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## Demographic Assumptions Study for Iowa POR System

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## Discussion Topics

- Economic assumptions reviewed May, 2016
- Demographic assumptions reviewed June, 2017
- July 1, 2017 valuation will use the full set of new assumptions
- Estimated financial impact of changes using July 1, 2016 valuation



# Actuarial Valuation

- Requires use of assumptions to estimate future obligations (liabilities)
- Best estimates of future experience
- Actual experience from year to year will vary from the assumptions even if they are appropriate over the long term



# Experience Study

- Study period July 1, 2011 through June 30, 2016
- Analyze actual experience compared to expected experience based on current assumptions
- Credibility is limited due to size of group
- Professional judgment and opinion impact the ultimate recommendations



# Actuarial Methods

- Actuarial funding method - no change
- Current asset valuation method smooths difference of actual and expected return over 4 years
  - Consider moving to 5-year smoothing period
  - Provides more stability in actuarial contribution rate
- Amortization of unfunded actuarial liability: currently one base over closed period of 21 years
  - Recommend moving to “layered” amortization bases with 2018 valuation
  - Legacy base remains on current schedule, but new “pieces” of UAL are amortized over separate 20-year periods beginning on each valuation date
  - Avoids volatility inherent in the contribution rate as the single amortization period shortens over time



# Demographic Assumptions

- Studies what happened to individual members in each year of study
  - Mortality
  - Termination of employment
  - Retirement
  - Disability
  - Merit Salary Increases
- Governed by Actuarial Standard of Practice Number 35



# Calculation Methodology

- Step 1: Tabulate actual decrements  
(# members changing status)
- Step 2: Calculate number expected to  
change status
- Step 3: Actual/Expected Ratio  
 $(\text{Item 1}/\text{Item 2}) \times 100$



## Sample of Methodology

Exposure: 100

Expected Decrement:  $100 \times .10 = 10$

Actual Decrement: 8

A/E Ratio =  $8/10 = 80\%$





# Demographic Assumptions

- Don't expect perfect match
  - Assumptions are long term
  - Experience unfolds short term
- Consider changes
  - A/E Ratio not close to 100
  - Pattern of actual rates different
- Challenges
  - Size of group/credibility
  - Economic conditions
  - Special circumstances



# Mortality

- Current: RP-2000 Mortality Table (generational) with no age adjustment
- Results for Healthy Male Retirees
  - Actual: 37
  - Expected: 45
  - A/E Ratio: 82%
- Last study: A/E ratio of 91%



# Mortality

- Change is needed, but small size of group limits credibility (use a standard table)
- Recommend moving to RP-2014 Mortality Table with 1 year age setback for males. Use MP-2016 Scale to project future mortality improvements.
- A/E ratio on recommended assumption is 99%.
- This change is anticipating longer lifetime than the current assumption so it increases costs.



## Other Recommendations

- Beneficiaries: Same basis as healthy retirees
- Disableds: RP-2014 Mortality Table set forward 4 years for males and 5 years for females with MP-2016 Projection Scale
- Actives: RP-2014 Mortality Table with one-year age setback for males and MP-2016 Projection Scale



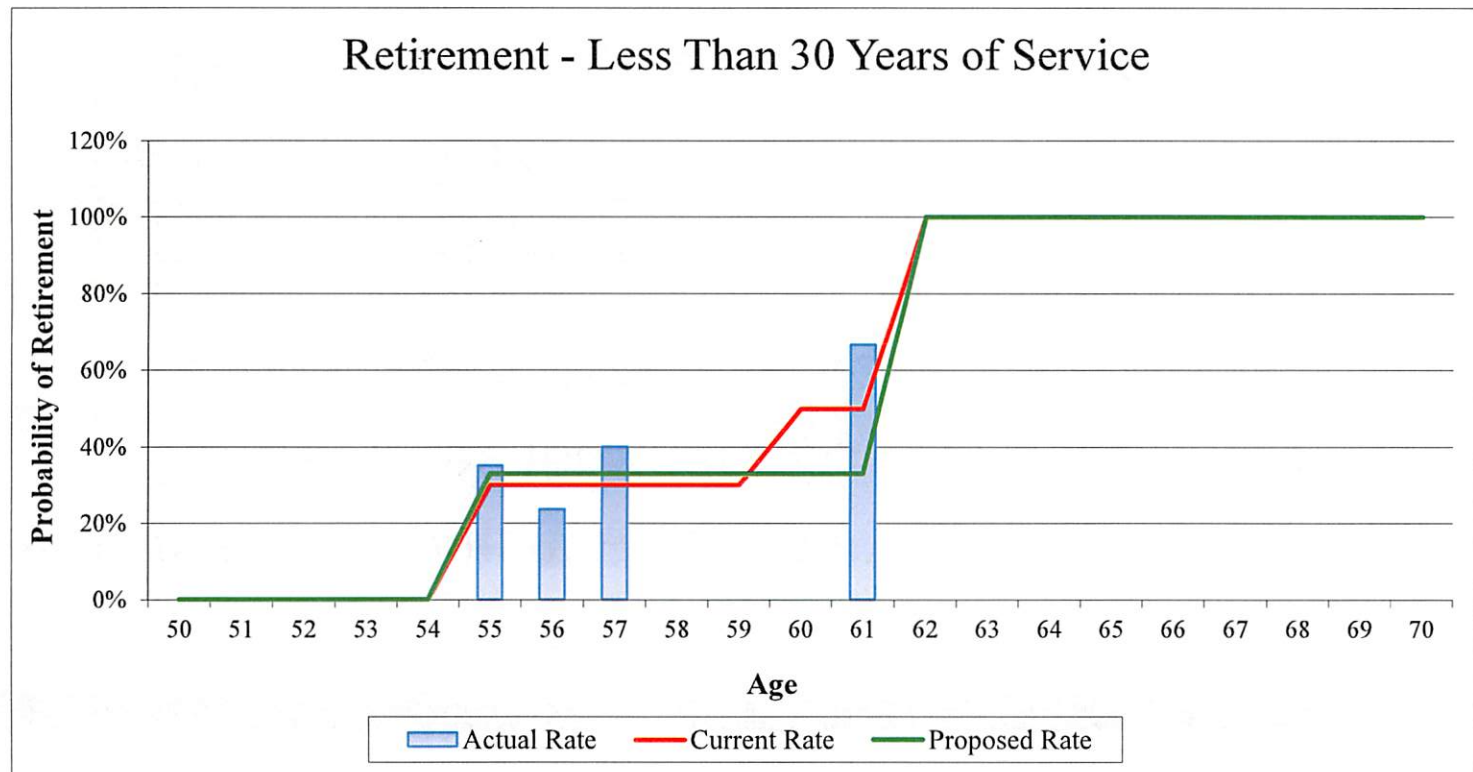
## Retirement Rates

- Current assumption varies by service
  - Lower rates for under 30 years of service
  - Higher rates if 30 or more years of service

	Actual	Expected	A/E Ratio
< 30 YOS	25	27	93%
30+ YOS	34	37	92%

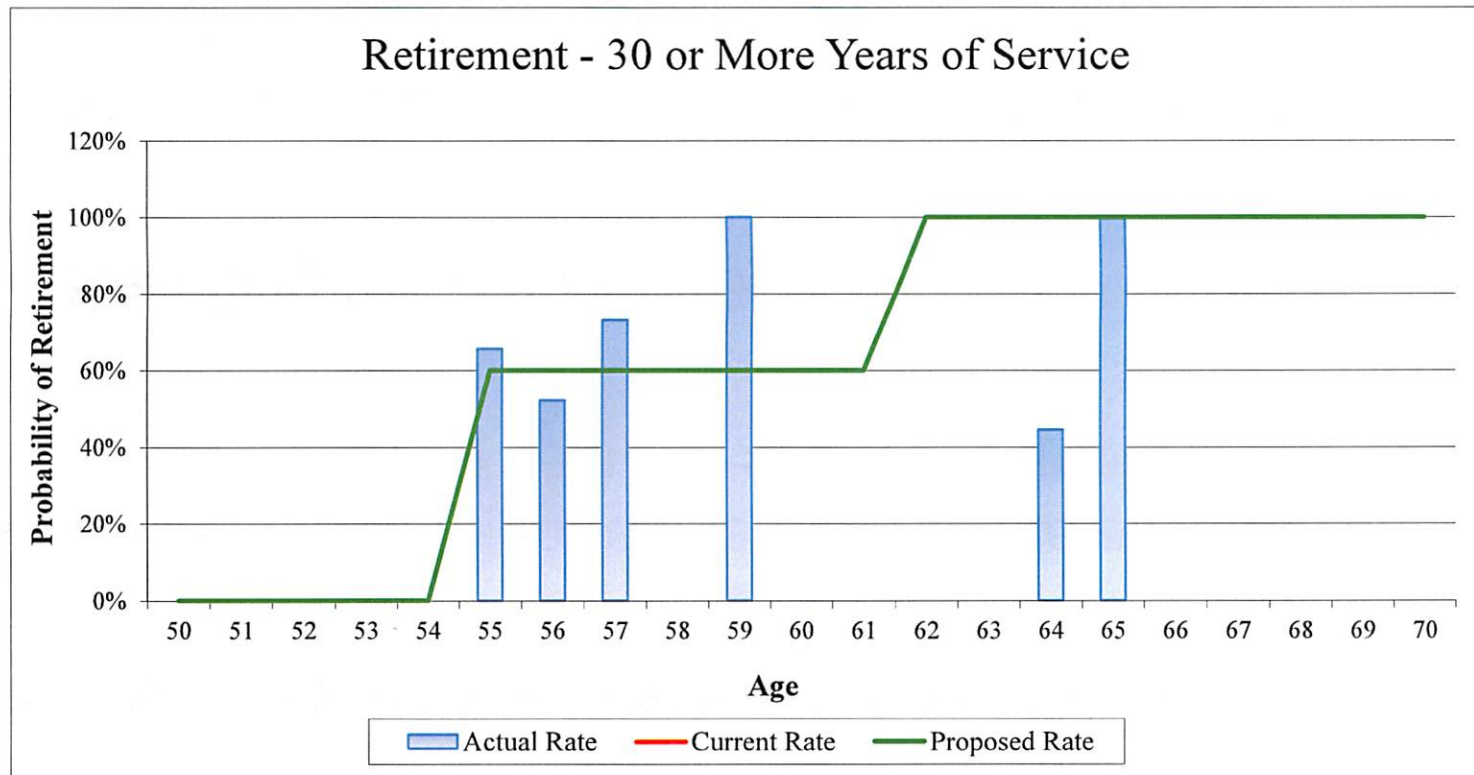


# Retirement Experience Less Than 30 YOS





# Retirement Assumption (30 or More YOS)





## Retirement Rates

- Recommend minor adjustment to the assumption for less than 30 years of service to improve the fit
- Resulting A/E ratio is 98%.
- Inactive vested members: assumed to retirement at earliest retirement age.
  - Conservative estimate
  - Recommend no change





# Disabilities

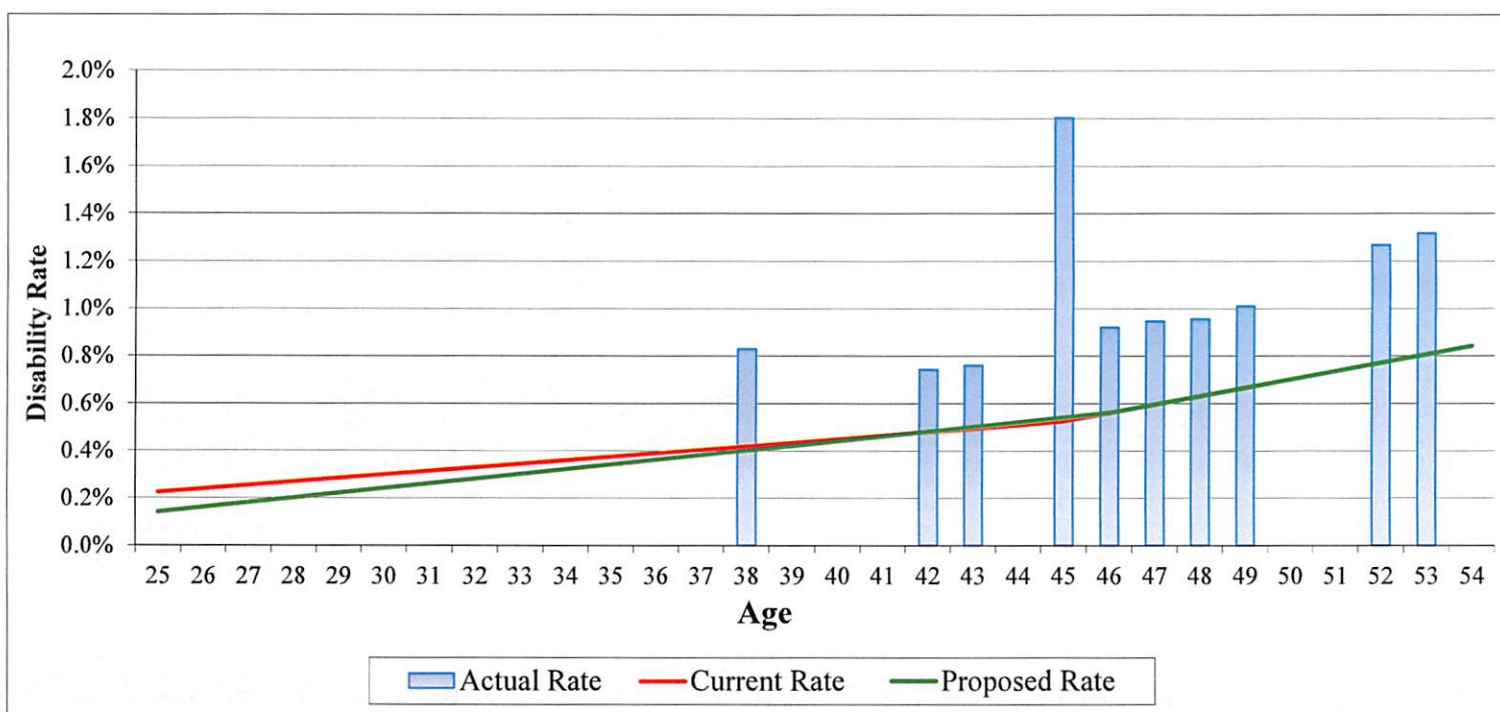
- Results:

Study Period	Actual	Expected	A/E Ratio
2006 - 2011	3	13	23%
2011 - 2016	11	14	79%

- Small probabilities applied to small number of active members – volatility expected
- Limited credibility
- Recommend decreasing rates at younger ages



# Disability Assumption





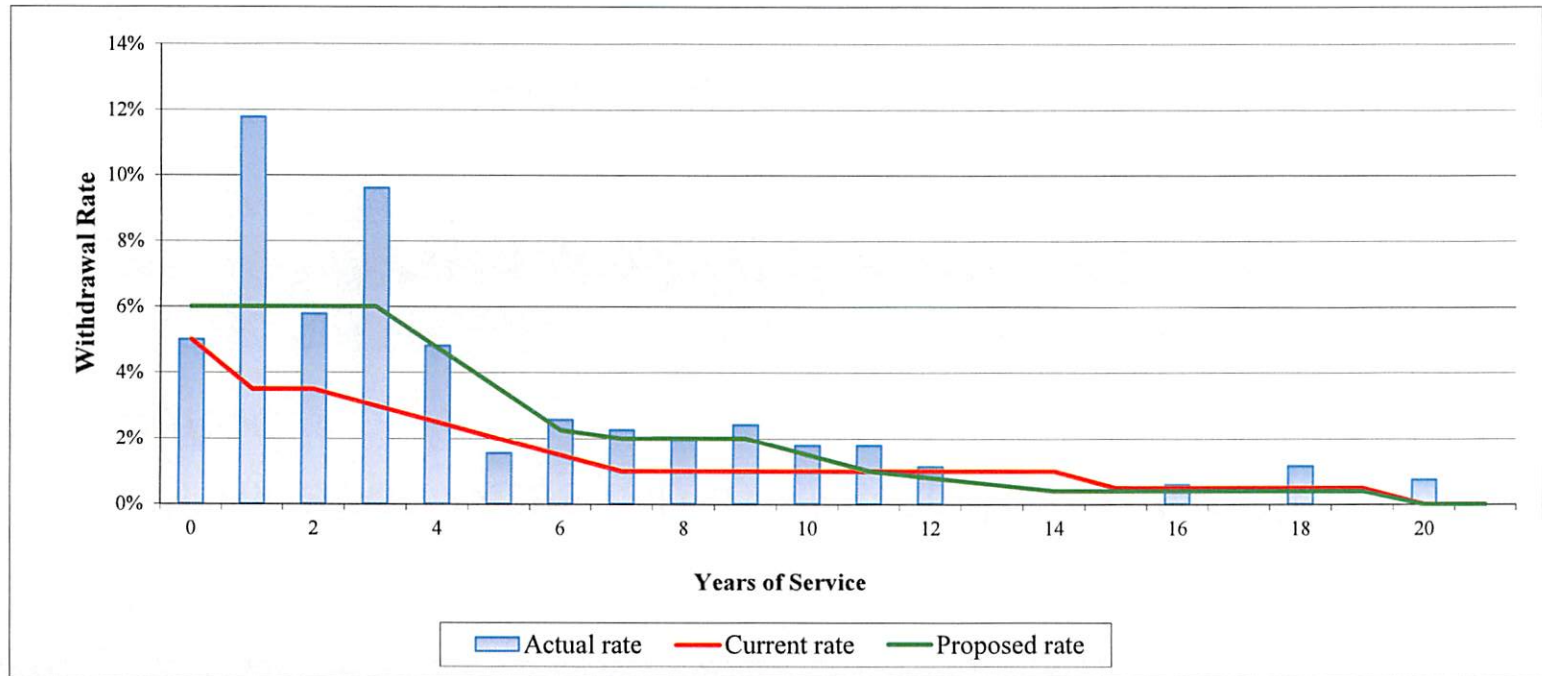
# Termination of Employment

- Termination rates much higher than prior study period

Study Period	Actual	Expected	A/E Ratio
Prior (2006 – 2011)	29	42	69%
Current (2011-2016)	42	27	154%



# Termination of Employment





# Recommendation for Termination Assumption



- Proposed modification to current assumption to better fit experience
- A/E ratio on proposed assumption is 108%



# Salary Increase

- Two components
  - Merit (promotion/longevity)
  - General wage growth
- General wage growth assumption is 3.50% (changed in last year's economic assumptions study)
- Studied total increase in salary and adjusted for general wage increases



## Merit Scale

- Current assumption is service based
- Common approach
- Expect merit scale to generally decline as service increases



## Actual Salary Experience

FYE	Actual	Expected	Difference
2012	5.13%	5.97%	(0.84%)
2013	3.95%	5.86%	(1.91%)
2014	2.99%	5.80%	(2.81%)
2015	4.77%	5.66%	(0.89%)
2016	4.30%	5.60%	(1.30%)
2012-2016	4.23%	5.78%	(1.55%)

- Actual wage growth in national economy was around 3.0%. Assumption was 4.0% so difference of 1.0% would be expected.



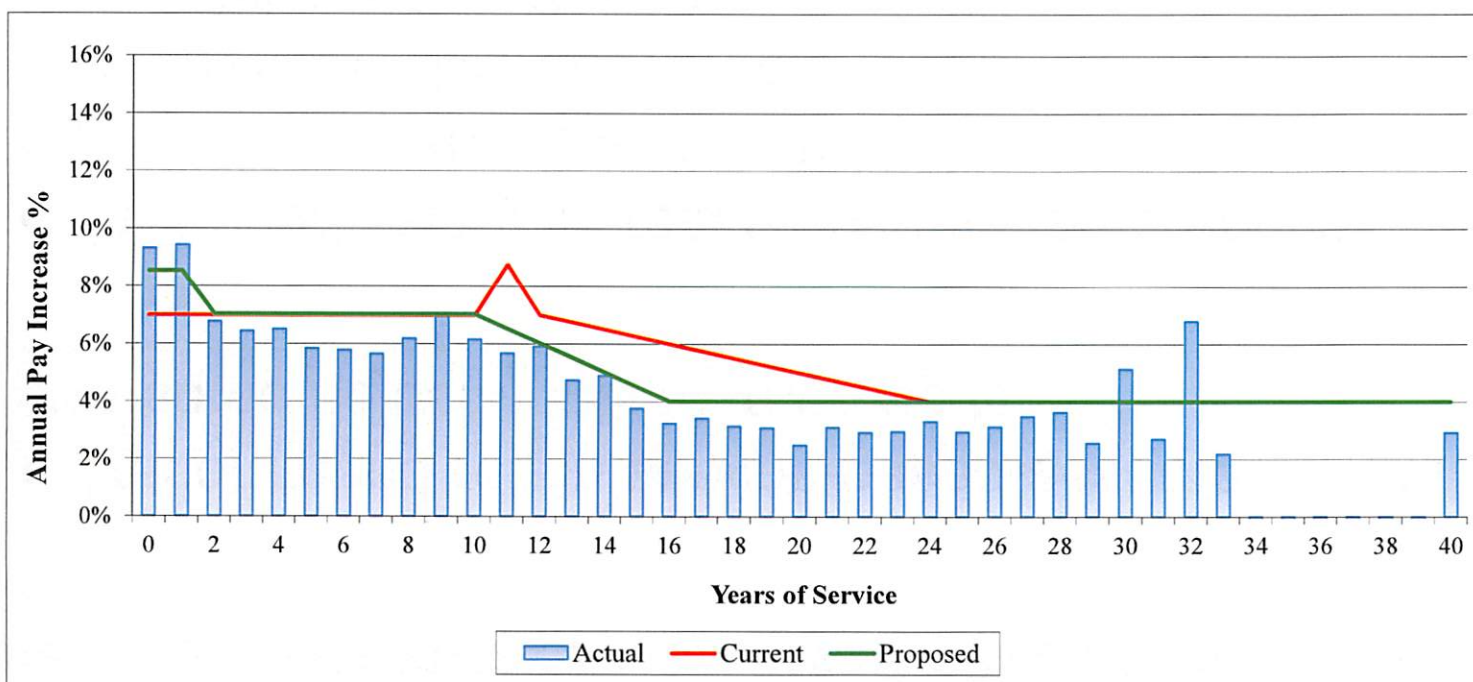


## Salary Merit Scale

- Recommend retain service-based assumption, but with some adjustments to improve fit
- Proposed salary increase assumption produces higher rates than actual experience, as expected
  - Overall salary increase rate: 5.02%
  - Actual salary increase rate: 4.23%
  - Difference in general wage growth assumption versus actual experience



# Salary Increase Assumption





# Recap of Economic Assumptions

Assumption	Prior	Recommended
Price inflation	3.00%	2.75%
Investment return	8.00%	7.50%
General wage growth	3.75%	3.50%
Payroll growth	3.75%	3.00%



# Recap of Demographic Assumptions

Assumption	Current	Recommended
Mortality	RP 2000 Table with Scale AA	RP 2014 Table (-1 Males). Scale MP 2016.
Retirement	Two sets of rates: less or more than 30 YOS	Adjust rates for those with less than 30 YOS
Disability	Increasing rates with age	Lower rates at younger ages
Termination	Service-based, decreasing with service	Modify rates for better fit
Merit Salary Scale	Service-based, declining with service	Adjust down for better fit to actual experience



# Estimated Financial Results (Based on 7/1/16 Valuation)

	<u>Current Assumptions</u>	<u>Proposed Assumptions</u>	<u>Difference</u>
1. Present Value of Future Benefits	\$706,245,707	\$721,144,971	\$14,899,264
2. Present Value Future Normal Costs	127,856,859	110,859,390	(16,997,469)
3. Actuarial Accrued Liability (1) – (2)	578,388,848	610,285,581	31,896,733
4. Actuarial Value of Assets	<u>426,398,446</u>	<u>426,398,446</u>	<u>0</u>
5. Unfunded Actuarial Accrued Liability (UAAL) (3) – (4)	\$151,990,402	\$183,887,135	\$31,896,733
6. Normal Cost Rate	28.70%	26.47%	(2.23%)
7. Administrative Expenses	0.57%	0.57%	0.00%
8. UAAL Payment	<u>24.17%</u>	<u>29.24%</u>	<u>5.07%</u>
9. Actuarial Contribution Rate	53.44%	56.28%	2.84%

**Note: Actual impact on the July 1, 2017 actuarial valuation may vary from that shown here.**