



Government Actuary's Department

NHS Superannuation Scheme (Scotland): Actuarial valuation at 31 March 2012

Advice on assumptions

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1 Executive summary

This report contains our recommendations for the best estimate assumptions to be set by the Scottish Ministers for the 2012 valuation of the NHS Superannuation Scheme (Scotland).

- 1.1 An actuarial valuation of the NHS Superannuation Scheme (Scotland) (NHSSS or 'the Scheme') is being undertaken as at 31 March 2012. The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014 ("the Directions") require that, unless specified otherwise¹, the actuarial assumptions to be adopted for this valuation are the responsibility of the Scottish Ministers, having taken advice from the scheme actuary. Direction 19(c) requires the assumptions to be the Scottish Ministers' best estimates.
- 1.2 This report sets out GAD's formal advice to the Scottish Ministers on the actuarial assumptions to be adopted. The advice covers the main assumptions to be set by the Scottish Ministers and is summarised in Table 1. Assumptions as required in other areas are covered in separate advice.
- 1.3 We consider that recent experience generally provides the most reliable evidence when determining best estimates of future experience and have adopted this approach throughout this advice unless noted otherwise. In some areas the data available to analyse inter-valuation experience for the NHSSS is less reliable and complete than corresponding information available about the NHS Pension Scheme for England and Wales (NHSPS). Where there is no reason to believe experience across the membership of the two schemes should be materially different we have also considered the conclusions reached based on the NHSPS experience² in formulating our recommendations for the NHSSS. This is consistent with the approach used for previous valuations where in many cases the same assumptions have been used for both schemes.
- 1.4 The previous completed actuarial valuation of the NHSSS was carried out as at 31 March 2004. A valuation as at 31 March 2008 was started, including an analysis of experience and a proposed set of assumptions, but was not completed. Most of the assumptions put forward in this report differ from those proposed for the 2008 valuation. The four most significant changes are:
 - > Increased expected pensioner longevity
 - > A reduction in the proportion of member deaths which are assumed to result in payment of a dependant's pension

¹ Certain assumptions are specified in the Directions.

² See NHS Pension Scheme; Valuation as at 31 March 2012:Advice on assumptions dated 9 June 2014 <https://www.gov.uk/government/publications/nhs-pension-scheme-actuarial-valuation>



- > Earlier age retirement assumptions for members expecting to receive benefits wholly or mainly from the existing scheme, together with later age retirement assumptions for members joining or moving to the 2015 scheme
 - > A reduction in assumed ill-health retirements.
- 1.5 The following sections and appendices provide more detail on the advice, supporting analysis and the financial impact of the assumptions on the results. They also contain important background information about the context of this advice and its limitations.
- 1.6 This report was provided to the Scottish Ministers in draft form, and was also circulated to the Scheme's member and employer representatives, in September 2013. It has been signed alongside the formal valuation report. The only substantive changes made between the draft and final report were to reflect the results of the Scottish Ministers considerations on the post retirement mortality assumption in light of advice provided by GAD in relation to the valuation of the Scottish Teachers Superannuation Scheme, and to incorporate changes resulting from the finalisation of the Directions, notably to include specific assumptions for new entrants and to accommodate the direction of assumed proportions commuted for certain purposes. The Scottish Ministers have already confirmed to GAD, having consulted with relevant stakeholders and having obtained HM Treasury consent, that the actuarial assumptions to be adopted for the valuation should be those set out in this report.



Table 1: Summary of recommended assumptions consistent with the 'best estimate' requirement

| Assumption | Summary of recommended assumptions | Rationale for recommendation | Approximate impact on total contribution rate of change from 2008 valuation assumptions | |
|---|--|--|---|---------------|
| | | | Past service | SCR (2015-19) |
| Pensioner baseline mortality³ | Aligned to standard SAPS table ^{4,5} | | | |
| Normal health | 92.5%(M)/97.5%(F) x S1NXA | Based on 2008-2012 NHSPS experience and analysis of aggregate population mortality rates for Scotland and for England and Wales. | +0.7% | +0.2% |
| Ill-health (current) | 92.5%(M)/97.5%(F) x S1IXA | | | |
| Ill-health (future) | 100% x S1IXA | | | |
| Dependants | 92.5%(M)/97.5%(F) x S1NXA | | | |
| Age retirement | | | | |
| Members expecting benefits wholly or mainly from the existing scheme (those covered by protection or tapering): | | | | |
| Currently in 1995 section (NPA 60 or 55) | Age, sex, NPA and occupation dependent rates. On average around 20% retire before NPA, 30% at NPA, with remainder spread over higher ages and majority assumed to have retired by NPA+5 years. | In line with 2008-2012 experience of both NHSSS and NHSPS experience. Recent experience has shown a step change, believed to be a result of the introduction of tiered contributions and tax changes. The reasons for the changes in behaviour are likely to persist over the key period these assumptions will be relevant for (relatively short term). | +0.4% | +0.1% |
| Currently in 2008 section (NPA 65) | Age, sex, NPA and occupation dependent rates. On average around 30% retire before NPA, 60% assumed to retire at NPA, with remainder spread over higher ages. | Insufficient evidence to revise previous assumption. Not financially significant. | | |

³ As directed by HMT, future improvements in mortality assumed to be in line with those underlying the ONS 2012-based population projections.

⁴ SAPS tables are published by the Actuarial Profession and are based on the experience of self-administered pension schemes over the period 2000 to 2006. The 'S1' series has separate standard tables based on experience of members retiring in normal health (S1NXA), in ill health (S1IXA) and for dependants (S1DFA).

⁵ Adjusted to take account of improvements in population mortality between 2002 (the base year for the tables) and the date the future improvements are applied from.



Other transitional members (transferring on 1 April 2015), and new entrants from 2015

| | | | | |
|---|---|--|------------|----------------|
| Existing benefits and 2015 scheme accrual (NPA = SPA in new scheme, existing scheme NPA 55,60,65) | Single set of unisex assumptions for early retirement dependent only on NPA in 2015 scheme. 1% pa 13 years before NPA, 2% 10 years before NPA, 6% 3 years before NPA and 8% 1 year before NPA | Translation of 2008-2012 experience of retirements before current NPAs to the 2015 scheme NPAs | -0.3% | New assumption |
| III-health retirement | | | | |
| Incidence | Sex dependent. Increasing by age: 0.01% at age 25, around 0.1% at age 45, about 0.7%/0.9% (M/F) at age 65 | In line with 2008-2012 experience, not adjusted for further improvements in health | Immaterial | -0.1% |
| Upper/lower tier split | 75% on upper tier | | Immaterial | Immaterial |
| Withdrawal | No (net) withdrawals assumed for closed groups and practitioners. Single set of net of re-entry within 5 years rates for all other members. Rates are unisex, age and duration dependent (up to 3 years' service) and vary from 30% pa for very young members with short service to around 3% pa from age 40 with over 3 years' service | Set in line with 2008-2012 experience in NHSPS | +0.1% | -0.2% |
| Death before retirement | Sex dependent rates increasing by age: around 0.025%/0.02% (M/F) at age 25, about 0.095%/0.06% (M/F) at age 45, 0.5%/0.28%(M/F) at age 65 | In line with 2008-2012 experience, not adjusted for future improvements in mortality | Immaterial | Immaterial |



| | | | | |
|---|--|---|---|------------|
| Promotional salary scale | Age, sex and manual/non-manual dependent scales. Steeper at younger ages: for non-manuals about 6%/5% (M/F) a year at age 25, 2%/1% (M/F) at age 45 and nil at age 65. For manual about 4% a year at age 25, 1% at age 45 and nil at age 65. | Broadly as adopted for 2004 and 2008 valuations, with some grouping of categories, as no clear evidence that the salary scale adopted in 2004 is no longer appropriate. | No change in assumption | |
| Commutation | | | | |
| 1995 section (Automatic lump sum of 3 times pension) | 8.5% of pension commuted (to provide total cash of 75% of HMRC maximum) | In line with assumption used for scheme reform calculations and NHSPS experience | +0.1% | Immaterial |
| Family statistics | | | | |
| Proportion married/partnered | Age and sex dependent rates of proportions married or partnered at death. 72%/ 52% (M/F) assumed married at age 60; 76%/54% (M/F) assumed partnered at age 60. | Based on NHSPS experience | -0.5% | -0.3% |
| Age difference | Male member 3 years older than partner Female 3 years younger than partner | Based on population statistics as no scheme experience | Immaterial | |
| Remarriage | No allowance | Simplification based on materiality | Immaterial | |
| New entrants | To maintain stable population over all periods. Average age of new entrants around 34 years, average pay around £24,000 in real terms. | Consistent with 2008-12 experience and to achieve an overall assumption of stability in the active membership | Not directly comparable owing to change in valuation method | |



2 Introduction

This report contains our advice to the Scottish Ministers but will be of interest to other parties who should note the limitations.

- 2.1 An actuarial valuation of the NHS Superannuation Scheme (Scotland) (NHSSS or 'the Scheme') is being undertaken as at 31 March 2012. The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014 ("the Directions") require that, unless specified otherwise⁶, the actuarial assumptions to be adopted for this valuation are the responsibility of the Scottish Ministers, having taken advice from the scheme actuary. Direction 19(c) requires the assumptions to be the Scottish Ministers' best estimates.
- 2.2 GAD is the appointed scheme actuary to the NHSSS. This report is addressed to the Scottish Ministers and contains our formal advice on the appropriate assumptions to be adopted for the 2012 valuation, as required by the Directions. The purpose of this advice is to enable the Scottish Ministers to determine the required best estimate assumptions.
- 2.3 The advice covers the main assumptions to be set by the Scottish Ministers. In particular, we consider nine sets of assumptions in this report:
- > Pensioner mortality
 - > Age retirement from service
 - > Ill-health retirement from service
 - > Voluntary withdrawal from service
 - > Death before retirement
 - > Promotional pay progression
 - > Commutation of pension for cash at retirement
 - > Family statistics
 - > New entrants.
- 2.4 Assumptions as required in other areas are covered in separate advice.

⁶ Certain assumptions are specified in the Directions.



- 2.5 This report was provided to the Scottish Ministers in draft form, and was also circulated to the Scheme's member and employer representatives, in September 2013. It has been signed alongside the formal valuation report. The only substantive changes made between the draft and final report were to reflect the results of the Scottish Ministers considerations on the post retirement mortality assumption in light of advice provided by GAD in relation to the valuation of the Scottish Teachers Superannuation Scheme, and to incorporate changes resulting from the finalisation of the Directions, notably to include specific assumptions for new entrants and to accommodate the direction of assumed proportions commuted for certain purposes..
- 2.6 The Scottish Ministers have already confirmed to GAD, having consulted with relevant stakeholders and having obtained HM Treasury consent, that the actuarial assumptions to be adopted for the valuation should be those set out in this report.
- 2.7 SPPA, the Scheme's administrator, supplied data on the experience of the scheme membership over the four-year period to 31 March 2012. We have used this data to analyse the Scheme's experience in order to develop our advice on the assumptions. Our report, *NHSSS (Scotland) actuarial valuation at 31 March 2012: Report on data used for experience analysis* dated 20 January 2015, provides information about this data and should be read in conjunction with this advice. The report includes details of the checks carried out on the data, the amendments made to the data and our concerns about the quality of the data. In preparing our advice, we have relied upon the general completeness and accuracy of the data provided.
- 2.8 We consider that recent experience generally provides the most reliable evidence when determining best estimates of future experience and have adopted this approach throughout this advice unless noted otherwise. In some areas the data available to analyse inter-valuation experience for the NHSSS is less reliable and complete than corresponding information available about the NHS Pension Scheme for England and Wales (NHSPS). Where there is no reason to believe experience across the membership of the two schemes should be materially different we have also considered the conclusions reached based on the NHSPS experience⁷ in formulating our recommendations for the NHSSS. This is consistent with the approach used for previous valuations where in many cases the same assumptions have been used for both schemes.
- 2.9 For both the 2004 and 2008 valuations the only assumptions which differed for the NHSSS and the NHSPS were:
- > Pensioner mortality: members of the NHSSS were assumed to experience heavier mortality than for the NHSPS, with, for longevity purposes, a member of the NHSSS assumed to be one year older than a member of the same age in the NHSPS.

⁷ See NHS Pension Scheme actuarial valuation as at 31 March 2012:Advice on assumptions dated 9 June 2014 <http://www.nhsbsa.nhs.uk/Pensions/806.aspx>



- > Age retirement from service: slightly different patterns of age retirement were assumed for members of the NHSSS, with broadly, slightly later average ages of retirement for men and slightly earlier average ages of retirement for women assumed in Scotland compared to England and Wales.
 - > Ill-health retirement from service; the rates assumed for NHSSS were generally lower at younger ages and higher at older ages than assumed for NHSPS.
- 2.10 The Scottish Ministers should consider whether there is any reason why the approach taken in recommending assumptions would be inappropriate.
- 2.11 The report is also being made available to:
- > the NHS Scottish Pensions Group; and
 - > HMT.
- 2.12 We are content for the Scottish Ministers to release this report to third parties, provided that:
- > it is released in full
 - > the advice is not quoted selectively or partially
 - > GAD is identified as the source of the report, and
 - > GAD is notified of such release.
- 2.13 Third parties whose interests may differ from those of the Scottish Ministers should be encouraged to seek their own actuarial advice where appropriate. Other than to the Scottish Ministers GAD has no liability to any person or third party for any act or omission taken, either in whole or in part, on the basis of this report.



3 General considerations

This section sets out a number of general considerations common to the setting of the different assumptions considered in this report.

- 3.1 The key considerations taken into account in formulating the advice in this report are explained in this section.

Directions

- 3.2 The advice in this report reflects the requirements of the Directions issued by HM Treasury that assumptions should be set, following consultation with stakeholders, as the Scottish Ministers' 'best estimates' of future experience and should contain no margin for prudence or optimism. They should be set having regard to:

- > assumptions set for previous valuations
- > analysis of demographic experience in the period up to the valuation date
- > historic long term trends and emerging evidence which may illustrate long-term trends in the future
- > relevant data from any other sources.

Different populations

- 3.3 Direction 52 requires this actuarial valuation to cover both the new scheme established under the Act⁸ and the existing Scheme. This means the 2012 valuation needs to consider assumptions appropriate to both the existing scheme and the new scheme. It also needs to cover the assessment of the employer contribution rate payable over the period 2015 to 2019 and the employer cost cap. Setting the employer contribution rate requires assumptions about anticipated member behaviour and characteristics during 2015 - 2019 as well as assumptions about member behaviour and characteristics in the longer term.

- 3.4 From 2015 there will be 3 distinct groups of members.
- > Those with full protection and thus remaining in the existing scheme to retirement. The introduction of the 2015 scheme is not expected to have any impact on this group's behaviours
 - > New members to the 2015 scheme. These members' behaviours are expected to be heavily influenced by the provisions of the new scheme

⁸ Public Service Pensions Act 2013



- > Members with service in both the existing and 2015 schemes (including members with tapered protection). Over time, as the proportion of 2015 scheme service increases, the behaviours are expected to become increasingly influenced by the provisions of that scheme.

Relative importance of assumptions

- 3.5 The Directions require the employer contribution rate and employer cost cap to be determined to the nearest 0.1% of pensionable payroll. This is a required level of accuracy for a particular calculation and based on a particular set of assumptions. In each of the remaining chapters in this report we conclude by providing an indication of the sensitivity of the valuation results to the particular assumptions under consideration. The figures are approximate and are not independent so the impact of multiple changes will not necessarily be the sum of the individual impacts. Changes are considered immaterial if their expected impact on the contribution rate is less than 0.05%.
- 3.6 Where relevant we also indicate in each of the following chapters the relative importance of each set of assumptions to each of the three groups of members identified in paragraph 3.4.



4 Pensioner mortality

This section sets out our recommendation for the pensioner mortality assumptions, the rationale for those assumptions and their financial impact.

Proposed assumptions for 2012 valuation

- 4.1 The assumptions we recommend for baseline pensioner mortality for the 2012 valuation may be summarised as follows:

Table 4.1: Recommended mortality assumptions

| Baseline mortality | Standard table ⁹ | Adjustment |
|-------------------------------|-----------------------------|------------|
| Males | | |
| Retirements in normal health | S1NMA | 92.5% |
| Current ill-health pensioners | S1IMA | 92.5% |
| Future ill-health pensioners | S1IMA | 100% |
| Dependants | S1NMA | 92.5% |
| Females | | |
| Retirements in normal health | S1NFA | 97.5% |
| Current ill-health pensioners | S1IFA | 97.5% |
| Future ill-health pensioners | S1IFA | 100% |
| Dependants | S1NFA | 97.5% |

- 4.2 As specified by HM Treasury, future improvements in mortality will be assumed to be in line with those underlying the ONS 2012-based population projections.
- 4.3 The above assumptions are similar to those proposed for the 2012 valuation of the NHSPS but with a 12.5% higher adjustment factor being applied. This is similar to the differential in mortality rates assumed between the schemes for the 2004 and 2008 valuations.

⁹ SAPS tables are published by the Actuarial Profession and based on the experience of self-administered pension schemes over the period 2000 to 2006. The 'S1' series has separate standard tables based on experience of members retiring in normal health (S1NXA) and in ill health (S1IXA) and for dependants (S1DFA).



Previous valuation assumptions

- 4.4 At previous valuations baseline mortality has similarly been based on adjusted standard tables with future improvements based on the then most recent ONS population projections.

Comparison of expected pensioner longevity

- 4.5 The table below gives a comparison of the resulting life expectancies¹⁰ (allowing for future improvements) assumed and recommended for the 2004, 2008 (uncompleted) and 2012 valuations.

Table 4.2: Comparison of life expectancies (years)

| | 2004 valuation | 2008 valuation | 2012 valuation |
|---|-------------------|-------------------|-------------------|
| Current pensioners | | | |
| Male aged 60 | 24.3 | 27.8 | 28.8 |
| Male aged 65 | 19.4 | 23.0 | 23.8 |
| Female aged 60 | 27.4 | 30.3 | 30.8 |
| Female aged 65 | 22.5 | 25.4 | 25.9 |
| Future pensioners – current age 45 | | | |
| Male life expectancy from age 60 | 25.4 | 29.3 | 30.5 |
| Male life expectancy from age 65 | 20.8 | 25.0 | 26.1 |
| Female life expectancy from age 60 | 28.4 | 31.9 | 32.5 |
| Female life expectancy from age 65 | 23.8 | 27.4 | 28.0 |

Use of the assumption

- 4.6 Pensioner mortality is a key valuation assumption and is a measure of how long members retiring in normal or ill health, or their dependants, expect to live and receive benefits.

¹⁰ Cohort life expectancies based on the ages shown as at the valuation date, i.e. allowing for future mortality improvement.



Results of analysis

- 4.7 The data available for the NHSS over the four-year period ending 31 March 2012 was not sufficiently robust to allow a credible analysis of mortality experience. A full mortality analysis was carried out for the NHSPS, which proposed assumptions based on the most appropriate S1 standard tables¹¹ with adjustments to provide the closest comparison with actual mortality experience over the period analysed.
- 4.8 Population statistics are available which demonstrate the differences between aggregate population mortality rates for Scotland and for England and Wales. We considered both an analysis of the differences in these population statistics and the NHSPS analysis in order to make a recommendation of the baseline mortality assumptions. Further information is shown in Appendix B.

Financial impact

- 4.9 The approximate financial impact of the proposed change to the mortality basis (both baseline and update of the improvement basis) compared to that proposed in 2008 is shown in Table 4.3.

Table 4.3: Approximate impact on contribution rate (as % of payroll) of proposed change in mortality assumptions

| | Past service effect* | Cost of accrual in existing scheme | Cost of accrual in 2015 scheme |
|---|----------------------|------------------------------------|--------------------------------|
| Change in mortality basis (baseline and improvements) from 2008 basis to that proposed for 2012 | +0.7% | +0.2% | +0.2% |

* adjustment to contribution rate for 15 years from 2015

¹¹ Adjusted to those applicable to the period the deaths occurred by applying adjustments broadly in line with the improvements applying to the UK population over the relevant period.



5 Age retirement from service

This section sets out our recommendation for the assumed patterns of retirement on grounds other than ill health, the rationale for those assumptions and their financial impact.

Proposed assumptions for 2012 valuation

- 5.1 We recommend that rates of age retirement are set separately for members who will continue in the existing schemes after April 2015 and for those members who will transfer to the new scheme on 1 April 2015, or join as new entrants from that date. Sample age retirement rates are provided in Appendix A.

Members remaining in the existing scheme after April 2015 (including those in tapering)

- 5.2 We recommend that members are assumed to retire in line with recent retirement patterns, which cover both early and late retirement. Recent experience is dominated by retirements from the 1995 section where members' NPA is either 55 or 60. The recommended rates provide that for members of the 1995 section, on average, about 20% of members will retire before normal pension age (NPA), about 30% at NPA, with the remainder retiring after NPA. The average assumed retirement age for NPA 55 members is about 58, for NPA 60 members 62 and for NPA 65 members 65. Similar averages apply for men and women although the actual rates differ by sex and, to some extent, by occupation. The recommended rates are identical to those proposed for the 2012 valuation of the NHSPS. Although different rates have been used at previous valuations the financial effect of the differences has been small and there is little robust evidence to support the continued differentials.

New entrants to the 2015 scheme and members transferring to that scheme on 1 April 2015

- 5.3 We recommend a common assumption for all members allowing for retirements before each member's NPA in the 2015 scheme. The same pattern of retirements is assumed for benefits accrued in both the existing scheme and the 2015 scheme. The actual recommended rates are set by reference to recent patterns of retirement before current scheme NPA, translated to the members' NPAs in the 2015 scheme. On average members are assumed to retire 1.7 years before their NPA in the 2015 scheme.

Previous valuation assumptions

- 5.4 Broadly similar assumptions about retirements in the 1995 and 2008 sections were adopted for previous valuations, though with no explicit allowance for retirement before NPA and lower levels of retirement at ages close to NPA, particularly for NPA 55 members. A similar range of rates was assumed for the NHSPS at previous valuations but with some differences across the various valuation groups. Broadly speaking the differences in rates implied slightly later average ages of retirement for men and slightly earlier average ages of retirement for women in Scotland compared with England and Wales.



Use of the assumptions

- 5.5 Age retirement rates specify the rate at which members are assumed to retire on grounds other than ill-health and therefore potentially include allowance for retirements before and after normal pension age.
- 5.6 In both sections of the existing scheme and in the 2015 scheme an actuarial reduction is applied to the pension payable on retirement before NPA. The actuarial reduction is set to give the early retirement pension the same value as the deferred benefits payable following withdrawal at the same age. Early retirement has not historically been common in the NHSSS although there have been more such retirements in the recent past than historically.
- 5.7 An actuarial uplift is applied for retirement after NPA in the 2008 section and in the 2015 scheme. However, in the 1995 section the pension payable on retirement after NPA is not subject to actuarial adjustment. This means pensions paid from the 1995 section on retirement after NPA are less costly to the scheme (ie the value of the benefit payable to a member is lower) than a pension paid at or before NPA. The rates of retirement of members of the 1995 section at or after NPA are therefore the most financially significant components of the assumption.

Results of analysis

- 5.8 A limited analysis of age retirements from active membership over the four-year period ending 31 March 2012 was carried out (further details set out in Appendix C). A full analysis was not possible as it was not possible to distinguish scheme section (and therefore NPA) from the data available. We considered the pattern of age retirements and compared this to the experience of the NHSPS over the same period. The patterns observed between the two schemes were very similar, and in both cases showed significant differences between expected retirement behaviours (which are based on historic experience) and actual retirement behaviours.
- 5.9 The analysis showed a number of areas where experience deviated from the previous valuation assumptions. This was particularly the case for men where the average age at retirement was lower than assumed; evidenced by more actual retirements at younger ages than expected and a higher proportion of members than expected retiring at or before their actual NPAs.
- 5.10 There are a number of known factors which may have contributed to the change in retirement patterns. For example, taxation changes and the introduction of tiered member contributions. The taxation changes and tiered contributions are more likely to impact the behaviours of higher earners in the scheme, many of whom are male, and thus explains the relatively more significant change in retirement patterns for men compared to a smaller difference for women. There is no evidence to suggest these factors will change in the near future, and this is the time horizon over which retirement patterns will be most financially significant as protected members of the 1995 section leave service.
- 5.11 The recommended assumptions are based on recent experience and have been set to equal those proposed for the NHSPS valuation.



Financial impact

5.12 The approximate financial impact of alternative retirement assumptions is set out in Table 5.1.

Table 5.1: Approximate impact on contribution rate (as % of payroll) of variation in assumed rates of age retirements

| | Past service effect* | Cost of accrual in existing scheme | Cost of accrual in 2015 scheme |
|---|----------------------|------------------------------------|--------------------------------|
| Impact of average age of retirement being 1 year earlier than under rates as proposed | +0.5% | +0.1% | Immaterial |
| Impact of adopting assumptions recommended compared to those used for the 2008 valuation: | | | |
| • Protected/tapered members | +0.4% | +0.1% | n/a |
| • Transitional/new members | -0.3% | n/a | New assumption |

* adjustment to contribution rate for 15 years from 2015



6 Ill-health retirement from service

This section sets out our recommendation for the assumed rates of retirement on grounds of ill-health, the rationale for those assumptions and their financial impact.

Proposed assumptions for 2012 valuation

- 6.1 We recommend that a single set of assumptions (separate for men and women) is used to allow for the incidence of ill-health retirement, ie applying both to those members who remain in the existing scheme and to those who join the new scheme. The recommended rates are the same as proposed for the 2012 valuation of the NHSPS. Assumed rates of ill-health retirement increase with age but fewer than 1% of members are assumed to retire on ill-health grounds each year, even at the highest ages. Assumptions related to ill-health retirement have therefore relatively minor financial impact on the valuation results. Sample rates are provided in Appendix A.
- 6.2 We also recommend assuming that 75% of members retiring on ill-health grounds will receive the upper-tier benefit and the remainder will receive the lower-tier benefit.

Previous valuation assumptions

- 6.3 Considerably higher rates of ill-health retirement were assumed for the 2004 valuation. A significant reduction in these rates was proposed for the 2008 valuation based on experience prior to 2008, and the rates recommended for the 2012 valuation represent a further reduction in the rates. At previous valuations the rates of ill-health retirement assumed were slightly different to those adopted for the NHSPS. In light of the low level of ill-health retirements now experienced it is not financially significant to assume continued differentials between the two schemes.
- 6.4 For both the 2004 and 2008 valuations it was assumed that 75% of members retiring on ill-health grounds would receive upper-tier benefits¹². This is the same assumption as adopted for the NHSPS.

Use of the assumptions

- 6.5 Ill-health retirement rates specify the rate at which members are assumed to retire on grounds of ill-health. The assumed eligibility for upper or lower tier awards specifies the benefits which will be provided. The rates of mortality experienced after ill-health retirement are also relevant to the valuation calculations. Post retirement mortality is addressed in Section 4.

¹² A lower tier award provides for immediate payment of accrued benefits with no actuarial reduction, regardless of age. A higher tier award provides for enhancement of accrued benefits.



Results of analysis

- 6.6 We analysed around 1,000 ill-health retirements over the four-year period to 31 March 2012. The analysis compared the numbers of actual retirements to the expected number of retirements under previous valuation assumptions. Given the relatively small number of retirements contributing to the analysis we also compared the recent experience to that observed in the larger population of the NHSPS in England and Wales. Details of the analysis are shown in Appendix D.
- 6.7 The analysis showed there were substantially fewer ill-health retirements than assumed under the 2004 and 2008 valuation assumptions.
- 6.8 The recommended ill-health rates have been based on recent experience with extension of rates to older ages by linear extrapolation of experience to provide for the expected lengthening of working lives following the introduction of the 2015 scheme. The rates recommended have been aligned to those proposed for the 2012 valuation of the NHSPS given the similarity in experience across the two populations.

Split between tiers

- 6.9 Experience over the four-year period ending on 31 March 2012 supports retention of an assumption that 75% of ill-health retirements will receive upper tier benefits.

Financial impact

- 6.10 The approximate financial impact of the proposed change to ill-health retirement assumptions is set out in Table 6.1.

Table 6.1: Approximate impact on contributions (as % of payroll) of variation in ill-health retirement assumptions

| | Past service effect* | Cost of accrual in existing scheme | Cost of accrual in 2015 scheme |
|---|----------------------|------------------------------------|--------------------------------|
| 20% lower ill-health retirement rates compared to 2012 proposed rates | Immaterial | -0.1% | -0.1% |
| 5% fewer upper tier awards | Immaterial | Immaterial | Immaterial |

* adjustment to contribution rate for 15 years from 2015



7 Voluntary withdrawal from service

This section sets out our recommendation for the assumed rates of withdrawal from active service, the rationale for those assumptions and their financial impact.

Proposed assumptions for 2012 valuation

- 7.1 We recommend that a common set of net rates of withdrawal are used for the purposes of the valuation ie applying equally to those members who remain in the existing scheme and those who join the new scheme. The recommended rates are the same as proposed for the 2012 valuation of the NHSPS. The recommended rates are net of re-entry within five years and are unisex and apply for all members with the exception of practitioner and special class members. For these members we recommend no net withdrawals are assumed. The recommended rates are both age and service related. Differential rates apply for the first three years' of pensionable service. The rates reduce with age and length of service from about 30% a year for very young members with short service to about 3% a year for members aged 40 or older and with over three years' service. Sample rates are provided in Appendix A.

Previous valuation assumptions

- 7.2 Similar assumed rates of withdrawal were adopted for the 2004 and 2008 valuations, in both cases with the rates being the same as those adopted for the corresponding valuations of the NHSPS. The main differences compared with those now recommended are that rates were set separately for males and females and for most valuation groups, there was a five year service relation, and no withdrawals were assumed in late career. For the 2008 valuation it was proposed that the 2004 rates be adjusted by doubling the rates for those leaving within the first year of service, with other rates reduced by 10%.

Use of the assumption

- 7.3 Withdrawal rates specify the rate at which members are assumed to leave voluntarily before retirement becoming entitled to either deferred benefits or, for those with less than two years' service, a refund of contributions. In all cases the withdrawal rates are 'net' rates, ie they are intended to reflect the probability of leaving service and not re-joining within five years, and therefore the member's benefits not being linked to their final salary at retirement (or the in-service revaluation rate in the CARE scheme).



Results of analysis

- 7.4 We were unable to analyse age and duration rates of withdrawal over the four-year period ending 31 March 2012 as only grouped data was available. However, comparison of the overall numbers of net leavers against the experience of the NHSPS in England and Wales supports the approach of retaining the same withdrawal assumptions to those proposed for the 2012 valuation of the NHSPS. Further information is given in Appendix E.

Financial impact

- 7.5 The approximate financial impact of the change to the withdrawal rates compared to those proposed for the 2008 valuation is set out in Table 7.1.

Table 7.1: Approximate impact on contributions (as % of payroll) of proposed change in net withdrawal assumptions

| | Past service effect* | Cost of accrual in existing scheme | Cost of accrual in 2015 scheme |
|---|----------------------|--|--------------------------------|
| Combined impact of changes in withdrawal assumptions from the 2008 proposed assumptions | +0.1% | +0.3% | -0.4% |
| | | Estimated combined impact on cost of accrual 2015 - 2019 = -0.2% | |

* adjustment to contribution rate for 15 years from 2015

- 7.6 Overall there is an opposite impact of the proposed change in assumptions in the 2015 scheme compared to that in the existing scheme. This is a result of the different benefit provisions under the two schemes which result in differing impacts of the changes proposed to the withdrawal assumptions.



8 Death before retirement

This section sets out our recommendation for the assumed rates of death before retirement, the rationale for those assumptions and their financial impact.

Proposed assumptions for 2012 valuation

- 8.1 We recommend a single set of assumptions (separate for men and women) is used to allow for the possibility of death before retirement, ie applying equally to those members who remain in the existing scheme and those who join the new scheme. The recommended rates are the same as proposed for the 2012 valuation of the NHSPS. Assumed rates of death in service increase with age but fewer than 0.5% of members are assumed to die each year, even at the highest ages. Sample rates are provided in Appendix A.

Previous valuation assumptions

- 8.2 A single set of rates (separate for men and women) were used for the 2004 and 2008 valuations to allow for the possibility of death before retirement. The rates were the same as those adopted for the corresponding NHSPS valuations, were based on experience prior to the valuation dates, and were higher than those recommended for the 2012 valuation.

Use of the assumption

- 8.3 Death before retirement rates are used to allow for the possibility of deaths whilst in active service or whilst entitled to a deferred pension. The numbers of deaths observed annually, and the recommended rates to be assumed are low, and thus this assumption has relatively little financial significance.

Results of analysis

- 8.4 We have analysed the deaths of active members over the four-year period to 31 March 2012. The recommended assumptions for both deaths in service and in deferment are based on this analysis. In total there were 399 deaths of active members over the period. The analysis compares the numbers of actual deaths to the expected number of deaths. Further information on the data analysed and the results of that analysis are shown in Appendix F.
- 8.5 The analysis showed there were significantly fewer deaths than expected although the distribution of rates of death in service was broadly in line with the rates assumed for the 2004 and 2008 valuations in terms of the profile of the assumption. To formulate a recommended assumption we considered what adjustment to the previous rates would provide the closest comparison taking into account actual experience and also the recent experience of the NHSPS where a larger volume of data was available.



Financial impact

- 8.6 The approximate financial impact of the proposed change to assumed rates of death before retirement is set out in Table 8.1.

Table 8.1: Approximate impact on contributions (as % of payroll) of proposed change in death before retirement assumptions

| | Past service effect* | Cost of accrual in existing scheme | Cost of accrual in 2015 scheme |
|---|----------------------|------------------------------------|--------------------------------|
| Change from 2008 assumptions to those proposed for 2012 | Immaterial | Immaterial | Immaterial |

* adjustment to contribution rate for 15 years from 2015



9 Promotional pay increases

This section sets out our recommendation for the assumed promotional pay increases of active members, the rationale for those assumptions and their financial impact.

Proposed assumption

- 9.1 We recommend assuming separate scales of promotional increases for manual and other staff (separate for men and women). The increases are dependent on age and are steeper at younger ages. Sample values of the scales are provided in Appendix A.

Previous assumption

- 9.2 The assumptions used for the 2004 and 2008 valuations are the same as those recommended for the 2012 valuation although for the 2012 valuation we recommend some grouping of similar scales previously used for differing types of member in recognition that pay progression is of lesser importance for the reformed scheme. All sets of assumptions are the same as those adopted by the NHSPS for the 2004, 2008 and 2012 valuations.

Use of the assumption

- 9.3 For most members of the existing scheme benefits are linked to salary at, or near, retirement. Members' salaries can increase through a combination of annual general pay awards and promotional pay increases. To calculate an estimate of the level of benefit payable in the future requires assumptions for both these components. The assumption for general pay awards is directed by HMT. The assumption for promotional pay increases is set by the Scottish Ministers.
- 9.4 Future pay progression will be more significant (in terms of expected pension) for those members with either full or tapered protection because they will continue to have benefits linked to final pensionable pay for service beyond 31 March 2015. A significant proportion of the past service liability for active members (around 70%) relates to members with full or tapered protection and thus the impact of experience differing from the assumptions used is likely to be most material over the next couple of valuation cycles as it relates to older existing members. This experience will impact future employer contribution rates and the cost cap mechanism.

Results of analysis

- 9.5 We analysed the promotional increases implied by the current pay profile of the membership. Details of the analysis are contained in Appendix G.



- 9.6 The analysis of the pay profile of the membership as at 31 March 2012 suggested that the 2004 valuation assumed pay scales might be too steep i.e. might overstate the level of promotional pay increases. However, this was also the case for the analysis carried out for the NHSPS over the same period and for which the same assumptions were proposed for the 2008 valuation. The NHSPS data also enabled a further analysis of the annual pay increases for individual officer members between 2008 and 2012 which suggested the opposite conclusion might be reached. It was not possible to undertake this individual analysis for NHSS due to data limitations.
- 9.7 The results of any pay analysis should be treated with some caution since it is, in general, difficult to identify promotional increases separately from other elements of pay increase.
- 9.8 As there is no compelling evidence to suggest that the promotional pay increase assumptions used previously are no longer appropriate, we do not propose to make any changes to the assumptions used for both the 2004 and 2008 valuations.

Financial impact

- 9.9 Table 9.1 shows the approximate financial impact of assuming promotional increases of 0.5 % a year higher than those proposed here.

Table 9.1: Approximate impact on contributions (as % of payroll) of alternative promotional salary increase assumption

| | Past service effect* | Cost of accrual in existing scheme | Cost of accrual in 2015 scheme |
|---|----------------------|------------------------------------|--------------------------------|
| Promotional increases are 0.5% a year higher than proposed for 2012 | +1.5% | +1.4% | Not a feature of the scheme |

* adjustment to contribution rate for 15 years from 2015



10 Commutation of pension for cash at retirement

This section sets out our recommendation for the assumed level of pension commutation at retirement (where this is not specified in the HM Treasury directions), the rationale for the assumption and the financial impact.

Proposed assumptions for 2012 valuation

- 10.1 An assumption is required about the amount of pension commuted by 1995 section members to increase their automatic entitlement to retirement lump sum. The assumption for the 2008 section and 2015 scheme is specified in the HM Treasury directions. Table 10.1 shows the recommended proportion of pension that members are assumed to commute (the assumptions for the 2008 section and 2015 scheme are included for completeness).

Table 10.1: Recommended commutation assumptions for the 2012 valuation

| 1995 section | 2008 section (directed) | 2015 scheme (directed) |
|--------------|-------------------------|------------------------|
| 8.5% | 15% | 15% |

- 10.2 The recommended assumption for the 1995 section is equivalent to assuming members take a total lump sum of 75% of the HMRC maximum permitted lump sum.

Previous valuation assumptions

- 10.3 Table 10.2 summarises the assumed proportions of pension commuted for cash as adopted for the 2004 valuation and proposed for the 2008 valuation.

Table 10.2: Commutation assumptions for the previous valuations

| | 1995 section | 2008 section |
|--------------------------------|--------------|--------------|
| 2004 and 2008 valuation | 9.8% | 27.8% |

- 10.4 This is equivalent to assuming members take a lump sum of 78% of the HMRC maximum permitted lump sum (equivalent to assuming 50% take the HMRC maximum and 50% take the automatic lump sum in the 1995 section (equal to $3N/80$ of pay where N is reckonable scheme service)).



Use of the assumption

10.5 Members may commute part of their pension for a lump sum at a rate of £12 for each £1 of annual pension given up. The assumption is important because the value of the pension given up, as assessed using the actuarial assumptions underlying the valuation is, on average, more than £12 and so commutation has a significant impact on total liabilities, contribution rates and the cost cap. Differences between assumed and actual experience in the 2015 scheme will feed through into the cost cap fund but experience in the 1995 and 2008 sections of the existing scheme will not.

Results of analysis

10.6 We were unable to analyse commutation experience owing to data limitations. Since the previously set valuation assumptions for commutation have been aligned to those set for the NHSPS we recommend that the assumption for the 2012 valuation should remain similarly aligned. The assumptions proposed for the NHSPS are based on experience over the five-year period ending 31 March 2013. Further details are contained in Appendix H.

Financial impact

10.7 The approximate financial impact of the proposed change to the commutation assumption for the 1995 section compared to that proposed in 2008 is set out in Table 10.3.

Table 10.3: Approximate impact on contributions (as % of payroll) of proposed change in commutation assumption

| | Past service effect* | Cost of accrual in existing scheme | Cost of accrual in 2015 scheme |
|---|----------------------|------------------------------------|--------------------------------|
| Change from 2008 assumptions to those proposed for 2012 | +0.1% | +0.1% | n/a |

* adjustment to contribution rate for 15 years from 2015



11 Family statistics

This section sets out our recommendation for the assumptions around dependants' pensions, the rationale for those assumptions and their financial impact.

Proposed assumptions for 2012 valuation

- 11.1 We recommend the following assumptions. These are the same as those proposed for the 2012 valuation of the NHSPS.
- > 72% of men and 52% of women are assumed to be married at death at age 60
 - > 76% of men and 54% of women are assumed to be partnered at death at age 60
 - > Male members are assumed to be three years older than their partners and female members are assumed to be three younger than their partners
 - > No allowance is made for remarriage on the grounds of materiality.

Previous valuation assumptions

- 11.2 A similar set of assumptions was assumed for the 2004 valuation, and no changes to these were proposed for the 2008 valuation. The assumed proportions married/partnered proposed for the 2012 valuation are considerably lower than adopted for the 2004 valuation or proposed for the 2008 valuation, particularly for older members and partners.
- 11.3 An age related age difference between members and dependants was assumed for the 2004 and 2008 valuations. A small allowance was made for remarriage in the 2004 valuation and 2008 valuations.
- 11.4 All family statistic assumptions adopted for the 2004 and 2008 valuations were the same as those adopted for the NHSPS.

Use of the assumption

- 11.5 Dependants' pensions¹³ are provided on the death of a member. The scheme's benefit provisions for dependants differ according to when the member's service ended. For members who left service before 1 April 2008 only legal spouses and civil partners are eligible for a survivor's pension. For members in service on or after 1 April 2008, survivors pensions are payable to a qualifying partner¹⁴.

¹³ Pensions are also payable to dependent children on a member's death but the costs are not material overall.

¹⁴ Qualifying partners includes legal spouse, civil partner and 'surviving nominated partner'. To satisfy the latter definition requires a valid nomination, a 2-year exclusive relationship between parties able to legally marry or enter a civil partnership, and financial interdependency.



- 11.6 Where the member has no service on or after 1 April 2008, the spouse's pension will cease if the spouse remarries.

Results of analysis

- 11.7 We were unable to analyse proportions married/partnered owing to data limitations. We recommend that the assumption for the 2012 valuation should remain aligned to those proposed for the 2012 valuation of the NHSPS. The assumptions proposed for the NHSPS are based on experience over the four-year period ending 31 March 2012. Further information on the analysis are contained in Appendix I.
- 11.8 We were also unable to carry out any analysis on the age differences between members and their dependants or remarriage experience as no data was available. However, we do not expect these assumptions to have a material effect on the valuation. In line with the approach taken for the 2012 valuation of the NHSPS we recommend that general population statistics are used to set the age difference assumption and that remarriage is ignored on the basis the impact is expected to be immaterial.

Financial impact

- 11.9 The approximate financial impact of the proposed change to the family statistics assumptions compared to those proposed for the 2008 valuation is set out in Table 11.1.

Table 11.1: Approximate impact on contributions (as % of payroll) of proposed changes in family statistics assumptions

| | Past service effect* | Cost of accrual in existing scheme | Cost of accrual in 2015 scheme |
|--|----------------------|------------------------------------|--------------------------------|
| Change in proportion married/partnered | -0.5% | -0.3% | -0.3% |
| Change in age differences | Immaterial | Immaterial | Immaterial |
| No allowance for remarriage | Immaterial | Not a feature of the scheme | Not a feature of the scheme |

* adjustment to contribution rate for 15 years from 2015



12 New entrants

This section sets out our recommendation for the profile of new entrants assumed to join active service over the period to the end of the implementation period. It also gives the rationale for the recommendation and explains the financial impact.

Proposed assumptions for 2012 valuation

- 12.1 We recommend that new entrants are assumed to join the active membership of the Scheme to replace those leaving service in line with the other assumptions made. We recommend that the profile of the new entrants should be such that the overall profile of the membership, in terms of distribution of headcount and pay by age and gender, remains stable over the period to the end of the implementation period (to 31 March 2019). The key characteristics of the assumed new entrant distribution are provided in Appendix A.

Previous valuation assumptions

- 12.2 A similar new entrant distribution was assumed for the previous valuation. The framework for the previous valuation was significantly different to that under which the current valuation is being carried out. A function of the change in framework is that the impact of the assumptions around the new entrant distribution are different. For the current valuation the new entrant distribution affects only the costs of accrual determined for periods after the valuation date. At the previous valuation the new entrant distribution also affected the past service position.

Use of the assumption

- 12.3 The active membership at the valuation date is assumed to reduce over time in line with the assumed rates of retirement, death and voluntary withdrawal. To determine the costs of benefit accrual over future periods as required by the valuation directions requires some assumption to be made about the future membership of the Scheme. Either an assumption can be made about the overall profile of the membership, in which case the profile of new entrants is 'implicit' in that it is that necessary to maintain the overall profile. Alternatively an explicit assumption can be made for new entrants. In either case the new entrant population over relevant future periods is taken into account when calculating the cost of benefit accruing over those periods. As outlined in paragraph 12.1 we recommend assumptions for new entrants which result in an overall stable profile of the membership. In practice this approach results in a similar profile of new entrants to that which would be set based on the profile of recent joiners.

Results of analysis

- 12.4 We have analysed the pattern of new joiners to active membership over the four-year period to 31 March 2012 and compared this to the pattern expected based on the assumptions made at the previous valuation.



12.5 Further information on the data analysed and the results of that analysis are shown in Appendix J.

Financial impact

12.6 The approximate financial impact of assuming a different assumption for new entrants to that proposed for the valuation is set out in Table 12.1.

Table 12.1: Approximate impact on contributions (as % of payroll) of adopting different new entrant assumption

| | Past service effect* | Cost of accrual in existing scheme | Cost of accrual in 2015 scheme |
|--|----------------------|------------------------------------|--------------------------------|
| Impact of assuming new entrants are 2 years older on average than proposed | Nil | 0.2% | 0.2% |
| Estimated combined impact on cost of accrual 2015 - 2019 = immaterial | | | |

* adjustment to contribution rate for 15 years from 2015



Appendix A: Details of assumptions

A.1 This appendix contains details of the recommended assumptions including sample rates and values.

Pensioner mortality

Table A1: Baseline mortality assumptions

| Baseline mortality | Standard table ^{15,16} | Adjustment |
|-------------------------------|---------------------------------|------------|
| Males | | |
| Retirements in normal health | S1NMA | 92.5% |
| Current ill-health pensioners | S1IMA | 92.5% |
| Future ill-health pensioners | S1IMA | 100% |
| Dependants | S1NMA | 92.5% |
| Females | | |
| Retirements in normal health | S1NFA | 97.5% |
| Current ill-health pensioners | S1IFA | 97.5% |
| Future ill-health pensioners | S1IFA | 100% |
| Dependants | S1NFA | 97.5% |

A.2 As specified by HM Treasury, future improvements in mortality will be assumed to be in line with those underlying the ONS 2012-based population projections.

¹⁵ From the 'S1' series of standard tables published by the CMI and based on the experience of self-administered pension schemes over the period 2000 to 2006. Separate tables are available based on experience of members retiring in normal and ill-health and for dependants.

¹⁶ Adjusted to take account of improvements in population mortality between 2002 (the base year for the tables) and the date the future improvements are applied from.



Age retirement from service

Table A2: Age retirement rates for members remaining in the existing schemes after 31 March 2015

| MEN | 1995 section | | | | | 2008 section | | | |
|-----|--------------|------------|--------|------|----------------------|--------------|------------|--------|--------------|
| | Age | Non-manual | Manual | MHO | Special Class Nurses | Practitioner | Non-Manual | Manual | Practitioner |
| | 50 | 0.01 | 0.01 | 0.02 | 0.01 | 0 | 0 | 0 | 0 |
| | 51 | 0.01 | 0.01 | 0.02 | 0.01 | 0 | 0 | 0 | 0 |
| | 52 | 0.01 | 0.01 | 0.03 | 0.01 | 0 | 0 | 0 | 0 |
| | 53 | 0.01 | 0.01 | 0.02 | 0.02 | 0 | 0 | 0 | 0 |
| | 54 | 0.02 | 0.02 | 0.19 | 0.09 | 0.01 | 0 | 0 | 0 |
| | 55 | 0.03 | 0.03 | 0.44 | 0.16 | 0.03 | 0.02 | 0.02 | 0.02 |
| | 56 | 0.03 | 0.03 | 0.22 | 0.09 | 0.03 | 0.02 | 0.02 | 0.02 |
| | 57 | 0.04 | 0.03 | 0.20 | 0.09 | 0.06 | 0.02 | 0.02 | 0.02 |
| | 58 | 0.05 | 0.04 | 0.22 | 0.11 | 0.10 | 0.02 | 0.02 | 0.02 |
| | 59 | 0.12 | 0.09 | 0.24 | 0.21 | 0.29 | 0.03 | 0.03 | 0.03 |
| | 60 | 0.24 | 0.17 | 0.33 | 0.35 | 0.64 | 0.04 | 0.04 | 0.04 |
| | 61 | 0.17 | 0.12 | 0.26 | 0.23 | 0.36 | 0.05 | 0.05 | 0.05 |
| | 62 | 0.20 | 0.14 | 0.27 | 0.23 | 0.35 | 0.06 | 0.06 | 0.06 |
| | 63 | 0.21 | 0.16 | 0.24 | 0.30 | 0.28 | 0.07 | 0.07 | 0.07 |
| | 64 | 0.42 | 0.47 | 0.56 | 0.53 | 0.37 | 0.08 | 0.08 | 0.08 |
| | 65 | 0.83 | 0.98 | 1 | 1 | 0.61 | 0.94 | 0.90 | 0.87 |
| | 66 | 0.47 | 0.44 | | | 0.45 | 0.55 | 0.70 | 0.32 |
| | 67 | 0.46 | 0.36 | | | 0.40 | 0.50 | 0.55 | 0.32 |
| | 68 | 0.30 | 0.37 | | | 0.42 | 0.50 | 0.50 | 0.32 |
| | 69 | 0.43 | 0.38 | | | 0.34 | 0.55 | 0.40 | 0.32 |
| | 70 | 1 | 1 | | | 1 | 1 | 1 | 1 |



| Age | 1995 section | | | | | 2008 section | | |
|-----|--------------|--------|------|----------------------|--------------|--------------|--------|--------------|
| | Non-manual | Manual | MHO | Special Class Nurses | Practitioner | Non-manual | Manual | Practitioner |
| 50 | 0 | 0 | 0.03 | 0.01 | 0 | 0 | 0 | 0 |
| 51 | 0.01 | 0.01 | 0.02 | 0.01 | 0 | 0 | 0 | 0 |
| 52 | 0.01 | 0.01 | 0.02 | 0.01 | 0 | 0 | 0 | 0 |
| 53 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0 | 0 | 0 |
| 54 | 0.01 | 0.01 | 0.14 | 0.10 | 0.01 | 0 | 0 | 0 |
| 55 | 0.02 | 0.01 | 0.30 | 0.21 | 0.02 | 0.02 | 0.02 | 0.02 |
| 56 | 0.02 | 0.02 | 0.16 | 0.12 | 0.03 | 0.02 | 0.02 | 0.02 |
| 57 | 0.03 | 0.02 | 0.16 | 0.12 | 0.05 | 0.02 | 0.02 | 0.02 |
| 58 | 0.04 | 0.03 | 0.15 | 0.14 | 0.08 | 0.02 | 0.02 | 0.02 |
| 59 | 0.15 | 0.15 | 0.23 | 0.26 | 0.28 | 0.03 | 0.03 | 0.03 |
| 60 | 0.36 | 0.38 | 0.46 | 0.50 | 0.59 | 0.04 | 0.04 | 0.04 |
| 61 | 0.21 | 0.19 | 0.26 | 0.30 | 0.27 | 0.05 | 0.05 | 0.05 |
| 62 | 0.24 | 0.20 | 0.27 | 0.32 | 0.27 | 0.06 | 0.06 | 0.06 |
| 63 | 0.25 | 0.22 | 0.28 | 0.33 | 0.39 | 0.07 | 0.07 | 0.07 |
| 64 | 0.37 | 0.35 | 0.59 | 0.63 | 0.34 | 0.08 | 0.08 | 0.08 |
| 65 | 0.64 | 0.67 | 1 | 1 | 0.46 | 0.92 | 0.94 | 0.87 |
| 66 | 0.40 | 0.35 | 1 | 1 | 0.39 | 0.45 | 0.50 | 0.40 |
| 67 | 0.41 | 0.31 | 1 | 1 | 0.23 | 0.40 | 0.50 | 0.40 |
| 68 | 0.37 | 0.40 | 1 | 1 | 0.5 | 0.35 | 0.50 | 0.40 |
| 69 | 0.42 | 0.42 | 1 | 1 | 0.35 | 0.35 | 0.50 | 0.40 |
| 70 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |



Table A3: Age retirement rates for members joining the 2015 scheme on or after 1 April 2015

| | <i>All members (and applicable to all service)</i> |
|-----------------------|--|
| NPA* | 1 |
| NPA-1 | 0.08 |
| NPA-2 | 0.07 |
| NPA-3 | 0.06 |
| NPA-4 | 0.05 |
| NPA-5 | 0.04 |
| NPA-6 | 0.03 |
| NPA-7 | 0.02 |
| NPA-8 | 0.02 |
| NPA-9 | 0.02 |
| NPA-10 | 0.02 |
| NPA-11} | 0.01 |
| NPA-12} to min age 55 | 0.01 |
| NPA-13} | 0.01 |

* NPA in 2015 scheme in all cases

A.3 Retirements are assumed to occur on a member's birthday

Ill-health retirement from service

Table A4: Ill-health retirement rates for all members

| Age* | Males | Females |
|-------------|--------------|----------------|
| 20 | .0001 | .0001 |
| 30 | .0002 | .0002 |
| 40 | .0006 | .0005 |
| 50 | .002 | .001 |
| 55 | .004 | .003 |
| 60 | .005 | .006 |
| 62 | .006 | .007 |
| 64 | .006 | .008 |
| 66 | .007 | .009 |
| 68 | 0 | 0 |

*rates are zero if above the NPA of the relevant section

A.4 75% of ill health retirements are assumed to qualify for higher tier awards.



Voluntary withdrawal from service

A.5 No net withdrawals are assumed for practitioner or special class members in the 1995 section.

Table A5: Withdrawal rates (net of re-entry within 5 years) of all other members

| Age | Duration of service | | | |
|------|---------------------|-----------|-----------|----------|
| | 0-1 year | 1-2 years | 2-3 years | >3 years |
| < 20 | 0.30 | 0.20 | 0.20 | 0.20 |
| 25 | 0.20 | 0.15 | 0.08 | 0.06 |
| 30 | 0.10 | 0.09 | 0.05 | 0.04 |
| 35 | 0.10 | 0.06 | 0.05 | 0.04 |
| 40 | 0.10 | 0.06 | 0.05 | 0.03 |
| 45 | 0.10 | 0.06 | 0.05 | 0.03 |
| 50+ | 0.10 | 0.06 | 0.05 | 0.03 |

Commutation of pension for cash at retirement

Table A6: Proportion of pension assumed commuted for cash

| | 1995 section | 2008 section* | 2015 scheme* |
|--------------------------|--------------|---------------|--------------|
| Males and females | 8.5% | 15% | 15% |

* As specified in Direction 18(e).

Death before retirement

Table A7: Death in service rates for all members

| Age | Males | Females |
|-----|--------|---------|
| 20 | 0.0002 | 0.0002 |
| 25 | 0.0002 | 0.0002 |
| 30 | 0.0003 | 0.0002 |
| 35 | 0.0005 | 0.0003 |
| 40 | 0.0006 | 0.0004 |
| 45 | 0.0009 | 0.0006 |
| 50 | 0.0013 | 0.0008 |
| 55 | 0.0020 | 0.0013 |
| 60 | 0.0031 | 0.0019 |
| 65 | 0.0050 | 0.0028 |



Promotional pay increases

Table A8: Promotional salary scales for members

| Age | Non-manual Officers and Practitioners | | Manual Officers | |
|-----|---------------------------------------|--------------|-----------------|--------------|
| | Males | Females | Males | Females |
| | Index value* | Index value* | Index value* | Index value* |
| 20 | 73 | 77 | 83 | 83 |
| 25 | 100 | 100 | 100 | 100 |
| 30 | 132 | 125 | 120 | 120 |
| 35 | 165 | 140 | 136 | 132 |
| 40 | 195 | 151 | 146 | 140 |
| 45 | 215 | 157 | 155 | 144 |
| 50 | 229 | 162 | 161 | 147 |
| 55 | 236 | 166 | 165 | 148 |
| 60 | 242 | 169 | 165 | 148 |
| 65 | 242 | 169 | 165 | 148 |

* Relative to an index value of 100 at age 25.

Family statistics

Table A9: Recommended proportion married or partnered at death

| Age | Members leaving service before 31 March 2008 | | Members in service on or after 31 March 2008 | |
|-----|--|---------|--|---------|
| | Males | Females | Males | Females |
| 50 | 72% | 52% | 76% | 54% |
| 60 | 72% | 52% | 76% | 54% |
| 70 | 72% | 45% | 74% | 46% |
| 80 | 60% | 22% | 61% | 23% |
| 90 | 34% | 7% | 34% | 7% |

A.6 Male members are assumed to be three years older than their partners and female members are assumed to be three years younger than their partners.

New entrants

A.7 A distribution of new entrants to the scheme is assumed over relevant periods such as to maintain a stable profile of the overall active membership in terms of age, gender and pay. The average age and average pay of new entrants is 34 years and around £24,000 in real terms respectively.

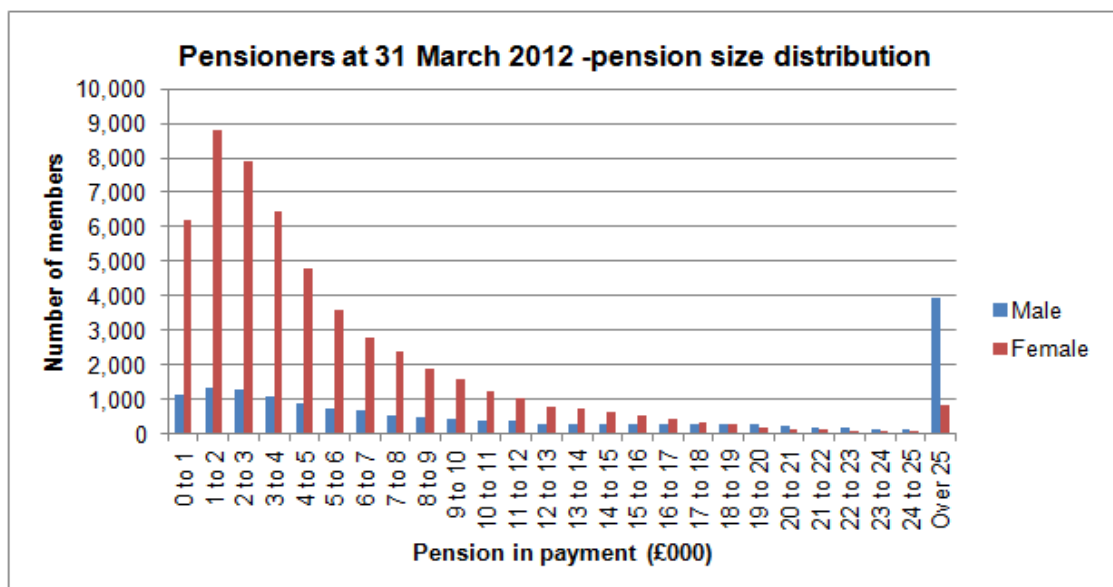


Appendix B: Analysis of pensioner mortality

Type of analysis

- B.1 Provided adequate data is available, mortality can be analysed on either a 'lives' basis or an 'amounts' basis. A lives basis gives an equal weighting to every member of the population being analysed. An amounts basis weights the experience by the size of each member's pension. There is much evidence¹⁷ to demonstrate that size of pension is positively correlated to longevity i.e. those with bigger pensions live longer on average. Thus for a population with a significant variation in the amounts of pension being paid, such as the NHSS (see Chart B1), an 'amounts' mortality analysis is generally expected to show lower rates of mortality than a corresponding 'lives' analysis.

Chart B1: Distribution of pensioners by pension size at 31 March 2012



Limitations on analysis

- B.2 We were not able to undertake a robust pensioner mortality analysis based on the data supplied. This was mainly because pensioner data has historically been stored on two systems and the required extracts could only be produced from one of those systems (containing 87% of the data). Analysis of the data provided suggested that it was not representative of the full population and thus we concluded a reliable mortality analysis was not possible for the four-year period ending 31 March 2012.

¹⁷ For example see CMI self-administered Pension Schemes Mortality Committee, Working Paper 65: *Analysis of the mortality experience of pensioners of self-administered pension schemes for the period 2004 to 2011, April 2013*



Approach to setting the assumption

- B.3 In the absence of a scheme specific mortality analysis we considered other evidence which may be relevant to setting the mortality assumption. The evidence considered was the mortality analysis of the NHSPS in England and Wales¹⁸ undertaken for the purposes of the 2012 valuation of that scheme together with an analysis of aggregate population mortality rates for Scotland and for England and Wales.
- B.4 The analysis undertaken for the NHSPS resulted in the proposed assumptions set out in Table B1. These assumptions were derived from an 'amounts' analysis of experience over the four-year period ending 31 March 2012. The assumptions were set by reference to standard mortality tables¹⁹ and by considering the adjustments needed to those standard tables to achieve a 'best fit' with the experience over the key age ranges for the various types of deaths

Table B1: Adjustments to standard tables to provide best fit for the NHSPS

| Description | Standard table | Adjustment |
|---------------------------|----------------|------------|
| Non-IH retirement Males | S1NMA | 80% |
| IH retirement Males | | |
| • Current | S1IMA | 80% |
| • Future | S1IMA | 100% |
| Dependant Males | S1NMA | 80% |
| Non-IH retirement Females | S1NFA | 85% |
| IH retirement Females | | |
| • Current | S1IFA | 85% |
| • Future | S1IFA | 100% |
| Dependant Females | S1NFA | 85% |

- B.5 We also compared an analysis of aggregate population mortality rates for Scotland and for England and Wales taken from the 2008-10 Interim Life tables²⁰.

¹⁸ See NHS Pension Scheme actuarial valuation as at 31 March 2012:Advice on assumptions dated 9 June 2014 <https://www.gov.uk/government/publications/nhs-pension-scheme-actuarial-valuation>

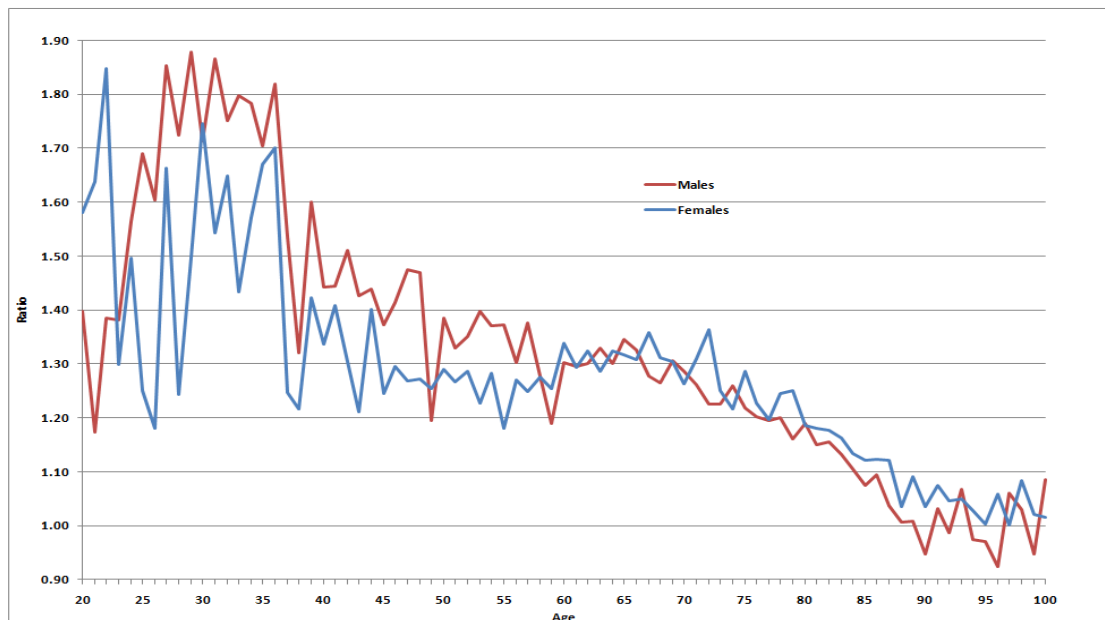
¹⁹ Adjusted to those applicable to the period the deaths occurred by applying adjustments broadly in line with the improvements applying to the UK population over the relevant period.

²⁰ The mortality rates are calculated based on data for three consecutive calendar years 2008 to 2010 and are not graduated. The life table for England and Wales is based on historical population estimates which have been revised following the 2011 census, whereas the life table for Scotland is based on 2001 census figures rolled forward.



- B.6 Chart B2 shows the ratio of Scottish mortality rates to those for England and Wales for ages 20 to 100. The ratios are generally higher for males than for females for ages up to the late 50s and are generally higher for females than males for ages from the late 60s onwards. Looking at ages 60 and older, mortality rates for Scotland are generally around 30% higher for ages 60 to 70; the ratio then declines in a relatively linear fashion until around age 90 after which mortality rates in Scotland are broadly similar to those in England and Wales for males and a little higher for females. This suggests that the geographical effects between Scotland and England and Wales decrease with age, perhaps as the frailer members of the population die earlier.

Chart B2: Ratio of Scottish mortality rates to England and Wales rates from 2008-10 Interim Life tables



- B.7 It can be argued that the differentials in NHS pensioner mortality rates would not be as wide as those for the population as a whole, particularly at the younger pensioner ages, given that the NHS Scotland and England and Wales both cover employed people in the same type of work and with similar pension amounts. This would mean that any differentials in aggregate mortality due to different proportions of the population being in ill-health, not being employed, being in different types of work, earning different salaries or with different educational attainment are largely removed, leaving only more environmental and lifestyle factors such as weather, diet etc. Ignoring the higher differentials at the lower ages of retirement might suggest an average differential of between 1.10 – 1.15 over the age range 70 to 90. Based on this evidence, and in light of similar discussions for the Scottish Teachers Superannuation Scheme where there were similar difficulties in setting a scheme specific mortality basis, Scottish Ministers have indicated that the valuation should assume mortality rates for NHS Scotland members will be 112.5% of the rates assumed for NHS England and Wales members. We confirm that this is consistent with a best estimate assumption based on the available data. The set of adjustments to the standard tables are set out in Table B2.



Table B2: Adjustments to standard tables recommended for NHSS

| Description | Standard table | Adjustment |
|---------------------------|----------------|------------|
| Non-IH retirement Males | S1NMA | 92.5% |
| IH retirement Males | | |
| • Current | S1IMA | 92.5% |
| • Future* | S1IMA | 100% |
| Dependant Males | S1NMA | 92.5% |
| Non-IH retirement Females | S1NFA | 97.5% |
| IH retirement Females | | |
| • Current | S1IFA | 97.5% |
| • Future* | S1IFA | 100% |
| Dependant Females | S1NFA | 97.5% |

* as for NHSPS the assumption for future ill health retirements has been set in line with the S1IA²¹ tables unadjusted. This may be justified on the grounds that the ill-health criteria in public and private sector pension schemes are now likely to be broadly similar, with ill-health mortality being driven primarily by the illness rather than the type of work undertaken. The relatively low level of ill-health retirement means that the choice of assumption is not particularly material.

B.8 Table B3 sets out the future life expectancies based on the recommended assumptions.

Table B3: Future life expectancy²² based on recommended 2012 assumptions

| | 2004 valuation | 2008 valuation | 2012 valuation |
|---|----------------|----------------|----------------|
| Current pensioners | | | |
| Male aged 60 | 24.3 | 27.8 | 28.8 |
| Male aged 65 | 19.4 | 23.0 | 23.8 |
| Female aged 60 | 27.4 | 30.3 | 30.8 |
| Female aged 65 | 22.5 | 25.4 | 25.9 |
| Future pensioners – current age 45 | | | |
| Male life expectancy from age 60 | 25.4 | 29.3 | 30.5 |
| Male life expectancy from age 65 | 20.8 | 25.0 | 26.1 |
| Female life expectancy from age 60 | 28.4 | 31.9 | 32.5 |
| Female life expectancy from age 65 | 23.8 | 27.4 | 28.0 |

²¹ Based on the ill-health experience of certain private sector pension schemes

²² Cohort life expectancy, with future improvements in line with the ONS published 2012-based UK population projections



Appendix C: Analysis of age retirement from service

Process for setting assumptions

C.1 A reasonable process is:

- > Set assumptions for the group expecting to receive benefits wholly or mainly from the existing scheme (ie those with full protection or continuing in the existing scheme after 31 March 2015 under the taper arrangements) by reference to the recent retirement experience in the Scheme.
- > Set assumptions for new entrants to the 2015 scheme and those expecting to receive benefits mainly from the 2015 scheme (ie those transferring to the new scheme on 1 April 2015) by considering any relevant evidence. This is not a simple task because the majority of the available NHSS experience relates to NPA 60 or 55 rather than State Pension Age which will determine NPA in the 2015 scheme.

Members expecting to receive benefits wholly or mainly from the existing scheme

- C.2 To set age retirement assumptions for the groups of members expecting to receive benefits wholly or mainly from the existing scheme we considered the recent retirement experience from the scheme.
- C.3 There were some 9,000 age retirements over the four-year period to 31 March 2012 compared to an expected 8,640 retirements based on the 2004 valuation assumptions (no changes to these assumptions were proposed for the 2008 valuation).
- C.4 Charts C1 and C2 show the actual number of age retirements from the scheme at each age compared with those expected based on the numbers in service each year and the 2004 valuation assumptions. The below includes all age retirements including those subject to actuarial reduction (or otherwise owing to redundancy). Previous valuation assumptions provide for such retirements to occur at NPA.

Chart C1: comparison of expected and actual age retirements – Males

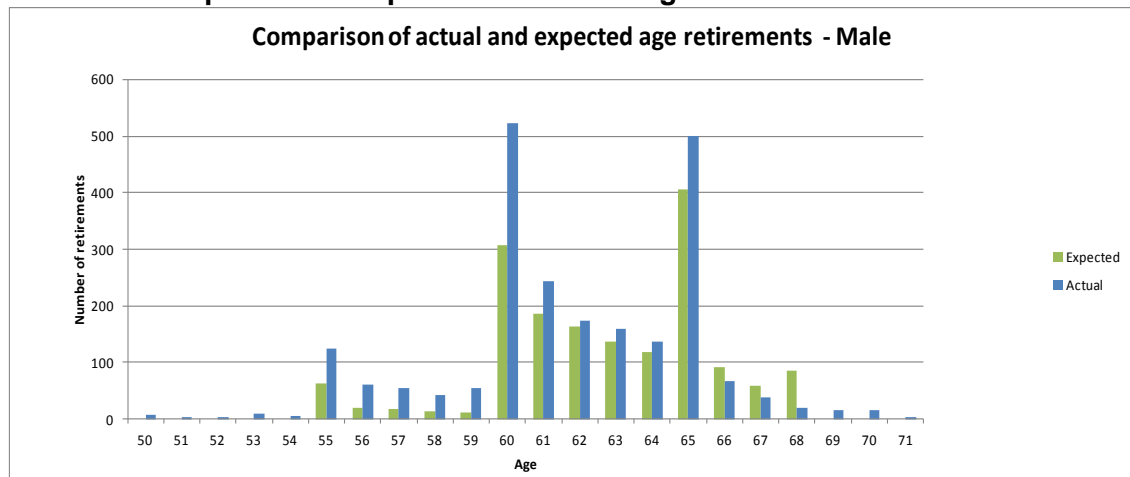
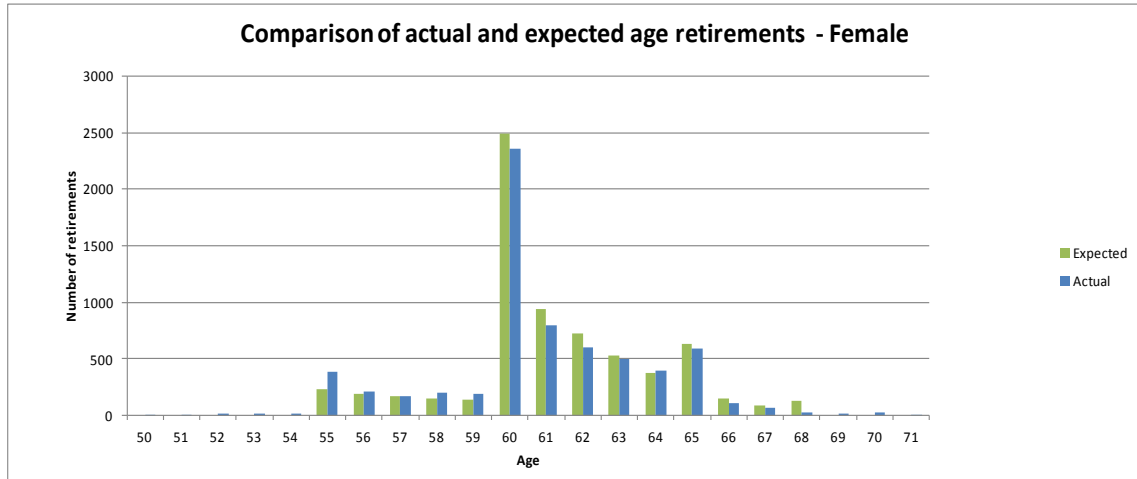




Chart C2: comparison of expected and actual age retirements – Females



C.5 The data provided did not enable a separate analysis to be undertaken of the experience of members of the 1995 section and 2008 section, nor separate analysis of the special class members (with NPA 55) of the 1995 section.

C.6 Given the limitations on the analysis which could be undertaken we compared the distribution of actual retirements from the scheme with the distribution of retirements in the NHSPS²³. The patterns observed were very similar; the average age of age retirements in the two schemes over the four-year period ending 31 March 2012 were as shown in Table C1.

Table C1: Comparison of average age at retirement of members retiring in normal health

| Retirements from NHSSS | Retirements from NHSPS |
|------------------------|------------------------|
| 61.0 | 60.7 |

C.7 As shown in Chart C1, over the four-year period ending 31 March 2012 there were significantly more earlier retirements than expected under the 2004 assumptions for men. This pattern is believed to be a result of the introduction of tiered member contributions and tax changes. These effects are more likely to affect higher earners who are predominantly male.

²³ See NHS Pension Scheme actuarial valuation as at 31 March 2012: Advice on assumptions dated 9 June 2014 <http://www.nhsbsa.nhs.uk/Pensions/806.aspx>



- C.8 Since the factors outlined above may be expected to continue to influence behaviours for the population of the membership which the assumptions will have most material impact for (those members within protection/tapering and expected to retire over the next couple of valuation cycles) we recommend that for the 2012 valuation members are assumed to retire in line with recent experience, with the rates being set equal to those observed in the NHSPS in England and Wales between 2008 and 2012.

Members expecting to receive benefits wholly or mainly from the 2015 scheme

- C.9 In the absence of directly relevant experience, a pragmatic approach to setting this assumption is required. There are a number of ways that this assumption could be set and no approach is clearly better than all others. Our recommended approach is to assume that members will retire before their 2015 scheme NPA in line with recent experience of early retirement in the 1995 section of the NHSPS (i.e. experience relative to the current NPA being translated to be relative to members' NPA in the 2015 scheme).



Appendix D: Analysis of ill-health retirement from service

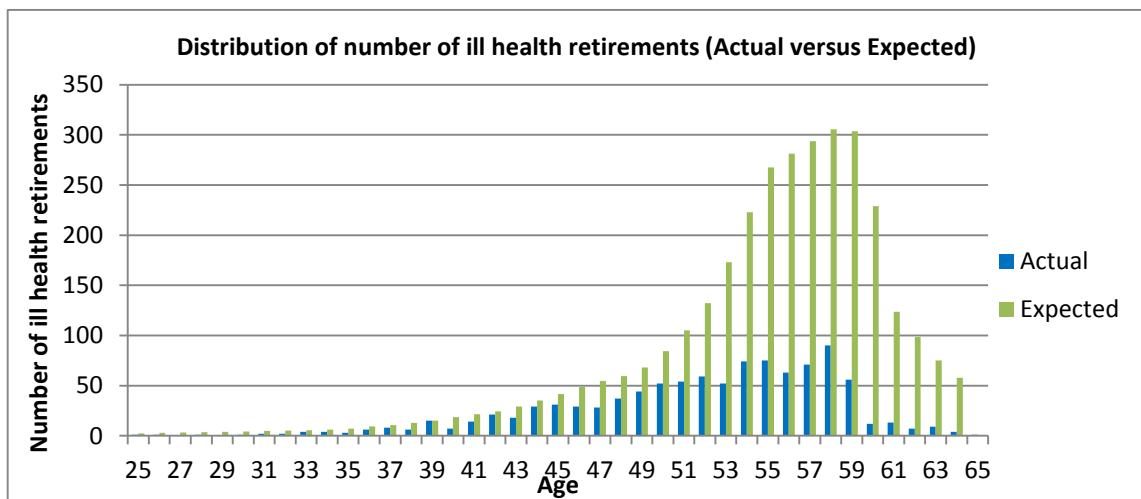
- D.1 There were some 1,000 ill health retirements over the four-year period to 31 March 2012 compared to an expected 3,250 retirements based on the 2004 assumptions.
- D.2 Table D1 summarises the comparison of expected and actual ill-health retirements. Our analysis considers the experience of the scheme as a whole since the data did not enable analysis by scheme section.

Table D1: Number of ill-health retirements

| Male members | | | Female members | | | Whole scheme | | |
|--------------|----------|-----------------|----------------|----------|-----------------|--------------|----------|-----------------|
| Actual | Expected | Actual/Expected | Actual | Expected | Actual/Expected | Actual | Expected | Actual/Expected |
| 232 | 821 | 28% | 755 | 2,433 | 31% | 987 | 3,254 | 30% |

- D.3 Chart D1 shows the distribution of ill-health retirements, as shown in Table D1, by age.

Chart D1: Whole scheme – ill-health retirements by age



- D.4 The above shows that the number of ill-health retirements has been considerably lower at all ages than assumed for the purposes of the 2004 valuation. On average rates have been around 30% of those assumed. This is consistent with the conclusions reached based on the 2004 to 2008 experience which resulted in a recommendation that the assumed number of ill-health retirements should be reduced to 50% of the 2004 rates for the uncompleted 2008 valuation.
- D.5 Since ill-health rates are now low some simplification of the assumptions may be made. We recommend that rates are set equal to those proposed for the 2012 valuation of the NHSPS, with a single set of assumptions for all members (separate for men and women). Charts D2 to D4 show a comparison of actual, expected rates (based on the 2004 assumptions), and proposed rates of ill health retirement for males and females separately and combined.



Chart D2: Ill-health retirement rates - males

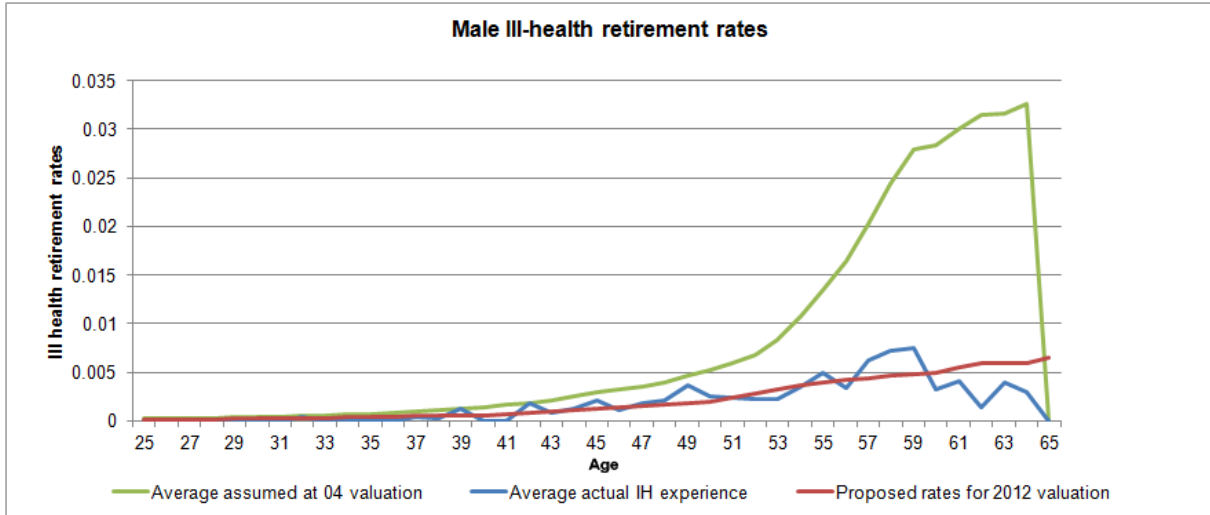


Chart D3: Ill-health retirement rates - females

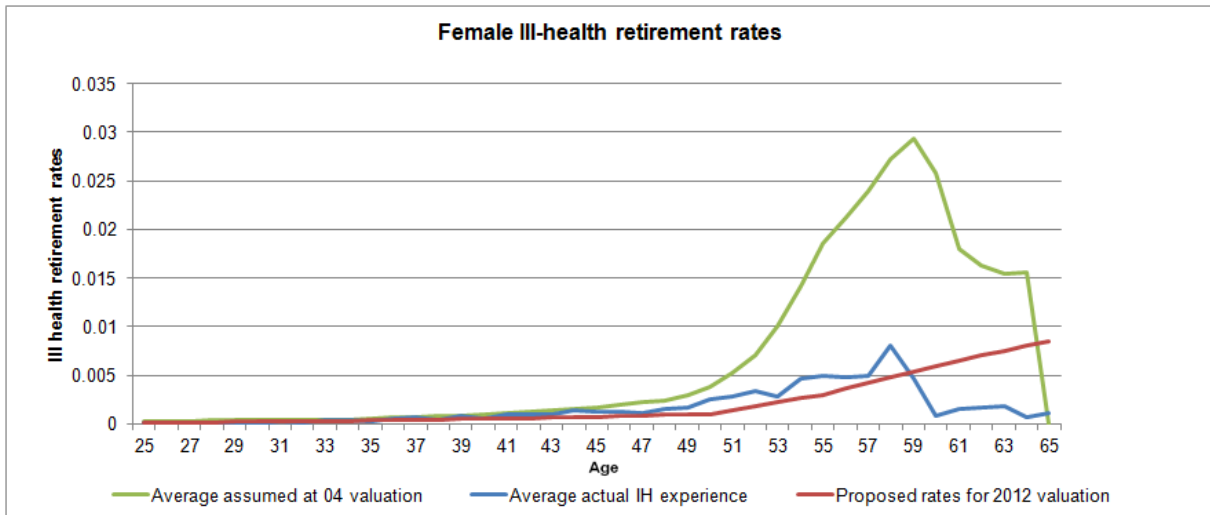
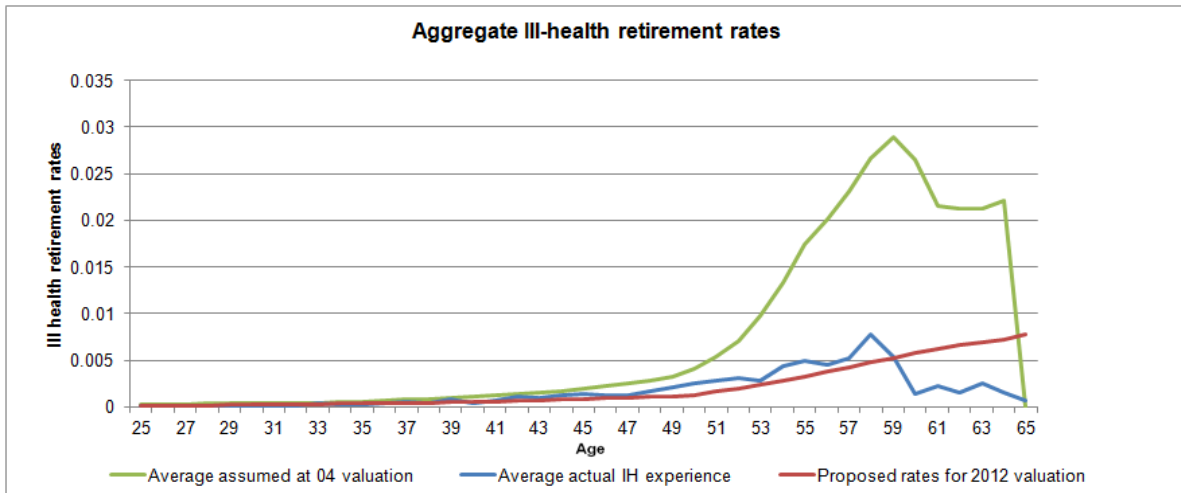


Chart D4: Ill-health retirement rates - all members





Proportion of upper tier ill-health benefit awards

- D.6 Data was provided for the four-year period ending 31 March 2012 to enable analysis of the recent experience of Tier 1 (lower tier) and Tier 2 (upper tier) retirements. The proportions of cases granted Tier 1 or Tier 2 benefits are shown in Table D2.

Table D2: Proportion of new ill-health pension awarded in year

| | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2008-2012 |
|--------|---------|---------|---------|---------|-----------|
| Tier 2 | 1% | 30% | 61% | 57% | 59% |
| Tier 1 | 99% | 70% | 39% | 43% | 41% |
| Total | 100% | 100% | 100% | 100% | 100% |

- D.7 The above shows that the proportions of members awarded Tier1/Tier 2 benefits over the four-year period were 41%/59%.
- D.8 From the above it can be seen that there were far fewer Tier 2 retirements in 2008/9 and 2009/10. Given that the ill health terms changed in April 2008 it is likely that the data for these years includes awards made under the old terms and so may not provide a true reflection of the long term expectations.
- D.9 The data for 2010 to 2012 may provide a better representation of the possible long term experience of ill health retirements. This experience suggests that 60% of members who retire on ill health grounds are initially awarded Tier 2 benefits. This experience is very similar to that observed in the NHSPS. The assumption for upper tier awards proposed for the 2012 valuation of the NHSPS was higher than this (75%) to incorporate an allowance for 'Tier 1 – with review' cases, i.e. those initially awarded a Tier 1 benefit but potentially later qualifying for a Tier 2 award. On this basis it was proposed that the assumed Tier 1/Tier 2 split of 25%/75% was retained for NHSPS for the purposes of the 2012 valuation. We recommend that similarly that this assumption is retained for the 2012 valuation of the NHSSS.



Appendix E: Analysis of voluntary withdrawal from service

- E.1 For the 2004 valuation, the assumed probabilities of withdrawal varied by both age and length of membership (with an age and service related rate for each of the first five years and just an age related rate thereafter). Separate rates were set for most valuation groups. In all cases the withdrawal assumptions were 'net' rates, i.e. they were intended to reflect the total number of leavers less the total number of re-joiners to the scheme. The actual rates set were the same as those adopted for the 2004 valuation of the NHSPS (with some adjustment to allow for slightly different categorisation between valuation groups).
- E.2 Owing to data limitations, for the 2008 valuation it was proposed that the 2004 assumptions be changed in line with the changes proposed for the 2008 valuation of the NHSPS. This resulted in a doubling of the rates of withdrawal for members in their first year of service and a reduction of 10% for all other rates.
- E.3 There are similar data limitations for the 2012 valuation. We have compared the overall proportions of net withdrawals from the NHSSS and the NHSPS over the four-year period ending 31 March 2012 and found them to be similar (approximately 22% of average active population in both NHSSS and NHSPS). In light of this we recommend that once again the withdrawal assumptions for the 2012 valuation should be aligned to those proposed for the 2012 valuation of the NHSPS.
- E.4 The main changes proposed are:
- > Set net withdrawal rates to zero for practitioners and special classes
 - > Have a single unisex set of rates for all other valuation groups. These rates reflect:
 - a three-year select period with age only related rates for members with service over three years
 - increased withdrawal rates for all durations for under-25s
 - revised withdrawal rates for ages above 25 in line with recent NHSPS experience to give a less age-dependent set of rates
 - extension of the 2008 valuation series of rates to all ages, which will accommodate the anticipated longer working lives of members of the 2015 scheme. The rates of withdrawal proposed for older ages are around 3% pa.



Appendix F: Analysis of death in service

- F.1 We compared the actual numbers of deaths against those expected under the assumptions used for the 2004 and uncompleted 2008 valuations for the four-year period ending 31 March 2012. Deaths in respect of members aged over 70 or with invalid valuation groups were ignored for this analysis.
- F.2 Table F1 shows the results of this analysis and shows that the actual number of deaths was lower than expected based on both the 2004 and 2008 assumptions.

Table F1: Death in service experience 2008-12

| | Actual deaths | 2004 assumptions | | 2008 assumptions | |
|---------|---------------|------------------|-----------------|------------------|-----------------|
| | | Expected deaths | Actual/Expected | Expected deaths | Actual/Expected |
| Males | 160 | 256 | 63% | 204 | 78% |
| Females | 239 | 448 | 53% | 404 | 59% |
| All | 399 | 704 | 57% | 608 | 66% |

- F.3 The rates of death before retirement assumed for both the 2004 and 2008 valuations were the same for the NHSSS and NHSPS. A similar trend to that shown in Table F1 was also observed in the NHSPS over the four-year period ending 31 March 2012. In this case actual deaths in service were around 60% and 70% of those expected based on the 2004 valuation assumptions for men and women respectively.
- F.4 Given the relatively small population of deaths able to be analysed for the NHSSS we recommend the assumed rates of death before retirement continue to be aligned to the NHSPS rates which are based on a considerably larger experience base. The recommended rates are 60% and 70% of the 2004 valuation rates for males and females respectively.
- F.5 Charts F1 and F2 show for males and females respectively a comparison of the actual rates of death by age over the four year period 2008 to 2012 and the recommended rates.



Chart F1: Male deaths in service 2008-12

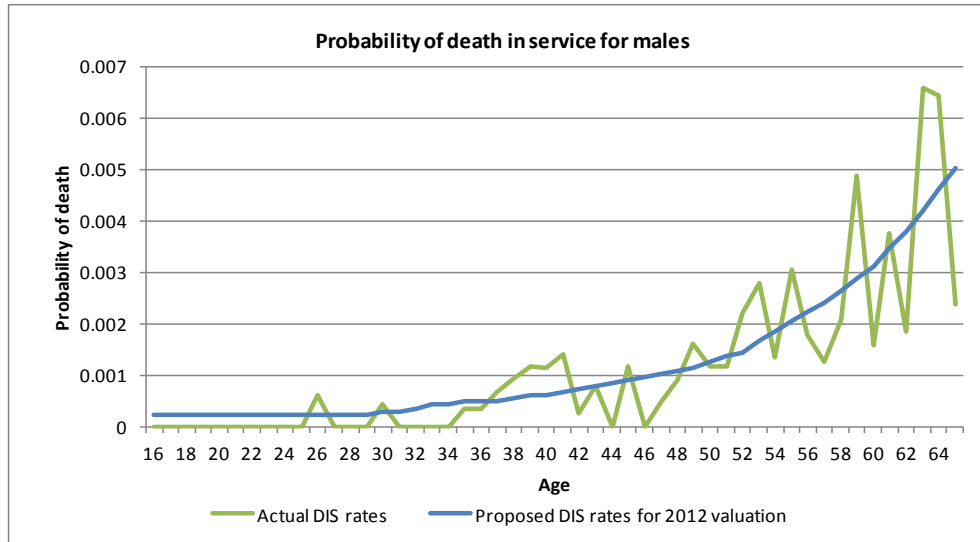
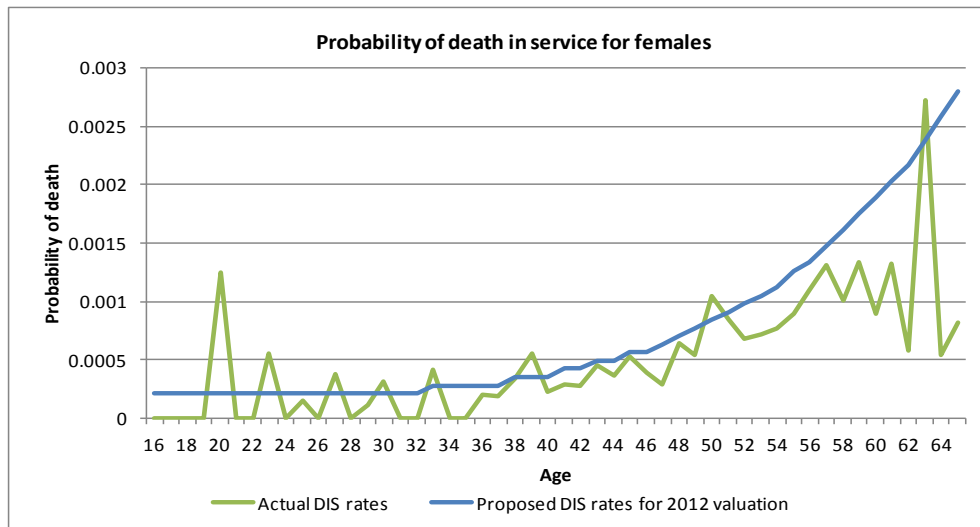


Chart F2: Female deaths in service 2008-12





Appendix G: Analysis of promotional pay increases

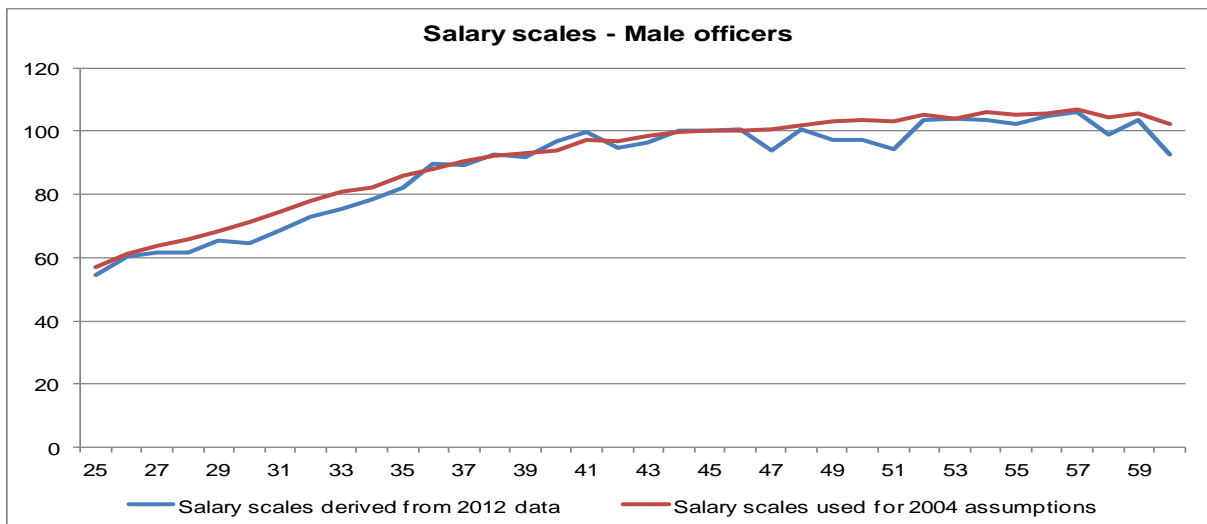
Approach to the analysis

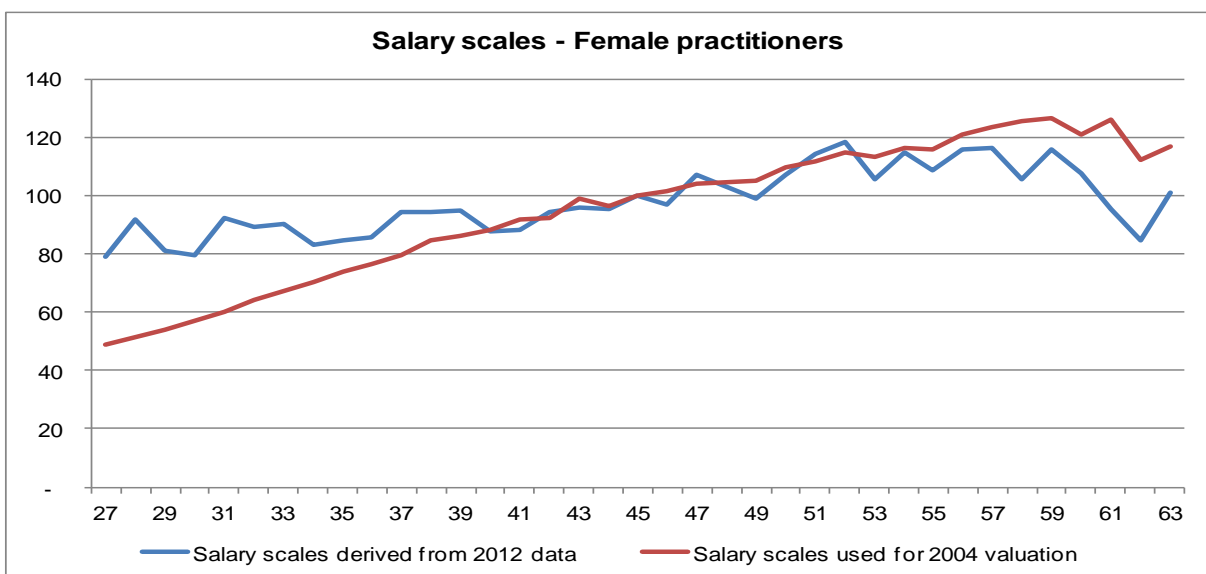
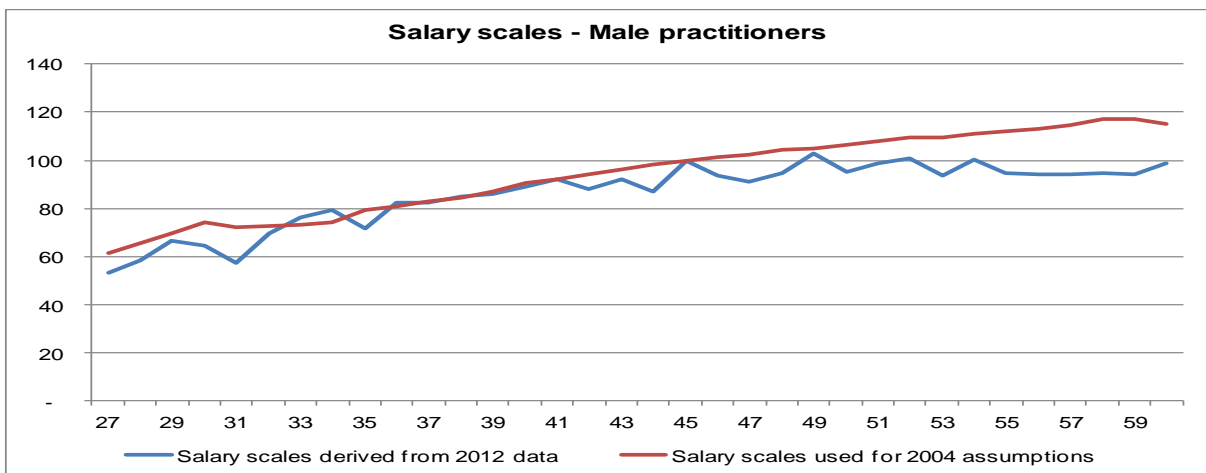
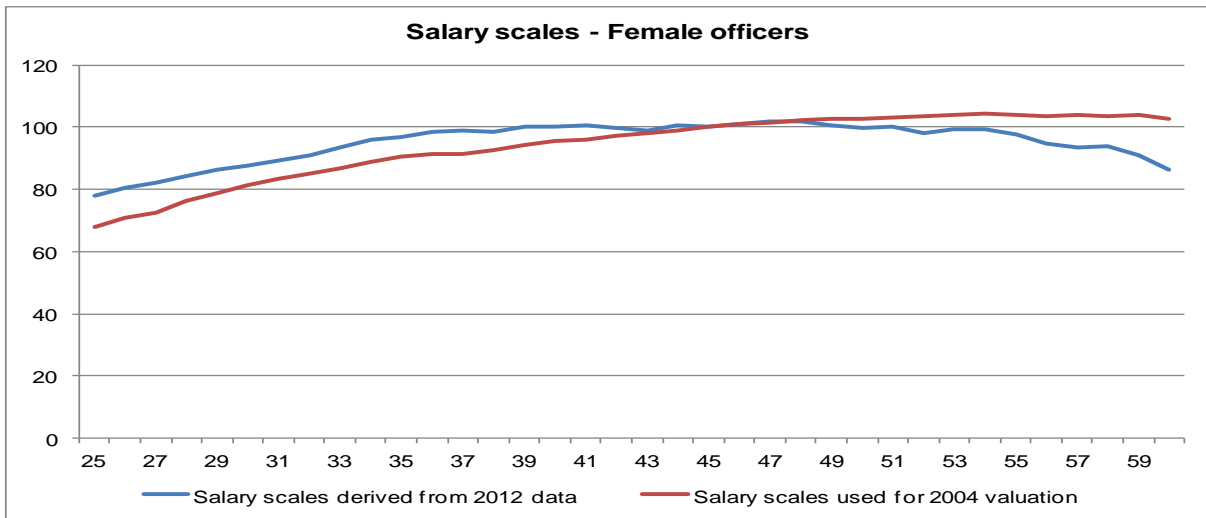
- G.1 There are two ways in which to analyse pay experience. The first is to track the pensionable pay progression of individual members who were in active service at both the start and end of a particular period and the second is to look at the profile of the active membership as at particular date in terms of average pensionable pay at each year of age and how this compares with the next year of age.
- G.2 Due to data limitations it was not possible to track the pay progression of individual members over the four-year period ending 31 March 2012. We were, however, able to analyse the pay profile of the membership as at 31 March 2012.
- G.3 For the purposes of this profile analysis we created an index table for each valuation group which represents how average whole time equivalent pay (WTE) (actual pay for Practitioners) at each age compares with a reference point. This is then compared with the promotional pay scale assumed for the 2004 and 2008 valuations.

Results of the analysis

- G.4 Chart G1 shows show how the age profile of male and female Officers' and Practitioners' average pay compares with a weighted average of the promotional pay scales used for the relevant valuation groups. (These charts are centred round an index value of 100 at the age of 45.)

Chart G1: Pay profile analysis 2008-2012







- G.5 These charts appear to show that there is lower-than-expected pay progression by age. However, it should be noted that the underlying population is not homogenous and that what is being observed is likely to be a result of a changing mix and different behaviours at different ages. For example, at older ages the better paid, and pensioned often retire earlier than those for whom availability of State retirement pension may influence later retirement decisions. It might therefore be expected that the profile of average pay by age will be distorted at the higher ages.
- G.6 The analysis carried out over the same period for the NHSPS where more data was available resulted in a similar observation. However, an analysis of pay progression of individual members in active service over the inter-valuation period was also undertaken and this analysis suggested different conclusions. Given that the two analyses led to different conclusions no change to the pay scales was recommended.
- G.7 We recommend that no changes are made to the pay scales as adopted for the 2004 and 2008 valuations, other than to reduce the number of separate scales used such that separate scales are used only for manual and other staff (and separate for men and women).



Appendix H: Analysis of commutation

- H.1 Members in the 1995 section of the scheme accrue both a pension and an automatic lump sum. In addition, those 1995 section members with service after 31 March 2008 may elect to commute (ie exchange) a part of their pension for an additional lump sum payment. 2008 section members do not accrue any lump sum automatically but may elect to commute part of their pension for a lump sum payment; however, members who switched from the 1995 section to the 2008 section under the Choice exercise must commute, as a minimum, sufficient pension to provide a lump sum equivalent to the automatic lump sum they had accrued in the 1995 section up to 31 March 2008. The extent to which any member may commute their pension is subject to a maximum limit set by HM Revenue and Customs ('HMRC').
- H.2 Owing to data limitations it has not been possible to analyse recent commutation experience.
- H.3 We have no reason to expect that commutation experience in the NHSS should be substantially different to that in the NHSPS. The assumptions used for the 2004 and 2008 valuations and the scheme reforms were consistent across the two schemes. We recommend that the commutation assumption should remain aligned to that proposed for the 2012 valuation of the NHSPS. This provides that for members in the 1995 section of the existing scheme, sufficient pension is commuted to result in a total cash sum of 75% of the HMRC maximum.



Appendix I: Analysis of family statistics

- I.1 The Scheme's benefit provisions for surviving partners differ between those members who were in active service on 1 April 2008 and those who had already become pensioners or deferred pensioners by that date. For active members on 1 April 2008 (and new joiners from that date onwards) a pension is payable to qualifying partners as well as to legal spouses and civil partners upon the member's death in service, in deferment or after their eventual retirement. For members who had left service before that date only legal spouses are eligible for a survivor's pension.
- I.2 There is another difference between those members of the Scheme who were in active service on 1 April 2008 and the existing pensioner and deferred members on that date. The pension of the surviving spouse or partner is now payable for life, rather than ceasing upon remarriage or cohabitation, as is the case for the spouse or civil partner of members who left active service prior to 1 April 2008.
- I.3 Owing to data limitations it has not been possible to analyse recent experience of family circumstances.
- I.4 We have no reason to expect that family circumstances in the NHSSS should be substantially different to those in the NHSPS. The assumptions used for the 2004 and 2008 valuations were consistent across the two schemes. We recommend that the family statistic assumptions should remain aligned to those proposed for the 2012 valuation of the NHSPS.
- I.5 The proportions married/partnered recommended for the 2012 valuation are shown in Table I1.

Table I1: Proportions married or partnered at death

| Age | Current pensioners and deferred members | | Current active members | |
|-----------|---|---------|------------------------|---------|
| | Males | Females | Males | Females |
| 50 | 0.72 | 0.52 | 0.76 | 0.54 |
| 60 | 0.72 | 0.52 | 0.76 | 0.54 |
| 70 | 0.72 | 0.45 | 0.74 | 0.46 |
| 80 | 0.60 | 0.22 | 0.61 | 0.23 |
| 90 | 0.34 | 0.07 | 0.34 | 0.07 |

- I.6 We recommend an assumption that men are three years older than their spouse/partner in all cases and that no allowance is made for remarriage on the grounds of materiality.

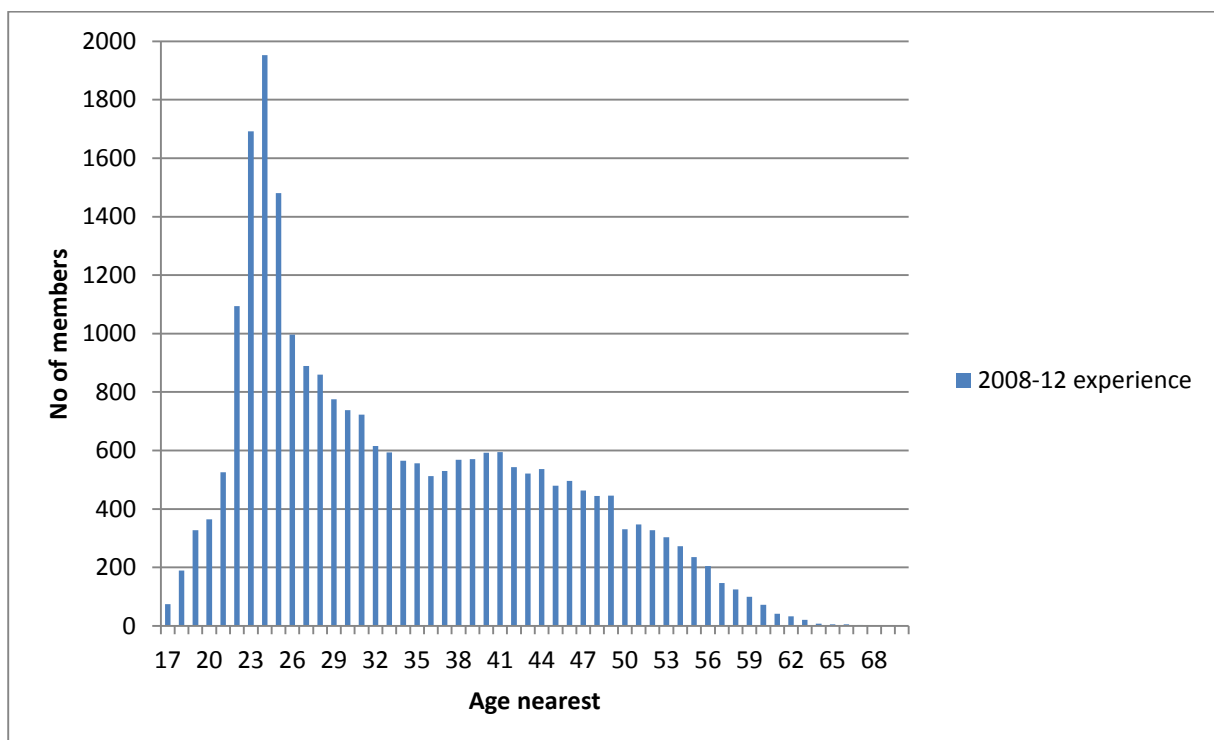


Appendix J: Analysis of new entrants

Analysis of experience

J.1 There were some 24,885 new entrants to the Scheme over the four year period ending 31 March 2012. These were in addition to the 6,181 rejoiners. The profile of the new entrants by age and gender is shown in Chart J1 below.

Chart J1: Profile of new entrants by age over four-year period ending 31 March 2012



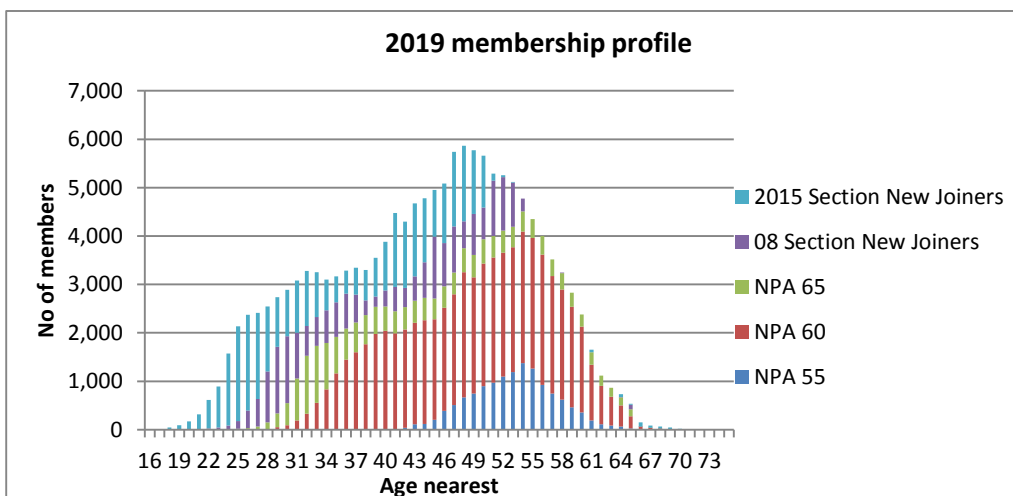
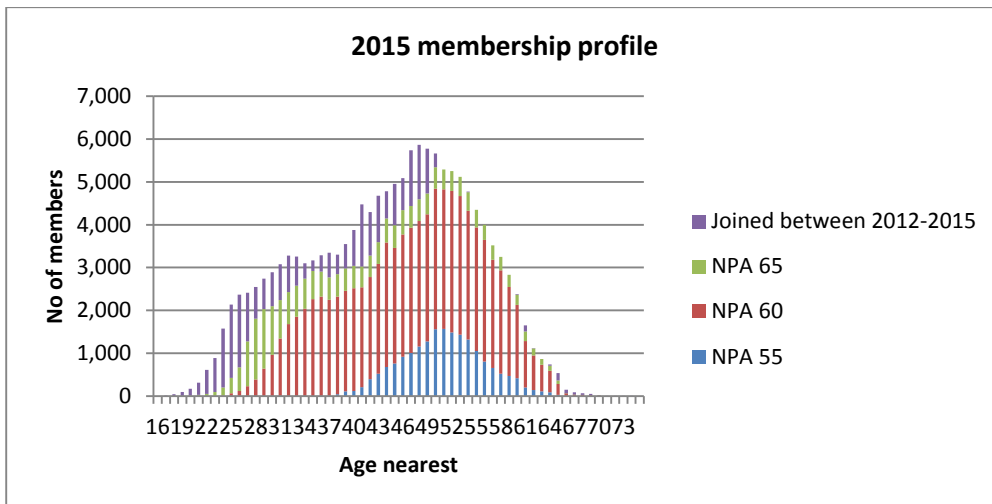
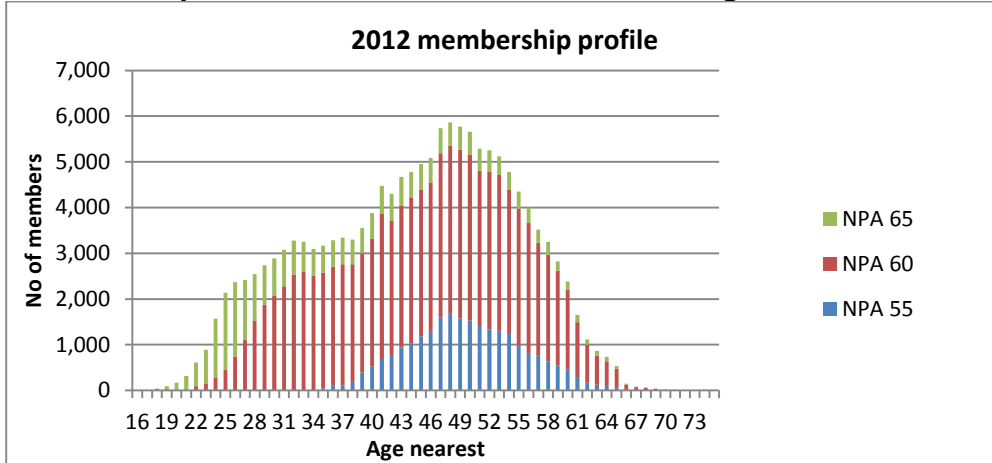
Use of the assumption : whole population

J.2 For the current valuation the profile of new entrants affects only the costs of accrual determined for periods after the valuation date. For this reason we have also considered the distribution of the overall membership over the relevant periods for which contributions are being calculated. Since for the purpose of workforce planning a stable payroll is assumed (in real terms) it may be reasonable to assume a stable workforce, in terms of distribution of head count and pay by age and gender.

J.3 Using this approach and allowing for members at the valuation date to 'run off' in line with the valuation assumptions gives an implicit distribution of new entrants. This is demonstrated in the chart J2 below which shows the implied new entrant population within the overall population by headcount and age at the key dates.



Chart J2 : Implied distribution of members, including new entrants at 2012, 2015, 2019





- J.4 The average age of new entrants over the four year period ending 31 March 2012 and that implied from the whole population model above are shown below. This demonstrates that the two approaches to considering the age of new entrants are consistent.

| | Average age at entry | Average pay at entry |
|---|-----------------------------|-----------------------------|
| Actual new entrants over four year period ending 31 March 2012 | 32.9 | Not available |
| Implied new entrants over period 2012 to 2015 under stable population model | 34.4 | 23,660 |
| Implied new entrants over period 2015 to 2019 under stable population model | 34.1 | 23,680 |

Other assumptions

- J.5 Using the stable population model above requires some assumption of proportions of males and females assumed to join over the appropriate future periods. It would seem appropriate to align this to that required to maintain the same distribution by gender as that at the valuation date.
- J.6 We recommend that all new entrants are assumed to experience assumptions in line with the largest valuation group. This simplification is not expected to have a material impact on the valuation results.