



Government Actuary's Department

NHS Pension Scheme – Valuation as 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 Secretary of State for Health for the 2012 valuation of the NHS Pension Scheme.

- 1.1 An actuarial valuation of the NHS Pension Scheme (NHSPS 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 Secretary of State for Health, having taken advice from the scheme actuary. Direction 19(c) requires the assumptions to be the Secretary of State for Health's best estimates.
- 1.2 This report sets out GAD's formal advice to the Secretary of State for Health on the actuarial assumptions to be adopted. The advice covers the main assumptions to be set by the Secretary of State for Health 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.
- 1.4 The previous completed actuarial valuation of the NHS Pension Scheme 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
 - > 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 chapters and annexes 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 Certain assumptions are specified in the Directions.



- 1.6 This report was provided to the Department of Health in draft form, and was also circulated to the Scheme's member and employer representatives, in April 2014. It has been signed alongside the formal valuation report². No substantive changes have been made. The Secretary of State for Health has 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 The formal valuation report is available from <https://www.gov.uk/government/collections/nhs-pensions> and component reports are available from <http://www.nhsbsa.nhs.uk/pensions>.

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	80%(M)/85%(F) x S1NXA	In line with 2008-2012 experience.	+0.9%	+0.3%
Ill-health (current)	80%(M)/85%(F) x S1IXA			
Ill-health (future)	100% x S1IXA			
Dependants	80%(M)/85%(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. Recent experience has shown a step change, believed to be a result of service reforms, 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 widows (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	Based on 2008-2012 net withdrawal experience	+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. "Starter-ender" analysis could suggest steeper scales for officers, "profile" analysis could suggest less steep scales.	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 2008-13 experience and in line with assumption used for scheme reform calculations	+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.	Proportions married assumptions based on scheme experience. Proportions partnered based on data and comparative level of scheme experience against ONS statistics	-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 33 years, average pay around £22,000.	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 Secretary of State for Health but will be of interest to other parties who should note the limitations.

- 2.1 An actuarial valuation of the NHS Pension Scheme (NHSPS 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 Secretary of State for Health, having taken advice from the scheme actuary. Direction 19(c) requires the assumptions to be the Secretary of State for Health's best estimates.
- 2.2 GAD is the appointed scheme actuary to the NHSPS. This report is addressed to the Secretary of State for Health 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 Secretary of State for Health to determine the required best estimate assumptions.
- 2.3 The advice covers the main assumptions to be set by the Secretary of State for Health. 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.

⁶ Certain assumptions are specified in the Directions.



- 2.4 Assumptions as required in other areas are covered in separate advice.
- 2.5 This report was provided to the Department of Health in draft form, and was also circulated to the Scheme's member and employer representatives, in April 2014. It has been signed alongside the formal valuation report⁷. No substantive changes have been made. The material and recommendations in this report are the same⁸ as those presented to NHS Governance Group in September 2013.
- 2.6 The Secretary of State for Health has 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 NHSBSA, the Scheme's administrator, supplied data on the experience of the scheme membership over the four-year period to 31 March 2012, with some additional more recent experience of commutation decisions. We have used this data to analyse the Scheme's experience in order to develop our advice on the assumptions. Our report, *NHSPS Actuarial Valuation at 31 March 2012: Report on data used for experience analysis* dated 9 June 2014, 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 residual 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. The Secretary of State for Health should consider whether there is any reason why this approach would be inappropriate.
- 2.9 The report is also being made available to:
- > the NHS Governance Group; and
 - > HMT
- 2.10 We are content for the Secretary of State for Health 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.

⁷ The formal valuation report is available from <https://www.gov.uk/government/collections/nhs-pensions-and-component-reports> are available from <http://www.nhsbsa.nhs.uk/pensions>.

⁸ Other than those resulting from amendments required on finalisation of the Directions.



- 2.11 Third parties whose interests may differ from those of the Secretary of State for Health should be encouraged to seek their own actuarial advice where appropriate. Other than to the Secretary of State for Health 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 chapter 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 Secretary of State for Health's '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 Act⁹ 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
 - > 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.

⁹ Public Service Pensions Act 2013



Relative importance of assumptions

- 3.5 The Directions require the employer contribution rate and employer cost cap to be estimated 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 3.5.



4 Pensioner mortality

This chapter 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 ¹⁰	Adjustment
Males		
Retirements in normal health	S1NMA	80%
Current ill-health pensioners	S1IMA	80%
Future ill-health pensioners	S1IMA	100%
Dependants	S1NMA	80%
Females		
Retirements in normal health	S1NFA	85%
Current ill-health pensioners	S1IFA	85%
Future ill-health pensioners	S1IFA	100%
Dependants	S1NFA	85%

- 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.

Previous valuation assumptions

- 4.3 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.

¹⁰ 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 widows (S1DFA).



Comparison of expected pensioner longevity

- 4.4 The table below gives a comparison of the resulting life expectancies¹¹ (allowing for future improvements) assumed and recommended for the 2004, 2008 (uncompleted) and 2012 valuations.

Table 4.2: Comparison of life expectancies (years) at the valuation date

	2004 valuation	2008 valuation	2012 valuation
Current pensioners			
Male aged 60	25.3	28.9	30.1
Male aged 65	20.4	23.9	25.1
Female aged 60	28.4	31.3	32.1
Female aged 65	23.4	26.4	27.1
Future pensioners – current age 45			
Male life expectancy from age 60	26.9	30.3	31.9
Male life expectancy from age 65	22.1	25.9	27.4
Female life expectancy from age 60	29.8	32.9	33.9
Female life expectancy from age 65	25.1	28.4	29.3

Use of the assumption

- 4.5 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.

Results of analysis

- 4.6 The proposed assumptions are based on analysis of past mortality experience for the scheme. We have analysed the pensioner mortality experience over the four-year period to 31 March 2012 on an 'amounts' basis. An amounts basis weights the experience by the size of each member's pension. Further information on the data analysed and the results of that analysis are shown in Annex B.

¹¹ Cohort life expectancies based on the ages shown as at the valuation date, ie allowing for future mortality improvement.



- 4.7 In order to make a recommendation of the most appropriate base table for pensioner mortality we have compared the actual mortality experience over the four year period with that expected based on the most appropriate S1 standard tables¹². This comparison considers the key age ranges for the various types of deaths and identifies what adjustment to the standard table is required to provide the closest comparison with actual experience. The results are as shown in paragraph 4.1. Annex B shows this comparison by age.

Financial impact

- 4.8 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	+0.9%	+0.3%	+0.3%

* adjustment to contribution rate for 15 years from 2015

¹² 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 chapter 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 Annex 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. On average, about 20% of members have retired before normal pension age (NPA), about 30% at NPA, with the remainder retiring after NPA. Recent experience is dominated by retirements from the 1995 section where members' NPA is either 55 or 60. Experience of the small number of retirements from the 2008 section, with NPA 65, shows almost all members of this section retired before or at 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.

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.



Use of the assumption

- 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 NHSPS although there have been considerably 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 We considered the pattern of age retirements from active membership over the four-year period to 31 March 2012 separately for the 1995 section (NPA 55 and NPA 60) and 2008 section (NPA 65). In total there were 114,000 age retirements over the period of which only 1,000 related to 2008 section members. The analysis concentrated on the experience of retirements from the 1995 section and compared the numbers of actual retirements to the expected number of retirements under previous valuation assumptions. Further information on the data analysed and the results of that analysis are shown in Annex C.
- 5.9 The analysis showed a number of areas where experience deviated from the previous valuation assumptions. In particular, the average age at retirement was lower than assumed; evidenced by more actual retirements at younger ages than expected. This effect was particularly marked for NPA 55 members. The analysis also showed 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, the reforms to the Service, taxation changes and the introduction of tiered member contributions. 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.



Financial impact

5.11 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 chapter 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. 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. Sample rates are provided in Annex 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 Higher rates of ill-health retirement were assumed for the 2004 and 2008 valuations. The 2012 assumptions are approximately 33% and 67% respectively of the 2004 and 2008 assumptions.
- 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 benefits¹³.

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 Chapter 4.

Results of analysis

- 6.6 We analysed around 7,500 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. Details of the analysis are shown in Annex D.

¹³ 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.



Ill-health retirement rates

- 6.7 The analysis showed there were substantially fewer ill-health retirements than assumed under the 2004 and 2008 valuation assumptions (around 33% and 67% of the expected number respectively), though the distribution of retirements was broadly in line with the rates assumed for the 2004 and 2008 valuations in terms of the profile of the assumption.
- 6.8 The numbers retiring on ill-health grounds from the 2008 section were particularly low. This is expected to be due to the effect of the introduction of the new section and the interaction with the two years' minimum service criterion, and the time lag before health issues result in retirement. For this reason we analysed the combined scheme experience when determining a recommended assumption.
- 6.9 The recommended ill-health rates have been based on the assumptions for the previous valuations but rated down to be in line with recent experience. The rates have also been extended to older ages by linear extrapolation of experience.

Split between tiers

- 6.10 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

- 6.11 The approximate financial impact of a 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 chapter 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 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 Annex A.

Previous valuation assumptions

- 7.2 A similar range of rates of withdrawal was assumed for the 2004 and 2008 valuations. 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 the 2004 rates were 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 rejoining 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 have analysed the pattern of (net) withdrawals from active membership over the four-year period to 31 March 2012 for the 1995 and 2008 sections combined. In practice 1995 section members form the majority of the long-serving leavers (over four years' service) and the majority of the short-serving leavers are from the 2008 section. In total there were 288,000 net withdrawals over the period. The recommended net withdrawal rates have been derived from recent experience, with some smoothing of the observed rates.
- 7.5 Further information on the data analysed and the results of that analysis are shown in Annex E.

Financial impact

- 7.6 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

- 7.7 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 chapter 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. 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 Annex 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 based on experience prior to the valuation dates and were higher than those recommended for the 2012 valuation. The 2012 rates are approximately 60%/70% of the 2004 rates for men/women and 80% of the 2008 rates.

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 3,732 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 Annex 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 with actual experience. The 'best fit' was achieved by taking 60% of the 2004 rates for men and 70% for women.



Financial impact

- 8.6 The approximate financial impact of change to assumed rates of death before retirement compared to those proposed for the 2008 valuation 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 chapter 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 Annex 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.

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 Secretary of State for Health.
- 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 (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 and the annual increases received by individual members over the four-year period to 31 March 2012. Details of the analysis are contained in Annex 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 ie might overstate the level of promotional pay increases. An analysis of the annual pay increases for individual members between 2008 and 2012 suggested the opposite conclusion might be reached for officers ie it showed that promotional pay increases had been higher at almost all ages than assumed under the 2004 valuation. For practitioners this analysis showed lower than expected increases over the period to 2012, but pay



progression is a minor assumption for practitioners since benefits are based on career average pay.

- 9.7 The results of both analyses should be treated with some caution. 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 The proposed assumptions are unchanged compared to those assumed for the 2004 and 2008 valuations. Table 9.1 shows the approximate financial impact of assuming promotional increases of ½ % 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 ½% 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 chapter sets out our recommendation for the assumed level of pension commutation at retirement (where this is not specified in the HM Treasury valuation 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 assumption 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 The previous valuation assumptions were equivalent to assuming members take a total 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 analysed the amounts of pension exchanged for cash for 148,000 members retiring over the five-year period to 31 March 2013. Our conclusions are based on analysis of those members retiring with the option to take additional cash (ie those in service on or after 1 April 2008). Details of the analysis are contained in Annex H.

10.7 The recommended assumption reflects the recent experience of the scheme.

Financial impact

10.8 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
Estimated combined impact on cost of accrual 2015 - 2019 = nil			

* adjustment to contribution rate for 15 years from 2015



11 Family statistics

This chapter 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.

- > 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 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.

Use of the assumption

- 11.4 Dependants' pensions¹⁴ are provided on the death of a member. The scheme's benefit provisions for dependants differ according to when the 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 partner¹⁵.
- 11.5 Where the member has no service on or after 1 April 2008, the spouse's pension will cease if the spouse remarries.

¹⁴ Pensions are also payable to dependent children on a member's death but the costs are not material overall.

¹⁵ 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.



Results of analysis

- 11.6 Approximately 53,000 pensioners died during the four-year period to 31 March 2012. We analysed the proportion of deaths giving rise to the payment of a surviving spouse's or partner's pension. Details of the analysis are contained in Annex I. We were unable to analyse the age of the dependants relative to the members, or rates of cessation on remarriage, due to lack of data.
- 11.7 The majority of deaths observed relate to members with service before 1 April 2008 only and so would qualify for a pension to a legal spouse (or civil partner). The analysis showed significantly fewer members left a surviving spouse than expected under either the 2004 and 2008 valuation proportion married assumptions. The assumptions recommended for proportions married are based on this analysis.
- 11.8 To formulate a recommended assumption for proportion partnered we compared the proportions married in the experience against population statistics¹⁶ of proportions married. The implied relationship was then applied to population statistics of proportions partnered to provide a Scheme assumption of proportions partnered.
- 11.9 We were 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. We have used general population statistics to set the age difference assumption and have ignored remarriage on the basis the impact is expected to be immaterial.

Financial impact

- 11.10 The approximate financial impact of the proposed change to the family statistics assumptions compared to those adopted for the 2004 and 2008 valuations 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	Immaterial	Not a feature of the scheme

* (adjustment to contribution rate for 15 years from 2015)

¹⁶ published by the Office for National Statistics (ONS)



12 New entrants

This chapter 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 Annex 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 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 Annex 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

A1 This annex contains details of the recommended assumptions including sample rates and values.

Pensioner mortality

Table A1: Baseline mortality assumptions

Baseline mortality	Standard table ^{17,18}	Adjustment
Males		
Retirements in normal health	S1NMA	80%
Current ill-health pensioners	S1IMA	80%
Future ill-health pensioners	S1IMA	100%
Dependants	S1NMA	80%
Females		
Retirements in normal health	S1NFA	85%
Current ill-health pensioners	S1IFA	85%
Future ill-health pensioners	S1IFA	100%
Dependants	S1NFA	85%

A2 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.

¹⁷ 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.

¹⁸ 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

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	0.0001	0.0001
25	0.0002	0.0002
30	0.0002	0.0002
35	0.0004	0.0004
40	0.0006	0.0005
45	0.0013	0.0008
50	0.002	0.001
55	0.004	0.003
60	0.005	0.006
62	0.006	0.007
64	0.006	0.008
66	0.007	0.009
68	0	0

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

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



Voluntary withdrawal from service

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) for 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 before retirement 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: 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%

A3 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

A4 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 33 years and around £22,000 respectively.

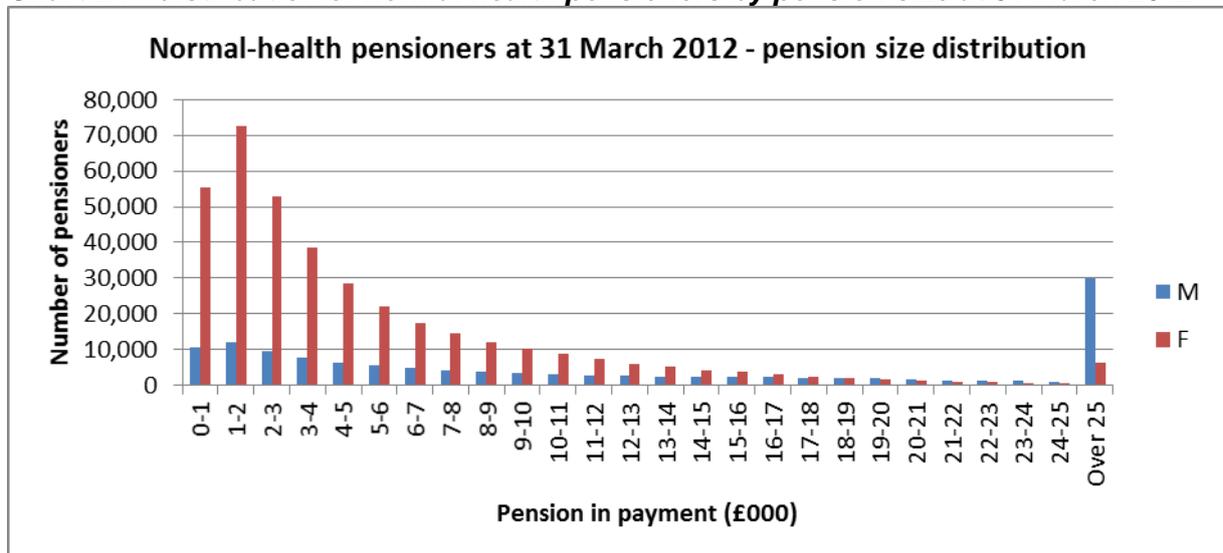


Appendix B: Analysis of pensioner mortality

Type of analysis

B1 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 evidence¹⁹ to demonstrate that size of pension is positively correlated to longevity ie 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 NHSPS (see chart B1 below), an 'amounts' mortality analysis is generally expected to show lower rates of mortality than a corresponding 'lives' analysis.

Chart B1 - distribution of normal health pensioners by pension size at 31 March 2012



Number of deaths analysed

B2 The total numbers of actual deaths of each type analysed over the four-year period are shown in Table B1 below.

Table B1 - number of pensioner deaths over four year period ending 31 March 2012

	Normal health pensioners	Ill-health pensioners	Dependants
Male	14,357	4,361	1,854
Female	26,326	7,705	10,628

¹⁹ 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*



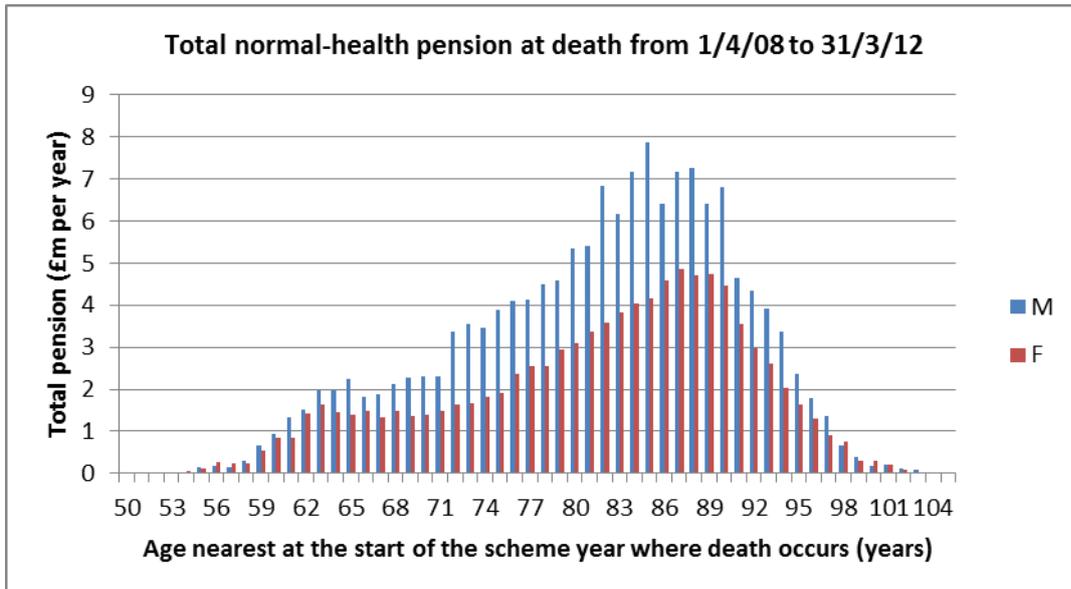
Profile of pensioner population and deaths by age

- B3 When considering mortality experience it is helpful to understand the age profile of the pensioner population and thus the relative importance which may be attributed to deaths experience observed at different ages.
B4 The charts below show, for normal health pensioners, the distribution of total pension by age as at 31 March 2012 (chart B2) and total pension cessation (chart B3) over the four-year period 2008 to 2012. These illustrate that the majority of pensions are being paid to pensioners in the age range 60 to 70. The majority of deaths have occurred in the age range 70 to 90. When considering the appropriate mortality basis, the experience over both these age ranges should be considered.

Chart B2 - Normal health pensioners total pension amount by age at 31 March 2012



Chart B3 - Normal health pensioners total pension cessation by age 2008 - 2012





Mortality analysis on an amounts basis: comparison of experience and 'best fit' against S1NXA tables

- B5 Charts B4 and B5 below show, by age, a comparison of the actual mortality experience over the four year period with that expected based on the recommended adjustment to the most appropriate S1 standard tables²⁰. The adjustments applied are summarised in table B2.
- B6 For ill-health retirements the adjustments as proposed fit reasonably with experience at ages over normal pension age. At earlier ages there is clear evidence of heavier mortality - presumably as a result of the more stringent criteria now applied for medical retirements. For this reason no adjustments to the standard table are proposed for future ill-health retirements.
- B7 In the case of male dependants there is some distortion at older ages owing to the limited provisions for widower's pensions before 1988. The amounts of pension payable to male dependants at ages above 80 are very small and thus the experience at the older ages is unlikely to be reliable.

Table B2: Adjustments to standard tables to provide best fit

Description	Standard table	Adjustment to provide best fit
Non-IH retirement Males	S1NMA	80%
IH retirement Males	S1IMA	80%
Dependant Males	S1NMA	80%
Non-IH retirement Females	S1NFA	85%
IH retirement Females	S1IFA	85%
Dependant Females*	S1NFA	85%

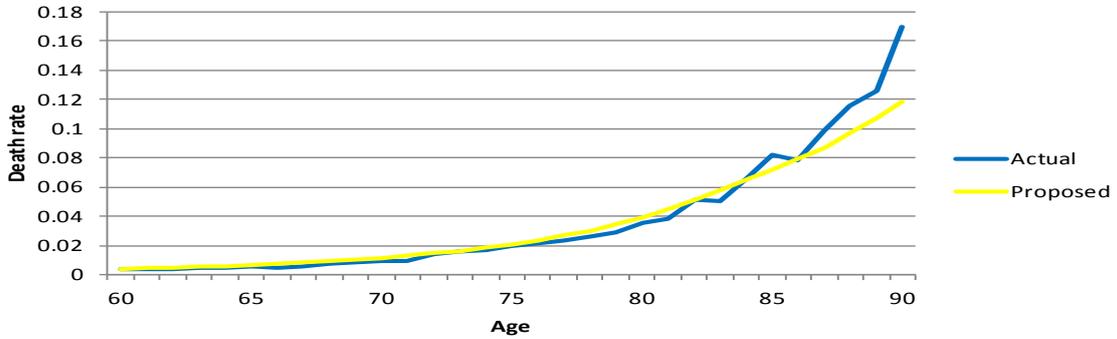
* a comparison against the S1DFA (dependant) table was also carried out but the normal life table proved a better comparator to the experience.

²⁰ 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.

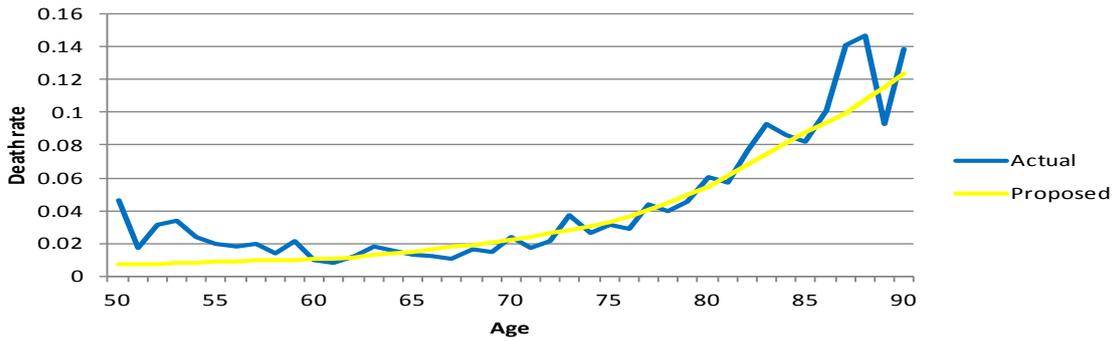


Chart B4: Actual versus expected deaths - males

**Actual vs expected death rates 2008-2012:
male normal-health pensioners**



**Actual vs expected death rates 2008-2012:
male ill-health pensioners**



**Actual vs expected death rates 2008-2012:
male dependants**

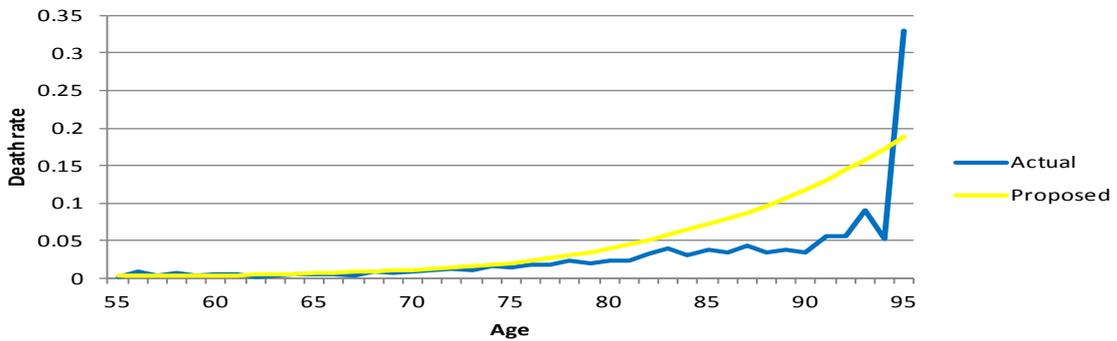
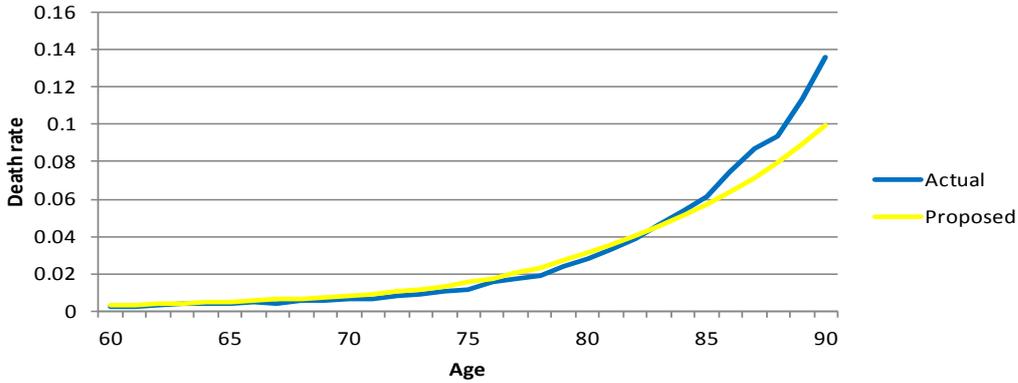


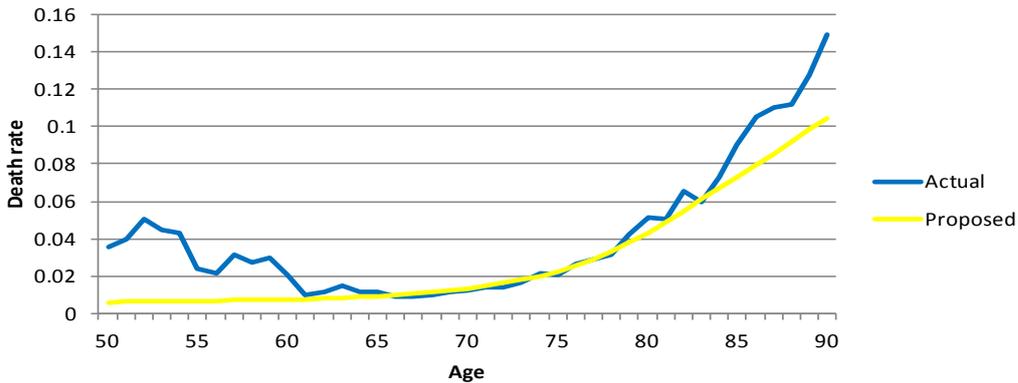


Chart B5: Actual versus expected deaths - females

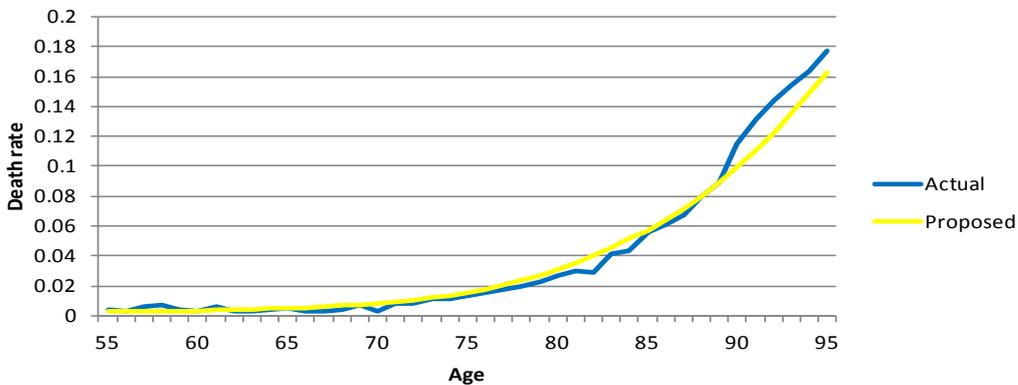
**Actual vs expected death rates 2008-2012:
female normal-health pensioners**



**Actual vs expected death rates 2008-2012:
female ill-health pensioners**



**Actual vs expected death rates 2008-2012:
female dependants**





Recommended assumptions

- B8 We recommend adopting assumptions of baseline pensioner mortality in line with the best fit against the standard S1 tables as set out in Table B2.
- B9 For future ill-health retirements we recommend a different assumption compared to that for current ill-health retirements to reflect an expectation that the mortality experience of future ill-health pensioners will be different from that of existing ill-health pensioners due to the significant reduction in ill-health awards in recent years and in light of the introduction of the two-tier ill-health arrangements in 2008. We do not hold sufficient data on those retiring under the current ill-health arrangements to carry out a credible mortality analysis; therefore a pragmatic approach is needed to setting the assumption for the mortality of future ill-health pensioners.
- B10 The approach we recommend is to assume mortality is in line with the S1IA tables (which are based on the ill-health experience of certain private sector pension schemes). 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.
- B11 The recommended baseline mortality assumptions are summarised in Table B3.

Table B3 - Summary of proposed baseline pensioner mortality for 2012 valuation

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%

- B12 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.
- B13 The resultant future life expectancies are summarised in Table B4 together with the comparable life expectancies based on previous valuation assumptions.



Table B4 - Future life expectancy²¹ based on proposed 2012 assumptions (normal health)

	2004 assumptions	2008 assumptions	2012 assumptions
Current pensioners			
- Male aged 60	25.3 years	28.9 years	30.1 years
- Male aged 65	20.4 years	23.9 years	25.1 years
- Female aged 60	28.4 years	31.3 years	32.1 years
- Female aged 65	23.4 years	26.4 years	27.1 years
Future pensioners – current age 45*			
- Male life expectancy from age 60	26.9 years	30.3 years	31.9 years
- Male life expectancy from age 65	22.1 years	25.9 years	27.4 years
- Female life expectancy from age 60	29.8 years	32.9 years	33.9 years
- Female life expectancy from age 65	25.1 years	28.4 years	29.3 years
- Future pensioners – current age 30*			
- Male life expectancy from age 60	26.9 years	31.7 years	33.6 years
- Male life expectancy from age 65	22.1 years	27.2 years	29.0 years
- Female life expectancy from age 60	29.8 years	34.2 years	35.6 years
- Female life expectancy from age 65	25.1 years	29.7 years	31.0 years

* Life expectancies are the same for the future pensioners currently aged 45 and 30 under the 2004 assumptions because that valuation adopted a calendar year proxy approach for future improvements in longevity. A more refined year of use approach has been adopted since 2008.

²¹ Cohort life expectancy, with future improvements in line with assumptions used at the relevant valuation



Appendix C: Analysis of age retirement from service

Process for setting assumptions

C1 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 NHSPS 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

C2 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.

C3 As set out in Table C1, there were some 114,000 age retirements over the four-year period to 31 March 2012 compared to an expected 83,000 retirements based on the 2004 valuation assumptions. The retirements from each section of the scheme are set out in Table C1.

Table C1: Age retirements in four year period ending 31 March 2012

1995 section - NPA 55		1995 section - NPA 60		2008 section - NPA 65	
Actual retirements	Expected retirements	Actual retirements	Expected retirements	Actual retirements	Expected retirements
32,000	20,000	81,000	59,000	1,000	4,000

C4 The table above shows there were considerably more retirements than anticipated from the 1995 section.

C5 Insufficient data exists to perform a credible analysis of the NPA 65 section experience. However it can be seen that there were far fewer retirements from the 2008 section than expected. This is thought to be largely due to the effect of the introduction of the new section in 2008 which means many members in service around retirement age will have been unable to complete the 2 years' minimum service criteria and will have received refunds of contributions rather than pension benefits.

C6 We analysed the pattern of age retirements from active membership over the four-year period to 31 March 2012 for the 1995 section of the Scheme. The analysis compares the actual rate of age retirements (grouped by age of retirement) to the expected rate.



C7 Charts C1 and C2 show the actual number of age retirements from the 1995 section 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 - NPA 55

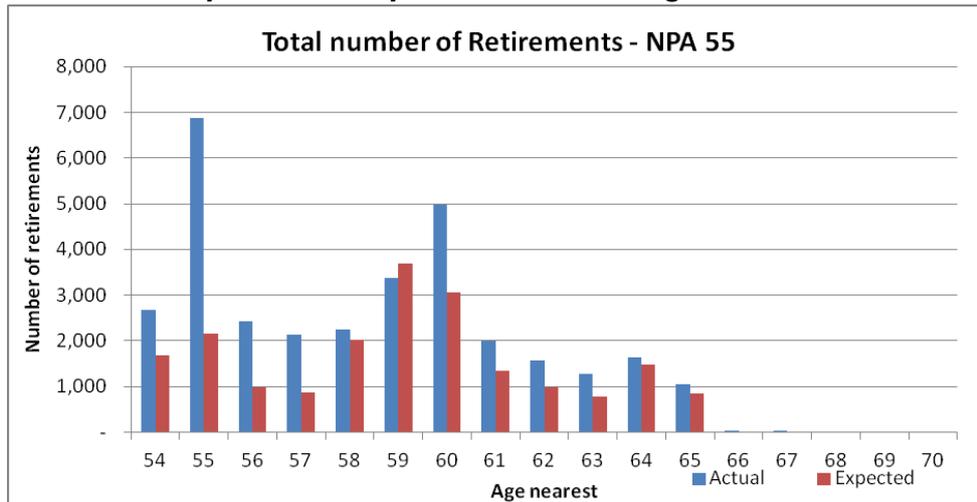
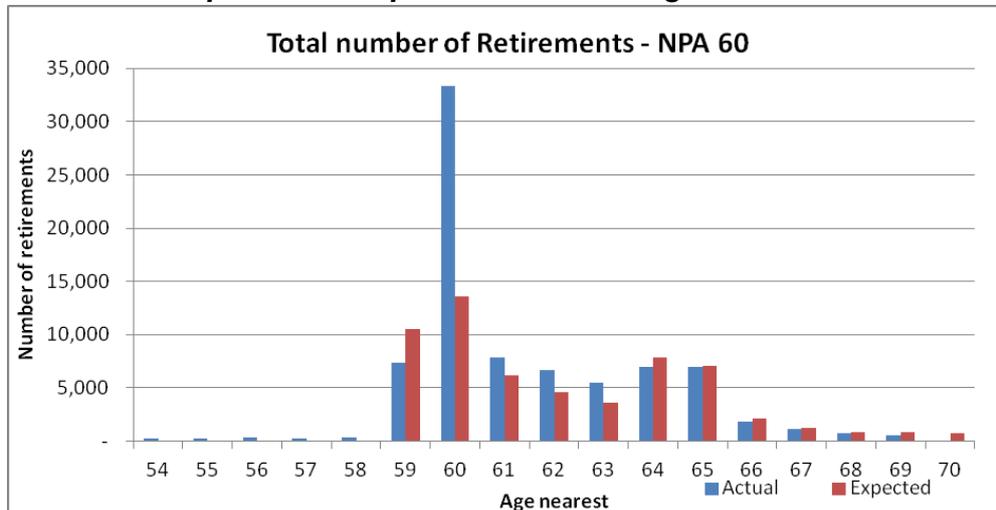


Chart C2: comparison of expected and actual age retirements - NPA 60



C8 Charts C3 and C4 show how experienced rates of retirement over the four-year period to 31 March 2012 have compared to the assumptions made for the 1995 section.



Chart C3: comparison of expected and actual rates of age retirements - NPA55

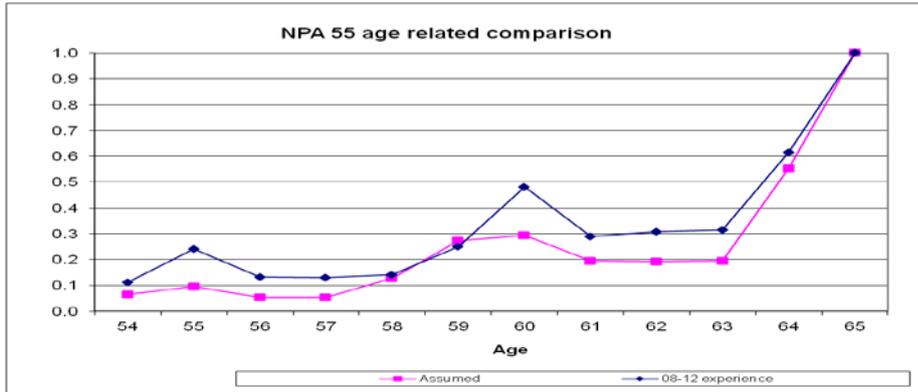
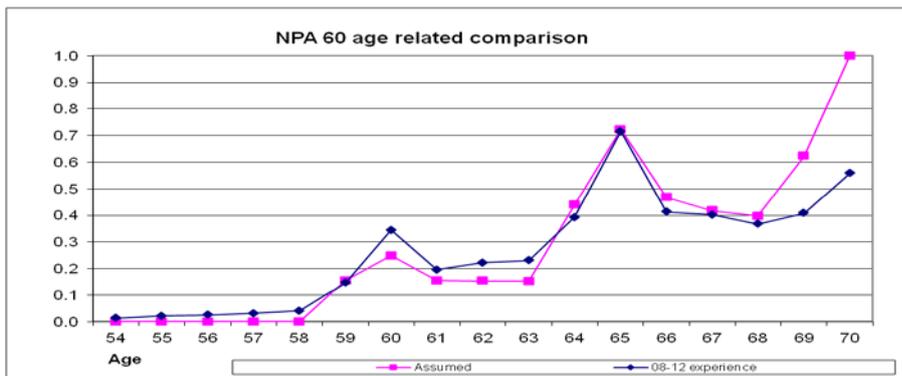


Chart C4: comparison of expected and actual rates of age retirements - NPA60



- C9 The experience over the period shows significantly more earlier retirements than expected under the 2004 assumptions. This pattern is believed to be a result of the changes made to the service over the period together with the introduction of tiered member contributions and tax changes.
- C10 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 the rates observed between 2008 and 2012.

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

- C11 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 (ie 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

Rates of ill-health retirements

D1 There were some 7,500 ill-health retirements over the four-year period to 31 March 2012 compared to an expected 25,000 retirements based on the 2004 assumptions. Table D1 shows the numbers of ill-health retirements from each section of the scheme.

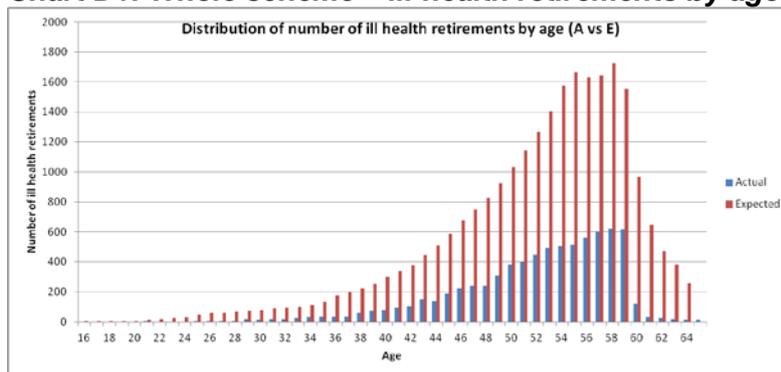
Table D1: Number of ill-health retirements

1995 section			2008 section			Whole scheme		
Actual	Expected	A/E	Actual	Expected	A/E	Actual	Expected	A/E
7,407	22,558	33%	105	2,392	4%	7,512	24,950	30%

D2 The numbers retiring on ill-health grounds from the 2008 section were clearly considerably lower than anticipated and in comparison to the numbers retiring from the 1995 section. This is expected to be due to the effect of the introduction of the new section. There is an explicit service criterion of two years before a member becomes eligible to ill-health benefits and additionally there is also likely to be a lag before health issues result in termination of employment and award of ill-health benefits. Those factors will mean the experience over the period 2008 - 2012, for the 2008 section in isolation, are not representative of longer-term expectations. For this reason our analysis considers both sections together.

D3 Chart D1 shows the distribution of the total numbers of ill-health retirements, as shown in table D1, by age.

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



D4 The above shows that the number of ill-health retirements was considerably lower at all ages than assumed for the purposes of the 2004 valuation. On average rates were around 1/3 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.

D5 Charts D2 to D4 show a comparison of actual and expected rates of ill-health retirement for males and females separately and combined. The recommended rates



are based on this comparison and will be set at 1/3 of the 2004 rates.



Chart D2: Ill-health retirement rates - males

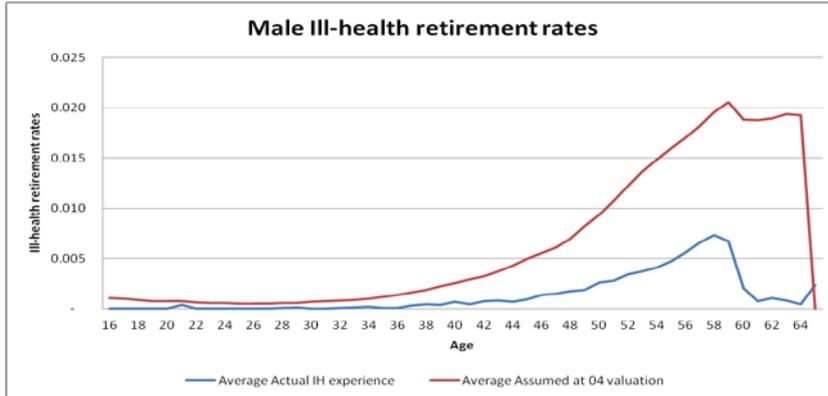


Chart D3: Ill-health retirement rates - females

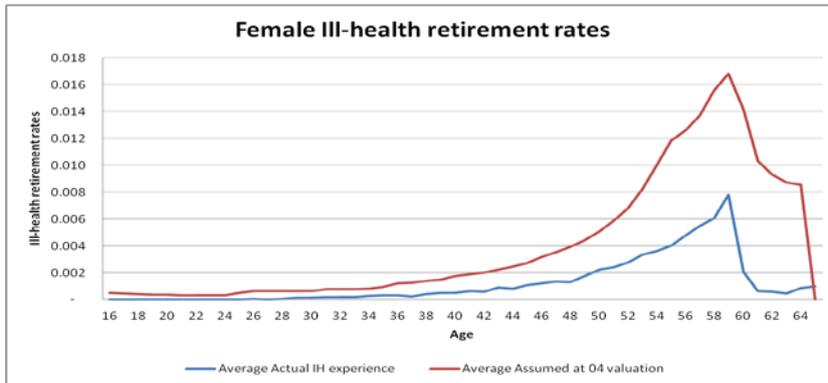
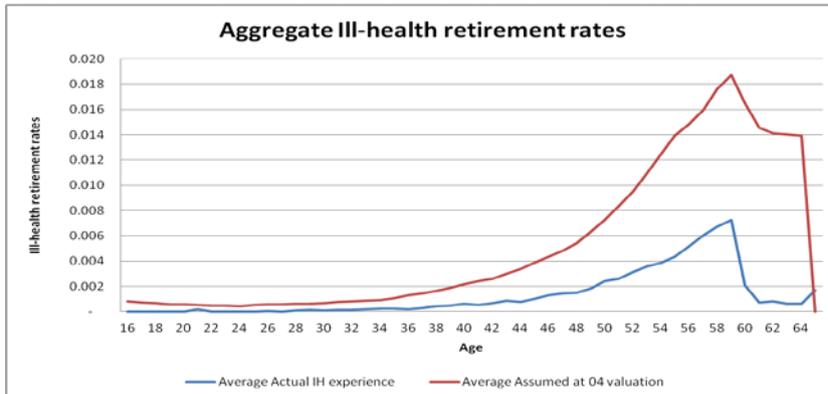


Chart D4: Ill-health retirement rates - all members





Proportion of upper tier ill-health benefit awards

D6 Data was provided on ill-health retirements from active status over the four-year period to 31 March 2012. Table D2 shows the proportions of Tier 1 (lower tier) and Tier 2 (upper tier) pensions which were awarded.

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

	2008/09	2009/10	2010/11	2011/12	2008-2012
Tier 2	60%	60%	62%	66%	62%
Tier 1	40%	40%	38%	34%	38%
Total	100%	100%	100%	100%	100%

D7 The above shows that the proportion of members awarded Tier1/Tier 2 benefits over the four-year period was 38%/62%. Looking at each year separately, it can be seen that the proportion of members receiving Tier 2 benefits increased each year over the four-year period from 60% in 2008-09 and 2009-10 to 66% in 2011-12.

D8 Data was also obtained from the Medical Adviser's Annual Report for the period 1 April 2011 to 31 March 2012. Table 3.2 of that report shows the following:

Table D3: Number of ill-health decisions made

	2009/10	2010/11	2011/12	2009-2012
Accept Tier 1	516	524	557	1,597
Accept Tier 1 – with review	357	390	329	1,076
Accept Tier 2	1,228	1,340	1,498	4,066
Total	2,101	2,254	2,384	6,739

D9 'Tier 1 - with review' cases are those where the Tier 1 criteria are met but it is unclear whether the case will progress to Tier 2 depending on how the member responds to treatment.

D10 Ignoring all 'Tier 1 – with review' cases indicates the following proportions of ill-health decisions:

Table D4: Proportion of ill-health decisions made ignoring 'with review'

Proportion of ill-health decisions made (of those being awarded Tier 1 or Tier 2 benefits only)

	2009/10	2010/11	2011/12	2009-2012
Tier 1	30%	28%	27%	28%
Tier 2	70%	72%	73%	72%
Total	100%	100%	100%	100%



D11 Not all 'Tier 1 – with review' cases will eventually become Tier 2 cases, but from the Medical Adviser's report it is evident that a small proportion will. Table D5 below indicates the proportions of Tier 1/Tier 2 cases assuming that all reviewable Tier 1 cases eventually become Tier 2 cases:

Table D5: Proportion of ill-health decisions made including 'with review' as Tier 2

Proportion of ill-health decisions (assuming that those being awarded 'Tier 1 - with review' eventually become Tier 1/Tier 2 cases)

	2009/10	2010/11	2011/12	2009-2012
Tier 1/Tier 2	25%/75%	23%/77%	23%/77%	24%/76%

D12 The above supports retention of the assumption that 75% will qualify for the upper tier ill-health award.



Appendix E: Analysis of voluntary withdrawal from service

Comparison of numbers of withdrawals (net of rejoiners)

E1 Table E1 compares the number of actual withdrawals net of re-joiners over the four-year period ending 31 March 2012 with the expected number of withdrawals based on the 2004 assumptions. We show results for the 'select' period adopted for the 2004 valuation (ie less than 5 years' service) and thereafter ('ultimate' rates).

Table E1: comparison of numbers of actual and expected net withdrawals

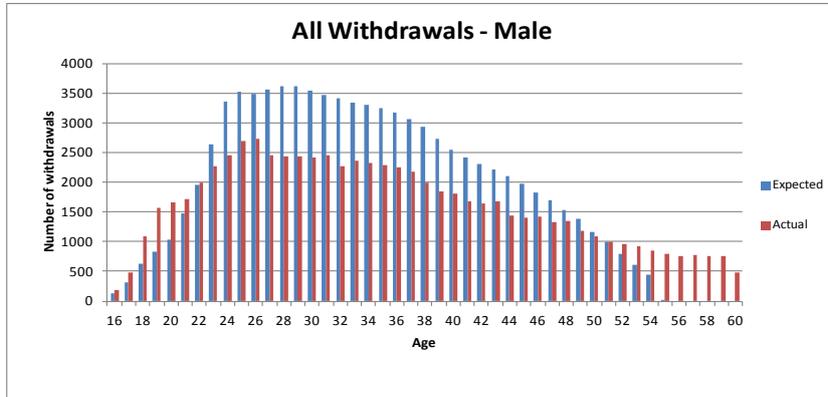
Male	Actual number (A) 000's	Expected number (E) 000's	A/E
Service < 5 years	47	70	67%
Service ≥ 5 years	27	16	165%
All durations	74	86	86%
<hr/>			
Female	Actual number (A) 000's	Expected number (E) 000's	A/E
Service < 5 years	126	193	66%
Service ≥ 5 years	88	63	141%
All durations	215	255	84%
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Combined	Actual number (A) 000's	Expected number (E) 000's	A/E
Service < 5 years	173	263	66%
Service ≥ 5 years	115	79	146%
All durations	288	342	84%

E2 The above comparison includes all members. The 2004 assumptions included a very low rate of withdrawals for both practitioners and special classes. Experience over the four year period has shown negligible net exits from these groups.

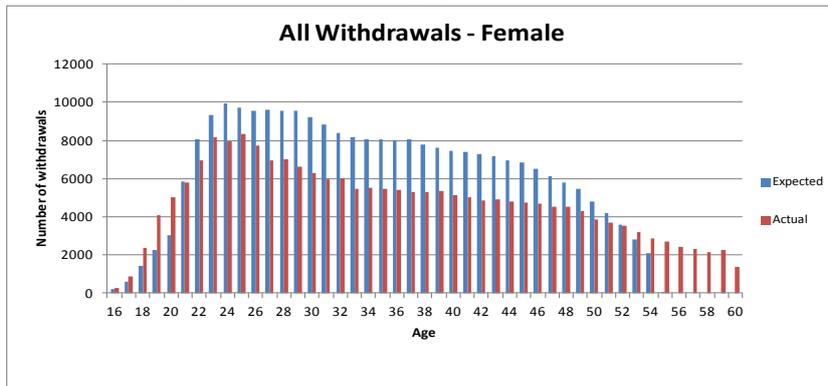
E3 Chart E1 shows a comparison of the distribution of actual and expected withdrawals, based on the 2004 assumptions, by age.



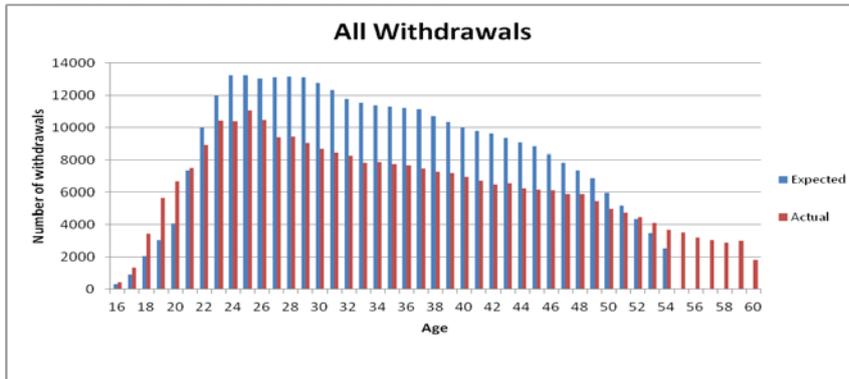
**Chart E1: comparison of rates of actual and expected net withdrawals
All durations – male members**



All durations – female members



Males and females all durations



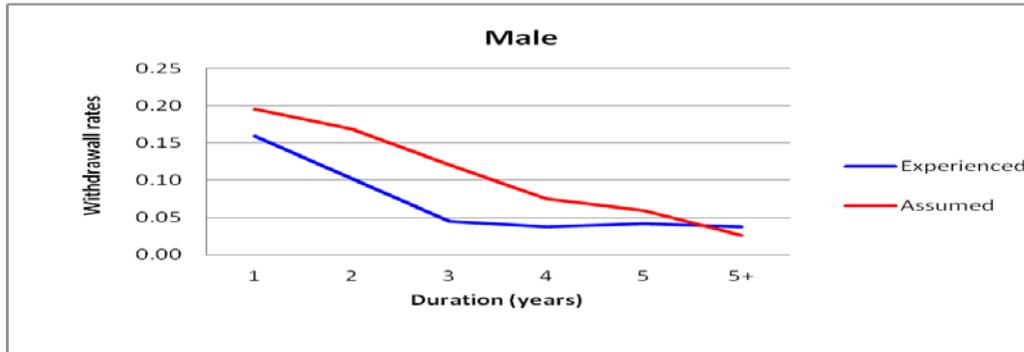
E4 Table E1 shows that overall there were fewer withdrawals than expected based on the 2004 assumptions. Chart E1 shows clear evidence of withdrawals continuing beyond the age range covered by the 2004 assumptions. It is also notable that the numbers of leavers at younger ages was higher than assumed.



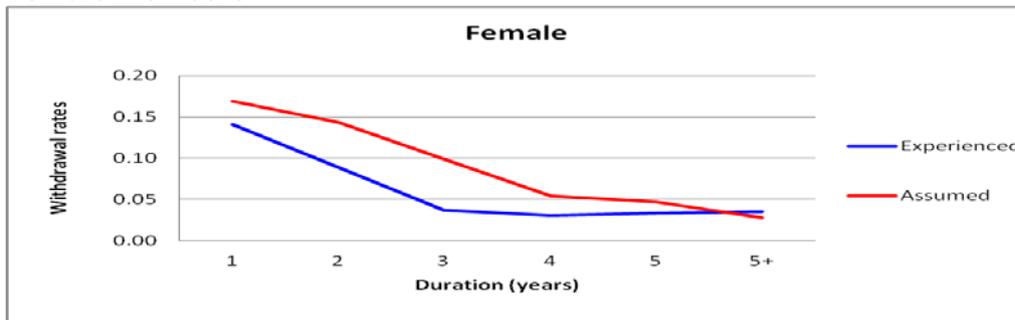
Distribution of actual vs expected withdrawal rates by service duration

E5 Chart E2 illustrates the relationship between actual and assumed rates of withdrawal at each service duration for which different rates were assumed in 2004.

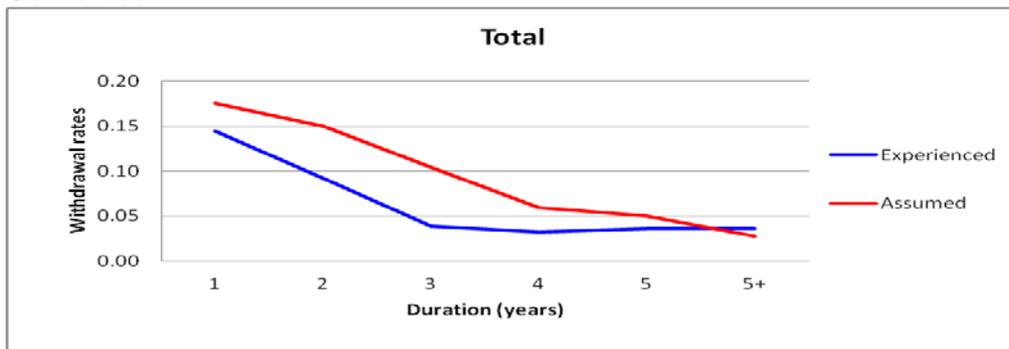
Chart E2: comparison of actual and expected rates of withdrawal by service duration
Male members



Female members



Combined



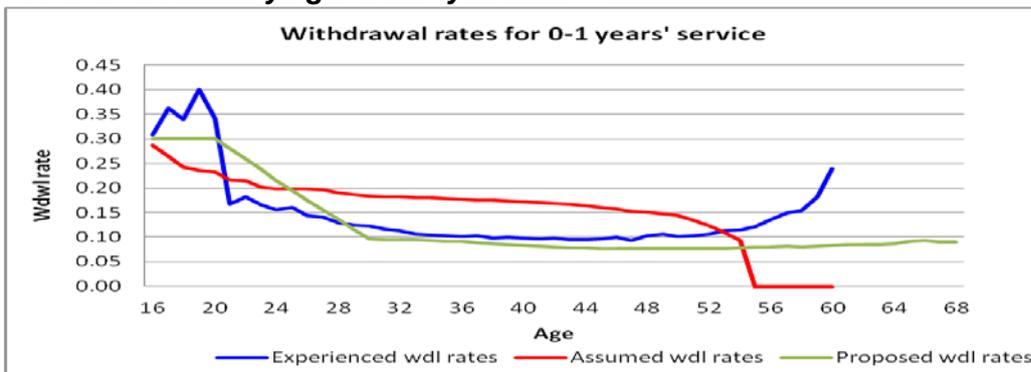
E6 Chart E2 illustrates a clear duration effect over the first three years of service. Thereafter the actual rates appear very stable, at around 3% per annum. This suggests a three-year select period would be more appropriate based on the recent experience.



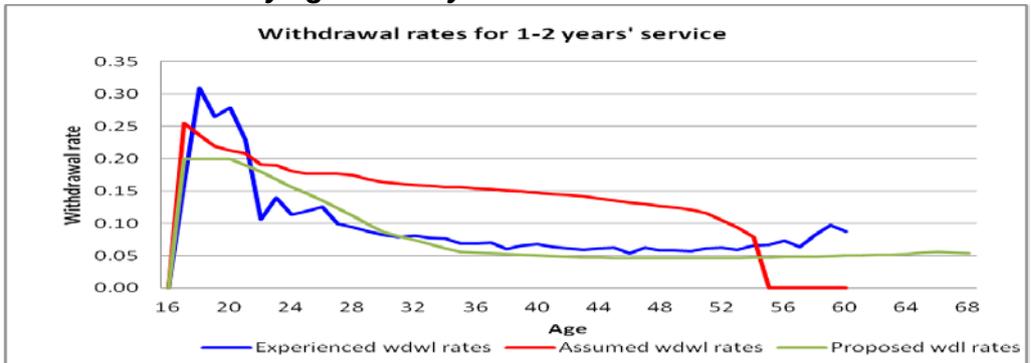
Distribution of withdrawal rates by age - comparison with proposed assumptions

E7 Chart E3 shows how experience compares to the 2004 assumptions and the assumptions recommended for the 2012 valuation based on aligning the assumptions to recent experience. The proposed rates include extension to older ages, to accommodate the anticipated longer working lives of members in the 2015 scheme. The rates have been extended to older ages by linear extrapolation of experience at older ages.

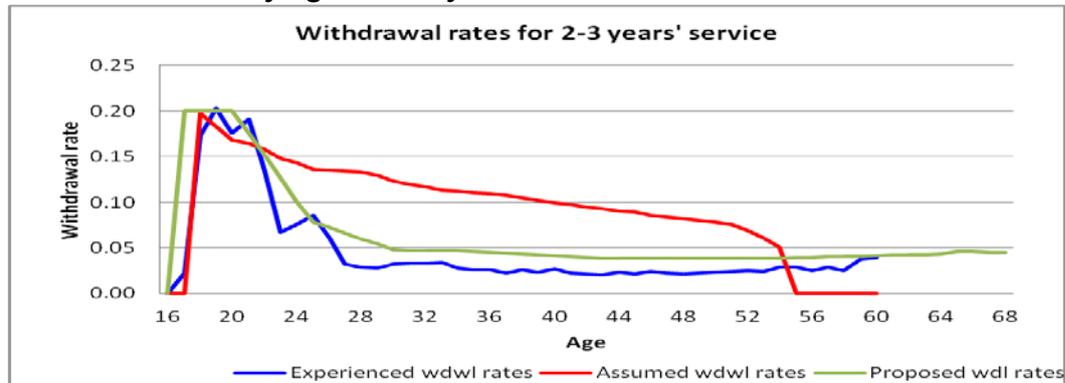
Chart E3: comparison of withdrawal rates including recommended assumptions
Withdrawal rates by age for 0-1 year's service



Withdrawal rates by age for 1-2 years' service

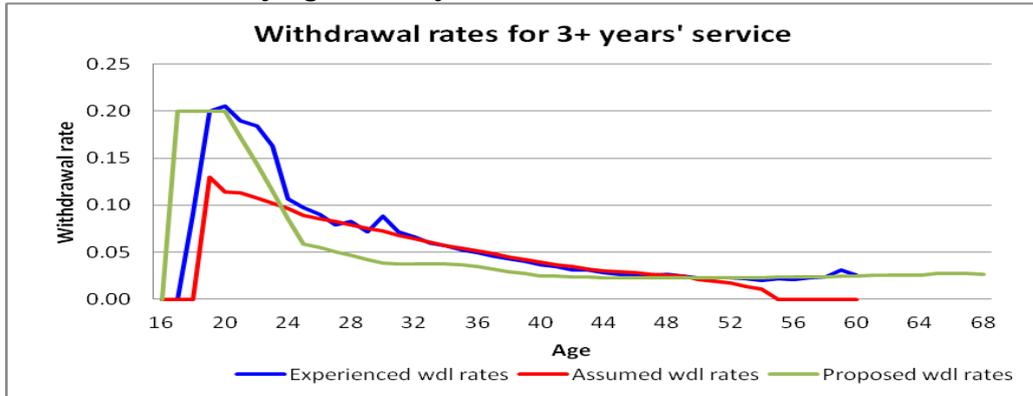


Withdrawal rates by age for 2-3 years' service





Withdrawal rates by age for 3+ years' service





Appendix F: Analysis of death in service

F1 The results of the experience analysis of deaths of active members over the four-year period to 31 March 2012 show that the actual number of deaths was lower than expected based on both the 2004 and 2008 valuation assumptions.

F2 Table F1 shows the number of actual and expected deaths split by gender.

Table F1: Death in service experience 2008-12

	Actual deaths	2004 assumptions		2008 assumptions	
		Expected deaths	Actual/Expected	Expected deaths	Actual/Expected
Males	1,233	2,107	59%	1,686	73%
Female	2,499	3,757	67%	3,381	74%
All	3,732	5,864	64%	5,067	74%

F3 The actual distribution of rates of death in service continues to be broadly in line with the rates assumed for the 2004 and 2008 valuations in terms of the profile of the assumption, although at lower rates than seen previously. In light of this we recommend assuming rates of 60% and 70% of the 2004 rates for men and women respectively for the purposes of the 2012 valuation. We recommend that these rates of death pre-retirement, based on the analysis of in-service deaths, are used for both deaths from active membership and of deferred members.

F4 Charts F1 and F2 show 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 death in service experience 2008-12

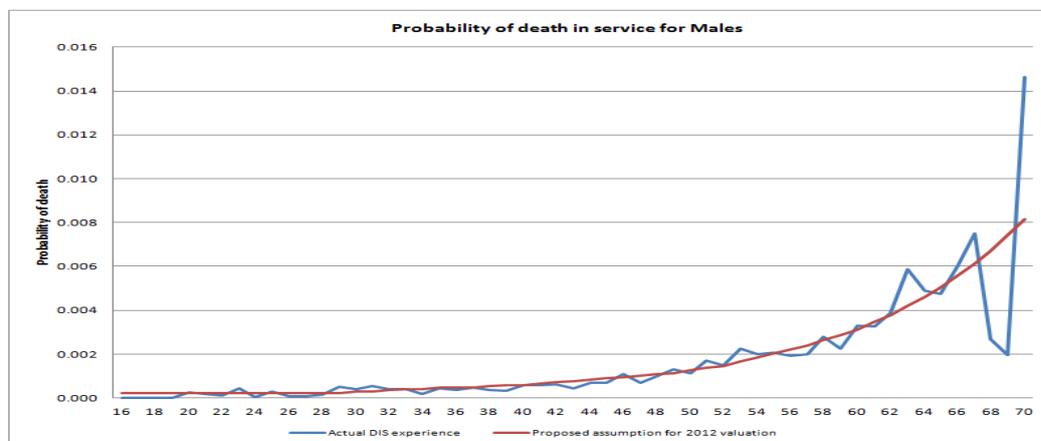
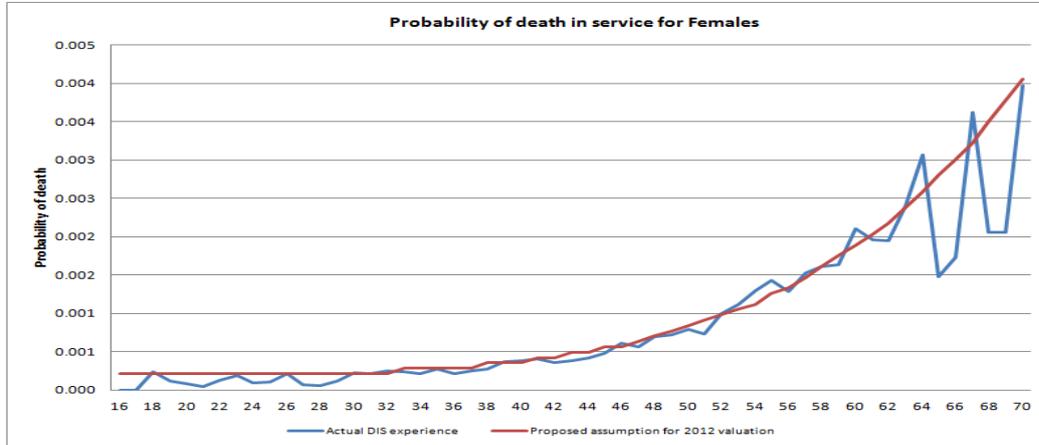




Chart F2: Female death in service experience 2008-12





Appendix G: Analysis of promotional pay increases

Approach to the analysis

- G1 The experience over the four-year period to 31 March 2012 was analysed in two different ways:
- > Tracking the pensionable pay progression of individual members who were in active service over this period (the 'starter-ender analysis'); and
 - > Looking at the profile of the active membership as at 31 March 2012 in terms of average pensionable pay at each year of age and how this compares with the next year of age (the 'profile analysis').

(i) Starter-ender analysis

- G2 To ensure that the analysis only includes promotional pay increases, members' pensionable pay was adjusted to allow for the general pay increases awarded in line with the Agenda for Charge (AfC) pay scales²² between 31 March 2008 and 31 March 2012 as follows.

General increases in AfC pay points:

- > Effective 1 April 2008: An across-the-board increase of 2.75%
 - > Effective 1 April 2009: An across-the-board increase of 2.4%
 - > Effective 1 April 2010: An across-the-board increase of 2.25% subject to a minimum increase of £420 for pay points 1-12, which broadly equates to those with pensionable pay in 2010 of less than £18,200 pa (ignoring any pensionable allowances)
 - > Effective 1 April 2011: The first year of a two-year pay freeze, except for a flat-rate increase of £250 for pay points 1-15, which broadly equates to those with pensionable pay in 2011 of less than £21,000 pa (ignoring any pensionable allowances).
- G3 The allowance for general pay increases (where made) is not the same as the general pay increases assumed for the purposes of the 2004 valuation. The rationale for making an allowance for known increases in the AfC pay points (where applicable) is to strip out the effects of these as far as possible so as to ensure the analysis focuses on how individual promotional increases compared with the age-dependent scales used for the 2004 valuation.
- G4 As well as looking at the entire four-year period to 31 March 2012 we also applied the starter-ender approach to certain intermediate periods to look for any changes in the pattern of promotional increases.

(ii) Profile analysis

²² This is relevant for Officers only. We assumed there were no general increases in Practitioners' pay, but still allowed for age-dependant promotional increases. (Actual pay progression is far less significant for valuation purposes for Practitioners as benefits are already on a career-average basis.)



- G5 For the purposes of the profile analysis we essentially create an index table for each valuation group which represents how average WTE pensionable pay (actual pay for Practitioners) at each age compares with a reference point. This is then compared with the promotional salary scale assumed for the 2004 valuation.
- G6 An alternative way of viewing the profile analysis is to compare the percentage difference between the average WTE pensionable pay (actual pay for Practitioners) at each age with the corresponding average at the next age. This is then compared with the age-dependent increase rates implicit in the assumed promotional salary scales.

Experience analysis for the suspended 2008 valuation

- G7 The data available for the suspended 2008 valuation only facilitated a profile analysis. The profile analysis did not provide any evidence to support a change to the promotional salary scales used for the 2004 valuation.

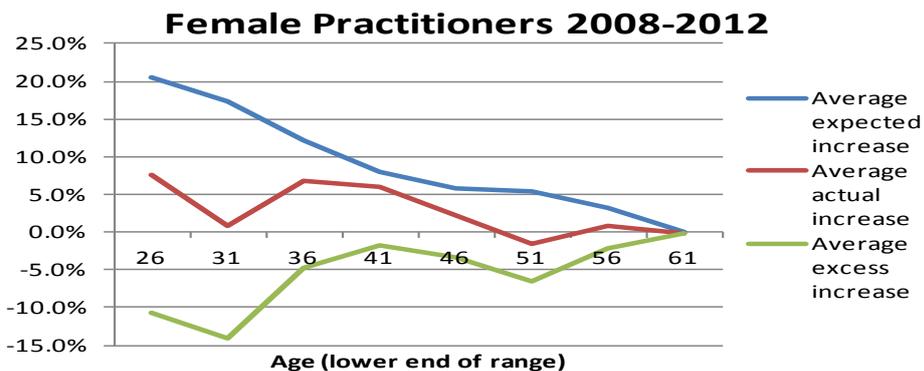
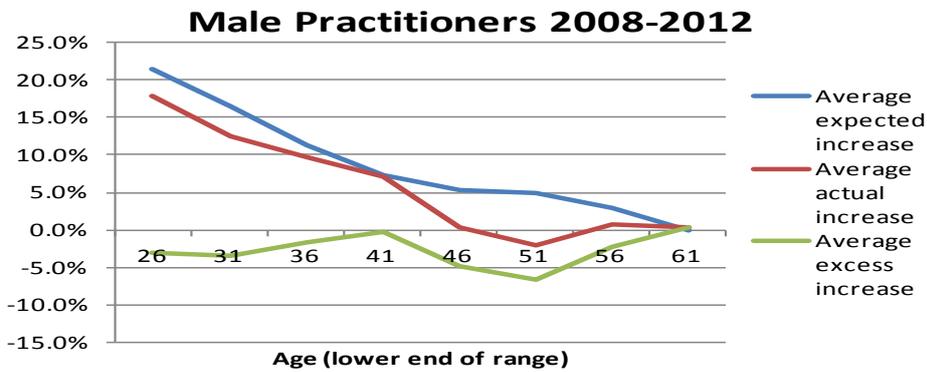
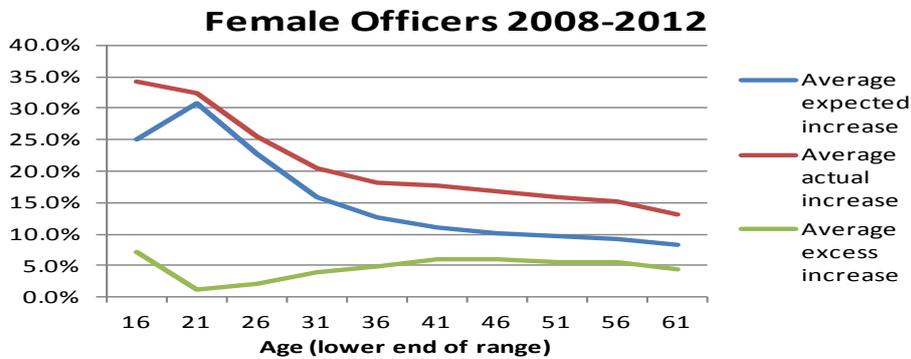
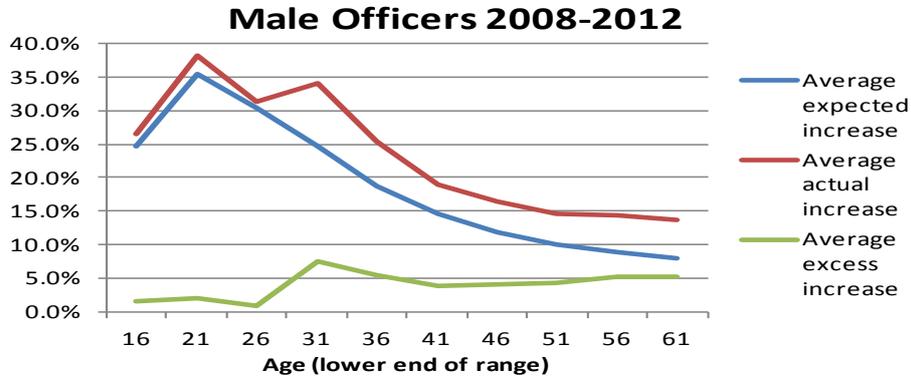
Results of 2008-2012 experience analysis

(i) Starter-ender analysis

- G8 Chart G1 summarises the results of the starter-ender analysis covering 2008-2012 as described above. The results are shown for male and female Officers and Practitioners separately.



Chart G1: starter-ender analysis of promotional pay progression 2008 – 2012

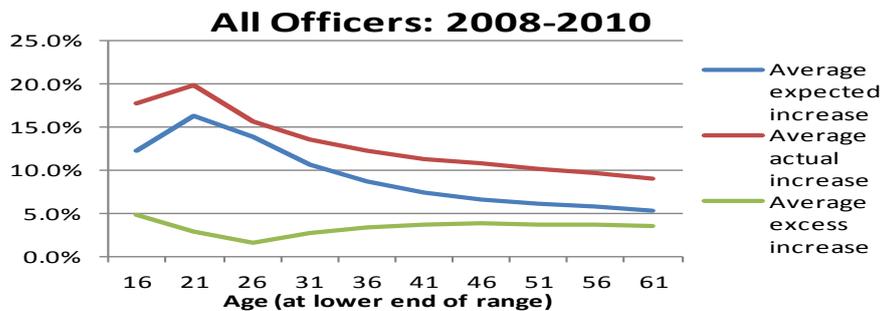




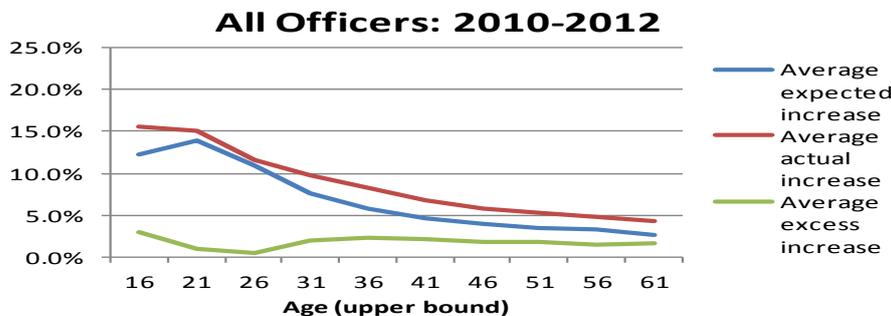
- G9 The results of the Officers' analysis indicate that for most members the actual increases granted over the four-year period were roughly 5% (equivalent to 1.25% pa) higher than expected, after allowing for general pay increases in line with average changes in the AfC pay scales. This applies to both males and females despite the expected levels of increase being different (those for men are generally higher than those for women, reflecting different mixes of staff).
- G10 Analyses carried out for each individual year within the four-year period revealed that most of the higher-than-expected increases for Officers occurred in the first two years of the four-year period with there being lower 'excess' increases in the latter two years. This is demonstrated in Chart G2 (aggregated for males and females), which relate to the periods 31 March 2008 to 31 March 2010 and 31 March 2010 to 31 March 2012.

Chart G2: starter-ender analysis 2008 - 2010 and 2010 - 2012

□



□



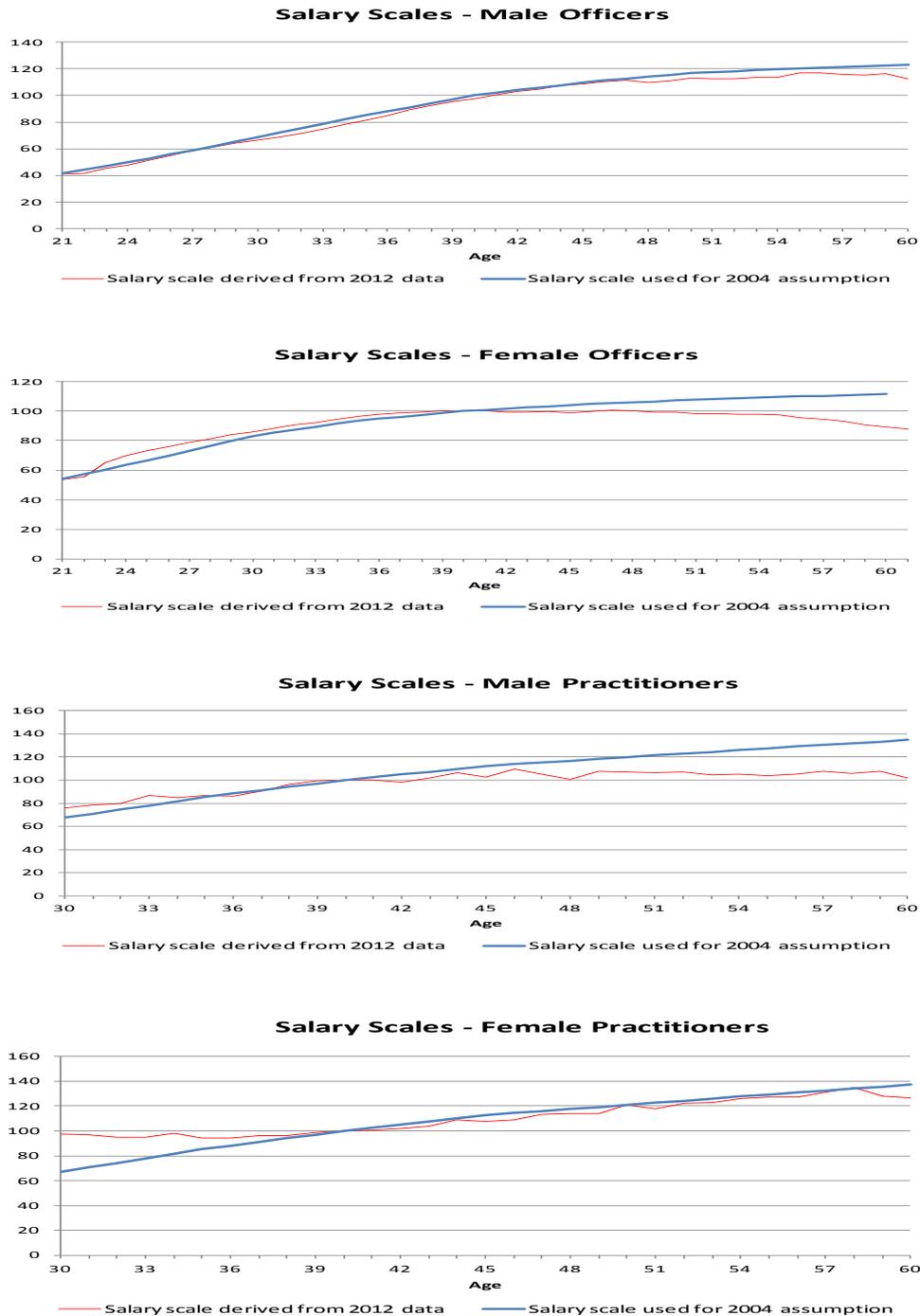
- G11 The above suggests there may be some distortion over the four-year period - possibly in the earlier years as a continuing effect of the introduction of the AfC national pay scales. The pay restraint towards the end of the period may also have introduced some short-term effects which may not be replicated in the longer term.
- G12 Practitioners' pay increased less than expected over the four-year period, even with no allowance for any general pay increases but, the actual rates of increase are relatively unimportant from a valuation perspective since benefits are provided on a career average basis.



(ii) Profile analysis

G13 Chart G3 shows how the age profile of male and female Officers' and Practitioners' average pay compares with a weighted average of the promotional salary scales used for the relevant valuation groups. (These charts are centred round an index value of 100 at the age of 40.)

Chart G3: profile analysis 2008-2012





- G14 At first sight these charts appear to show a different picture to that illustrated by the starter-ender analysis, with there being lower-than-expected increases at the higher ages. 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.

Conclusions based on the 2008-2012 experience analysis

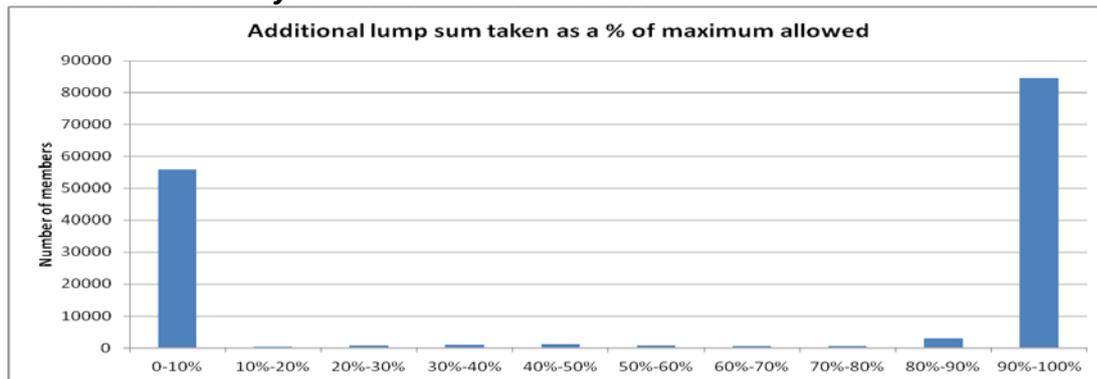
- G15 Given the two analyses might lead to different conclusions our recommendation is that no change should be made to the pay scales as assumed for the 2004 and 2008 valuation. However in recognition of the similarity between some of the scales previously used for differing groups of members, and given that pay progression will be of lesser importance for the reformed scheme, we recommend some grouping of the scales previously used. This grouping results in four differential scales; one for non-manuals and practitioners combined and one for manual staff. In each case with different scales for men and women.



Appendix H: Analysis of commutation

- H1 We were provided with retirement details for some 210,000 members retiring over the five-year period to 31 March 2013. We analysed the amounts of pension exchanged for cash by some 144,000 members of the 1995 section (the commutation assumption for the 2008 section is set in the Directions). The 144,000 members analysed excluded those retiring who did not have an option to take additional cash (ie those who left service before 1 April 2008), those retiring on grounds of serious ill-health (and eligible for full commutation), and other records where the data was not considered to be reliable.
- H2 The analysis shows that overall commutation has been similar to the 2004 set assumption of 78% of the HMRC maximum and that prescribed by HM Treasury for scheme reform purposes of 75% of the HMRC maximum.
- H3 Chart H1 shows that the vast majority of members took either the maximum additional lump sum or no additional lump sum.

Chart H1: Variability in commutation decisions



Proportion commuted by gender

- H4 Table H1 (right-hand column) shows separately by gender the average amount of cash taken over the period as a percentage of the HMRC maximum. It also shows the number of retirements and the amount of pension commuted (expressed as a percentage of the member's pre-commutation pension). Members of the 1995 section need to commute 8.5% of pre-commutation pension to achieve an overall cash sum of 75% of the HMRC maximum (or 9.8% to achieve an overall cash sum of 78% of the HMRC maximum).

Table H1: Proportion commuted by section and gender

	Number of members (000's)	% of pension commuted	Proportion of lump sum taken as a % of HMRC limits
1995 section			
• Male	32	7.5%	73.3%
• Female	112	11.0%	80.9%
Total	144	9.4%	77.5%

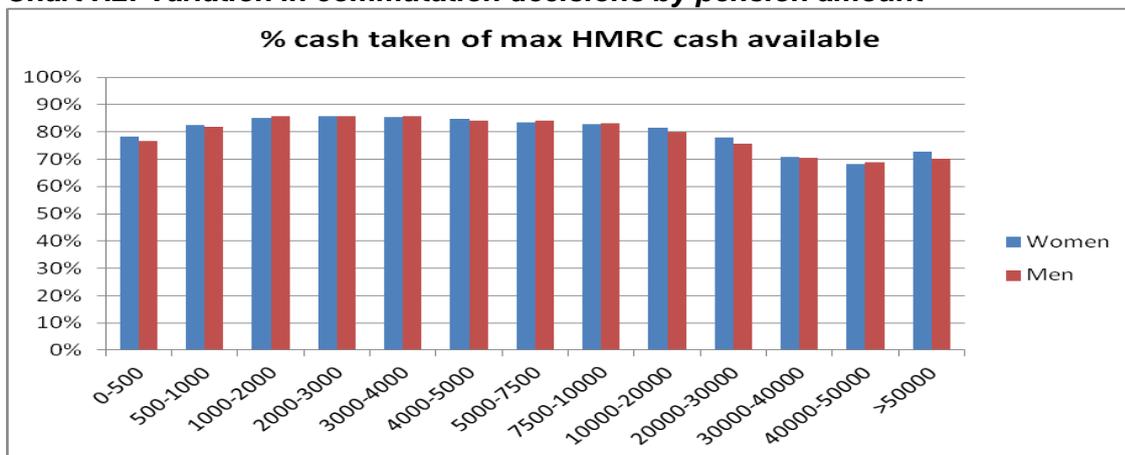


H5 Overall the amounts commuted by members of the 1995 section are similar to the 2004 set assumption and the HM Treasury prescribed reform assumption. This is a result of male members commuting less than the average and females commuting more.

Proportion commuted by pension amount

H6 Chart H2 shows for males and females the relationship between the percentage of maximum cash taken and pre-commutation pension amount.

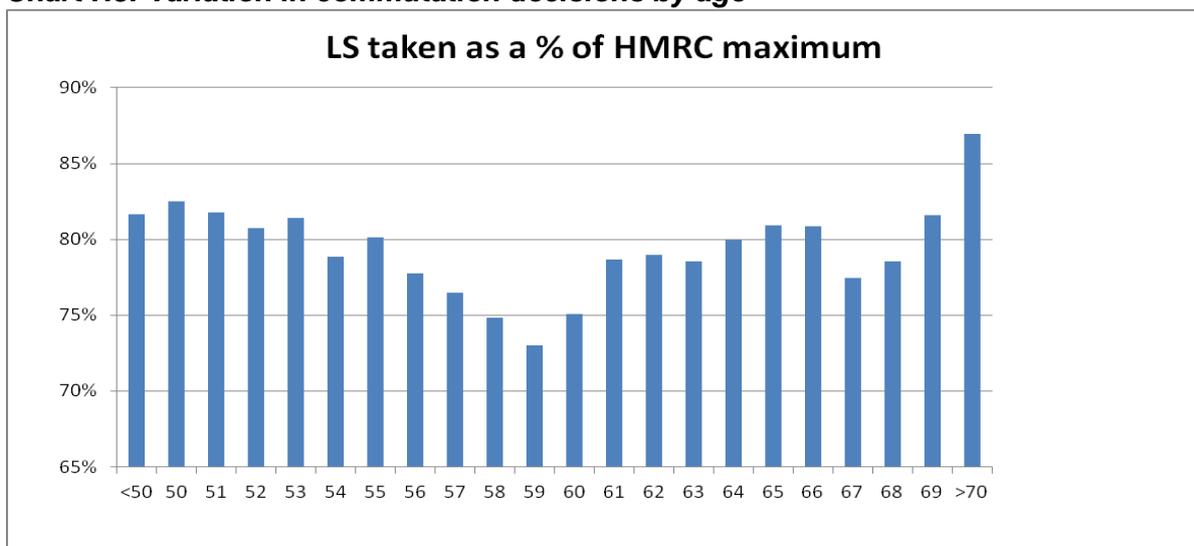
Chart H2: Variation in commutation decisions by pension amount



Proportion commuted by age

H7 Chart H3 shows the relationship between the percentage of maximum cash taken and age at retirement.

Chart H3: Variation in commutation decisions by age





- H8 The above shows a broad trend for higher amounts of cash at earlier ages of retirement - many being ill-health cases, reducing around normal pension age and then increasing again at older ages. There is however substantial variability across the age range.

Recommended assumption

- H9 Based on the analysis of experience over the five-year period ending 31 March 2013 we consider that it would reasonable to set the commutation assumption for the 1995 section such that sufficient pension is commuted to result in a total cash sum of 75% of the HMRC maximum (i.e. 8.5% of member's pension).



Appendix I: Analysis of family statistics

Approach taken to the analysis of proportion partnered

- I1 For members whose pensionable service ended before 1 April 2008 a dependant's pension is payable only to a legal spouse or civil partner. For those in service on or after 1 April 2008 a dependant's pension is payable to a qualifying dependant.
- I2 Our experience analysis looked at the pensioners who died over the four-year period to 31 March 2012 to compare the proportion giving rise to the payment of a dependant's pension. Since almost all experience in this period will relate to those who left service before 1 April 2008, in effect the data analysed is of deaths which result in a surviving legal spouse or civil partner and can be used to set the assumptions for the relevant membership (ie those leaving service before 1 April 2008).
- I3 The data can also be compared with the corresponding proportions assumed married for the 2004 valuation (the same assumptions were used for both the 2004 and 2008 valuations) and with data published by the Office for National Statistics (ONS) in 2008 on the proportions of people at various ages that are married. This ONS data also includes statistics on proportions of people that are cohabiting or 'other' (ie living alone and not married).
- I4 The assumptions for qualifying dependants were set by translation of the relationship between the NHSPS proportions married (or with a civil partner) and the population statistics of that criteria, to the population statistics on proportions partnered.
- I5 Table I1 shows the results of our analysis.

Table I1: Comparison of the proportion of male pensioner deaths during 2008 - 2012 giving rise to a survivor's pension against the 2004 valuation assumptions and ONS tables

Males							
Ages	Actual deaths			2004 assumptions		2008 ONS tables	
	Total	Survivor's pension payable	Proportion with survivor	Expected number of survivors	Actual / Expected	Expected number of survivors	Actual / Expected
40 - 44	23	7	30%	15	47%	14	50%
45 - 49	63	28	44%	46	61%	41	68%
50 - 54	155	97	63%	121	80%	107	90%
55 - 59	360	230	64%	290	79%	261	88%
60 - 64	1,014	670	66%	854	78%	767	87%
65 - 69	1,590	1,099	69%	1,322	83%	1,216	90%
70 - 74	2,230	1,543	69%	1,776	87%	1,682	92%
75 - 79	2,959	1,935	65%	2,178	89%	2,106	92%
80 - 84	3,693	2,211	60%	2,342	94%	2,318	95%
85 - 89	3,658	1,864	51%	1,767	106%	1,883	99%
Over 90	2,965	1,040	35%	798	130%	1,063	98%
All	18,710	10,724	57%	11,510	93%	11,459	94%



Females							
Ages	Actual deaths			2004 assumptions		2008 ONS data	
	Total	Survivor's pension payable	Proportion with survivor	Expected number of survivors	Actual / Expected	Expected number of survivors	Actual / Expected
40 - 44	108	61	56%	87	70%	67	90%
45 - 49	219	122	56%	176	69%	144	85%
50 - 54	442	259	59%	349	74%	303	85%
55 - 59	738	438	59%	560	78%	518	85%
60 - 64	2,155	1,190	55%	1,581	75%	1,509	79%
65 - 69	2,824	1,449	51%	1,932	75%	1,834	79%
70 - 74	3,389	1,264	37%	1,879	67%	1,899	67%
75 - 79	4,781	1,081	23%	2,012	54%	2,033	53%
80 - 84	6,176	548	9%	1,768	31%	1,717	32%
85 - 89	6,878	45	1%	1,138	4%	1,112	4%
Over 90	6,301	3	0%	434	1%	528	1%
All	34,011	6,460	19%	11,916	54%	11,665	55%

- 16 A ratio of 'actual / expected' of less than 100% indicates fewer survivors' pensions are payable compared to the assumption, over 100% indicates more survivors' pensioners are payable.
- 17 The 'actual / expected' ratios drop away rapidly for older female pensioners. This reflects the historical situation whereby unequal eligibility criteria applied to widows and widowers for service prior to 1988 and so the 'actual' experience does not provide reliable information about the proportion of older female pensioners who are married.
- 18 The analysis shows that the number of survivors' pensions that became payable following pensioners' deaths over the four years to 31 March 2012 was lower than both the number expected according to the proportions married assumed for the 2004 valuation and the number expected according to the ONS 'married' tables.
- 19 The derived recommended assumptions using the approach explained above are as set out in Table I2.

Table I2: Recommended assumptions for proportions married

	Proposed proportion married or partnered at death			
	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



Remarriage rates

- I10 We have not analysed remarriage rates but do not expect these to have a material effect on the value of existing spouses' pensions or on the pensions prospectively payable to spouses on the death of those existing pensioners and deferred pensioners who left service before 1 April 2008. We thus recommend no explicit allowance is made for spouses' pensions ceasing in future because of remarriage.

Age difference between member and spouse/partner

- I11 We do not have sufficiently complete data to analyse the age difference between members and their dependants (spouse, civil partner or other partner). We recommend an assumption that men are three years older than their spouse/partner in all cases broadly based on population data.

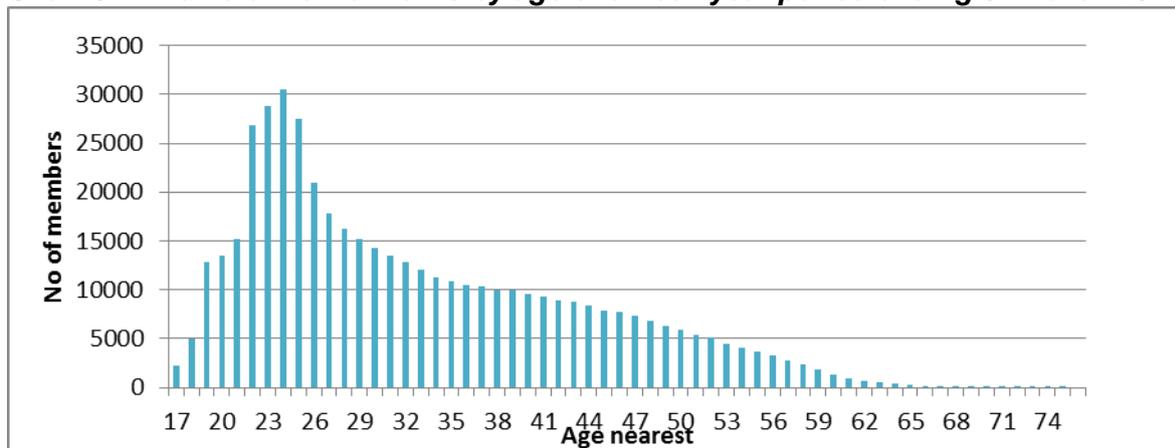


Appendix J: Analysis of new entrants

Analysis of experience

- J1 There were some 472,969 new entrants to the Scheme over the four year period ending 31 March 2012. These were in addition to the 236,476 rejoiners. The profile of the new entrants by age is shown in Chart J1 below.

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

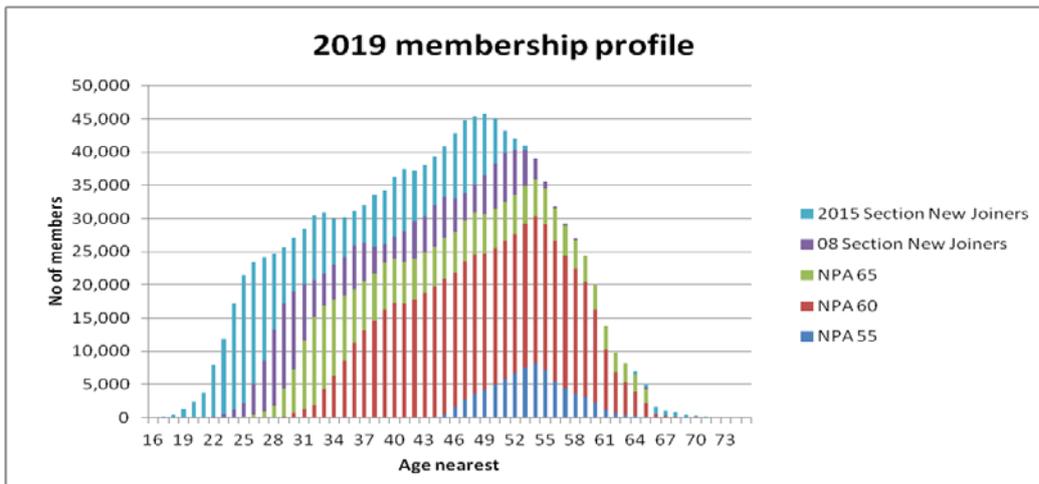
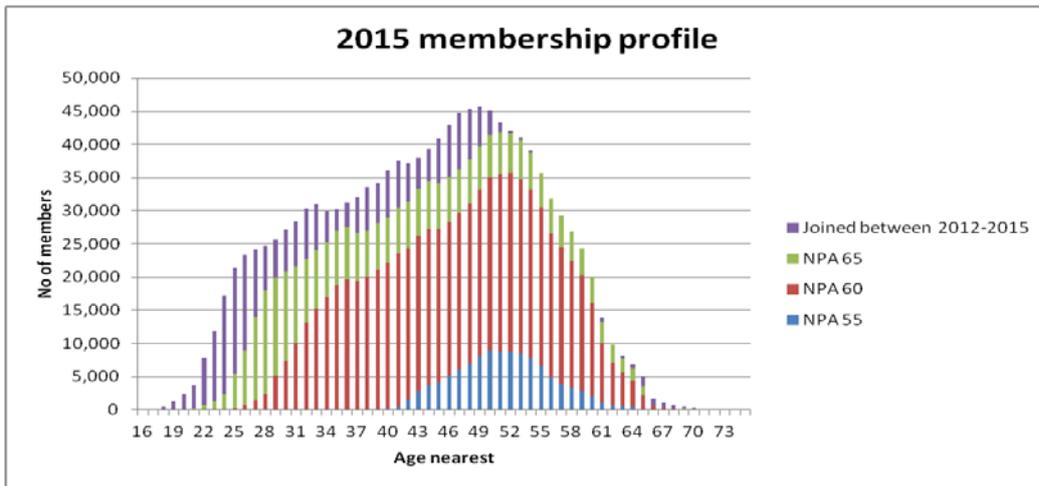
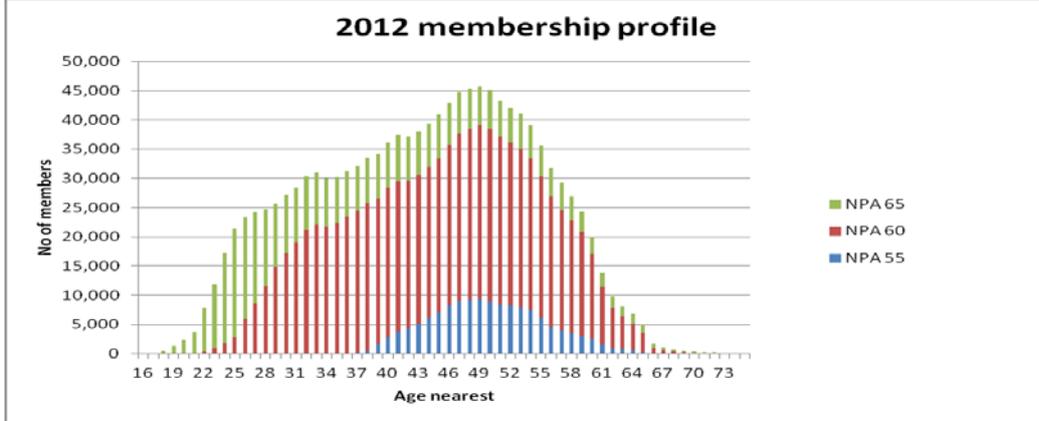


Use of the assumption: whole population

- J2 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 broadly stable payroll is assumed (in real terms) it is reasonable for valuation purposes to assume a stable workforce, in terms of distribution of head count and pay by age and gender.
- J3 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





- J4 The average age of actual new entrants over the four year period ending 31 March 2012 and that implied from the whole population model above are shown in Table J1. This demonstrates that the two approaches to considering the age of new entrants are broadly consistent.

Table J1: Average age and pay of new entrants

	Average age at entry	Average pay at entry
Actual new entrants over four year period ending 31 March 2012	31.7	Not available
Implied new entrants over period 2012 to 2015 under stable population model	33.1	£22,645
Implied new entrants over period 2015 to 2019 under stable population model	32.9	£22,057

Other assumptions

- J5 Using the stable population model above requires some assumption of proportions of males and females assumed to join over the appropriate future periods. It is reasonable for valuation purposes to align this to that required to maintain the same distribution by gender as that at the valuation date.
- J6 We recommend that all new entrants are assumed to experience assumptions in line with the largest valuation group. This simplification does not have a material impact on the valuation results.