Hewitt

Principal Civil Service Pension Scheme

Analysis of Scheme Experience between 1 April 2003 and 31 March 2007

4 December 2007

Prepared for

The Civil Service Pensions Division of the Cabinet Office

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Executive Summary

Principal findings

We have carried out an investigation into the experience of the Principal Civil Service Pension Scheme (PCSPS) during the four-year period from 1 April 2003 to 31 March 2007.

This investigation forms part of our review of the Accruing Superannuation Liability Charges (ASLCs) as at 31 March 2007. The purpose of the review is to compare the actual experience of the PCSPS with the expected experience over the same period on the basis of the assumptions adopted at the last ASLC review.

The main findings of our experience analysis were as follows:

- Mortality rates for female pensioners in normal health were higher than expected.
- Mortality rates for ill-health pensioners were generally lower than expected.
- Mortality rates in service for active members were significantly lower than expected, especially at older ages.
- Members tended to retire slightly later than expected, especially in salary bands 1 and 3.
- Ill-health retirements for non-prison officers were significantly less than expected.
- Promotional salary increases were generally in line with expectations.

Contents

Introduction

Introduction

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This investigation forms part of our review of the Accruing Superannuation Liability Charges (ASLCs) as at 31 March 2007. The purpose of the review is to compare the actual experience of the PCSPS with the expected experience over the same period on the basis of the assumptions adopted at the previous ASLC review.

Data

We were supplied with separate files of information relating to:

- Active membership movements over the period 1 April 2003 to 31 March 2007 ("movement data").
- Pensioner deaths over the period 1 April 2003 to 31 March 2007 ("movement data").
- Membership details of all current members of the PCSPS as at 31 March 2007 ("valuation data").

No movement data was supplied in respect of deferred members or dependants.

To the extent that we can, we have satisfied ourselves that the movement data looks reasonable. Our analysis relies entirely on the accuracy of the data.

Process

We have analysed separately the following experience items:

- Mortality in retirement (analysed separately for men and women, normal and ill-health retirements).
- Mortality before retirement (analysed for men and women).
- Age retirement patterns (analysed for men and women, the four pay bands and prison officers).
- Rates of ill-health retirement (analysed for men and women, and prison officers).
- Rates of withdrawal (analysed for men and women, the four pay bands and prison officers).
- Promotional salary scales (analysed for men and women, the four pay bands and prison officers).
- Commutation of pension for lump sum (**premium**).

The results are set out in the remainder of this report along with, where relevant, some background on each assumption.

The references to "prison officers" in this report refer to prison officers who were in post on 30 September 1987, who have reserved rights.

In addition, we have reviewed the allowances for rates of marriage (and dependency) and age differences between partners.

Sensitivities

For each item we have provided a range of sensitivity figures illustrating the approximate impact on the results of adopting alternative assumptions. In all cases the sensitivity is relative to the assumption adopted for the 2003 ASLC review.

The sensitivities show:

(A) The approximate impact on the future service contribution rate, as a percentage of Pensionable Pay. This excludes any past service effect shown in (B).

(B) The approximate impact of spreading any change in past service liabilities (or surplus) over a 15 year period, as a percentage of Pensionable Pay over that period.

(C) The total approximate impact ((A) plus (B)), as a percentage of Pensionable Pay.

The sensitivities illustrate the impact of changing one assumption at a time. The net impact of changing several assumptions simultaneously can be broadly indicated by combining the results of the individual sensitivity analyses in this report. We would be happy to prepare more accurate results on a specific combination of assumptions on request.

Overall approach to assumption setting

In reaching our recommendations on the assumptions considered in this paper we have assumed that, as for the previous review, the assumptions considered in this paper should be a "best estimate" of expected future experience. In particular, we have tried to avoid introducing any margins of prudence in the assumptions.

Pensioner Mortality – Experience

Introduction

The assumption for mortality rates in retirement is, perhaps, the most significant demographic assumption. It is an assumption which has seen much recent debate, largely around how to allow for future improvements in life expectations.

In the following three sections we consider:

- The results of our analysis of the recent mortality experience of Scheme members
- Fitting a suitable "base table" which reflects recent experience
- Making an allowance for future improvements.

2003 Assumptions

At the 2003 ASLC review we adopted the following assumptions:

- Future pensioners: Standard table PA92 (Calendar year 2026), rated down two years.
- Current pensioners: Standard table PA92 (Calendar year 2010), rated down one year.
- Future pensioners' dependants: Standard table PA92 (Calendar year 2026), rated down two years for female dependants and one year for males.
- Current pensioners' dependants: Standard table PA92 (Calendar year 2010), rated down one year for female dependants.

Further adjustments were made for ill-health pensioners to reflect higher rates of mortality for those members. Details of the assumptions can be found in our ASLC report dated 4 May 2004.

Approach to analysis

In carrying out our analysis of mortality experience, we have compared the actual amount of pension ceasing due to deaths at each age with those amounts expected under the 2003 assumptions.

The 2003 assumptions used tables relating to the mortality rates applying in future calendar years as a proxy for using tables appropriate to the year of birth for each individual and projecting improvement in mortality rates until year of death.

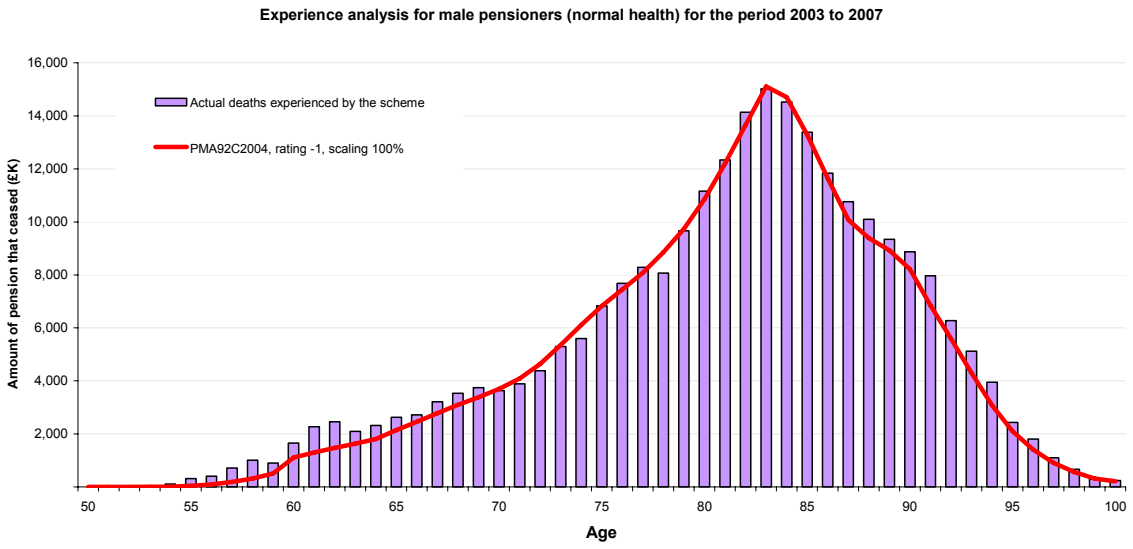
In order to obtain sensible results, it is appropriate to compare actual deaths in the period 1 April 2003 to 31 March 2007 with those expected in calendar year 2004, which is a proxy to the midpoint of the experience period.

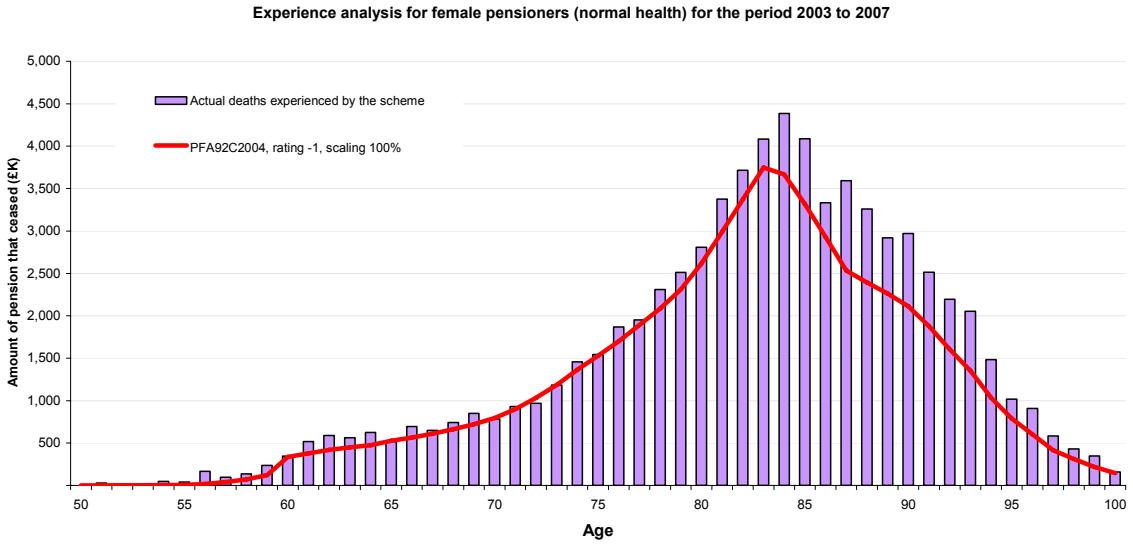
Spouses and dependants

No movement data in respect of spouses or dependants over the period was available. In the absence of this information, we have assumed that mortality assumptions for these categories should be consistent with mortality for members.

Results

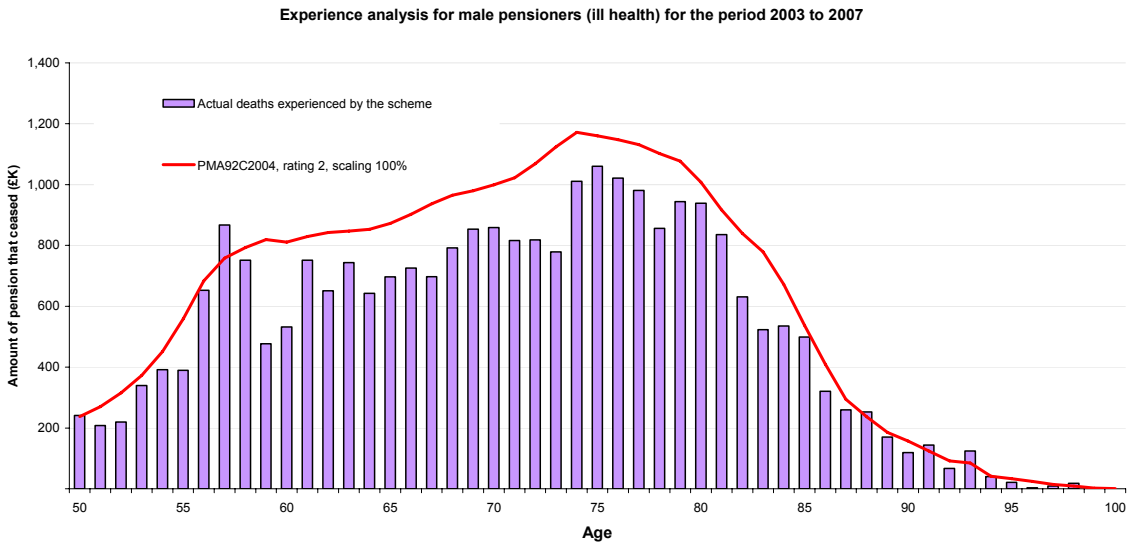
The following charts illustrate how the actual amounts of pension which ceased (the purple bars) compared with those expected to cease according to the 2003 assumption (red line).

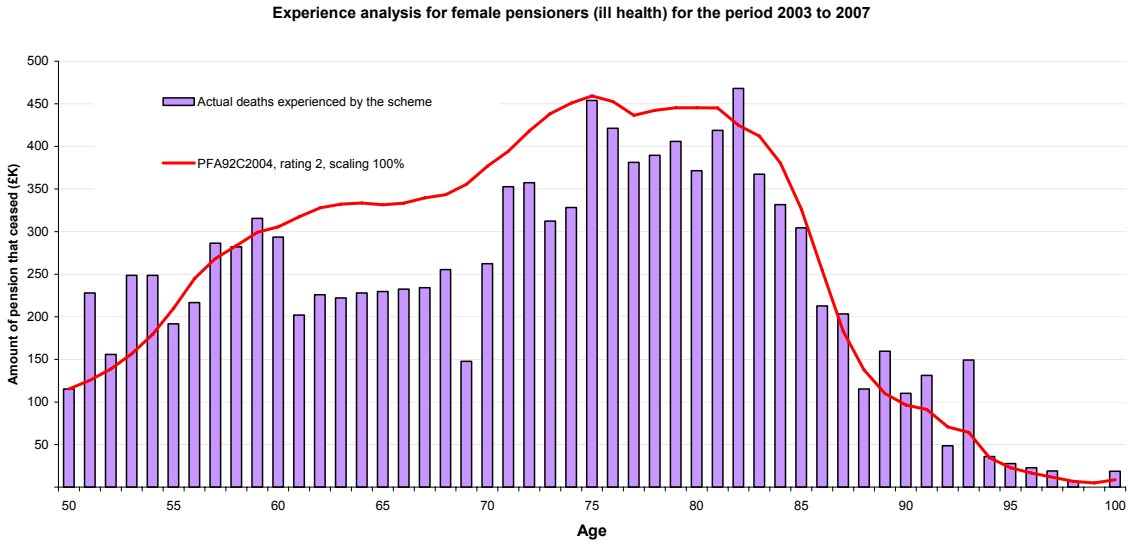




Comments – Normal Health Mortality

The actual experience for male pensioners has been very similar to that expected under the 2003 assumptions. The female assumption also looks reasonable at younger ages but appears to have understated deaths for members older than 75. The evidence suggests that the "shape" of the PA92 standard tables is not a good match for the experience of female pensioners.





Comments – Ill-Health

The 2003 mortality assumption for ill-health pensioners very broadly follows the pattern of the actual experience, although much less closely than for normal health. Overall the 2003 assumption predicted slightly more deaths than actually experienced, particularly amongst the over 60s.

There is some evidence that average mortality rates for ill-health pensioners (relative to the assumption) may vary by age. This could be due to changes in procedures for ill-health retirement. For example, if

ill-health qualification procedures have been tightened, causing the average ill-health retiree to be relatively less healthy than before, we might expect mortality rates to rise for ill-health pensioners retiring under the new procedures.

Pensioner Mortality – Base Table

Introduction

In the previous section we examined the actual experience of the Scheme compared with the assumptions made in 2003. We can use that analysis to derive a "base table" - a standard table of mortality rates which best reflects the recent experience of the Scheme.

Factors influencing mortality

Mortality rates tend to vary depending on the age and sex of the member. As well as these well known influences, other factors may also be relevant. Some of the main factors are discussed below.

There is considerable evidence that shows that mortality rates vary depending on **size of pension**. Those on higher pensions generally have "healthier lifestyles" and better access to medical services, both of which are conducive to people living longer.

PCSPS pensioners tend to have higher pensions than the average UK pensioner and we have previously allowed for this difference in setting the "base table". A similar approach would be expected to apply for this valuation.

Differences in mortality rates can also be attributed to different **occupations**. There is evidence to suggest that white collar workers generally live longer than blue collar workers. However, we have not attempted to investigate differences in mortality assumptions attributable to different occupations within the Civil Service. For this review, our analysis has been based on aggregated data for all occupations. This is expected to lead to appropriate assumptions, provided that the relative proportion of members in particular occupations remains materially stable.

Lastly, there is strong evidence to suggest that mortality rates vary between different **regions** of the UK. Civil Servants are widely spread across the country and in theory assumptions varying by region may be appropriate.

For this review, we have not investigated differences in mortality due to regional factors.

For the 2007 ASLC review we are comfortable that the mortality assumption derived from aggregate experience data will be appropriate, on average, for members employed in different occupations and living in different locations, provided the membership remains stable in these respects.

Rating and scaling factors

Rating and scaling factors are the adjustments we make to the standard tables to arrive at a "base table" which reflects the actual experience of the Scheme.

Rating factors allow us to adjust the member's age when looking at mortality rates. For example, a rating factor of "-1 year" would mean that a member aged 75 would be assumed to have the life expectancy of a 74 year old, as implied by the standard table. So by "rating down" we are assuming members live longer.

Scaling factors allow us to adjust the mortality rates in a standard table. For example, a scaling factor of 110% would mean that members are assumed to experience mortality rates 10% higher than implied by the standard table at any particular age. So by "scaling up" we are assuming members have lower life expectancies.

Standard tables

For the 2003 ASLC review we adopted a modified version of the PA92 standard mortality tables. On 31 July 2006 the Actuarial Profession announced that new '00' series mortality tables, which were published by the Continuous Mortality Investigation (CMI), would be adopted by the Actuarial Profession with effect from 1 September 2006. These standard tables cover experience of life office pensioners between 1999 and 2002.

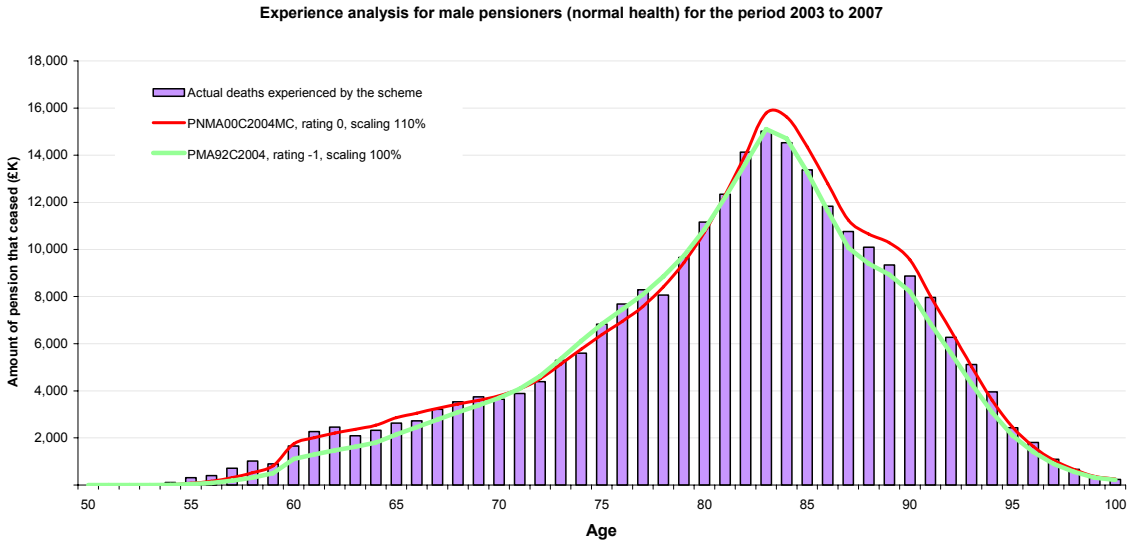
Approach to analysis

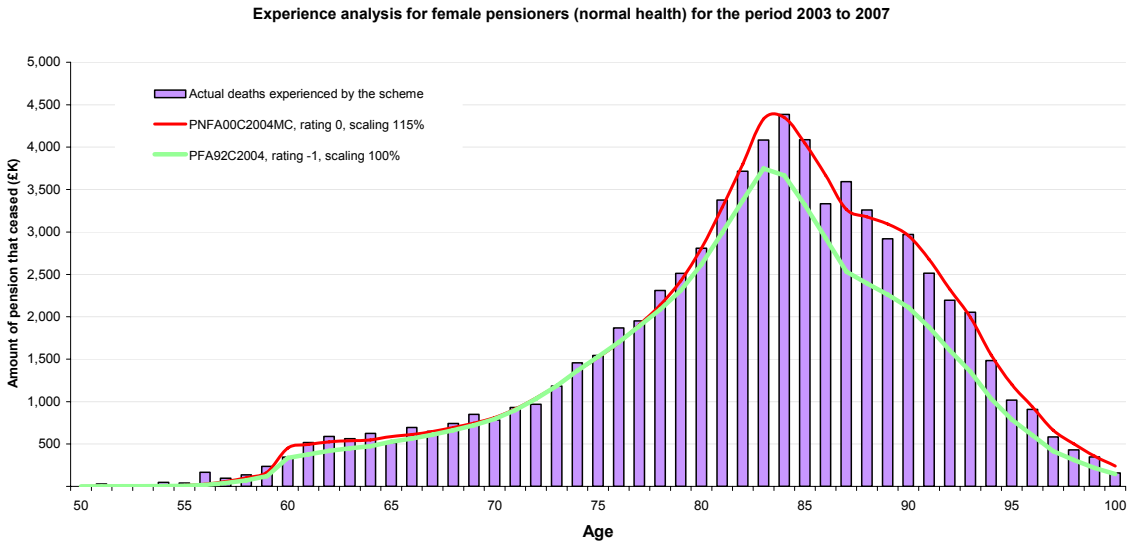
Starting with a standard mortality table specific to the period under investigation, the approach we have adopted is to apply scaling factors to standard mortality rates. The optimal scaling factor is that which, when applied to the standard table, gives us a mortality assumption that best fits the actual experience of the Scheme.

When setting scaling factors we also make allowance for recent mortality improvements attributable to the "cohort effect", a concept that we discuss further later in this paper.

Proposed base tables

The following charts illustrate how the actual amounts of pension that ceased (the purple bars) compare to those which would be expected by the proposed assumptions (red line) which represent the best fit. The charts also show the 2003 assumptions (in green).



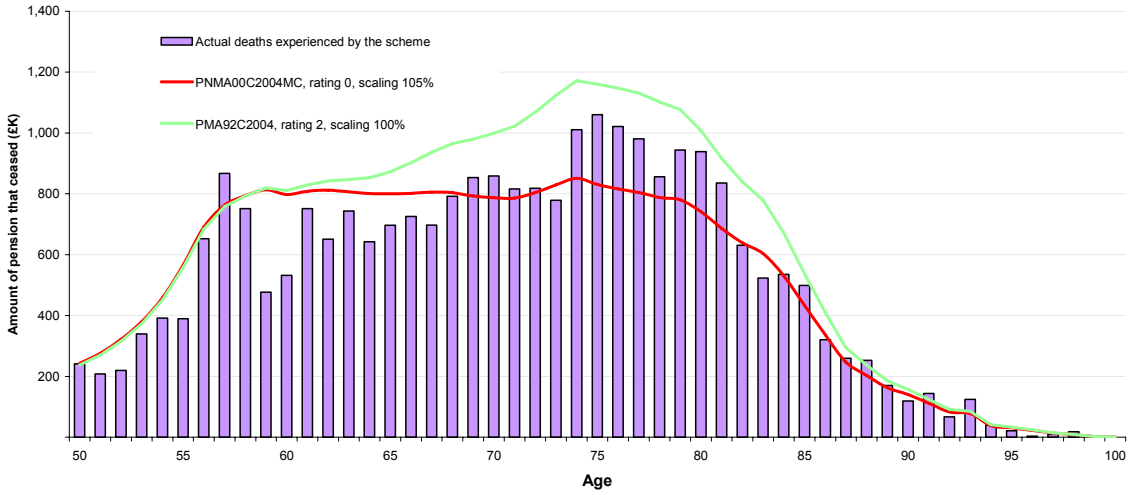


Comments – normal health

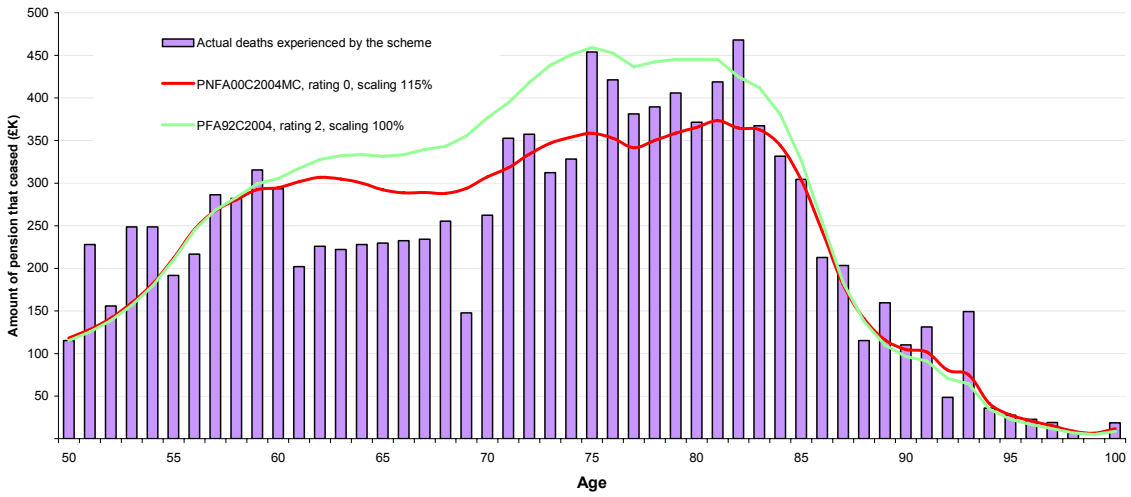
For the males, the proposed assumption is a slightly better fit than the 2003 assumption, particularly at the very young and very old ages.

The female table is more interesting. We can see that the shape of the new assumption is a much better match for the actual experience of the Scheme, particularly at older ages.

Experience analysis for male pensioners (ill health) for the period 2003 to 2007



Experience analysis for female pensioners (ill health) for the period 2003 to 2007



Comments – ill-health

The mortality experience of ill-health pensioners is more variable at different ages than that of pensioners in normal health, making it more difficult to fit a standard table. The proposed "best fit" assumptions are on average a reasonable match for actual experience, although they do not follow the shape of the experience particularly well.

We have previously mentioned the distortions that can be caused by changes in ill-health procedures over time. If there has been a tightening of procedures recently, it is possible that future ill-health pensioners will be less healthy than current ill-health pensioners. We would welcome the opportunity to discuss this with you.

Pensioner Mortality – Future Improvements

Introduction

We have already discussed how the recent mortality experience compared with the 2003 assumption and used that experience to propose a base table.

The final, and most subjective, step is to decide on an allowance for future mortality improvements.

Background

Future developments in mortality rates will depend on a combination of many factors, including medical advancements, reductions in smoking rates (possibly expedited by the smoking ban) and lifestyle improvements. These factors would tend to reduce mortality rates but could be offset by factors such as epidemics of new diseases (e.g. MRSA) and increases in obesity. It is particularly difficult to place quantitative values on these qualitative factors.

Recent experience has shown sharp falls in mortality rates compared with previous expectations. Current evidence suggests that these rapid improvements are particularly relevant to a cohort of people born between the first and second world wars.

In 2002 the Continuous Mortality Investigation (CMI) produced adjustments to mortality tables on three scenarios, known as Short, Medium and Long Cohort. These scenarios assume that the recently experienced rapid improvements will continue until 2010, 2020 and 2040 respectively, after which time the rate of improvement will tail off. These and many other current projections that have been in use, assume that future year-on-year improvements in mortality rates will eventually become negligible.

Until quite recently, we were seeing Medium Cohort improvements being adopted by actuaries as their best estimate of future improvements. However, given that the actual evidence to date shows no sign of a slowing of improvements, our view is that even Medium Cohort is unlikely to be cautious enough to provide a best estimate and that additional improvements should be allowed for over the longer term; one way of doing this is to adopt "underpinned" assumptions. For example, an underpin of 1.25% would allow for year-on-year future improvements in-line with the standard table to be subject to a minimum improvement of 1.25% in any given year. This "underpin" approach has become much more widespread in actuarial valuations carried out over the last year.

Using an "underpin" approach, rather than assume that year-on-year improvements in mortality rates will eventually become negligible, ties in better with the Government's national population projections, the latest of which assumes improvements rates trending towards 1.0% p.a. at most ages after 2031.

(source: www.gad.gov.uk/Demography_Data/Population/2006/methodology/mortass.asp)

Year of birth

The 2003 assumptions used tables relating to future calendar years as a proxy for using tables appropriate to year of birth for each individual and projecting improvements in mortality rates until year of death.

For the 2007 review we have updated our methodology to incorporate "Year of Use" tables. Year of Use tables allow us to adopt a mortality assumption specific to each individual's year of birth, rather than an overall policy.

Sensitivities

Table 2 illustrates the impact of adopting alternative assumptions relative to retaining the 2003 assumption. The columns are labelled as follows:

(A) The approximate impact on the future service contribution rate, as a percentage of Pensionable Pay. This excludes any past service effect shown in (B).

(B) The approximate impact of spreading any change in past service liabilities (or surplus) over a 15 year period, as a percentage of Pensionable Pay over that period.

(C) The total approximate impact ((A) plus (B)), as a percentage of Pensionable Pay.

The sensitivities below cover both normal and ill-health assumptions at the same time. The final scenario represents our recommendation.

Table 2

Scenario	(A) (% of Pensionable Pay)	(B) (% of Pensionable Pay)	(C) (% of Pensionable Pay)
Proposed base plus Medium Cohort improvements	-0.08	-0.13	-0.21
Proposed base plus Long Cohort improvements	+0.45	+1.54	+1.99
Proposed base plus Medium Cohort applying a 1.25% p.a. underpin for males and 0.75% p.a. underpin for females	+0.26	+0.41	+0.67

Recommendations

To reach our recommendation we have:

- Updated our assumption to the "00" standard tables, which provide a better fit for female experience in particular.
- Included an allowance for Medium Cohort mortality improvements but subject to a 1.25% p.a. underpin for males and a 0.75% p.a. underpin for females.
- Applied scaling factors to adjust the standard tables to better fit the experience of the Scheme.
- Retained the flat additions to mortality for the ill-health mortality assumption (0.016 for males, 0.011 for females).

The rationale behind assuming a higher underpin for males than for females is that this is more consistent with past national trends. (Assuming a 1% p.a. underpin for both sexes is likely to lead to very similar results.) That process has led us to the following recommendations:

- **Females (normal health):** 115% of standard table PNFA00 (Year of Use 2007), with allowance for future improvements as per the 92 Series subject to the Medium Cohort effect adjustment and subject to a 0.75% p.a. underpin.
- **Males (normal health):** 110% of standard table PNMA00 (Year of Use 2007), with allowance for future improvements as per the 92 Series subject to the Medium Cohort effect adjustment and subject to a 1.25% p.a. underpin.
- **Females (ill-health):** 115% of standard table PNFA00 (Year of Use 2007), with allowance for future improvements as per the 92 Series subject to the Medium Cohort effect adjustment and subject to a 0.75% p.a. underpin, plus a flat addition of 0.011 at all ages.
- **Males (ill-health):** 105% of standard table PNMA00 (Year of Use 2007), with allowance for future improvements as per the 92 Series subject to the Medium Cohort effect adjustment and subject to a 1.25% p.a. underpin, plus a flat addition of 0.016 at all ages.

Mortality Before Retirement

Introduction

It is rare for schemes to have enough data to carry out a credible analysis of pre-retirement mortality rates. However, the PCSPS has many more members than a typical scheme and, therefore, we are able to use actual experience to test our assumptions.

The results of our analysis are set out in the remainder of this section.

2003 Assumption

The pre retirement mortality assumptions were unchanged for the 2003 ASLC review compared to those adopted for the 1999 review. Details of those assumptions can be found in our ASLC report dated 4 May 2004.

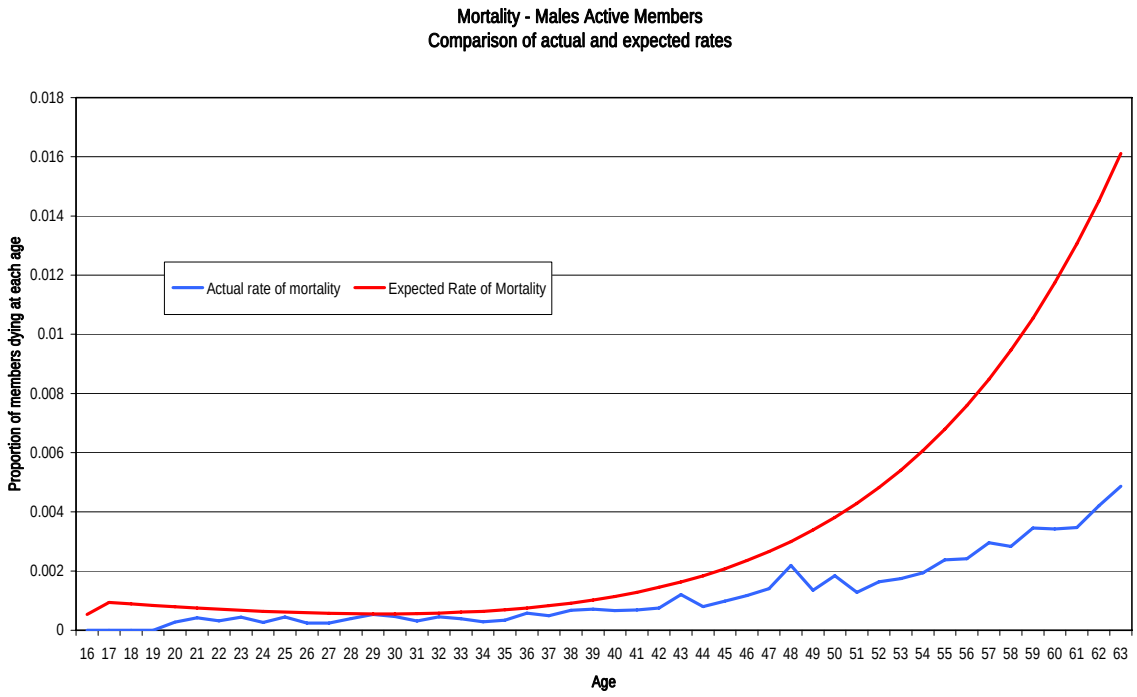
Approach to analysis

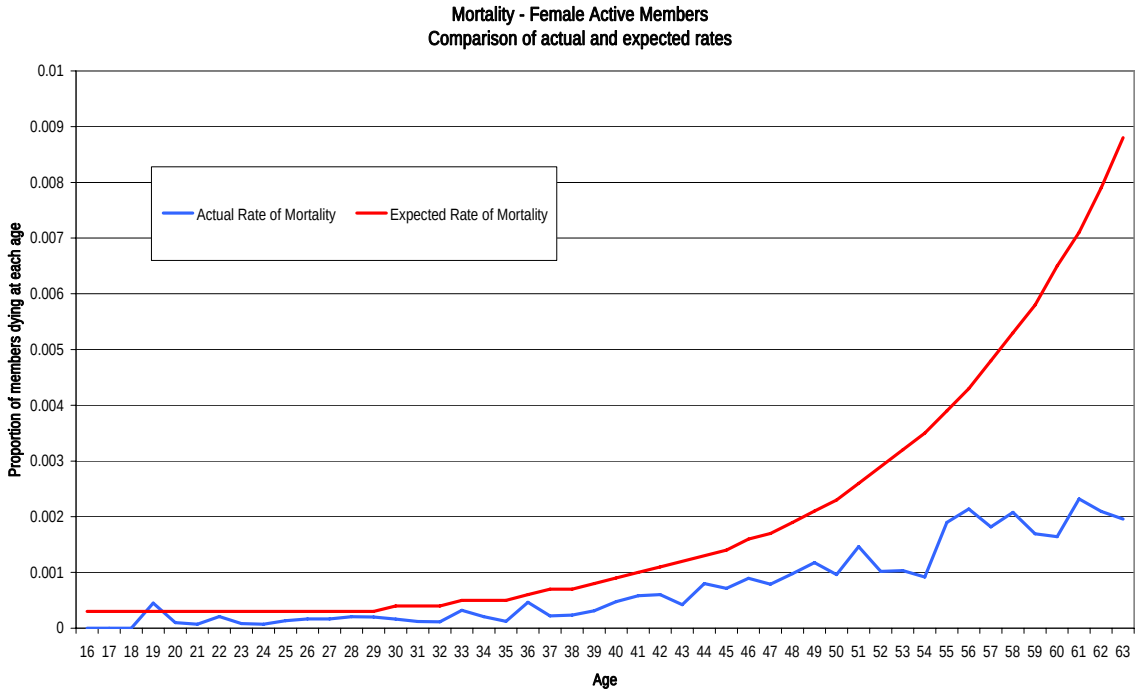
In carrying out our analysis of mortality experience, we have compared the actual number of deaths at each age with those expected under the assumptions adopted for the 2003 review.

Our analysis is restricted to the experience of active members since no movement data was available in relation to deaths of deferred pensioners before retirement.

Results

The following charts illustrate how the actual mortality rates (the red lines) compared to those expected under the 2003 assumption (blue lines):





Comments

Actual rates of mortality in service for both men and women were lower than expected under the 2003 assumption.

Sensitivities

Table 3 illustrates the impact of adopting alternative assumptions relative to retaining the 2003 assumption. The columns are labelled as follows:

(A) The approximate impact on the future service contribution rate, as a percentage of Pensionable Pay. This excludes any past service effect shown in (B).

(B) The approximate impact of spreading any change in past service liabilities (or surplus) over a 15 year period, as a percentage of Pensionable Pay over that period.

(C) The total approximate impact ((A) plus (B)), as a percentage of Pensionable Pay.

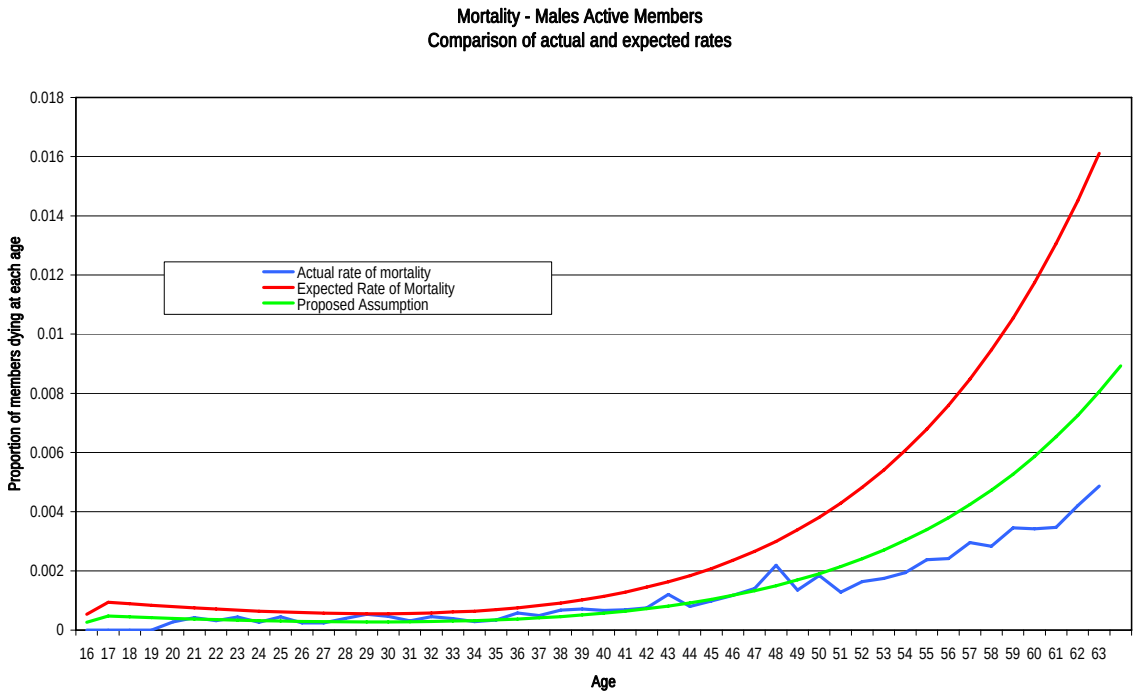
Table 3

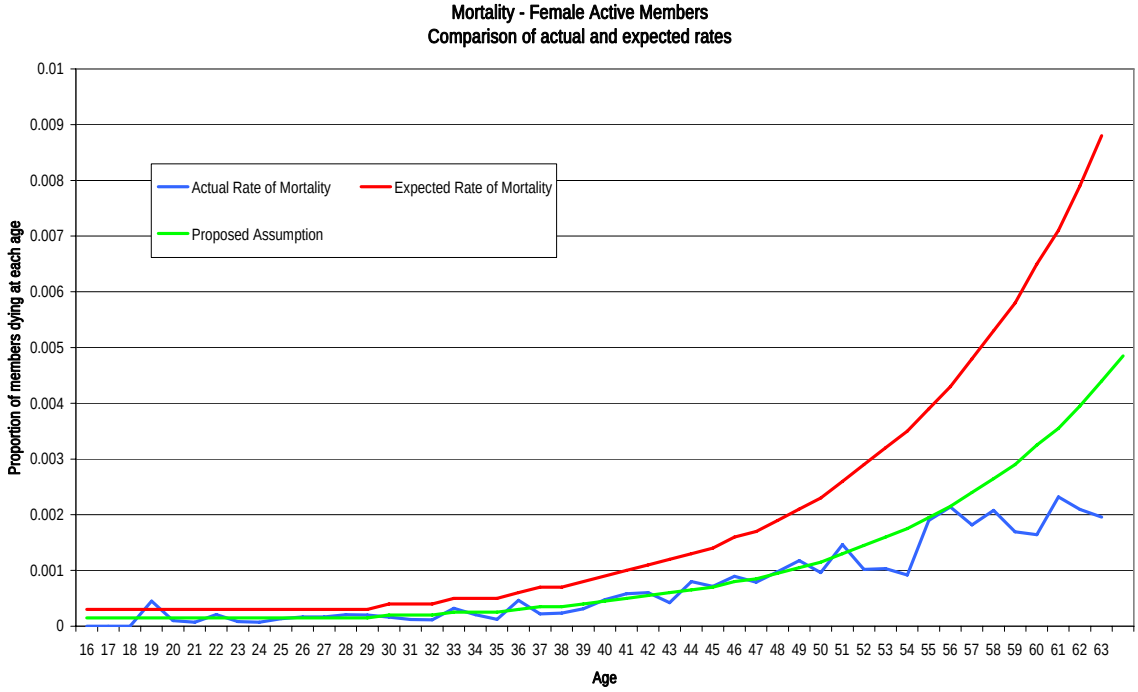
Scenario	(A) (% of Pensionable Pay)	(B) (% of Pensionable Pay)	(C) (% of Pensionable Pay)
Proposed assumption (see below)	+0.01	+0.47	+0.48

Recommendations

We recommend that the existing pre-retirement mortality assumptions are scaled down by 50% to better match the actual experience of the Scheme. In reaching our proposal we have considered the current experience analysis in conjunction with the results of the 2003 experience analysis, both of which pointed towards a reduction in the pre-retirement mortality assumption.

The following charts illustrate how the actual mortality rates (the red lines) compared to those expected under the 2003 assumption (blue lines) and with our proposed assumptions (green lines):


Mortality - Males Active Members
Comparison of actual and expected rates
Actual rate of mortality
Expected Rate of Mortality
Proposed Assumption
Proportion of members dying at each age
Age


Mortality - Female Active Members
Comparison of actual and expected rates
Actual Rate of Mortality
Expected Rate of Mortality
Proposed Assumption
Proportion of members dying at each age
Age

Age Retirement

Introduction

From 30 July 2007 new entrants to PCSPS will join **nuvos** (or **partnership**) and will have a pension age of 65, with reductions applying to anyone wishing to retire before age 65. Existing members of PCSPS retain the right to retire at age 60 without reduction. Pre-fresh start prison officers can continue to retire at age 55 without reduction.

Despite having the right to retire at age 60 (or 55) without reduction, evidence shows some existing members tend to opt to work on to later ages.

This section sets out the results of our analysis of age retirement patterns.

2003 Assumption

The age retirement assumptions were unchanged for the 2003 ASLC review compared to those adopted for the 1999 review. The assumptions vary by sex and pay band and are different for pre-fresh start prison officers.

Details of those assumptions can be found in our ASLC report dated 4 May 2004.

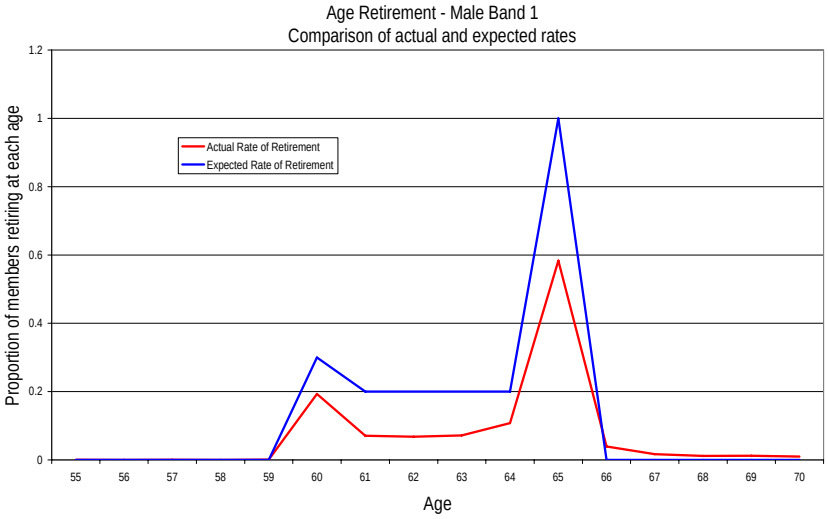
Deferred members were assumed to retire at the earliest age at which they could receive their pension unreduced.

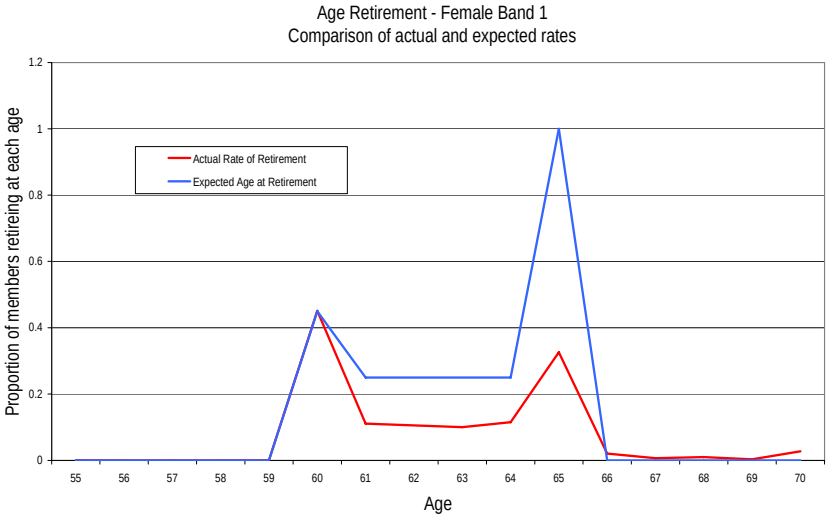
Approach to analysis

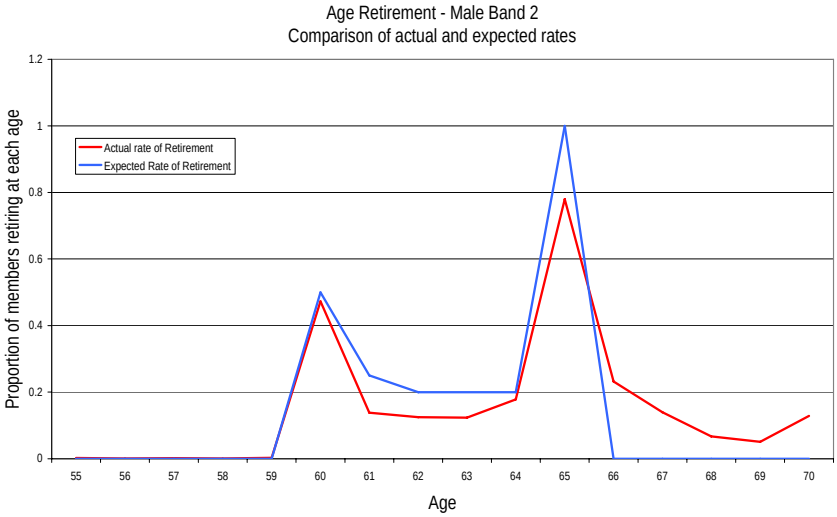
In carrying out our analysis of age retirement patterns, we have compared the actual proportions of members retiring at each age with those expected under the assumptions adopted for the 2003 review.

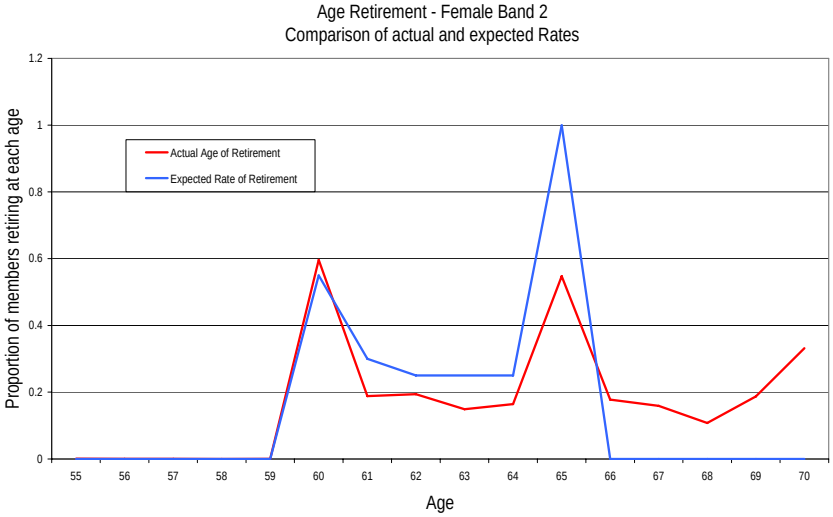
Results

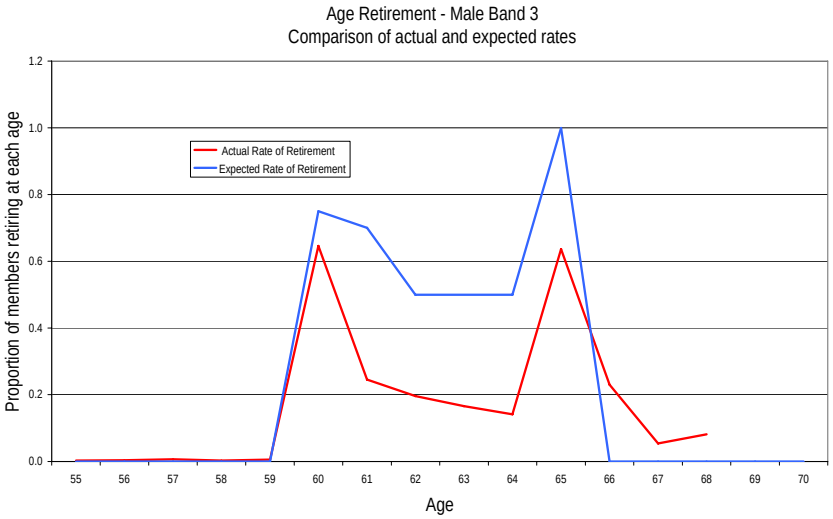
The following charts illustrate how the actual age retirement patterns (the red lines) compared to those expected under the 2003 assumption (blue lines):

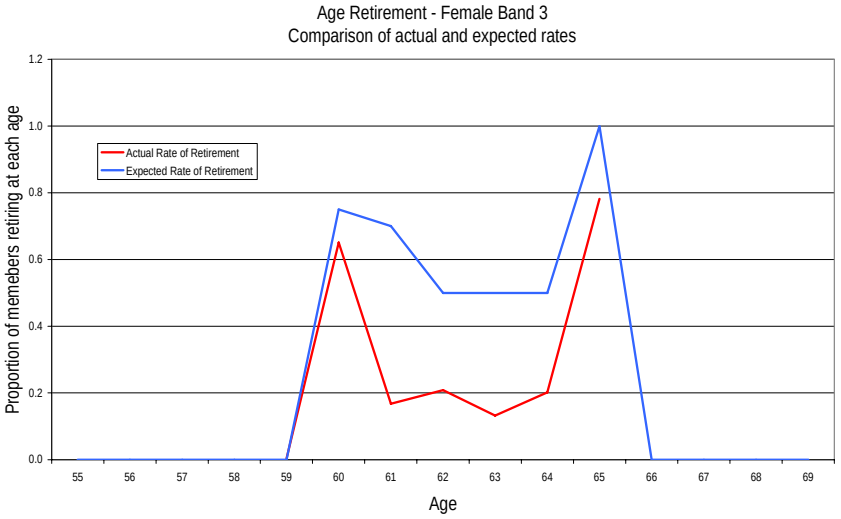


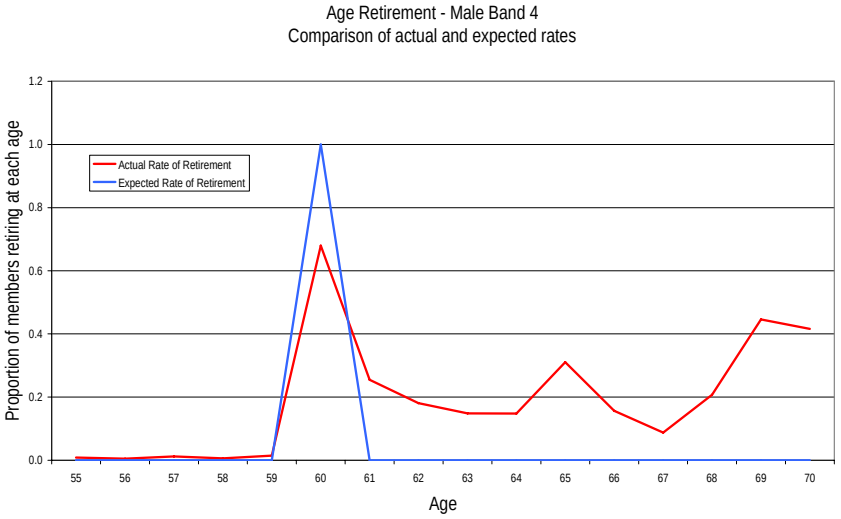


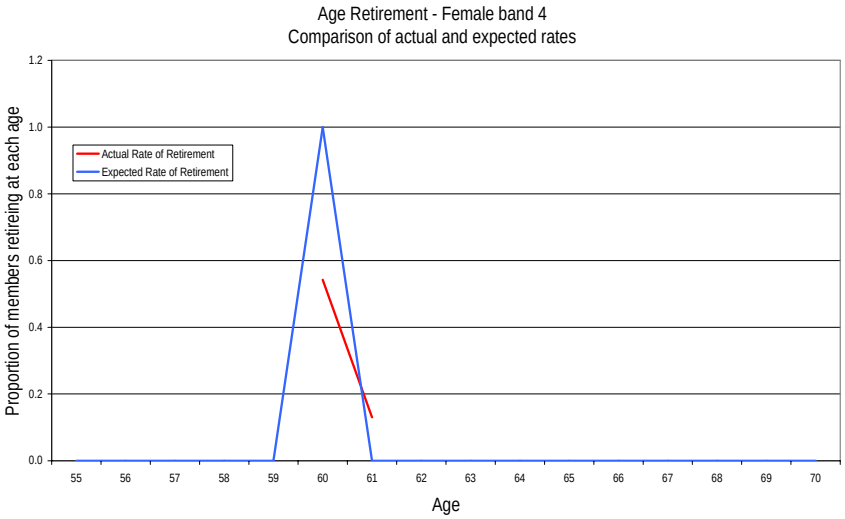

Age Retirement - Male Band 2
Comparison of actual and expected rates
Actual rate of Retirement
Expected Rate of Retirement
Proportion of members retiring at each age
Age

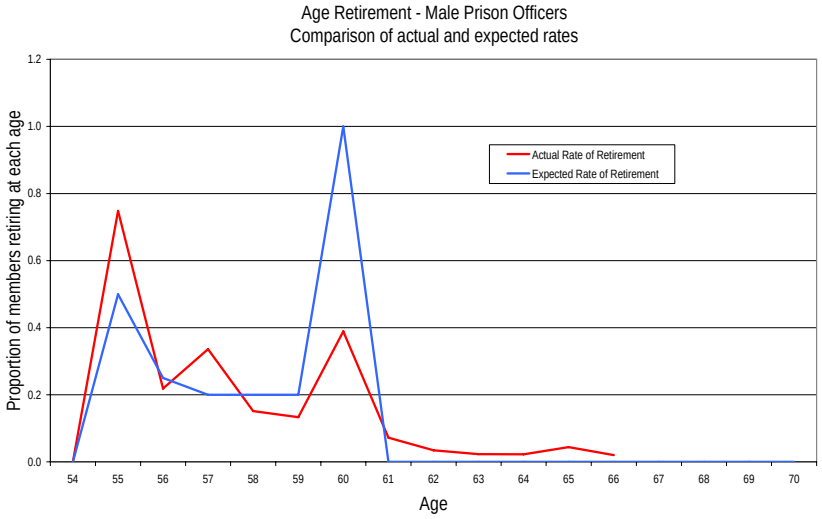

Age Retirement - Female Band 2
Comparison of actual and expected Rates
Actual Age of Retirement
Expected Rate of Retirement
Proportion of members retiring at each age
Age


Age Retirement - Male Band 3
Comparison of actual and expected rates
Actual Rate of Retirement
Expected Rate of Retirement
Proportion of members retiring at each age
Age


Age Retirement - Female Band 3
Comparison of actual and expected rates
Proportion of memebers retiring at each age
Actual Rate of Retirement
Expected Rate of Retirement
1.2
1.0
0.8
0.6
0.4
0.2
0.0
55 56 57 58 59 60 61 62 63 64 65 66 67 68 69
Age


Age Retirement - Male Band 4
Comparison of actual and expected rates
Proportion of members retiring at each age
Actual Rate of Retirement
Expected Rate of Retirement
1.2
1.0
0.8
0.6
0.4
0.2
0.0
55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70
Age


Age Retirement - Female band 4
Comparison of actual and expected rates
Proportion of members retireing at each age
Actual Rate of Retirement
Expected Rate of Retirement
1.2
1.0
0.8
0.6
0.4
0.2
0.0
55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70
Age



Comments

The analyses show that, in general, experience has been reasonably consistent with the assumptions. The main areas where experience has deviated from the assumptions are:

- Age 60 in Band 1 where the rate of retirement has been lower than expected.
- Ages 61-64 in Bands 1 and 3 where the rate of retirement has been lower than expected.
- Ages 66 and upwards in Band 2 where there is evidence that members are retiring later than age 65.
- Band 4 where a significant proportion of members have retired later than assumed (the assumption is that Band 4 members retire at age 60).

Flexible retirement and other changes

It is proposed that from 1 March 2008 the flexible retirement provisions will be extended to existing members. (New entrants to **nuvos** will be eligible for flexible retirement.)

We also understand that in view of the recent age discrimination legislation, Government departments now operate either a contractual retirement age of 65 (whereas a contractual retirement age of 60 was previously allowed), or no contractual retirement age.

Clearly, the flexible retirement provisions and the changes to contractual retirement ages may influence the pattern of age retirements experienced by the Scheme, resulting in pensions being drawn on average earlier or later than previously experienced.

Our recommendations for this review are based on consideration of the experience over the four year period commencing 1 April 2003 and also the previous four year period, but we recommend that this assumption is revisited at the next review where there will be more experience which reflects these new developments.

Sensitivities

Table 4 illustrates the impact of adopting alternative assumptions relative to the 2003 assumption. The columns are labelled as follows:

(A) The approximate impact on the future service contribution rate, as a percentage of Pensionable Pay. This excludes any past service effect shown in (B).

(B) The approximate impact of spreading any change in past service liabilities (or surplus) over a 15 year period, as a percentage of Pensionable Pay over that period.

(C) The total approximate impact ((A) plus (B)), as a percentage of Pensionable Pay.

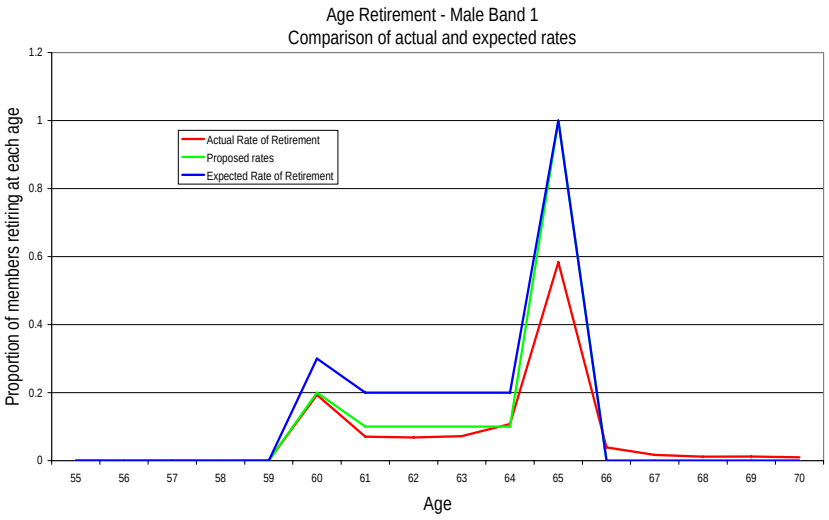
Table 4

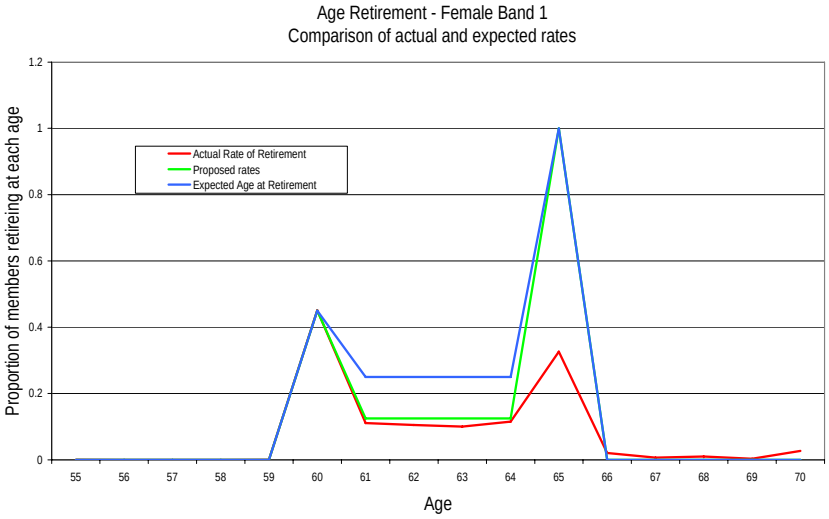
Average retirement age	(A) (% of Pensionable Pay)	(B) (% of Pensionable Pay)	(C) (% of Pensionable Pay)
Proposed assumption (see below)	-0.08	-0.09	-0.17

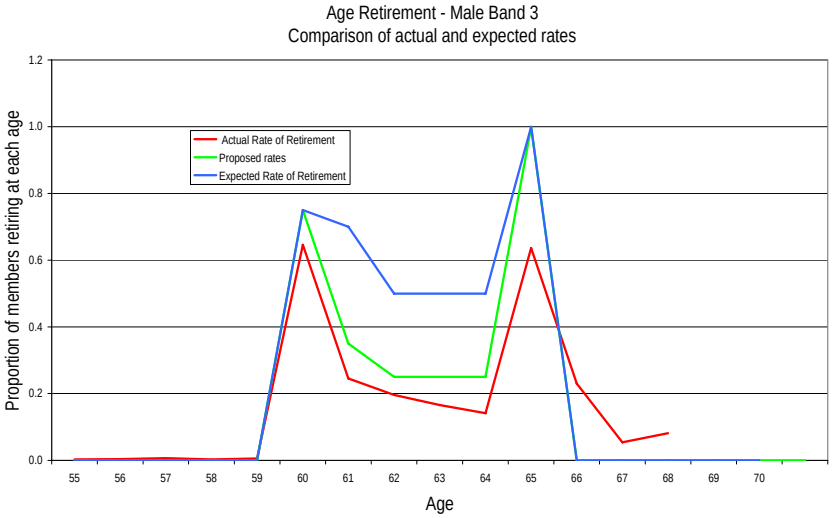
Recommendations

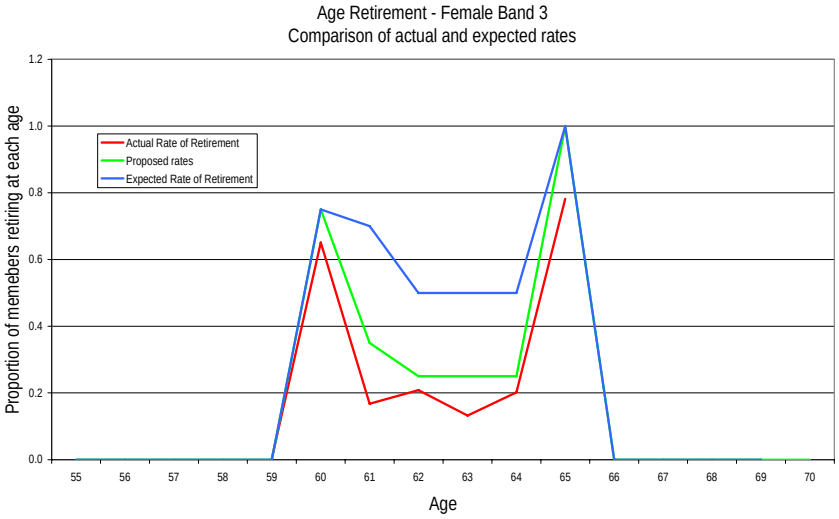
We recommend retaining the 2003 assumptions except that retirement rates for members in Band 1 should be scaled down by 33% at age 60 and that retirement rates for members in Band 1 and 3 should be scaled down by 50% at ages 61 to 64. In reaching our recommendation we have considered the current experience results in conjunction with the results of the 2003 experience analysis.

The following charts illustrate how the actual age retirement patterns (the red lines) compared to those expected under the 2003 assumption (blue lines) and with our proposed assumptions (green lines):


Age Retirement - Male Band 1
Comparison of actual and expected rates
Proportion of members retiring at each age
Actual Rate of Retirement
Proposed rates
Expected Rate of Retirement
Age


Age Retirement - Female Band 1
Comparison of actual and expected rates
Proportion of members retireing at each age
Actual Rate of Retirement
Proposed rates
Expected Age at Retirement
Age


Age Retirement - Male Band 3
Comparison of actual and expected rates
Proportion of members retiring at each age
Actual Rate of Retirement
Proposed rates
Expected Rate of Retirement
Age


Age Retirement - Female Band 3
Comparison of actual and expected rates
Proportion of memebers retiring at each age
Age
Actual Rate of Retirement
Proposed rates
Expected Rate of Retirement
1.2
1.0
0.8
0.6
0.4
0.2
0.0
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70

Ill-Health Retirements

Introduction

In certain circumstances members of PCSPS are able to retire early and receive an unreduced pension on the grounds of ill-health (in many situations, the pension is also based on enhanced service).

The following section sets out the results of our analysis into ill-health retirement rates.

2003 Assumption

The ill-health retirement assumptions were amended slightly for the 2003 ASLC review compared with those adopted for the 1999 review. The adjustment reflected evidence that ill health retirement rates were lower than previously assumed, possibly due to the tightening of ill-health retirement procedures.

The assumptions vary by sex and pay band and are different for pre-fresh start prison officers. Details of the 2003 assumptions can be found in our ASLC report dated 4 May 2004.

Approach to analysis

In carrying out our analysis of ill-health retirement patterns, we have compared the actual proportions of members retiring at each age with those expected under the assumptions adopted for the 2003 review.

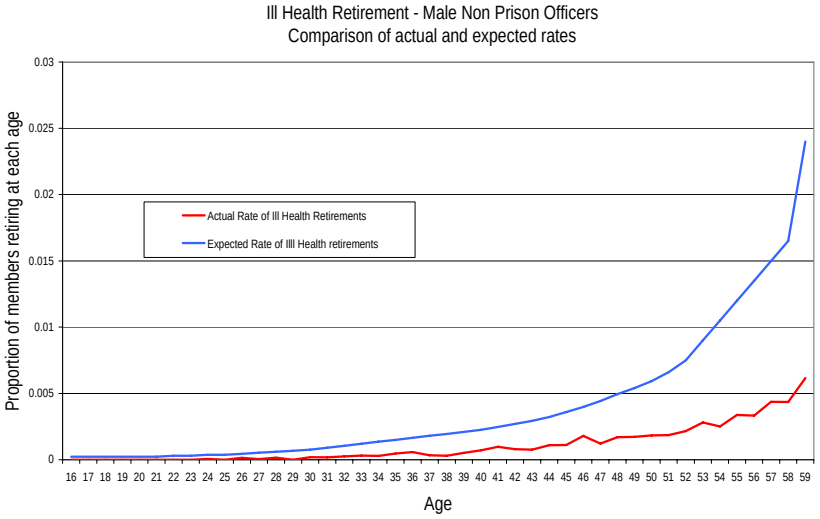
Eligibility

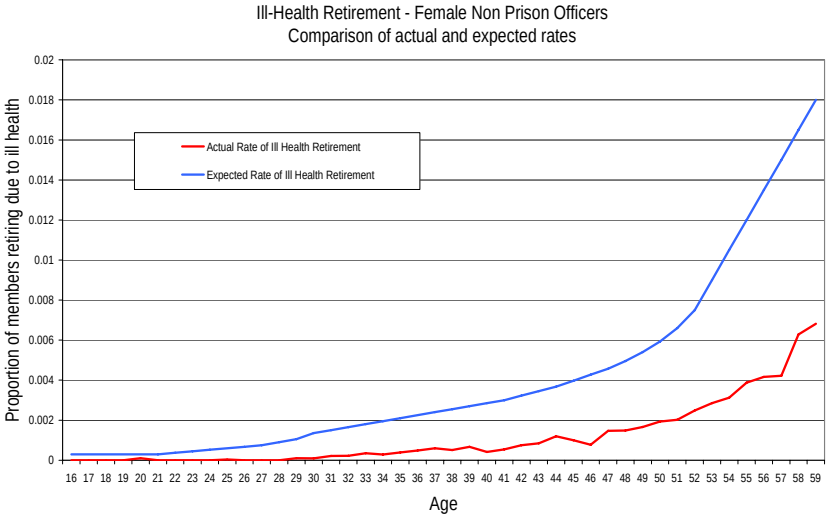
The eligibility conditions for ill-health retirement differ depending on which section of PCSPS someone is a member of. Furthermore, **premium** members may be eligible for Upper or Lower Tier ill-health retirement depending on the nature of their illness.

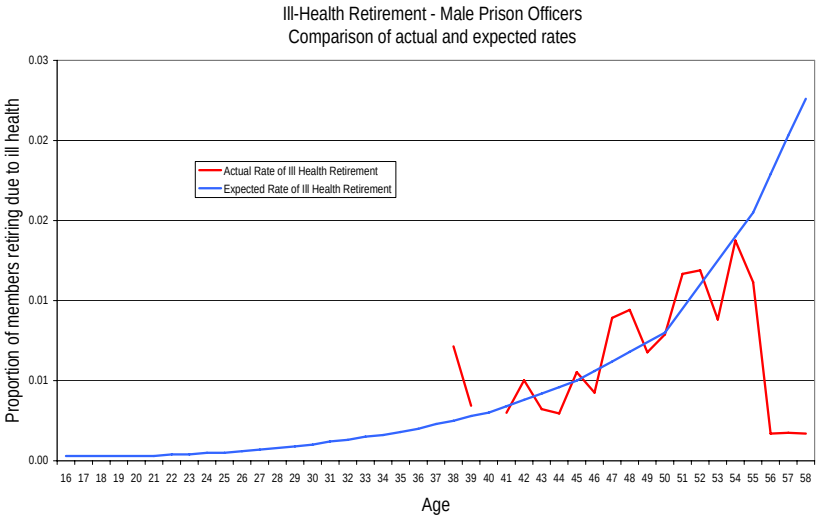
The experience data does not allow us to investigate the incidence of ill-health separately for different sections of PCSPS or to investigate the split between Upper and Lower Tier ill-health retirements in the **premium** section.

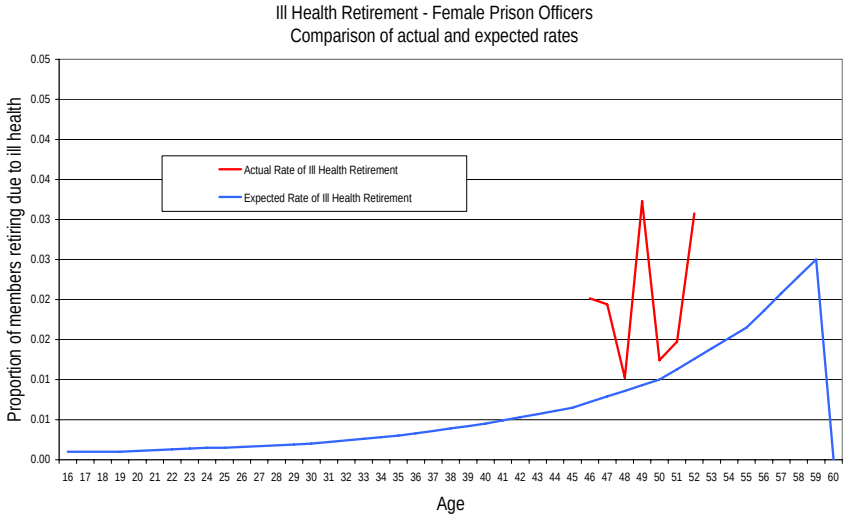
Results

The following charts illustrate how the actual ill-heath retirement patterns (the red lines) compared to those expected under the 2003 assumption (blue lines):


Ill Health Retirement - Male Non Prison Officers
Comparison of actual and expected rates
Proportion of members retiring at each age
Actual Rate of Ill Health Retirements
Expected Rate of Illl Health retirements
Age


Ill-Health Retirement - Female Non Prison Officers
Comparison of actual and expected rates
Proportion of members retiring due to ill health
Actual Rate of Ill Health Retirement
Expected Rate of Ill Health Retirement
Age


Ill-Health Retirement - Male Prison Officers
Comparison of actual and expected rates
Proportion of members retiring due to ill health
Actual Rate of Ill Health Retirement
Expected Rate of Ill Health Retirement
Age



Comments

The graphs for non-prison officers show that the rates of ill-health retirement have continued to fall, a trend which emerged at the 2003 review. This trend may be attributable to a tightening up of the ill-health procedures.

The non-prison officer experience suggests that a further reduction in the ill-health retirement assumption could be justified.

The experience for male prison officers has been broadly as expected whilst the lack of data for female prison officers means the analysis provides little useful information.

Sensitivities

Table 5 illustrates the impact of adopting alternative assumptions relative to the 2003 assumption. The columns are labelled as follows:

(A) The approximate impact on the future service contribution rate, as a percentage of Pensionable Pay. This excludes any past service effect shown in (B).

(B) The approximate impact of spreading any change in past service liabilities (or surplus) over a 15 year period, as a percentage of Pensionable Pay over that period.

(C) The total approximate impact ((A) plus (B)), as a percentage of Pensionable Pay.

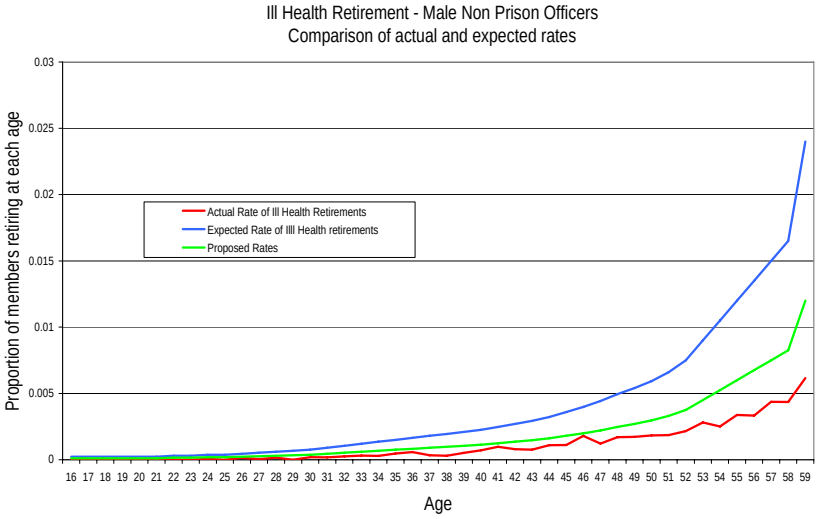
Table 5

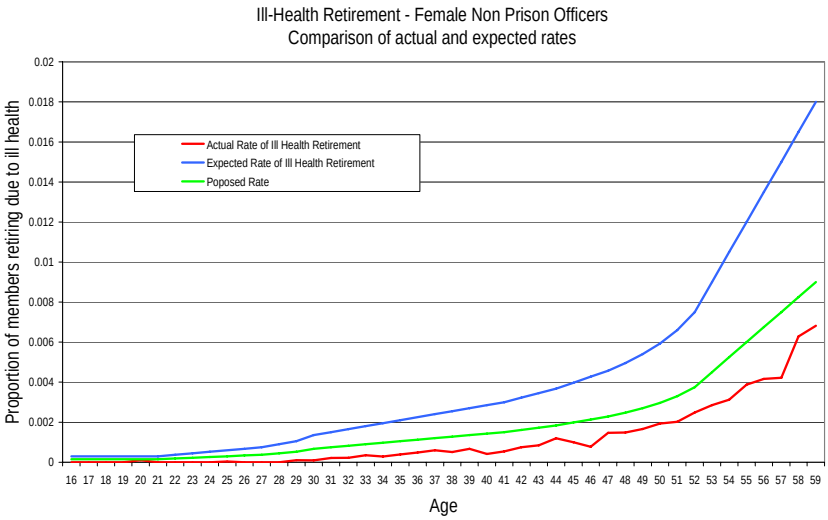
Scenario	(A) (% of Pensionable Pay)	(B) (% of Pensionable Pay)	(C) (% of Pensionable Pay)
Proposed assumption (see below)	-0.41	-0.13	-0.54

Recommendations

Taking into account the results of this experience analysis and the analysis carried out at the 2003 review, we recommend retaining the 2003 assumption for prison officers and scaling down the rates by 50% for non-prison officers.

The following charts illustrate how the actual ill-heath retirement patterns (the red lines) compared to those expected under the 2003 assumption (blue lines) and our proposed assumptions (green lines):





Withdrawals

Introduction

Members who leave PCSPS before their pension age may become entitled to a deferred pension, payable from their pension age.

The following section sets out the results of our analysis of the rates of withdrawal experienced by the Scheme between 1 April 2003 and 31 March 2007.

The data for withdrawals includes data for early retirements before age 60 (whether arising through redundancy or otherwise). For the purposes of our analysis this is appropriate, because in nearly all cases the benefit provided by PCSPS will have been actuarially equivalent in value to the corresponding deferred benefits, with any additional benefits having been funded by employers through the Civil Service Compensation Scheme (CSCS).

2003 Assumption

The withdrawal assumptions were updated slightly for the 2003 ASLC review compared with those adopted for the 1999 review. The adjustment reflected evidence that withdrawal rates were higher than previously assumed for lower paid male members but lower than previously assumed for Band 2 female members.

The assumptions vary by sex and pay band and are different for pre-fresh start prison officers. Details of the 2003 assumptions can be found in our ASLC report dated 4 May 2004.

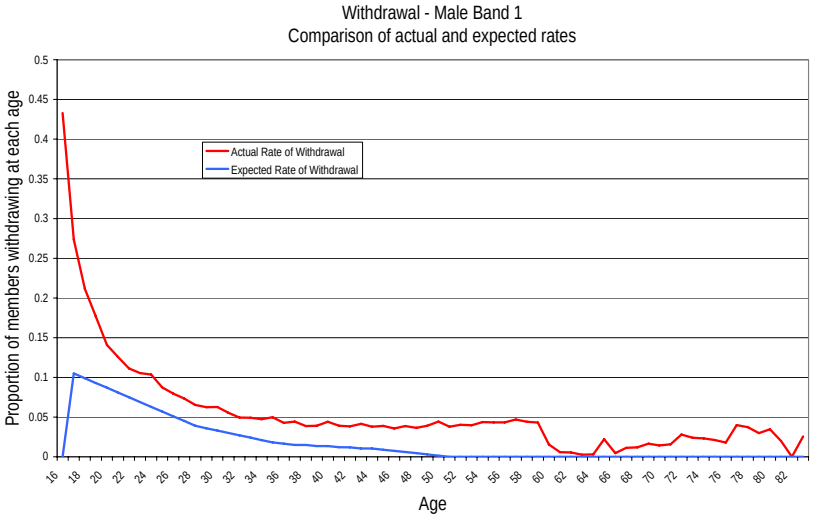
Approach to analysis

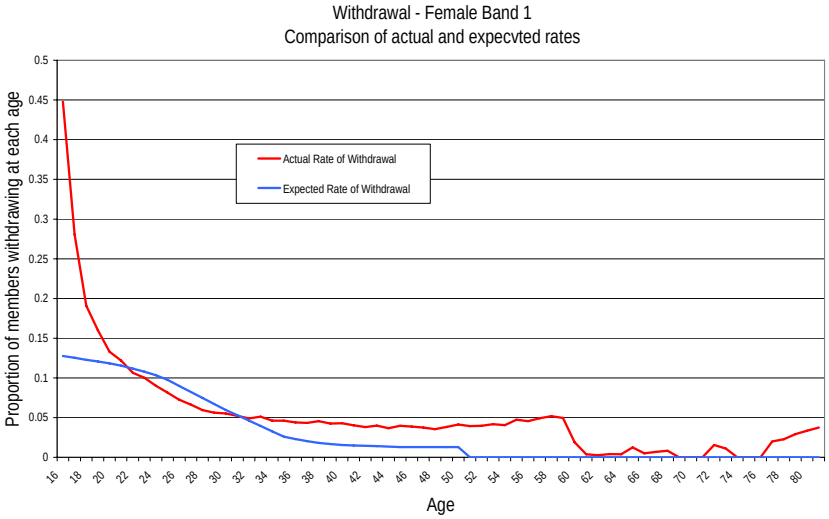
In carrying out our analysis of withdrawal rates, we have compared the actual proportions of members withdrawing at each age with those expected under the assumptions adopted for the 2003 review.

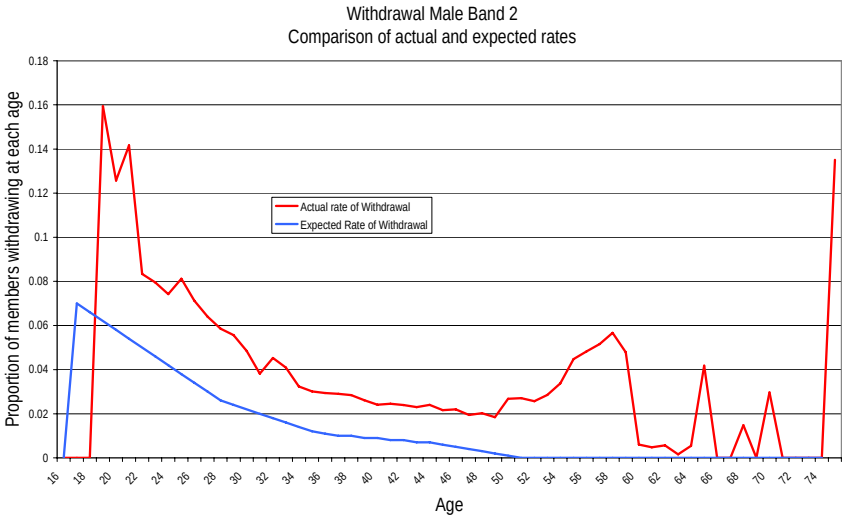
The data does not allow us to identify withdrawals due to bulk transfers out of the Scheme. We have been able to adjust our analysis to allow approximately for this.

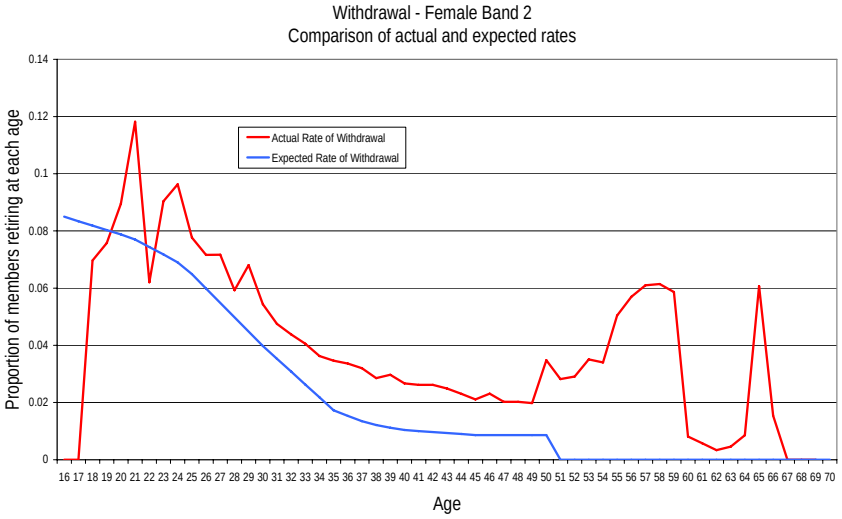
Results

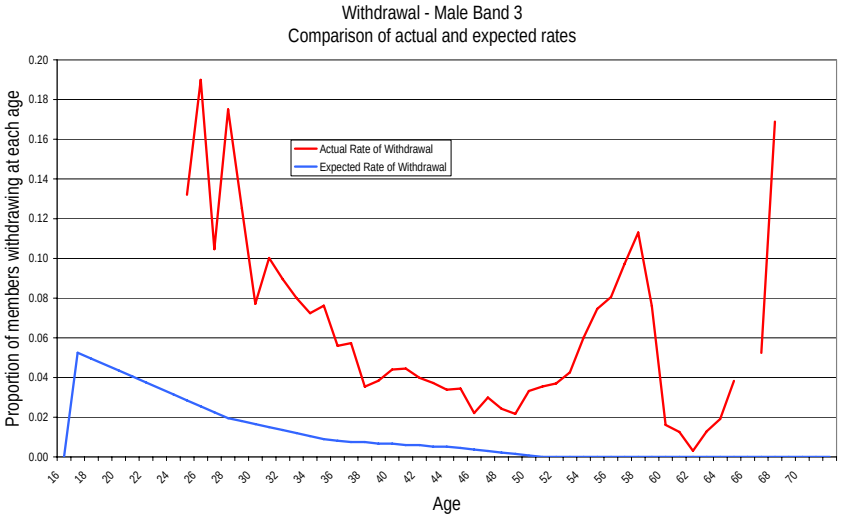
The following charts illustrate how the actual withdrawal rates (the red lines) compared to those expected under the 2003 assumption (blue lines). In each case, the expected rates are based on those applicable for members with more than 5 years' service.

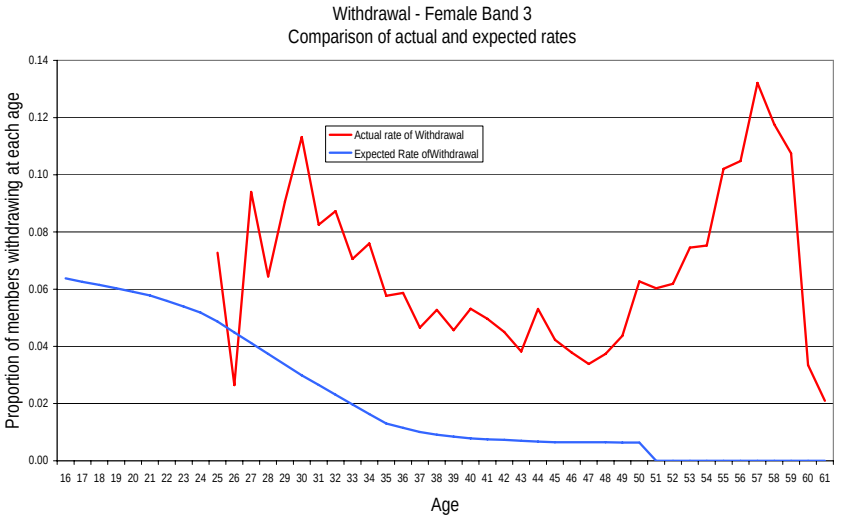

Withdrawal - Male Band 1
Comparison of actual and expected rates
Actual Rate of Withdrawal
Expected Rate of Withdrawal
Proportion of members withdrawing at each age
Age


Withdrawal - Female Band 1
Comparison of actual and expecvted rates
Actual Rate of Withdrawal
Expected Rate of Withdrawal
Proportion of members withdrawing at each age
Age

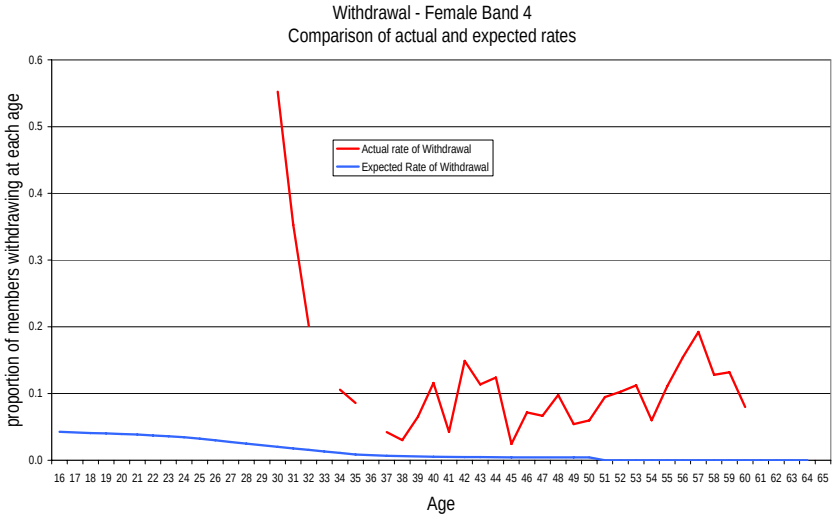

Withdrawal Male Band 2
Comparison of actual and expected rates
Actual rate of Withdrawal
Expected Rate of Withdrawal
Proportion of members withdrawing at each age
Age

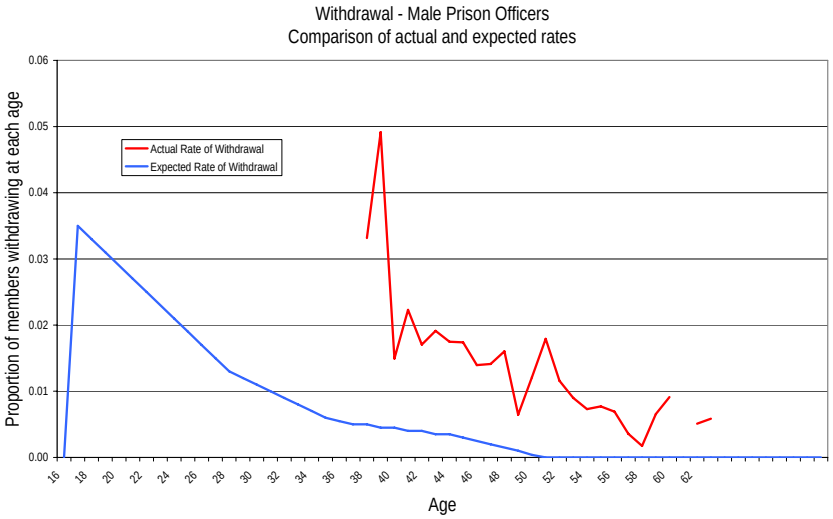

Withdrawal - Female Band 2
Comparison of actual and expected rates
Actual Rate of Withdrawal
Expected Rate of Withdrawal
Proportion of members retiring at each age
Age

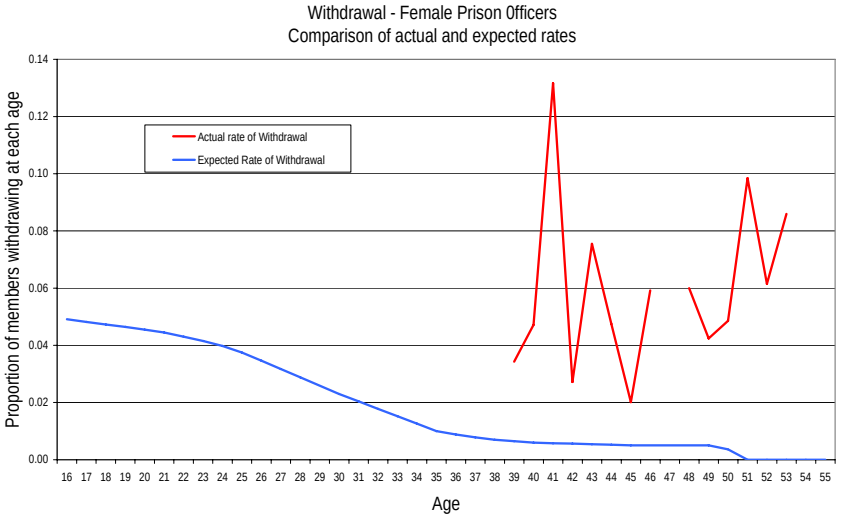

Withdrawal - Male Band 3
Comparison of actual and expected rates
Actual Rate of Withdrawal
Expected Rate of Withdrawal
Proportion of members withdrawing at each age
Age


Withdrawal - Female Band 3
Comparison of actual and expected rates
Actual rate of Withdrawal
Expected Rate ofWithdrawal
Proportion of members withdrawing at each age
Age


Withdrawal - Male Band 4
Comparison of actual and expected rates
Proportion of members withdrawing at each age
Actual Rate of Withdrawal
Expected Rate of Withdrawal
Age


Withdrawal - Female Band 4
Comparison of actual and expected rates
proportion of members withdrawing at each age
Actual rate of Withdrawal
Expected Rate of Withdrawal
Age


Withdrawal - Male Prison Officers
Comparison of actual and expected rates
Proportion of members withdrawing at each age
Actual Rate of Withdrawal
Expected Rate of Withdrawal
Age



Comments

Overall, rates of withdrawal have been greater than expected under the 2003 assumption relating to members with more than 5 years' service.

This is consistent with what we would expect given that a proportion of the withdrawals relate to members with shorter service who tend to have a higher likelihood of withdrawal in the early years of their career.

The rates of withdrawal at higher ages appear to be primarily due to early retirement (below age 60). There is an argument for making advance allowance for such retirements within the valuation but it is also acceptable to retain the current approach, of allowing profit or loss from such retirements to emerge between valuations.

Sensitivities

Table 6 illustrates the impact of adopting alternative assumptions relative to the 2003 assumption. The columns are labelled as follows:

(A) The approximate impact on the future service contribution rate, as a percentage of Pensionable Pay. This excludes any past service effect shown in (B).

(B) The approximate impact of spreading any change in past service liabilities (or surplus) over a 15 year period, as a percentage of Pensionable Pay over that period.

(C) The total approximate impact ((A) plus (B)), as a percentage of Pensionable Pay.

Table 6

Scenario	(A) (% of Pensionable Pay)	(B) (% of Pensionable Pay)	(C) (% of Pensionable Pay)
25% more withdrawals	-0.10	-0.04	-0.14
25% less withdrawals	+0.09	+0.04	+0.13

Recommendations We recommend that the 2003 assumptions are retained.

Promotional Salary Scales

Introduction

The following section sets out the results of our analysis of promotional salary increases experienced between 1 April 2003 and 31 March 2007.

2003 Assumption

The promotional salary increase assumptions were unchanged for the 2003 ASLC review compared to those adopted for the 1999 review. The assumptions vary by sex and pay band and are different for pre-fresh start prison officers.

Details of those assumptions can be found in our ASLC report dated 4 May 2004.

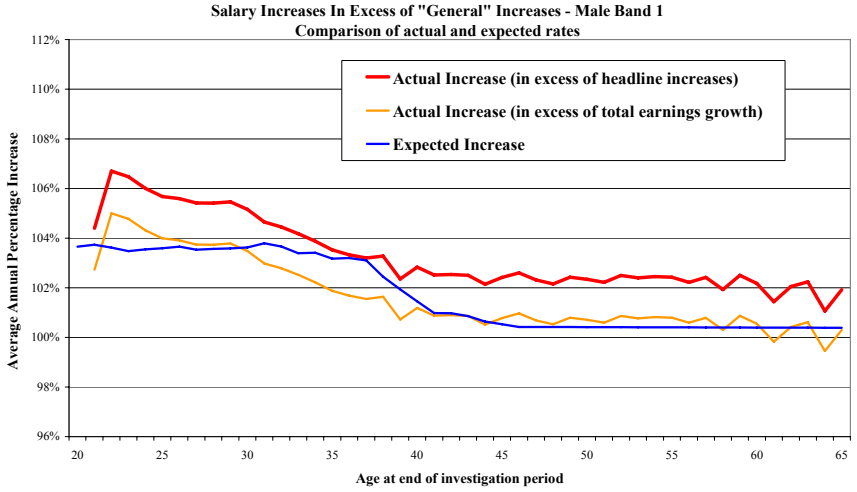
Approach to analysis

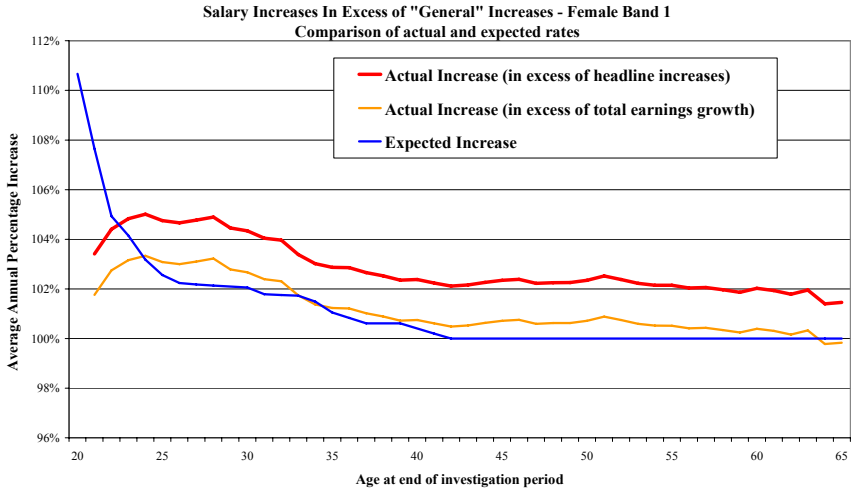
In order to analyse the actual rate of promotional salary increases against those expected, we have:

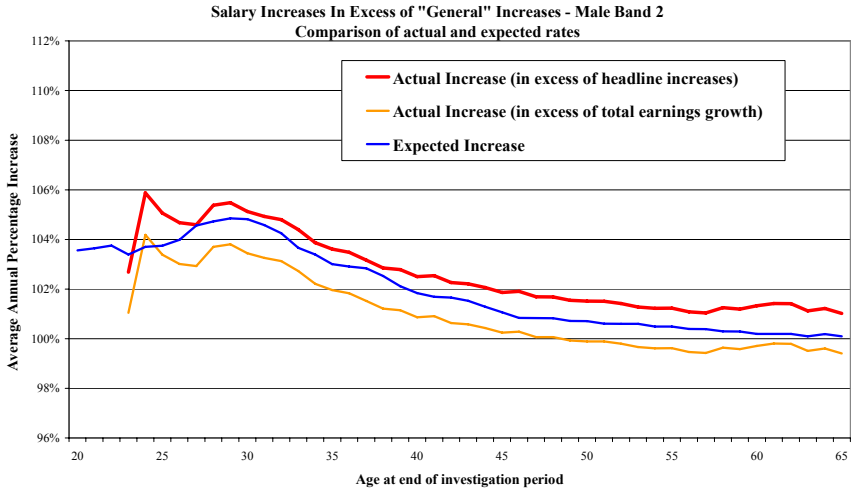
- Identified the members who were present throughout the period of investigation
- Attempted to exclude the effect of general salary increases granted over the period of investigation. We have carried out the analysis on two alternative scenarios. The first strips out "headline" increases and the second strips outs "Earnings Growth". (Both these data items are as supplied to us each year for the ASLC pay band revalorisation exercise.)
- Compared the residual salary increases with the 2003 assumptions.

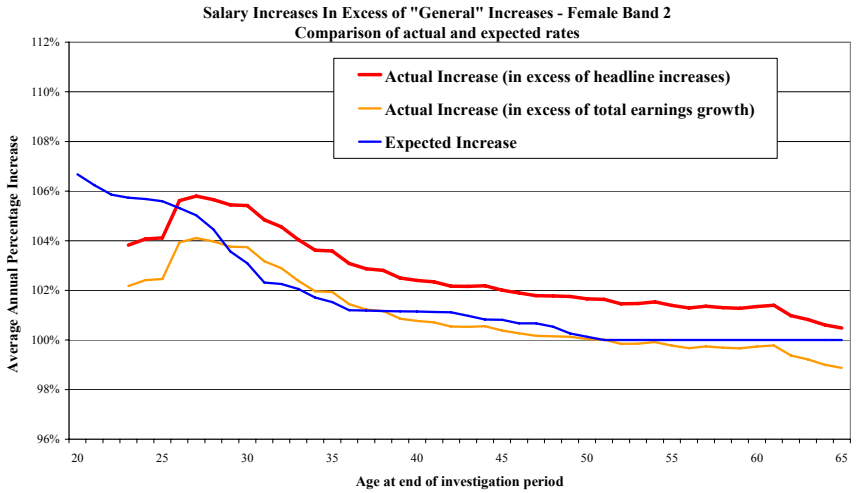
Results

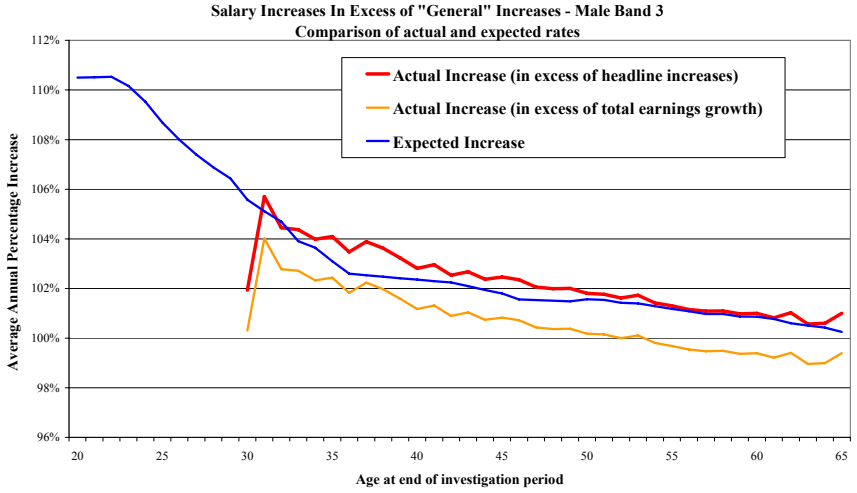
The following charts illustrate how the actual promotional salary increases (the red and orange lines) compared to those expected under the 2003 assumption (blue lines):

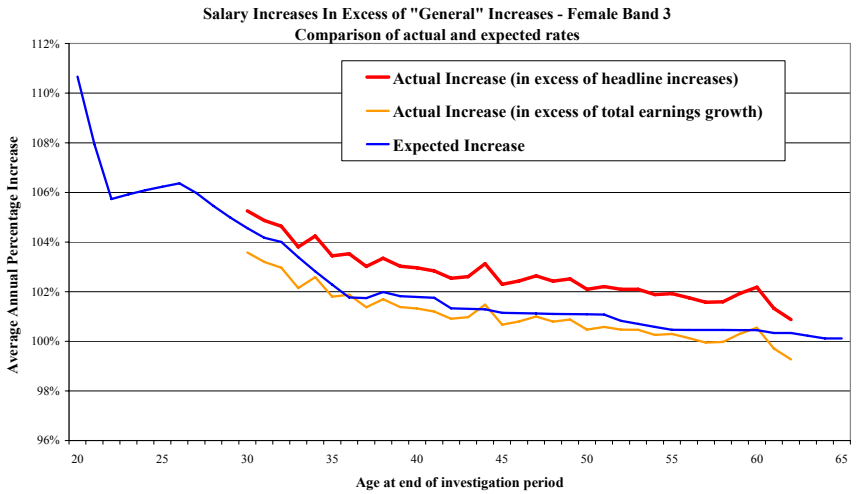

Salary Increases In Excess of "General" Increases - Male Band 1
Comparison of actual and expected rates
Actual Increase (in excess of headline increases)
Actual Increase (in excess of total earnings growth)
Expected Increase
Average Annual Percentage Increase
112%
110%
108%
106%
104%
102%
100%
98%
96%
20
25
30
35
40
45
50
55
60
65
Age at end of investigation period

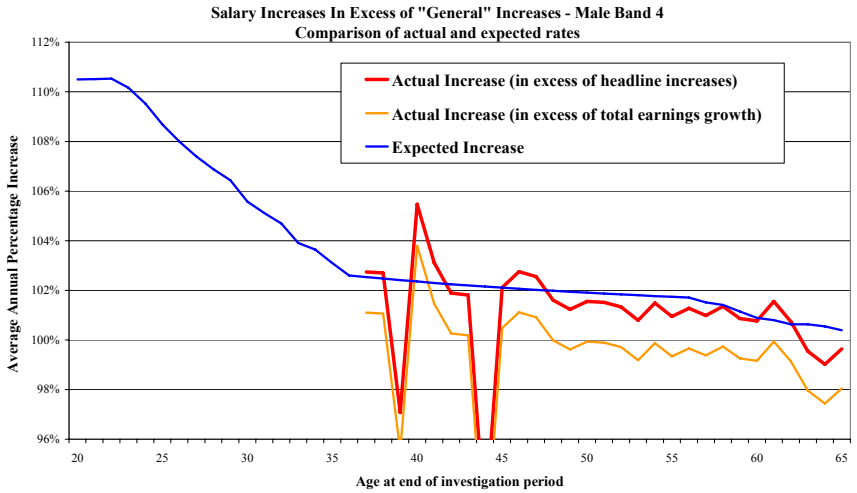

Salary Increases In Excess of "General" Increases - Female Band 1
Comparison of actual and expected rates
Actual Increase (in excess of headline increases)
Actual Increase (in excess of total earnings growth)
Expected Increase
Average Annual Percentage Increase
112%
110%
108%
106%
104%
102%
100%
98%
96%
20
25
30
35
40
45
50
55
60
65
Age at end of investigation period

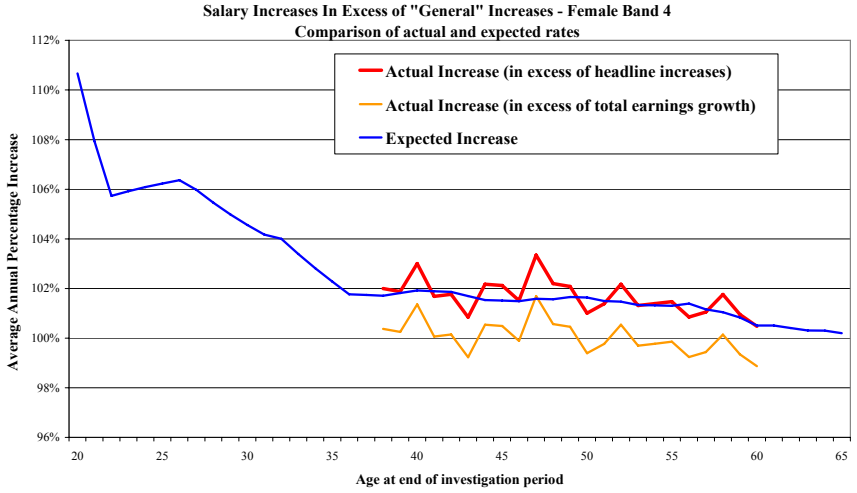

Salary Increases In Excess of "General" Increases - Male Band 2
Comparison of actual and expected rates
Actual Increase (in excess of headline increases)
Actual Increase (in excess of total earnings growth)
Expected Increase
Average Annual Percentage Increase
112%
110%
108%
106%
104%
102%
100%
98%
96%
20
25
30
35
40
45
50
55
60
65
Age at end of investigation period

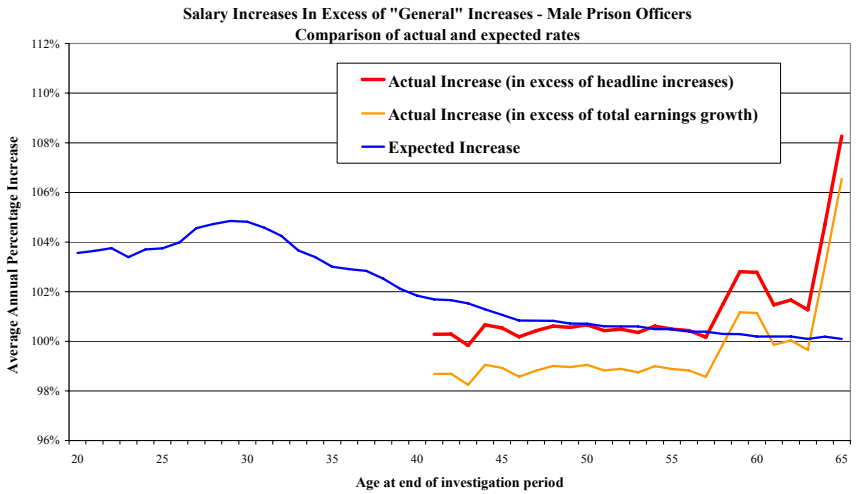

Salary Increases In Excess of "General" Increases - Female Band 2
Comparison of actual and expected rates
Actual Increase (in excess of headline increases)
Actual Increase (in excess of total earnings growth)
Expected Increase
Average Annual Percentage Increase
112%
110%
108%
106%
104%
102%
100%
98%
96%
20
25
30
35
40
45
50
55
60
65
Age at end of investigation period

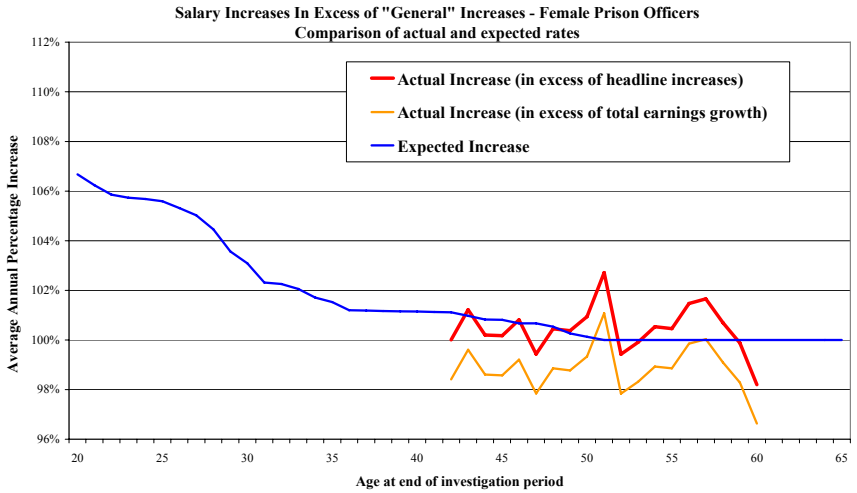

Salary Increases In Excess of "General" Increases - Male Band 3
Comparison of actual and expected rates
Actual Increase (in excess of headline increases)
Actual Increase (in excess of total earnings growth)
Expected Increase
Average Annual Percentage Increase
112%
110%
108%
106%
104%
102%
100%
98%
96%
20
25
30
35
40
45
50
55
60
65
Age at end of investigation period


Salary Increases In Excess of "General" Increases - Female Band 3
Comparison of actual and expected rates
Actual Increase (in excess of headline increases)
Actual Increase (in excess of total earnings growth)
Expected Increase
Average Annual Percentage Increase
112%
110%
108%
106%
104%
102%
100%
98%
96%
20
25
30
35
40
45
50
55
60
65
Age at end of investigation period


Salary Increases In Excess of "General" Increases - Male Band 4
Comparison of actual and expected rates
Actual Increase (in excess of headline increases)
Actual Increase (in excess of total earnings growth)
Expected Increase
Average Annual Percentage Increase
112%
110%
108%
106%
104%
102%
100%
98%
96%
20
25
30
35
40
45
50
55
60
65
Age at end of investigation period


Salary Increases In Excess of "General" Increases - Female Band 4
Comparison of actual and expected rates
Actual Increase (in excess of headline increases)
Actual Increase (in excess of total earnings growth)
Expected Increase
Average Annual Percentage Increase
112%
110%
108%
106%
104%
102%
100%
98%
96%
20
25
30
35
40
45
50
55
60
65
Age at end of investigation period


Salary Increases In Excess of "General" Increases - Male Prison Officers
Comparison of actual and expected rates
Actual Increase (in excess of headline increases)
Actual Increase (in excess of total earnings growth)
Expected Increase
Average Annual Percentage Increase
112%
110%
108%
106%
104%
102%
100%
98%
96%
20
25
30
35
40
45
50
55
60
65
Age at end of investigation period



Comments

The analysis shows that actual experience has been a good reflection of the 2003 assumption, especially in relation to the "shape" of the increases at different ages. For Bands 1 and 2, where we have the most data, experience has matched the assumptions particularly closely.

For most categories, the assumed level of the increases appears consistent with actual experience, falling towards the middle of the range defined by basing the analysis on "headline" or "real earnings" figures.

Sensitivities

Since experience was a reasonably close match for our assumption we have not shown any sensitivities for promotional salary increases.

Recommendations

We recommend that the 2003 assumption is retained.

Family Statistics

Introduction

PCSPS may provide benefits to members' dependants on the death of a member. In valuing such benefits we need to make two important assumptions:

- The age difference between members and their spouses.
- The proportion of deaths giving rise to dependants' benefits.

The following section sets out the results of our analysis into these factors.

2003 Assumption

The assumptions for the 2003 ASLC review were simplified compared to those adopted by the Government Actuary's Department (GAD) for the 1999 review.

Details of the 2003 assumptions can be found in our ASLC report dated 4 May 2004.

Approach to analysis

The membership and experience data provided for the ASLC review does not contain detailed information about individual members' marital statuses or existence of dependants.

We have therefore had regard to statistical information available in the public domain, as well as the relevant assumptions adopted by GAD for the 1999 ASLC review, which we understand were derived from the experience of ex-civil servants, other groups of public service employees and life office pensioners.

Background

The **classic** section of PCSPS provides contingent pensions to members' spouses on the death of a member whereas the **premium** section also provides contingent pensions to members' dependants (other than legal spouses). This leads to different "dependency rates" depending on the section of PCSPS a member belongs to.

In addition, **classic** members' spouses' pensions cease on the remarriage of the spouse.

These factors were allowed for in the assumptions adopted at the 2003 ASLC review.

Since the 2003 review, contingent pensions have been introduced for Civil Partners for accrual after 6 April 1988 for all sections of the PCSPS.

Analysis

Our analysis has focused on statistical information available in the public domain, in particular information available from the Office of National Statistics, and GAD's Teachers Pension Scheme valuation report dated November 2006.

We have also been able to carry out some rough tests on the "proportion married" assumption by comparing number of members dying to new dependants' pension coming into payment over the period. This analysis suggests that there is no particular evidence to justify a change to the current marriage/dependency rates, despite the extension of benefits to Civil Partners.

The 2003 assumption, a four year age difference between men and their dependants, seems to be out of line with the general population. We have no reason to believe that members of PCSPS should exhibit age differences differing from the general population. Therefore, we propose reducing the age difference between males and their dependants to 3 years, which is more consistent with population statistics.

Sensitivities

Table 8 illustrates the impact of adopting alternative assumptions relative to the 2003 assumptions. The columns are labelled as follows:

(A) The approximate impact on the future service contribution rate, as a percentage of Pensionable Pay. This excludes any past service effect shown in (B).

(B) The approximate impact of spreading any change in past service liabilities (or surplus) over a 15 year period, as a percentage of Pensionable Pay over that period.

(C) The total approximate impact ((A) plus (B)), as a percentage of Pensionable Pay.

Table 8

Assumption	(A) (% of Pensionable Pay)	(B) (% of Pensionable Pay)	(C) (% of Pensionable Pay)
3 year age difference	-0.02	-0.11	-0.13

Recommendations

We recommend that the 2003 assumptions for family statistics are retained except that:

- Men are assumed to be three years older than their dependants

Commutation

Introduction

Members of the **classic** section of PCSPS accrue pension and lump sum separately and under normal circumstances did not (in the period covered by this experience analysis) have the option to commute pension in order to increase their lump sum. Members of **premium** only accrue pension and must commute pension in order to receive a retirement lump sum.

The following section sets out the results of our analysis of the recent commutation rates experienced by the Scheme.

Incidentally, members of **classic** have the opportunity of opting for reverse commutation, i.e. exchanging lump sum entitlement for additional pension. In the ASLC review we assume that any such exchange takes place on a cost-neutral basis, so there is no need to make allowance for reverse commutation within the valuation.

2003 Assumption

For the 2003 ASLC review **premium** members were assumed to commute pension such that they received a lump sum equal to 3/80ths of Final Pensionable Pay for each year of service. The same assumption was applicable for **classic plus** members in respect of post 1 October 2002 service. This is equivalent to assuming that members commuted 18.75% of their **premium** pension on retirement.

Approach to analysis

In order to analyse the actual rate of commutation against those expected, we have:

- Considered pensioners in the valuation data who are members of the **premium** section of PCSPS. The 31 March 2007 data includes around 3,000 **premium** pensioners.
- Used the spouses' pension data item to derive the implied pre-commutation members' pensions.
- Compared the derived pre-commutation pensions to the actual members' pensions in the data to derive the proportion of pension commuted
- Compared the derived proportion to the proportion assumed at the 2003 ASLC review

Recent developments

The June 2007 Cabinet Office proposal to the CCSU included a proposal to increase the maximum lump sums available from PCSPS to be in line with the maximum permitted under the Finance Act 2004. We might expect this to result in some members commuting more pension than they would do at present, but we won't know the impact for certain until we have some actual experience.

Results and commentary

Our analysis shows that **premium** pensioners have been commuting (on average) only around 11% of their pension on retirement. The result implies that members have commuted somewhat less than the maximum lump sum that they were entitled to.

This could be taken as evidence to reduce the allowance for commutation. Alternatively, we could assume that the impact of allowing greater lump sums on retirement would make our current assumption reasonable or even justify an increased allowance for commutation. In the sensitivity calculation below we illustrate the impact of allowing for increased lump sums to be taken.

Sensitivities

Table 9 illustrates the impact of adopting alternative assumptions relative to the 2003 assumption, with columns labelled as follows:

(A) The approximate impact on the future service contribution rate, as a percentage of Pensionable Pay. This excludes any past service effect shown in (B).

(B) The approximate impact of spreading any change in past service liabilities (or surplus) over a 15 year period, as a percentage of Pensionable Pay over that period.

(C) The total approximate impact ((A) plus (B)), as a percentage of Pensionable Pay.

Table 9

Assumption	(A) (% of Pensionable Pay)	(B) (% of Pensionable Pay)	(C) (% of Pensionable Pay)
Half of members to commute up to the pre A-day maximum and half to commute up to the post A-day maximum.	-0.40	-0.56	-0.96

Recommendations

We propose retaining the existing 2003 assumption.