NHS Pension Scheme (Scotland)

Actuarial valuation as at 31 March 2016
Report on valuation data

Date: 15 February 2019
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Contents

1   Introduction

1.1   This report is addressed to the Scottish Ministers. It is also being made available to the NHS Pension Scheme (Scotland) ('NHSPS (Scotland)' or 'the Scheme') Scheme Advisory Board (SAB) as part of the consultation process relating to the actuarial valuation of the NHSPS (Scotland) which is being carried out as at 31 March 2016.

1.2   Pension scheme membership data for the NHSPS (Scotland) is required for the actuarial valuation of the Scheme as at 31 March 2016, carried out in accordance with HM Treasury's Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014 as amended ('HMT Directions").

1.3   The membership data is used for the following:

> to calculate valuation results including the uncorrected employer contribution rate, corrected employer contribution rate and past service liability (all valuation data);

> to assess the initial cost cap fund (membership data as at 31 March 2015); and

> to assess elements of the Scheme's demographic experience in order to recommend assumptions for the valuation (movements data 31 March 2012 to 31 March 2016).

1.4   The results of the valuation are critically dependent on the quality and correctness of the data used. The data provided was not fully correct and complete for all members and approximations have been made to enable valuation calculations to be undertaken.

1.5   The purposes of this report are:

> to discuss and summarise the membership data provided, and any checks and adjustments made to the data;

> to enable users of the valuation report to understand the underlying membership data used in the valuation and any issues relating to it; particularly those issues that may impact on the valuation results; and

> to discuss and summarise the movements data provided and to be used to inform decisions around scheme specific assumptions to be used for the valuation.

1.6   All member data and supplementary accounting information provided and discussed in this report were supplied by the Scottish Public Pensions Agency (SPPA). Resource accounts for the relevant period are publicly available.

1.7   In preparing this report, GAD has relied on data and other information supplied by SPPA as described in the report. Any checks that GAD has made on this data and information are limited to those described in the report, including any checks on the overall reasonableness and consistency of the data. These checks do not represent a full independent audit of the data supplied and do not by themselves confirm or guarantee the overall quality or correctness of the data. In particular, GAD has relied on the general completeness and accuracy of the information supplied without independent verification.

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1.8   Summaries of the membership and movements data used for the valuation are provided in section 2 of this report with further information in Appendices A and B of this report respectively.

1.9   We are required to comment on data quality. A considerable number of adjustments and assumptions were necessary to the data to enable the valuation to be completed. In addition other sources of data had to be considered, notably data from the NHS Pension Scheme for England and Wales. In GAD's opinion these adjustments and assumptions are reasonable and appropriate for the purpose of this actuarial valuation. However, it should be noted that the uncorrected employer contribution rate and employer contribution correction cost in this report might have been different if more reliable data had been available.

1.10   Given the potential impact of data deficiencies, GAD recommends that SPPA takes forward initiatives to improve valuation data quality before the next actuarial valuation as at 31 March 2020.

1.11   Throughout this report the totals given for summed data may not be exactly the same as the sum of the components shown due to rounding effects.

1.12   We are content for the Scottish Ministers to release this report to third parties, provided that:

> it is released in full;

> the advice is not quoted selectively or partially;

> GAD is identified as the source of the report, and;

> GAD is notified of such release.

1.13   Third parties whose interests may differ from those of the Scottish Ministers should be encouraged to seek their own actuarial advice where appropriate. 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.

1.14   This work has been carried out in accordance with the applicable Technical Actuarial Standards: TAS 100 and TAS 300 issued by the Financial Reporting council (FRC). The FRC sets technical standards for actuarial work in the UK.

2   Summary of data used for the valuation

Membership data at 31 March 2016

2.1   The membership data to be used for the purposes of the 2016 valuation is summarised below together with comparative data at 2015 (where relevant) and as used for the 2012 valuation. Detailed tables are set out in Appendix A.

Chart 2.1: Number of active members
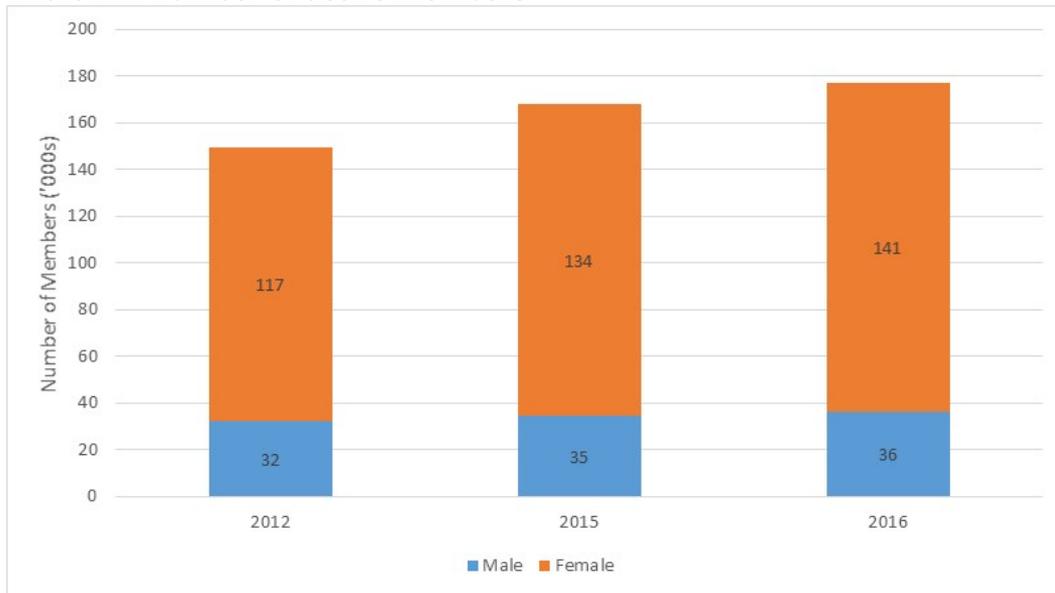
Chart 2.2: Active total pensionable pay (actual annualised pay and whole-time equivalent pay)
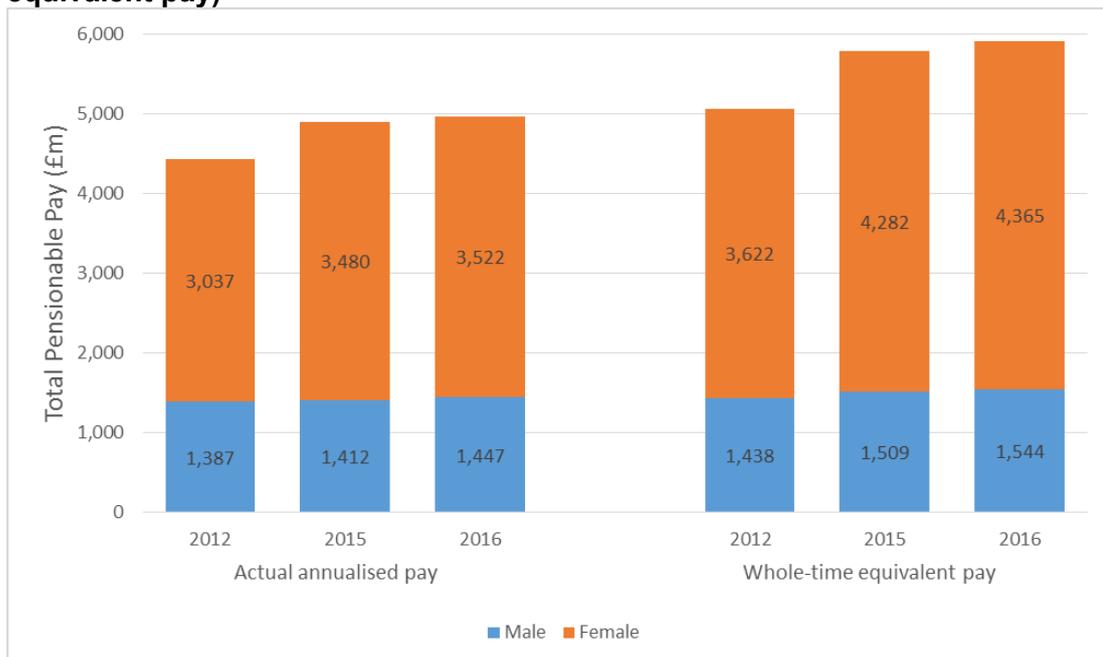
Chart 2.3: Number of deferred members
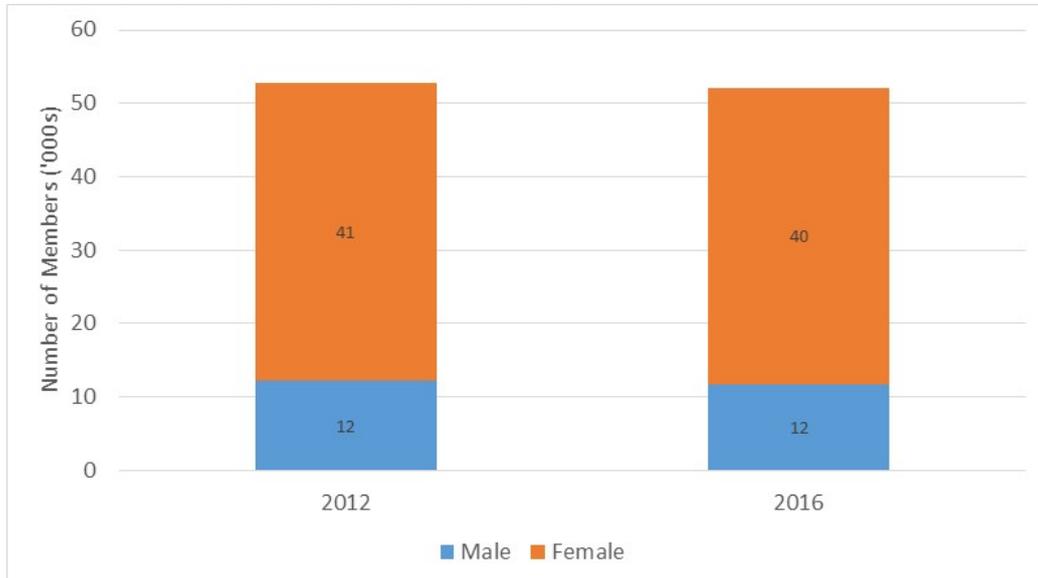
Chart 2.4: Total deferred pension
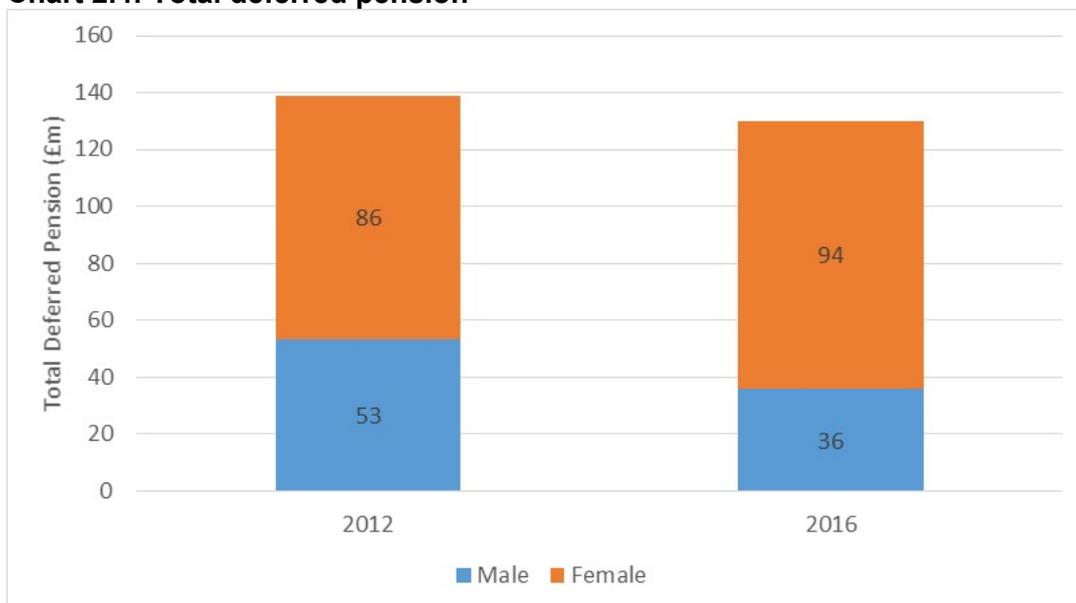
Chart 2.5: Number of pensioners and dependants
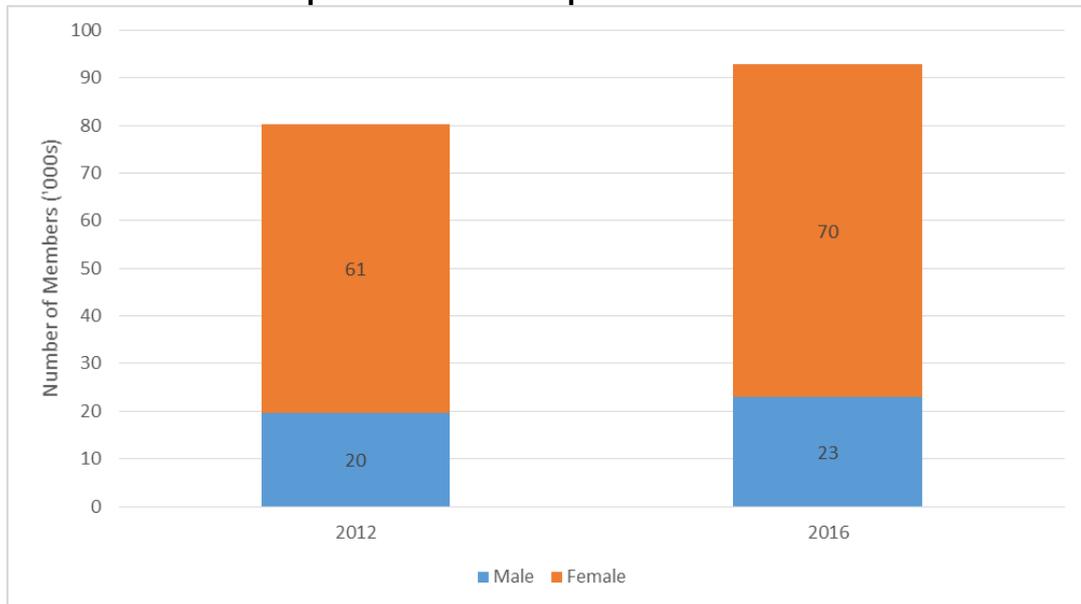
Chart 2.6: Total pension in payment (pensioners and dependants)
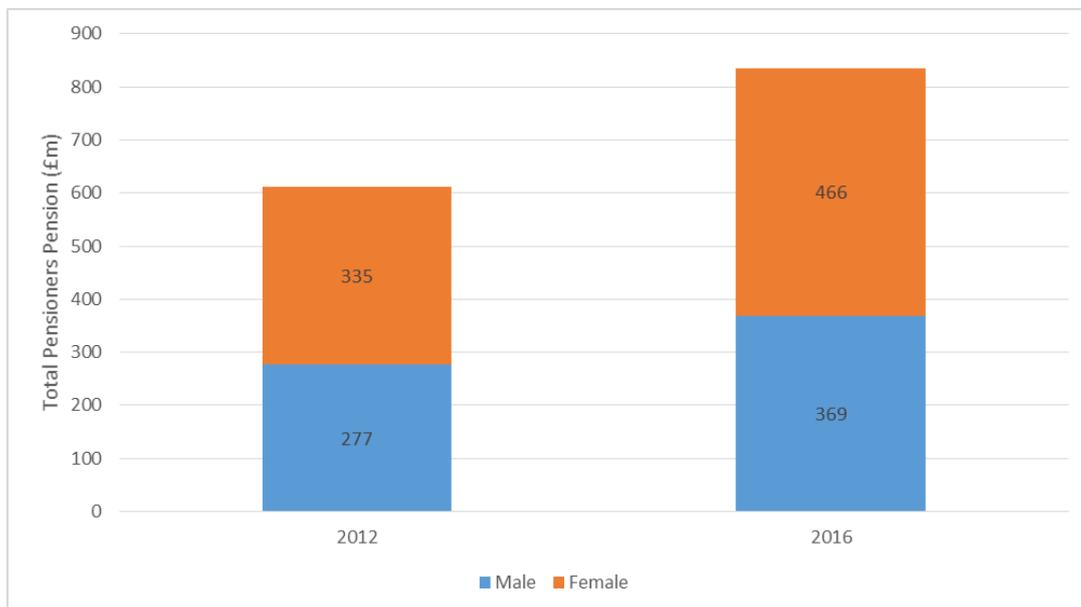
2.2   The charts above show an increase between 2012 and 2016 in the active and pensioner membership by both headcount and total payroll / pension roll. Deferred headcount and total deferred pensions haven fallen marginally between 2012 and 2016.

2.3   Around 300k records were provided to GAD across all three membership categories (active, deferred and pensioner). Checks were applied to these records to ensure all key data items are provided and reliable for valuation purposes. Some adjustments were made where reasonable estimates of missing or unreliable data could be made. Further details of these estimates are provided in section 3 and Appendix F. Where reasonable estimates could not be made records with key data items either missing or unreliable were excluded and remaining data uprated. This approach implicitly assumes that the records with missing/unreliable data have the same average profile as the complete/reliable records. The derivation of the uprating factors and the checks and adjustments applied to the data are explained further in the next section of this report. The overall uprating factors applied to each category of member are shown below with the comparative factors at 2015 and at the 2012 valuation.

Table 2.1: Uprating factors

	Uprating factor 2016	**Uprating factor 2015**	**Uprating factor 2012**
Active members	1.09	1.03	1.02
Deferred members	1.03	n/a	1.16
Pensioner members	1.00	n/a	1.00
Total membership	**1.05**	**n/a**	**1.04**

2.4   Making assumptions about missing or unreliable data and allowing for known members with unusable data by uprating introduces uncertainty into the valuation results. Appendix G gives an indication of the potential level of uncertainty introduced by the approach taken to missing or unreliable data.

2.5   The uprating approach has been taken for many years for NHS scheme valuations. We have no evidence to indicate that this approach and the implicit assumption is not appropriate for this valuation. The sizeable number of data adjustments applied owing to apparent problems with the data extract process do introduce further uncertainty into the valuation calculations. Whilst in our opinion the data as adjusted does not appear to be unreasonable for use for the purposes of the current valuation we recommend identified issues are rectified before subsequent data extracts are commissioned.

Movements data 31 March 2012 to 31 March 2016

2.6   The movements data provided is used for the purposes of informing the demographic assumptions to be used for the 2016 valuation. It is used in conjunction with the membership data at both 2016 and 2015 to determine an element of the cost cap calculation termed the Net Leavers Liability ('NLL'). The charts below show a reconciliation of the movements between 2012 and 2016. The underlying numbers and some further information is set out in Appendix B. Appendix G gives an indication of the potential level of uncertainty introduced into the valuation results owing to missing or unreliable movements data.

## Chart 2.7: Active membership reconciliation
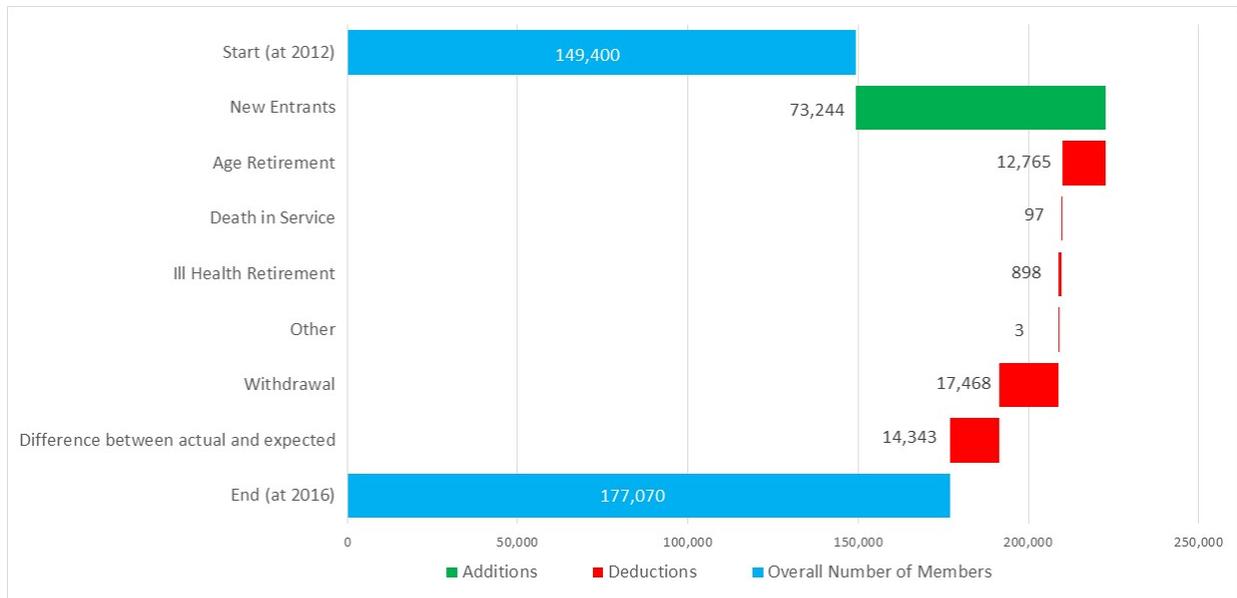
Chart 2.8: Deferred membership reconciliation

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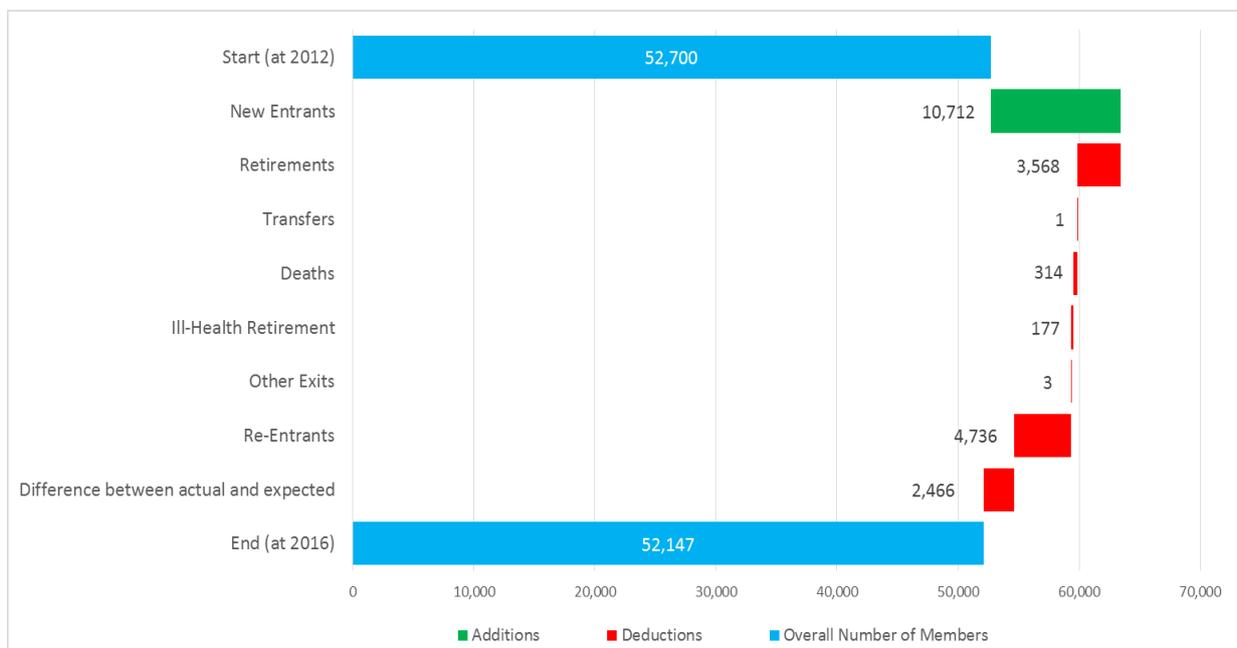
Chart 2.9: Pensioner membership reconciliation
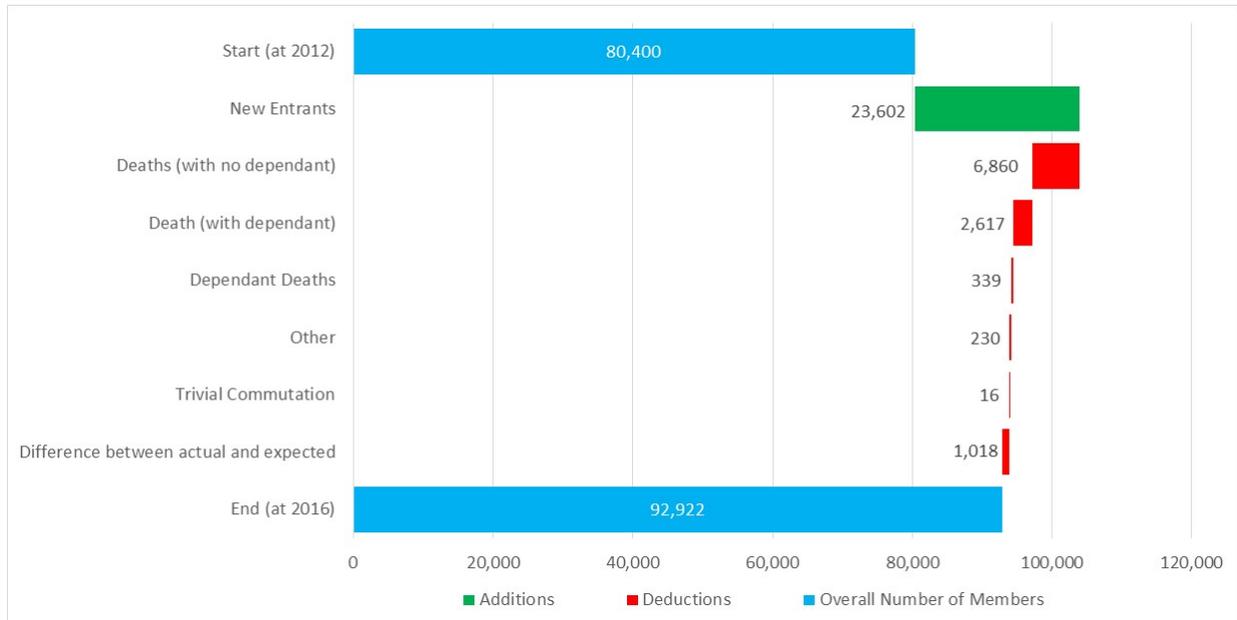
Data quality

2.7 The introduction of the reformed NHS scheme in April 2015 and the requirements of the valuation Directions means data requirements for this valuation are considerably expanded compared to the requirements for the 2012 valuation. SPPA have been required to build a new extraction process to accommodate these requirements whilst also developing the administrative capability to deal with the new scheme. In the circumstances it is understandable that both the headline level of completeness of membership data has deteriorated since the 2012 valuation and that no significant improvements in movements data has been achieved since the 2012 valuation.

Membership data

2.8 The headline level of completeness of member data has deteriorated since the 2012 valuation. The level of completeness achieved has also required considerable manipulation of data, including cross referencing with prior year data sets and direct intervention to 'correct' identified errors in the extract process. Based on comparisons between data items at different valuation dates for a sample of individual members it was evidenced that there was a systematic error in the data extraction of reckonable service which could be explained by a change in the extraction process. Whilst we have taken the view the manipulation undertaken is appropriate for the current valuation, and is not expected to materially detract from the quality of the valuation results, we recommend that timely action is taken to rectify the underlying issues before the 2020 valuation data is due.

Movements data

2.9 The movements data available for the 2012 valuation was not adequate to enable full analysis to inform the setting of scheme specific assumptions. In many cases assumptions were then set based on the analysis undertaken for the NHS scheme in England and Wales. Similarly for the current valuation, the movements data was not appropriate for setting scheme specific assumptions in most cases. Charts 2.7 to 2.9 show there was a material discrepancy between the number of actual and expected members in the 2016 data, suggesting the movements data did not fully capture all movements between member categories. Although the absence of reliable movements data to set assumptions is not considered critical for this valuation since other data sources have been able to be considered, it should be recognised that should movements data become available for future valuations it could result in recommendations regarding appropriate assumptions which lead to greater changes in valuation results than otherwise.

2.10 The movements data is additionally for the first time at this valuation used to calculate the Net Leavers Liability ('NLL'). This is a component part of the cost cap calculation. To accurately calculate NLL in accordance with the directions requires full movement data for all members who were active in 2015 and are no longer active at the 2016 valuation. Some approximation has been required to determine NLL for all valuations being undertaken in accordance with the valuation directions.

2.11 Further information on how assumptions have been set and the NLL calculated including an indication of the potential uncertainty in valuation results is provided in the report NHS Pension Scheme (Scotland): Actuarial Valuation as at 31 March 2016: Advice on Assumptions dated with today's date. Again we recommend that timely action is taken to rectify the underlying issues before the 2020 valuation data is due.

2.12 The issues we have encountered with the data prepared for valuation purposes do not directly imply that the scheme data are of insufficient quality to support the delivery of benefits to members. However, the quality of scheme data and the management of risks associated with data are of paramount importance and are subjects with which the Pensions Regulator is concerned. In this regard you should note that GAD does have regular discussions with the Regulator, on a non-scheme specific basis, to promote a wider understanding of the role of the actuarial valuation as it relates to data quality of the public service pension schemes.

3   Data provided and checks and adjustments made

Membership data at 31 March 2016 and 31 March 2015

3.1   Individual member data was supplied for all active (officer, practitioner and concurrent officer and practitioner) members, deferred members and current beneficiaries of the Scheme at the valuation date. The individual data items supplied which are critical to the valuation calculations are summarised in Appendix D. The chart below shows the total number of valid* records (i.e. key data items are complete and appear to be reliable), the total number of records excluded that are rated up for and the total number of immediate exclusions without rate up. Further details are set out in Appendix F.

*For active members valid records for this purpose include 110k records where GAD have made estimates of individual data items as set out in Appendix F.

Chart 3.1: Summary of data provided and excluded
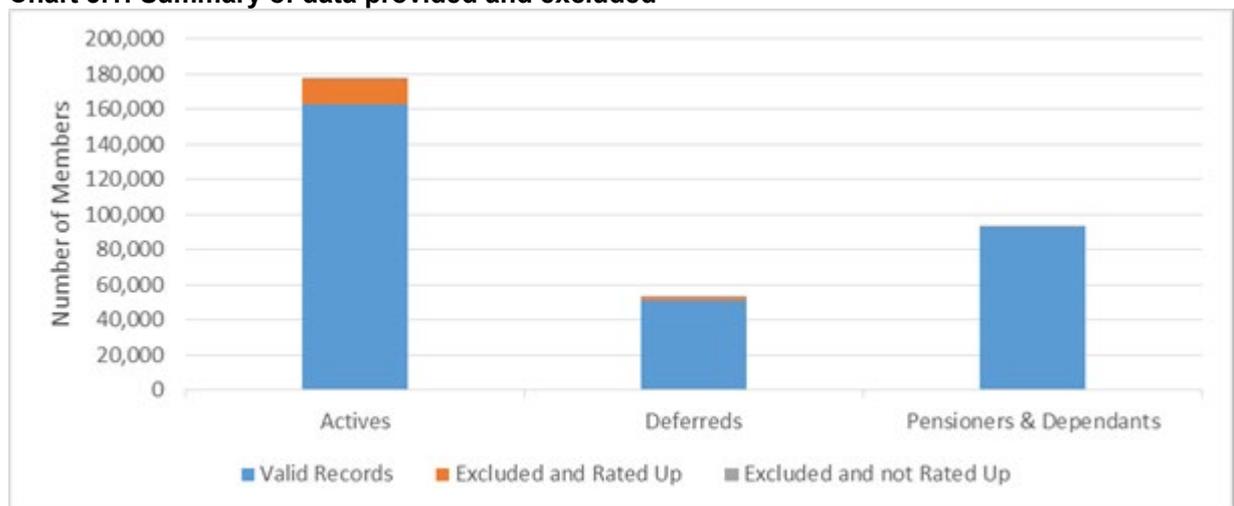
Checks made and adjustments applied

3.2   All key data items were checked against the specification requested for both completeness and consistency.

3.3   Checks were carried out to determine which records would need to be excluded based on applying reasonableness tests to key data items including comparisons between data items at different valuation dates for a sample of individual members. The checks also identified a significant number of areas were data items appeared to have been systematically extracted incorrectly and where adjustments to the data could be made to avoid the need to exclude the records. Data 'corrections' were made for 110k active members. The checks and adjustments applied are summarised in Appendix F.

3.4   Based on the checks applied some records were excluded from the dataset for valuation purposes. Uprating factors were determined for each membership category equal to the ratio of known valid records and the number of records with adequate data. Implicitly this uprating approach assumes that excluded records have the same average profile (ie age, sex, pay, service) as included records. Tables 3.1 and 3.2 shows the derivation of the uprating factors[1].

Table 3.1: Derivation of uprating factors (31 March 2016)

31-Mar-16	No of records received (000s)	Number of valid* records (000s) (A)	Number of exclusions (000s)	Number of members after exclusions (000s) (B)	Uprating factor (A/B)
Active members	177.1	177.1	14.3	162.8	1.09
Deferred members	52.5	52.1	1.5	50.6	1.03
Pensioner members	93.0	92.9	0.1	92.8	1.00
Total membership	**322.6**	**322.1**	**15.9**	**306.2**	**1.05**

**For active members valid records for this purpose include 110k records where GAD have made estimates of individual data items as set out in Appendix F.

Table 3.2: Derivation of uprating factors (31 March 2015)

31-Mar-15	No of records received (000s)	Number of valid records (000s) (A)	Number of exclusions (000s)	Number of members after exclusions (000s) (B)	Uprating factor (A/B)
Active members	169.2	169.2	4.8	164.4	1.03
Total membership	**312.6**	**310.9**	**6.5**	**304.4**	**1.02**

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[1] In practice uprating factors are determined for each identifiable valuation group (see Appendix C)

Movements data – 31 March 2012 to 31 March 2016

3.5   Individual member movement records were supplied for all members who changed category of membership (ie active, deferred or pensioner) between the previous and current valuation dates. The movements data is analysed and used to inform how assumptions of future member behaviours should be set for the valuation. The key data items provided for member movements are set out in Appendix E.

3.6   Limited checks were applied to movements data and records were only excluded if key missing data materially impacted the analysis being undertaken. In general this was only the case for commutation analysis. The checks and exclusions are summarised in Appendix H.

Accounting information

3.7   Published resource accounts were available for the full intervaluation period. Certain pieces of financial accounting information have been used to perform independent checks on the dataset supplied. These checks and the data used are set out in Appendix F.

Benefit information

3.8   A summary of the benefits provided to members of the Scheme is given in Appendix I. SPPA has confirmed that the only uncertainty that they are aware of about the form of benefits that the scheme is liable to provide is the potential requirement for sex equalisation of GMPs. No allowance has been made for this in the valuation calculations.

Appendix A: Summary of membership data

Table A1: Comparison of active membership as at 31 March 2012 and 31 March 2016 (final datasets after rating up)

Valuation group	2012						2016					
	Number of members (000's)	Total pensionable pay[1] (£m)	Average pensionable pay (£)	Average age (weighted by WTE pay) (yrs)	Average reckonable service[2] (yrs)	Average accrued pension[3,4] (£)	Number of members (000's)	Total pensionable pay[1] (£m)	Average pensionable pay (£)	Average age (weighted by WTE pay) (yrs)	Average reckonable service[2] (yrs)	Average accrued pension[3] (£)
1	17.4	730	42,046	46.7	13.3	9,321						
11	74.1	1,811	24,455	43.1	9.7	4,134						
2	1.5	62	42,439	50.4	30.2	19,377	0.9	43	46,620	51.7	34.1	19,265
12	3.1	108	34,764	49.9	27.7	15,691	2.0	78	38,413	51.4	30.9	15,622
3	5.7	130	22,795	48.9	13.3	4,358						
13	5.6	83	14,735	46.5	7.5	1,993						
5[5]	2.8	108	38,933	35.9	4.1	2,983	32.2	1,118	34,723	45.4	10.5	6,950
15[5]	5.5	157	28,759	35.0	4.6	2,374	134.4	3,177	23,639	44.1	9.5	4,565
7	2.3	223	96,338	47.3	n/a	31,043	2.1	217	104,994	48.7	n/a	36,377
17	2.8	177	63,206	44.8	n/a	17,119	3.0	212	71,652	46.6	n/a	21,283
8	1.6	99	63,280	43.0	n/a	16,423	1.3	69	54,197	44.5	n/a	21,083
18	1.3	65	48,363	38.9	n/a	9,299	1.2	54	44,682	41.9	n/a	13,007
9	0.9	31	33,706	49.1	22.4	10,086						
19	18.4	534	28,961	49.5	20.3	8,966						
10	0.1	3	27,145	49.0	10.2	4,458						
20	6.3	102	16,101	48.3	8.8	2,579						
All male	**32.2**	**1,387**	**43,043**	**46.1**	**13.5**	**10,271**	**36.5**	**1,447**	**39,681**	**46.1**	**11.1**	**9,418**
All female	**117.2**	**3,037**	**25,921**	**44.3**	**11.5**	**5,301**	**140.6**	**3,522**	**25,044**	**44.3**	**9.8**	**5,150**
All	**149.4**	**4,424**	**29,614**	**44.8**	**11.9**	**6,373**	**177.1**	**4,969**	**28,058**	**44.8**	**10.1**	**6,029**

1. The pay shown is the actual salary for the time worked. The pensionable pay has been uprated to be in line with the contribution implied payroll.
2. Reckonable service excludes any service accrued on a CARE basis.
3. Any accrued CARE pension rights held by officers that relate to past service as practitioner are also valued.
4. The practitioner pension shown here doesn't include practitioner flexibilities/FVEC; these are valued in addition to the pension shown above.
5. The 2016 valuation dataset includes all uncategorised members within groups 5 and 15. Special class nurses (valuation groups 9 and 19) were not identifiable from the data.

Table A2: Final membership data after rating up for setting cost cap fund (active membership as at 31 March 2015)

Valuation group	Number of members (000's)	Total pensionable pay[1] (£m)	Average pensionable pay (£)	Total WTE Pay (£m)	Average age (weighted by WTE pay) (yrs)	Average reckonable service[2] (yrs)	Average accrued pension[3] (£)
					2015		
1							
11							
2	1.1	49	46,235	50	51.7	28.1	18,078
12	2.4	94	38,786	98	51.4	26.5	15,014
3							
13							
5[4]	30.4	1,089	35,808	1,179	45.5	11.5	7,229
15[4]	128.1	3,141	24,519	3,936	44.1	10.3	4,718
7	2.1	208	99,048	208	47.7	N/A	33,915
17	2.9	198	68,276	198	45.5	N/A	19,118
8	1.2	66	54,491	72	43.7	N/A	19,622
18	1.0	47	44,765	50	40.8	N/A	11,707
9							
19							
10							
20							
All male	**34.9**	**1,412**	**40,446**	**1,509**	**45.9**	**12.1**	**9,615**
All female	**134.4**	**3,480**	**25,892**	**4,282**	**44.3**	**10.6**	**5,265**
All	**169.2**	**4,891**	**28,909**	**5,791**	**44.8**	**10.9**	**6,161**

1. The pay shown is the actual salary for the time worked. The pensionable pay has been uprated to be in line with the contribution implied payroll.
2. Reckonable service excludes any service accrued on a CARE basis.
3. Any accrued CARE pension rights held by officers that relate to past service as practitioner are also valued.
4. The 2015 valuation dataset includes all uncategorised members within groups 5 and 15. Special class nurses (valuation groups 9 and 19) were not identifiable from the data.

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Table A3: Active Membership split by protection status as at 31 March 2016

Scheme/Section	Number of members	Total pensionable Pay[1]	Total WTE pensionable salary	Average age[2]	Average service[3]
	(000s)	(£m)	(£m)	(yrs)	(yrs)
Protected 1995[4]	34	1,171	1,255	56.3	20.4
Protected 2008[4]	1	33	38	61.8	9.6
Unprotected 1995[4]	66	2,355	2,675	44.0	13.3
Unprotected 2008[4]	65	1,308	1,721	38.7	3.3
New to 2015 scheme	11	101	219	32.8	n/a
Total M	36	1,447	1,544	46.1	11.1
Total F	141	3,522	4,365	44.3	9.8
Total 2016	177	4,969[4]	5,908	44.8	10.1
Total 2015	169	4,891[4]	5,791	44.8	10.9

[1] The pay shown is actual pay for the time worked
[2] Weighted by whole time equivalent pensionable salary.
[3] In WTE years, including transferred in service, excluding practitioners
[4] Pensionable pay has been uprated to be in line with contribution implied payroll.

Table A4: Comparison of deferred membership as at 31 March 2012 and 31 March 2016 (final datasets after rating up)

	Section	2012***				2016*			
		Number of members (000's)	Total deferred pension[1] (£m)	Average pension[1] (£)	Average age (weighted by pension) (yrs)	Number of members (000's)	Total deferred pension[2] (£m)	Average pension[2] (£)	Average age (weighted by pension) (yrs)
Male	1995					10.5	33.1	3,149	51.9
Female	1995					36.9	88.7	2,406	50.4
Male	2008					1.2	2.9	2,371	45.6
Female	2008					3.6	5.1	1,437	41.8
Male	2015**								
Female	2015**								
Male		**12.2**	**53.3**	**4,369**	**50.6**	**11.7**	**36.0**	**3,077**	**51.4**
Female		**40.5**	**85.5**	**2,111**	**47.6**	**40.5**	**93.8**	**2,316**	**49.9**
Total		**52.7**	**138.8**	**2,634**	**48.8**	**52.1**	**129.8**	**2,489**	**50.3**

*   *Members with service in both 1995 and 2008 schemes have been included with 2008 scheme members*

**   *There were no 2015 scheme deferred members identified in the data*

***   *Breakdown of members by section not readily available as at 31 March 2012*

1.   2012 pension amounts do not include the April 2012 PI.
2.   2016 pension amounts include the April 2016 PI.

Table A5: Comparison of pensioner membership as at 31 March 2012 and 31 March 2016 (final datasets after rating up)

Type of benefit		2012				2016			
		Number of members (000's)	Total pension[1] (£m)	Average pension[1] (£)	Average age (weighted by pension) (yrs)	Number of members (000's)	Total pension[2] (£m)	Average pension[2] (£)	Average age (weighted by pension) (yrs)
Age retirement	Male	11	180	17,104	70.5	13	274	20,316	70.4
	Female	38	198	5,294	69.7	47	308	6,510	68.9
	Total	**48**	**378**	**7,882**	**70**	**61**	**582**	**9,577**	**69.6**
Ill-health retirement	Male	2	26	10,808	65.9	3	36	12,035	68
	Female	10	50	5,284	65.8	11	66	6,068	67.4
	Total	**12**	**76**	**6,417**	**65.9**	**14**	**103**	**7,352**	**67.6**
Redundancy	Male	2	31	15,968	71.7	2	50	20,205	70
	Female	4	28	7,347	71.1	5	45	8,591	69.6
	Total	**6**	**59**	**10,251**	**71.4**	**8**	**95**	**12,306**	**69.8**
Spouses and other dependants	Male	3	8	2,284	56.8	4	9	2,322	60.2
	Female	7	43	5,897	73.5	7	47	7,170	75.4
	Total	**11**	**50**	**4,769**	**71**	**11**	**56**	**5,360**	**72.9**
Uncategorised[3]	Male	1	33	23,054	69.4	0	0	0	0
	Female	3	16	5,671	69.3	0	0	0	0
	Total	**4**	**48**	**11,497**	**69.4**	**0**	**0**	**0**	**0**
All	**Male**	**20**	**277**	**14,148**	**69.7**	**23**	**369**	**16,124**	**69.8**
	Female	**61**	**335**	**5,510**	**69.7**	**70**	**466**	**6,659**	**69.4**
	Total	**80**	**612**	**7,615**	**69.7**	**93**	**835**	**8,991**	**69.6**

1. 2012 pension amounts do not include the April 2012 PI.
2. 2016 pension amounts include the April 2016 PI
3. These members have been re-categorised into age and ill-health retirements depending on their age at date of retirement in the 2016 dataset.

**Chart A1: Active Members whole-time equivalent pensionable salary by age**

NHS S Active Membership - analysis of 2012 and 2016 datasets (WTE pay)
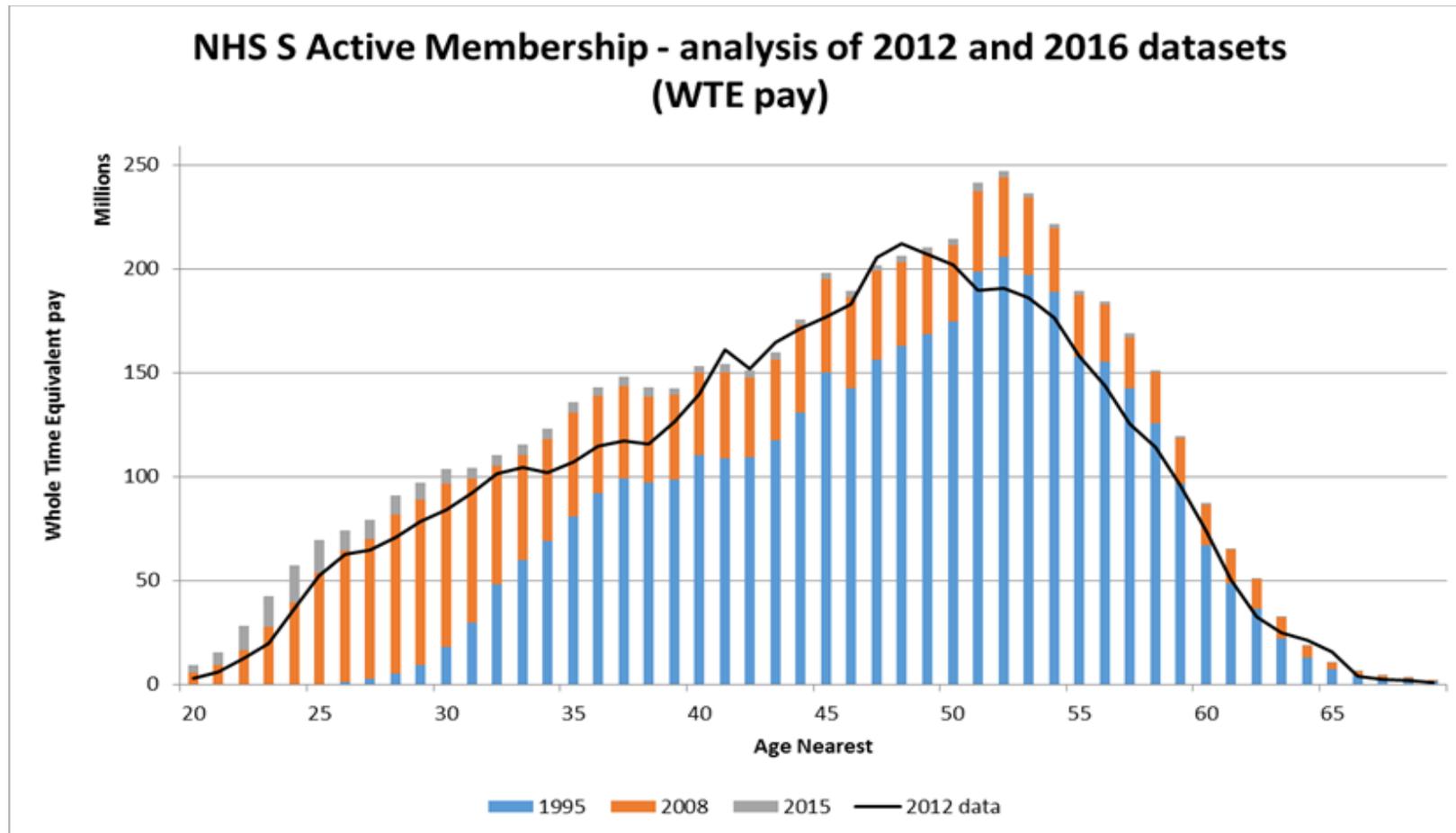
Chart A2: Deferred pension data by age

NHS S Deferred Membership - Analysis of 2012 and 2016 Datasets
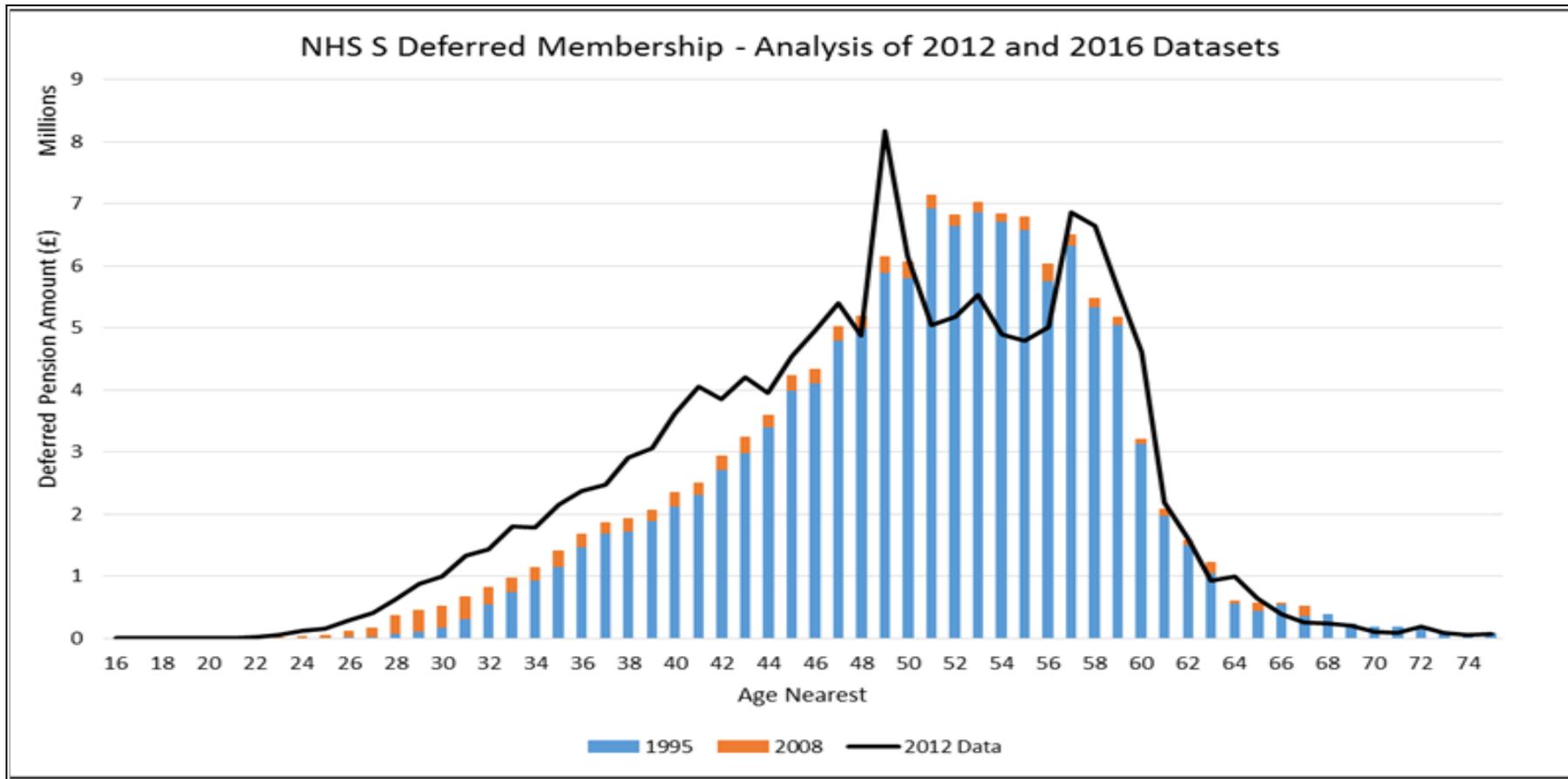
Chart A3: Summary of pension amount by age

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NHS Pension Scheme (Scotland)

Actuarial valuation as at 31 March 2016
Report on valuation data
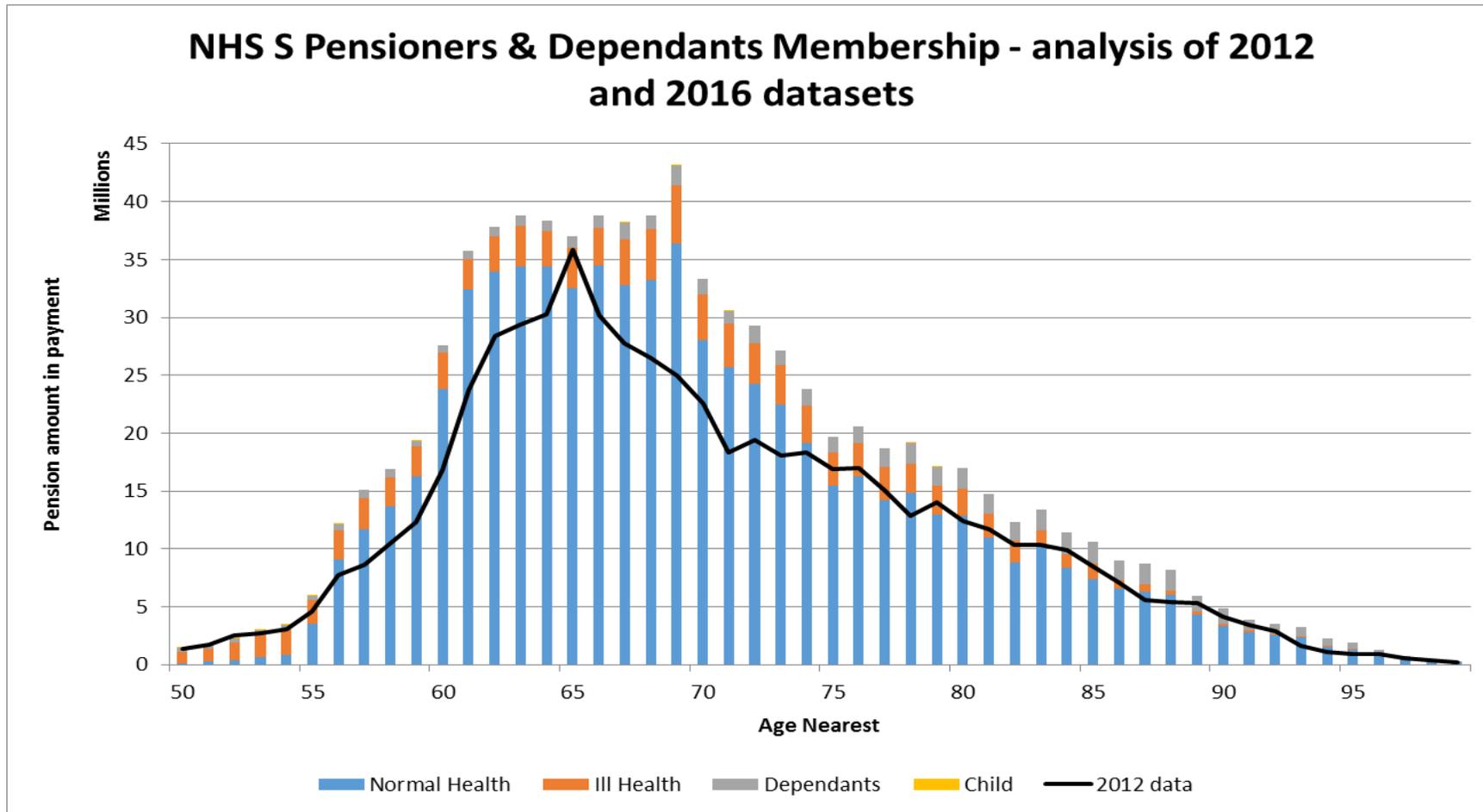
Chart A4: Distribution of whole time equivalent pensionable pay as at 31 March 2016

Government
Actuary's
Department

NHS Pension Scheme (Scotland)

*Actuarial valuation as at 31 March 2016*
*Report on valuation data*
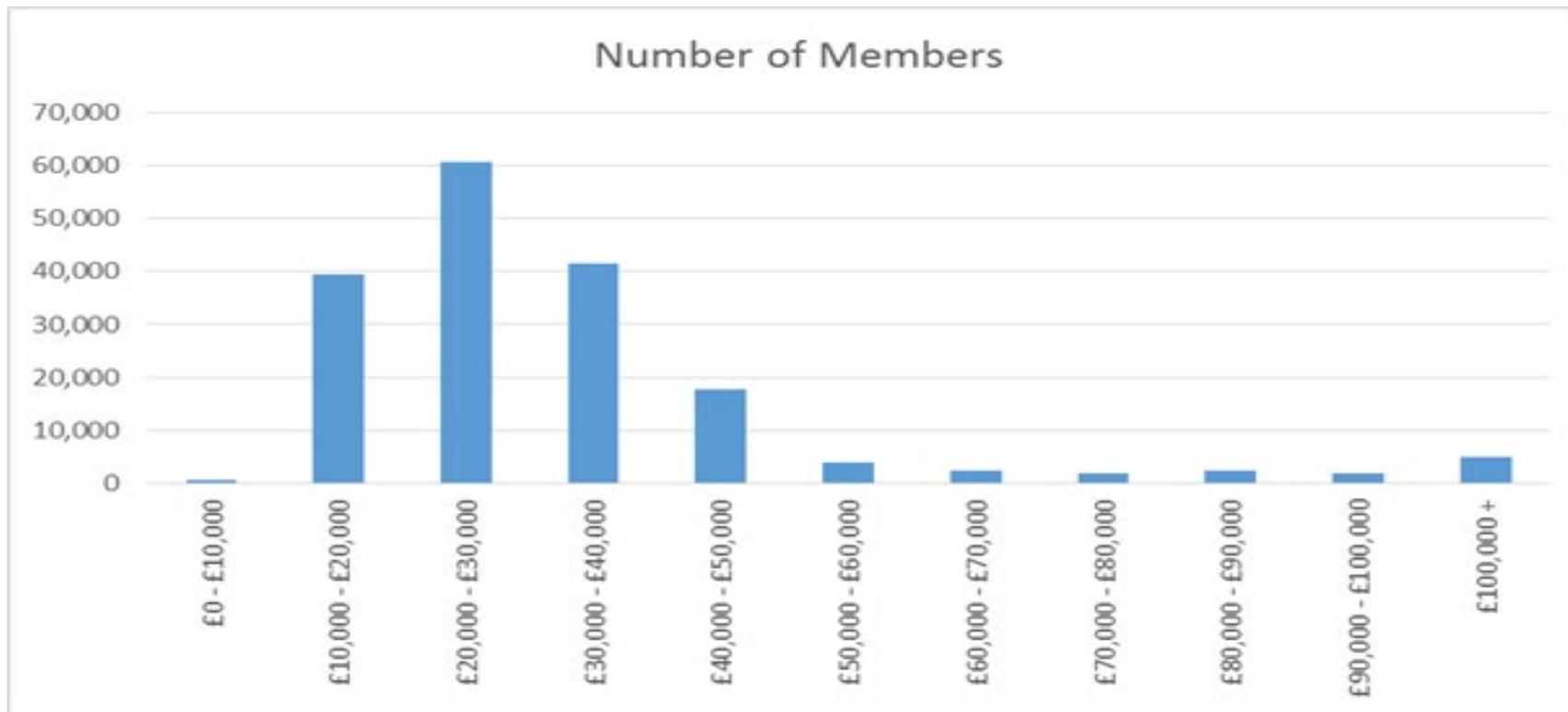
Chart A5: Distribution of pension amount in payment as at 31 March 2016 (excluding dependants and children)
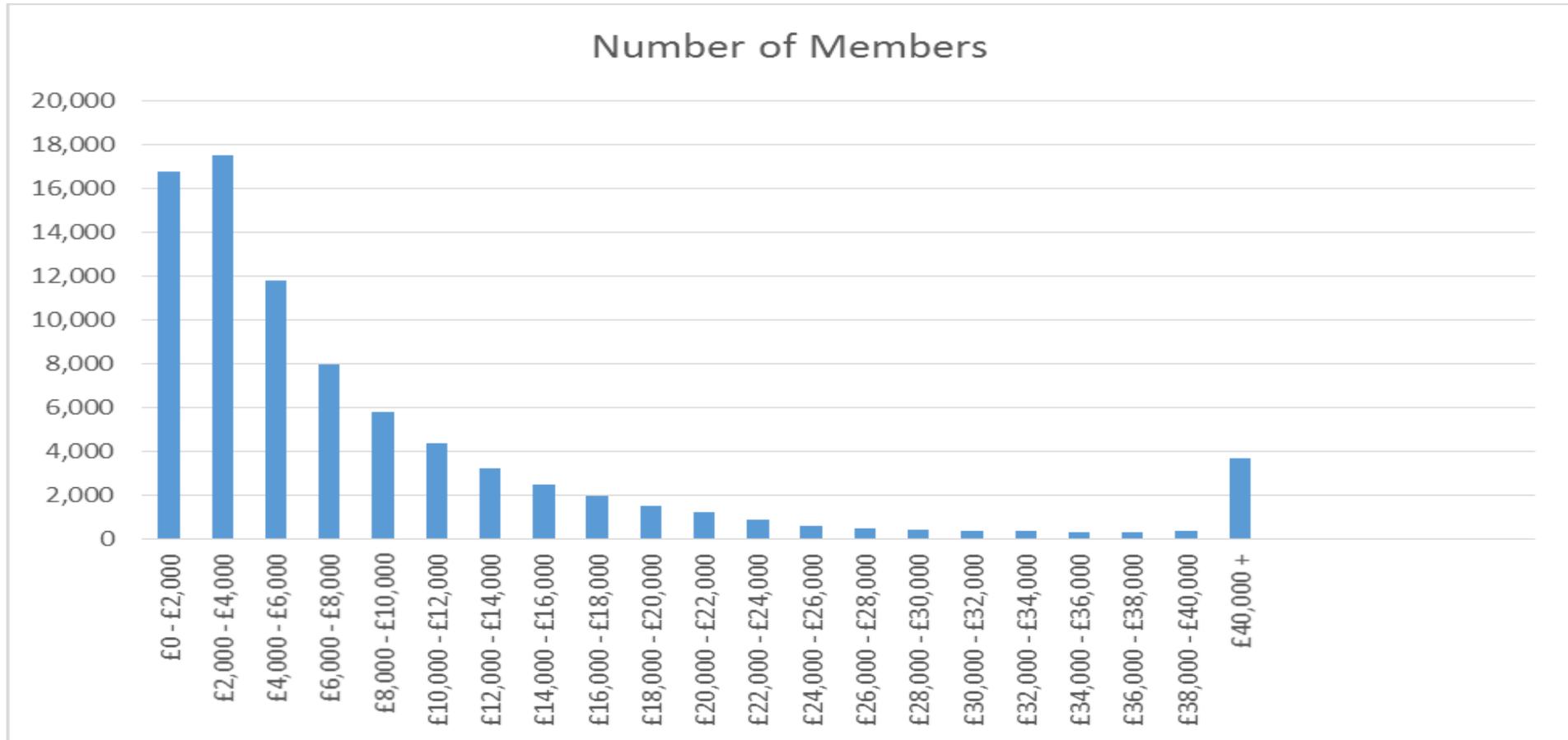
Appendix B: Summary of movements data

Table B1: Reconciliation of membership over the intervaluation period (2012-16) and the prior intervaluation period (2008-12)

	Reconciliation over intervaluation period 2012-2016 000s	Prior intervaluation period 2008-2012 000s	Resource Accounts 2012-2016 000s
Actives			
Number at 31/3/12	149.4	151.0	161.1[d]
Additions:			101.5
• New entrants	59.1	31.1[a]	
• Rejoiners and re-employed	14.2		
Deductions:			(63.1)
• Deaths	(0.1)	(0.4)[a]	
• Retirements	(13.7)	(10.6)[a]	
• Withdrawals	(17.5)	(30.2)[a]	
• Other exits	(0.0)		
Number expected at 31/3/16	191.4*	140.8	
Valuation data at 2016	177.1	149.4	189.8[d]
Deferreds			
Number at 31/3/12	52.7	75.4	53.0[e]
Additions:		(b)	28.3
• New deferreds	10.7		
Deductions:			(30.2)[f]
• Deaths	(0.3)		
• Retirements	(3.7)	(b)	
• Rejoiners to active	(4.7)		
• Other exits	(0)		
Number expected at 31/3/16	54.7		
Valuation data at 2016	52.3	52.7	59.5[e]
Pensioners and Dependants			
Number at 31/3/12	80.4	70.2	80.8[e]
Additions			22.0
• New pensioners including new dependants	23.6	11.8[c]	
Deductions:			(10.9)
• Deaths	(9.8)	(3.8)[c]	
• Other cessations	(0.2)		
Number expected at 31/3/16	94.0	N/A[c]	
Valuation data at 2016	93.0	80.4	91.9[e]

* withdrawals believed to be significantly understated in the movements data provided

[a] Movements data was been provided in 2 different formats which were not entirely consistent. The figures shown here are from the individual member record datasets.

[b] This information was not readily available from the movements data provided.

[c] We are aware that not all pensioner movements for this period were captured in the movements data.

[d] This figure is number of contracts rather than number of members and is after adjustments

[e] After adjustments

[f] includes c20k exits with less than two years' service in 2015-16

Adjustments made at the start and end of each accounting period are not included in the additions and deduction figures for the resource accounts and hence the opening 2012 membership numbers plus additions less deductions does not equal the 2016 membership numbers. The most significant adjustment is an addition of c11k deferred members at 31 March 2015 to take account of the change in regulations surrounding breaks in service.

The above table shows broad consistency in the actual number of members and expected as implied by movements data for the period 2012 to 2016 for pensioner and deferred members. However, there appears to be a discrepancy in the reconciliation for active members. We believe the discrepancy arises from missing movements data rather than omissions from the valuation membership data, based on comparisons against accounting figures and comparisons with the previous intervaluation period. For this reason care should be taken if when interpreting any analysis of movements to and from active status for the purposes of informing assumption setting.

Appendix C: Description of valuation groups

Description		Valuation Group
Administrative Officers - (non manuals, excluding mental health officers, nurses and hospital medical staff).	Men	1
	Women	11
MHOs, including manual MHOs and MHOs not yet doubling service.	Men	2
	Women	12
Manual Workers	Men	3
	Women	13
Hospital Medical staff (consultants, registrars, junior doctors, nurses without special class status and part-time Specialists) but excluding GP practice staff.	Men	5
	Women	15
Medical Practitioners	Men	7
	Women	17
Dental Practitioners	Men	8
	Women	18
Nurses, physiotherapists, midwives and health visitors with special class status.	Men	9
	Women	19
GP practice staff (except Practitioners and those with special class status who are included in the appropriate groups above).	Men	10
	Women	20

Valuation group is an important data item whilst members are in contributory service as it identifies the benefit provisions which apply (in the case of the pre-reform scheme). In the 2015 and 2016 data extracts valuation group was not assigned to all active members. In particular groups 9 and 19 (who have preferential retirement provisions) were significantly underreported in the data. The data summary in Appendix A includes all uncategorised members within groups 5 and 15. Appendix F explains the approach taken to dealing with the underreporting of groups 9 and 19.

Appendix D: Data items – membership data

Key data items are shown below. These are the items where a valid and reasonable data value is required to determine a liability.

Actives

> identifier;
> date of birth;
> gender;
> valuation group;
> valuation group – 1995 section;
> valuation group – 2008 section;
> protection status;
> Date of Transfer to 2015 Scheme;
> old scheme section code ('1995' or '2008'); [only required for members in service before 1 April 2015]
> whole-time equivalent pay at the extract date;
> actual annual pensionable pay at the extract date (see comments in Appendix F)
> total 1995 section pension; [only required for members in service before 1 April 2015]
> GP flexibilities earnings in 1995 section revalued to extract date – only required for members in service before 1 April 2015 and with preserved practitioner service;
> officer's 1995 section pension; [only required for members in service before 1 April 2015];
> fixed practitioner pension in 1995 section revalued to extract date – only required for members in service before 1 April 2015 and with preserved practitioner service;
> total 2008 section pension; [only required for members in service before 1 April 2015]
> GP flexibilities earnings in 2008 section revalued to extract date – only required for members in service before 1 April 2015 and with preserved practitioner service;
> officer's 2008 section pension; [only required for members in service before 1 April 2015];
> fixed practitioner pension in 2008 section revalued to extract date – only required for members in service before 1 April 2015 and with preserved practitioner service;
> accrued 2015 scheme pension amount;

Pensioners and Dependants

> identifier;
> date of birth;
> pensioner group;
> protection status (only expected for retirements after 31 March 2015);
> gender;
> total pension in payment including pension increases awarded to the extract date;
> total prospective dependant's pension, including pension increases awarded to the extract date

Deferred pensioners

> identifier;
> date of birth;
> protection status (only expected for leavers after 31 March 2015);
> gender;
> old scheme section code ('1995' or '2008'); [only required for members in service before 1 April 2015];
> date of most recent exit from active service;
> total 1995 section preserved pension including pension increases up to the extract date;
> total 2008 section preserved pension including pension increases up to the extract date;
> total 2015 section preserved pension including pension increases up to the extract date;

Appendix E: Data items - movements data

Actives

The following data was provided separately for each year of the inter-valuation period for active staff who joined / rejoined left the Scheme during that year:

a. unique identifier;
b. date of birth;
c. gender;
d. valuation group at date of entry/exit);
e. old scheme section code ('1995' or '2008'); [only required for members in service before 1 April 2015];
f. method of entry/exit;
g. date of entry/exit;
h. date of prior exit for rejoiners;
i. calendar service at exit;

Deferreds

For deferred pensioners whose pension started or ceased during each year in the inter-valuation period, we were provided with the following details for each individual:

a. unique identifier;
b. date of birth;
c. gender;
d. valuation group at date of entry/exit;
e. old scheme section code ('1995' or '2008'); [only required for members in service before 1 April 2015];
f. method of entry/exit to/from deferred/free year status;
g. date of entry/exit to/from deferred/free year status;
h. date of last exit from active service;

Pensioners

For pensioners and dependants whose pension started or ceased during each year in the inter-valuation period, we were provided with the following details for each individual:

a. unique identifier;

b. gender;

c. date of birth;

d. old scheme section code ('1995' or '2008'); [only required for members in service before 1 April 2015];

e. pensioner group ;

f. reason for entry to/exit from pensioner status;

g. date of entry/exit to status;

h. 1995 section pension at entry/exit to status including pension increases to that date (after any commutation);

i. 2008 section pension at entry/exit to status including pension increases to that date (after any commutation);

j. 2015 scheme pension at entry/exit to status including pension increases to that date (after any commutation);

k. 1995 section pension including any increases to that date before any commutation option exercised;

l. 2008 section pension including any increases to that date before any commutation option exercised;

m. 2015 scheme pension including any increases to that date before any commutation option exercised;

Appendix F: Checks and adjustments applied to the membership data

Checks and exclusion

Valid records were excluded and taken into account by uprating for the following reasons:

Table A – Active members

Reason for Exclusion	Number of exclusions[β]
Duplicate members	10
Actual pay outside reasonable range (£0k to £250k)	6,298
Age outside the appropriate range[+]	1
FTE pay outside reasonable range (£0k to £250k)	3,121
Members couldn't be assigned a category (missing pension/limited information on record)[+]	85
PT Proportion outside acceptable range	3,075
Reckonable service outside reasonable range (0 to 45)	1,990
Total no of exclusions	14,289

+ Indicates initial exclusions which are assumed to have no attaching liability and therefore we have not uprated for these members

β if a record fails for more than one reason it is included multiple times in the numbers shown

Table B – Deferred members

Reason for Exclusion	Number of exclusions[β]
Date of leaving active membership after the valuation date[+]	325
Pension was outside acceptable range (<£10 or >£125k)	1,832
Total no of exclusions	1,833

[+]Indicates initial exclusions which are assumed to have no attaching liability and therefore we have not uprated for these members.

β if a record fails for more than one reason it is included multiple times in the numbers shown

Table C – Pensioners and Dependants

Reason for Exclusion	Number of Members[β]
Duplicate members[+]	125
Members aged below 16 or above 120 at the valuation date	65
Pension was outside acceptable range (<£1 or >£125k)	6
Total number of exclusions	196

[+]Indicates initial exclusions which are assumed to have no attaching liability and therefore we have not uprated for these members.

β if a record fails for more than one reason it is included multiple times in the numbers shown

Table E – Summary of total exclusions

	Total number of exclusions[1]
Actives	14,289
Deferreds	1,833
Pensioners	129
Dependants	67
Total exclusions	**16,318**

1. Notified immediate exclusions plus exclusions for invalid records

Table F: Data supplied (31 March 2016)

31 March 2016	Total number of records provided	Notified immediate exclusions	Valid records
Actives	177,080	10[1]	177,070
Deferreds	52,472	325[1]	52,147
Pensioners	82,498	116[1]	82,382
Dependents	10,549	9[1]	10,540
Total	**322,599**	**460**	**322,139**

1. Duplicate records

Table F: Data supplied (31 March 2015)

31 March 2015	Total number of records provided	Notified immediate exclusions	Valid records
Actives	169,249	0	169,249

Table G: Derivation of uprating factors (31 March 2016)

31 March 2016	Number of valid records (A)	Number of exclusions	Number of members after exclusions (B)	Uprating factor (A/B)
Active members	177,070	14,279	162,791	1.09
Deferred members	52,147	1,508	50,639	1.03
Pensioners & Dependants	92,922	71	92,851	1.00
Total membership	**322,139**	**15,858**	**306,281**	**1.05**

Table H: Derivation of uprating factors (active membership 31 March 2015)

31 March 2015	Number of valid records (A)	Number of exclusions	Number of members after exclusions (B)	Uprating factor (A/B)
Active members	169,249	4,837	164,412	1.03

Adjustments applied to data for included members

> **Practitioners with missing pay and pension:** The membership data received in respect of Practitioner and Concurrent members as at 31 March 2016 was missing pay and accrued pension data. Of the 7k member records provided, we were able to extract pay and pension information from the 31 March 2015 extract (or some cases by reference to 2013 pay) for around 6k of these members. We made the following adjustments to estimate each member's pay and pension as at 31 March 2016.

>> 2015 pension amounts were rated up by 1.5% (plus inflation) for both Practitioner and Concurrent members.

>> A year's accrual of pension (based on estimated pay for 2015/16 was added to the revalued 2015 pension amount to give an estimate of the 2016 pension.

>> 2015 pay was uprated by 2%; 2013 pay was uprated by 6% to give an estimate of pay at 31 March 2016.

> **Missing CARE pension:** Around 1k new and unprotected members of the 2015 scheme had missing CARE pension (as earned over the year 2015/16). Where pay was available, we estimated the pension earned from this and included these records for valuation purposes.

> **Valuation groups:** Valuation groups allocated for active members were not consistent with those expected based on the 2012 valuation data. In particular the majority of the members in the 2016 data were classified as clinical staff (groups 5, 15) with very few members allocated to the manual worker groups (3, 13) or special class nurse group (9, 19). Since the special class nurses (a closed group of members) have preferential retirement provisions they have higher liabilities than corresponding members without the preferential status. We have allowed for their expected additional liabilities in the 2015 and 2016 valuation calculations by estimating an additional value based on the 2012 valuation calculations and allowing for the expected run off of the closed group of members over the period.

> **Deferred members over NPA:** There are a number of deferred members in the 31 March 2016 data who were over NPA at the valuation date. Such members are included in the summaries in this report. In line with the 2012 valuation, we expect to exclude liabilities for all such members aged over 70 and 50% of the liability for 1995 section members aged between 60 and 70.

> **Dependants' pensions:** Were estimated as 50% (37.5% for 2008 section and 33.75% for the 2015 scheme) of deferred members' pensions. Dependant pension information was missing for around a quarter of the pensioner records. These pensions were estimated as 40% of the member's pension based on the average dependant pension in the equivalent data for the England and Wales scheme.

> **Guaranteed minimum pensions (GMPs):** GMP data was incomplete. An adjustment will be applied to the overall liabilities to allow for GMPs on an approximate basis.

> **Service:** A number of issues arose with the service information provided. The following adjustments were applied to the data provided.

> Reckonable service for unprotected members who transitioned to the 2015 scheme on 01/04/2015 was noted to have increased between the 2015 and 2016 datasets. We extracted these members' reckonable service as provided in the 2015 dataset for use in the 2016 valuation data.
> MHO's: the valuation data is expected to allow for doubling of reckonable service after completion of 20 years. It was observed that the 2016 data didn't allow for this and we adjusted the provided reckonable service to include appropriate allowance in the valuation calculations.
> Choice optants: the 2016 extract incorrectly excluded pre 2008 service for these members. We extracted the relevant information from the 2015 data and used within the 2016 data.
> Protected 1995 section members: reckonable service provided in individual member records for protected 1995 section members reduced between the 2015 and 2016 datasets. To deal with the apparent error introduced into the extract process we 'corrected' each member's reckonable service by read across from the 2015 data and by addition of a further year's service (adjusted for part time working as applicable).

The data summaries in Appendix A show service after these adjustments have been applied.

> **Actual pay :** liability calculations for final salary benefits are based on whole-time equivalent pensionable pay and reckonable service. Actual pay only directly affects the liabilities determined for CARE benefits earned since 1 April 2015. We also use actual pay as provided to undertake aggregate checks on the data supplied (see following section). Aggregate actual pay as provided was noted to be 5.3% lower than that expected based on contributions paid to the Scheme. Analysis of the provided whole-time equivalent pay (comparisons with prior data sets and against equivalent data provided for the NHS schemes in England and Wales and Northern Ireland) suggested that whole-time equivalent data was in line with that expected and there was only an underlying issue with extracting the actual pay for members. As it was not possible to correct the underlying problem with actual pay a global uprating has been applied to the actual pay provided for members, equivalent to 5.3%. This uprating only affects the liability for CARE benefits earned since 1 April 2015. The data summaries and totals shown in this report are after the global uprating was applied to aggregate actual pay as supplied.

Checks on uprated dataset

Financial accounting information taken from published scheme accounts were used to perform independent checks on the dataset supplied.

For actives the total pensionable payroll in the uprated actives data (£4.71bn) was compared with pensionable pay derived from employer contribution payments recorded in the resource accounts (£4.96bn = £0.739bn/0.149). We expect these two figures to align reasonably closely and so concluded that the actual pay provided in the data was likely to be understated. We also analysed aggregate whole-time equivalent pay by comparing it with prior data sets and with equivalent data in other UK NHS schemes. This appears to be more consistent with that expected. Actual pay is a relatively minor data item for the valuation (whole-time equivalent pay is used for final salary benefits and actual is only used for CARE benefits accrued since 1 April 2015). Since it was not possible to explain the discrepancy or correct any underlying issue with the extract process we have taken the view that it is appropriate to apply a global uprating to actual pay as provided (of 5.3% based on the ratio of 4.96 / 4.71 as

above). This uprating is included in all summaries and totals shown in this report. It has a minor impact on the valuation calculations as shown in Appendix G.

For pensioners the total pensioner payroll in the adjusted pensioner data (£835m) was compared with total pensions paid during 2015/16 recorded in the resource accounts (£806m). Over recent years, in real terms, the pensioner payroll has been growing by 5% each year. Allowing for this rate of change would suggest that the pensioner payroll provided in the data is broadly consistent with that implied from the accounts.

It was not possible to undertake any independent checks on the deferreds data.

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Actuarial valuation as at 31 March 2016
Report on valuation data

Appendix G: Uncertainty in valuation results arising from data deficiencies

Membership data

The table below illustrates the potential impact if known data omissions are subsequently found to have been handled incorrectly. Since it is not possible to undertake independent checks for all categories of members and a full reconciliation has not been achieved against all prior datasets there is the potential for currently unidentified problems with the data to emerge in future. For example a group of deferred members could be identified where no liability has previously been determined. The impact of such unknowns emerging at subsequent valuations could be considerably more than the sensitivity indicated below.

The table below illustrates the potential impact on the results if the actual liability for each missing member is in fact under/overstated by 10%.

	Impact of error in assumption for missing data	
	Uncorrected Employer contribution rate	Employer contribution correction cost
Actives (uprating applied: 9%)	0.3%	0.3%
Deferreds (uprating applied: 3%)	<0.05%	nil
Pensioners (uprating applied: 0%)	nil	nil

As set out in Appendix F adjustments were also applied to certain data items to 'correct' identified issues with the extraction process. The most significant adjustments applied were as follows:

> Practitioner pay and pensions were extrapolated from prior data
> Adjustments were applied to reckonable service for certain categories of members
> An explicit addition was added to the calculated liabilities to allow for the preferential retirement provisions applying to unidentified special class nurses
> A global uplift was applied to actual pay as provided. This only affects the valuation calculations relating to CARE benefits earned from.

The adjustments applied are intended to avoid the need for further data exclusions with the inherent introduction of uncertainty. However it should be recognised that these adjustments themselves do introduce some element of uncertainty into the valuation results which could be of greater magnitude than the impacts illustrated in the table above.

	NHS Pension Scheme (Scotland)
Government Actuary's Department	Actuarial valuation as at 31 March 2016
	Report on valuation data

Movements data

Setting assumptions

Assumption setting relies on analysis of movements data in consideration with such other relevant information which is available. The setting of demographic assumptions is to some extent subjective and a matter of interpretation. Changes in assumptions may be expected at successive valuations as circumstances change even with full data. Thus the absence of fully complete movements data does not necessarily introduce uncertainty into the valuation results provided there is other relevant information available to inform those assumptions. Further commentary on assumption setting is provided in the report NHS (Scotland) Pension Scheme : Actuarial Valuation at 31 March 2016: Advice on Assumptions report dated today.

Net Leavers Liability (NLL)

The NLL is a component part of the cost cap calculation and is a quantification of the amount of pre-reformed liabilities which fall out of the cost cap fund at a valuation owing to members which have left service since the previous valuation (or since the initial cost cap fund was set in the case of the 2016 valuation), net of the additional liabilities in respect of members with pre-reformed service who rejoined active membership during 2015-16.

To accurately calculate NLL in accordance with the directions requires full movement data for all members who were active in 2015 and are no longer active at the 2016 valuation. Further details on the approach taken to determining NLL in the absence of fully complete data is provided in the Assumptions Report.

We expect that the uncertainty introduced by the approach above is not more than 0.2% of pay. Although it should be noted that the deficiencies in the membership data discussed above could compound this scale of uncertainty.

Appendix H: Checks and exclusions applied to the movements data

Checks were undertaken to ensure all records with sufficient information to assign the movement to the correct category for analysis were taken into account. Minimal exclusions were made based on these checks. No further checks were undertaken other than to compare the overall number of movements with the comparable figures shown in the resource accounts. This comparison is shown in Appendix B which illustrates there is believed some underreporting of active member movements in the data provided.

The pensioner movements data was expected to be used to analyse commutation experience. For these purposes only relevant records and those with reasonable critical data could be used. There were significant issues with this data and no analysis was possible. In particular the information required to analyse commutation was blank in the data provided for 2013-16 and half of the records provided for 2012-13 showed unreliable information.

Appendix I: Summary of benefits

The Directions require the pre and post 2015 NHS schemes to be taken into account in aggregate for the purposes of the current valuation. A summary of benefits provided from the pre and post 2015 schemes is shown separately below. The criteria by which Scheme membership is determined after 31 March 2015 is also shown.

Pre-2015 schemes

The main benefit provisions of the pre-2015 scheme for each category of member is shown in Table I1.

Table I1: Main benefit provisions of pre-2015 schemes

	1995 section			2008 section	
	Standard officer	**Special class officer***	**Practitioner**	**Officer**	**Practitioner**
Basis of provision	Final salary		Career average with revaluation of CPI + 1.5% pa	Final salary	Career average with revaluation of CPI + 1.5% pa
Contracted out/in	Contracted out to 2016†		Dependent on employment status	Contracted out to 2016†	Dependent on employment status
Normal Pension Age (NPA)	60	55 (subject to certain criteria)	60	65	65
Pension accrual rate	1/80	1/80 with doubling of service in some cases	1.4%	1/60	1.87%
Retirement lump sum accrual rate	3.75%	3.75% (doubling as above)	4.2%	None Cash by commutation only (£12: £1pa)	
Final Pensionable pay	Best 12 months Pensionable Pay in final 3 years		Generally practitioner income and other fee based earnings less expenses	Average of the best 3 consecutive years pay in the 10 years before retirement that are revalued by price inflation.	Generally practitioner income and other fee based earnings less expenses
Dependant benefits	50% of member pension subject to some service restrictions. Eligibility for benefit depends on whether in service on or after 1 April 2008			37.5% of member pension	
Ill health pension	Tier 1 (permanently unable to do current job) - accrued pension, no reduction Tier 2 (permanently unable to do any job) - 2/3 prospective service to NPA, no reduction				
Pension increases	In line with increases in price inflation				

*members with reserved rights to special provisions
†contracting out ceased on 5 April 2016

2015 scheme

The main benefit provisions of the post-2015 scheme are shown in Table I2.

Table I2: Main benefit provisions of post-2015 scheme

	2015 scheme
Basis of provision Contracted out/in	Career average with earnings revaluation of CPI + 1.5% pa whilst in service Contracted out (to 2016†)
Normal Pension Age (NPA)	Equal to each member's state pension age
Pension accrual rate	1/54 (1.85%)
Retirement lump sum accrual rate	None - cash by commutation only (£12: £1pa)
Final Pensionable pay	Not applicable
Dependant benefits	33.75% of member pension
Ill health pension	Tier 1 (permanently unable to do current job) - accrued pension, no reduction Tier 2 (permanently unable to do any job) - 50% prospective service to NPA, no reduction
Pension increases	In line with increases in price inflation

†contracting out is due to cease from 5 April 2016.

Criteria for scheme membership after 31 March 2015

Protected Members

1995 section - excluding Special Classes

All members in pensionable service on 1 April 2012 or members with entitlement to vested benefits in the Scheme from service before that date who re-join pensionable service within five years of date of leaving and whose date of birth is on or before 1 April 1962. Such members will remain in the existing Scheme to retirement. Any member exercising the option to switch to the 2008 section are treated as 2008 section members for the purposes of protection.

1995 section - Special Classes

All members in special class posts as at 1 April 2012, or otherwise with entitlement to vested benefits from service before 1 April 2012 and in reserved posts as at 1 April 2015 or date of ceasing to accrue benefits in the scheme and who were within 10 years of their earliest pension age as at 1 April 2012 i.e. whose date of birth is between 1 April 1962 and 1 April 1967 will remain in the existing Scheme to retirement. Entitlement to unreduced benefits before age 60 will continue to be based on the existing criteria. Any member exercising the option to switch to the 2008 section are treated as 2008 section members for the purposes of protection.

2008 section

All members in pensionable service on 1 April 2012 or members with entitlement to vested benefits in the Scheme from service before that date who re-join pensionable service within five years of date of leaving and whose date of birth is on or before 1 April 1957. Such members will remain in the existing Scheme to retirement. Members in scope of protection will be provided with a one off opportunity to switch to the 2015 scheme on 1 April 2015.

Tapered Members

Members meeting the above criteria but within a further 3 years and 5 months of retirement age at 1 April 2012 will transfer to the 2015 scheme at a date between 1 June 2015 and 1 February 2022. The final date of service in the 1995 and 2008 sections will be determined as follows:

31 March 2022 – 2 x T months

Where T = the number of months by which the member's age on 1 April 2012 (rounded down to the nearest whole month) is less than NPA - 10 years.