



OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM

2012 Experience Study (Updated)

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September 18, 2013

Board of Trustees
Oregon Public Employees Retirement System

Re: 2012 Experience Study (Updated) – Oregon Public Employees Retirement System

Dear Members of the Board:

The results of an actuarial valuation are based on the actuarial methods and assumptions used in the valuation. These methods and assumptions are used in developing employer contribution rates, disclosing employer liabilities pursuant to GASB requirements and for analyzing the fiscal impact of proposed legislative amendments. The 2012 Experience Study report has been updated from the version originally published on July 25, 2013 to reflect input received from the PERS Board at its July 26, 2013 public meeting.

This experience study report has been prepared exclusively for the Oregon Public Employees Retirement System (PERS) and its governing PERS Board (Board). **The study recommends to the Board the actuarial methods and assumptions to be used in the December 31, 2012 and 2013 actuarial valuations of PERS.**

Except where otherwise noted, the analysis in this study was based on data for the experience period from January 1, 2009 to December 31, 2012 as provided by PERS. PERS is solely responsible for the validity, accuracy and comprehensiveness of this information; the results of our analysis can be expected to differ and may need to be revised if the underlying data supplied is incomplete or inaccurate.

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Board of Trustees
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No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are pension actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein. Assumptions related to the health care cost inflation rates for the RHIPA retiree healthcare program discussed in this report were determined by Milliman actuaries qualified in such matters.

Sincerely,



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1. Executive Summary

This experience study report has been prepared exclusively for the Oregon Public Employees Retirement System (PERS) and the PERS Board (Board) in order to analyze the system's experience from January 1, 2009 through December 31, 2012 and to recommend actuarial methods and assumptions to be used in the December 31, 2012 and 2013 actuarial valuations of PERS.

A brief summary of the recommended method and assumption changes as well as items for discussion and review at the July 2013 Board meeting contained in this report follows:

Actuarial Methods

- Change the actuarial cost method to Entry Age Normal (EAN) from the current Projected Unit Credit (PUC) method. The Entry Age Normal method provides for funding benefits according to a level cost allocation as a percent of payroll over a member's projected full working career. A change to EAN will also allow PERS to use the same cost method for contribution rate calculations as will soon be required by the Governmental Accounting Standards Board (GASB) under recently revised financial reporting standards.
- Consider pros and cons of re-amortizing all accumulated Tier 1/Tier 2 shortfall (UAL) as of the date of the next rate-setting valuation (December 31, 2013) over a closed 20-year period as a level percentage of projected payroll. If the Board elects to re-amortize, the re-amortization would manage and provide partial mitigation to rate increases from recommended changes to the cost method and investment return assumption. A decision to re-amortize involves trade-offs between rate stability and protection of funded status, and those trade-offs are assessed in our July 2013 Board presentation materials. At the July 2013 meeting, the Board did elect to re-amortize the Tier 1/Tier 2 shortfall.
- Modify the "grade-in range" over which the rate collar gradually doubles so that the collar doubles as funded status decreases from 70% to 60% excluding side accounts. Previously the range had been from 80% to 70%. In combination with the recommended change to the EAN cost method, a stress test indicates that this change provides increased near-term rate predictability while not materially impacting the long-term risk profile of the program. Details on the stress tests are in our July 2013 Board presentation.

Allocation Procedures

- When allocating accrued liability for Tier 1/Tier 2 active members who have earned service with multiple PERS employers, base 70% of the allocation on service with each employer (95% for police & fire members) and base the rest on the member account balance associated with each employer. These assumptions have increased 10% and 5%, respectively, since the prior experience study. This movement illustrates the continued migration of projected future Tier 1/Tier 2 retirement benefits away from the frozen Money Match calculation, which is based on account balances, and toward the ongoing Full Formula approach, which is based on final average salary.

Economic Assumptions

- Lower the regular account rate of return assumption from the current assumption of 8.00% per year. Based on the current target asset allocation of the Oregon PERS Fund, analyses under two different sets of capital market assumptions indicate the best estimate of future expected returns falls between 7.50% and 7.75%. At the July 2013 meeting, the Board selected an assumed return of 7.75%.
- Set the variable account rate of return assumption to be equal to the assumed rate of return on regular accounts. In previous studies, this was set to be 25 basis points greater than assumed rate of return on

regular accounts, but based on Milliman's current capital market assumptions the relationship between the relevant asset classes no longer warrants a distinction.

Demographic Assumptions

- Adjust the healthy mortality assumption for two groups to reflect statistically significant recent experience.
- Adjust retirement rates for most groups modestly to more closely align with recent and expected future experience.
- Lower the merit component of the salary increase assumption for school district members based on observations of the last eight years of experience, with the most pronounced decreases for long-service school district members.
- Convert the pre-retirement termination of employment assumptions from an age-based select and ultimate approach with separate tables for Tier 1/Tier 2 and OPSRP to a set of service-only tables used for all members.
- Slightly lower assumed rates of duty disability for general service members.
- Add new categories to the Tier 1 unused vacation cash out assumption. Compared to the prior assumption, the recommendations moderately decrease the Tier 1 unused vacation cash out assumption for the state general service and state police & fire groups, while significantly increasing the assumption for the local police & fire group.
- Modestly adjust the Tier 1/Tier 2 unused sick leave assumption for most groups.
- Slightly decrease the participation assumption for the RHIA retiree healthcare programs.
- Restructure the participation assumption for the RHIPA retiree healthcare program to a service-based assumption, with higher rates for long-service members and lower rates for shorter service members when compared to the previous assumption.

2. Actuarial Methods and Allocation Procedures

Overview

Actuarial methods and allocation procedures are used as part of the valuation to determine actuarial accrued liabilities, to determine normal costs, to allocate costs to individual employers and to amortize unfunded liabilities. The following Board objectives were considered in developing the actuarial methods and allocation procedures:

- Transparency of shortfall and funded status calculations
- Predictable and stable employer contribution rates
- Protection of the plan's funded status to enhance benefit security for members
- Equity across generations of taxpayers funding the program
- Actuarial soundness - crafting policy that will fully fund the system if assumptions are met
- Compliance with GASB (Governmental Accounting Standards Board) requirements

The actuarial methods used for the December 31, 2011 actuarial valuation and the changes recommended for the December 31, 2012 and 2013 actuarial valuations are shown in the table below.

Method	December 31, 2011 Valuation	December 31, 2012 and 2013 Valuations
Cost method	Projected Unit Credit (PUC)	Entry Age Normal (EAN)
UAL Amortization method	UAL amortized as a level percent of combined Tier 1/Tier 2 and OPSRP payroll	No change
UAL Amortization period	<ul style="list-style-type: none"> ▪ UAL bases – Closed amortization from the first rate setting valuation in which experience is recognized <ul style="list-style-type: none"> – Tier 1/Tier 2 – 20 years – OPSRP – 16 Years – RHIA/RHIPA – 10 years ▪ Newly established side accounts – Aligned with the new Tier 1/Tier 2 base from the most recent rate-setting valuation ▪ Newly established transition liabilities or surpluses – 18 years from the date joining the SLGRP (State & Local Government Rate Pool) 	<ul style="list-style-type: none"> ▪ UAL bases – Per Board direction, re-amortize all accumulated Tier 1/Tier 2 shortfall as of 12/31/2013 over a closed 20-year period ▪ Newly established side accounts – No change ▪ Newly established transition liabilities or surpluses – No change
Asset valuation method	Market value	No change
Exclusion of reserves from valuation assets	Contingency Reserve, Capital Preservation Reserve, and Tier 1 Rate Guarantee Reserve (RGR) excluded from valuation assets. RGR is not excluded from valuation assets when RGR is negative (i.e., when the RGR is a deficit reserve).	No change
Allocation of Benefits in Force (BIF) Reserve	The BIF is allocated to each rate pool in proportion to the retiree liability attributable to the rate pool.	No change

Method	December 31, 2011 Valuation	December 31, 2012 and 2013 Valuations
Rate collar	Change in base contribution rate limited (i.e., collared) to greater of 20% of current base rate or 3% of payroll. Size of collar doubles if funded percentage excluding side accounts falls below 70% or increases above 130%. If the funded percentage excluding side accounts is between 70% and 80% or between 120% and 130%, the size of the rate collar is increased on a graded scale. Exclude RHIA and RHIPA (retiree medical) rates from the rate collar calculation.	Modify the “grade-in range” of the double rate collar feature, such that the size of the collar doubles if funded percentage excluding side accounts falls below 60% or increases above 140%. If the funded percentage excluding side accounts is between 60% and 70% or between 130% and 140%, the size of the rate collar is increased on a graded scale.
Liability allocation for actives with several employers	<ul style="list-style-type: none"> ▪ Allocate Actuarial Accrued Liability 40% (10% for police & fire) based on account balance with each employer and 60% (90% for police & fire) based on service with each employer 	Change allocation to 30% (5% for police & fire) based on account balance and 70% (95% for police & fire) based on service with each employer.
	<ul style="list-style-type: none"> ▪ Allocate Normal Cost to current employer 	No change

The methods or procedures are described in greater detail on the following pages.

Actuarial Cost Method

The total cost of the Tier 1/Tier 2 program, over time, will be equal to the benefits paid less investment earnings and is not affected directly by the actuarial cost method. The actuarial cost method is simply a tool to allocate costs to past, current or future years and thus primarily affects the timing of cost recognition.

The December 31, 2011 valuation used the Projected Unit Cost (PUC) method. PUC, which was first adopted for the December 31, 2004 actuarial valuation, allocates all benefits projected to be paid under the Tier 1/Tier 2 “Money Match” formula to past service since additional member account contributions are not permitted subsequent to 2003. The PUC method had the additional benefit of being compliant under the GASB 25 & GASB 27 financial reporting standards.

Last year, revised financial reporting standards (GASB 67 & GASB 68) were enacted. The new standards will incrementally become effective over the next two years and will replace the GASB 25 & GASB 27 standards. Under GASB 67 & 68, all financial reporting calculations must be made using the Entry Age Normal (EAN) actuarial cost method. Unlike PUC, the EAN method will allocate projected “Money Match” retirement liabilities across the full projected working careers of Tier 1 members. For Tier 1 members projected to retire with Money Match benefits, the EAN method will lower the liability allocated to past service (accrued liability) while increasing the liability allocated to current year service (normal cost). For OPSRP members, EAN will increase both accrued liability and the current year normal cost for OPSRP in total due to the differing allocation patterns of those two methods. EAN allocates costs as a level percentage of payroll across the full projected working career. In contrast, PUC allocates costs in accordance with an economic value pattern of benefit accruals, resulting in increasing costs as a percentage of payroll over the projected working career as active member gets closer to his or her projected retirement age.

Since EAN is now mandated for financial reporting purposes, we recommend changing to the EAN method for employer contribution rate calculations. Using EAN will be more understandable to interested parties as only one set of liability and normal cost calculations will be made for each employer. The EAN approach is widely used in the actuarial and public plan sponsor community because it provides a realistic estimate of the long-term costs of a retirement program as a level percentage of payroll if all assumptions are met. While the unique Money Match benefit formula provided a rationale for using PUC in the last several valuations, Money Match is now a less dominant formula among the active member population. Combined with the reasons noted above, this makes a change to the EAN cost method at this time appropriate.

Amortization Method

Unfunded Actuarial Liability

The unfunded actuarial liability (UAL) is amortized as a level percentage of combined payroll (Tier 1/Tier 2 plus OPSRP) in order to maintain more level contribution rates as payroll for the closed group of Tier 1/Tier 2 members declines and payroll of OPSRP members increases. We recommend this methodology continue.

The UAL is currently amortized over the following closed periods as a level percent of projected payroll from the first rate-setting valuation in which the experience is recognized:

- Tier 1/Tier 2 – 20 years
- OPSRP – 16 years
- RHIA/RHIPA – 10 years

As noted in the section above, the recommended change to the EAN method will increase calculated normal cost rates for most members and will increase the calculated actuarial accrued liability for OPSRP members.

Both of these changes will cause calculated employer rates prior to the application of the rate collar (discussed in a subsequent section) to increase, even though the change to EAN does not affect projected member benefit levels. As a policy decision to manage and partially mitigate near-term rate increases associated with the recommended change to EAN, the Board should consider the pros and cons of re-amortizing all existing Tier 1/Tier 2 shortfall (unfunded actuarial liability or UAL) at the date of the next rate-setting actuarial valuation (December 31, 2013). The considered amortization would be as a level percentage of payroll over a closed 20-year period. A 20-year period is suggested because that payoff duration avoids significant negative amortization. Amortization periods longer than 20 years can incur significant negative amortization, wherein the calculated shortfall can increase even if all contributions are made and all assumptions are met.

The decision whether or not to re-amortize the Tier 1/Tier 2 shortfall as part of other changes in methods and assumptions involves striking a balance between competing Board objectives, including protecting funded status and promoting predictable and stable contribution rates. Material discussing the trade-offs associated with a re-amortization are included in our July 2013 presentation materials to the Board.

After consideration at their July 2013 meeting, the PERS Board did elect to re-amortize the existing Tier 1/Tier 2 shortfall over a 20-year period as of December 31, 2013.

Side Accounts and Transition Liabilities/Surpluses

Prior to the 2010 Experience Study, side accounts and transition liabilities/surpluses were amortized over the period ending December 31, 2027. To better match the amortization periods for new side accounts and new transition liabilities with the amortization of the Tier 1/Tier 2 UAL and to avoid issues related to a shortening amortization period, as part of the 2010 Experience Study the PERS Board adopted the following amortization procedures which are not tied to a fixed date:

- Newly established side accounts are amortized over the same period as the new Tier 1/Tier 2 UAL base from the most recent rate-setting valuation. For example, a side account created in July 2013 would be amortized to December 31, 2031, aligned with the Tier 1/Tier 2 UAL base created in the December 31, 2011 valuation.
- New transition liabilities/surpluses would be amortized over the 18 year period beginning when the employer joins the SLGRP. This amortization period aligns with the last Tier 1/Tier 2 amortization base established as an independent employer.

We recommend no change to the amortization method or periods of side accounts and new transition liabilities/surpluses.

Asset Valuation Method

Effective December 31, 2004, the Board adopted market value as the actuarial value of assets, replacing the four-year smoothing method previously used to determine the actuarial asset value, which is used for shortfall (UAL) calculations. Although asset smoothing is a common method for smoothing contribution rates in public sector plans, the smoothed asset value does not provide a transparent measure of the plan's funded status and UAL. Market value provides more transparency to members and other interested parties regarding the funded status of the plan. Instead of smoothing assets, a rate collar method (described below) is used to smooth contribution rates.

We recommend no change to the asset valuation method.

Excluded Reserves

Statute provides that the Board may establish Contingency and Capital Preservation reserve accounts to mitigate gains and losses of invested capital and other contingencies, including certain legal expenses or judgments. In addition, statute requires the establishment and maintenance of a Rate Guarantee or Deficit reserve to fund earnings crediting to Tier 1 member regular accounts when actual earnings are below the investment return assumption selected by the Board.

The Contingency and Capital Preservation reserves are excluded from the valuation assets used for employer rate-setting calculations. We recommend no change to the treatment of the Contingency and Capital Preservation reserves.

The Rate Guarantee Reserve (RGR) has been negative (in deficit status) since the 12/31/2008 valuation. All else being equal, excluding a negative reserve increases the level of valuation assets used in employer rate-setting calculations. This occurs because subtracting a negative amount is mathematically equivalent to adding a positive amount of the same magnitude. If the negative reserve was larger in absolute value than the sum of the other reserves, this approach would lead to the actuarial value of assets used in shortfall (UAL) calculations being larger than the market value of assets.

As part of the 2010 Experience Study, the Board decided to only exclude the RGR from assets when it is in positive surplus position, and to not treat a negative RGR as an asset when it is in deficit status. We recommend this treatment of the RGR continue.

Rate Collar Method

Effective December 31, 2004, a rate collar method was adopted that limits biennium to biennium changes in contribution rates to be within a specified “collar”. The existing rate collar method restricts the change in an employer’s “base” Tier 1/Tier 2 contribution rate (i.e., the rate before contemplation of side account rate offsets or rate adjustments for any pre-pooled obligations) to the greater of 20 percent of the current rate or 3% of payroll. If the funded status excluding side accounts is less than 70% or greater than 130%, the size of the rate collar is doubled. If the funded percentage excluding side accounts is between 70% and 80% or between 120% and 130%, the size of the rate collar is increased on a graded scale.

In combination with the recommended move to EAN, we recommend a revision to the rate collar’s methodology. The recommendation is that the funded status “grade in range” of the double collar be adjusted by 10%. As noted above, previously the collar gradually doubled in size between 80% funded status and 70% funded status or between 120% funded status and 130% funded status. Our recommendation is that if the funded status excluding side accounts is less than 60% or greater than 140%, the size of the rate collar is doubled. If the funded percentage excluding side accounts is between 60% and 70% or between 130% and 140%, the size of the rate collar is increased on a graded scale. This change serves to improve the predictability of near-term contribution rates for a large percentage of PERS employers. A stochastic stress test under a wide variety of potential future investment return scenarios was used to assess this recommendation. The testing indicated that this recommendation, when combined with the recommended change to the EAN actuarial cost method, did not materially alter the risk profile of the system for several key “negative event” metrics related to low funded status or high employer contribution rates. Results of that stress test, which serve as the basis for this recommendation, and the underlying methodology of the test can be found in our July 2013 Board presentation materials.

The rate collar is applied for each employer (or rate pool) prior to any adjustments to the employer contribution rate for side accounts, transition liabilities, or pre-SLGRP pooled liabilities. The rate collar only applies to employer contribution rates for pension benefits. The effect of any significant benefit changes adopted by the Legislature is applied to the base contribution rate before determining the collar. Rates attributable to RHIA and RHIPA (retiree medical) programs are not subject to the collar.

Liability Allocation for Actives with Several Employers

Over the course of a member’s working career, a member may work for more than one employer covered under the Tier 1/Tier 2 program. Since employer contribution rates are developed on an individual employer basis, the member’s liability should be allocated between such a member’s various Tier 1/Tier 2 employers. If all of the member’s employers participate in the same rate pool, the allocation has no effect on rates, but if the employers participate in different pools or are independent, the allocation can have an impact on the different employers’ rates.

When a member retires, PERS allocates the cost of the retirement benefit between the employers the member worked for based on the formula that produces the member’s retirement benefit. If the member’s benefit is calculated under the Money Match approach, the cost is allocated in proportion to the member’s account balance attributable to each employer. If the member’s benefit is calculated under the percent of final average pay Full Formula approach, the cost is allocated in proportion to the service attributable to each employer.

In the period prior to the 2003 system reforms and shortly thereafter, the vast majority of retirement benefits were calculated under Money Match, so the member liability in valuations prior to December 31, 2006 had been allocated in proportion to the member’s account balance attributable to each employer. With no new member contributions to Tier 1/Tier 2, however, this procedure meant no liability was allocated to employers for service after December 31, 2003 in the valuation. As Money Match benefits became less dominant and retirements with Full Formula benefits become more prevalent, a change in the procedure to allocate liability among employers was warranted.

Effective with the December 31, 2006 valuation, a change was made to allocate a member’s actuarial accrued liability among employers based on a weighted average of the Money Match methodology, which utilizes account balance, and the Full Formula methodology, which utilizes service. The methodologies were weighted according to the percentage of the system-wide actuarial accrued liability for new retirements projected to be attributable to Money Match and Full Formula, respectively, as of the next rate-setting valuation. For the December 31, 2010 and December 31, 2011 valuations, the Money Match method was weighted 60 percent for general service members and 10 percent for police & fire members.

A summary of the portion of the actuarial accrued liability for new retirements projected to be attributable to Money Match benefits over the next several years is shown in the table below:

December 31,	General Service	Police & Fire
2011	34%	7%
2012	32%	6%
2013	30%	5%
2014	28%	5%

Since the next rate-setting valuation is the December 31, 2013 valuation, we recommend the Money Match method be weighted 30 percent for general service members and 5 percent for police & fire members. This weighting will continue to be reviewed with each experience study and updated as necessary.

As in prior valuations, the member's normal cost will continue to be assigned to his or her current employer. Due to the recommended change in actuarial cost method, some members previously assigned zero normal cost will now have non-zero normal cost amounts.

3. Economic Assumptions

Overview

Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, provides guidance on selecting economic assumptions used in measuring obligations under defined benefit pension plans. ASOP No. 27 suggests that economic assumptions be developed using the actuary's professional judgment, taking into consideration past experience and the actuary's expectations regarding the future. The process for selecting economic assumptions involves:

- Identifying components of each assumption and evaluating relevant data;
- Developing a best-estimate range for each economic assumption; and
- Evaluating measurement specific factors and selecting a point within the best-estimate range.

The Actuarial Standard of Practice noted above is currently in a "review and revision" process. When this process is complete, the revised ASOP is likely to include a requirement that an economic assumption does not merely fall within a best-estimate range. Instead, the assumption will need to be "unbiased", such that it is not anticipated to result in actual performance being persistently above or below assumption based on the outlook at the time the assumption is selected. We have reflected this consideration in our recommendations.

A summary of the economic assumptions used for the December 31, 2011 actuarial valuation and those recommended for the December 31, 2012 and 2013 actuarial valuations are shown below:

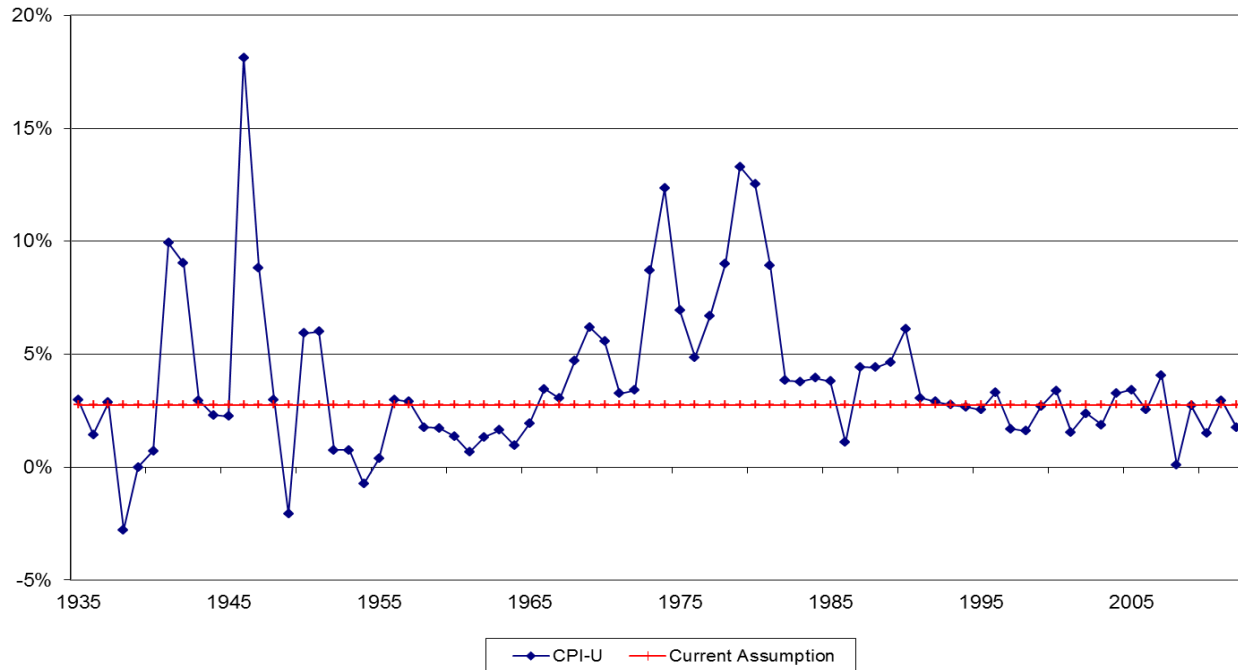
Assumption	December 31, 2011 Valuation	December 31, 2012 and 2013 Valuations
Inflation (other than healthcare)	2.75%	No Change
Real wage growth	1.00%	No Change
Payroll growth	3.75%	No Change
Regular investment return	8.00%	7.50% - 7.75% (7.75% selected by Board at its July 2013 meeting)
Variable account investment return	8.25%	Same as regular investment return
OPSRP administrative expenses	\$6.6 million/year	\$5.5 million/year
Healthcare cost inflation rates		
▪ 2013 rate	7.00%	8.00%
▪ Ultimate inflation rate	4.50%	4.70%
▪ Year reaching ultimate rate	2029	2083

The recommended assumptions shown above, in our opinion, were selected in a manner consistent with the requirements of ASOP No. 27. Each of the above assumptions is described in detail below and on the following pages.

Inflation

The assumed inflation rate is the basis for all of the other economic assumptions. It affects other assumptions including payroll growth, investment return, and healthcare inflation.

Historical CPI-U



In selecting an appropriate inflation assumption, we consider both historical data and the breakeven inflation rates inherent in current long-term Treasury Inflation Protection Securities (TIPS). The chart above shows the annual inflation rate for the years ending December 31 from 1935 through 2012 as reported by the Bureau of Labor Statistics. The mean and median annual rates over this period are **3.77** percent and **2.97** percent respectively.

Historical inflation rates vary significantly from period to period and may not be an indication of future inflation rates. With the development of a TIPS market, we can calculate an estimated breakeven inflation rate by comparing yields on regular Treasury securities to the yields on TIPS. The table below shows yields as of December 31, 2012, for 10-year and 30-year Treasury bonds and TIPS.

As of 12/31/2012	10-Year	30-Year
Treasury Yield	1.78%	2.95%
TIPS Yield	-0.67%	0.41%
Breakeven Inflation	2.45%	2.54%

We also considered two other inflation measures in our analysis: Social Security’s current intermediate inflation assumption of **2.8** percent, and the Congressional Budget Office’s projection of CPI of an average of **2.15** percent inflation over the period 2013-2023.

Based on the information shown above, we do not see a compelling rationale to modify the long-term inflation assumption. We therefore recommend no change to the assumed annual inflation rate of 2.75 percent.

Real Wage Growth

The expected salary growth assumption is the sum of three factors:

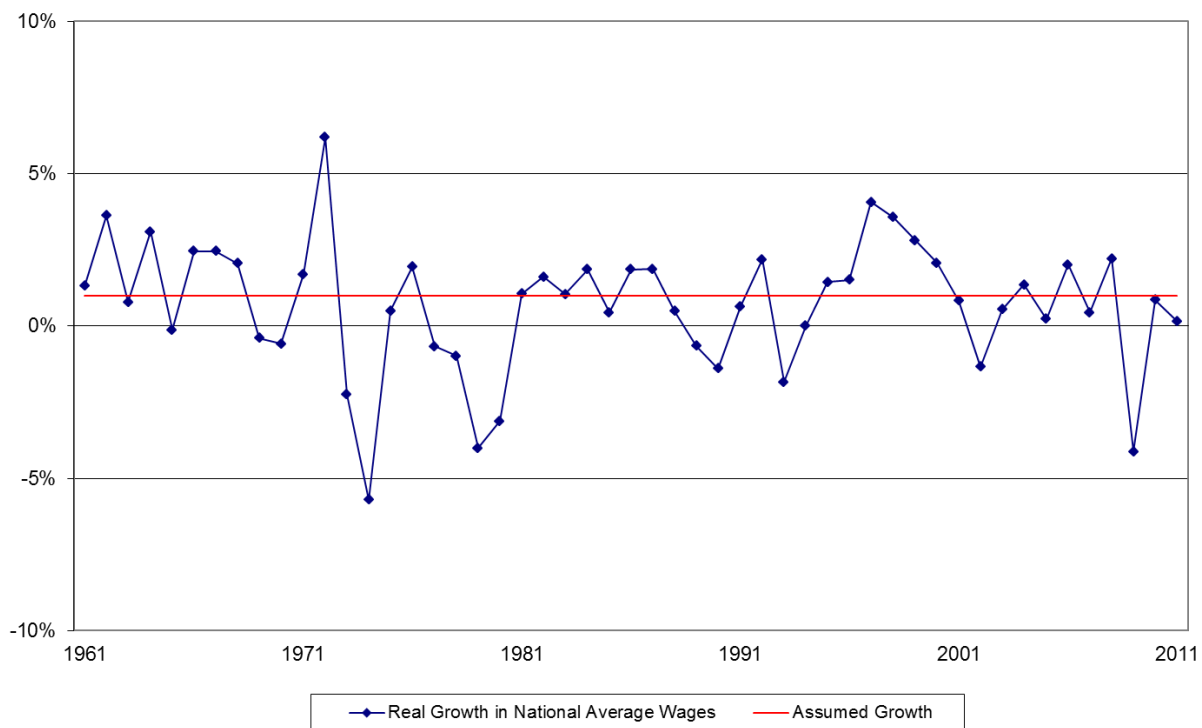
- Inflation,
- Real wage growth, and
- Merit and longevity wage growth.

Real wage growth represents the increase in wages above inflation for the entire group due to improvements in productivity and competitive pressures. Merit and longevity wage growth, in contrast, represent the increases in wages for an individual due to factors such as performance, promotion, or seniority.

Real wage growth combined with inflation represents the expected growth in total payroll for a stable population. Changes in payroll due to an increase or decline in the covered population are not captured by this assumption. The payroll growth assumption is used to develop the annual amount necessary to amortize the unfunded actuarial liability as a level percentage of expected payroll.

The chart below shows the real growth in national average wages over the past fifty years based on data compiled by the Social Security Administration.

Historical Real Growth in National Average Wages



While the change in any one year has been volatile, the change over longer periods of time is more stable as shown in the table below. However, the significant outlier result of a 4.1 percent productivity decrease in 2009 (measuring change in national average wages from 2008 to 2009) has a strong downward impact on the trailing averages shown in the table below. For example, the 10 year trailing average ending on December 31, 2008, is 1.11 percent.

Length of Period Ending December 31, 2011	Average Real Growth in National Average Wages
10 years	0.22%
20 years	0.93%
30 years	0.88%
40 years	0.47%
50 years	0.67%

We also considered the Social Security Administration’s current intermediate wage growth assumption of 1.12 percent in our analysis.

Based on this data, a reasonable best-estimate range is from 0.75 percent to 1.25 percent. We recommend no change to the current assumption of 1.00 percent.

Payroll Growth

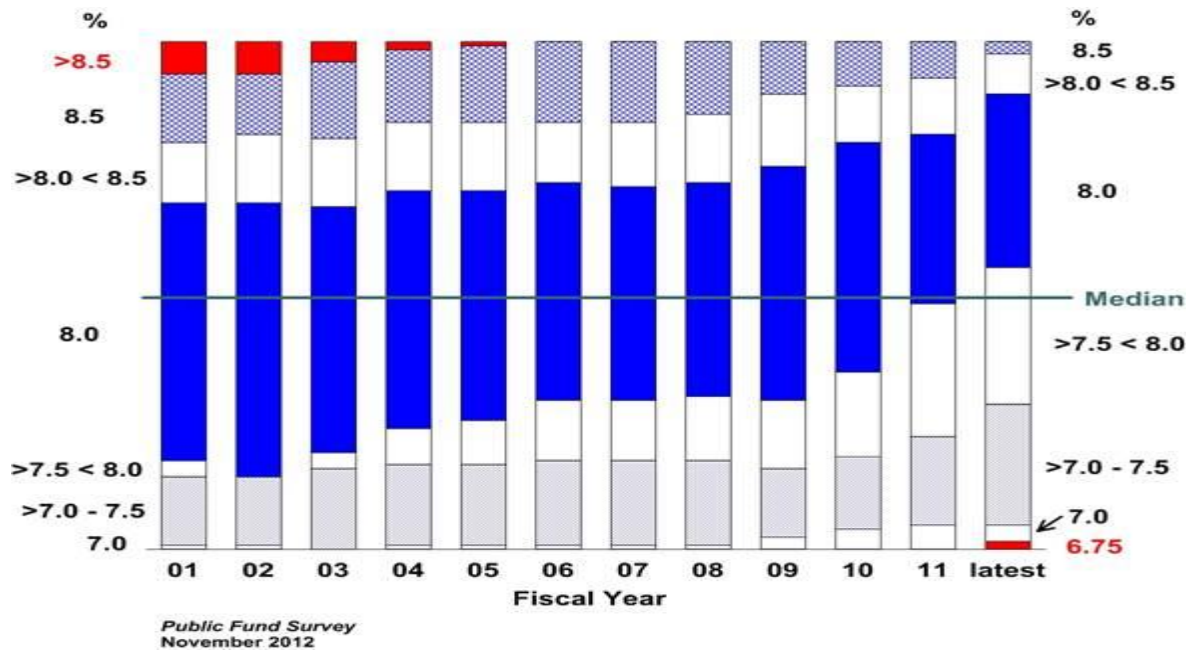
Payroll growth is the sum of inflation and real wage growth. Since we are recommending no changes to the inflation or the real wage growth assumptions, the payroll growth assumption will remain at 3.75 percent.

Investment Return

The assumed rate of investment return is used to discount the future projected benefit payments from the retirement plan to the valuation date, to project interest credits on member accounts to retirement, to convert member accounts to a monthly retirement allowance under the Money Match formula, and to convert the retirement allowance to optional joint & survivor benefits. As such, it is one of the most important assumptions used in valuing the plan’s liabilities and developing contribution rates. The assumption is intended to reflect the long-term expected future return on the portfolio of assets that fund the benefits.

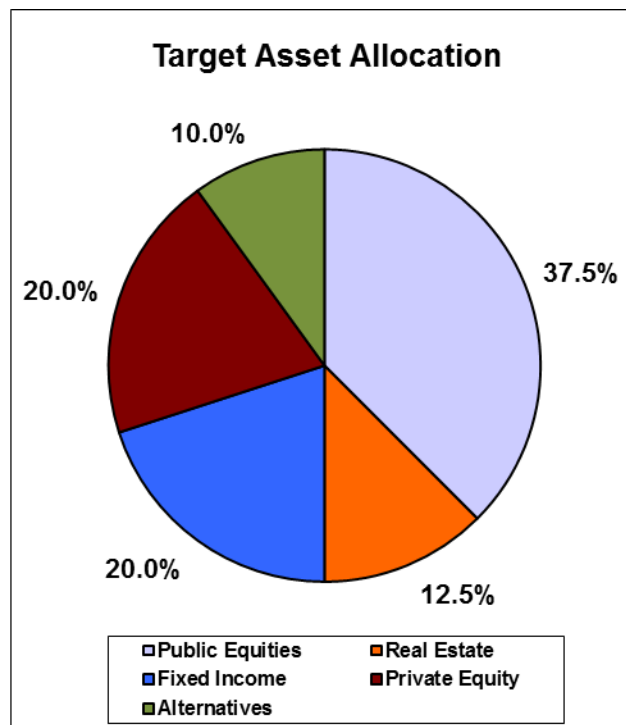
To provide some perspective on this assumption, the chart below shows the assumptions used by the 120 largest US public sector systems in a regularly updated survey published by the National Association of State Retirement Administrators (NASRA). As can be seen from the chart, the Oregon PERS assumption of 8.0% used in the prior valuation is no longer the median assumption for large US public sector systems. The majority of systems have investment return assumptions below 8%, with the median assumption in the most recent survey update lying in the 7.51%-7.99% range. Given the consensus view among investment professionals regarding lower long-term expected returns for fixed income investments, we believe that this downward trend in the survey will continue in the future as systems periodically revisit their investment return assumptions.

**NASRA Public Fund Survey
Assumed Investment Return**



Regular Accounts

Based on the Oregon Investment Council’s (OIC) Statement of Investment Objectives and Policy Framework for the Oregon Public Employees Retirement Fund revised as of December 18, 2012 and the revised allocation adopted at the June 26, 2013 OIC meeting, we understand the target asset allocation adopted by the OIC is as follows:



To develop an analytical basis for Board's selection of the investment return assumption, we use long-term assumptions developed by Milliman's capital market assumptions team for each of the asset classes in which the plan is invested based on the OIC's long-term target asset allocation. Since the OIC uses broader asset classes than those for which Milliman's investment actuaries develop long-term return assumptions, we used OIC's description of each asset class to map it to the classes shown below. For example, the OIC's allocation to "alternatives" was distributed among hedge funds, real estate, and commodities based on the detail available. Each asset class assumption is based on a consistent set of underlying assumptions, including the inflation assumption. These assumptions are not based on historical returns, but instead are based on a forward-looking capital market economic model. Based on the target allocation and investment return assumptions for each of the asset classes, our 50th percentile best estimate assumption is developed as follows:

Asset Class	Target Allocation	Compound Annual Return	Annual Arithmetic Return	Standard Deviation
Core Fixed Income	7.20%	4.50%	4.70%	6.60%
Short-Term Bonds	8.00%	3.70%	3.76%	3.45%
Intermediate-Term Bonds	3.00%	4.10%	4.23%	5.15%
High Yield Bonds	1.80%	6.66%	7.21%	11.10%
Large Cap US Equities	11.65%	7.20%	8.60%	17.90%
Mid Cap US Equities	3.88%	7.30%	9.38%	22.00%
Small Cap US Equities	2.27%	7.45%	10.38%	26.40%
Developed Foreign Equities	14.21%	6.90%	8.73%	20.55%
Emerging Market Equities	5.49%	7.40%	11.51%	31.70%
Private Equity	20.00%	8.26%	11.95%	30.00%
Hedge Funds/Absolute Return	5.00%	6.01%	6.46%	10.00%
Real Estate (Property)	13.75%	6.51%	7.27%	13.00%
Real Estate (REITS)	2.50%	6.76%	8.41%	19.45%
Commodities	1.25%	6.07%	7.71%	19.70%
Portfolio – Gross of Expenses	100.00%	7.62%	8.39%	13.01%
Portfolio – Net of Expenses	100.00%	7.57%	8.34%	13.01%

Based on capital market expectations developed by Milliman.

In addition, we compared the expected return to the range of returns developed using a mean-variance model and the capital market assumptions of both Milliman and Strategic Investment Solutions (SIS), the OIC's investment consultant. Returns shown below are net of administrative and passive investment expenses. Administrative expenses were assumed to be equal to 5 basis points; passive investment expenses vary by asset class but represented 12 basis points on a portfolio-wide average. We assume that expenses incurred for active management are offset by additional returns gained from active management.

The table below compares the distribution of expected annualized returns over 20 years calculated on a geometric basis for the Regular Account based on Milliman’s and SIS’ capital market assumptions.

Percentile	Milliman	SIS
25 th	5.64%	5.61%
45 th	7.21%	7.28%
50 th	7.57%	7.66%
55 th	7.93%	8.05%
75 th	9.53%	9.75%

The expected annualized return percentiles shown above do not include any upward adjustment for the potential value of active fund management. SIS expects the fund to earn additional long-term return due to the value of active management. Thus, after adjusting for any additional expected returns due to active management, SIS would anticipate median returns in excess of those shown in the 50th percentile of the table above.

Based on Milliman’s capital market outlook, we believe the investment return assumption should be reduced from the current 8.0% assumption. An assumption between 7.50% and 7.75% would fall in the reasonable range. Before any potential active management adjustments, the reasonable range based on the SIS capital market outlook would be approximately the same.

Variable Account

The expected investment return on the variable account is developed in the same manner as the assumption for regular accounts.

Based on the target allocation and investment return assumptions for each of the asset classes in the variable account, the best estimate assumption is developed as follows:

Asset Class	Target Allocation	Compound Geometric Annual Return	Annual Arithmetic Return	Standard Deviation
Large Cap US Equities	31.06%	7.20%	8.60%	17.90%
Mid Cap US Equities	10.35%	7.30%	9.38%	22.00%
Small Cap US Equities	6.06%	7.45%	10.38%	26.40%
Developed Foreign Equities	37.88%	6.90%	8.73%	20.55%
Emerging Market Equities	14.65%	7.40%	11.51%	31.70%
Portfolio – Gross of Expenses	100.00%	7.58%	9.27%	19.42%
Portfolio – Net of Expenses	100.00%	7.53%	9.22%	19.42%

The variable account is invested entirely in Public Equities, which we mapped to the above asset classes based on OIC’s description of the Public Equity asset class. The annual arithmetic return is significantly higher than for the regular account, but so is the standard deviation. The result is a long-term compounded geometric annual return slightly lower than the regular account. In the recent valuations, the compound geometric variable account return has been assumed to be 25 basis points higher than the regular account return. Based on Milliman’s current capital market outlook assumptions, the relationship between the various

asset classes no longer warrants such a distinction, and we recommend setting the variable account return assumption equal to the regular account return assumption.

OPSRP Administrative Expenses

In the mature Tier 1/Tier 2 program, administrative expenses are modest compared to program asset levels. As such, administrative expenses for Tier 1/Tier 2 are estimated by a 5 basis point adjustment to the expected plan investment return, as noted previously in this report.

In contrast, administrative expenses for the relatively new OPSRP program are significant in comparison to OPSRP assets. As such, the December 31, 2011 valuation included an explicit administrative expense assumption for the OPSRP program of \$6.6 million.

A cost allocation change in PERS policy resulted in lower OPSRP administrative expenses in 2012 than in prior years, and is expected to keep expenses at around this new level in future years. On this basis, we recommend a reduction in the assumption for regular administrative expenses, from \$6.6 million to \$5.5 million per year. A summary of our recommendation is below.

Valuation Year	Current		Recommended	
	Dollar Amount	Percentage of Beginning of Year Assets	Dollar Amount	Percentage of Beginning of Year Assets
2010	\$6.6	1.48%	N/A	N/A
2011	\$6.6	1.00%	N/A	N/A
2012	\$6.6	0.79%	\$5.5	0.65%
2013	\$6.6	0.55%	\$5.5	0.46%

Health Cost Inflation Rates

Health cost inflation rates are used to predict increases in the RHIPA subsidy. The subsidy increased an average of 5.1 percent per year over the last five years. Based on analysis performed by Milliman’s healthcare actuaries, we recommend the following change to the health cost inflation assumption. These rates include consideration of the excise tax that will be introduced in 2018 by the Patient Protection and Affordable Care Act.

Note that the following chart shows sample rates. A full chart can be found in the appendices.

Year ¹	December 31, 2010 and 2011 Valuations	December 31, 2012 and 2013 Valuations
2011	7.0%	N/A
2012	6.9%	N/A
2013	6.9%	8.0%
2014	6.9%	6.1%

¹ For valuation purposes, the health cost trend rates are assumed to be applied at the beginning of the plan year.

Year ¹	December 31, 2010 and 2011 Valuations	December 31, 2012 and 2013 Valuations
2015	6.9%	5.9%
2016	6.8%	5.5%
2017	6.8%	6.2%
2018	6.6%	5.9%
2019	6.4%	5.8%
2020	6.2%	5.9%
2021	6.0%	6.0%
2022	5.8%	6.0%
2023	5.6%	6.5%
2024	5.4%	6.9%
2025	5.2%	6.9%
2030	4.5%	6.6%
2035	4.5%	6.4%
2040	4.5%	5.9%
2045	4.5%	5.7%
2050	4.5%	5.6%
2060	4.5%	5.5%
2070	4.5%	5.3%
2080	4.5%	4.9%
2083+	4.5%	4.7%

4. Demographic Assumptions

Overview

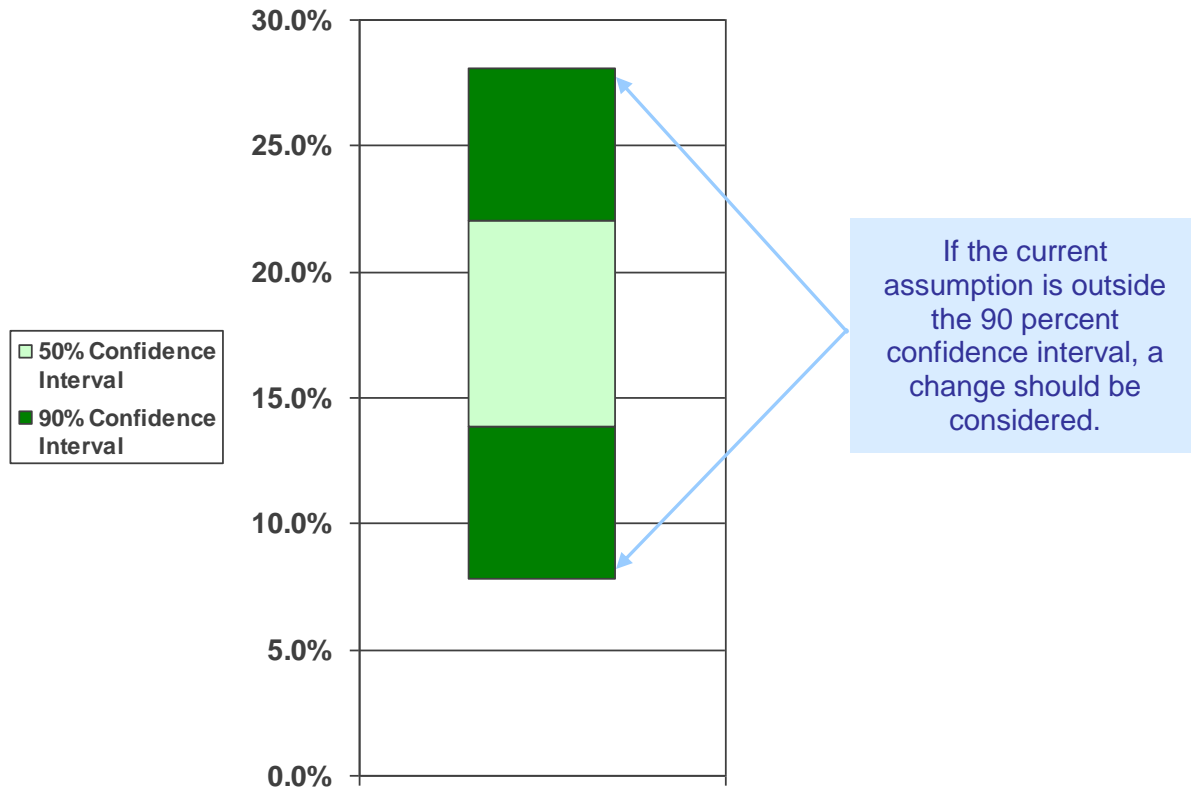
Actuarial Standard of Practice (ASOP) No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*, provides guidance on selecting demographic assumptions used in measuring obligations under defined benefit pension plans. The general process for recommending demographic assumptions as defined in ASOP No. 35 is as follows:

- Identify the types of assumptions;
- Consider the relevant assumption universe;
- Consider the assumption format;
- Select the specific assumptions; and
- Evaluate the reasonableness of the selected assumption.

The purpose of the demographic experience study is to compare actual experience against expected experience based on the assumptions used in the most recent actuarial valuation. The observation period used in this study is January 1, 2009 through December 31, 2012, and the current assumptions are those adopted by the Board for the December 31, 2011 actuarial valuation. If the actual experience differs significantly from the overall expected experience, or if the pattern of actual decrements by age, sex, or duration does not follow the expected pattern, new assumptions are considered.

Confidence intervals have been used to measure observed experience against current assumptions to determine the reasonableness of the assumption. The floating bars represent the 50 percent and 90 percent confidence intervals around the observed experience. The 90 percent confidence interval represents the range around the observed rate that could be expected to contain the true rate during the period of study with 90 percent probability. The size of the confidence interval depends on the number of observations and the likelihood of occurrence. If an assumption is outside the 90 percent confidence interval and there is no other information to explain the observed experience, a change in assumption should be considered. A sample graph with confidence intervals is shown below:

Overview (continued)



The demographic assumptions used for the December 31, 2011 actuarial valuation and the recommended assumptions for the December 31, 2012 and December 31, 2013 actuarial valuations are shown in detail in the following sections.

A summary of the changes recommended to the Board are as follows:

- Modest adjustment to male mortality for non-disabled police & fire retirees to better reflect statistically significant recent observed experience
- Minor adjustment to school district male mortality assumption for non-disabled school district retirees to simplify the computation of mortality tables
- Modest adjustments to mortality assumption for three active member groups (school district males, police & fire males, non-school district females) to better align tables with recent observed experience
- Modest adjustments to mortality tables for disabled retirees to better align tables with recent experience
- Adjust retirement rates for most groups modestly to more closely align with recent and expected future experience, with the most notable trend being a lowering of retirement rates for full career Tier 1/Tier 2 members in their early-to-mid 50s and an increase in rates for those members in their mid-to-late 60s
- Material decrease in the merit component of the salary increase assumption for school district members, most notably for long service members, to reflect observed experience over the past eight years
- Slightly lower assumed rates of duty disability for general service members and slightly raise assumed rates of duty disability for police & fire members
- Decrease the Tier 1 unused vacation cash out assumption for the state general service and state police & fire groups and increase it for local police & fire members

Overview (continued)

- Minor adjustment to the Tier 1/Tier 2 unused sick leave assumption for most groups
- Minor modifications to participation assumptions for the RHIA retiree healthcare programs
- Significant restructuring of the participation assumptions for the RHIPA retiree healthcare program via introduction of an assumption that varies by service, with rates decreased for low service members and materially increased for long service members

The recommended assumptions, in our opinion, were selected in a manner consistent with the requirements of ASOP No. 35.

Mortality

Mortality rates are used to project the length of time benefits will be paid to current and future retirees and beneficiaries. The selection of a mortality assumption affects plan liabilities because the estimated value of retiree benefits depends on how long the benefit payments are expected to continue. There are clear differences in the mortality rates among healthy retired members, disabled retired members and non-retired members. As a result, each of these groups is reviewed independently.

A summary of the current assumed mortality rates and recommended changes is shown below:

Assumption	December 31, 2011 Valuation	Recommended December 31, 2012 and 2013 Valuations
Healthy Annuitant Mortality	RP2000 <u>Generational</u>, Combined Active/Healthy Annuitant, Sex Distinct	No change
▪ School District male	White collar, set back 18 months	No collar, set back 24 months
▪ Other General Service male (and male beneficiary)	Blended 25% blue collar, set back 12 months	No change
▪ Police & Fire male	Blended 33% blue collar, no setback	Blended 25% blue collar, set back 12 months
▪ School District female	White collar, set back 24 months	No change
▪ Other female (and female beneficiary)	White collar, no setback	No change
Disabled Retiree Mortality	RP 2000 Static, Combined Active/Healthy Annuitant, No Collar, Sex distinct	RP 2000 Static, Disabled, No Collar, Sex distinct
▪ Male	Set forward 60 months, minimum of 2.25%	65% of Disabled table
▪ Female	Set forward 48 months, minimum of 2.25%	90% of Disabled table
Non-Annuitant Mortality	Fixed Percentage of Healthy Annuitant Mortality	No change
▪ School District male	75%	70%
▪ Other General Service male	85%	No change
▪ Police & Fire male	70%	95%
▪ School District female	60%	No change
▪ Other female	50%	55%

Mortality (continued)

Healthy Annuitant Mortality

Mortality assumptions for healthy retired members are separated into five groups based on employment category and gender (school district males, school district females, police & fire males, other general service males, all other females). Experience for female police & fire members was not sufficient for them to be rated on their own, so they were combined with non-school district general service females.

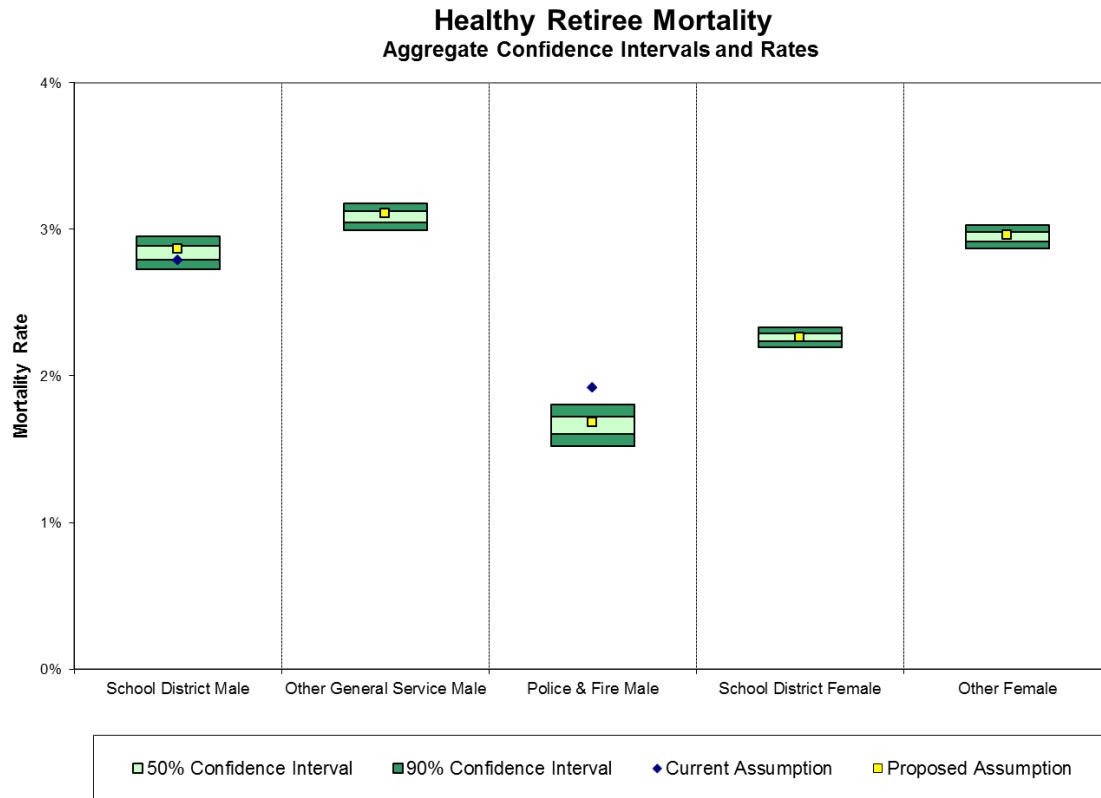
Mortality rates are expected to continue to decrease in the future, and the resulting increased longevity should be anticipated in the actuarial valuation. For Oregon PERS, this is done through the use of a generational mortality table. A generational mortality table anticipates future improvements in mortality by using a different static mortality table for each year of birth, with the tables for later years of birth assuming lower mortality than the tables for earlier years of birth.

To determine whether the current mortality assumption remains reasonable, we calculated the ratio of actual deaths to expected deaths (A/E ratio) during the experience study period for each of the five groups described above. With a generational mortality table, we target A/E ratios of 100 percent.

	Exposures	Actual Deaths	Current Assumption		Recommended Assumption	
			Expected Deaths	A/E Ratio	Expected Deaths	A/E Ratio
School District male	60,373	1,714	1,683	102%	1,731	99%
Other General Service male	93,151	2,875	2,893	99%	2,893	99%
Police & Fire male	22,001	366	422	87%	370	99%
School District Female	123,215	2,789	2,789	100%	2,789	100%
Other female	120,624	3,559	3,568	100%	3,568	100%

The A/E ratios for four of the five groups are near 100 percent. For the police & fire males, the A/E ratio is below 100 percent by an amount that was determined to be statistically significant at the 90 percent confidence level given the number of exposures in the study. For this group, we recommend changes to the mortality assumption to bring the A/E ratio closer to 100 percent. We also recommend making a change to the school district male mortality assumption to simplify the adjustment to the base mortality table used while maintaining a statistically justified assumption.

Mortality (continued)



The RP 2000 generational mortality table has a number of adjustments that can be applied to match the mortality rates of Oregon PERS. At times we use a “set back” to adjust the mortality rates. A “set back” of 12 months, for example, treats all members as if they were 12 months younger than they really are when applying the mortality table. In addition to a “set back,” we have also applied a collar adjustment as defined in the RP 2000 table. Essentially, a “white collar” adjustment further reduces the rates of mortality while a “blue collar” adjustment increases the rates of mortality. The basic table reflects a blend of approximately 55 percent “white collar” and 45 percent “blue collar.” Please note that “white collar” and “blue collar” are used in this context only to describe the adjustments made to the RP 2000 generational mortality table and are not intended to classify any members as either “blue collar” or “white collar.”

Mortality (*continued*)

A summary of the current and recommended healthy retiree mortality assumptions is shown below:

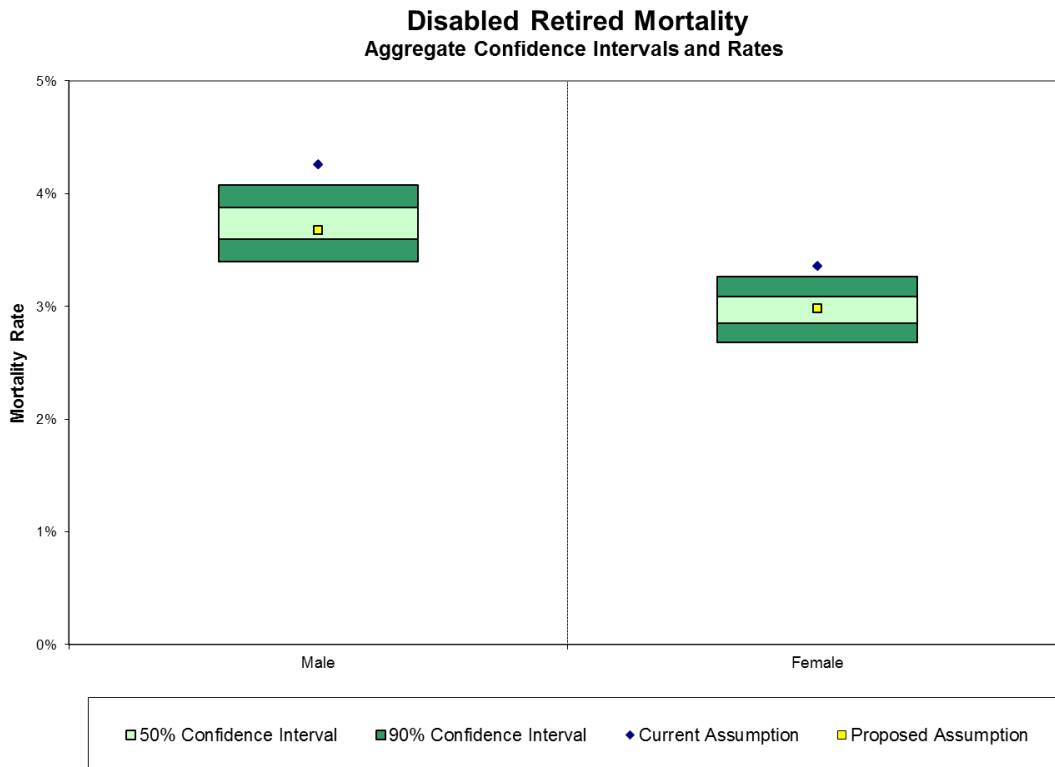
	December 31, 2011 Valuation	Recommended December 31, 2012 and 2013 Valuations
Basic Table	RP2000 <u>Generational</u>, Combined Active/Healthy Annuitant, Sex distinct	No change
School District male	White collar, set back 18 months	No collar, set back 24 months
Other General Service male (and male beneficiary)	Blended 25% blue collar, set back 12 months	No change
Police & Fire male	Blended 33% blue collar, no setback	Blended 25% blue collar, set back 12 months
School District female	White collar, set back 24 months	No change
Other female (and female beneficiary)	White collar, no setback	No change

Disabled Retiree Mortality

Disabled members are expected to have a shorter life expectancy than healthy retired members. In addition, future life expectancies for disabled members are not expected to increase as significantly as the future life expectancies for healthy retirees. As a result, we do not use generational mortality for disabled retirees and target A/E ratios at or near 100 percent. The A/E ratio for the current assumption is below 100 percent for both male and female mortality. For both groups, the results fell outside the 90 percent confidence interval for aggregate mortality rates, given the number of exposures in the study. We recommend a change to both assumptions. Our recommended new assumptions are based on a percentage of a standard national disabled mortality table, rather than an adjusted healthy mortality table as was previously the case.

	Exposures	Actual Deaths	December 31, 2011 Valuation		Recommended December 31, 2012 and 2013 Valuations	
			Expected Deaths	A/E Ratio	Expected Deaths	A/E Ratio
Male	8,270	309	352	88%	310	100%
Female	9,222	274	310	89%	276	99%

Mortality (continued)



A summary of current and recommended disabled retiree mortality assumptions is shown below:

	December 31, 2011 Valuation	Recommended December 31, 2012 and 2013 Valuations
Basic Table	RP 2000, Combined Active/Healthy Retired, No Collar, Sex Distinct	RP 2000 Disabled Mortality, Sex Distinct
Male	Set forward 60 months, minimum of 2.25%	65% of basic table rates
Female	Set forward 48 months, minimum of 2.25%	90% of basic table rates

Non-Annuitant Mortality

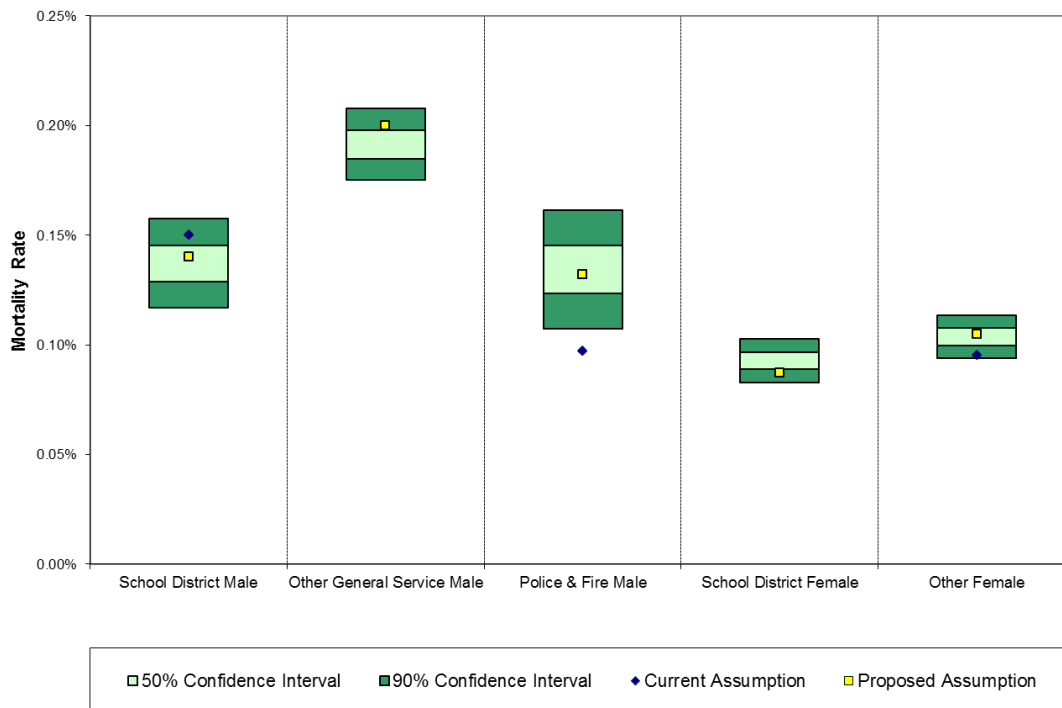
The non-annuitant mortality assumption applies to active members and dormant members (those members who have terminated employment but are vested and entitled to a future benefit), and is a fixed percentage of the healthy annuitant mortality rates. Because the healthy annuitant mortality assumptions have changed for two groups, the associated non-annuitant mortality assumptions have also changed. The analysis below compares the current fixed percentages as applied to the recommended healthy annuitant mortality assumptions to determine if a change also needs to be made in the fixed percentages for each of the groups. A/E ratios for non-annuitants have been targeted around 100 percent.

Mortality (continued)

	Exposures	Actual Deaths	December 31, 2011 Valuation		Recommended December 31, 2012 and 2013 Valuations	
			Expected Deaths	A/E Ratio	Expected Deaths	A/E Ratio
School District male	90,732	125	136	91%	127	98%
Other General Service male	194,422	372	389	96%	389	96%
Police & Fire male	49,861	67	48	138%	66	102%
School District female	260,301	242	227	107%	227	107%
Other female	290,742	301	277	109%	305	99%

With the very limited number of deaths in the experience period, the A/E ratio tends to fluctuate, particularly for police & fire males. For the police & fire males, the A/E ratio is above 100 percent by an amount that was determined to be statistically significant at the 90 percent confidence level given the number of exposures in the study. While the experience for school district males falls inside of the 90 confidence interval, the underlying healthy retiree table has changed. The experience for non-school district females fell near the bottom of the 90% confidence interval for the second consecutive study. As such, we recommend assumption changes for those groups.

Pre-Retirement Mortality
Aggregate Confidence Intervals and Rates



Mortality (*continued*)

A summary of the current and recommended non-retired mortality assumptions is shown below:

	December 31, 2011 Valuation	Recommended December 31, 2012 and 2013 Valuations
Basic Assumption	Fixed Percentage of Healthy Annuitant Mortality	No change
School District male	75%	70%
Other General Service male	85%	No change
Police & Fire male	70%	95%
School District female	60%	No change
Other female	50%	55%

Retirement Assumptions

The retirement assumptions used in the actuarial valuation include the following assumptions:

- Retirement from active status
- Probability a member will elect a lump sum option at retirement
- Percentage of members who elect to purchase credited service at retirement.

Retirement from Active Status

Members are eligible to retire as early as age 55 (50 for police & fire members) or earlier if the member has 30 years of service. In our analysis, we have found significant differences in the retirement patterns based on length of service, employment category (general service or police & fire), and eligibility for unreduced benefits.

A summary of the early, normal, and unreduced retirement dates under the plan are as follows:

Employment Category	Tier	Normal Retirement Age	Early Retirement Age	Unreduced Retirement
General Service	1	58	55	30 years of service
General Service	2	60	55	30 years of service
General Service	OPSRP	65	55	Age 58 with 30 years
Police & Fire	1 and 2	55	50	Age 50 with 25 years of service, or 30 years of service
Police & Fire	OPSRP	60	50	Age 53 with 25 years

Structure for Retirement Rates

The structure of the PERS retirement rate assumption separates rates by job classification and by service level. General service rates differ across three service bands: less than 15 years, 15 to 29 years, and 30 or more years of service. The first two service bands have different assumptions for school districts versus all other general service members. Police & fire rates employ the following three service bands: less than 13 years, 13 to 24 years, and 25 or more years of service.

The service band structure anticipates that member retirement decisions will contemplate the amount of the retirement benefit and the affordability of retirement.

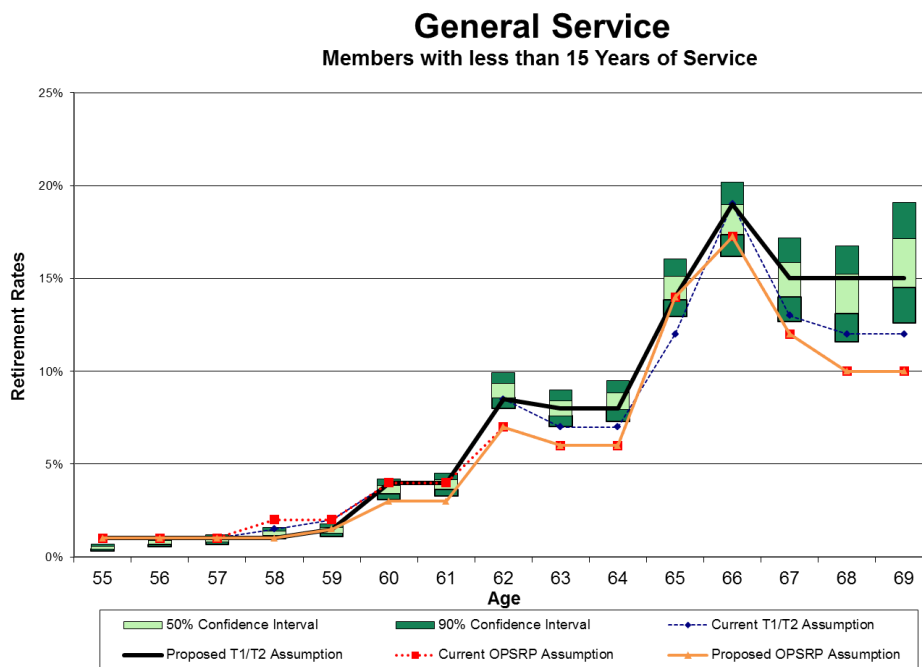
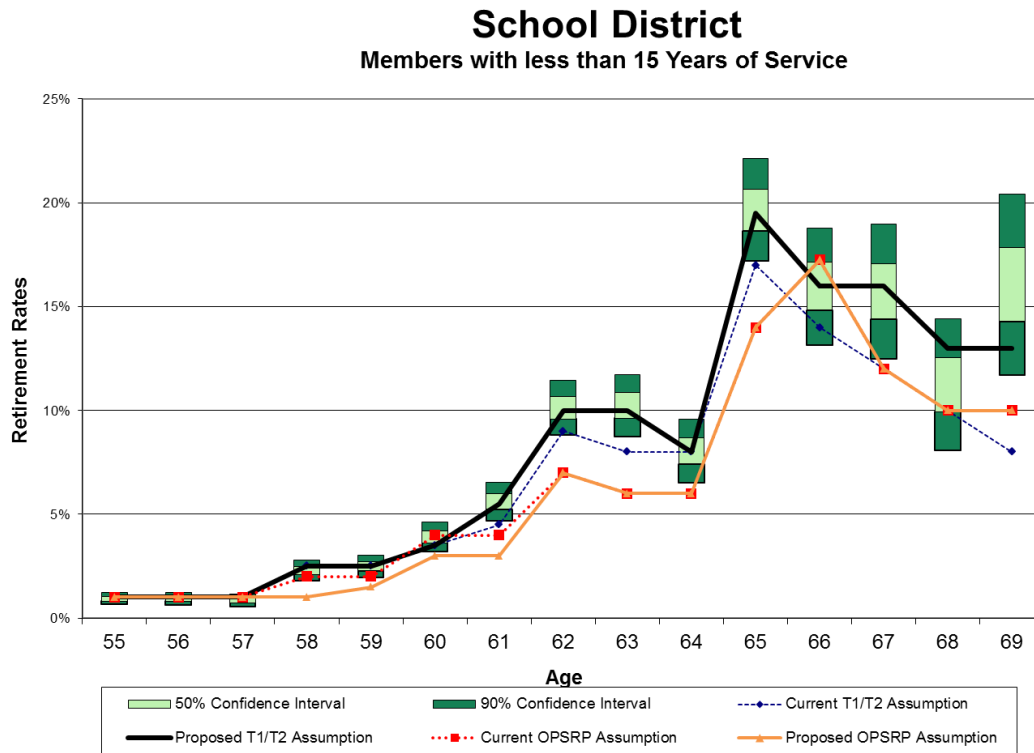
School District and General Service Retirement Rates

Members with Less Than 15 Years of Service

Retirement decisions by members with less than 15 years of service are likely to be heavily influenced by the availability of resources other than PERS benefits, including Social Security, prior employment, spousal benefits, and savings.

The following charts show the current assumed rates of retirement, the confidence interval around observed experience and the recommended retirement rates (if different than the current rates) for school district and general service members retiring with less than 15 years of service.

Retirement Assumptions (continued)

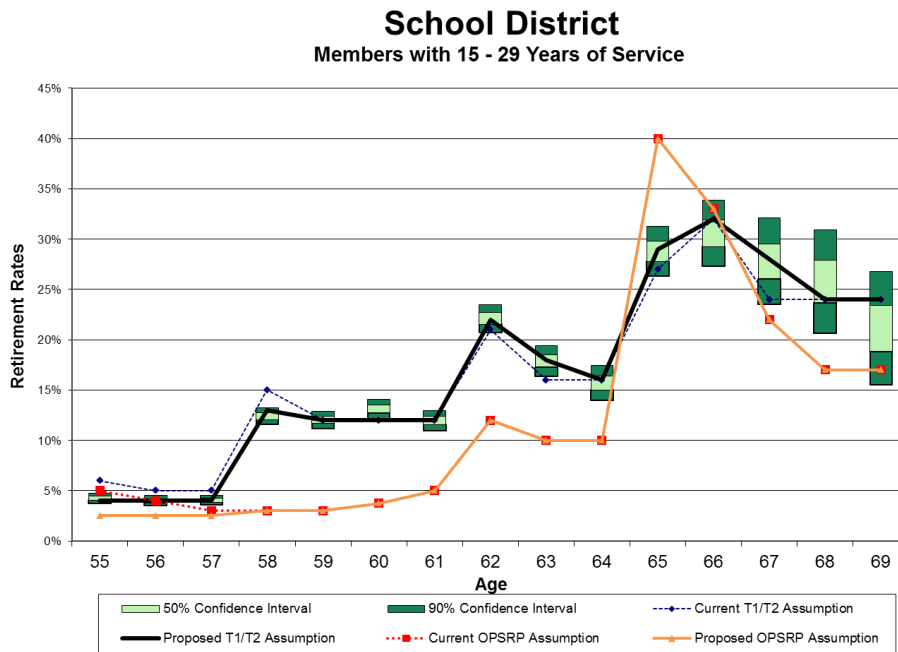


Retirement Assumptions (continued)

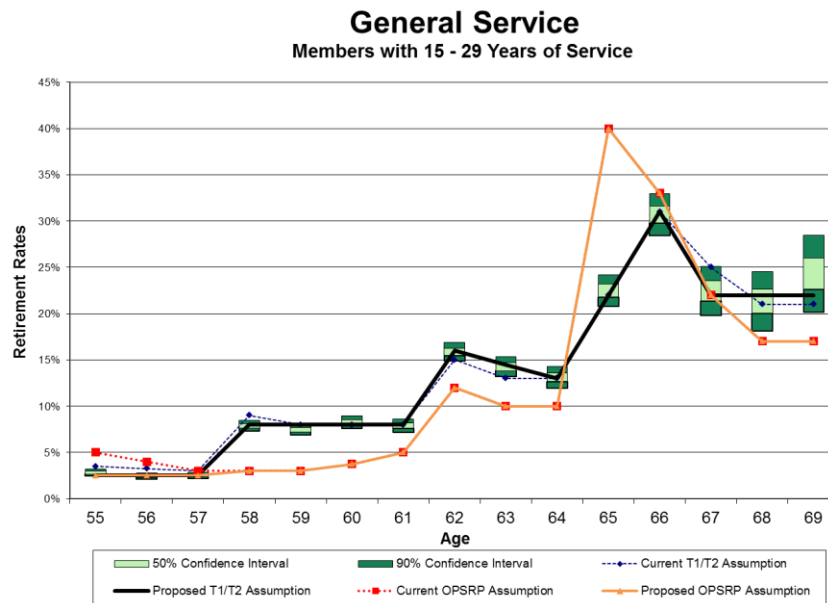
Members with 15 to 30 Years of Service

Retirement decisions by members with 15 to 29 years of years of service are likely to be influenced by the structure of PERS benefits as well as the availability of other resources, including Social Security, prior employment, spousal benefits and savings.

The following charts show the current assumed rates of retirement, the confidence interval around observed experience and the recommended retirement rates (if different than the current rates) for school district and general service members retiring with more than 15 years of service and less than 30 years of service.



Retirement Assumptions (continued)

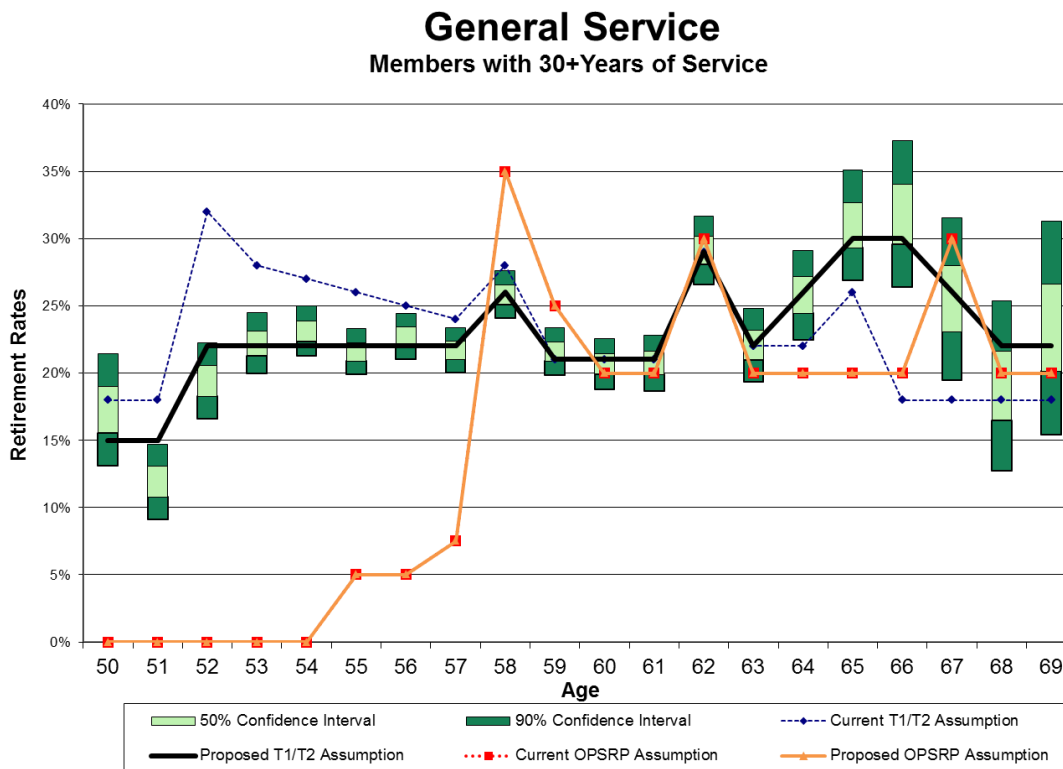


Retirement Assumptions (continued)

Members with 30 or More Years of Service

The retirement rate assumption for members with 30 or more years of service at retirement is not differentiated for school district and all other general service members. Instead, one set of rates is developed for all general service members with 30 or more years of service. Our analysis indicated that actual retirement rates for members with 30 or more years of service were somewhat lower than the current assumption for ages less than 59 and were somewhat higher than the current assumption after 62. This reflects a consistent pattern we have observed when analyzing year-by-year data. Our recommended assumption reflects this experience.

The following graph shows the current assumed rates of retirement, the confidence interval around observed experience and the recommended retirement rate assumption for members retiring with more than 30 years of service. No change is recommended to the assumption for OPSRP members.



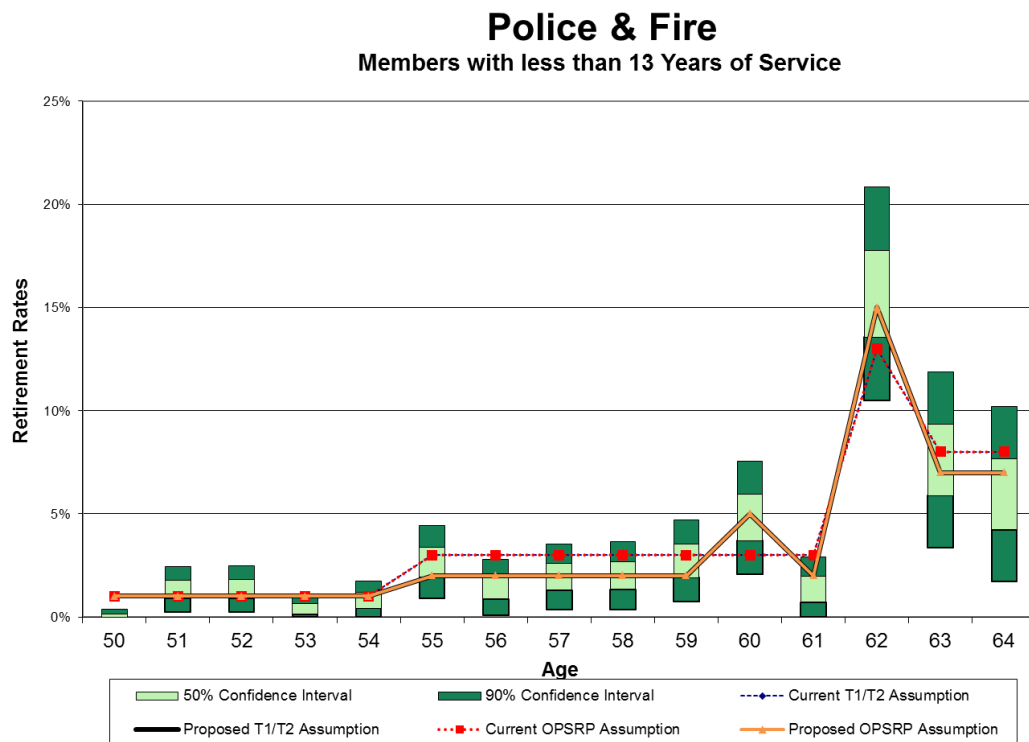
Retirement Assumptions (*continued*)

Police & Fire

Members with Less Than 13 Years of Service

The retirement assumption for police & fire members differs for members retiring with less than 13 years of service, those retiring with between 13 and 24 years of service, and those retiring with more than 25 years of service. Retirement rates for members with less than 13 years of service are likely to be heavily influenced by the availability of resources other than PERS benefits, including Social Security, prior employment, spousal benefits and savings.

The following graph shows the current assumed rates of retirement, the confidence interval around observed experience and the recommended retirement rate assumption for police & fire members retiring with less than 13 years of service. At many ages, we recommend modest changes to more closely align with experience.

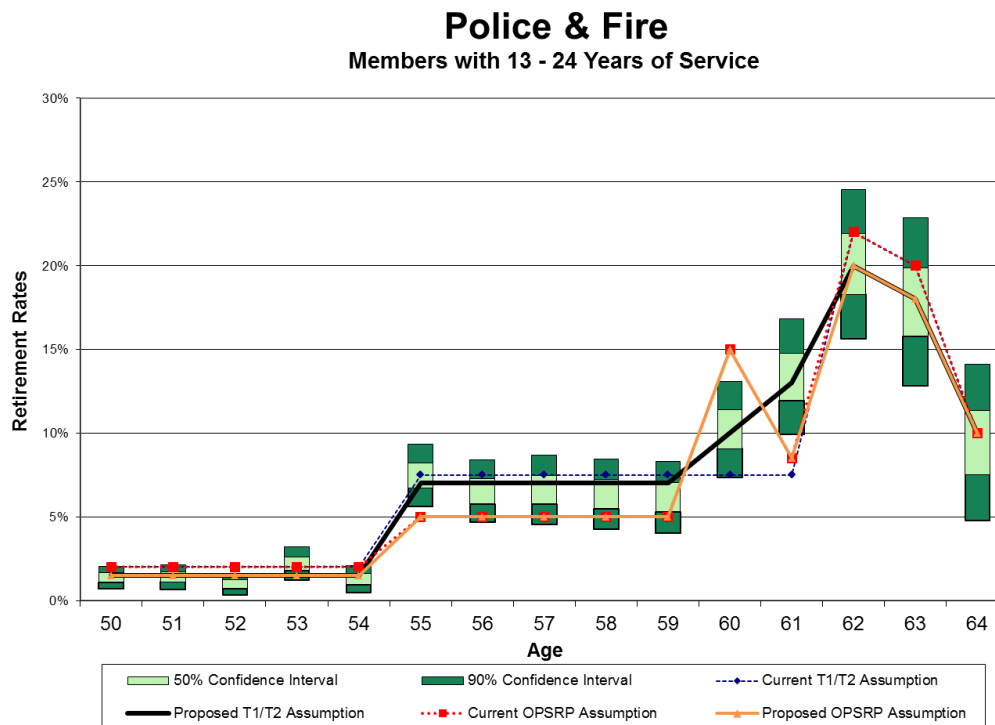


Retirement Assumptions (continued)

Members with 13 to 24 Years of Service

Retirement rates for members with 13 to 24 years of service are likely to be influenced by the structure of PERS benefits as well as the availability of other resources, including Social Security, prior employment, spousal benefits and savings.

The following graph shows the current assumed rates of retirement, the confidence interval around observed experience and the recommended retirement rate assumption for police & fire members retiring with between 13 and 24 years of service. At many ages, we recommend changes to more closely align with experience.

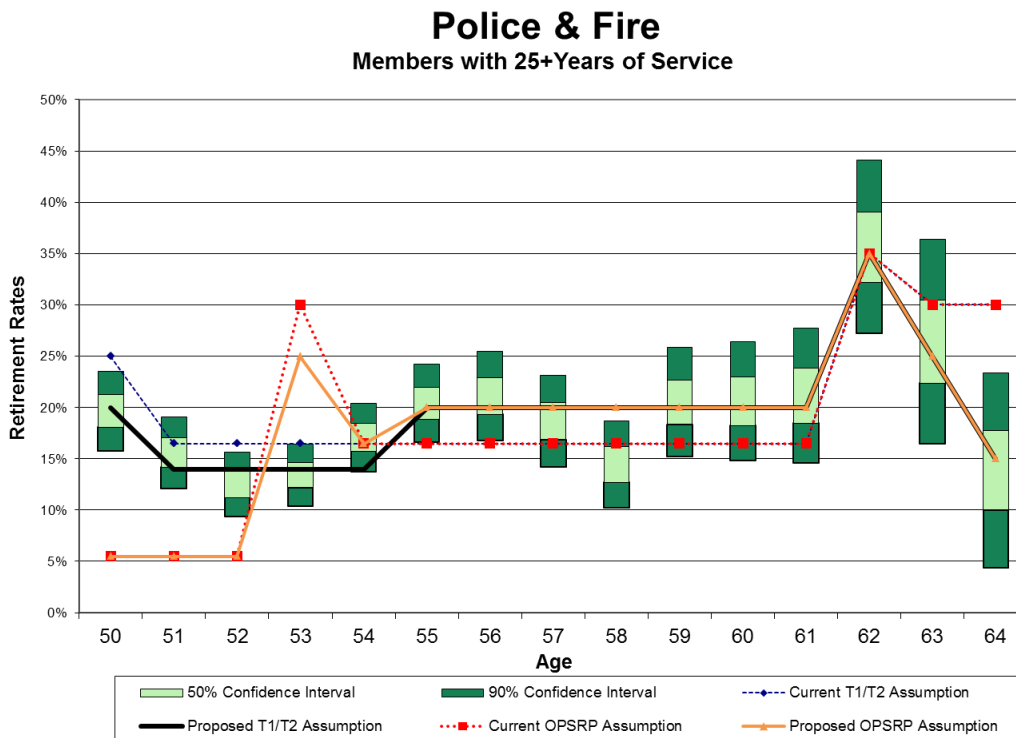


Retirement Assumptions (continued)

Members with 25 or More Years of Service

Police & fire members with 25 or more years of service can retire immediately at age 50 (53 for OPSRP) with unreduced retirement benefits. As a result, retirement rates at all ages are relatively high, with a spike at first eligibility for unreduced benefits, and another increase when Social Security benefits become available.

The following graph shows the current assumed rates of retirement, the confidence interval around observed experience and the recommended retirement rate assumption for police & fire members retiring with more than 25 years of service. At many ages, we recommend changes to more closely align with experience.



Retirement Assumptions (continued)

Summary of Recommended Retirement Rates

The following table summarizes our recommended Tier 1/Tier 2 retirement rates:

Tier 1/Tier 2 Recommended December 31, 2012 and 2013 Valuations									
Age	Police & Fire			General Service		School Districts		General Service (Including School Districts)	Judges
	< 13 yrs	13-24 yrs	25+ yrs	<15 yrs	15-29 yrs	<15 yrs	15-29 yrs	30+ yrs	
Less than 50								15.00%	
50	1.00%	1.50%	20.00%					15.00%	
51	1.00%	1.50%	14.00%					15.00%	
52	1.00%	1.50%	14.00%					22.00%	
53	1.00%	1.50%	14.00%					22.00%	
54	1.00%	1.50%	14.00%					22.00%	
55	2.00%	7.00%	20.00%	1.00%	2.50%	1.00%	4.00%	22.00%	
56	2.00%	7.00%	20.00%	1.00%	2.50%	1.00%	4.00%	22.00%	
57	2.00%	7.00%	20.00%	1.00%	2.50%	1.00%	4.00%	22.00%	
58	2.00%	7.00%	20.00%	1.00%	8.00%	2.50%	13.00%	26.00%	
59	2.00%	7.00%	20.00%	1.50%	8.00%	2.50%	12.00%	21.00%	
60	5.00%	10.00%	20.00%	4.00%	8.00%	3.50%	12.00%	21.00%	10.00%
61	2.00%	13.00%	20.00%	4.00%	8.00%	5.50%	12.00%	21.00%	10.00%
62	15.00%	20.00%	35.00%	8.50%	16.00%	10.00%	22.00%	29.00%	10.00%
63	7.00%	18.00%	25.00%	8.00%	14.50%	10.00%	18.00%	22.00%	10.00%
64	7.00%	10.00%	15.00%	8.00%	13.00%	8.00%	16.00%	26.00%	10.00%
65	100.00%	100.00%	100.00%	14.00%	22.00%	19.50%	29.00%	30.00%	10.00%
66				19.00%	31.00%	16.00%	32.00%	30.00%	10.00%
67				15.00%	22.00%	16.00%	28.00%	26.00%	10.00%
68				15.00%	22.00%	13.00%	24.00%	22.00%	10.00%
69				15.00%	22.00%	13.00%	24.00%	22.00%	30.00%
70				100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Retirement Assumptions (*continued*)

The following table summarizes our recommended OPSRP retirement rates:

Age	OPSRP Recommended December 31, 2012 and 2013 Valuations					
	Police & Fire			General Service/School District		
	< 13 yrs	13-24 yrs	25+ yrs	<15 yrs	15-29 yrs	30+ years
50	1.00%	1.50%	5.50%			
51	1.00%	1.50%	5.50%			
52	1.00%	1.50%	5.50%			
53	1.00%	1.50%	25.00%			
54	1.00%	1.50%	16.50%			
55	2.00%	5.00%	20.00%	1.00%	2.50%	5.00%
56	2.00%	5.00%	20.00%	1.00%	2.50%	5.00%
57	2.00%	5.00%	20.00%	1.00%	2.50%	7.50%
58	2.00%	5.00%	20.00%	1.00%	3.00%	35.00%
59	2.00%	5.00%	20.00%	1.50%	3.00%	25.00%
60	5.00%	15.00%	20.00%	3.00%	3.75%	20.00%
61	2.00%	8.50%	20.00%	3.00%	5.00%	20.00%
62	15.00%	20.00%	35.00%	7.00%	12.00%	30.00%
63	7.00%	18.00%	25.00%	6.00%	10.00%	20.00%
64	7.00%	10.00%	15.00%	6.00%	10.00%	20.00%
65	100.00%	100.00%	100.00%	14.00%	40.00%	20.00%
66				17.25%	33.00%	20.00%
67				12.00%	22.00%	30.00%
68				10.00%	17.00%	20.00%
69				10.00%	17.00%	20.00%
70				100.00%	100.00%	100.00%

Lump Sum Option at Retirement

At retirement, a member has the option of electing a total lump sum distribution equal to two times the member's account balance, a partial lump sum distribution equal to the member's account balance with a reduced monthly allowance, or a monthly allowance with no lump sum distribution. The percentage of active members electing a lump sum distribution at retirement has declined slightly from the prior experience study. The results of our analysis are as follows:

Retirement Assumptions (*continued*)

Election at Retirement	Number of Retired Members	Percentage of Retirements	December 31, 2011 Valuation Assumption	Recommended December 31, 2012 and 2013 Valuations
Partial Lump Sum	800	4.8%	6.0%	5.0%
Total Lump Sum				
• 2009	141	3.7%	N/A	N/A
• 2010	159	4.5%	N/A	N/A
• 2011	247	4.7%	5.0%	N/A
• 2012	154	3.8%	4.5%	N/A
• 2013	TBD	TBD	4.0%	No change
• 2014	TBD	TBD	3.5%	No change

When a member elects a total or partial lump sum under Money Match or a partial lump sum under Full Formula, he or she gives up the value of future COLAs (cost of living allowances) on the lump sum amount. A total lump sum election under Full Formula may cause the member to give up significantly more. Because there are no new contributions to member accounts and the system is projected to become dominated by Full Formula over time, we expect the total lump sum rate to decline over time.

Based on the data shown above, we recommend lowering the partial lump sum assumption of 6.0 percent to 5.0 percent. We recommend no change to the total lump sum assumption of 4.0 percent in 2013 decreasing by 0.5 percent per year until reaching 0.0 percent.

Purchase of Credited Service

A member has the option of purchasing service at retirement to enhance his or her retirement benefits. Service may be purchased under one or more of the following categories:

- Purchase of forfeited service
- Credit for waiting time
- Credit for educational service
- Credit for military service
- Credit for seasonal positions
- Credit for police officers and firefighters
- Purchase of retirement credit for disability time

Most purchases are full cost purchases, meaning the member pays both the member and employer cost to obtain the service. Since the member pays the full cost of the service purchased, the purchase produces no impact or only a small impact on projected Tier 1/Tier 2 employer costs. The most common, and predictable, non-full cost service purchase made by members is purchasing credit for the six-month waiting period. Thus, for valuation purposes, we have included an adjustment to account for those members who are expected to make the waiting period service purchase.

Retirement Assumptions (*continued*)

For Money Match retirements, the purchase of credited service is generally cost-neutral to the system, because the member is depositing both the member and employer contributions. Therefore, in reviewing actual experience, we examined non-Money Match retirements. For this assumption, we focused on experience during 2011 and 2012 only, as reliable data was not available for the earlier portion of the study period. The following table shows the number of members who retired in the experience period and elected to purchase credit for the six-month waiting period:

	Count	Number Electing to Purchase Waiting Time Service	Percentage of Retirements	December 31, 2011 Valuation Assumption	Recommended December 31, 2012 and 2013 Valuations
Non-Money Match Retirements	5,854	3,371	58%	60%	60%

We recommend maintaining the assumption of non-Money Match retirements purchasing credited service for the six month waiting period at 60 percent.

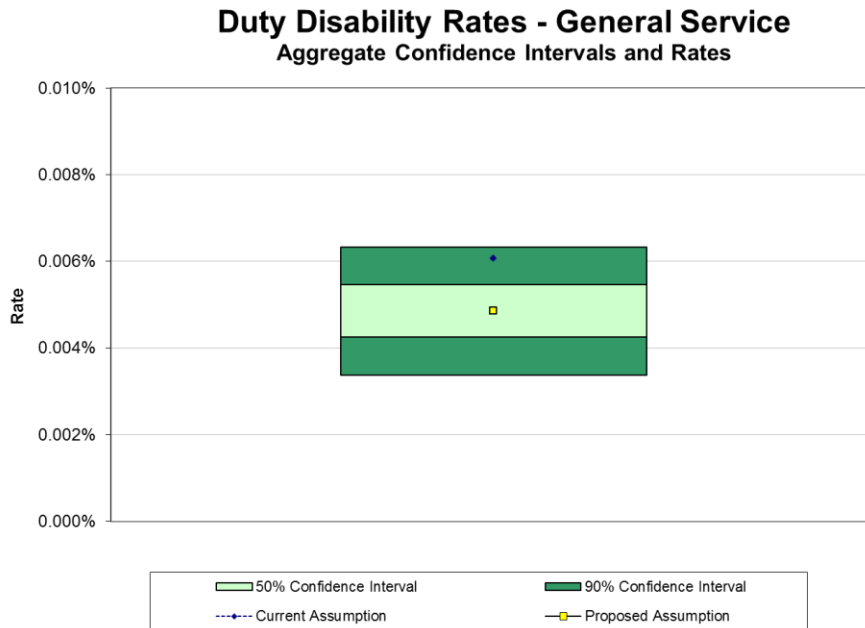
Disability Incidence Assumptions

The Plan provides duty and non-duty disability benefits to members. Members are eligible to receive duty disability benefits if they become disabled as a direct result of a job-related injury or illness, regardless of length of service. Members are eligible for non-duty disability benefits (also referred to as ordinary disability) if they become disabled after ten years of service (six years if a judge), but prior to normal retirement eligibility.

Duty disability incidence rates are developed separately for police & fire and general service members. Ordinary (non-duty) disability rates are developed for the system as a whole.

Duty Disability

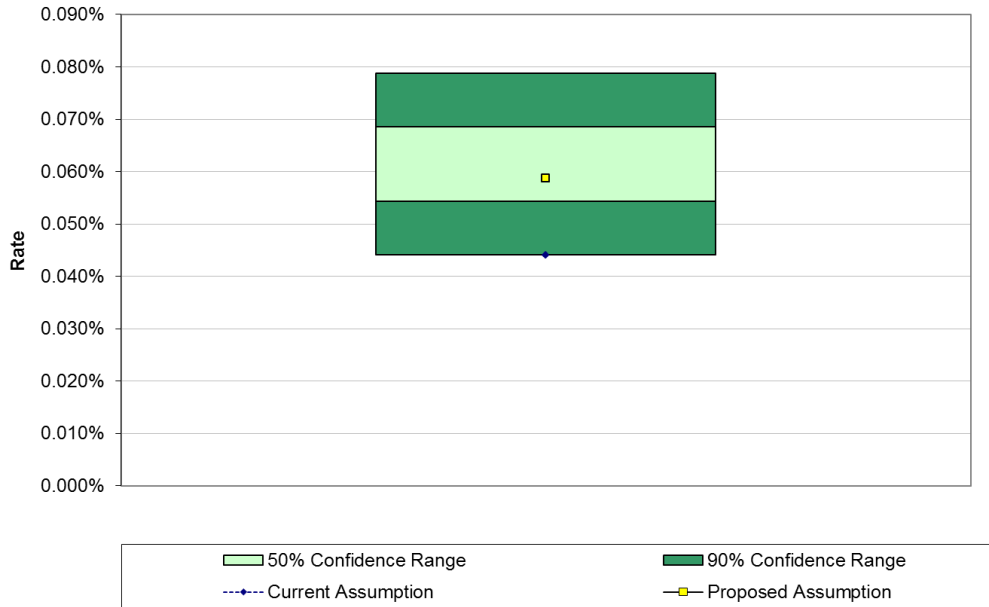
Due to the limited amount of experience data available at some ages, this assumption employs a standard table adjusted to fit within the aggregate confidence interval. We recommend updating the duty disability incidence assumption for both general service and police & fire members at this time. While the current assumed aggregate rate for the general service assumption is within the 90 percent confidence interval of the disability rates experienced, it sits near the top of the confidence interval for the second consecutive study. As such, we recommend updating the assumption.



The current assumed aggregate rate for the police & fire assumption is below the 90 percent confidence interval of the disability rates experienced. We recommend updating the assumption to more closely match observed experience.

Disability Incidence Assumptions (*continued*)

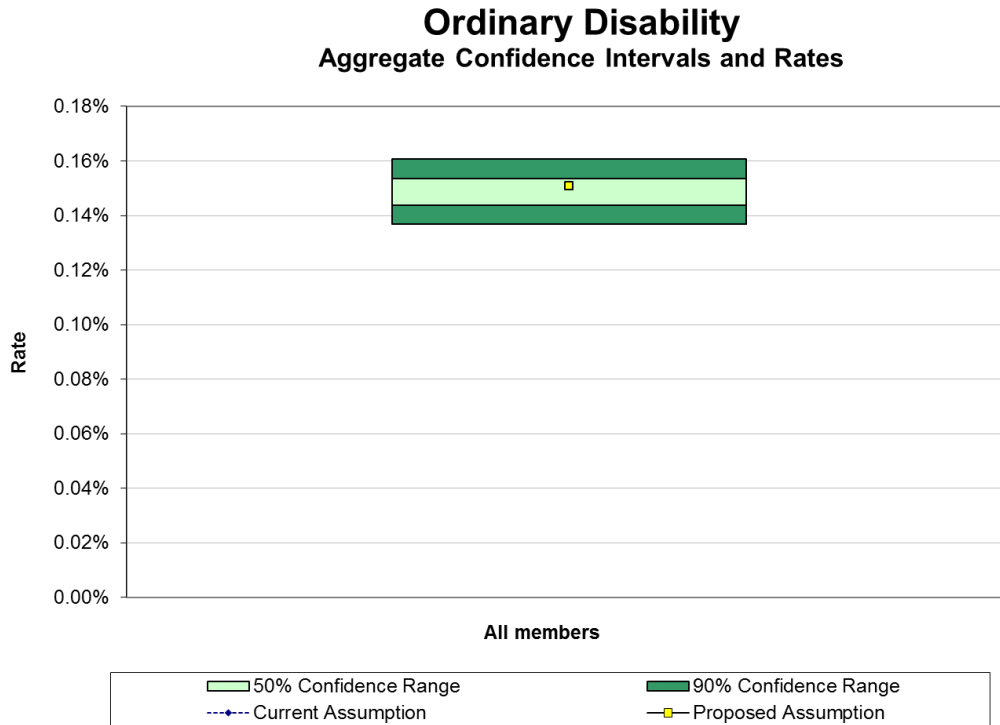
Duty Disability Rates - Police & Fire Aggregate Confidence Intervals and Rates



Ordinary (Non-Duty) Disability

As with duty disability, the experience data for ordinary disability was very limited at specific ages. Therefore, this assumption also uses a standard table adjusted to fit within the aggregate confidence interval. Based on the disability rates experienced, we recommend no change to the ordinary disability incidence assumption at this time.

Disability Incidence Assumptions (*continued*)



The following table summarizes our recommended disability incidence rates:

	Percentage of the 1985 Disability Class 1 Rates	
	December 31, 2011 Valuation	Recommended December 31, 2012 and 2013 Valuations
Duty Disability		
• Police & Fire	15% (0.005% – 0.127%)	20% (0.007% – 0.169%)
• General Service	1.5% (0.0005% – 0.013%)	1.2% (0.0004% – 0.010%)
Ordinary Disability	50% with 0.18% cap (0.015% – 0.180%)	No change

Termination Assumptions

Not all active members are expected to continue working for covered employers until retirement. Termination rates represent the probabilities that a member will leave covered employment at any given point during their working career. In previous studies, termination rates were established by age with select rates for the first three years of employment. Since Tier 1 and Tier 2 have been closed for more than three years, the select rates only apply to OPSRP members.

With this study, we recommend shifting the structure of the termination assumption from an age-based table with a select period to a service-based assumption. Service-based assumptions will reflect the experience of Tier 1, Tier 2, and OPSRP members, with each group affecting the period of the table relating to the relevant service amount.

We recommend developing assumptions on this basis for the following groups:

- School District males
- School District females
- Other General Service males
- Other General Service females
- Police & Fire (single table for both males & females)

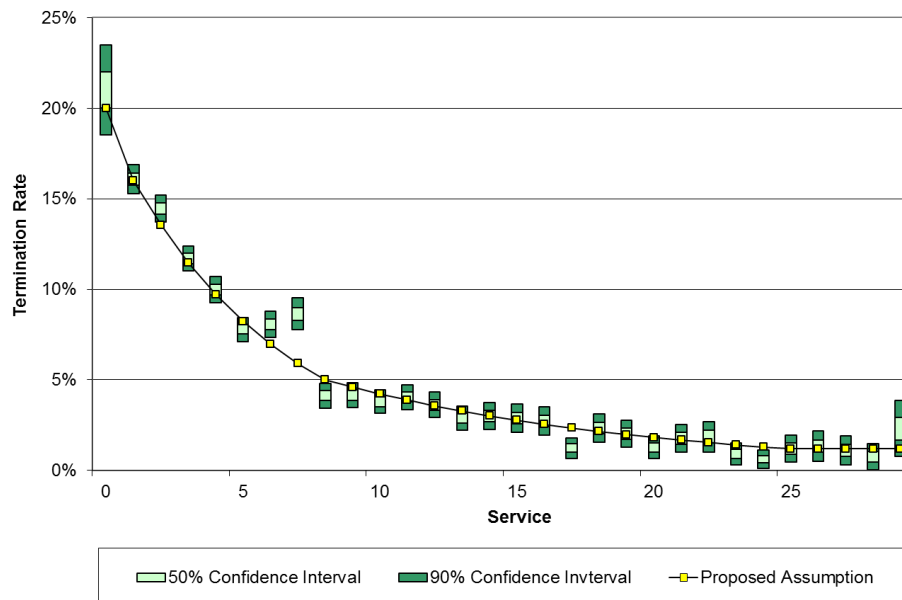
Termination Rates

The following charts show the confidence interval around observed experience and the recommended rates of termination by year of service. There is not an entry for the current assumption in these charts, as the previous structure of the assumption does not readily map to a service-only table. These charts are based on the observed experience of members in the relevant group during the study period.

Full listings of recommended termination assumptions are included in the appendix.

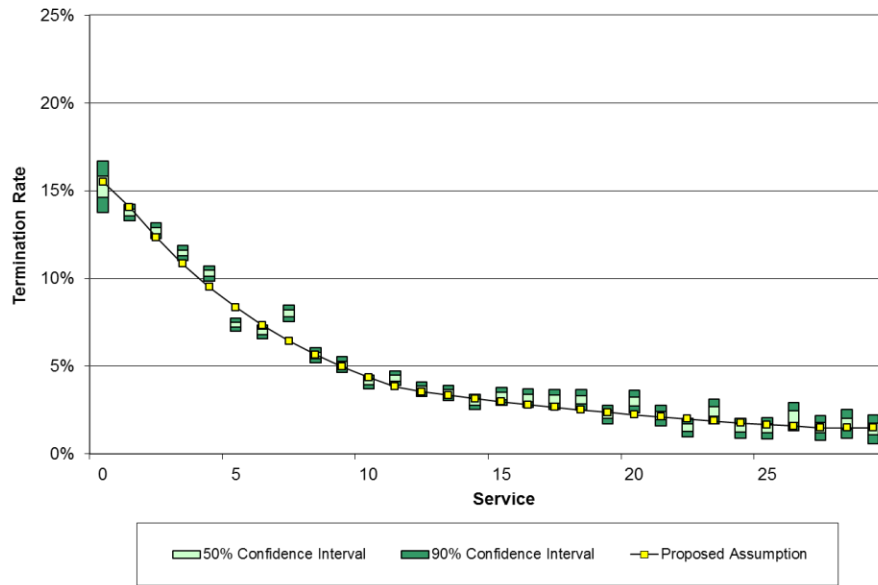
School Districts

School District Male



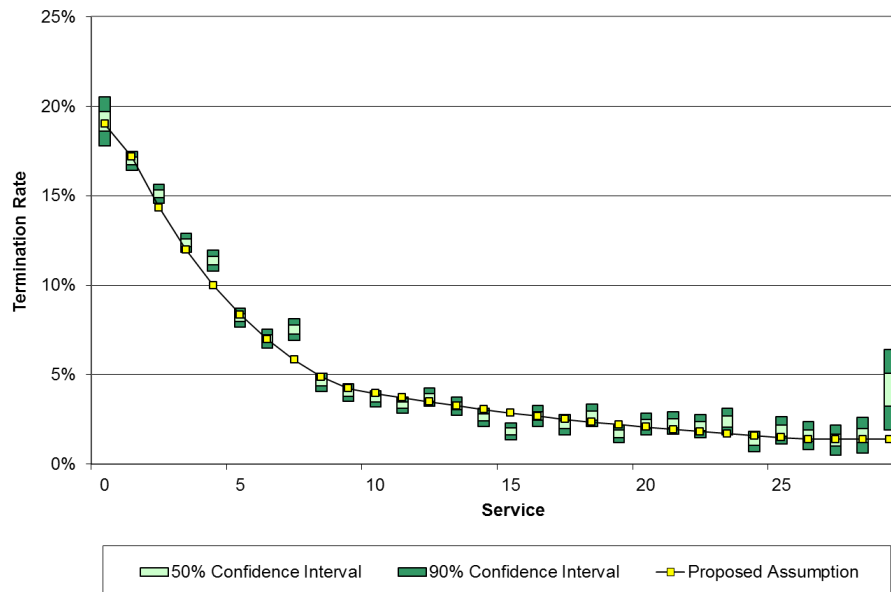
Termination Assumptions (continued)

School District Female



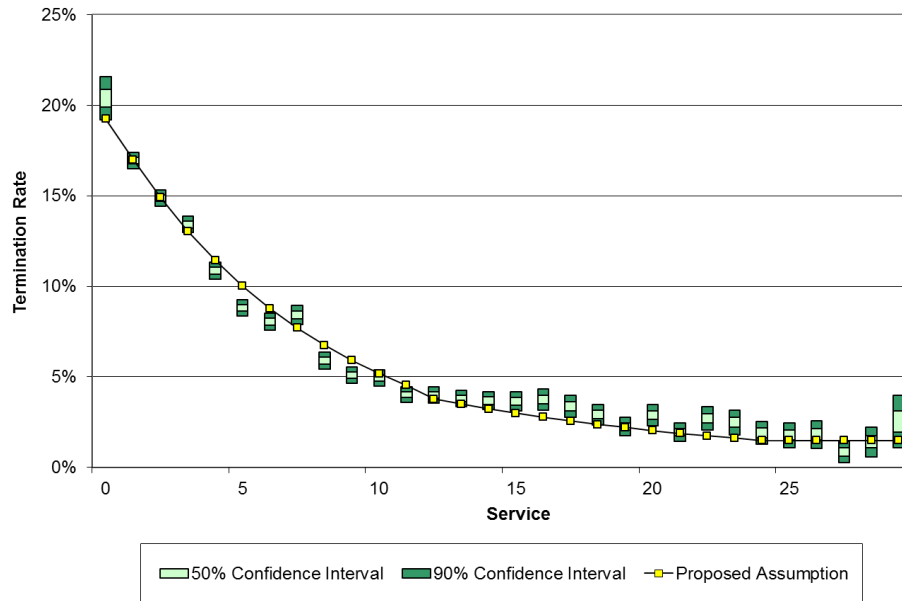
General Service

Other General Service Male



Termination Assumptions (continued)

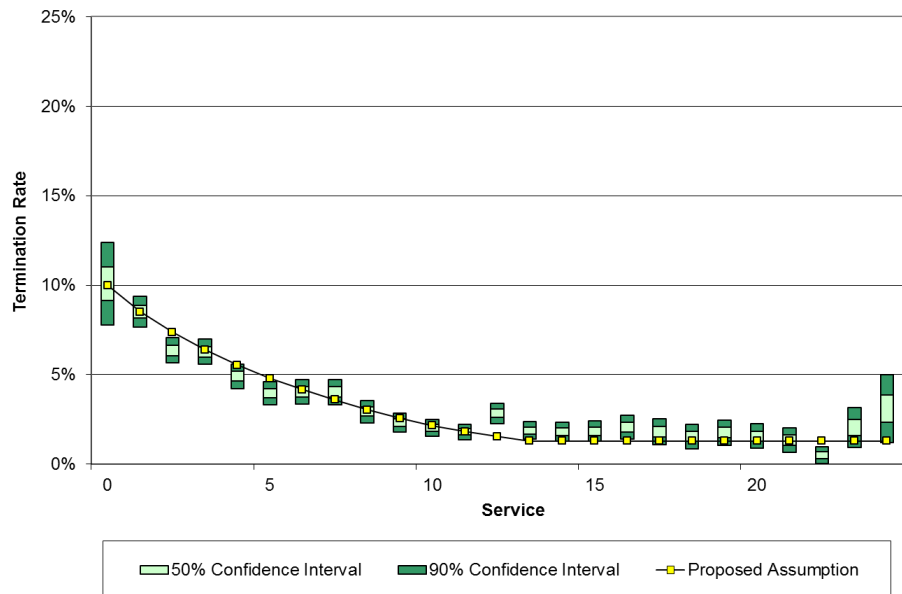
Other General Service Female



Police & Fire

All police & fire members were rated together, with no variation by group or gender.

Police & Fire



Salary Increase Assumptions

The salary increase assumptions analyzed with demographic experience were:

- Merit scale increases
- Unused sick leave adjustments.
- Unused vacation cash out adjustments

Merit Scale

The merit scale assumption is used in conjunction with the inflation and real wage growth assumptions to project individual member salaries to retirement. To focus on the merit and longevity component of salary increases, actual inflation and assumed long-term real wage growth were subtracted from observed salary increases. Our analysis assumes a one-year lag in the impact of actual inflation on a member’s salary increase. For example, the actual 2011 inflation level is expected to impact the salary increase from 2011 to 2012. In our analysis, our assumed level of annual real wage growth was used instead of the actual annual changes in the Average Wage Index (AWI) published by the Social Security Administration because a stable annual productivity assumption was judged to be a more appropriate measure for the salary increase expectations of members and employers in, for example, a bargaining process to set salary increases.

In order to capture experience across a broader range of budget, collective bargaining and economic cycles, the analysis covered observed salary increase experience from 2005 through 2012. As shown in the table below, actual inflation was measured using CPI-U and the assumed real growth in wages is the 1.00 percent assumption adopted by PERS.

Year	Actual Inflation (CPI-U)	Assumed Real Wage Growth
2004	3.26%	1.00%
2005	3.42%	1.00%
2006	2.54%	1.00%
2007	4.08%	1.00%
2008	0.09%	1.00%
2009	2.72%	1.00%
2010	1.50%	1.00%
2011	2.96%	1.00%

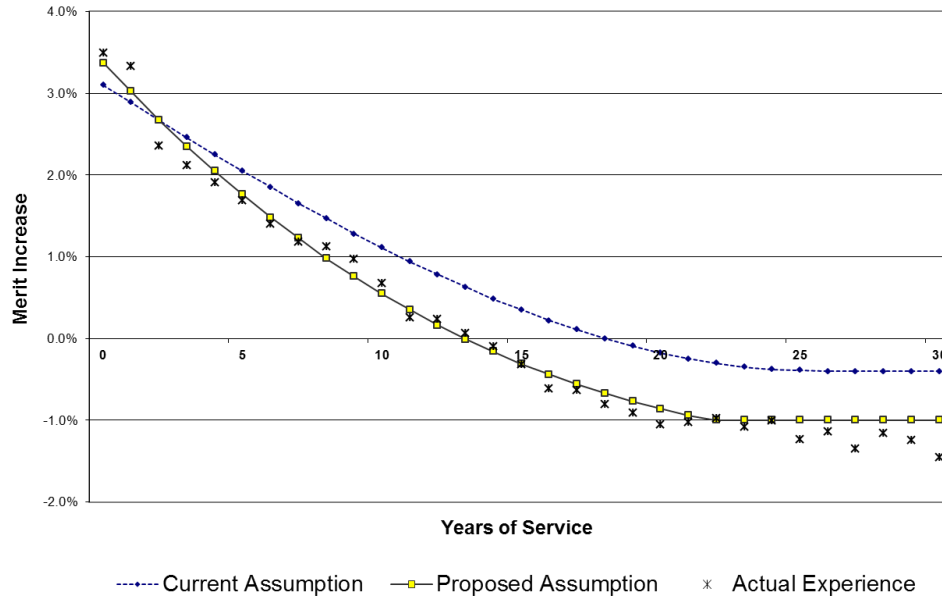
In the past, separate assumptions have been set for:

- School Districts
- Other General Service
- Police & Fire

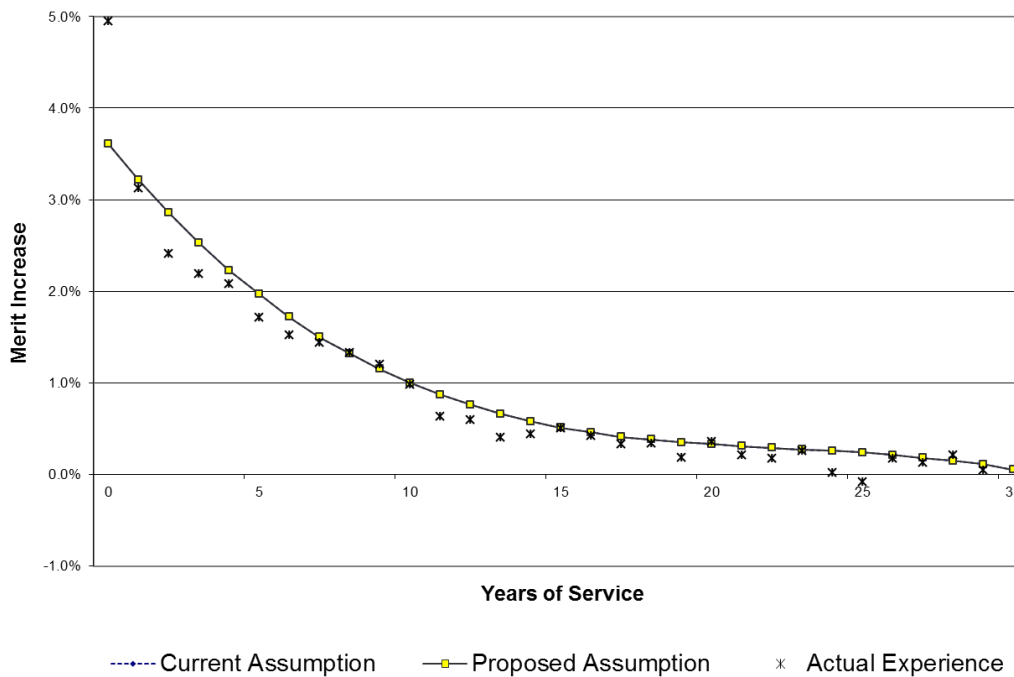
The following charts show the current assumed rates of merit salary increases, the eight-year average of merit increases based on observed experience, and the recommended rates of merit salary increases. We recommend decreases in the merit salary increase assumptions for school districts, but no change to the other general service or police & fire assumptions. For school districts, the merit increase at long-service ages was restricted to a minimum of -1.0% even though recent observed experience indicated moderately lower rates. The -1.0% floor was put in place so that it would be assumed that long service school district employees would receive increases not less than the inflation assumption of 2.75%.

Salary Increase Assumptions (continued)

School Districts

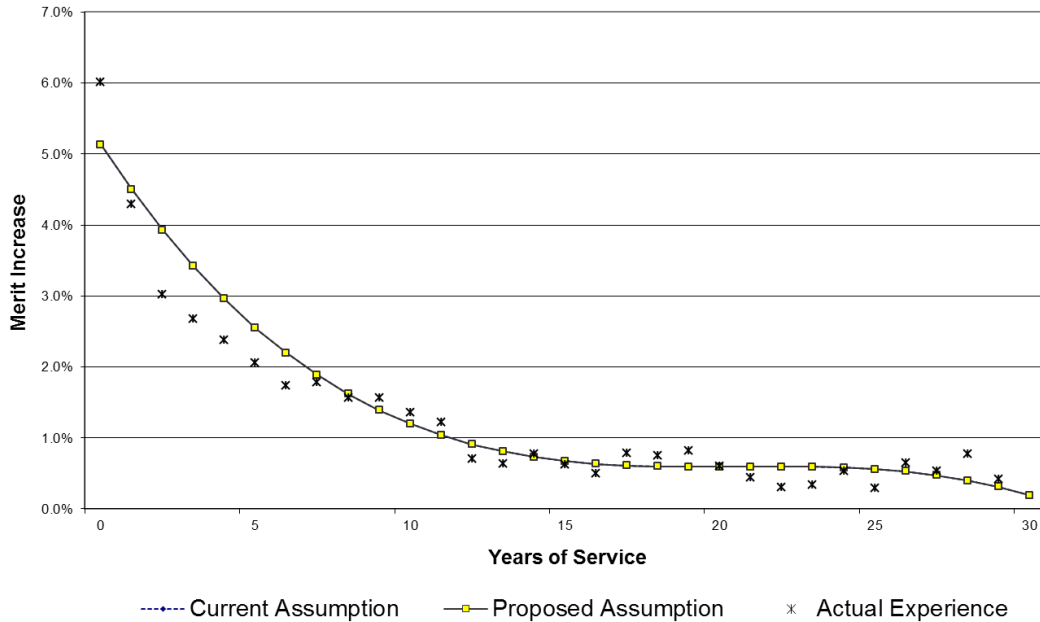


Other General Service



Salary Increase Assumptions (*continued*)

Police & Fire



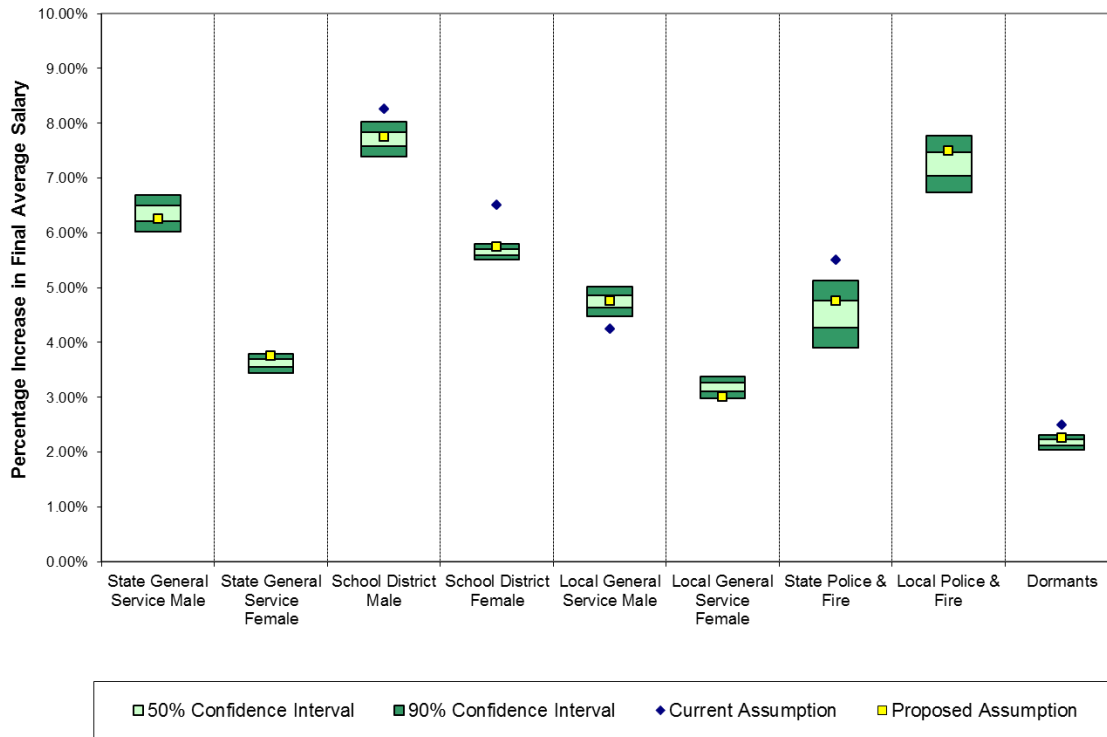
Unused Sick Leave Adjustment

Employers may elect to participate in the Unused Sick Leave Program. This program allows Tier 1/Tier 2 members to convert the value of one-half of their accumulated sick leave into additional retirement benefits. The assumption represents the percentage increase in a member's final average pay due to the inclusion of the value of 50 percent of the member's accumulated sick leave, and is only applied to employers who participate in the program.

For active members, there are currently eight sets of rates developed by employer group, employment category (general service or police & fire) and gender. The chart below shows the current assumption, the confidence intervals of the observed experience, and the recommended assumption for each of the groups studied.

Salary Increase Assumptions (*continued*)

Unused Sick Leave Adjustment



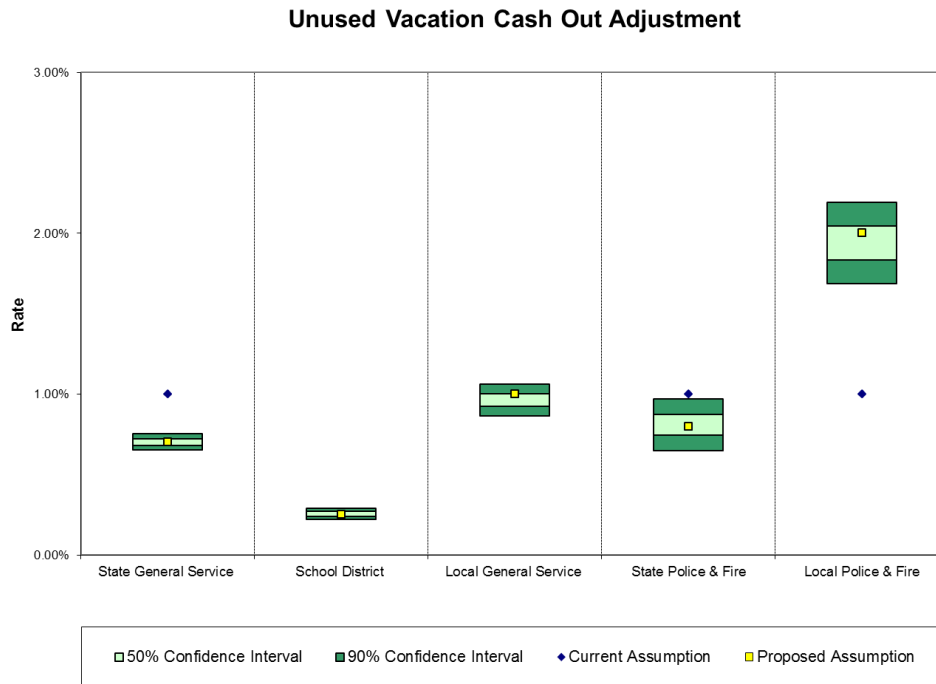
Due to the volatility in experience from one study to the next, for the groups where we recommended changes the recommended change is between the prior assumption and the actual observed experience, but within the confidence interval around current experience.

Unused Vacation Cash Out Adjustment

Tier 1 members are eligible to include the value of any lump sum payment of unused vacation pay in the calculation of their final average salary. The assumption shown below represents the percentage increase in a member's final average salary expected to result from this provision.

In previous valuations, this assumption distinguished only by Tier 1 school district members versus all other Tier 1 members. We are recommending developing assumptions according to the five categories of members shown below.

Salary Increase Assumptions (*continued*)



Retiree Healthcare Assumptions

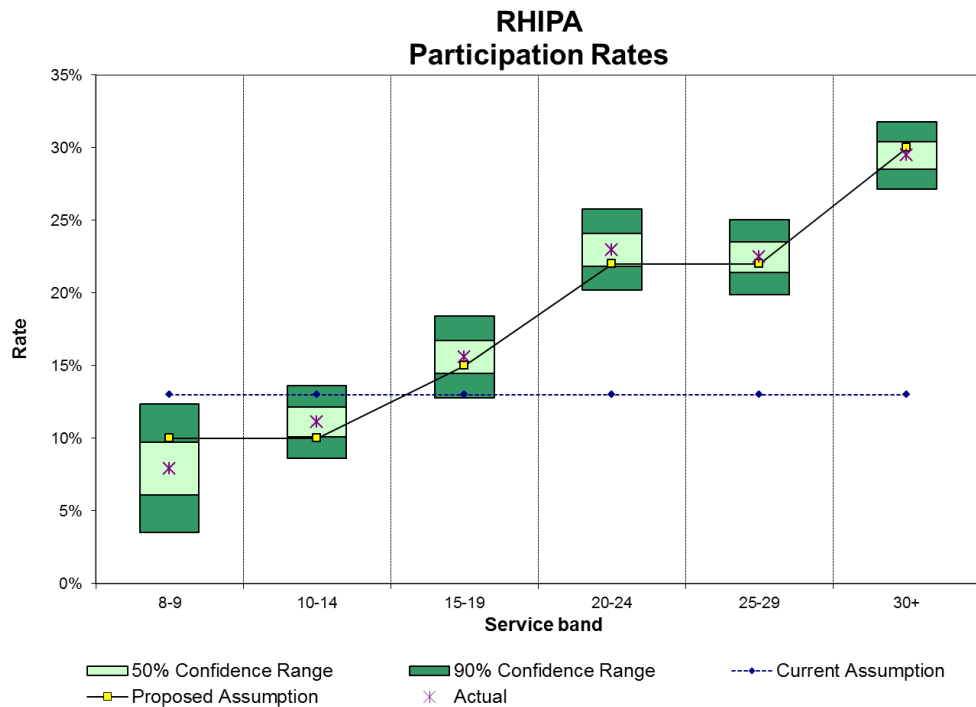
There are two retiree healthcare programs offered to eligible members, the Retiree Health Insurance Premium Account (RHIPA) and the Retiree Health Insurance Account (RHIA).

RHIPA

RHIPA is a program for eligible retirees from State of Oregon employment that provides a subsidized pre-Medicare insurance plan. In the previous valuation, the participation rate assumption for future eligible retirees was set at a flat 13 percent, which was slightly above the actual rate experienced during the prior observation period. During the current observation period, participation increased significantly. If the current flat assumption structure was maintained, we would recommend increasing the assumed participation rate to over 20 percent.

However, for this study we recommend a restructuring of the assumption. In our recommendation, the assumed participation rate varies based on service at the time of retirement. This modification attempts to more closely anticipate future experience, as the level of employer-paid benefits in the RHIPA program varies by service level. We believe this change will increase the liability and lower the funded status for the program, which already had a very low funded status at the most recent valuation. This level of participation in RHIPA may be affected, at least in part, by economic conditions, cost of coverage, competition from alternative programs available to retirees, and the impact of healthcare reform legislation becoming effective. Since changes in these factors could change participation rates in RHIPA quickly and because the program’s funded status is very low, we recommend that PERS closely monitor participation on a regular basis.

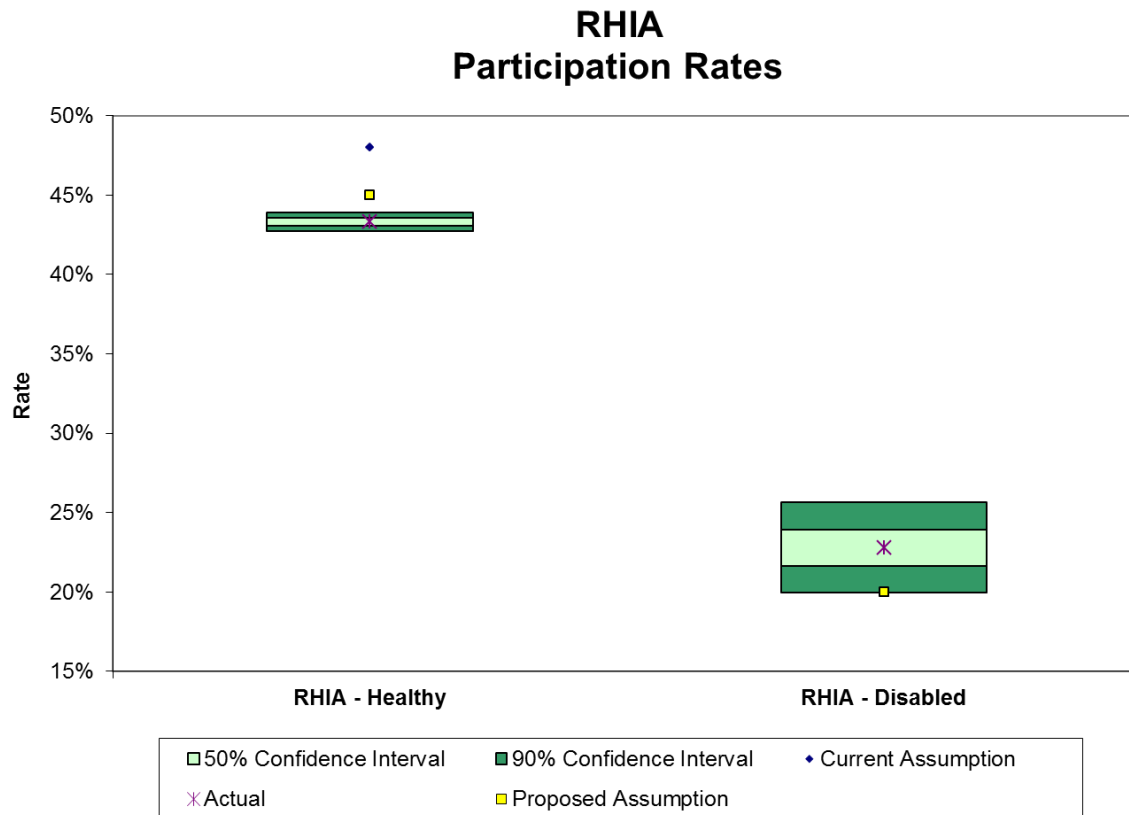
Retiree Healthcare Assumptions (continued)



RHIA

RHIA is a subsidized Medicare supplemental insurance program offered to all eligible retirees. Participation rates during the period of study decreased to approximately 43 percent for healthy retirees compared to our assumption of 48 percent. For disabled retirees, the participation followed our assumption of 20 percent fairly closely. As shown in the table below, we recommend decreasing the healthy assumption to 45 percent and maintaining the disabled assumption of 20 percent. Healthy RHIA participation behavior has been somewhat volatile in recent study periods, which contributes to our recommendation to not move the assumption all the way down to the recently observed experience. This will provide a measure of conservatism in establishing rates for this program, which is currently underfunded.

Retiree Healthcare Assumptions (*continued*)



5. Appendix

Data

Except where noted, the analysis in this study was based on data for the experience period from January 1, 2009, to December 31, 2012, as provided by the Oregon Public Employees Retirement System (PERS). PERS is solely responsible for the validity, accuracy and comprehensiveness of this information; the results of our analysis can be expected to differ and may need to be revised if the underlying data supplied is incomplete or inaccurate.

The member data was summarized according to the actual and potential member decrements for each year in the study. Actual and potential decrements were grouped according to age or service depending on the demographic assumption.

Assumption Tables

A complete listing of all the assumptions, methods and procedures presented to the Board for review on July 26, 2013 that are used in the actuarial valuation are summarized on the following pages.

Methods and Procedures

Actuarial cost method: Entry Age Normal (changed from projected unit credit)

UAL amortization method: Level percent of combined Tier 1, Tier 2, and OPSRP payroll

UAL amortization period:

- Closed amortization from the first rate setting valuation in which the experience is recognized
 - Tier 1/Tier 2 – All accumulated Tier 1/Tier 2 UAL shortfall as of 12/31/2013 to be re-amortized over a closed 20 year period per direction from the Board at the July 2013 Board meeting)
 - OPSRP – 16 years
 - RHIA/RHIPA – 10 years
- New side accounts are aligned with the new Tier 1/Tier 2 base from the most recent rate-setting valuation.
- New transition liabilities are amortized over the 18-year period beginning when the employer joins the SLGRP.

Asset valuation method: Market value

Excluded reserves: Contingency Reserve, Capital Preservation Reserve. Rate Guarantee Reserve is excluded only when it is positive.

Contribution Rate Stabilization Method: Contribution rates for a rate pool (e.g. Tier 1/Tier 2 SLGRP, Tier 1/Tier 2 School Districts, OPSRP) are confined to a collar based on the prior contribution rate (prior to application of side accounts, pre-SLGRP liabilities, and 6 percent Independent Employer minimum). The new contribution rate will generally not increase or decrease from the prior contribution rate by more than the greater of 3 percentage points or 20 percent of the prior contribution rate. If the funded percentage excluding side accounts drops below 60% or increases above 140%, the size of the collar doubles. If the funded percentage excluding side accounts is between 60% and 70% or between 130% and 140%, the size of the rate collar is increased on a graded scale. The recommended “sliding scale” range was modified from 70%-80% and 120%-130 to 60%-70% and 130%-140%, to be first effective with the advisory December 31, 2012 valuation.

Liability Allocation for Actives with Several Employers: Allocate Actuarial Accrued Liability 30% (5% for police & fire) based on account balance with each employer and 70% (95% for police & fire) based on service with each employer.

Allocate Normal Cost to current employer.

Allocation of Benefits-In-Force (BIF) Reserve: The BIF is allocated to each rate pool in proportion to the retiree liability attributable to the rate pool.

Recommended Economic Assumptions

Inflation	2.75%
Real wage growth	1.00%
Payroll growth	3.75%
Investment Return	7.50%-7.75% (7.75% selected by the Board at its July 2013 meeting)
Interest Crediting	
▪ Regular account	Equal to investment return assumption
▪ Variable account	Equal to investment return assumption
Health cost trend rates	
▪ 2013 trend rate	8.00%
▪ Ultimate trend rate	4.70%
▪ Year reaching ultimate trend	2083

Demographic Assumptions

Mortality

		Healthy Annuitant Mortality								Beneficiary Mortality				
Age	School District	Other General		School District		Other Female		Male	Female	Male	Female			
		Service Male	Police & Fire Male	Female	Other Female									
Year of Birth	1950	1960	1950	1960	1950	1960	1950	1960	1950	1960	1950	1960		
50	0.001860	0.001583	0.001948	0.001641	0.001948	0.001641	0.001344	0.001121	0.001589	0.001339	0.001948	0.001641	0.001589	0.001339
51	0.001961	0.001652	0.002049	0.001709	0.002049	0.001709	0.001437	0.001198	0.001739	0.001480	0.002049	0.001709	0.001739	0.001480
52	0.002062	0.001719	0.002322	0.001917	0.002322	0.001917	0.001535	0.001293	0.001871	0.001625	0.002322	0.001917	0.001871	0.001625
53	0.002312	0.001908	0.002468	0.002017	0.002468	0.002017	0.001684	0.001433	0.002024	0.001794	0.002468	0.002017	0.002024	0.001794
54	0.002460	0.002010	0.002638	0.002156	0.002638	0.002156	0.001818	0.001579	0.002212	0.002001	0.002638	0.002156	0.002212	0.002001
55	0.002636	0.002154	0.002822	0.002306	0.002822	0.002306	0.001976	0.001751	0.002484	0.002292	0.002822	0.002306	0.002484	0.002292
56	0.002831	0.002313	0.003142	0.002594	0.003142	0.002594	0.002168	0.001961	0.002846	0.002680	0.003142	0.002594	0.002846	0.002680
57	0.003169	0.002616	0.003570	0.002977	0.003570	0.002977	0.002445	0.002256	0.003202	0.003045	0.003570	0.002977	0.003202	0.003045
58	0.003632	0.003029	0.003901	0.003286	0.003901	0.003286	0.002812	0.002648	0.003573	0.003398	0.003901	0.003286	0.003573	0.003398
59	0.004022	0.003388	0.004295	0.003655	0.004295	0.003655	0.003170	0.003015	0.003983	0.003788	0.004295	0.003655	0.003983	0.003788
60	0.004488	0.003819	0.004715	0.004012	0.004715	0.004012	0.003537	0.003364	0.004488	0.004231	0.004715	0.004012	0.004488	0.004231
61	0.004978	0.004237	0.005238	0.004458	0.005238	0.004458	0.003943	0.003751	0.005015	0.004770	0.005238	0.004458	0.005015	0.004770
62	0.005560	0.004732	0.005940	0.005107	0.005940	0.005107	0.004404	0.004189	0.005638	0.005363	0.005940	0.005107	0.005638	0.005363
63	0.006307	0.005422	0.006720	0.005777	0.006720	0.005777	0.004965	0.004722	0.006384	0.006072	0.006720	0.005777	0.006384	0.006072
64	0.007087	0.006093	0.007745	0.006727	0.007745	0.006727	0.005582	0.005309	0.007150	0.006801	0.007745	0.006727	0.007150	0.006801
65	0.008104	0.007038	0.008677	0.007536	0.008677	0.007536	0.006320	0.006011	0.008024	0.007632	0.008677	0.007536	0.008024	0.007632
66	0.009002	0.007818	0.009721	0.008442	0.009721	0.008442	0.007079	0.006733	0.009035	0.008594	0.009721	0.008442	0.009035	0.008594
67	0.010022	0.008705	0.011067	0.009710	0.011067	0.009710	0.007944	0.007556	0.010051	0.009560	0.011067	0.009710	0.010051	0.009560
68	0.011385	0.009989	0.012179	0.010685	0.012179	0.010685	0.008945	0.008508	0.011115	0.010572	0.012179	0.010685	0.011115	0.010572
69	0.012537	0.010999	0.013080	0.011360	0.013080	0.011360	0.009951	0.009464	0.012280	0.011680	0.013080	0.011360	0.012280	0.011680
70	0.013480	0.011707	0.014243	0.012370	0.014243	0.012370	0.011005	0.010467	0.013737	0.013065	0.014243	0.012370	0.013737	0.013065
71	0.014727	0.012791	0.015395	0.013236	0.015395	0.013236	0.012157	0.011563	0.014867	0.013999	0.015395	0.013236	0.014867	0.013999
72	0.015925	0.013691	0.016770	0.014417	0.016770	0.014417	0.013599	0.012935	0.016455	0.015494	0.016770	0.014417	0.016455	0.015494
73	0.017356	0.014921	0.018331	0.015760	0.018331	0.015760	0.014689	0.013831	0.017784	0.016578	0.018331	0.015760	0.017784	0.016578
74	0.018981	0.016319	0.020096	0.017277	0.020096	0.017277	0.016258	0.015308	0.019616	0.018285	0.020096	0.017277	0.019616	0.018285
75	0.020825	0.017904	0.022095	0.018996	0.022095	0.018996	0.017536	0.016347	0.021038	0.019415	0.022095	0.018996	0.021038	0.019415
76	0.022885	0.019675	0.024958	0.021676	0.024958	0.021676	0.019342	0.018103	0.023120	0.021335	0.024958	0.021676	0.023120	0.021335
77	0.025856	0.022456	0.027514	0.023896	0.027514	0.023896	0.020703	0.019105	0.026097	0.024327	0.027514	0.023896	0.026097	0.024327
78	0.028415	0.024678	0.031151	0.027330	0.031151	0.027330	0.022751	0.020995	0.028720	0.026772	0.031151	0.027330	0.028720	0.026772
79	0.032094	0.028158	0.035331	0.031313	0.035331	0.031313	0.025733	0.023987	0.031622	0.029477	0.035331	0.031313	0.031622	0.029477
80	0.036286	0.032159	0.040114	0.035914	0.040114	0.035914	0.028320	0.026398	0.034894	0.032527	0.040114	0.035914	0.034894	0.032527
81	0.041112	0.036807	0.045456	0.041191	0.045456	0.041191	0.033181	0.029066	0.038556	0.035940	0.045456	0.041191	0.038556	0.035940
82	0.046666	0.042203	0.052136	0.047629	0.052136	0.047629	0.034407	0.032073	0.042623	0.039732	0.052136	0.047629	0.042623	0.039732
83	0.053458	0.048837	0.059677	0.055071	0.059677	0.055071	0.038018	0.035439	0.047194	0.043992	0.059677	0.055071	0.047194	0.043992
84	0.061252	0.056524	0.066041	0.060944	0.066041	0.060944	0.042029	0.039178	0.052284	0.048737	0.066041	0.060944	0.052284	0.048737
85	0.067731	0.062504	0.075475	0.070355	0.075475	0.070355	0.046536	0.043379	0.060102	0.056591	0.075475	0.070355	0.060102	0.056591
86	0.077484	0.072228	0.083300	0.077649	0.083300	0.077649	0.051555	0.048058	0.069158	0.065777	0.083300	0.077649	0.069158	0.065777
87	0.085407	0.079613	0.091898	0.085664	0.091898	0.085664	0.059383	0.055914	0.079737	0.076605	0.091898	0.085664	0.079737	0.076605
88	0.094028	0.087650	0.105256	0.099109	0.105256	0.099109	0.068469	0.065121	0.088458	0.084983	0.105256	0.099109	0.088458	0.084983
89	0.107583	0.101300	0.120599	0.114703	0.120599	0.114703	0.079101	0.075993	0.101634	0.098626	0.120599	0.114703	0.101634	0.098626
90	0.123231	0.117206	0.132883	0.126386	0.132883	0.126386	0.087752	0.084304	0.111866	0.108555	0.132883	0.126386	0.111866	0.108555
91	0.135504	0.128879	0.151997	0.146025	0.151997	0.146025	0.101025	0.098035	0.122475	0.118850	0.151997	0.146025	0.122475	0.118850
92	0.154992	0.148903	0.165063	0.158578	0.165063	0.158578	0.111196	0.107904	0.133097	0.129157	0.165063	0.158578	0.133097	0.129157
93	0.168143	0.161537	0.186260	0.180747	0.186260	0.180747	0.121742	0.118138	0.149963	0.146991	0.186260	0.180747	0.149963	0.146991
94	0.189782	0.184165	0.200581	0.194644	0.200581	0.194644	0.132299	0.128384	0.160690	0.157505	0.200581	0.194644	0.160690	0.157505
95	0.204113	0.198071	0.214555	0.208205	0.214555	0.208205	0.149364	0.146403	0.170819	0.167434	0.214555	0.208205	0.170819	0.167434
96	0.218333	0.211871	0.239200	0.234459	0.239200	0.234459	0.160048	0.156876	0.187310	0.183597	0.239200	0.234459	0.187310	0.183597
97	0.243470	0.238644	0.258410	0.253288	0.258410	0.253288	0.170137	0.166764	0.205353	0.203309	0.258410	0.253288	0.205353	0.203309
98	0.257893	0.252781	0.272379	0.266980	0.272379	0.266980	0.186561	0.182864	0.213446	0.211321	0.272379	0.266980	0.213446	0.211321
99	0.271834	0.266446	0.300212	0.297223	0.300212	0.297223	0.204942	0.202902	0.220317	0.218124	0.300212	0.297223	0.220317	0.218124
100	0.299911	0.296926	0.314095	0.310968	0.314095	0.310968	0.213020	0.210899	0.225880	0.223631	0.314095	0.310968	0.225880	0.223631
101	0.313781	0.310657	0.327416	0.324156	0.327416	0.324156	0.219877	0.217688	0.244834	0.244834	0.327416	0.324156	0.244834	0.244834
102	0.327088	0.323832	0.358628	0.358628	0.358628	0.358628	0.225428	0.223184	0.254498	0.254498	0.358628	0.358628	0.254498	0.254498
103	0.358628	0.358628	0.371685	0.371685	0.371685	0.371685	0.244834	0.244834	0.266044	0.266044	0.371685	0.371685	0.266044	0.266044
104	0.371685	0.371685	0.383040	0.383040	0.383040	0.383040	0.254498	0.254498	0.279055	0.279055	0.383040	0.383040	0.279055	0.279055
105	0.383040	0.383040	0.392003	0.392003	0.392003	0.392003	0.266044	0.266044	0.293116	0.293116	0.392003	0.392003	0.293116	0.293116
106	0.392003	0.392003	0.397886	0.397886	0.397886	0.397886	0.279055	0.279055	0.307811	0.307811	0.397886	0.397886	0.307811	0.307811
107	0.397886	0.397886	0.400000	0.400000	0.400000	0.400000	0.293116	0.293116	0.322725	0.322725	0.400000	0.400000	0.322725	0.322725
108	0.400000	0.400000	0.400000	0.400000	0.400000	0.400000	0.307811	0.307811	0.337441	0.337441	0.400000	0.400000	0.337441	0.337441
109	0.400000	0.400000	0.400000	0.400000	0.400000	0.400000	0.322725	0.322725	0.351544	0.351544	0.400000	0.400000	0.351544	0.351544
110	0.400000	0.400000	0.400000	0.400000	0.400000	0.400000	0.337441	0.337441	0.364617	0.364617	0.400000	0.400000	0.364617	0.364617

Demographic Assumptions (continued)

Disabled Retired Mortality			Non-Annuitant Mortality										
Age	Male	Female	Other General Service										
			Age	School District	Male		Police & Fire Male		School District Female		Other Female		
					Year of Birth	1950	1960	1950	1960	1950	1960	1950	1960
45	0.014671	0.006705	30	0.000275	0.000275	0.000350	0.000350	0.000391	0.000391	0.000141	0.000141	0.000156	0.000156
46	0.015501	0.007366	31	0.000288	0.000288	0.000379	0.000379	0.000424	0.000424	0.000149	0.000149	0.000179	0.000179
47	0.016331	0.008063	32	0.000311	0.000311	0.000417	0.000417	0.000466	0.000466	0.000170	0.000170	0.000200	0.000200
48	0.017163	0.008798	33	0.000349	0.000349	0.000461	0.000461	0.000515	0.000515	0.000195	0.000195	0.000221	0.000221
49	0.017997	0.009571	34	0.000393	0.000393	0.000508	0.000508	0.000568	0.000568	0.000218	0.000218	0.000239	0.000239
50	0.018834	0.010382	35	0.000442	0.000442	0.000557	0.000557	0.000622	0.000622	0.000241	0.000241	0.000256	0.000256
51	0.019674	0.011229	36	0.000491	0.000491	0.000608	0.000608	0.000679	0.000679	0.000261	0.000261	0.000273	0.000273
52	0.020516	0.012110	37	0.000541	0.000541	0.000658	0.000658	0.000736	0.000736	0.000280	0.000280	0.000290	0.000290
53	0.021358	0.013019	38	0.000589	0.000589	0.000707	0.000707	0.000790	0.000790	0.000298	0.000298	0.000309	0.000309
54	0.022199	0.013947	39	0.000633	0.000633	0.000757	0.000757	0.000846	0.000846	0.000316	0.000316	0.000329	0.000329
55	0.023037	0.014890	40	0.000675	0.000675	0.000807	0.000807	0.000902	0.000902	0.000337	0.000337	0.000355	0.000355
56	0.023876	0.015838	41	0.000715	0.000710	0.000859	0.000852	0.000960	0.000952	0.000359	0.000354	0.000384	0.000379
57	0.024717	0.016789	42	0.000755	0.000743	0.000915	0.000899	0.001023	0.001005	0.000387	0.000375	0.000420	0.000407
58	0.025567	0.017739	43	0.000799	0.000778	0.000980	0.000951	0.001096	0.001063	0.000419	0.000401	0.000460	0.000440
59	0.026434	0.018691	44	0.000851	0.000817	0.001055	0.001009	0.001179	0.001128	0.000458	0.000431	0.000507	0.000477
60	0.027327	0.019655	45	0.000909	0.000860	0.001139	0.001072	0.001273	0.001199	0.000502	0.000466	0.000559	0.000516
61	0.028258	0.020642	46	0.000978	0.000910	0.001237	0.001143	0.001382	0.001278	0.000553	0.000505	0.000615	0.000555
62	0.029238	0.021672	47	0.001056	0.000963	0.001332	0.001207	0.001489	0.001349	0.000610	0.000545	0.000676	0.000595
63	0.030280	0.022764	48	0.001131	0.001011	0.001435	0.001272	0.001604	0.001422	0.000671	0.000585	0.000739	0.000639
64	0.031400	0.023940	49	0.001214	0.001059	0.001543	0.001334	0.001724	0.001491	0.000737	0.000626	0.000805	0.000683
65	0.032613	0.025233	50	0.001302	0.001108	0.001656	0.001395	0.001851	0.001559	0.000806	0.000672	0.000874	0.000736
66	0.033938	0.026635	51	0.001373	0.001156	0.001742	0.001452	0.001946	0.001623	0.000862	0.000719	0.000956	0.000814
67	0.035393	0.028193	52	0.001443	0.001203	0.001974	0.001629	0.002206	0.001821	0.000921	0.000776	0.001029	0.000893
68	0.036991	0.029911	53	0.001618	0.001336	0.002098	0.001714	0.002345	0.001916	0.001010	0.000860	0.001113	0.000987
69	0.038748	0.031802	54	0.001722	0.001407	0.002242	0.001832	0.002506	0.002048	0.001091	0.000948	0.001217	0.001100
70	0.040679	0.033872	55	0.001845	0.001508	0.002399	0.001960	0.002681	0.002190	0.001186	0.001051	0.001366	0.001261
71	0.042797	0.036126	56	0.001982	0.001619	0.002671	0.002205	0.002985	0.002464	0.001301	0.001177	0.001565	0.001474
72	0.045113	0.038566	57	0.002218	0.001831	0.003034	0.002530	0.003391	0.002828	0.001467	0.001354	0.001761	0.001675
73	0.047640	0.041192	58	0.002542	0.002120	0.003316	0.002794	0.003706	0.003122	0.001687	0.001589	0.001965	0.001869
74	0.050383	0.044006	59	0.002815	0.002372	0.003650	0.003107	0.004080	0.003472	0.001902	0.001809	0.002191	0.002084
75	0.053344	0.047007	60	0.003141	0.002673	0.004007	0.003410	0.004479	0.003812	0.002122	0.002019	0.002447	0.002327
76	0.056518	0.050199	61	0.003485	0.002966	0.004452	0.003789	0.004976	0.004235	0.002366	0.002250	0.002758	0.002623
77	0.059897	0.053591	62	0.003892	0.003312	0.005049	0.004341	0.005643	0.004852	0.002642	0.002513	0.003101	0.002950
78	0.063466	0.057191	63	0.004415	0.003795	0.005712	0.004911	0.006384	0.005488	0.002979	0.002833	0.003511	0.003340
79	0.067205	0.061014	64	0.004961	0.004265	0.006583	0.005718	0.007358	0.006390	0.003349	0.003186	0.003933	0.003740
80	0.071092	0.065801	65	0.005672	0.004927	0.007375	0.006405	0.008243	0.007159	0.003792	0.003607	0.004413	0.004198
81	0.075104	0.069422	66	0.006301	0.005473	0.008263	0.007176	0.009235	0.008020	0.004247	0.004040	0.004970	0.004727
82	0.079220	0.074068	67	0.007016	0.006093	0.009407	0.008253	0.010514	0.009224	0.004767	0.004534	0.005528	0.005258
83	0.083423	0.079054	68	0.007970	0.006992	0.010352	0.009150	0.011570	0.010151	0.005367	0.005105	0.006114	0.005815
84	0.087700	0.084415	69	0.008776	0.007699	0.011118	0.009656	0.012426	0.010792	0.005970	0.005679	0.006754	0.006424
85	0.092042	0.090183	70	0.009436	0.008195	0.012106	0.010514	0.013531	0.011751	0.006603	0.006280	0.007555	0.007186
86	0.097906	0.096389	71	0.010309	0.008953	0.013086	0.011250	0.014625	0.012574	0.007294	0.006938	0.008177	0.007699
87	0.103774	0.103061	72	0.011147	0.009584	0.014254	0.012255	0.015931	0.013696	0.008160	0.007761	0.009050	0.008521
88	0.112346	0.110218	73	0.012149	0.010445	0.015582	0.013396	0.017415	0.014972	0.008814	0.008299	0.009781	0.009118
89	0.117387	0.117875	74	0.013287	0.011423	0.017082	0.014686	0.019091	0.016413	0.009755	0.009185	0.010789	0.010057
90	0.125141	0.126044	75	0.014578	0.012533	0.018781	0.016146	0.020990	0.018046	0.010522	0.009808	0.011571	0.010678
91	0.130049	0.134728	76	0.016019	0.013772	0.021214	0.018424	0.023710	0.020592	0.011605	0.010818	0.012716	0.011734
92	0.135408	0.145214	77	0.018099	0.015719	0.023387	0.020312	0.026138	0.022701	0.012422	0.011463	0.014353	0.013380
93	0.203829	0.159246	78	0.019890	0.017275	0.026478	0.023231	0.029593	0.025964	0.013651	0.012597	0.015796	0.014725
94	0.220161	0.170979	79	0.022466	0.019710	0.030031	0.026616	0.033564	0.029747	0.015440	0.014392	0.017392	0.016212
95	0.236208	0.182121	80	0.025400	0.022512	0.034097	0.030527	0.038108	0.034118	0.016992	0.015839	0.019192	0.017890
96	0.255537	0.200103	81	0.028778	0.025765	0.038714	0.035012	0.043269	0.039132	0.018709	0.017439	0.021206	0.019767
97	0.276611	0.212459	82	0.032666	0.029542	0.044316	0.040485	0.049529	0.045248	0.020644	0.019244	0.023443	0.021853
98	0.292149	0.221053	83	0.037420	0.034186	0.050725	0.046810	0.056693	0.052317	0.022811	0.021263	0.025957	0.024196
99	0.311222	0.228397	84	0.042876	0.039657	0.056135	0.051803	0.062739	0.057897	0.025217	0.023507	0.028756	0.026806
100	0.325940	0.234398	85	0.047412	0.043752	0.064153	0.059801	0.071701	0.066837	0.027921	0.026027	0.033056	0.031125
101	0.340104	0.244834	86	0.054239	0.050559	0.070805	0.066002	0.079135	0.073767	0.030933	0.028835	0.038037	0.036177
102	0.358628	0.254498	87	0.059785	0.055729	0.078113	0.072814	0.087303	0.081381	0.035630	0.033549	0.043856	0.042133
103	0.371685	0.266044	88	0.065820	0.061355	0.084688	0.078424	0.099994	0.094153	0.041081	0.039073	0.048652	0.046741
104	0.383040	0.279055	89	0.075308	0.070910	0.102509	0.097498	0.114569	0.108968	0.047460	0.045596	0.055899	0.054244
105	0.392003	0.293116	90	0.086262	0.082044	0.112950	0.107428	0.126239	0.120067	0.052651	0.050583	0.061526	0.059705
106	0.397886	0.307811	91	0.094853	0.090215	0.129197	0.124122	0.144397	0.138724	0.060615	0.058821	0.067361	0.065368
107	0.400000	0.322725	92	0.108495	0.104232	0.143003	0.134791	0.156810	0.150649	0.066717	0.064743	0.073203	0.071037
108	0.400000	0.337441	93	0.117700	0.113076	0.158321	0.153635	0.176947	0.171710	0.073045	0.070883	0.082480	0.080845
109	0.400000	0.351544	94	0.132848	0.128915	0.170494	0.165448	0.190552	0.184912	0.079380	0.077030	0.088379	0.086628
110	0.400000	0.364617	95	0.142879	0.138650	0.182372	0.176974	0.203828	0.197795	0.089618	0.087842	0.093951	0.092088
111	0.400000	0.376246	96	0.152833	0.148310	0.203320	0.199290	0.227240	0.222736	0.096029	0.094125	0.103020	0.100979
112	0.400000	0.386015	97	0.170429	0.167051	0.219648	0.215294	0.245489	0.240623	0.102082	0.100059	0.112944	0.111820
113	0.4000												

Demographic Assumptions (continued)

Retirement Assumptions (Tier 1/Tier 2)

Retirement from Active Status (Tier 1/Tier 2)

Age	Police & Fire			General Service / School Districts				Judges	
	<13 Years	13 - 24	25+ Years	General Service		School Districts		30+ Years	
				< 15 years	15-29 Years	< 15 years	15-29 Years		
< 50								15.00%	
50	1.00%	1.50%	20.00%					15.00%	
51	1.00%	1.50%	14.00%					15.00%	
52	1.00%	1.50%	14.00%					22.00%	
53	1.00%	1.50%	14.00%					22.00%	
54	1.00%	1.50%	14.00%					22.00%	
55	2.00%	7.00%	20.00%	1.00%	2.50%	1.00%	4.00%	22.00%	
56	2.00%	7.00%	20.00%	1.00%	2.50%	1.00%	4.00%	22.00%	
57	2.00%	7.00%	20.00%	1.00%	2.50%	1.00%	4.00%	22.00%	
58	2.00%	7.00%	20.00%	1.00%	8.00%	2.50%	13.00%	26.00%	
59	2.00%	7.00%	20.00%	1.50%	8.00%	2.50%	12.00%	21.00%	
60	5.00%	10.00%	20.00%	4.00%	8.00%	3.50%	12.00%	21.00%	10.00%
61	2.00%	13.00%	20.00%	4.00%	8.00%	5.50%	12.00%	21.00%	10.00%
62	15.00%	20.00%	35.00%	8.50%	16.00%	10.00%	22.00%	29.00%	10.00%
63	7.00%	18.00%	25.00%	8.00%	14.50%	10.00%	18.00%	22.00%	10.00%
64	7.00%	10.00%	15.00%	8.00%	13.00%	8.00%	16.00%	26.00%	10.00%
65	100.00%	100.00%	100.00%	14.00%	22.00%	19.50%	29.00%	30.00%	10.00%
66				19.00%	31.00%	16.00%	32.00%	30.00%	10.00%
67				15.00%	22.00%	16.00%	28.00%	26.00%	10.00%
68				15.00%	22.00%	13.00%	24.00%	22.00%	10.00%
69				15.00%	22.00%	13.00%	24.00%	22.00%	30.00%
70				100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Demographic Assumptions (continued)

Retirement Assumptions (OPSRP)

Retirement from Active Status (OPSRP)

Age	Police & Fire			General Service / School Districts				
	<13 Years	13 - 24	25+ Years	General Service		School Districts		30+ Years
				< 15 years	15-29 Years	< 15 years	15-29 Years	
50	1.00%	1.50%	5.50%					
51	1.00%	1.50%	5.50%					
52	1.00%	1.50%	5.50%					
53	1.00%	1.50%	25.00%					
54	1.00%	1.50%	16.50%					
55	2.00%	5.00%	20.00%	1.00%	2.50%	1.00%	2.50%	5.00%
56	2.00%	5.00%	20.00%	1.00%	2.50%	1.00%	2.50%	5.00%
57	2.00%	5.00%	20.00%	1.00%	2.50%	1.00%	2.50%	7.50%
58	2.00%	5.00%	20.00%	1.00%	3.00%	1.00%	3.00%	35.00%
59	2.00%	5.00%	20.00%	1.50%	3.00%	1.50%	3.00%	25.00%
60	5.00%	15.00%	20.00%	3.00%	3.75%	3.00%	3.75%	20.00%
61	2.00%	8.50%	20.00%	3.00%	5.00%	3.00%	5.00%	20.00%
62	15.00%	20.00%	35.00%	7.00%	12.00%	7.00%	12.00%	30.00%
63	7.00%	18.00%	25.00%	6.00%	10.00%	6.00%	10.00%	20.00%
64	7.00%	10.00%	15.00%	6.00%	10.00%	6.00%	10.00%	20.00%
65	100.00%	100.00%	100.00%	14.00%	40.00%	14.00%	40.00%	20.00%
66				17.25%	33.00%	17.25%	33.00%	20.00%
67				12.00%	22.00%	12.00%	22.00%	30.00%
68				10.00%	17.00%	10.00%	17.00%	20.00%
69				10.00%	17.00%	10.00%	17.00%	20.00%
70				100.00%	100.00%	100.00%	100.00%	100.00%

Lump Sum Option at Retirement

Partial Lump Sum	5.0% for all years
Total Lump Sum	4.0% for 2013, declining by 0.5% per year until reaching 0.0%

Purchase of Credited Service at Retirement

Money Match Retirements	0%
Non-Money Match Retirements	60%

Disability Assumptions

Age	Duty Disability		Ordinary Disability
	Police & Fire	General Service	
20	0.006%	0.000%	0.015%
25	0.009%	0.001%	0.022%
30	0.013%	0.001%	0.032%
35	0.020%	0.001%	0.049%
40	0.032%	0.002%	0.079%
45	0.052%	0.003%	0.130%
50	0.090%	0.005%	0.180%
55	0.169%	0.010%	0.180%
60	0.241%	0.014%	0.180%

Termination Assumptions

Duration	School District	School District	General	General	Police & Fire
	Male	Female	Service Male	Service Female	
0	20.00%	15.50%	19.00%	19.23%	10.00%
1	16.00%	14.05%	17.16%	16.99%	8.50%
2	13.55%	12.34%	14.34%	14.89%	7.37%
3	11.48%	10.83%	11.98%	13.05%	6.39%
4	9.72%	9.51%	10.00%	11.44%	5.54%
5	8.24%	8.35%	8.36%	10.02%	4.80%
6	6.98%	7.33%	6.98%	8.78%	4.16%
7	5.91%	6.44%	5.83%	7.70%	3.61%
8	5.01%	5.66%	4.87%	6.74%	3.03%
9	4.60%	4.97%	4.23%	5.91%	2.56%
10	4.23%	4.36%	3.96%	5.18%	2.16%
11	3.89%	3.83%	3.71%	4.54%	1.82%
12	3.57%	3.55%	3.48%	3.78%	1.54%
13	3.28%	3.35%	3.26%	3.50%	1.30%
14	3.02%	3.16%	3.06%	3.24%	1.30%
15	2.78%	2.98%	2.86%	3.00%	1.30%
16	2.55%	2.81%	2.68%	2.78%	1.30%
17	2.35%	2.66%	2.51%	2.57%	1.30%
18	2.16%	2.51%	2.36%	2.38%	1.30%
19	1.98%	2.37%	2.21%	2.21%	1.30%
20	1.82%	2.23%	2.07%	2.04%	1.30%
21	1.68%	2.11%	1.94%	1.89%	1.30%
22	1.54%	1.99%	1.82%	1.75%	1.30%
23	1.42%	1.88%	1.70%	1.62%	1.30%
24	1.30%	1.77%	1.59%	1.50%	1.30%
25	1.20%	1.67%	1.49%	1.50%	1.30%
26	1.20%	1.58%	1.40%	1.50%	1.30%
27	1.20%	1.50%	1.40%	1.50%	1.30%
28	1.20%	1.50%	1.40%	1.50%	1.30%
29	1.20%	1.50%	1.40%	1.50%	1.30%
30 +	1.20%	1.50%	1.40%	1.50%	1.30%

Merit Salary Increase Assumptions

Duration	School	Other General	
	District	Service	Police & Fire
0	3.37%	3.61%	5.13%
1	3.02%	3.22%	4.50%
2	2.67%	2.86%	3.93%
3	2.35%	2.53%	3.42%
4	2.05%	2.23%	2.96%
5	1.76%	1.97%	2.55%
6	1.48%	1.72%	2.20%
7	1.23%	1.50%	1.89%
8	0.98%	1.32%	1.62%
9	0.76%	1.15%	1.39%
10	0.55%	1.00%	1.20%
11	0.35%	0.87%	1.04%
12	0.16%	0.76%	0.91%
13	-0.01%	0.66%	0.81%
14	-0.16%	0.58%	0.73%
15	-0.31%	0.51%	0.67%
16	-0.44%	0.46%	0.63%
17	-0.56%	0.41%	0.61%
18	-0.67%	0.38%	0.60%
19	-0.77%	0.35%	0.59%
20	-0.86%	0.33%	0.59%
21	-0.94%	0.31%	0.59%
22	-1.00%	0.29%	0.59%
23	-1.00%	0.27%	0.59%
24	-1.00%	0.26%	0.58%
25	-1.00%	0.24%	0.56%
26	-1.00%	0.21%	0.53%
27	-1.00%	0.18%	0.47%
28	-1.00%	0.15%	0.40%
29	-1.00%	0.11%	0.31%
30	-1.00%	0.05%	0.19%
31 +	-1.00%	0.00%	0.00%

Unused Sick Leave Adjustment

Actives	
• State General Service Male	6.25%
• State General Service Female	3.75%
• School District Male	7.75%
• School District Female	5.75%
• Local General Service Male	4.75%
• Local General Service Female	3.00%
• State Police & Fire	4.75%
• Local Police & Fire	7.50%
Dormants	2.25%

Unused Vacation Cash Out Adjustment

Tier 1	
• State General Service	0.70%
• School District	0.25%
• Local General Service	1.00%
• State Police & Fire	0.80%
• Local Police & Fire	2.00%
Tier 2	0.00%

Probability of Account Withdrawal Before Retirement

None.

Retiree Healthcare Assumptions

Retiree Healthcare Participation

RHIPA	
• 8 – 9 years of service	10.0%
• 10 – 14 years of service	10.0%
• 15 – 19 years of service	15.0%
• 20 – 24 years of service	22.0%
• 25 – 29 years of service	22.0%
• 30+ years of service	30.0%
RHIA	
• Healthy Retired	45.0%
• Disabled Retired	20.0%

Health Cost Inflation Rates

Year	Rate
2013	8.00%
2014	6.10%
2015	5.90%
2016	5.50%
2017	6.20%
2018	5.90%
2019	5.80%
2020	5.90%
2021-2022	6.00%
2023	6.50%
2024-2025	6.90%
2026	6.80%
2027-2029	6.70%
2030-2031	6.60%
2032-2033	6.50%
2034-2035	6.40%
2036	6.20%
2037	6.10%
2038-2039	6.00%
2040-2041	5.90%
2042-2043	5.80%
2044-2047	5.70%
2048-2052	5.60%
2053-2060	5.50%
2061-2065	5.40%
2066-2072	5.30%
2073-2074	5.20%
2075-2076	5.10%
2077-2078	5.00%
2079-2080	4.90%
2081-2082	4.80%
2083 +	4.70%



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