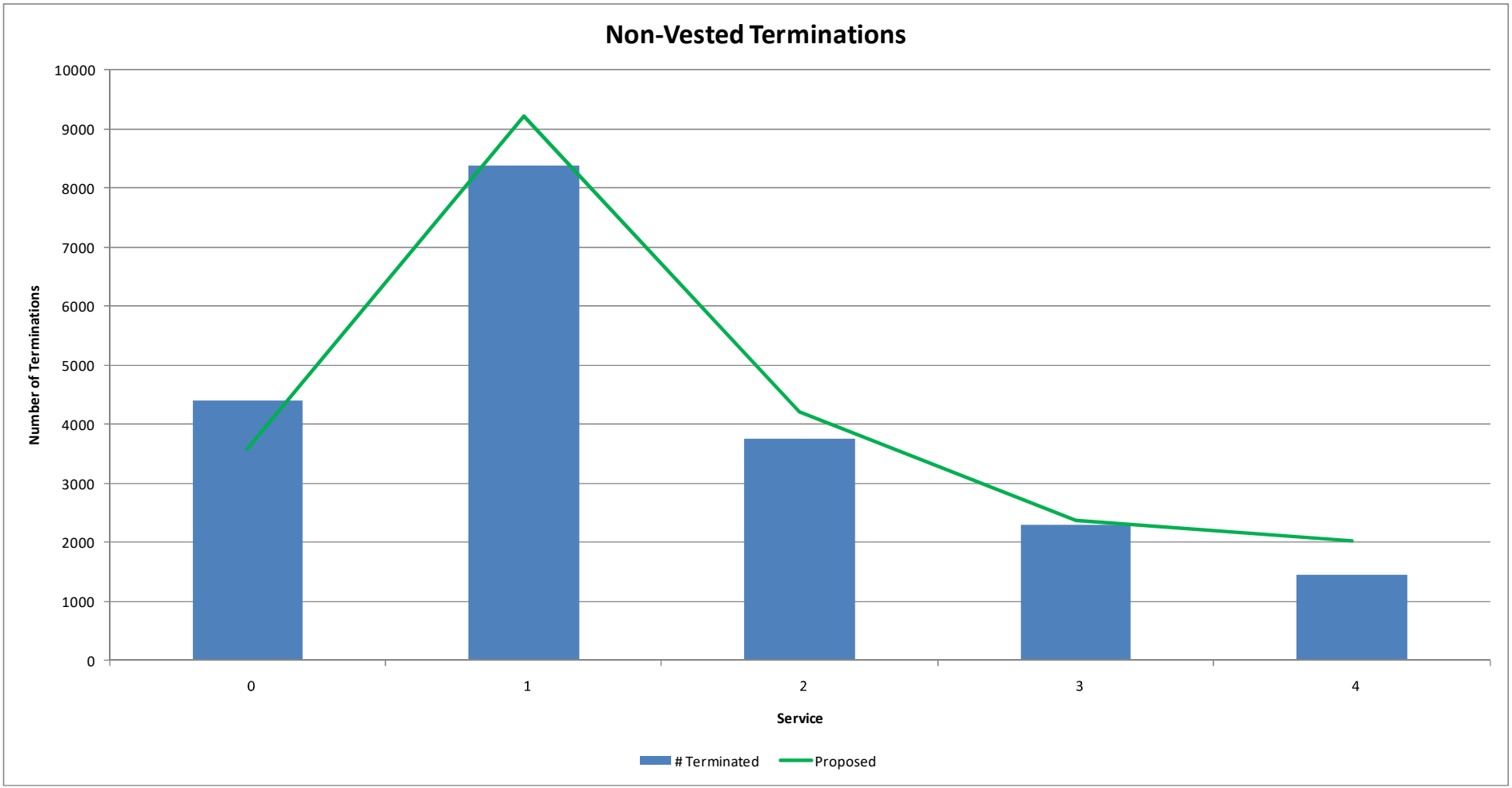
Current Assumption

	Non-Vested		Vested	
Age	Male	Female	Male	Female
20	24.70 %	19.50 %	15.00 %	20.00 %
25	13.60	9.99	15.00	19.00
30	12.75	9.99	3.20	6.40
35	14.50	11.75	2.61	3.60
40	13.75	9.00	2.16	2.25
45	13.40	9.00	1.90	1.80
50	13.40	9.00	1.80	2.00
55	13.40	9.00	1.80	2.40
60	13.40	7.25	1.80	2.40
65	13.40	7.25	0.00	0.00

Demographic Assumptions – Withdrawal

Experience and Analysis

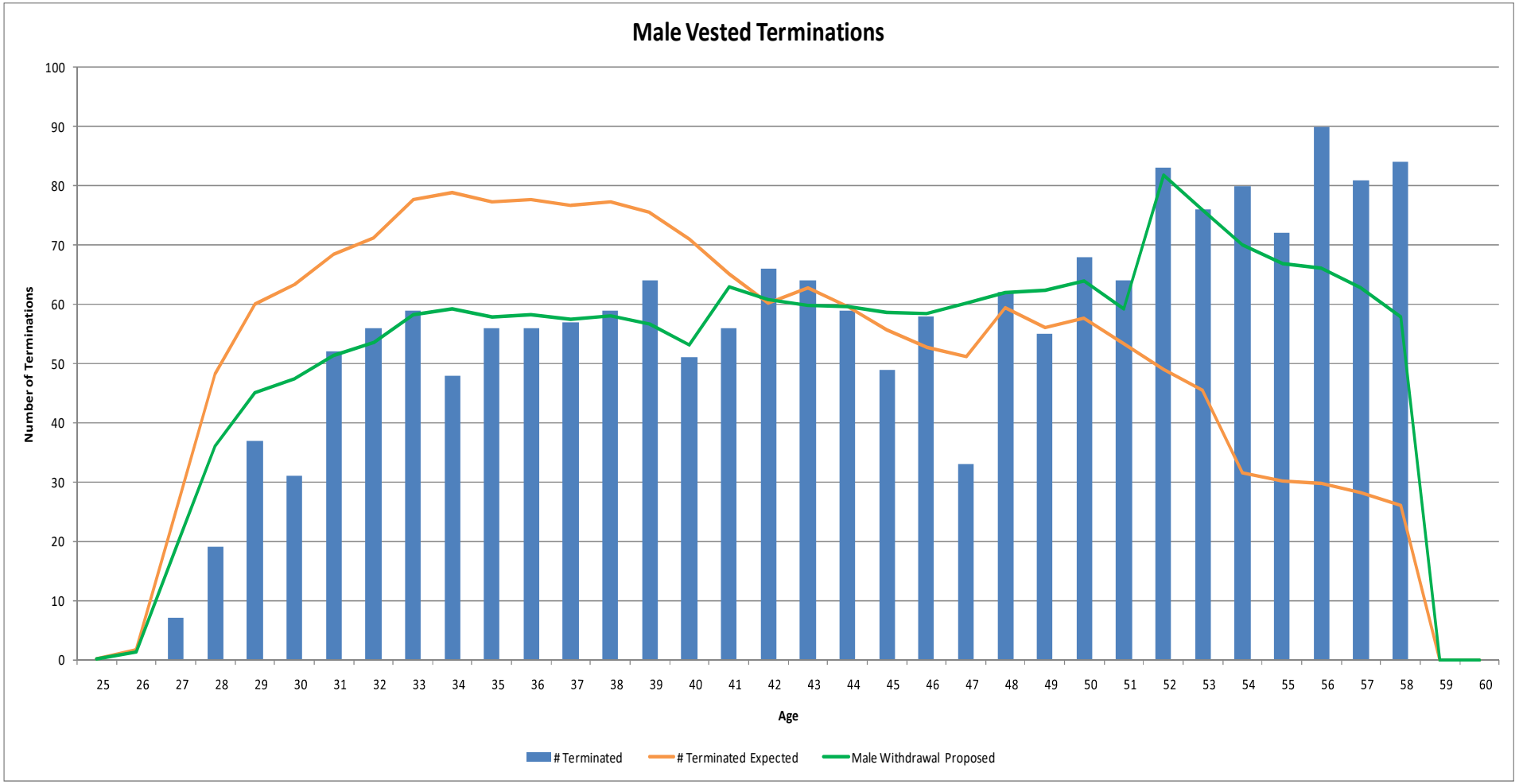
Non-Vested Terminations - Years of Service



Demographic Assumptions – Withdrawal

Experience and Analysis

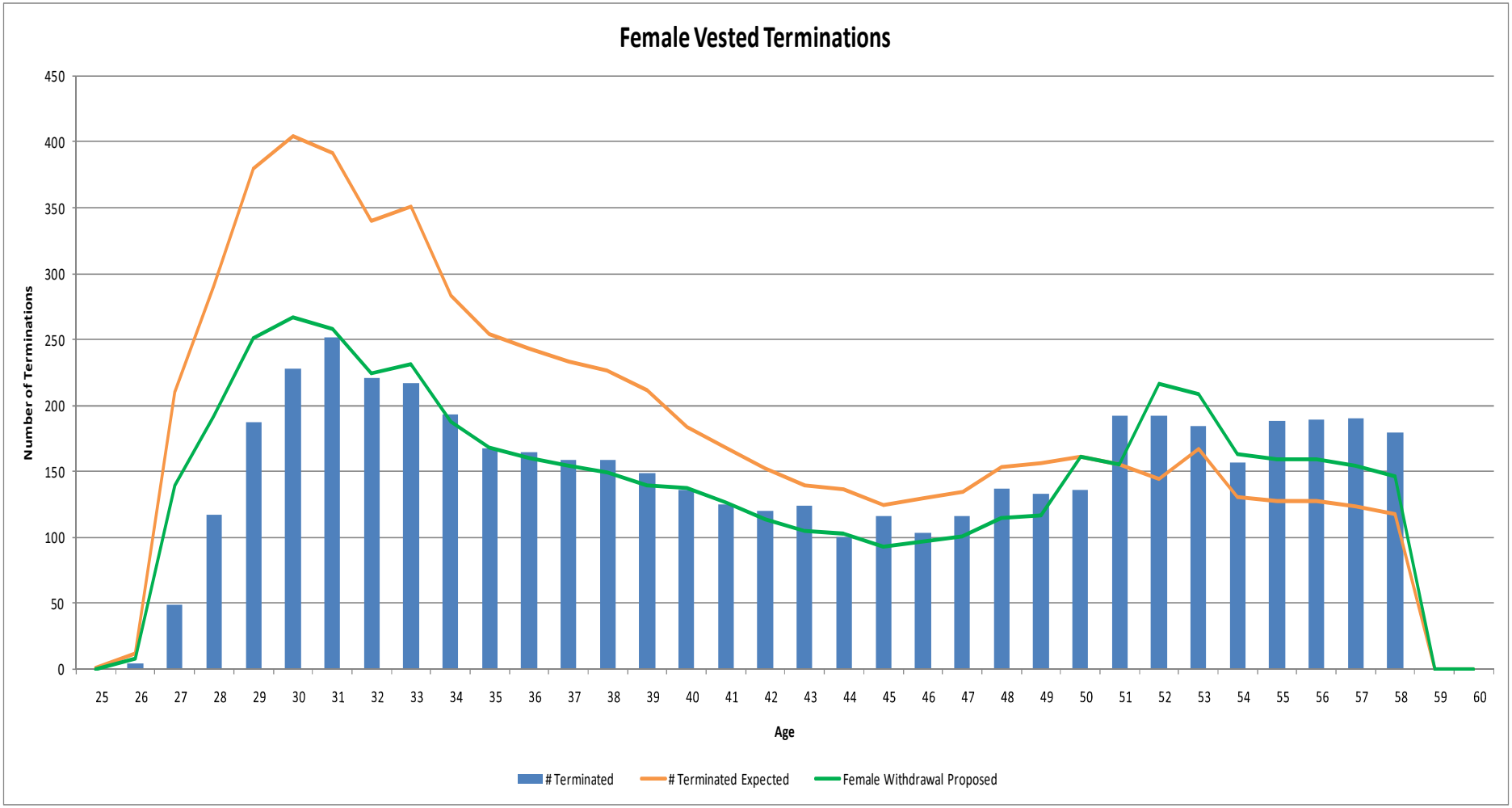
Vested Termination Males



Demographic Assumptions – Withdrawal

Experience and Analysis

Vested Termination Females



Demographic Assumptions – Withdrawal

Summary

- For non-vested terminations overall withdrawal rates did not seem to vary as much by age as by service. In addition, there were clear differences based on years of service.
- Withdrawal for vested terminations significantly less than expected at younger ages (males age 45 and females age 50).

Demographic Assumptions – Withdrawal

Recommendations

- Implement rates based on service for participants with less than 5 years of service.
  - 35% expected to terminate in the first year of employment
  - 25% in the second year of employment
  - 15% in the third year of employment
  - 10% in the fourth and fifth years of employment
- The change from age-based to service-based withdrawal assumptions, for participants with less than 5 years of service, is because we have observed that in certain professions, such as teaching, employees who leave the profession before retirement tend to do so very early in their careers, regardless of age.

Demographic Assumptions – Withdrawal

Recommendations

- Decrease expected withdrawal rates for participants with 5 or more years of service at the younger ages (males less than age 45 and females less than age 50).
- Increase expected withdrawal rates for males age 45 or older and females age 50 or older.
- Apply the same rates for the Combined Plan.
- See Appendix A for a complete list of current and proposed withdrawal rates.

Demographic Assumptions – Disability

Description

- The disability assumption is used to estimate the number of members that will terminate employment prior to retirement eligibility due to a disability.
- In general, disability assumptions tend to be age-based and sex distinct.
  - The likelihood of disability grows with age.

Demographic Assumptions – Disability

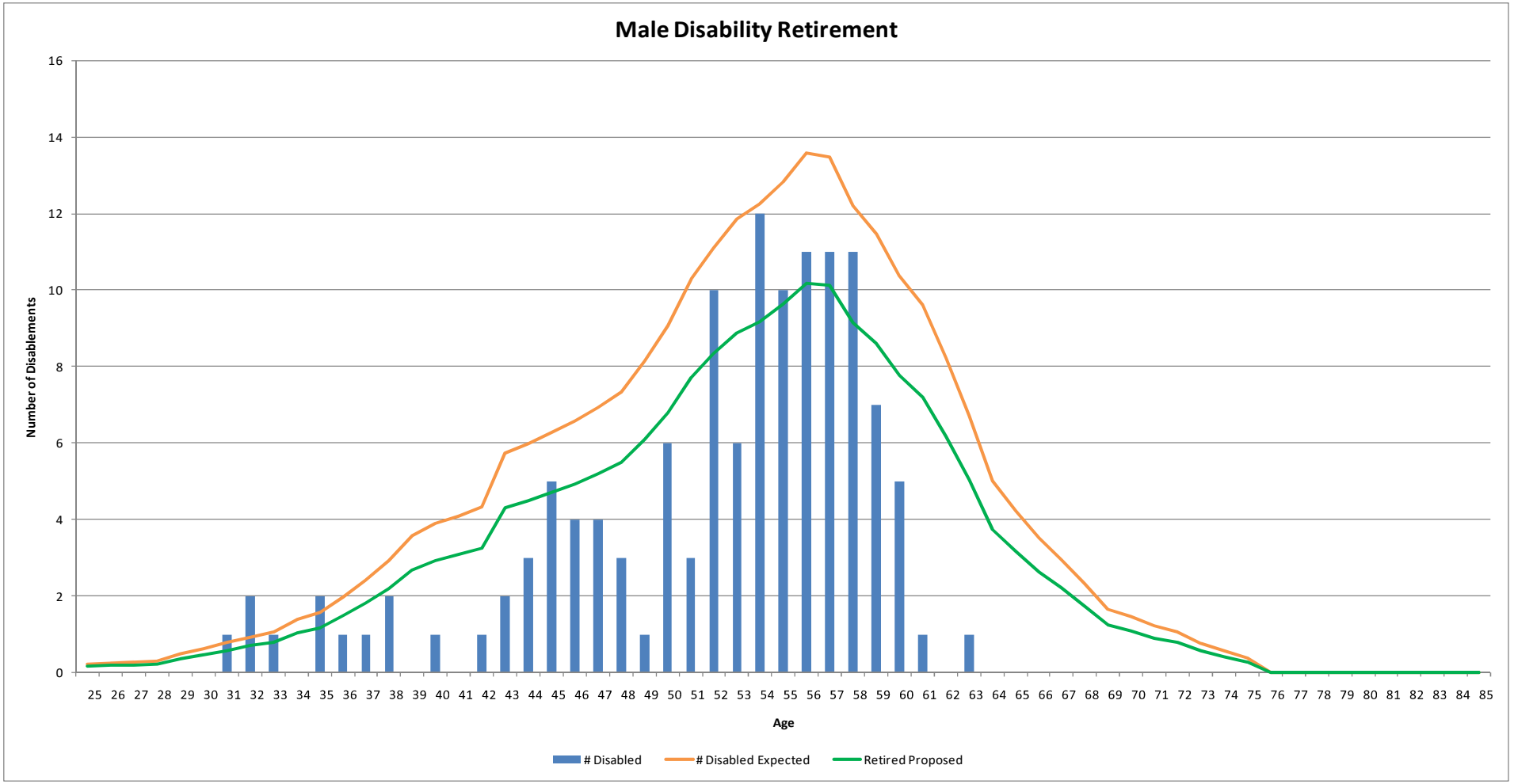
Current Assumption

Age		Male		Female	
20		0.01	%	0.02	%
25		0.01		0.02	
30		0.02		0.02	
35		0.04		0.07	
40		0.10		0.12	
45		0.18		0.17	
50		0.24		0.24	
55		0.30		0.30	
60		0.35		0.35	
65		0.40		0.40	

Demographic Assumptions – Disability

Experience and Analysis

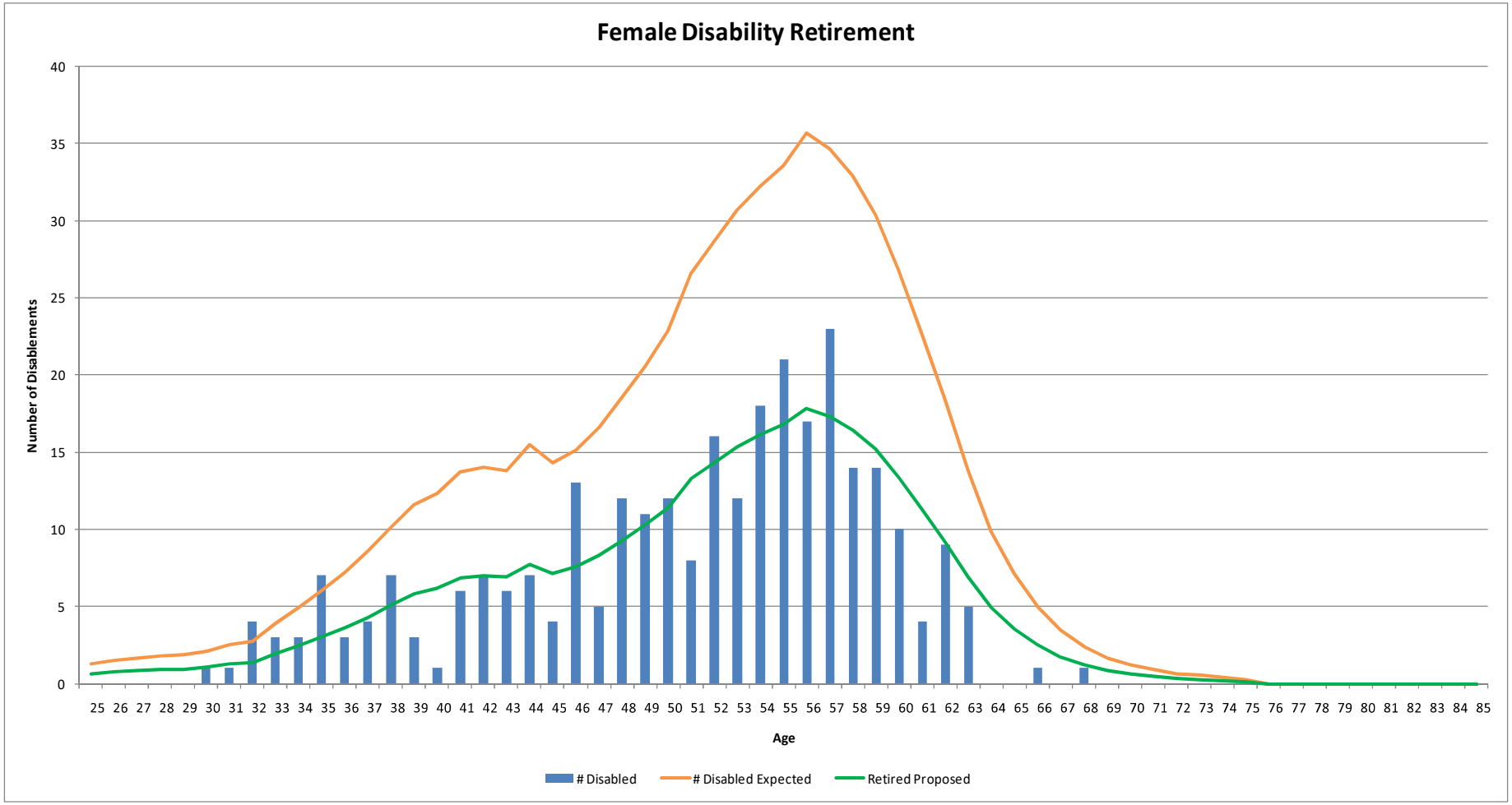
Disability Retirement Males



Demographic Assumptions – Disability

Experience and Analysis

Disability Retirement Females



Demographic Assumptions – Disability

Summary

- Overall, actual disabilities were less than expected.
- Disability experience is less credible than other events, since one or two additional disabilities can materially affect rates.

Recommendations

- For males reduce rates by 25%.
- For females reduce rates by 50%.
- Apply the same rates for the Combined Plan.

Demographic Assumptions – Dependent Assumptions

Description

- In certain circumstances, the spouse and/or dependent beneficiary(ies) of a member may be eligible to receive benefits upon the death of a member.
  - If a members dies while active or inactive and vested
  - After a member's death in retirement with a joint and survivor annuity election
- Prior to a member's retirement, spouse/beneficiary data is typically not collected and therefore assumptions are made to estimate the benefits that would be payable upon the death of a member.

Demographic Assumptions – Dependent Assumptions

Description

- Dependent assumptions typically include:
  - The percentage of members that are married or have an eligible dependent.
  - The age difference between the member and their spouse or eligible dependent.

Demographic Assumptions – Dependent Assumptions

Current Assumptions

- Marriage – 80% of male members and 60% of female members are assumed to be married.
- Age difference – Male spouses are assumed to be 3 years older than female spouses.

Demographic Assumptions – Dependent Assumptions

Experience and Analysis

- Marriage – New Retirees

Male Members:			
	Total		
Age	# Newly Retired	# Married	% Married
<50			
50-54	457	339	74.18%
55-59	1,806	1,452	80.40%
60-64	1,615	1,255	77.71%
65-69	630	488	77.46%
>=70	201	157	78.11%
Total	4,709	3,691	78.38%
Female Members:			
	Total		
Age	# Newly Retired	# Married	% Married
<50	1	1	100.00%
50-54	916	550	60.04%
55-59	4,331	2,837	65.50%
60-64	4,722	2,625	55.59%
65-69	1,565	710	45.37%
>=70	255	80	31.37%
Total	11,790	6,803	57.70%

Demographic Assumptions – Dependent Assumptions

Experience and Analysis

- Age Difference – Current Retirees
  - Spouse/Dependent data is most reliable for retired members who have elected a joint and survivor form of benefit. Prior to retirement spouse/dependent data is generally not collected.

Male Members:				
Experience Year	# Retired	Member Age	Beneficiary Age	Difference
2008	29,828	68.73	65.66	3.07
2009	30,315	69.12	66.08	3.04
2010	30,836	69.47	66.44	3.03
2011	24,406	71.37	68.26	3.11
Total	115,385	69.59	66.53	3.06

Female Members:				
Experience Year	# Retired	Member Age	Beneficiary Age	Difference
2008	27,554	67.04	67.98	(0.94)
2009	28,702	67.28	68.20	(0.92)
2010	30,096	67.42	68.32	(0.90)
2011	25,326	68.60	69.50	(0.90)
Total	111,678	67.56	68.47	(0.92)

Demographic Assumptions – Dependent Assumptions

Experience and Analysis

- Age Difference – New Retirees
  - Spouse/Dependent data is most reliable for retired members who have elected a joint and survivor form of benefit. Prior to retirement spouse/dependent data is generally not collected.

Male Members:				
Experience Year	# Newly Retired	Member Age	Beneficiary Age	Difference
2008-2009	1,132	60.16	57.54	2.62
2009-2010	1,237	60.44	57.65	2.79
2010-2011	1,280	60.52	57.86	2.66
Total	3,649	60.38	57.69	2.69
Female Members:				
Experience Year	# Newly Retired	Member Age	Beneficiary Age	Difference
2008-2009	1,687	59.47	60.57	(1.10)
2009-2010	2,170	59.88	61.05	(1.17)
2010-2011	2,583	60.11	61.22	(1.11)
Total	6,440	59.86	60.99	(1.13)

Demographic Assumptions – Dependent Assumptions

Recommendation

- Continue to assume 80% of male participants are married and 60% of female participants are married.
- Continue to assume female spouses are 3 years younger than male members.
- Change the assumption for male spouses to be only 1 year older than female members rather than 3 years older. Supported by new retirees and current retirees.
- Apply the same assumptions for the Combined Plan.

Economic Assumptions – Inflation

Description

- Inflation represents the annual increase in the cost of living.
- There are several published indices that track inflation over time, the most common of which is the Consumer Price Index for Urban Consumers that is published by the U. S. Department of Labor's Bureau of Labor Statistics.
  - Otherwise known as the "CPI-U" index.
- Inflation is one of the "building blocks" of most economic actuarial assumptions, such as:
  - Expected asset returns (inflation + real return)
  - Individual salary (inflation + productivity + merit/promotion)
  - Total payroll growth (inflation + real wage growth)

Economic Assumptions – Inflation

Description

- For the Combined Plan, inflation is a determinant factor in the cost of living adjustment granted to certain retirees.
- Inflation component of each economic actuarial assumption should be consistent.

Economic Assumptions – Inflation

Current Assumption

- The current inflation assumption is 3.00% compounded annually.

Experience

- Historic U. S. inflation, as measured by the CPI-U index in June of each year:

CPI-U Index (Historic U.S. Inflation)		
Date	*CPI-U*	*Annual Increase*
Jun-2008	*218.85*	
Jun-2009	*215.693*	*-1.44%*
Jun-2010	*217.963*	*1.05%*
Jun-2011	*225.722*	*3.56%*
Average		*1.06%*

Economic Assumptions – Inflation

Analysis

- With regard to inflation, historical experience is generally given less weight in terms of setting future expectations.
  - There are a number of factors that can change the economic outlook very quickly
- Current market conditions and the expectations of economists and other financial experts are weighed more heavily in setting inflation assumptions.
  - Observable data in this regard can be pulled from the financial markets by analyzing the difference in yields between fixed coupon U. S. Treasury bonds and inflation-protected U. S. Treasuries ("TIPS").
  - As of 2/1/2012, yields on Treasuries and TIPS for various maturities were as follows:

	Maturity				
Security	**5 Years**	**7 Years**	**10 Years**	**20 Years**	**30 Years**
US Treasuries	0.72%	1.27%	1.87%	2.65%	3.01%
US TIPS	-1.17%	-0.78%	-0.28%	0.42%	0.65%
Expected Inflation	1.89%	2.05%	2.15%	2.23%	2.36%

Economic Assumptions – Inflation

Summary

- In recent years, inflation has averaged between -1.50% and 3.50%.
- Long-term future inflation expectations based on the yields of Treasuries and TIPS is roughly 2.30%.

Recommendation

- We recommend an inflation assumption in the range of 2.50% - 2.75%.

Economic Assumptions – Expected Return on Assets

Description

- The expected return on assets is typically derived by weighting the expected returns of each type or class of security to which funds are allocated and invested.
  - The expected investment return of any financial security includes the following components:
    - Inflation
    - Risk-free real returns
    - Risk premium
- Past investment experience is generally not a good predictor of future performance, given the volatility of the financial markets and other factors that can significantly impact the financial markets.
- The advice and expectations of professional asset managers are generally sought to help in developing the asset return assumption.

Economic Assumptions – Expected Return on Assets

Current Assumption

- The current expected return on assets assumption is 8.00% annually, net of administrative and investment expenses. Based on a 3.00% inflation rate, this assumes a 4.85% real rate of return.

Recommendation

- The Callan report shows that based on a 2.5% inflation assumption, expected returns over the near term are expected to be 7.60%, prior to administrative expenses.
- As of June 30, 2010, 8.00% was the average and most commonly used rate by Public Employee Retirement Systems. Since that time, the trend has clearly been to reduce the rates.
- While an 8.00% or higher rate of return is possible, at this time, based on the very low yield rates on bonds, we remain comfortable with a 4.85% real rate of return and a nominal rate of return in the range of 7.50% - 7.75% (depending on rate of inflation adopted), net of administrative and investment expenses.

Economic Assumptions – Individual Salary Growth

Description

- The retirement benefits for STRS Ohio are based upon a member's final average salary.
  - Salary is typically the highest in the final years of employment.
  - Estimating each member's benefit for the actuarial valuation requires us to project salary for future years of employment.
- The individual salary growth assumption consists of the following components:
  - Inflation
  - Productivity (real wage growth)
  - Merit and promotional increases

Economic Assumptions – Individual Salary Growth

Description

- Comparing overall salary increases with those expected can mask the separate effects of inflation and real wage increases
- Non-inflationary salary increases can be measured in separately by analyzing salary growth, net of inflation.

Economic Assumptions – Individual Salary Growth

Current Assumption

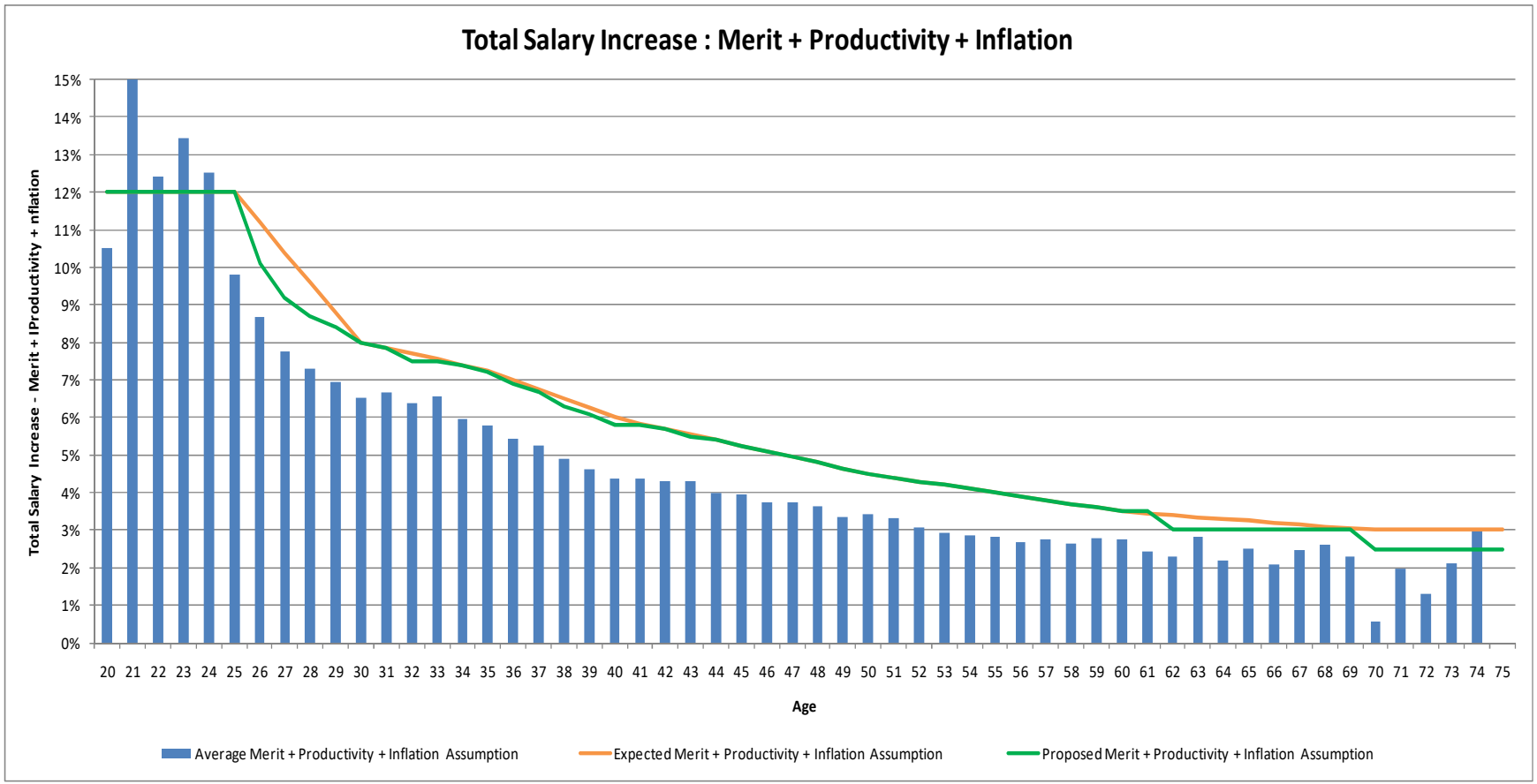
- The current individual salary growth assumption includes 3.00% for inflation.

		Total Salary Increase		Salary Increase Net of Inflation	
Age		Rate		Rate	
20		12.00	%	9.00	%
25		12.00		9.00	
30		8.00		5.00	
35		7.25		4.25	
40		6.00		3.00	
45		5.25		2.25	
50		4.50		1.50	
55		4.00		1.00	
60		3.50		0.50	
65		3.25		0.25	

Economic Assumptions – Individual Salary Growth

Experience and Analysis

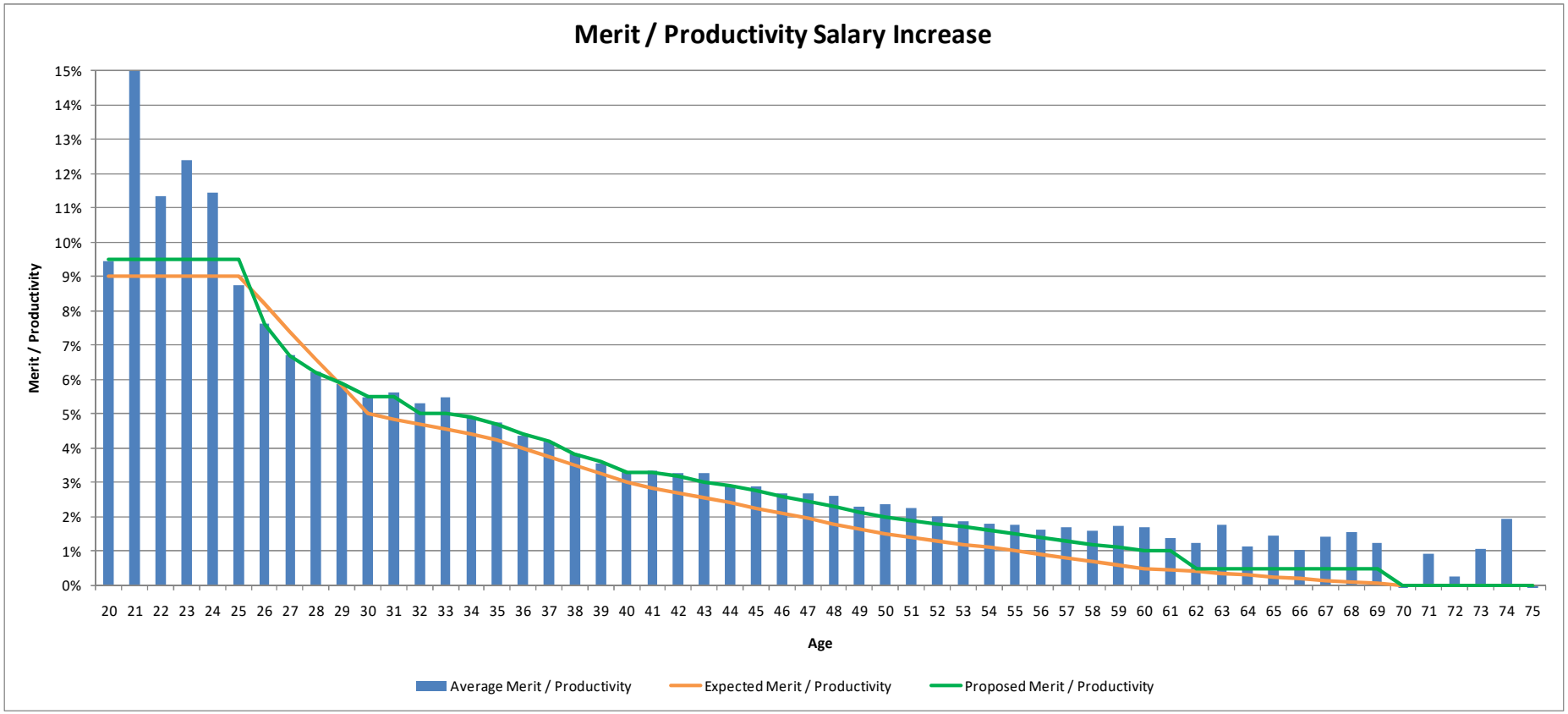
- The graph below compares the average annual increases from 2008-2011 to the current and proposed assumptions.



Economic Assumptions – Individual Salary Growth

Experience and Analysis

- The following table shows individual salary growth experience, net of inflation (actual increases shown are net of the increase in the CPI-U index).



Economic Assumptions – Individual Salary Growth

Summary

- Overall, the salary experience has been favorable as a result of the low level of inflation during 2 of the last 3 years.
  - Inflation has averaged 1.06% in the last three years rather than the assumed rate of 3.00%.
- Actual merit increases have been greater than assumed.
  - Had inflation been 3%, and the same merit increases were granted, we would have experienced actuarial losses.

Economic Assumptions – Individual Salary Growth

Recommendations

- Assume inflation in the range of 2.5% - 2.75%.
- Increase merit / productivity rates based on experience.
- See Appendix A for a full comparison of proposed vs. current salary increase assumptions.

Economic Assumptions – Payroll Growth

Description

- The current method used for amortizing unfunded past service liabilities is to amortize the unfunded actuarial accrued liability ("UAAL") as a level percent of payroll. This requires an assumption of future payroll growth.
- The payroll growth assumption consists of the following components:
  - Inflation
  - Real wage growth
- Real wage growth can be measured by analyzing wage growth, net of inflation.
- For GASB purposes, the payroll growth assumption is not to include expected growth in population.

Economic Assumptions – Payroll Growth

Current Assumption

- The current payroll growth assumption is 3.50% compounded annually for the next 7 years and 4.00% thereafter.
- This reflects an inflation assumption of 3.00% and 1.00% real wage growth for a total of 4.00%.
- The assumption of 3.50% for the next 7 years incorporates an adjustment to 2018 to anticipate continued migration to the DC plan.

Economic Assumptions – Payroll Growth

Experience and Analysis

- The following table shows historic STRS Ohio payroll growth, as well as growth net of inflation.

June 30	Plan	Total Payroll	Number of Active Members	Average Pay Per Active Member	Growth in Average Pay	Inflation (CPI-U Index)	Real Growth in Average Pay
2008	DB	9,650,295,720	169,014	$ 57,097.61			
2008	CO	183,910,400	4,313	$ 42,640.95			
Total		9,834,206,120	173,327	$ 56,737.88			
2009	DB	9,921,161,280	170,307	$ 58,254.57	2.03%	-1.44%	3.47%
2009	CO	200,979,900	4,500	$ 44,662.20	4.74%	-1.44%	6.18%
Total		10,122,141,180	174,807	$ 57,904.67	2.06%	-1.44%	3.50%
2010	DB	10,133,819,948	171,339	$ 59,144.85	1.53%	1.05%	0.48%
2010	CO	207,692,374	4,503	$ 46,123.11	3.27%	1.05%	2.22%
Total		10,341,512,322	175,842	$ 58,811.39	1.57%	1.05%	0.51%
2011	DB	10,155,296,005	169,362	$ 59,962.07	1.38%	3.56%	-2.18%
2011	CO	214,071,419	4,583	$ 46,709.89	1.27%	3.56%	-2.29%
Total		10,369,367,424	173,945	$ 59,612.91	1.36%	3.56%	-2.20%
					1.66%	1.04%	0.63%
					Geometric Average		Net Real Growth

Economic Assumptions – Payroll Growth

Recommendation

- We recommend no change in the payroll growth assumption.
- Payroll growth, net of inflation, has increased on average less than 1% per year. Even though the merit pay experience analysis confirmed that those who remain employed are receiving merit increases greater than expected, the increase in total payroll has been minimal. This is due to the retirement of older, higher paid employees replaced by younger, lower paid employees. This decrease in payroll has offset the merit increases for continuing employees and thus, the total payroll has remained relatively unchanged.
- Current data shows that the number of active employees with 30 or more years of service has declined almost 22% from 13,386 in 2008 to only 10,448 in 2011. Thus, the pattern of the last few years is not expected to continue.
- Therefore, we recommend keeping the payroll growth assumption at the current 3.50%/4.00% rate.

Appendix A

- 2012 Proposed Retirement Rates and Current 2008 Retirement Rates
- 2012 Proposed Withdrawal Rates and Current 2008 Withdrawal Rates
- 2012 Proposed Salary Increase Assumptions and Current 2008 Salary Increase Assumption
- Raw Data For Each Assumption Analyzed

Appendix A

Proposed 2012 Retirement Rates – Current Plan

	Early Retirement							
	35 Years of Service		30-34 Years of Service		25-29 Years of Service		Under 25 Years of Service	
Age	Male	Female	Male	Female	Male	Female	Male	Female
50	0.400000	0.500000	0.200000	0.200000	0.000000	0.000000	0.000000	0.000000
51	0.400000	0.500000	0.200000	0.200000	0.000000	0.000000	0.000000	0.000000
52	0.400000	0.500000	0.200000	0.200000	0.000000	0.000000	0.000000	0.000000
53	0.400000	0.500000	0.100000	0.100000	0.000000	0.000000	0.000000	0.000000
54	0.600000	0.500000	0.100000	0.100000	0.000000	0.000000	0.000000	0.000000
55	0.600000	0.500000	0.100000	0.100000	0.060000	0.090000	0.000000	0.000000
56	0.600000	0.500000	0.100000	0.150000	0.060000	0.090000	0.000000	0.000000
57	0.550000	0.500000	0.150000	0.150000	0.060000	0.090000	0.000000	0.000000
58	0.500000	0.450000	0.150000	0.150000	0.060000	0.090000	0.000000	0.000000
59	0.450000	0.450000	0.150000	0.200000	0.100000	0.150000	0.000000	0.000000
60	0.450000	0.450000	0.150000	0.250000	0.100000	0.150000	0.100000	0.100000
61	0.450000	0.450000	0.150000	0.250000	0.100000	0.150000	0.100000	0.100000
62	0.450000	0.450000	0.150000	0.250000	0.100000	0.150000	0.120000	0.100000
63	0.450000	0.450000	0.100000	0.300000	0.100000	0.150000	0.120000	0.100000
64	0.300000	0.450000	0.100000	0.300000	0.150000	0.250000	0.120000	0.150000
65	0.300000	0.450000	0.100000	0.300000	0.200000	0.300000	0.200000	0.250000
66	0.300000	0.450000	0.100000	0.300000	0.200000	0.300000	0.200000	0.200000
67	0.250000	0.450000	0.100000	0.300000	0.200000	0.200000	0.150000	0.200000
68	0.200000	0.450000	0.100000	0.300000	0.200000	0.200000	0.150000	0.200000
69	0.200000	0.450000	0.100000	0.300000	0.200000	0.200000	0.150000	0.200000
70	0.200000	0.300000	0.100000	0.300000	0.200000	0.200000	0.150000	0.200000
71	0.200000	0.300000	0.100000	0.300000	0.200000	0.200000	0.150000	0.200000
72	0.200000	0.300000	0.100000	0.300000	0.200000	0.200000	0.150000	0.200000
73	0.200000	0.300000	0.100000	0.300000	0.200000	0.200000	0.150000	0.200000
74	0.200000	0.300000	0.100000	0.300000	0.200000	0.200000	0.150000	0.200000
75	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000

Appendix A

Current 2008 Retirement Rates – Current Plan

Early Retirement								
	35 Years of Service		30-34 Years of Service		25-29 Years of Service		Under 25 Years of Service	
Age	Male	Female	Male	Female	Male	Female	Male	Female
50	0.400000	0.800000	0.200000	0.200000	0.000000	0.000000	0.000000	0.000000
51	0.400000	0.800000	0.200000	0.200000	0.000000	0.000000	0.000000	0.000000
52	0.400000	0.800000	0.200000	0.200000	0.000000	0.000000	0.000000	0.000000
53	0.400000	0.500000	0.150000	0.150000	0.000000	0.000000	0.000000	0.000000
54	0.600000	0.500000	0.140000	0.120000	0.000000	0.000000	0.000000	0.000000
55	0.600000	0.500000	0.120000	0.120000	0.180000	0.140000	0.000000	0.000000
56	0.600000	0.500000	0.140000	0.150000	0.060000	0.090000	0.000000	0.000000
57	0.550000	0.500000	0.140000	0.150000	0.060000	0.090000	0.000000	0.000000
58	0.500000	0.400000	0.150000	0.150000	0.060000	0.090000	0.000000	0.000000
59	0.450000	0.400000	0.160000	0.200000	0.060000	0.130000	0.000000	0.000000
60	0.450000	0.400000	0.150000	0.250000	0.090000	0.150000	0.130000	0.220000
61	0.400000	0.400000	0.150000	0.250000	0.090000	0.150000	0.070000	0.090000
62	0.350000	0.450000	0.150000	0.250000	0.080000	0.150000	0.070000	0.090000
63	0.300000	0.450000	0.100000	0.250000	0.080000	0.150000	0.070000	0.090000
64	0.300000	0.450000	0.100000	0.250000	0.140000	0.300000	0.090000	0.150000
65	0.300000	0.450000	0.100000	0.250000	0.200000	0.320000	0.170000	0.200000
66	0.300000	0.400000	0.100000	0.250000	0.200000	0.220000	0.150000	0.130000
67	0.250000	0.350000	0.100000	0.250000	0.150000	0.200000	0.120000	0.130000
68	0.200000	0.350000	0.100000	0.150000	0.150000	0.200000	0.120000	0.120000
69	0.200000	0.350000	0.100000	0.150000	0.150000	0.200000	0.120000	0.120000
70	0.200000	0.350000	0.100000	0.150000	0.150000	0.200000	0.120000	0.120000
71	0.200000	0.350000	0.100000	0.150000	0.150000	0.200000	0.120000	0.120000
72	0.200000	0.350000	0.100000	0.150000	0.150000	0.200000	0.120000	0.120000
73	0.200000	0.350000	0.100000	0.150000	0.150000	0.200000	0.120000	0.120000
74	0.200000	0.350000	0.100000	0.150000	0.150000	0.200000	0.120000	0.120000
75	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000

Appendix A

2012 Proposed Withdrawal Rates (5 or more YOS)

	Vested	
Age	Male	Female
19	0.1125000	0.1320000
20	0.1125000	0.1320000
21	0.1125000	0.1320000
22	0.1125000	0.1320000
23	0.1125000	0.1320000
24	0.1125000	0.1320000
25	0.1125000	0.1254000
26	0.1125000	0.1122000
27	0.0825000	0.0924000
28	0.0420000	0.0528000
29	0.0300000	0.0475200
30	0.0240000	0.0422400
31	0.0210000	0.0369600
32	0.0198000	0.0316800
33	0.0209250	0.0326700
34	0.0202500	0.0267300
35	0.0195750	0.0237600
36	0.0189000	0.0219780
37	0.0182250	0.0201960
38	0.0175500	0.0184140
39	0.0168750	0.0166320
40	0.0162000	0.0168750
41	0.0200000	0.0162000
42	0.0200000	0.0155250
43	0.0200000	0.0148500
44	0.0200000	0.0141750
45	0.0200000	0.0135000
46	0.0200000	0.0135000
47	0.0200000	0.0135000
48	0.0200000	0.0150000
49	0.0200000	0.0150000

	Vested	
Age	Male	Female
50	0.0200000	0.0200000
51	0.0200000	0.0200000
52	0.0300000	0.0300000
53	0.0300000	0.0300000
54	0.0400000	0.0300000
55	0.0400000	0.0300000
56	0.0400000	0.0300000
57	0.0400000	0.0300000
58	0.0400000	0.0300000
59	0.0400000	0.0300000
60	0.0400000	0.0300000
61	0.0000000	0.0000000
62	0.0000000	0.0000000
63	0.0000000	0.0000000
64	0.0000000	0.0000000
65	0.0000000	0.0000000
66	0.0000000	0.0000000
67	0.0000000	0.0000000
68	0.0000000	0.0000000
69	0.0000000	0.0000000
70	0.0000000	0.0000000
71	0.0000000	0.0000000
72	0.0000000	0.0000000
73	0.0000000	0.0000000
74	0.0000000	0.0000000
75	0.0000000	0.0000000

Appendix A

Current 2008 Withdrawal Rates

	Termination			
	Non-Vested		Vested	
Age	Male	Female	Male	Female
19	0.2470000	0.1950000	0.1500000	0.2000000
20	0.2470000	0.1950000	0.1500000	0.2000000
21	0.2392000	0.1866000	0.1500000	0.2000000
22	0.2314000	0.1781000	0.1500000	0.2000000
23	0.1462000	0.1109000	0.1500000	0.2000000
24	0.1411000	0.1054000	0.1500000	0.2000000
25	0.1360000	0.0999000	0.1500000	0.1900000
26	0.1343000	0.0999000	0.1500000	0.1700000
27	0.1326000	0.0999000	0.1100000	0.1400000
28	0.1309000	0.0999000	0.0560000	0.0800000
29	0.1292000	0.0999000	0.0400000	0.0720000
30	0.1275000	0.0999000	0.0320000	0.0640000
31	0.1267000	0.0999000	0.0280000	0.0560000
32	0.1258000	0.0999000	0.0264000	0.0480000
33	0.1470000	0.1175000	0.0279000	0.0495000
34	0.1460000	0.1175000	0.0270000	0.0405000
35	0.1450000	0.1175000	0.0261000	0.0360000
36	0.1435000	0.1120000	0.0252000	0.0333000
37	0.1420000	0.1065000	0.0243000	0.0306000
38	0.1405000	0.1010000	0.0234000	0.0279000
39	0.1390000	0.0955000	0.0225000	0.0252000
40	0.1375000	0.0900000	0.0216000	0.0225000
41	0.1368000	0.0900000	0.0207000	0.0216000
42	0.1361000	0.0900000	0.0198000	0.0207000
43	0.1354000	0.0900000	0.0210000	0.0198000
44	0.1347000	0.0900000	0.0200000	0.0189000
45	0.1340000	0.0900000	0.0190000	0.0180000
46	0.1340000	0.0900000	0.0180000	0.0180000
47	0.1340000	0.0900000	0.0170000	0.0180000
48	0.1340000	0.0900000	0.0192000	0.0200000
49	0.1340000	0.0900000	0.0180000	0.0200000

	Termination			
	Non-Vested		Vested	
Age	Male	Female	Male	Female
50	0.1340000	0.0900000	0.0180000	0.0200000
51	0.1340000	0.0900000	0.0180000	0.0200000
52	0.1340000	0.0900000	0.0180000	0.0200000
53	0.1340000	0.0900000	0.0180000	0.0240000
54	0.1340000	0.0900000	0.0180000	0.0240000
55	0.1340000	0.0900000	0.0180000	0.0240000
56	0.1340000	0.0865000	0.0180000	0.0240000
57	0.1340000	0.0830000	0.0180000	0.0240000
58	0.1340000	0.0795000	0.0180000	0.0240000
59	0.1340000	0.0760000	0.0180000	0.0240000
60	0.1340000	0.0725000	0.0180000	0.0240000
61	0.1340000	0.0725000	0.0000000	0.0000000
62	0.1340000	0.0725000	0.0000000	0.0000000
63	0.1340000	0.0725000	0.0000000	0.0000000
64	0.1340000	0.0725000	0.0000000	0.0000000
65	0.1340000	0.0725000	0.0000000	0.0000000
66	0.1340000	0.0725000	0.0000000	0.0000000
67	0.1340000	0.0725000	0.0000000	0.0000000
68	0.1340000	0.0725000	0.0000000	0.0000000
69	0.1340000	0.0725000	0.0000000	0.0000000
70	0.1340000	0.0725000	0.0000000	0.0000000
71	0.1340000	0.0725000	0.0000000	0.0000000
72	0.1340000	0.0725000	0.0000000	0.0000000
73	0.1340000	0.0725000	0.0000000	0.0000000
74	0.1340000	0.0725000	0.0000000	0.0000000
75	0.1340000	0.0725000	0.0000000	0.0000000

Appendix A

Proposed and Current Salary Increase Assumptions

Proposed w/ 2.50% Inflation		Proposed w/ 2.75% Inflation		Current	
Age	Annual Rate of Salary Increase	Age	Annual Rate of Salary Increase	Age	Annual Rate of Salary Increase
20	12.00%	20	12.25%	20	12.00%
21	12.00%	21	12.25%	21	12.00%
22	12.00%	22	12.25%	22	12.00%
23	12.00%	23	12.25%	23	12.00%
24	12.00%	24	12.25%	24	12.00%
25	12.00%	25	12.25%	25	12.00%
26	10.10%	26	10.35%	26	11.20%
27	9.20%	27	9.45%	27	10.40%
28	8.70%	28	8.95%	28	9.60%
29	8.40%	29	8.65%	29	8.80%
30	8.00%	30	8.25%	30	8.00%
31	7.85%	31	8.10%	31	7.85%
32	7.50%	32	7.75%	32	7.70%
33	7.50%	33	7.75%	33	7.55%
34	7.40%	34	7.65%	34	7.40%
35	7.20%	35	7.45%	35	7.25%
36	6.90%	36	7.15%	36	7.00%
37	6.70%	37	6.95%	37	6.75%
38	6.30%	38	6.55%	38	6.50%
39	6.10%	39	6.35%	39	6.25%
40	5.80%	40	6.05%	40	6.00%
41	5.80%	41	6.05%	41	5.85%
42	5.70%	42	5.95%	42	5.70%
43	5.50%	43	5.75%	43	5.55%
44	5.40%	44	5.65%	44	5.40%
45	5.25%	45	5.50%	45	5.25%
46	5.10%	46	5.35%	46	5.10%
47	4.95%	47	5.20%	47	4.95%
48	4.80%	48	5.05%	48	4.80%
49	4.65%	49	4.90%	49	4.65%
50	4.50%	50	4.75%	50	4.50%
51	4.40%	51	4.65%	51	4.40%
52	4.30%	52	4.55%	52	4.30%
53	4.20%	53	4.45%	53	4.20%
54	4.10%	54	4.35%	54	4.10%
55	4.00%	55	4.25%	55	4.00%
56	3.90%	56	4.15%	56	3.90%
57	3.80%	57	4.05%	57	3.80%
58	3.70%	58	3.95%	58	3.70%
59	3.60%	59	3.85%	59	3.60%
60	3.50%	60	3.75%	60	3.50%
61	3.50%	61	3.75%	61	3.45%
62	3.00%	62	3.25%	62	3.40%
63	3.00%	63	3.25%	63	3.35%
64	3.00%	64	3.25%	64	3.30%
65	3.00%	65	3.25%	65	3.25%
66	3.00%	66	3.25%	66	3.20%
67	3.00%	67	3.25%	67	3.15%
68	3.00%	68	3.25%	68	3.10%
69	3.00%	69	3.25%	69	3.05%
70	2.50%	70	2.75%	70	3.00%

Appendix A

Service Mortality Raw Data

Age	Gender									
	Male					Female				
	Exposure	# Death	% Death Actual	% Death Expected	# Death Expected	Exposure	# Death	Death Actual	% Death Expected	# Death Expected
50	3	0	0.0000%	0.2897%	0.01	3	0	0.0000%	0.0963%	0.00
51	16	0	0.0000%	0.3357%	0.05	29	0	0.0000%	0.1124%	0.03
52	149	0	0.0000%	0.3856%	0.57	299	0	0.0000%	0.1367%	0.41
53	350	0	0.0000%	0.3914%	1.37	713	1	0.1403%	0.1722%	1.23
54	579	2	0.3454%	0.3923%	2.27	1,153	2	0.1735%	0.1839%	2.12
55	875	1	0.1143%	0.3978%	3.48	1,780	10	0.5618%	0.2054%	3.66
56	1,329	3	0.2257%	0.4030%	5.36	2,558	7	0.2737%	0.2330%	5.96
57	2,125	3	0.1412%	0.4181%	8.88	4,205	8	0.1902%	0.2662%	11.19
58	3,104	15	0.4832%	0.4416%	13.71	5,874	15	0.2554%	0.3056%	17.95
59	3,928	20	0.5092%	0.4733%	18.59	7,019	23	0.3277%	0.3522%	24.72
60	4,690	24	0.5117%	0.5158%	24.19	8,031	26	0.3237%	0.4007%	32.18
61	5,829	27	0.4632%	0.5599%	32.64	9,578	36	0.3759%	0.4496%	43.06
62	6,293	30	0.4767%	0.6131%	38.58	9,887	39	0.3945%	0.5054%	49.97
63	6,193	28	0.4521%	0.6857%	42.47	9,398	43	0.4575%	0.5665%	53.24
64	5,466	41	0.7501%	0.7553%	41.28	8,319	35	0.4207%	0.6322%	52.59
65	5,208	46	0.8833%	0.8496%	44.25	8,063	40	0.4961%	0.7026%	56.65
66	5,426	44	0.8109%	0.9401%	51.01	8,559	41	0.4790%	0.7775%	66.55
67	5,366	61	1.1368%	1.0411%	55.87	8,447	49	0.5801%	0.8584%	72.51
68	4,980	46	0.9237%	1.1748%	58.51	7,804	60	0.7688%	0.9470%	73.90
69	4,545	54	1.1881%	1.3006%	59.11	6,981	60	0.8595%	1.0428%	72.80
70	4,256	37	0.8694%	1.4121%	60.10	6,620	58	0.8761%	1.1458%	75.85
71	4,053	58	1.4310%	1.5599%	63.22	6,425	73	1.1362%	1.2583%	80.85
72	3,933	68	1.7290%	1.6917%	66.53	6,176	56	0.9067%	1.3846%	85.51
73	3,731	64	1.7154%	1.8718%	69.84	5,722	66	1.1534%	1.5298%	87.54
74	3,580	68	1.8994%	2.0783%	74.40	5,319	77	1.4476%	1.6672%	88.68
75	3,355	84	2.5037%	2.3149%	77.66	4,830	82	1.6977%	1.8543%	89.56
76	3,208	87	2.7120%	2.5826%	82.85	4,563	78	1.7094%	2.0242%	92.36
77	3,116	96	3.0809%	2.9354%	91.47	4,388	94	2.1422%	2.2434%	98.44
78	3,064	100	3.2637%	3.2717%	100.24	4,430	106	2.3928%	2.4323%	107.75
79	2,901	112	3.8607%	3.7063%	107.52	4,319	120	2.7784%	2.6798%	115.74
80	2,653	120	4.5232%	4.1943%	111.27	4,086	106	2.5942%	3.0054%	122.80
81	2,409	121	5.0228%	4.7469%	114.35	3,855	141	3.6576%	3.3130%	127.72
82	2,191	121	5.5226%	5.3716%	117.69	3,561	150	4.2123%	3.6576%	130.25
83	1,997	152	7.6114%	6.1222%	122.26	3,257	138	4.2370%	4.0430%	131.68
84	1,792	133	7.4219%	6.9651%	124.81	2,886	163	5.6480%	4.4749%	129.15
85	1,570	133	8.4713%	7.7641%	121.90	2,600	178	6.8462%	5.5082%	143.21
86	1,281	106	8.2748%	8.7928%	112.64	2,395	189	7.8914%	6.1260%	146.72
87	1,034	107	10.3482%	9.7602%	100.92	2,235	143	6.3982%	6.9495%	155.32
88	845	100	11.8343%	10.8212%	91.44	2,054	190	9.2502%	7.8924%	162.11
89	631	90	14.2631%	12.2076%	77.03	1,787	190	10.6323%	8.9632%	160.17
90	516	74	14.3411%	13.7598%	71.00	1,560	210	13.4615%	9.9834%	155.74
91	395	78	19.7468%	15.2062%	60.06	1,346	192	14.2645%	11.2881%	151.94
92	319	63	19.7492%	17.0642%	54.43	1,189	194	16.3162%	12.4750%	148.33
93	231	53	22.9437%	18.5864%	42.93	1,008	188	18.6508%	13.6991%	138.09
94	157	49	31.2102%	20.5202%	32.22	812	172	21.1823%	14.9320%	121.25
95	108	22	20.3704%	22.1361%	23.91	650	133	20.4615%	16.4401%	106.86
96	88	24	27.2727%	23.7495%	20.90	536	141	26.3060%	17.6329%	94.51
97	59	21	35.5932%	25.8023%	15.22	397	114	28.7154%	18.7624%	74.49
98	32	7	21.8750%	27.3856%	8.76	304	77	25.3289%	19.8110%	60.23
99	25	11	44.0000%	28.9239%	7.23	221	76	34.3891%	21.1398%	46.72
100	13	5	38.4615%	30.9669%	4.03	154	55	35.7143%	21.9950%	33.87
101	12	5	41.6667%	32.4314%	3.89	104	41	39.4231%	22.7257%	23.63
102	5	2	40.0000%	33.8406%	1.69	55	23	41.8182%	23.3229%	12.83
103	4	1	25.0000%	35.8628%	1.43	35	13	37.1429%	24.4834%	8.57
104	2	2	100.0000%	37.1685%	0.74	23	15	65.2174%	25.4498%	5.85
105	0	0	0.0000%	38.3040%	0.00	8	6	75.0000%	26.6044%	2.13
106	0	0	0.0000%	39.2003%	0.00	2	2	100.0000%	27.9055%	0.56
107	0	0	0.0000%	39.7886%	0.00	2	2	100.0000%	29.3116%	0.59
108	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	30.7811%	0.00
109	0	0	0.0000%	40.0000%	0.00	1	1	100.0000%	32.2725%	0.32
110	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	33.7441%	0.00
111	0	0	0.0000%	40.0000%	0.00	1	0	0.0000%	35.1544%	0.35
112	0	0	0.0000%	40.0000%	0.00	1	1	100.0000%	36.4617%	0.36
113	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	37.6246%	0.00
114	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	38.6015%	0.00
115	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	39.3507%	0.00
116	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	39.8308%	0.00
117	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	40.0000%	0.00
118	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	40.0000%	0.00
119	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	40.0000%	0.00
>=120	0	0	0.0000%	100.0000%	0.00	0	0	0.0000%	100.0000%	0.00
Total	120,020	2,819	2.3488%	2.2820%	2,738.82	198,618	4,549	2.2903%	2.0941%	4,159.35

Appendix A

Service Mortality Raw Data

Age	Gender									
	Male					Female				
	Exposure	# Death	% Death Actual	% Death Expected	# Death Expected	Exposure	# Death	Death Actual	% Death Expected	# Death Expected
50	3	0	0.0000%	0.2897%	0.01	3	0	0.0000%	0.0963%	0.00
51	16	0	0.0000%	0.3357%	0.05	29	0	0.0000%	0.1124%	0.03
52	149	0	0.0000%	0.3856%	0.57	299	0	0.0000%	0.1367%	0.41
53	350	0	0.0000%	0.3914%	1.37	713	1	0.1403%	0.1722%	1.23
54	579	2	0.3454%	0.3923%	2.27	1,153	2	0.1735%	0.1839%	2.12
55	875	1	0.1143%	0.3978%	3.48	1,780	10	0.5618%	0.2054%	3.66
56	1,329	3	0.2257%	0.4030%	5.36	2,558	7	0.2737%	0.2330%	5.96
57	2,125	3	0.1412%	0.4181%	8.88	4,205	8	0.1902%	0.2662%	11.19
58	3,104	15	0.4832%	0.4416%	13.71	5,874	15	0.2554%	0.3056%	17.95
59	3,928	20	0.5092%	0.4733%	18.59	7,019	23	0.3277%	0.3522%	24.72
60	4,690	24	0.5117%	0.5158%	24.19	8,031	26	0.3237%	0.4007%	32.18
61	5,829	27	0.4632%	0.5599%	32.64	9,578	36	0.3759%	0.4496%	43.06
62	6,293	30	0.4767%	0.6131%	38.58	9,887	39	0.3945%	0.5054%	49.97
63	6,193	28	0.4521%	0.6857%	42.47	9,398	43	0.4575%	0.5665%	53.24
64	5,466	41	0.7501%	0.7553%	41.28	8,319	35	0.4207%	0.6322%	52.59
65	5,208	46	0.8833%	0.8496%	44.25	8,063	40	0.4961%	0.7026%	56.65
66	5,426	44	0.8109%	0.9401%	51.01	8,559	41	0.4790%	0.7775%	66.55
67	5,366	61	1.1368%	1.0411%	55.87	8,447	49	0.5801%	0.8584%	72.51
68	4,980	46	0.9237%	1.1748%	58.51	7,804	60	0.7688%	0.9470%	73.90
69	4,545	54	1.1881%	1.3006%	59.11	6,981	60	0.8595%	1.0428%	72.80
70	4,256	37	0.8694%	1.4121%	60.10	6,620	58	0.8761%	1.1458%	75.85
71	4,053	58	1.4310%	1.5599%	63.22	6,425	73	1.1362%	1.2583%	80.85
72	3,933	68	1.7290%	1.6917%	66.53	6,176	56	0.9067%	1.3846%	85.51
73	3,731	64	1.7154%	1.8718%	69.84	5,722	66	1.1534%	1.5298%	87.54
74	3,580	68	1.8994%	2.0783%	74.40	5,319	77	1.4476%	1.6672%	88.68
75	3,355	84	2.5037%	2.3149%	77.66	4,830	82	1.6977%	1.8543%	89.56
76	3,208	87	2.7120%	2.5826%	82.85	4,563	78	1.7094%	2.0242%	92.36
77	3,116	96	3.0809%	2.9354%	91.47	4,388	94	2.1422%	2.2434%	98.44
78	3,064	100	3.2637%	3.2717%	100.24	4,430	106	2.3928%	2.4323%	107.75
79	2,901	112	3.8607%	3.7063%	107.52	4,319	120	2.7784%	2.6798%	115.74
80	2,653	120	4.5232%	4.1943%	111.27	4,086	106	2.5942%	3.0054%	122.80
81	2,409	121	5.0228%	4.7469%	114.35	3,855	141	3.6576%	3.3130%	127.72
82	2,191	121	5.5226%	5.3716%	117.69	3,561	150	4.2123%	3.6576%	130.25
83	1,997	152	7.6114%	6.1222%	122.26	3,257	138	4.2370%	4.0430%	131.68
84	1,792	133	7.4219%	6.9651%	124.81	2,886	163	5.6480%	4.4749%	129.15
85	1,570	133	8.4713%	7.7641%	121.90	2,600	178	6.8462%	5.5082%	143.21
86	1,281	106	8.2748%	8.7928%	112.64	2,395	189	7.8914%	6.1260%	146.72
87	1,034	107	10.3482%	9.7602%	100.92	2,235	143	6.3982%	6.9495%	155.32
88	845	100	11.8343%	10.8212%	91.44	2,054	190	9.2502%	7.8924%	162.11
89	631	90	14.2631%	12.2076%	77.03	1,787	190	10.6323%	8.9632%	160.17
90	516	74	14.3411%	13.7598%	71.00	1,560	210	13.4615%	9.9834%	155.74
91	395	78	19.7468%	15.2062%	60.06	1,346	192	14.2645%	11.2881%	151.94
92	319	63	19.7492%	17.0642%	54.43	1,189	194	16.3162%	12.4750%	148.33
93	231	53	22.9437%	18.5864%	42.93	1,008	188	18.6508%	13.6991%	138.09
94	157	49	31.2102%	20.5202%	32.22	812	172	21.1823%	14.9320%	121.25
95	108	22	20.3704%	22.1361%	23.91	650	133	20.4615%	16.4401%	106.86
96	88	24	27.2727%	23.7495%	20.90	536	141	26.3060%	17.6329%	94.51
97	59	21	35.5932%	25.8023%	15.22	397	114	28.7154%	18.7624%	74.49
98	32	7	21.8750%	27.3856%	8.76	304	77	25.3289%	19.8110%	60.23
99	25	11	44.0000%	28.9239%	7.23	221	76	34.3891%	21.1398%	46.72
100	13	5	38.4615%	30.9669%	4.03	154	55	35.7143%	21.9950%	33.87
101	12	5	41.6667%	32.4314%	3.89	104	41	39.4231%	22.7257%	23.63
102	5	2	40.0000%	33.8406%	1.69	55	23	41.8182%	23.3229%	12.83
103	4	1	25.0000%	35.8628%	1.43	35	13	37.1429%	24.4834%	8.57
104	2	2	100.0000%	37.1685%	0.74	23	15	65.2174%	25.4498%	5.85
105	0	0	0.0000%	38.3040%	0.00	8	6	75.0000%	26.6044%	2.13
106	0	0	0.0000%	39.2003%	0.00	2	2	100.0000%	27.9055%	0.56
107	0	0	0.0000%	39.7886%	0.00	2	2	100.0000%	29.3116%	0.59
108	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	30.7811%	0.00
109	0	0	0.0000%	40.0000%	0.00	1	1	100.0000%	32.2725%	0.32
110	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	33.7441%	0.00
111	0	0	0.0000%	40.0000%	0.00	1	0	0.0000%	35.1544%	0.35
112	0	0	0.0000%	40.0000%	0.00	1	1	100.0000%	36.4617%	0.36
113	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	37.6246%	0.00
114	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	38.6015%	0.00
115	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	39.3507%	0.00
116	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	39.8308%	0.00
117	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	40.0000%	0.00
118	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	40.0000%	0.00
119	0	0	0.0000%	40.0000%	0.00	0	0	0.0000%	40.0000%	0.00
>=120	0	0	0.0000%	100.0000%	0.00	0	0	0.0000%	100.0000%	0.00
Total	120,020	2,819	2.3488%	2.2820%	2,738.82	198,618	4,549	2.2903%	2.0941%	4,159.35

Appendix A

Disabled Mortality Raw Data

	Gender									
Age	Male					Female				
	Exposure	# Death	% Death Actual	% Death Expected	# Death Expected	Exposure	# Death	% Death Actual	% Death Expected	# Death Expected
33	2	1	50.0000%	3.0800%	0.06	11	0	0.0000%	2.9500%	0.32
34	0	0	0.0000%	3.0800%	0.00	13	0	0.0000%	2.9500%	0.38
35	2	0	0.0000%	3.0800%	0.06	12	0	0.0000%	2.9500%	0.35
36	6	0	0.0000%	3.0800%	0.18	19	0	0.0000%	2.9500%	0.56
37	4	0	0.0000%	3.0800%	0.12	22	0	0.0000%	2.9500%	0.65
38	7	2	28.5714%	3.0800%	0.22	27	1	3.7037%	2.9500%	0.80
39	9	0	0.0000%	3.0800%	0.28	24	0	0.0000%	2.9500%	0.71
40	10	0	0.0000%	3.0800%	0.31	30	1	3.3333%	2.9500%	0.89
41	8	0	0.0000%	2.1560%	0.17	39	0	0.0000%	2.0650%	0.81
42	8	1	12.5000%	2.1560%	0.17	38	0	0.0000%	2.0650%	0.78
43	10	0	0.0000%	2.1560%	0.22	53	0	0.0000%	2.0650%	1.09
44	18	0	0.0000%	2.1560%	0.39	72	2	2.7778%	2.0650%	1.49
45	32	0	0.0000%	2.1560%	0.69	86	1	1.1628%	2.0650%	1.78
46	41	2	4.8780%	2.1560%	0.88	81	0	0.0000%	2.0650%	1.67
47	43	0	0.0000%	2.1560%	0.93	97	1	1.0309%	2.0650%	2.00
48	42	1	2.3810%	2.1560%	0.91	120	1	0.8333%	2.0650%	2.48
49	38	0	0.0000%	2.1560%	0.82	141	3	2.1277%	2.0650%	2.91
50	36	0	0.0000%	2.1560%	0.78	151	5	3.3113%	2.0650%	3.12
51	54	0	0.0000%	2.1560%	1.16	178	5	2.8090%	2.0650%	3.68
52	56	0	0.0000%	2.1560%	1.21	215	3	1.3953%	2.0650%	4.44
53	92	2	2.1739%	2.1560%	1.98	277	6	2.1661%	2.0650%	5.72
54	97	0	0.0000%	2.1560%	2.09	314	8	2.5478%	2.0650%	6.48
55	131	6	4.5802%	2.1560%	2.82	358	4	1.1173%	2.0650%	7.39
56	169	3	1.7751%	2.1560%	3.64	435	11	2.5287%	2.0650%	8.98
57	209	4	1.9139%	2.1560%	4.51	484	10	2.0661%	2.0650%	9.99
58	248	4	1.6129%	2.1560%	5.35	558	9	1.6129%	2.0650%	11.52
59	252	6	2.3810%	2.1560%	5.43	612	14	2.2876%	2.0650%	12.64
60	305	5	1.6393%	2.1560%	6.58	660	21	3.1818%	2.0650%	13.63
61	337	8	2.3739%	2.1560%	7.27	642	7	1.0903%	2.0650%	13.26
62	356	7	1.9663%	2.1560%	7.68	600	12	2.0000%	2.0650%	12.39
63	338	9	2.6627%	2.1560%	7.29	548	14	2.5547%	2.0650%	11.32
64	296	5	1.6892%	2.1560%	6.38	494	4	0.8097%	2.0650%	10.20
65	275	4	1.4545%	3.0800%	8.47	451	7	1.5521%	2.9500%	13.30
66	252	4	1.5873%	3.0800%	7.76	430	13	3.0233%	2.9500%	12.69
67	231	5	2.1645%	3.0800%	7.11	376	8	2.1277%	2.9500%	11.09
68	203	6	2.9557%	3.0800%	6.25	328	8	2.4390%	2.9500%	9.68
69	174	8	4.5977%	3.0800%	5.36	288	6	2.0833%	2.9500%	8.50
70	161	2	1.2422%	3.0800%	4.96	267	8	2.9963%	2.9500%	7.88
71	150	6	4.0000%	3.0800%	4.62	268	6	2.2388%	2.9500%	7.91
72	154	4	2.5974%	3.0800%	4.74	246	10	4.0650%	2.9500%	7.26
73	149	7	4.6980%	3.0800%	4.59	238	6	2.5210%	2.9500%	7.02
74	155	1	0.6452%	3.1000%	4.81	206	12	5.8252%	2.9500%	6.08
75	145	8	5.5172%	3.3880%	4.91	180	7	3.8889%	2.9500%	5.31
76	145	11	7.5862%	3.6980%	5.36	152	5	3.2895%	2.9530%	4.49
77	128	8	6.2500%	4.0330%	5.16	156	8	5.1282%	3.2370%	5.05
78	123	8	6.5041%	4.3950%	5.41	162	9	5.5556%	3.5440%	5.74
79	102	7	6.8627%	4.7860%	4.88	163	10	6.1350%	3.8760%	6.32
80	94	11	11.7021%	5.2060%	4.89	154	13	8.4416%	4.2350%	6.52
81	78	6	7.6923%	5.6600%	4.41	143	9	6.2937%	4.6230%	6.61
82	82	7	8.5366%	6.1480%	5.04	127	7	5.5118%	5.0420%	6.40
83	68	8	11.7647%	6.6730%	4.54	125	11	8.8000%	5.4940%	6.87
84	58	11	18.9655%	7.2380%	4.20	105	10	9.5238%	5.9820%	6.28
85	41	8	19.5122%	7.8450%	3.22	104	17	16.3462%	6.5080%	6.77
86	25	2	8.0000%	8.4970%	2.12	78	6	7.6923%	7.0750%	5.52
87	30	3	10.0000%	9.1980%	2.76	79	12	15.1899%	7.6850%	6.07
88	24	4	16.6667%	9.9500%	2.39	74	8	10.8108%	8.3410%	6.17
89	16	4	25.0000%	10.7570%	1.72	63	7	11.1111%	9.0470%	5.70
90	8	0	0.0000%	11.6220%	0.93	50	7	14.0000%	9.8060%	4.90
91	4	0	0.0000%	12.5470%	0.50	32	10	31.2500%	10.6220%	3.40
92	6	1	16.6667%	13.5360%	0.81	22	4	18.1818%	11.4980%	2.53
93	3	1	33.3333%	14.5910%	0.44	13	3	23.0769%	12.4380%	1.62
94	4	1	25.0000%	15.7140%	0.63	12	5	41.6667%	13.4470%	1.61
95	1	0	0.0000%	16.9080%	0.17	6	2	33.3333%	14.5270%	0.87
Total	6,346	222	3.4983%	3.0558%	193.92	12,528	399	3.1849%	2.8126%	352.36

Appendix A

Active Mortality Raw Data

	Gender									
Age	Male					Female				
	Exposure	# Death	Death Actual	% Death Expected	# Death Expected	Exposure	# Death	% Death	ath Expected	# Death Expected
<20	2	0	0.0000%	0.0213%	0.00	2	0	0.0000%	0.0135%	0.00
20	6	0	0.0000%	0.0224%	0.00	4	0	0.0000%	0.0143%	0.00
21	13	0	0.0000%	0.0234%	0.00	28	0	0.0000%	0.0146%	0.00
22	37	0	0.0000%	0.0244%	0.01	167	0	0.0000%	0.0145%	0.02
23	526	0	0.0000%	0.0257%	0.14	2,572	0	0.0000%	0.0143%	0.37
24	1,486	0	0.0000%	0.0269%	0.40	5,154	1	0.0194%	0.0141%	0.73
25	2,109	0	0.0000%	0.0284%	0.60	6,610	1	0.0151%	0.0142%	0.94
26	2,459	0	0.0000%	0.0297%	0.73	7,604	1	0.0132%	0.0147%	1.12
27	2,789	0	0.0000%	0.0314%	0.88	8,315	1	0.0120%	0.0153%	1.27
28	3,057	0	0.0000%	0.0339%	1.04	9,089	1	0.0110%	0.0161%	1.46
29	3,272	0	0.0000%	0.0349%	1.14	9,533	1	0.0105%	0.0172%	1.64
30	3,422	2	0.0584%	0.0359%	1.23	9,818	1	0.0102%	0.0179%	1.76
31	3,721	1	0.0269%	0.0376%	1.40	10,040	2	0.0199%	0.0189%	1.90
32	3,874	1	0.0258%	0.0406%	1.57	9,704	0	0.0000%	0.0200%	1.94
33	3,915	2	0.0511%	0.0456%	1.79	9,358	4	0.0427%	0.0220%	2.06
34	3,980	3	0.0754%	0.0514%	2.05	9,102	2	0.0220%	0.0266%	2.42
35	3,934	0	0.0000%	0.0577%	2.27	9,122	4	0.0439%	0.0303%	2.76
36	3,961	1	0.0252%	0.0641%	2.54	9,241	1	0.0108%	0.0335%	3.10
37	4,026	2	0.0497%	0.0706%	2.84	9,543	4	0.0419%	0.0363%	3.46
38	4,195	3	0.0715%	0.0768%	3.22	10,159	1	0.0098%	0.0389%	3.95
39	4,220	0	0.0000%	0.0826%	3.49	10,567	1	0.0095%	0.0414%	4.37
40	4,120	2	0.0485%	0.0865%	3.56	10,305	4	0.0388%	0.0438%	4.51
41	3,906	2	0.0512%	0.0900%	3.52	9,817	2	0.0204%	0.0464%	4.56
42	3,767	4	0.1062%	0.0934%	3.52	9,330	1	0.0107%	0.0494%	4.61
43	3,701	1	0.0270%	0.0983%	3.64	8,903	6	0.0674%	0.0538%	4.79
44	3,633	3	0.0826%	0.1095%	3.98	9,668	0	0.0000%	0.0590%	5.70
45	3,583	3	0.0837%	0.1266%	4.54	8,670	4	0.0461%	0.0649%	5.63
46	3,549	5	0.1409%	0.1493%	5.30	8,901	4	0.0449%	0.0714%	6.36
47	3,550	3	0.0845%	0.1772%	6.29	9,209	6	0.0652%	0.0784%	7.22
48	3,670	4	0.1090%	0.2102%	7.71	9,273	11	0.1186%	0.0841%	7.80
49	3,699	5	0.1352%	0.2477%	9.16	9,319	9	0.0966%	0.0898%	8.37
50	3,777	6	0.1589%	0.2897%	10.94	9,515	5	0.0525%	0.0963%	9.16
51	3,956	8	0.2022%	0.3357%	13.28	10,237	7	0.0684%	0.1124%	11.51
52	4,111	7	0.1703%	0.3856%	15.85	10,603	9	0.0849%	0.1367%	14.49
53	4,233	4	0.0945%	0.3914%	16.57	10,954	11	0.1004%	0.1722%	18.86
54	4,224	2	0.0473%	0.3923%	16.57	11,118	10	0.0899%	0.1839%	20.45
55	4,278	10	0.2338%	0.3978%	17.02	11,175	13	0.1163%	0.2054%	22.95
56	4,382	8	0.1826%	0.4030%	17.66	11,504	13	0.1130%	0.2330%	26.80
57	4,214	9	0.2136%	0.4181%	17.62	10,825	17	0.1570%	0.2662%	28.82
58	3,697	11	0.2975%	0.4416%	16.33	9,964	15	0.1505%	0.3056%	30.45
59	3,378	5	0.1480%	0.4733%	15.99	8,918	10	0.1121%	0.3522%	31.41
60	2,958	10	0.3381%	0.5158%	15.26	7,640	10	0.1309%	0.4007%	30.61
61	2,666	6	0.2251%	0.5599%	14.93	6,283	11	0.1751%	0.4496%	28.25
62	2,221	7	0.3152%	0.6131%	13.62	4,972	9	0.1810%	0.5054%	25.13
63	1,769	4	0.2261%	0.6857%	12.13	3,627	5	0.1379%	0.5665%	20.55
64	1,282	2	0.1560%	0.7553%	9.68	2,523	4	0.1585%	0.6322%	15.95
65	1,054	5	0.4744%	0.8496%	8.95	1,779	1	0.0562%	0.7026%	12.50
66	878	6	0.6834%	0.9401%	8.25	1,259	4	0.3177%	0.7775%	9.79
67	741	5	0.6748%	1.0411%	7.71	877	3	0.3421%	0.8584%	7.53
68	582	2	0.3436%	1.1748%	6.84	597	1	0.1675%	0.9470%	5.65
69	414	4	0.9662%	1.3006%	5.38	421	2	0.4751%	1.0428%	4.39
70	364	3	0.8242%	1.4121%	5.14	310	1	0.3226%	1.1458%	3.55
71	304	2	0.6579%	1.5599%	4.74	237	2	0.8439%	1.2583%	2.98
72	263	2	0.7605%	1.6917%	4.45	164	0	0.0000%	1.3846%	2.27
73	190	0	0.0000%	1.8718%	3.56	137	0	0.0000%	1.5298%	2.10
74	141	0	0.0000%	2.0783%	2.93	106	1	0.9434%	1.6672%	1.77
75	96	3	3.1250%	2.3149%	2.22	74	0	0.0000%	1.8543%	1.37
76	79	0	0.0000%	2.5826%	2.04	70	0	0.0000%	2.0242%	1.42
77	71	0	0.0000%	2.9354%	2.08	54	0	0.0000%	2.2434%	1.21
78	56	2	3.5714%	3.2717%	1.83	36	0	0.0000%	2.4323%	0.88
79	38	1	2.6316%	3.7063%	1.41	17	0	0.0000%	2.6798%	0.46
80	38	0	0.0000%	4.1943%	1.59	12	0	0.0000%	3.0054%	0.36
81	28	0	0.0000%	4.7469%	1.33	6	0	0.0000%	3.3130%	0.20
82	17	0	0.0000%	5.3716%	0.91	6	0	0.0000%	3.6576%	0.22
83	14	0	0.0000%	6.1222%	0.86	3	0	0.0000%	4.0430%	0.12
84	8	0	0.0000%	6.9651%	0.56	1	0	0.0000%	4.4749%	0.04
85	6	0	0.0000%	7.7641%	0.47	1	0	0.0000%	5.5082%	0.06
86	4	0	0.0000%	8.7928%	0.35	1	0	0.0000%	6.1260%	0.06
87	4	0	0.0000%	9.7602%	0.39	1	0	0.0000%	6.9495%	0.07
88	3	0	0.0000%	10.8212%	0.32	1	0	0.0000%	7.8924%	0.08
89	3	0	0.0000%	12.2076%	0.37	1	0	0.0000%	8.9632%	0.09
90	1	0	0.0000%	13.7598%	0.14	1	0	0.0000%	9.9834%	0.10
Total	148,726	181	0.1217%	0.2535%	376.96	375,157	237	0.0632%	0.1305%	489.47

Appendix A

Disability Retirement Raw Data

Age	Gender									
	Male					Female				
	Exposure	# Disabled	% Disabled Actual	% Disabled Expected	# Disabled Expected	Exposure	# Disabled	% Disabled Actual	% Disabled Expected	# Disabled Expected
<20	2	0	0.0000%	0.0100%	0.00	2	0	0.0000%	0.0200%	0.00
20	6	0	0.0000%	0.0100%	0.00	4	0	0.0000%	0.0200%	0.00
21	13	0	0.0000%	0.0100%	0.00	28	0	0.0000%	0.0200%	0.01
22	37	0	0.0000%	0.0100%	0.00	167	0	0.0000%	0.0200%	0.03
23	526	0	0.0000%	0.0100%	0.05	2,572	0	0.0000%	0.0200%	0.51
24	1,486	0	0.0000%	0.0100%	0.15	5,154	0	0.0000%	0.0200%	1.03
25	2,109	0	0.0000%	0.0100%	0.21	6,610	0	0.0000%	0.0200%	1.32
26	2,459	0	0.0000%	0.0100%	0.25	7,604	0	0.0000%	0.0200%	1.52
27	2,789	0	0.0000%	0.0100%	0.28	8,315	0	0.0000%	0.0200%	1.66
28	3,057	0	0.0000%	0.0100%	0.31	9,089	0	0.0000%	0.0200%	1.82
29	3,272	0	0.0000%	0.0150%	0.49	9,533	0	0.0000%	0.0200%	1.91
30	3,422	0	0.0000%	0.0180%	0.62	9,818	1	0.0102%	0.0210%	2.06
31	3,721	1	0.0269%	0.0210%	0.78	10,040	1	0.0100%	0.0250%	2.51
32	3,874	2	0.0516%	0.0240%	0.93	9,704	4	0.0412%	0.0280%	2.72
33	3,915	1	0.0255%	0.0270%	1.06	9,358	3	0.0321%	0.0420%	3.93
34	3,980	0	0.0000%	0.0350%	1.39	9,102	3	0.0330%	0.0540%	4.92
35	3,934	2	0.0508%	0.0400%	1.57	9,122	7	0.0767%	0.0660%	6.02
36	3,961	1	0.0252%	0.0500%	1.98	9,241	3	0.0325%	0.0780%	7.21
37	4,026	1	0.0248%	0.0600%	2.42	9,543	4	0.0419%	0.0900%	8.59
38	4,195	2	0.0477%	0.0700%	2.94	10,159	7	0.0689%	0.1000%	10.16
39	4,220	0	0.0000%	0.0850%	3.59	10,567	3	0.0284%	0.1100%	11.62
40	4,120	1	0.0243%	0.0950%	3.91	10,305	1	0.0097%	0.1200%	12.37
41	3,906	0	0.0000%	0.1050%	4.10	9,817	6	0.0611%	0.1400%	13.74
42	3,767	1	0.0265%	0.1150%	4.33	9,330	7	0.0750%	0.1500%	14.00
43	3,701	2	0.0540%	0.1550%	5.74	8,903	6	0.0674%	0.1550%	13.80
44	3,633	3	0.0826%	0.1650%	5.99	9,668	7	0.0724%	0.1600%	15.47
45	3,583	5	0.1395%	0.1750%	6.27	8,670	4	0.0461%	0.1650%	14.31
46	3,549	4	0.1127%	0.1850%	6.57	8,901	13	0.1461%	0.1700%	15.13
47	3,550	4	0.1127%	0.1950%	6.92	9,209	5	0.0543%	0.1800%	16.58
48	3,670	3	0.0817%	0.2000%	7.34	9,273	12	0.1294%	0.2000%	18.55
49	3,699	1	0.0270%	0.2200%	8.14	9,319	11	0.1180%	0.2200%	20.50
50	3,777	6	0.1589%	0.2400%	9.06	9,515	12	0.1261%	0.2400%	22.84
51	3,956	3	0.0758%	0.2600%	10.29	10,237	8	0.0781%	0.2600%	26.62
52	4,111	10	0.2432%	0.2700%	11.10	10,603	16	0.1509%	0.2700%	28.63
53	4,233	6	0.1417%	0.2800%	11.85	10,954	12	0.1095%	0.2800%	30.67
54	4,224	12	0.2841%	0.2900%	12.25	11,118	18	0.1619%	0.2900%	32.24
55	4,278	10	0.2338%	0.3000%	12.83	11,175	21	0.1879%	0.3000%	33.53
56	4,382	11	0.2510%	0.3100%	13.58	11,504	17	0.1478%	0.3100%	35.66
57	4,214	11	0.2610%	0.3200%	13.48	10,825	23	0.2125%	0.3200%	34.64
58	3,697	11	0.2975%	0.3300%	12.20	9,964	14	0.1405%	0.3300%	32.88
59	3,378	7	0.2072%	0.3400%	11.49	8,918	14	0.1570%	0.3400%	30.32
60	2,958	5	0.1690%	0.3500%	10.35	7,640	10	0.1309%	0.3500%	26.74
61	2,666	1	0.0375%	0.3600%	9.60	6,283	4	0.0637%	0.3600%	22.62
62	2,221	0	0.0000%	0.3700%	8.22	4,972	9	0.1810%	0.3700%	18.40
63	1,769	1	0.0565%	0.3800%	6.72	3,627	5	0.1379%	0.3800%	13.78
64	1,282	0	0.0000%	0.3900%	5.00	2,523	0	0.0000%	0.3900%	9.84
65	1,054	0	0.0000%	0.4000%	4.22	1,779	0	0.0000%	0.4000%	7.12
66	878	0	0.0000%	0.4000%	3.51	1,259	1	0.0794%	0.4000%	5.04
67	741	0	0.0000%	0.4000%	2.96	877	0	0.0000%	0.4000%	3.51
68	582	0	0.0000%	0.4000%	2.33	597	1	0.1675%	0.4000%	2.39
69	414	0	0.0000%	0.4000%	1.66	421	0	0.0000%	0.4000%	1.68
70	364	0	0.0000%	0.4000%	1.46	310	0	0.0000%	0.4000%	1.24
71	304	0	0.0000%	0.4000%	1.22	237	0	0.0000%	0.4000%	0.95
72	263	0	0.0000%	0.4000%	1.05	164	0	0.0000%	0.4000%	0.66
73	190	0	0.0000%	0.4000%	0.76	137	0	0.0000%	0.4000%	0.55
74	141	0	0.0000%	0.4000%	0.56	106	0	0.0000%	0.4000%	0.42
75	96	0	0.0000%	0.4000%	0.38	74	0	0.0000%	0.4000%	0.30
76	79	0	0.0000%		0.00	70	0	0.0000%		0.00
77	71	0	0.0000%		0.00	54	0	0.0000%		0.00
78	56	0	0.0000%		0.00	36	0	0.0000%		0.00
79	38	0	0.0000%		0.00	17	0	0.0000%		0.00
80	38	0	0.0000%		0.00	12	0	0.0000%		0.00
81	28	0	0.0000%		0.00	6	0	0.0000%		0.00
82	17	0	0.0000%		0.00	6	0	0.0000%		0.00
83	14	0	0.0000%		0.00	3	0	0.0000%		0.00
84	8	0	0.0000%		0.00	1	0	0.0000%		0.00
85	6	0	0.0000%		0.00	1	0	0.0000%		0.00
86	4	0	0.0000%		0.00	1	0	0.0000%		0.00
87	4	0	0.0000%		0.00	1	0	0.0000%		0.00
88	3	0	0.0000%		0.00	1	0	0.0000%		0.00
89	3	0	0.0000%		0.00	1	0	0.0000%		0.00
90	1	0	0.0000%		0.00	1	0	0.0000%		0.00
91	1	0	0.0000%		0.00	0	0	0.0000%		0.00
Total	148,726	128	0.0861%	0.1724%	256.46	375,157	293	0.0781%	0.1725%	647.23

Appendix A

60 /5 (< 25 YOS) Retirement Raw Data

	Gender									
Age	Male					Female				
	Exposure	# Retired	% Retired	% Retired Expected	# Retired Expected	Exposure	# Retired	% Retired	% Retired Expected	# Retired Expected
60	2,789	283	10.1470%	13.0000%	362.57	8,582	886	10.3239%	22.0000%	1,888.04
61	1,236	119	9.6278%	7.0000%	86.52	3,117	334	10.7154%	9.0000%	280.53
62	1,047	118	11.2703%	7.0000%	73.29	2,477	285	11.5059%	9.0000%	222.93
63	817	121	14.8103%	7.0000%	57.19	1,769	234	13.2278%	9.0000%	159.21
64	555	67	12.0721%	9.0000%	49.95	1,255	223	17.7689%	15.0000%	188.25
65	471	100	21.2314%	17.0000%	80.07	865	224	25.8960%	20.0000%	173.00
66	366	67	18.3060%	15.0000%	54.90	591	133	22.5042%	13.0000%	76.83
67	302	44	14.5695%	12.0000%	36.24	406	83	20.4433%	13.0000%	52.78
68	236	39	16.5254%	12.0000%	28.32	273	59	21.6117%	12.0000%	32.76
69	171	31	18.1287%	12.0000%	20.52	202	47	23.2673%	12.0000%	24.24
70	153	24	15.6863%	12.0000%	18.36	144	22	15.2778%	12.0000%	17.28
71	130	17	13.0769%	12.0000%	15.60	107	24	22.4299%	12.0000%	12.84
72	103	14	13.5922%	12.0000%	12.36	71	15	21.1268%	12.0000%	8.52
73	73	18	24.6575%	12.0000%	8.76	60	15	25.0000%	12.0000%	7.20
74	55	7	12.7273%	12.0000%	6.60	47	10	21.2766%	12.0000%	5.64
75	43	12	27.9070%	100.0000%	43.00	39	7	17.9487%	100.0000%	39.00
76	38	5	13.1579%	100.0000%	38.00	34	5	14.7059%	100.0000%	34.00
77	33	7	21.2121%	100.0000%	33.00	32	9	28.1250%	100.0000%	32.00
78	26	6	23.0769%	100.0000%	26.00	18	3	16.6667%	100.0000%	18.00
79	16	5	31.2500%	100.0000%	16.00	8	2	25.0000%	100.0000%	8.00
80	14	3	21.4286%	100.0000%	14.00	5	1	20.0000%	100.0000%	5.00
81	14	1	7.1429%	100.0000%	14.00	2	1	50.0000%	100.0000%	2.00
82	6	0	0.0000%	100.0000%	6.00	1	0	0.0000%	100.0000%	1.00
83	7	1	14.2857%	100.0000%	7.00	0	0	0.0000%	100.0000%	0.00
84	5	2	40.0000%	100.0000%	5.00	0	0	0.0000%	100.0000%	0.00
85	2	2	100.0000%	100.0000%	2.00	0	0	0.0000%	100.0000%	0.00
86	1	0	0.0000%	100.0000%	1.00	0	0	0.0000%	100.0000%	0.00
87	2	0	0.0000%	100.0000%	2.00	0	0	0.0000%	100.0000%	0.00
88	2	0	0.0000%	100.0000%	2.00	1	0	0.0000%	100.0000%	1.00
89	2	0	0.0000%	100.0000%	2.00	1	0	0.0000%	100.0000%	1.00
90	1	0	0.0000%	100.0000%	1.00	0	0	0.0000%	100.0000%	0.00
91	1	1	100.0000%	100.0000%	1.00	0	0	0.0000%	100.0000%	0.00
Total	8,717	1,114	12.7796%	12.8972%	1,124.25	20,107	2,622	13.0402%	16.3677%	3,291.05

Appendix A

55 / 25 (YOS 25 – 29) Retirement Raw Data

	Gender										
Age	Male					Female					
	Exposure	# Retired	% Retired	% Retired Expected	# Retired Expected	Exposure	# Retired	% Retired	% Retired Expected	# Retired Expected
55	1,310	67	5.1145%	18.0000%	235.80	2,860	181	6.3287%	14.0000%	400.40
56	572	22	3.8462%	6.0000%	34.32	1,490	100	6.7114%	9.0000%	134.10
57	552	38	6.8841%	6.0000%	33.12	1,533	130	8.4801%	9.0000%	137.97
58	533	30	5.6285%	6.0000%	31.98	1,575	148	9.3968%	9.0000%	141.75
59	492	50	10.1626%	6.0000%	29.52	1,509	172	11.3983%	13.0000%	196.17
60	407	43	10.5651%	9.0000%	36.63	1,373	195	14.2025%	15.0000%	205.95
61	372	30	8.0645%	9.0000%	33.48	1,199	151	12.5938%	15.0000%	179.85
62	311	34	10.9325%	8.0000%	24.88	942	155	16.4544%	15.0000%	141.30
63	226	28	12.3894%	8.0000%	18.08	704	124	17.6136%	15.0000%	105.60
64	164	25	15.2439%	14.0000%	22.96	463	125	26.9978%	30.0000%	138.90
65	125	28	22.4000%	20.0000%	25.00	336	111	33.0357%	32.0000%	107.52
66	101	14	13.8614%	20.0000%	20.20	207	59	28.5024%	22.0000%	45.54
67	79	16	20.2532%	15.0000%	11.85	127	30	23.6220%	20.0000%	25.40
68	58	15	25.8621%	15.0000%	8.70	95	19	20.0000%	20.0000%	19.00
69	35	8	22.8571%	15.0000%	5.25	61	15	24.5902%	20.0000%	12.20
70	25	5	20.0000%	15.0000%	3.75	44	13	29.5455%	20.0000%	8.80
71	18	3	16.6667%	15.0000%	2.70	26	8	30.7692%	20.0000%	5.20
72	19	2	10.5263%	15.0000%	2.85	17	2	11.7647%	20.0000%	3.40
73	14	1	7.1429%	15.0000%	2.10	14	3	21.4286%	20.0000%	2.80
74	13	3	23.0769%	15.0000%	1.95	10	1	10.0000%	20.0000%	2.00
75	5	0	0.0000%	100.0000%	5.00	6	1	16.6667%	100.0000%	6.00
76	6	1	16.6667%	100.0000%	6.00	4	0	0.0000%	100.0000%	4.00
77	5	0	0.0000%	100.0000%	5.00	1	0	0.0000%	100.0000%	1.00
78	6	4	66.6667%	100.0000%	6.00	1	0	0.0000%	100.0000%	1.00
79	1	1	100.0000%	100.0000%	1.00	2	0	0.0000%	100.0000%	2.00
80	1	1	100.0000%	100.0000%	1.00	0	0	0.0000%	100.0000%	0.00
81	0	0	0.0000%	100.0000%	0.00	1	0	0.0000%	100.0000%	1.00
82	2	0	0.0000%	100.0000%	2.00	1	1	100.0000%	100.0000%	1.00
83	1	1	100.0000%	100.0000%	1.00	0	0	0.0000%	100.0000%	0.00
84	1	0	0.0000%	100.0000%	1.00	0	0	0.0000%	100.0000%	0.00
85	1	0	0.0000%	100.0000%	1.00	0	0	0.0000%	100.0000%	0.00
Total	5,455	470	8.6159%	11.2579%	614.12	14,601	1,744	11.9444%	13.9021%	2,029.85

Appendix A

30 Years (YOS 30 - 34) Retirement Raw Data

	Gender										
Age	Male					Female					
	Exposure	# Retired	% Retired	% Retired Expected	# Retired Expected	Exposure	# Retired	% Retired	% Retired Expected	# Retired Expected
48	0	0	0.0000%	20.0000%	0.00	1	0	0.0000%	20.0000%	0.20
49	0	0	0.0000%	20.0000%	0.00	11	1	9.0909%	20.0000%	2.20
50	8	0	0.0000%	20.0000%	1.60	76	13	17.1053%	20.0000%	15.20
51	434	109	25.1152%	20.0000%	86.80	1,094	189	17.2761%	20.0000%	218.80
52	855	141	16.4912%	20.0000%	171.00	2,088	297	14.2241%	20.0000%	417.60
53	1,147	134	11.6827%	15.0000%	172.05	2,720	296	10.8824%	15.0000%	408.00
54	1,284	144	11.2150%	14.0000%	179.76	3,127	343	10.9690%	12.0000%	375.24
55	1,449	149	10.2830%	12.0000%	173.88	3,282	332	10.1158%	12.0000%	393.84
56	1,155	116	10.0433%	14.0000%	161.70	2,398	301	12.5521%	15.0000%	359.70
57	880	128	14.5455%	14.0000%	123.20	1,709	294	17.2030%	15.0000%	256.35
58	627	95	15.1515%	15.0000%	94.05	1,384	259	18.7139%	15.0000%	207.60
59	549	76	13.8434%	16.0000%	87.84	1,207	253	20.9611%	20.0000%	241.40
60	449	67	14.9220%	15.0000%	67.35	1,088	246	22.6103%	25.0000%	272.00
61	387	73	18.8630%	15.0000%	58.05	958	245	25.5741%	25.0000%	239.50
62	289	51	17.6471%	15.0000%	43.35	777	217	27.9279%	25.0000%	194.25
63	260	43	16.5385%	10.0000%	26.00	584	188	32.1918%	25.0000%	146.00
64	181	32	17.6796%	10.0000%	18.10	407	128	31.4496%	25.0000%	101.75
65	119	19	15.9664%	10.0000%	11.90	269	89	33.0855%	25.0000%	67.25
66	98	19	19.3878%	10.0000%	9.80	197	50	25.3807%	25.0000%	49.25
67	75	14	18.6667%	10.0000%	7.50	148	52	35.1351%	25.0000%	37.00
68	63	12	19.0476%	10.0000%	6.30	80	31	38.7500%	15.0000%	12.00
69	48	5	10.4167%	10.0000%	4.80	47	14	29.7872%	15.0000%	7.05
70	32	7	21.8750%	10.0000%	3.20	37	11	29.7297%	15.0000%	5.55
71	30	2	6.6667%	10.0000%	3.00	22	7	31.8182%	15.0000%	3.30
72	19	2	10.5263%	10.0000%	1.90	16	4	25.0000%	15.0000%	2.40
73	14	4	28.5714%	10.0000%	1.40	17	5	29.4118%	15.0000%	2.55
74	10	0	0.0000%	10.0000%	1.00	10	1	10.0000%	15.0000%	1.50
75	9	0	0.0000%	100.0000%	9.00	9	1	11.1111%	100.0000%	9.00
76	4	2	50.0000%	100.0000%	4.00	7	1	14.2857%	100.0000%	7.00
77	3	1	33.3333%	100.0000%	3.00	6	1	16.6667%	100.0000%	6.00
78	1	0	0.0000%	100.0000%	1.00	3	1	33.3333%	100.0000%	3.00
79	1	0	0.0000%	100.0000%	1.00	1	0	0.0000%	100.0000%	1.00
80	1	1	100.0000%	100.0000%	1.00	1	1	100.0000%	100.0000%	1.00
81	1	1	100.0000%	100.0000%	1.00	0	0	0.0000%	100.0000%	0.00
Total	10,482	1,447	13.8046%	14.6492%	1,535.53	23,781	3,871	16.2777%	17.0913%	4,064.48

Appendix A

35 Years Retirement Raw Data

	Gender										
Age	Male					Female					
	Exposure	# Retired	% Retired	% Retired Expected	# Retired Expected	Exposure	# Retired	% Retired	% Retired Expected	# Retired Expected
53	1	0	0.0000%	40.0000%	0.40	3	0	0.0000%	50.0000%	1.50
54	4	2	50.0000%	60.0000%	2.40	7	1	14.2857%	50.0000%	3.50
55	22	10	45.4545%	60.0000%	13.20	123	48	39.0244%	50.0000%	61.50
56	494	293	59.3117%	60.0000%	296.40	1,326	710	53.5445%	50.0000%	663.00
57	681	379	55.6535%	55.0000%	374.55	1,576	780	49.4924%	50.0000%	788.00
58	589	311	52.8014%	50.0000%	294.50	1,331	606	45.5297%	40.0000%	532.40
59	476	230	48.3193%	45.0000%	214.20	1,031	479	46.4597%	40.0000%	412.40
60	415	203	48.9157%	45.0000%	186.75	800	368	46.0000%	40.0000%	320.00
61	339	157	46.3127%	40.0000%	135.60	633	317	50.0790%	40.0000%	253.20
62	243	105	43.2099%	35.0000%	85.05	461	207	44.9024%	45.0000%	207.45
63	170	69	40.5882%	30.0000%	51.00	331	150	45.3172%	45.0000%	148.95
64	158	55	34.8101%	30.0000%	47.40	208	103	49.5192%	45.0000%	93.60
65	173	57	32.9480%	30.0000%	51.90	167	79	47.3054%	45.0000%	75.15
66	155	48	30.9677%	30.0000%	46.50	130	62	47.6923%	40.0000%	52.00
67	142	46	32.3944%	25.0000%	35.50	98	41	41.8367%	35.0000%	34.30
68	92	26	28.2609%	20.0000%	18.40	59	26	44.0678%	35.0000%	20.65
69	63	15	23.8095%	20.0000%	12.60	61	27	44.2623%	35.0000%	21.35
70	56	13	23.2143%	20.0000%	11.20	40	11	27.5000%	35.0000%	14.00
71	51	9	17.6471%	20.0000%	10.20	32	10	31.2500%	35.0000%	11.20
72	54	12	22.2222%	20.0000%	10.80	21	7	33.3333%	35.0000%	7.35
73	45	9	20.0000%	20.0000%	9.00	14	4	28.5714%	35.0000%	4.90
74	28	6	21.4286%	20.0000%	5.60	17	7	41.1765%	35.0000%	5.95
75	24	7	29.1667%	100.0000%	24.00	8	2	25.0000%	100.0000%	8.00
76	17	2	11.7647%	100.0000%	17.00	12	3	25.0000%	100.0000%	12.00
77	16	3	18.7500%	100.0000%	16.00	6	1	16.6667%	100.0000%	6.00
78	14	4	28.5714%	100.0000%	14.00	5	2	40.0000%	100.0000%	5.00
79	9	2	22.2222%	100.0000%	9.00	3	1	33.3333%	100.0000%	3.00
80	10	5	50.0000%	100.0000%	10.00	2	1	50.0000%	100.0000%	2.00
81	4	1	25.0000%	100.0000%	4.00	1	0	0.0000%	100.0000%	1.00
82	3	0	0.0000%	100.0000%	3.00	2	1	50.0000%	100.0000%	2.00
83	2	0	0.0000%	100.0000%	2.00	1	1	100.0000%	100.0000%	1.00
84	2	0	0.0000%	100.0000%	2.00	0	0	0.0000%	100.0000%	0.00
85	1	0	0.0000%	100.0000%	1.00	0	0	0.0000%	100.0000%	0.00
86	1	0	0.0000%	100.0000%	1.00	0	0	0.0000%	100.0000%	0.00
Total	4,554	2,079	45.6522%	44.2721%	2,016.15	8,509	4,055	47.6554%	44.3336%	3,772.35

Appendix A

Withdrawal < 5 YOS Raw Data

	Male and Female Combined		
Service	**Exposure**	**# Terminated**	**% Terminated**
0	10,235	4,397	42.9604%
1	36,876	8,382	22.7302%
2	27,997	3,753	13.4050%
3	23,686	2,293	9.6808%
4	20,284	1,443	7.1140%
Total	119,078	20,268	17.0208%

Appendix A

Withdrawal
5 or more YOS
Raw Data

	Gender									
Age	Male					Female				
	Exposure	# Terminated	% Terminated	% Terminated Expected	# Terminated Expected	Exposure	# Terminated	% Terminated	% Terminated Expected	# Terminated Expected
23	0	0	0.0000%	15.0000%	0	1	0	0.0000%	20.0000%	0
24	0	0	0.0000%	15.0000%	0	0	0	0.0000%	20.0000%	0
25	1	0	0.0000%	15.0000%	0	3	0	0.0000%	19.0000%	1
26	11	0	0.0000%	15.0000%	2	67	4	5.9701%	17.0000%	11
27	229	7	3.0568%	11.0000%	25	1,504	49	3.2580%	14.0000%	211
28	860	19	2.2093%	5.6000%	48	3,638	117	3.2161%	8.0000%	291
29	1,501	37	2.4650%	4.0000%	60	5,276	187	3.5444%	7.2000%	380
30	1,978	31	1.5672%	3.2000%	63	6,317	228	3.6093%	6.4000%	404
31	2,443	52	2.1285%	2.8000%	68	6,995	252	3.6026%	5.6000%	392
32	2,699	56	2.0748%	2.6400%	71	7,083	221	3.1201%	4.8000%	340
33	2,781	59	2.1215%	2.7900%	78	7,084	217	3.0632%	4.9500%	351
34	2,920	48	1.6438%	2.7000%	79	7,011	193	2.7528%	4.0500%	284
35	2,958	56	1.8932%	2.6100%	77	7,066	168	2.3776%	3.6000%	254
36	3,084	56	1.8158%	2.5200%	78	7,291	165	2.2631%	3.3300%	243
37	3,153	57	1.8078%	2.4300%	77	7,636	159	2.0822%	3.0600%	234
38	3,302	59	1.7868%	2.3400%	77	8,113	159	1.9598%	2.7900%	226
39	3,352	64	1.9093%	2.2500%	75	8,402	149	1.7734%	2.5200%	212
40	3,283	51	1.5535%	2.1600%	71	8,165	136	1.6656%	2.2500%	184
41	3,143	56	1.7817%	2.0700%	65	7,798	125	1.6030%	2.1600%	168
42	3,044	66	2.1682%	1.9800%	60	7,335	120	1.6360%	2.0700%	152
43	2,992	64	2.1390%	2.1000%	63	7,023	124	1.7656%	1.9800%	139
44	2,984	59	1.9772%	2.0000%	60	7,242	100	1.3808%	1.8900%	137
45	2,928	49	1.6735%	1.9000%	56	6,904	116	1.6802%	1.8000%	124
46	2,925	58	1.9829%	1.8000%	53	7,167	103	1.4371%	1.8000%	129
47	3,006	33	1.0978%	1.7000%	51	7,495	116	1.5477%	1.8000%	135
48	3,096	62	2.0026%	1.9200%	59	7,642	137	1.7927%	2.0000%	153
49	3,116	55	1.7651%	1.8000%	56	7,801	133	1.7049%	2.0000%	156
50	3,200	68	2.1250%	1.8000%	58	8,042	136	1.6911%	2.0000%	161
51	2,960	64	2.1622%	1.8000%	53	7,751	192	2.4771%	2.0000%	155
52	2,726	83	3.0448%	1.8000%	49	7,205	192	2.6648%	2.0000%	144
53	2,530	76	3.0040%	1.8000%	46	6,943	184	2.6502%	2.4000%	167
54	1,749	80	4.5740%	1.8000%	31	5,425	157	2.8940%	2.4000%	130
55	1,673	72	4.3036%	1.8000%	30	5,315	188	3.5372%	2.4000%	128
56	1,651	90	5.4512%	1.8000%	30	5,303	189	3.5640%	2.4000%	127
57	1,571	81	5.1560%	1.8000%	28	5,134	190	3.7008%	2.4000%	123
58	1,445	84	5.8131%	1.8000%	26	4,885	179	3.6643%	2.4000%	117
59	0	0	0.0000%	1.8000%	0	0	0	0.0000%	2.4000%	0
60	0	0	0.0000%	1.8000%	0	0	0	0.0000%	2.4000%	0
Total	81,294	1,852	2.2782%	2.2432%	1,824	214,062	5,085	2.3755%	3.0656%	6,562

Appendix A

Salary Increase Raw Data

Age	Average Salary Increase Over the Period	Average Salary Increase Over the Period Net of Inflation	Expected Salary Increase Net of Inflation	Proposed Salary Increase Net of Inflation
20	10.50%	9.45%	9.00%	9.50%
21	19.01%	17.95%	9.00%	9.50%
22	12.40%	11.34%	9.00%	9.50%
23	13.44%	12.39%	9.00%	9.50%
24	12.51%	11.45%	9.00%	9.50%
25	9.80%	8.74%	9.00%	9.50%
26	8.67%	7.61%	8.20%	7.60%
27	7.75%	6.70%	7.40%	6.70%
28	7.28%	6.23%	6.60%	6.20%
29	6.93%	5.88%	5.80%	5.90%
30	6.53%	5.48%	5.00%	5.50%
31	6.67%	5.61%	4.85%	5.50%
32	6.38%	5.33%	4.70%	5.00%
33	6.55%	5.50%	4.55%	5.00%
34	5.95%	4.89%	4.40%	4.90%
35	5.80%	4.74%	4.25%	4.70%
36	5.42%	4.36%	4.00%	4.40%
37	5.24%	4.19%	3.75%	4.20%
38	4.89%	3.83%	3.50%	3.80%
39	4.63%	3.57%	3.25%	3.60%
40	4.37%	3.31%	3.00%	3.30%
41	4.39%	3.33%	2.85%	3.30%
42	4.32%	3.26%	2.70%	3.20%
43	4.31%	3.26%	2.55%	3.00%
44	3.98%	2.93%	2.40%	2.90%
45	3.94%	2.88%	2.25%	2.75%
46	3.73%	2.67%	2.10%	2.60%
47	3.73%	2.67%	1.95%	2.45%
48	3.65%	2.59%	1.80%	2.30%
49	3.35%	2.29%	1.65%	2.15%
50	3.42%	2.36%	1.50%	2.00%
51	3.31%	2.25%	1.40%	1.90%
52	3.07%	2.02%	1.30%	1.80%
53	2.93%	1.88%	1.20%	1.70%
54	2.86%	1.81%	1.10%	1.60%
55	2.81%	1.75%	1.00%	1.50%
56	2.67%	1.61%	0.90%	1.40%
57	2.75%	1.69%	0.80%	1.30%
58	2.63%	1.58%	0.70%	1.20%
59	2.77%	1.72%	0.60%	1.10%
60	2.76%	1.70%	0.50%	1.00%
61	2.44%	1.38%	0.45%	1.00%
62	2.29%	1.24%	0.40%	0.50%
63	2.81%	1.75%	0.35%	0.50%
64	2.18%	1.13%	0.30%	0.50%
65	2.51%	1.45%	0.25%	0.50%
66	2.09%	1.04%	0.20%	0.50%
67	2.48%	1.43%	0.15%	0.50%
68	2.60%	1.54%	0.10%	0.50%
69	2.28%	1.22%	0.05%	0.50%
70	0.56%	-0.50%	0.00%	0.00%
71	1.97%	0.91%	0.00%	0.00%
72	1.30%	0.24%	0.00%	0.00%
73	2.11%	1.06%	0.00%	0.00%
74	3.01%	1.95%	0.00%	0.00%
75	-0.87%	-1.93%	0.00%	0.00%

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This 2011 Experience Study was based on the actuarial assumptions and methods as adopted by the Board of Trustees. A full summary of the actuarial assumptions and plan provisions applied in generating the results enclosed herein, can be found in our actuarial valuation report which reports the final July 1, 2011 valuation results.

In preparing the results presented in this presentation, we have relied upon information provided to us regarding the plan provisions, proposed plan changes, System members, unaudited plan assets, and benefit payments. The census data and plan asset information used in determining the results herein were collected as of July 1, 2008, July 1, 2009, July 1, 2010 and July 1, 2011. While the scope of our engagement did not call for us to perform an audit or independent verification of this information, we have reviewed this information for reasonableness but have not audited it. The accuracy of the results presented in this presentation is dependent upon the accuracy and completeness of the underlying information. The experience study has been conducted in accordance with generally accepted actuarial principles and practices.

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