
Municipal Fire and Police Retirement System of Iowa

Post-Retirement Mortality Assumption Study

June 2017

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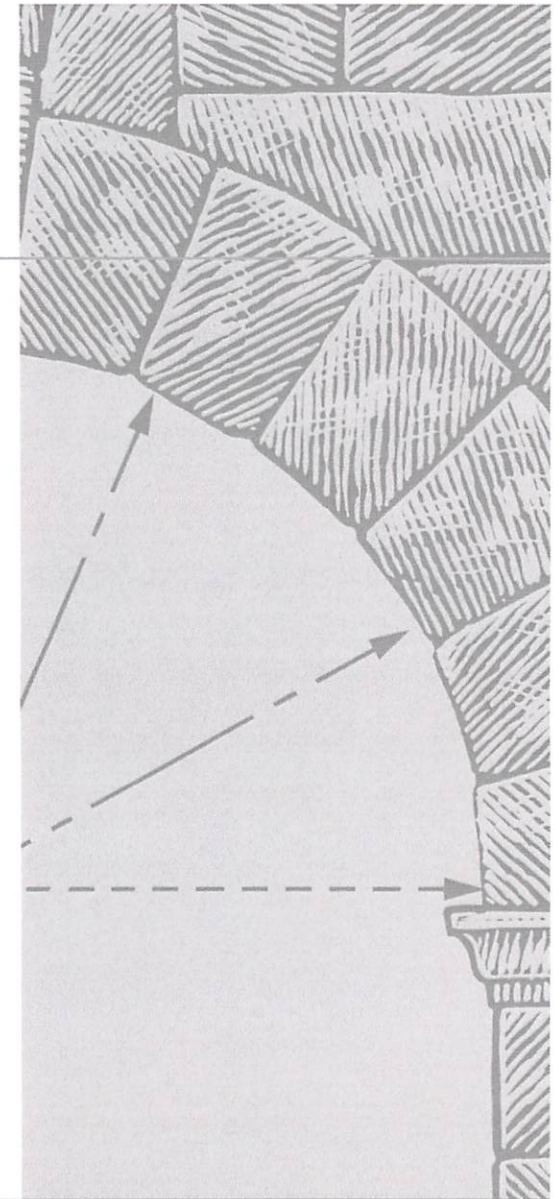
SilverStone
GROUP 

Topics

- Mortality Assumption Overview
- Public Pension Plan Trends
- Actuarial Standards of Practice
- MFPRSI Experience
- SilverStone Group's Recommendation
- Impact on Actuarial Valuation

Mortality Assumption

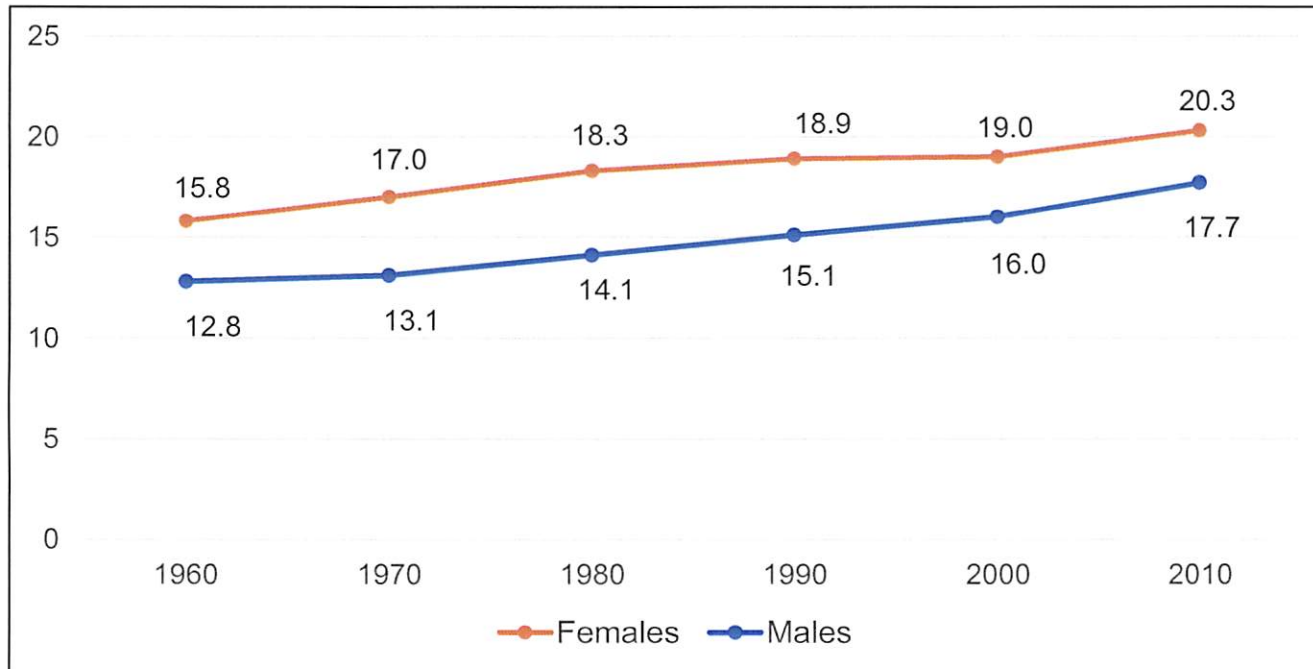
- Board of Trustees and System management has agreed to an analysis of the post-retirement mortality assumptions used in the actuarial valuation of the System
- This assumption has historically been updated periodically in response to recent mortality experience of the System and observed trends
- Some updates to mortality assumption were to “catch up” to System experience
- System has not yet adopted an assumption of future mortality improvement



History of Post-Retirement Mortality Assumptions

- Valuation year assumptions as of July 1
 - 1998 – 1971 GAM
 - 1999 – 11/12 1971 GAM and 1/12 1994 GAM
 - 2000 – 10/12 1971 GAM and 2/12 1994 GAM
 - 2001 – 9/12 1971 GAM and 3/12 1994 GAM
 - 2005 – 8/12 1971 GAM and 4/12 1994 GAM
 - 2006 – 5/12 1971 GAM and 7/12 1994 GAM
 - 2007 – 4/12 1971 GAM and 8/12 1994 GAM
 - 2014 – 2/12 1971 GAM and 10/12 1994 GAM
 - 2015 – 1/12 1971 GAM and 11/12 1994 GAM
 - 2016 – RP 2000, Blue Collar (Male -2, Female +1)

Life Expectancy for the General US Population – from Age 65



Since 2010, life expectancies continue to increase. The latest published rates (2014) are 20.5 years for females and 18.0 years for males, both from age 65.

Source: Health, United States 2015 Report, National Center for Health Statistics

What Does Life Expectancy in a Given Year Mean?

- It is important to understand how to interpret the data in the statistics
- When males age 65 in 2010 had a life expectancy of 17.7 years, that does not actually mean men who are age 65 in 2010 will live 17.7 years, in fact, half would be expected to live longer and half would not
- Instead, the 17.7 years represents an estimated life expectancy for the male population using the probability of death from 2010 at *all ages above age 65*. We will define this as “static”
- Alternatively, if improvement in mortality occurs in the future, we would expect estimated life expectancy to improve for a male age 65 in the future (for example, a male age 65 in the year 2030). We will define this as “generational”

Public Pension Plan Trends

- Most public pension plans we have observed include an assumption for future mortality improvement
- In the last three to five years, the majority of pension plans have adopted a generational mortality improvement scale
- Of the 11 other regional police and fire Systems included in our May 2017 survey, 10 of the 11 included a generational mortality improvement scale assumption
 - Most selected either improvement scale AA or BB

Actuarial Standards of Practice No. 35

Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations

From Background Section of the ASOP

- As mortality rates have continued to decline over time, concern has increased about the impact of potential future mortality improvements on the magnitude of pension commitments
- In the view of many actuaries, the guidance regarding mortality assumptions should more explicitly recognize estimated future mortality improvement as a fundamental and necessary assumption, and the actuary's provision for such improvement should be disclosed explicitly and transparently

Actuarial Standards of Practice No. 35 (continued)

From Section 3.5.3: Mortality and Mortality Improvement Assumptions

- The actuary should reflect* the effect of mortality improvement both before and after the measurement date
- With regard to mortality improvement, the actuary should do the following:
 - Adjust mortality rates to reflect mortality improvement prior to the measurement date
 - Include an assumption as to expected mortality improvement after the measurement date
- Note that the existence of uncertainty about the occurrence or magnitude of future mortality improvement does not by itself mean that an assumption of zero future improvement is a reasonable assumption

*This language was changed from “should consider” to “should reflect” effective for measurement dates on or after June 30, 2015.

Actuarial Standards of Practice

- Assumptions to be a reasonable expectation of future experience
- May include some margins in case of potential adverse experience
- Each specific assumption held to reasonableness standard

From a Report by the Society of Actuaries (SOA) Retirement Plans Experience Committee (RPEC), published September 2012

- Projection Scale BB has been published, based on recent data and trends. The following are excerpts from the report which introduced Scale BB.
 - “As part of its periodic review of retirement plan mortality experience, RPEC initiated a Pension Mortality Study in 2010. This study, which is still in progress, includes a comprehensive review of recent mortality experience of uninsured retirement plans in the United States. The SOA anticipates publishing a new set of retirement plan mortality tables and mortality improvement rates in late 2013, or early 2014, that would be the successors to the RP-2000 tables and Scale AA.”

From a Report by the Society of Actuaries (SOA) Retirement Plans Experience Committee (RPEC), published in September 2012 (continued)

- “RPEC recognizes that there is a wide range of opinion with respect to future levels of mortality in the United States and that the assumptions underlying any set of mortality improvement rates must necessarily reflect some degree of subjectivity. RPEC characterizes the assumptions that underpin Scale BB (including a 1.0% long-term rate of mortality improvement and limited cohort effects) as middle-of-the road, being neither overly optimistic nor too pessimistic with respect to future longevity improvements in the United States.”

From a Report by the Society of Actuaries (SOA) Retirement Plans Experience Committee (RPEC), published in September 2012 (continued)

- “In light of the nearly continuous pattern of increasing longevity in the United States over the past century, the Committee recommends that actuaries incorporate adequate provisions for future mortality improvement into their calculations. Taking into consideration the methodology used to develop Scale BB (Section 5.3) and RPECs preference for generational projection of mortality over static approximations (Section 7.1), the Committee encourages users of Scale BB to do so on a fully generational basis.”

From a Report by the Society of Actuaries (SOA) Retirement Plans Experience Committee (RPEC), published in October 2014

- The SOA published the RP 2014 base mortality tables and described them as the most current and complete benchmarks of U.S. private pension plan mortality experience
- RPEC considered mortality experience of three large public plans, but experience was “significantly different” from private plans rates and also statistically disparate, so no public plan mortality tables were developed
- The SOA also published generational mortality improvement scale MP 2014
 - RPEC recommended pension actuaries to carefully consider use of MP 2014 improvement scale along with RP 2014 base mortality table

From a Report by the Society of Actuaries (SOA) Retirement Plans Experience Committee (RPEC), published in October 2016

- The SOA published an update to the MP 2014 and MP 2015 improvement scales
 - In general, use of the MP 2015 improvement scale reduced pension liabilities about 1% to 2% from MP 2014
 - In general, use of the MP 2016 improvement scale reduced pension liabilities about 1.5% to 2.0% from MP 2015
- RPEC stated they believe MP 2016 produces a reasonable mortality improvement assumption for measuring obligations for most retirement programs in the U.S. within the context of the “assumption universe” as described in ASOP 35
 - However, RPEC also believes other mortality improvement scales, including those created with assumptions different than those selected by RPEC, could fall within the ASOP 35 assumption universe
 - In our opinion, scale BB is also within this assumption universe
- This assumption universe may be thought of as a range of reasonable assumptions

Valuation Mortality Assumption

- An Actual to Expected ratio (A/E) is used to measure the Actual experience to the assumption, or what was Expected
 - For example, if the actuary expects 100 deaths and 80 deaths actually occur during the observation period, A/E ratio would be $80 / 100$ which = 80%. An A/E of 100% would be a “perfect match.”
- Traditionally for this assumption, setting a static assumption with additional margin was used to allow for future increases in life expectancy or future mortality improvement
 - With additional margin, the A/E ratio would be in excess of 100%, perhaps up to 110%
- Historically, this would have been similar to adding up to one decade of mortality improvement

Valuation Mortality Assumption (continued)

- However, this has led to upward drift in contribution rates as the assumption is slightly modified every four to five years. Over time, this adds up
 - An additional UAAL was created every time the assumption was updated
- This was a customary practice for two main reasons:
 - a general belief that there was a limit on the ultimate longevity, and
 - the added complexity of implementing a generational mortality type model and limitations in computational power

Valuation Mortality Assumption (continued)

- The current best practice is to include a generational mortality improvement
 - Projects mortality improvement consistent with past U.S. population experience
 - Actuarial valuation systems can now handle the complexity of the calculations
 - Consistent with professional standards of practice
 - Improved estimate of cost to fund benefits over working lifetimes
 - Consistent with most other public pension systems
 - Eliminates the frequent mortality assumption changes when using static tables

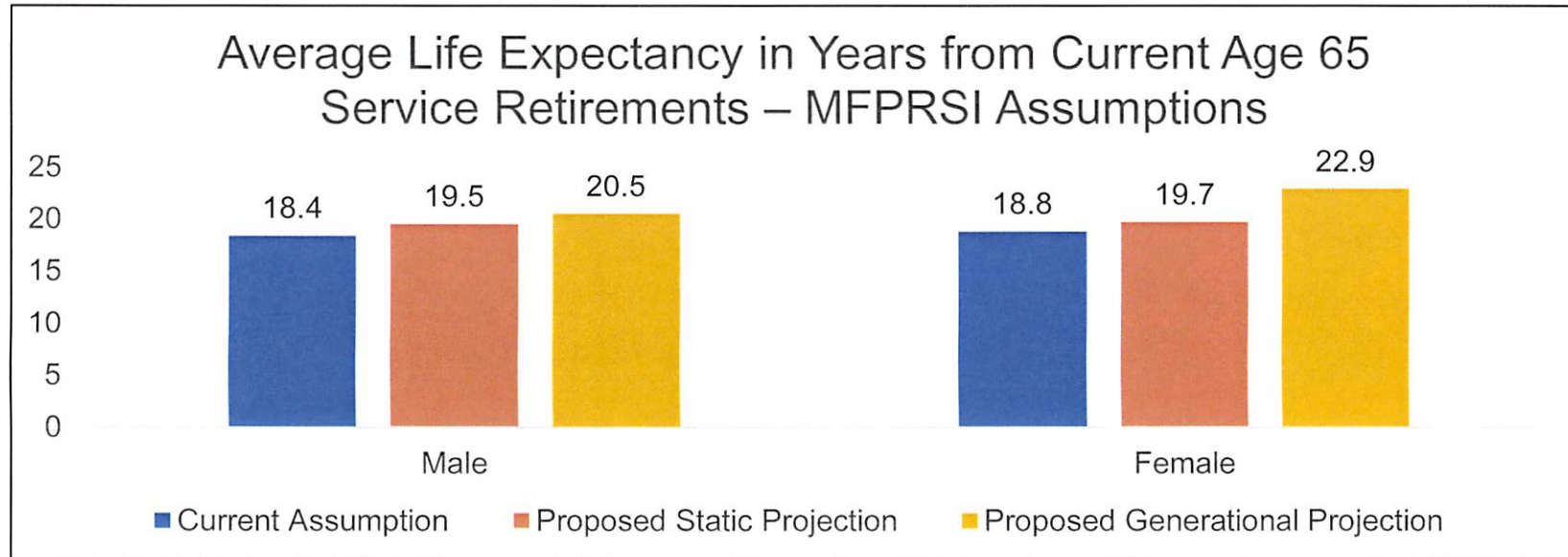
Actual MFPRSI Experience

- Review of past 10-, 5- and 2-year periods of actual post-retirement mortality experience of the System has shown some slight observation of mortality improvement

System A/E Ratios			
	10-Year	5-Year	2-Year
Inactive Deaths	0.998	0.997	0.982

- Based on these A/E ratios, the System's current mortality assumption does not include margins for adverse experience or future mortality improvement
- It is becoming more widely accepted that the trend of ever-increasing life expectancies is likely to continue

Post-Retirement Mortality



Current Assumption – RP 2000 Blue Collar

Proposed Static Projection – RP 2000 Blue Collar with Scale BB 10-year improvement projection

Proposed Generational Projection – RP 2000 Blue Collar with Scale BB Generational projection from 2016 baseline year 20 (i.e., projected to year 2036)

Recommendation of Post-Retirement Mortality Assumption

- SilverStone Group’s recommendation is to adopt an assumption for future mortality improvement
- While a generational mortality improvement scale is considered “best practice,” a static improvement assumption with sufficient margin may also be considered reasonable
- We are recommending the continued use of the RP-2000 base table with blue collar adjustment, set back two years for males and set forward one year for females but with mortality improvement based on scale BB
 - Scale BB is generally used with the RP-2000 base mortality table
 - RP 2014 and MP 2014 tables were based only on private pension plans
- With a generational projection approach, a gradual and consistent improvement over time would be inherent in the valuation process
 - Future rates would not have to be reset every four to five years
 - Keep future unfunded accrued liabilities from being systematically created

Recommendation of Post-Retirement Mortality Assumption (continued)

- With a static improvement projection approach, the mortality assumption may need to be updated more frequently than a generational improvement scale
- We recommend adoption of an assumption for mortality improvement for the July 1, 2017 actuarial valuation
 - A mortality improvement assumption is expected to be a better prediction of actual future mortality experience
 - New public pension plan mortality tables were originally expected to be published in 2017 (now pushed back to 2018)
 - Best practice is to adopt the assumption now rather than wait
 - More closely align the mortality assumption with other surveyed police and fire systems
- We expect the mortality assumption to continue to be monitored and will likely recommend the System adopt the public pension plan mortality tables when finalized

Post-Retirement Mortality Assumption Cost Impact Alternatives as of July 1, 2016

	Current	10-Year Static Improvement	Generational from 2016 Improvement
Funded Status			
Accrued Liability (000s)	\$2,867,807	\$2,943,035	\$2,979,308
Actuarial Assets (000s)	\$2,333,945	\$2,333,945	\$2,333,945
Funded Percentage	81.38%	79.30%	78.34%
Cities Contribution Rate			
Cities Contribution	\$72,829	\$79,921	\$84,757
Covered Payroll	\$283,640	\$283,640	\$283,640
Cities Contribution Rate	25.68%	28.18%	29.88%
Assumption			

Post-Retirement Mortality	RP 2000 Blue Collar (M -2, F +1)	RP 2000 Blue Collar (M -2, F +1) Projected 10 years with Scale BB	RP 2000 Blue Collar (M -2, F +1) Generational Projection from 2016 with Scale BB
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Future Post-Retirement Mortality Assumption

- Society of Actuaries is in the process of developing mortality tables specific to public pension plans based on public pension plan experience
 - The RP 2000 and RP 2014 mortality tables were based on private pension plan data
- We expect the public pension plan mortality tables to include tables specific to public safety employees
- We also expect these tables to be published with a recommendation to use a generational mortality improvement scale
- An exposure draft of this table is expected in 2018
 - If so, they may be generally adopted by public systems beginning in 2019
 - Originally, the exposure draft was expected in 2017

Next Steps

- Board decision on post-retirement mortality assumption to use for July 1, 2017 valuation
- October board meeting – present impact on actual Cities' contribution rate based on July 1, 2017 valuation to be recognized in Cities' contribution rate beginning July 1, 2018

Comparison to Other Retirement Systems

	MFPRSI	IPERS	State of Iowa	Police and/or Fire Systems									
			Peace Officer's Retirement System	Denver	Kansas City	Louisville	Milwaukee	Oklahoma City	Omaha	St. Paul	Tulsa	Wichita	
Actuarial Cost Method	Entry Age Normal (EAN)	EAN	EAN	EAN	EAN	EAN	Projected Unit Credit	EAN	EAN	EAN	EAN	EAN	
UAAL Amortization Structure	Level Dollar	Level % of Pay	Level % of Pay	Level % of Pay	Level % of Pay	Level % of Pay	Level % of Pay	Level Dollar	Level % of Pay	Level % of Pay	Level Dollar	Level % of Pay	
UAAL Amortization Period	25 Years Closed, Layered	Initial 2014 - 30 Years Subsequent UAAL - shorter Closed, Layered	Initial 2008 - 30 Years Closed	30 Years Open	30 Years Open	Initial 2013 - 30 Years	2016 - 18 Years Closed	2015 - 15 Years Closed	2014 - 30 Years Closed	25 Years Open	2015 - 15 Years Closed	20 Years Open	
Investment Return	7.50%	7.50%*	7.50%	7.50%	7.50%	7.50%	8.50%	7.50%	8.00%	8.00%	7.50%	7.75%	
Post-Retirement Mortality	RP 2000 Blue Collar Male (-2), Female (+1)	RP 2000 Combined	RP 2000 Healthy Annuitant	RP 2014 Blue Collar	RP 2000 Healthy Annuitant	RP 2000 Combined Female (-1)	RP 2000	RP 2000 Combined Blue Collar	RP 2000 Male (+1) Female (+1)	RP 2000 Healthy Annuitant White Collar	RP 2000 Combined Blue Collar	RP 2000 Healthy Annuitant	
Mortality Improvement	None	Scale AA Generational	Scale AA Generational	Scale BB Generational	Scale AA Generational	Scale BB to 2013	Scale AA Generational	Scale AA Generational	Generational	Scale AA Generational	Scale AA Generational	Generational	
Valuation Date	7/1/2016	7/1/2016	7/1/2016	1/1/2016	5/1/2016	7/1/2016	1/1/2016	7/1/2016	1/1/2016	7/1/2016	7/1/2016	1/1/2016	

* IPERS investment return assumption decreasing from 7.50% to 7.00% effective as of 6/30/2017