Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016

Report on membership data

Date: 5 March 2019

Authors: Matt Wood & Garth Foster

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

Contents

1   Introduction

1.1   This report is addressed to the Department for Education (DfE). It is also being made available to the Teachers' Pension Scheme ('TPS' or 'the Scheme') Scheme Advisory Board (SAB) as part of the consultation process relating to the actuarial valuation of the TPS which is being carried out as at 31 March 2016.

1.2   Pension scheme membership data for the TPS 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 corrected and uncorrected employer contribution rates, the employer correction cost, and the past service liabilities (all valuation data)

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

> 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 provided and discussed in this report was supplied by Teachers' Pensions (TP), the Scheme's administrator, and all supplementary accounting information was supplied by DfE. Scheme accounts for the relevant period are publicly available.

1.7   In preparing this report, GAD has relied on data and other information supplied by TP and DfE 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.

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   In our opinion the membership data provided is adequate for the purposes of the valuation.

1.10   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.

1.11   This report should not be reproduced or disseminated to other parties without prior consent. The Government Actuary's Department (GAD) does not accept any liability to third parties, whether or not it has agreed to the disclosure.

1.12   This report has been prepared 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 (for actives only) and as used for the 2012 valuation. Detailed tables are set out in in Appendix A.

Chart 2.1: Number of active members
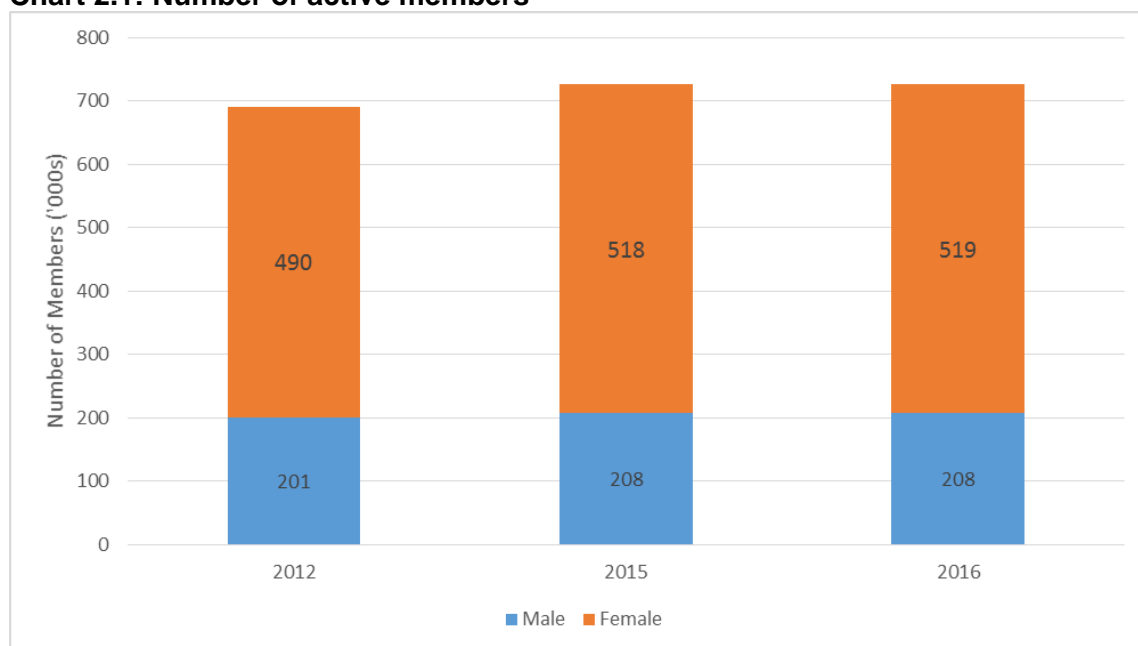
Chart 2.2: Active total pensionable pay (full time pay)
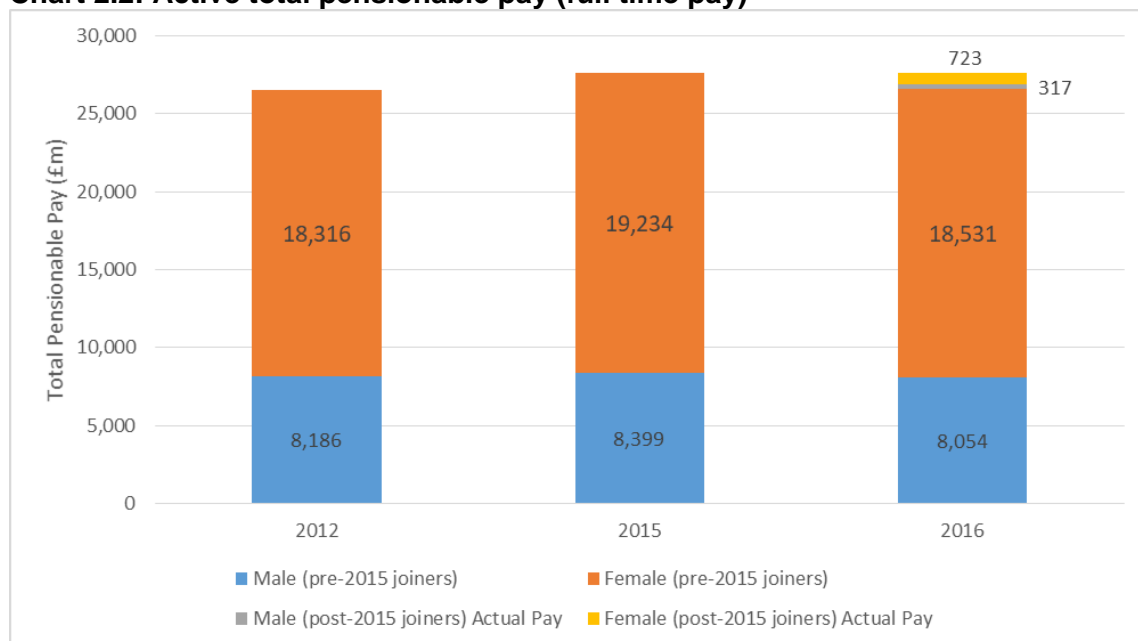
Note: Full-time equivalent pay not available for post-2015 joiners, so Actual Pay used in comparison for these members.

Chart 2.3: Number of deferred members

Chart 2.4: Total deferred pension

Note: the deferred membership shown above includes all deferred members with preserved benefits in the scheme, including those who are older than their Normal Retirement Age. When assessing the liabilities of the scheme, it is assumed that a proportion of these members are unlikely to claim their pensions.

Chart 2.5: Number of pensioners and dependants
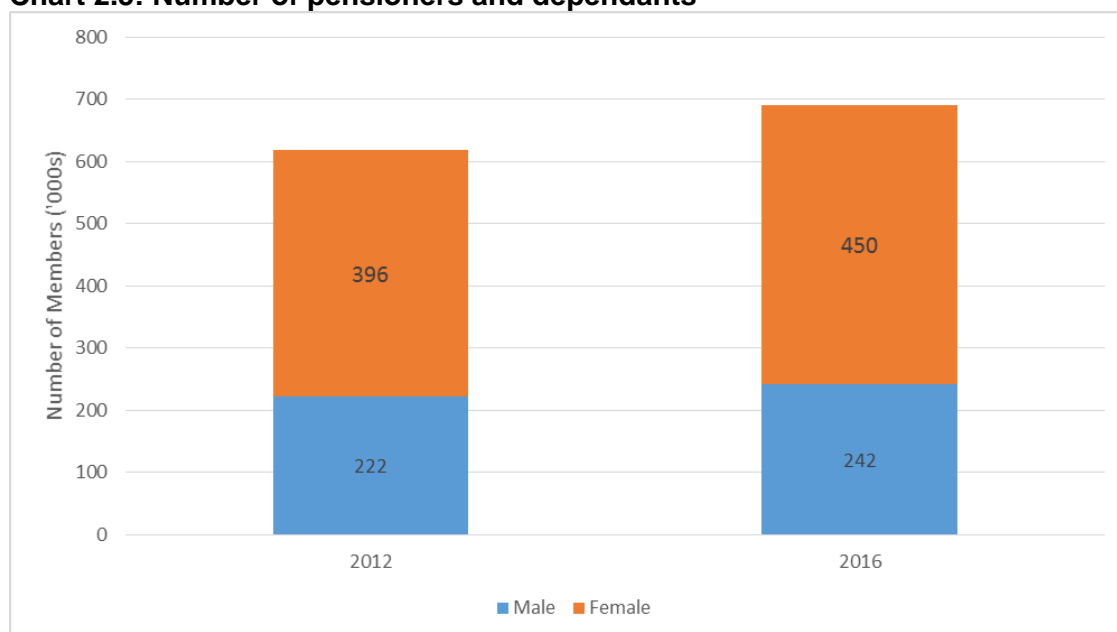
Chart 2.6: Total pension in payment (pensioners and dependants)

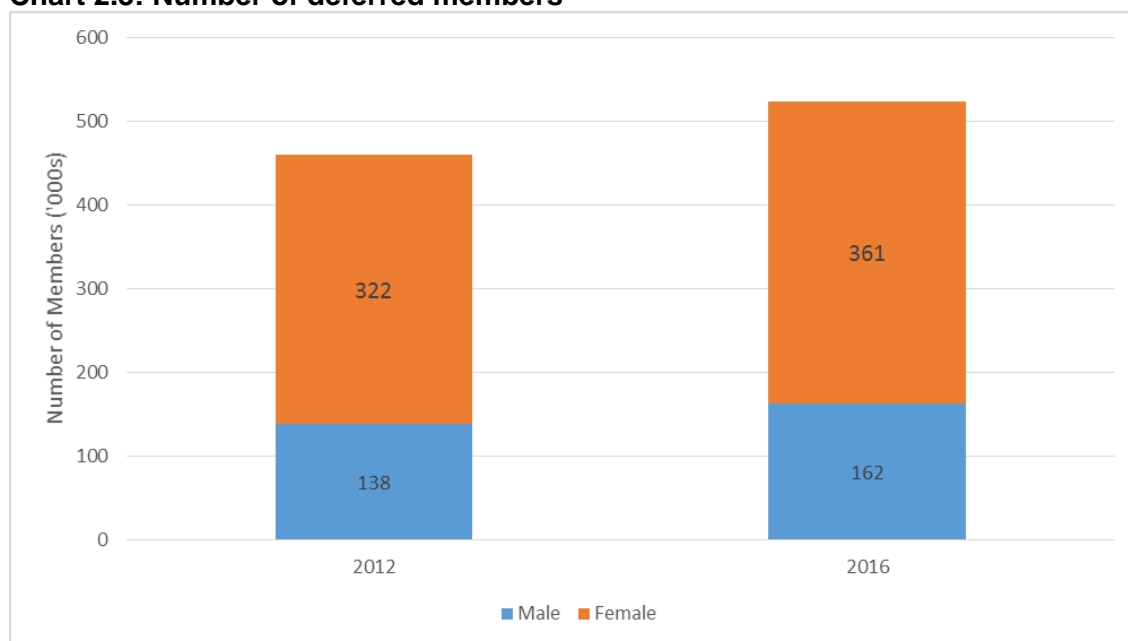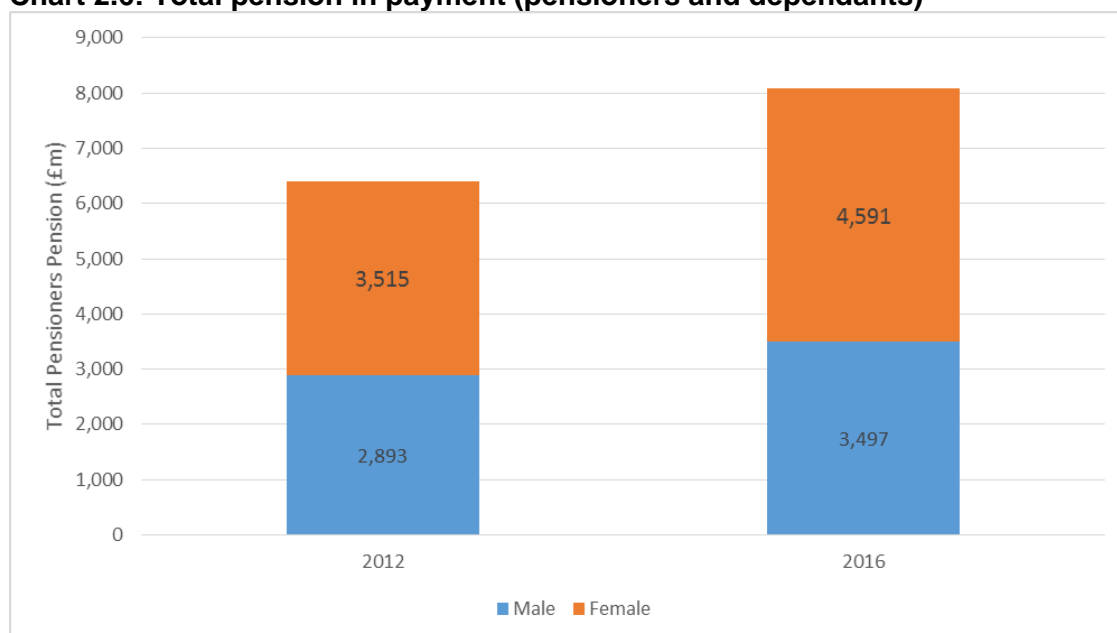2.2   The data shown in the charts above is as used for valuation purposes and reflects adjustments made following analysis of the data provided. The key adjustments are the rating up of the active membership and the rating down of the deferred membership. These ratings are applied principally to adjust the data for the impact of members who are classified as deferred at the valuation date based on the information provided by employers, but who are in fact active members, together with a smaller adjustment in respect of members who are likely to be excluded from the data altogether.

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

2.3 The number of active members has been rated up by about 8% and the number of deferred members has been rated down by about 9%. Section 3.7 of this report explains that the rating applied to the deferred pension amounts is larger than this, as an additional adjustment is applied, and so overall the rating of the pension amount is around 18%.

Table 2.1: Uprating factors (membership) including global adjustments

	Uprating factor 2016	Uprating factor 2015	Uprating factor 2012
Active members	1.083	1.080	1.039**
Deferred members	0.908*		1.00**
Pensioners	1.000		1.000
Total membership	**1.001**		**1.015**

* A rate down of the total deferred pension was also applicable (see section 3.7)
** A different processing approach was adopted for the 2012 active and deferred data (see section 3.8)

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

2.5 In our opinion the data used as summarised above is adequate for the purposes of the valuation.

Movements data 31 March 2012 to 31 March 2016

2.6 The movements data provided is to be used for the purposes of informing the assumptions to be used for the 2016 valuation. 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.

2.7 The data underlying charts 2.7 and 2.8 showed very high levels of member movements between active and deferred statuses over the inter-valuation period. This is a reflection of the way that data has been collected for the valuation, and will overstate the actual number members who had a break in their active service during this period. Sections 3.17 and 3.18 give some examples of situations where members may be recorded in the valuation data as leaving and / or rejoining active status, without an actual break in their pensionable service. To avoid this effect distorting these charts, we have therefore chosen to illustrate net membership movements between active and deferred statuses (ie. new/re-entrants to active status net of members who withdrew from active service, and new deferred members net of active re-entrants).

Chart 2.7: Active membership reconciliation*
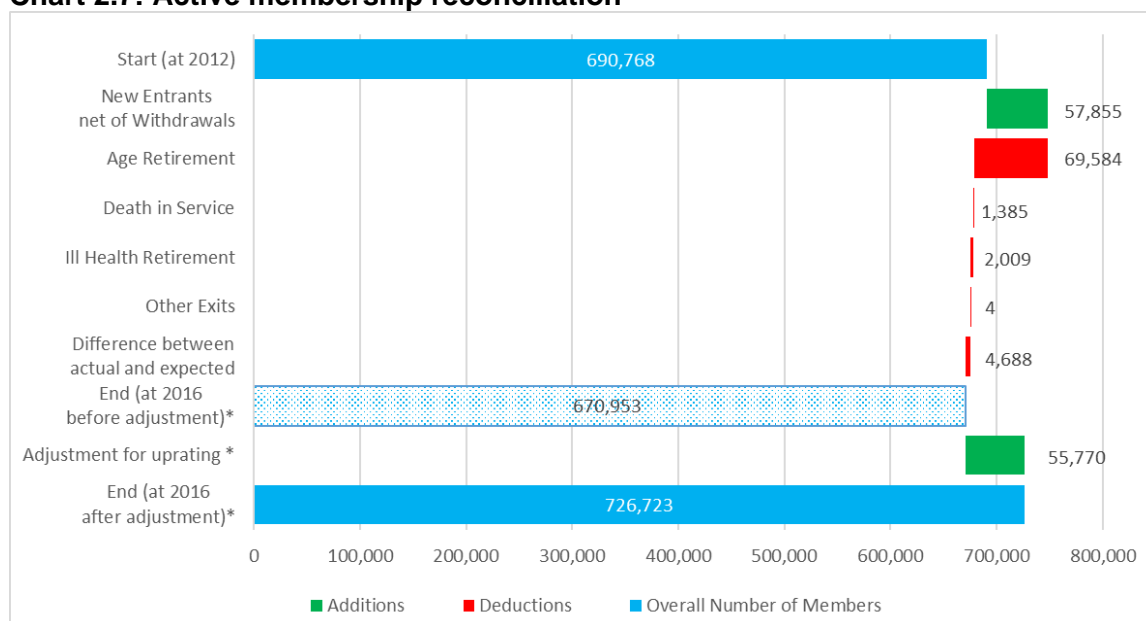
Note: Active New entrants includes those members recorded as having re-entered active status from deferment.

Chart 2.8: Deferred membership reconciliation*
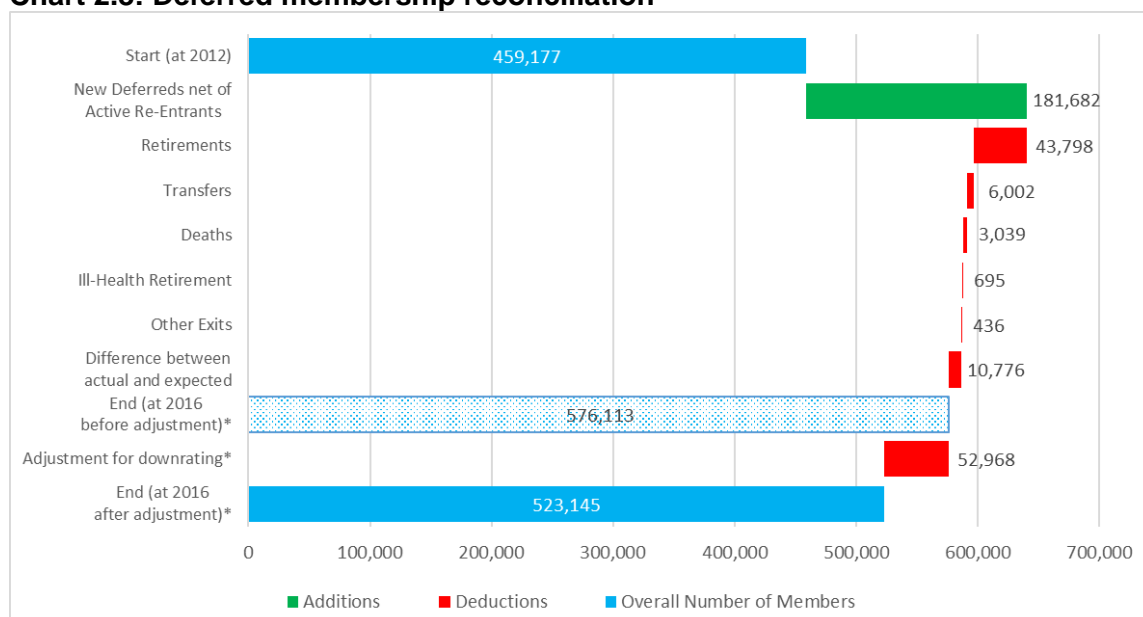
* The movements data provided by TP is taken from the same source as the active and deferred membership lists supplied as at 31 March 2016. Sections 3.5 and 3.7 describe the global adjustments made to those datasets as part of our processing. As a consequence, the global adjustments described will not be reflected in the movements data provided. For consistency, the charts above therefore show a comparison of the movements data against the number of members in the initial 2016 active and deferred membership lists before the global rating adjustments are applied, and then the size of these global rating adjustments, followed by the final membership totals used for the valuation.

Chart 2.9: Pensioner membership reconciliation
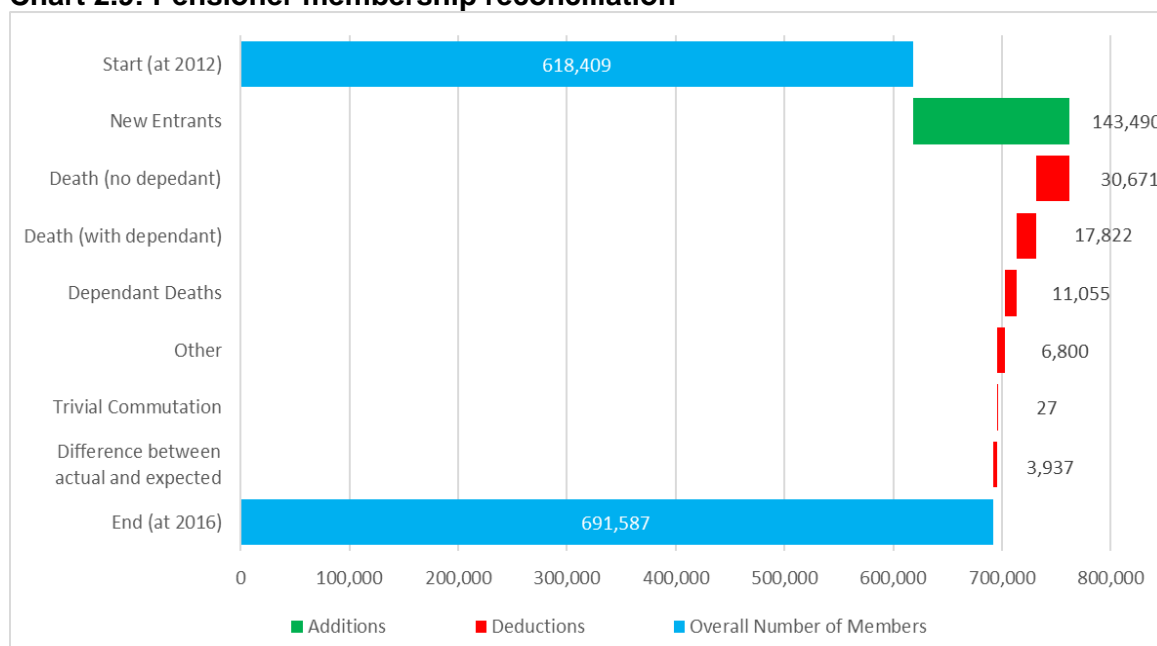
Note: Pensioner New Entrants includes the dependant pensions which came into payment following the death of a pensioner member.

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 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 C. The chart below shows the total number of valid records received (i.e. key data items are complete, and suitable for checking), the total number of records after exclusions (those that are valid and pass our checks on the data), and the total number of records after we have applied ratings to the dataset. Two sets of ratings are applied to the datasets in this final stage. We first rate up to replace the records which failed our checks. We 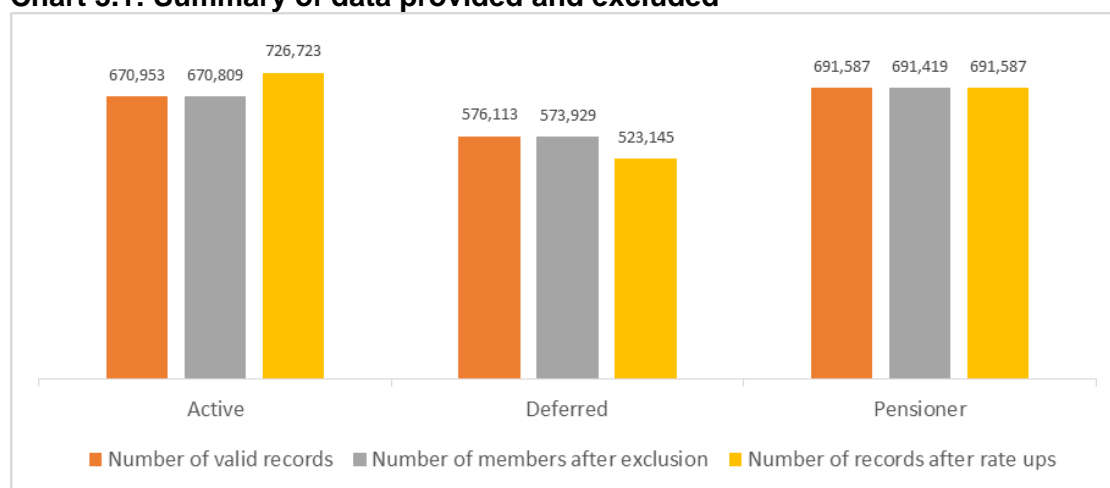also apply a global rating to the actives and deferred membership groups as described in sections 3.5 and 3.7. The global rating is much more significant because the number of individual records that failed our checks is low. Further details of both rating processes are set out in Appendix E.

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 by applying reasonableness tests. The checks identified a number of areas where adjustments to the data were appropriate. The checks and adjustments applied are summarised in Appendix E.

3.4   The most significant issue affecting the data relates to the classification of active and deferred members as at the valuation date. There are a number of reasons why members who are still active will appear to be deferred. In particular:

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

> The member's employer has indicated that service ceased on 31 March 2016 but another period of service commences on 1 April 2016 so there is no break in service. TP indicated that this is likely to relate to staff on annual contracts linked to the financial year and often the member remains with the same employer on a new contract. There will also be some members who change employer on this date. Due to the nature of the existing Annual Service Return method for employers to provide membership data to TP, we could not verify the number of teachers who were back in service on 1 April 2016 as this data was not available at the time of the valuation data extract.

> Some active members are excluded from their employers' annual returns and so incorrectly appear to have left service.

It is known that there are a large number of such cases (an exact number is unavailable but experience from previous data extracts suggests this will be in the tens of thousands).

3.5   As a result, the active membership is significantly understated. One way to measure this is to compare the salary data provided in the valuation extract with the salary roll implied by the contributions recorded in the accounts. We have applied a global rate up of around 8% to the actives valuation data in order to bring the two salary rolls into line. The global rate up increases the number of members by about 56,000.

3.6   Consideration of previous data extracts has shown there to be significant numbers of members excluded from the active records who are back in service on the 1 April after the valuation date. Analysis of past data extracts suggests that about 95% of the rate up required to bring salary rolls into line relates to members recorded as deferreds at the extract date, ie they are classified as deferred but should in fact be actives.

3.7   To allow for this we have applied a global rate down to the deferred membership in respect of about 53,000 members, which is around 9% of the deferred membership originally recorded. The members classified as deferreds based on the data received but who should, in fact, be active members, have significantly higher than average deferred pensions (consistent with them actually being active members with more service and a more recent salary than a typical deferred member). Analysis of a data extract collected as at March 2014 suggests a further rate down of 10% of the deferred pension roll is appropriate to allow for this. The impact on the overall accrued pension amounts of the global ratings is set out in Appendix E.

3.8   The way in which allowance has been made for missing active data has varied over previous data extracts collected at different times. The 2015 active dataset was processed in the same way as the 2016 active dataset and this process resulted in an 8% rating up of the active membership.

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

3.9 For the 2012 valuation, TP provided the most recent details held for those members for whom they had not received a 2011/12 annual return and had not received confirmation that the members had left service. These members were then added into the actives data with allowance for an increase in salary and service. Although this may seem a more accurate approach, it assumes that all such members remain in service, which will not be the case, and requires assumptions about the service and salary progression. It also required an additional rate up of about 3% of the membership to align the salary roll to the contributions in the accounts (meaning that the overall adjustment to the actives data was about 8%, similar to that required at this valuation). It is not clear that the more complex approach leads to a more accurate assessment of liability.

3.10 A data extract as at 31 March 2014 was used for the 2016/17 accounts. Amendments were made to this data in respect of members who appeared to be out of service on 31 March 2014 but were back in service on 1 April 2014 (many of whom would be the result of missing data returns). A similar approach was not available as, due to the timing of the data collection exercise - required to allow timely completion of the valuation calculations, a complete set of 2016/17 data returns was not available.

3.11 It is likely that missing data returns for previous scheme years will result in an understatement of the service accrued in the scheme. We have not made an adjustment in respect of this as we do not expect it to have a material impact. Appendix F gives further details of this uncertainty.

3.12 Unless otherwise noted, the number of deferred members shown throughout this report includes all deferred members with preserved benefits in the scheme, including those who are older than their Normal Retirement Age. When assessing the liabilities of the scheme, it is assumed that a proportion of these members are unlikely to claim their pensions. TP are currently carrying out an exercise to contact these members, and the membership data provided for future valuations will reflect the outcome of the exercise.

3.13 In addition to the adjustments above, 144 active members, 2,306 deferred members and 168 pensioner members were excluded from the data because they failed reasonableness checks. The relevant data groups were rated up to offset these exclusions (with the exception of 122 deferred records which failed initial verification checks and are assumed to have no attaching liability). These are very small adjustments in the context of the overall scheme membership.

3.14 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 3.3 and 3.4 shows the derivation of the uprating factors[1].

---

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

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

3.15 **Monthly Data Collection**

The move by TP to collecting data from employers on a monthly basis rather than an annual basis will significantly help to alleviate the issues described above. In particular, data on the number of teachers who appear to be deferred at 31 March but who are actually still in pensionable service on 1 April will be readily available for future valuations. TP expect all employers to be providing data on a monthly basis by April 2018. Furthermore, proposed changes to more accurately reconcile contributions to service and salary data should also help to identify any missing service. Therefore, we would expect any adjustments to the active and deferred populations to be much smaller at future valuations.

Table 3.3 Derivation of uprating factors (31 March 2016)

31-Mar-16	Number of valid records (A)	Number of exclusions	Number of members after exclusions (B)	Uprating factor (A/B)	Number of members after rate up (C)	Uprating factor (including global rating) (C/A)
Active members	670,953	144	670,809	1.000	726,723	1.083
Deferred members	576,113	2,184	573,929	1.004	523,145	0.908
Pensioners	691,587	168	691,419	1.000	691,587	1.000
Total membership	**1,938,653**	**2,496**	**1,936,157**	**1.001**	**1,941,455**	**1.001**

* A rate down of the total deferred pension was also applicable (see section 3.7)

Table 3.4 Derivation of uprating factors (31 March 2015)

31-Mar-15	Number of valid records (A)	Number of exclusions	Number of members after exclusions (B)	Uprating factor (A/B)	Number of members after rate up (C)	Uprating factor (including global rating) (C/A)
Active members	672,724	1,110	671,614	1.002	726,320	1.080

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

Movements data – 31 March 2012 to 31 March 2016

3.16   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 members behaviours should be set for the valuation. The key data items provided for member movements are set out in Appendix D.

3.17   The withdrawal data provided is known to overstate the number of withdrawals. In particular, it includes all members who are recorded as leaving an employer, including where these members are also recorded as in employment with a different employer immediately afterwards. The withdrawals and corresponding re-entries of such members have been removed from the movement data.

3.18   Members with a gap in their service record (of any length) are recorded as having withdrawn. This includes a large number of members for whom annual returns have not been correctly submitted by employers. It has not been possible to separate out such withdrawals from the true withdrawal data.

3.19   Limited checks were applied to movements data and, other than the withdrawals in paragraph 3.17, records were only excluded if key missing data materially impacted the analysis being undertaken. The checks and exclusions are summarised in Appendix G.

Accounting information

3.20   Published scheme 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 are set out in Appendix E.

Benefit information

3.21   A summary of the benefits provided to members of the Scheme is given in Appendix H. DfE has confirmed that the only uncertainty that they are aware of about the form of benefits that the scheme is liable to provide relates to GMPs. No allowance has been made in the valuation calculations for the possible sex equalisation of GMPs or the possible changes to the indexation arrangements that were the subject of a DWP consultation issued in November 2016.

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)

Scheme section (i)	Gender	31 March 2012						31 March 2016						
		Number of members (000's)	Full time equivalent pay (£m)	Average full time equivalent pay (£)	Average age (ii)	Average service (iii) (years)	Average total accrued pension (£)	Number of members (000's)	Actual pay (£m)	Full time equivalent pay (£m) (iv)	Average full time equivalent pay (iv) (£)	Average age (ii)	Average service (iii) (years)	Average total accrued pension (£)
NPA 60	Male	140	6,352	45,236	47.3	17.3	9,782	109	4,851	5,156	47,410	48.3	17.5	10,871
	Female	338	13,898	41,120	45.7	14.5	7,471	269	9,652	11,454	42,627	47.0	15.3	8,544
NPA 65	Male	57	1,705	29,769	37.1	2.2	1,087	80	2,380	2,744	34,479	37.9	3.6	2,061
	Female	137	3,879	28,333	34.5	2.2	1,056	196	5,488	6,428	32,735	35.6	3.6	1,935
Mixed Service (ie. periods of NPA 60 & 65)	Male	3	130	38,078	46.0	8.0	4,250	4	122	154	40,599	50.4	8.5	4,802
	Female	15	539	35,062	45.0	7.3	3,458	18	445	650	36,864	47.8	8.1	4,149
Post- 2015 new-entrant	Male							16	317	N/A	N/A	32.6	N/A	211
	Female							36	723	N/A	N/A	29.9	N/A	217
Total		**691**	**26,502**	**38,334**	**43.9**	**12.4**	**6,036**	**727**	**23,978**	**26,585**	**39,400**	**43.1**	**11.5**	**5,675**

i. For unprotected members, the section is that applicable prior to April 2015.
ii. Weighted by full time equivalent pay, except for post-2015 new entrants which are weighted by actual pay.
iii. Reckonable service for final sections only, weighted by full time equivalent pay.
iv. Full time equivalent pay not provided for post-2015 new entrant members.

Average amounts calculated excluding members for whom information was not available (ie. N/A). Pay quoted throughout the Appendix is rate received on valuation date.

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

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

Scheme section (i)	Gender	31 March 2015						
		Number of members (000's)	Actual pay (£m)	Full time equivalent pay (£m)	Average full time equivalent pay (£)	Average age (ii)	Average service (iii) (years)	Average total accrued pension (£)
NPA 60	Male	117	5,128	5,437	46,533	48.0	17.7	10,281
	Female	288	10,242	12,081	41,978	46.6	15.4	8,062
NPA 65	Male	88	2,373	2,823	32,242	37.3	3.5	1,893
	Female	213	5,509	6,525	30,614	34.9	3.5	1,794
Mixed Service	Male	3	116	139	39,816	47.1	8.7	4,321
	Female	17	430	627	35,868	45.5	8.1	3,635
Total		726	23,798	27,633	38,045	43.1	11.6	5,711

i.   For unprotected members, the section is that applicable prior to April 2015.
ii. Weighted by full time equivalent pay.
iii. Reckonable service for final sections only.

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

Scheme section (i)	Protection status	Number of members (000's)	Actual pay (£m)	Full time equivalent pay (£m) (ii)	Average full time equivalent pay (£)	Average age (iii)	Average service (iv) (years)	Total Career Average section pension (£m)
NPA 60	Protected	87	3,384	3,961	45,315	58.4	21.8	-
	Unprotected / Tapered (v)	290	11,119	12,649	43,610	43.9	14.1	165
NPA 65	Protected	5	94	162	34,630	62.6	4.6	-
	Unprotected / Tapered	271	7,775	9,011	33,214	35.8	3.6	131
Mixed Service	Protected	1	24	45	36,710	63.8	9.2	-
	Unprotected / Tapered	20	544	758	37,576	47.4	8.1	9
Post- 2015 new-entrant	n/a	52	1,039	N/A	N/A	30.7	N/A	11
Total		**727**	**23,978**	**26,585**	**39,400**	**43.1**	**11.5**	**317**

i.   For unprotected members, the section is that applicable prior to April 2015.
ii. Full time equivalent pay not provided for post-2015 new entrant members.
iii. Weighted by full time equivalent pay, except for post-2015 new entrants which are weighted by actual pay.
iv. Reckonable service for final sections only
v.   Once tapered members have transferred into the Career Average section they are included in the Unprotected membership groups above.

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

Scheme section (ii)	Gender	31 March 2012 (i)				31 March 2016			
		Number of members (000's)	Total deferred pension (£m pa) (iii)	Average deferred pension (£ pa) (iii)	Average age (iv)	Number of members (000's)	Total deferred pension (£m pa) (iii)	Average deferred pension (£ pa) (iii)	Average age (iv)
NPA 60	Male	84	310	3,693	51.4	103	311	3,024	52.8
	Female	197	591	3,003	49.5	239	631	2,636	51.1
NPA 65	Male	23	10	419	38.3	53	40	751	40.5
	Female	45	19	433	35.7	106	86	813	37.9
Mixed Service	Male	1	4	2,949	51.0	5	8	1,727	52.7
	Female	4	11	2,507	48.5	13	26	2,063	50.6
Post- 2015 new-entrant	Male					2	0	99	35.0
	Female					3	0	106	32.4
Total		**354**	**945**	**2,666**	**49.7**	**523**	**1,102**	**2,106**	**50.2**

i. The deferred data shown as at 31 March 2012 in the table above excludes deferred members over the age of 70, and half of those aged between their NPA and 70. If these excluded members had been included in the table above, then the total deferred scheme membership at 31 March 2012 would be 459,177. The deferred data shown as at 31 March 2016 includes all members (including around 55,000 members over age 70, and around 100,000 members over their Deferred Pension Age with pensions totalling around £100m).
ii. For unprotected members, the section is that applicable prior to April 2015.
iii. Including pension increase awarded in April following extract date
iv. Weighted by pension.

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

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

Type of benefit		31 March 2012				31 March 2016			
		Number of members (000's)	Total pension (£m pa) (i)	Average pension (£ pa) (i)	Average age (ii)	Number of members (000's)	Total pension (£m pa) (i)	Average pension (£ pa) (i)	Average age (ii)
Age retirement	Male	180	2,448	13,620	70.2	198	3,021	15,232	71.1
	Female	299	2,786	9,329	69.9	351	3,768	10,741	70.3
Ill-health retirement	Male	30	413	13,853	67.4	28	425	15,321	70.4
	Female	49	525	10,767	68.3	46	552	11,923	71.2
Spouses and other dependants	Male	13	31	2,441	63.1	16	51	3,220	64.9
	Female	49	204	4,187	75.1	53	271	5,152	75.6
Total		**618**	**6,408**	**10,362**	**69.8**	**692**	**8,088**	**11,695**	**70.8**

i.   Does not include pension increase in April following extract date in 2012 (2016 increase was 0%).
ii. Weighted by pension.

Chart A6: Active members' full-time equivalent (FTE) pensionable pay by age
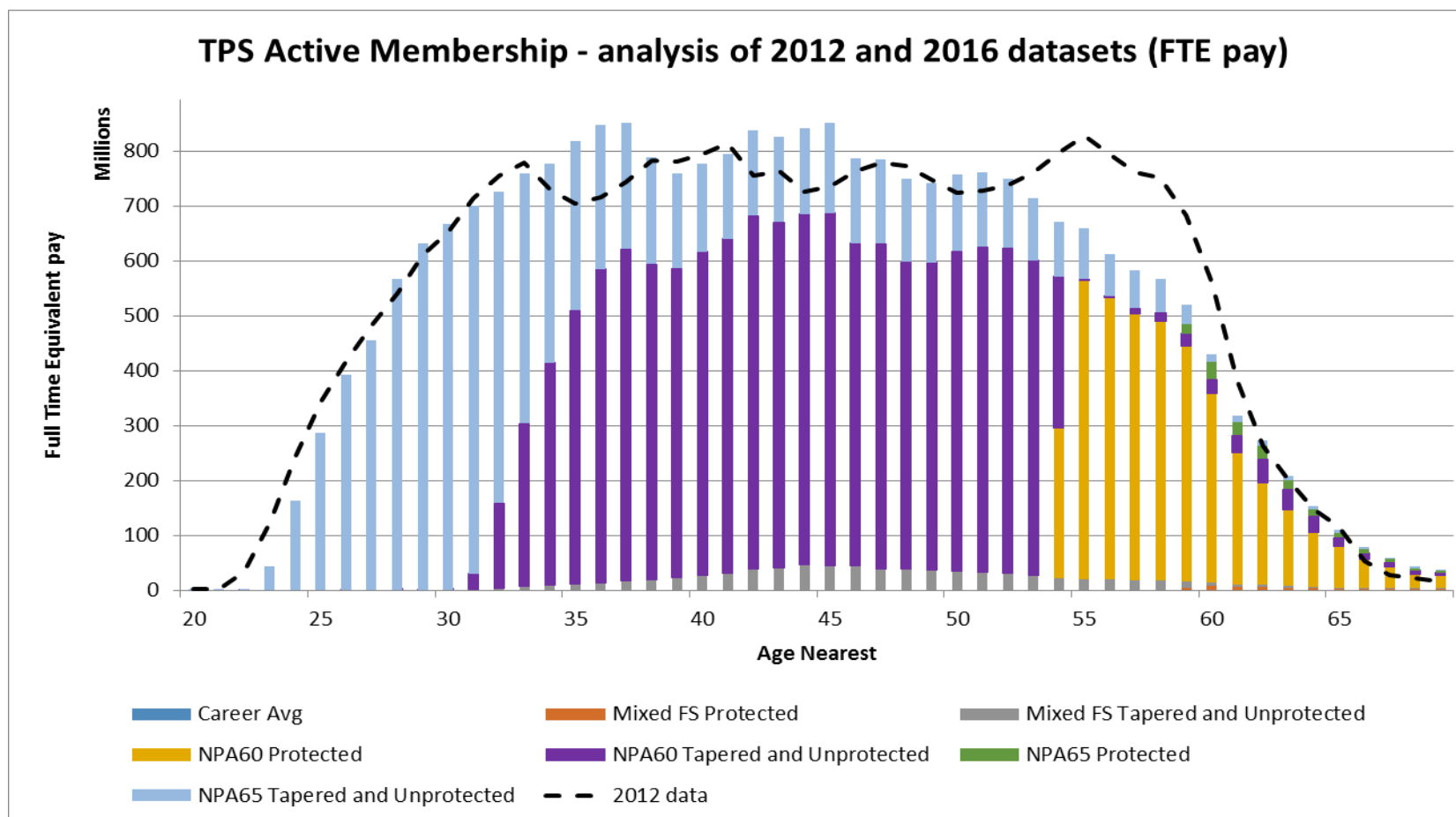
Note: FTE pay is not recorded for Post-2015 New Entrants who joined the Career Average scheme. As a consequence, FTE pay in the 2016 data is lower at younger ages than in 2012.

Chart A7: Deferred pension data by age

TPS Deferred Membership - analysis of 2012 and 2016 datasets
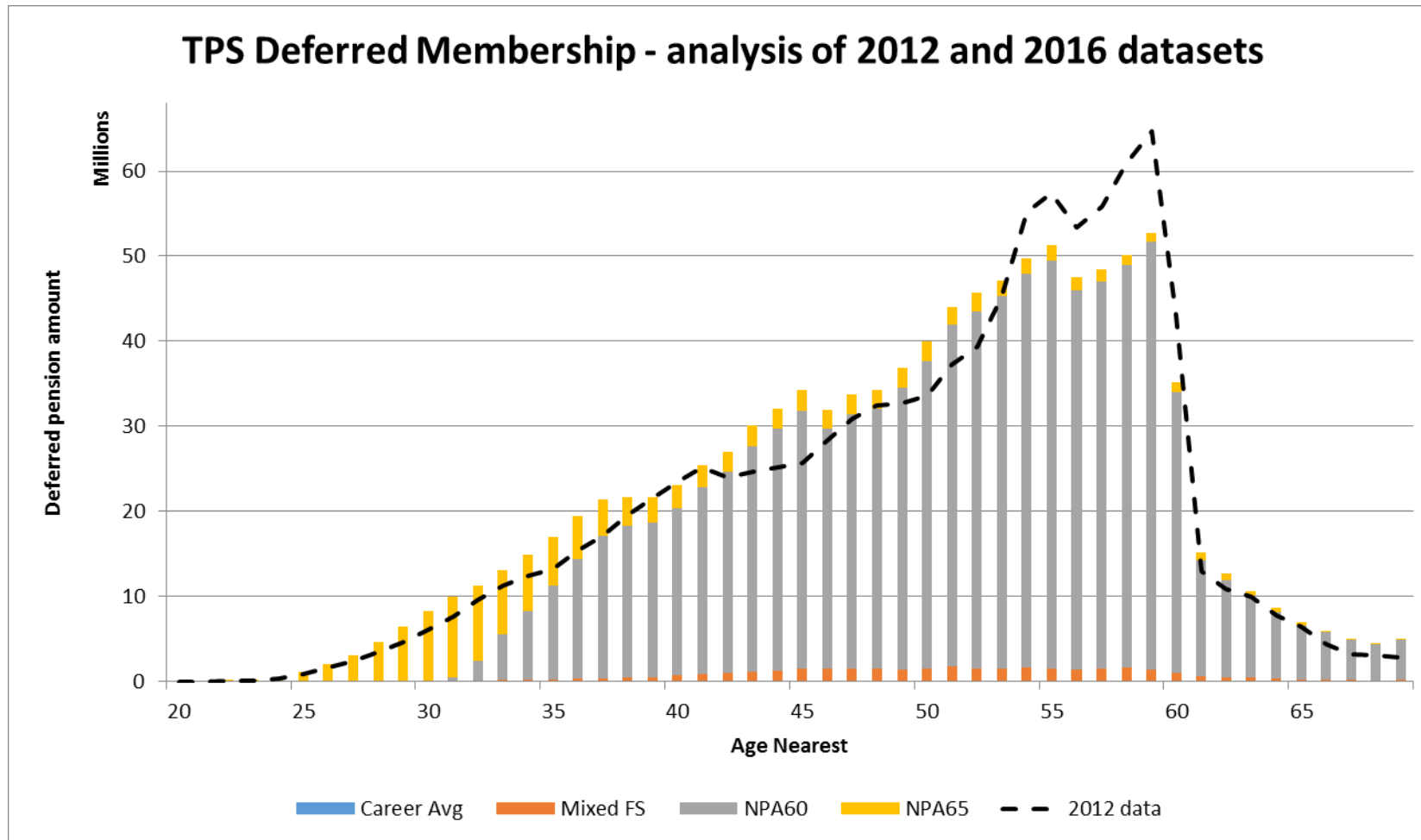
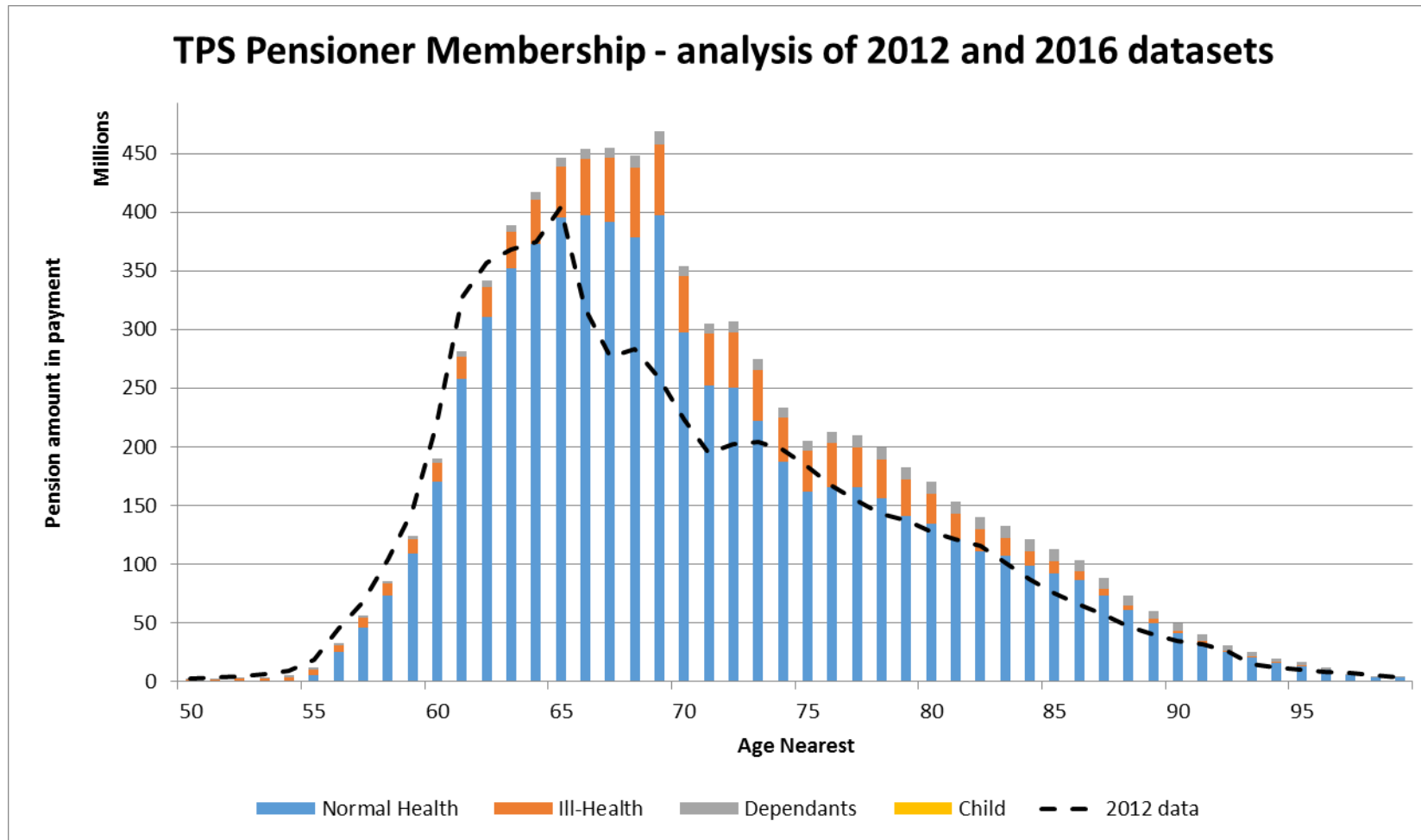**Chart A8: Summary of pension amount by age**

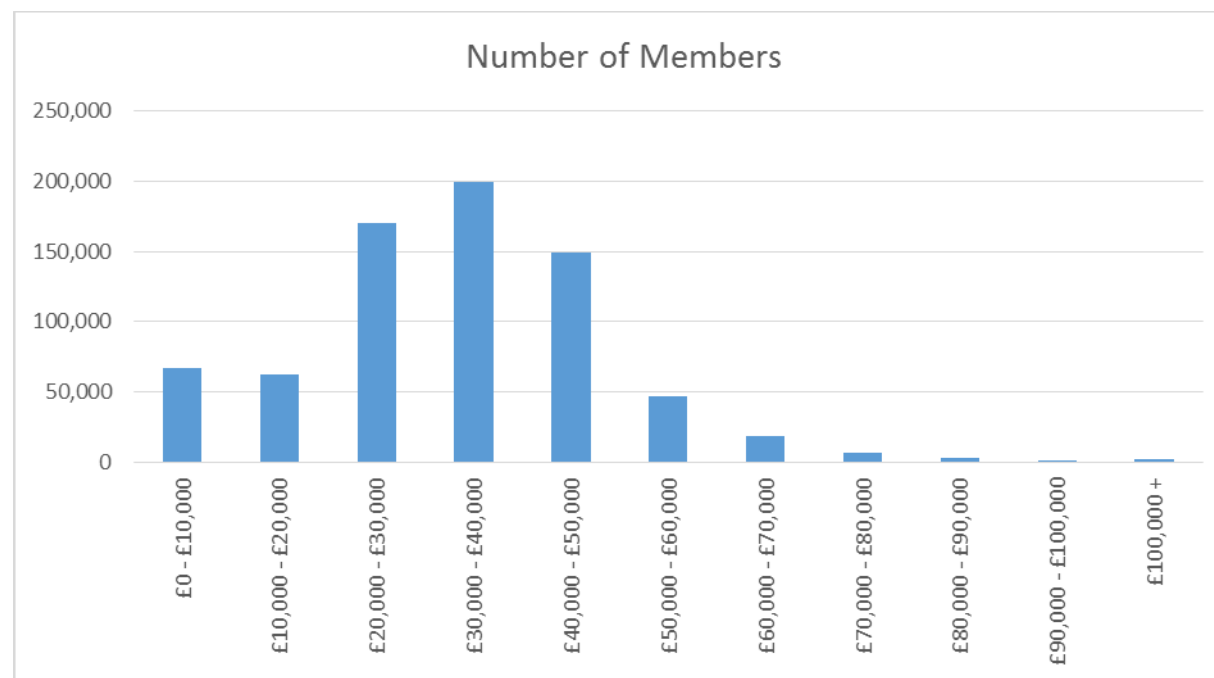**Chart A9: Active membership: Distribution of actual pay received as at 31 March 2016**

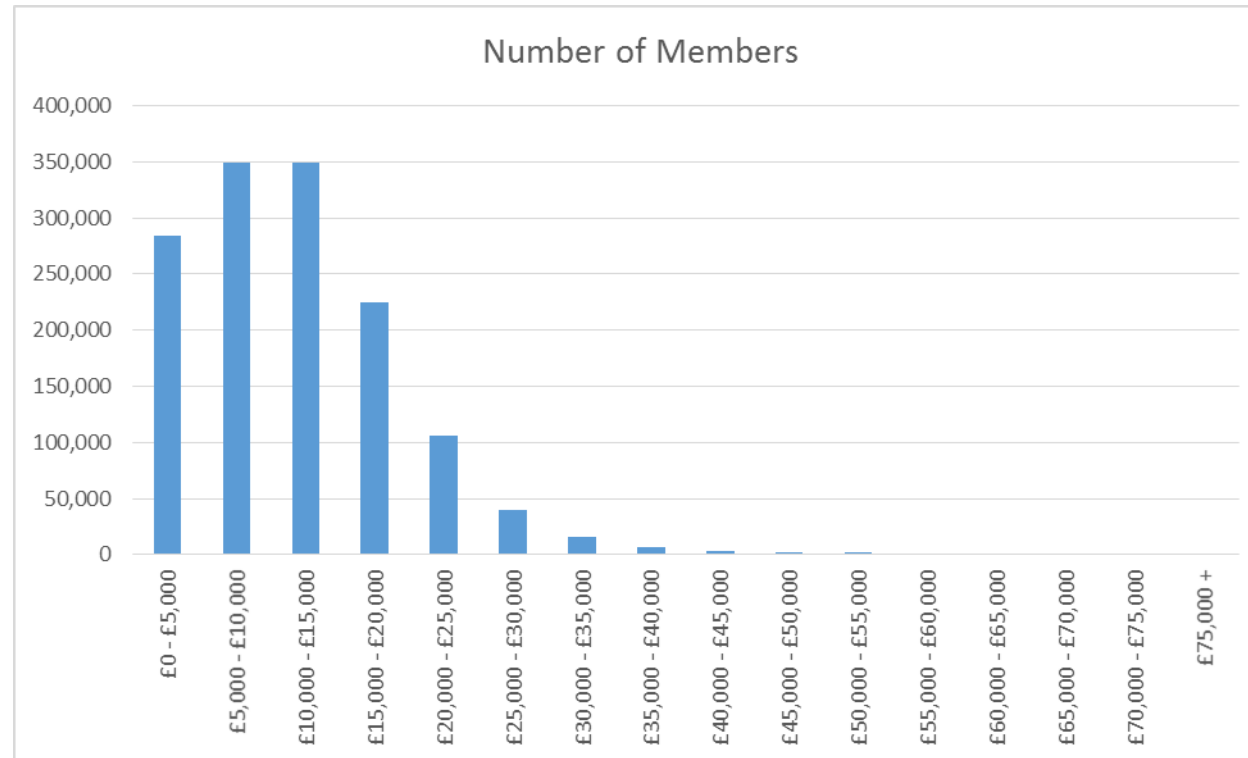**Chart A10: Pensioner membership: Distribution of pension as at 31 March 2016**

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

Appendix B: Summary of movements data 2012-2016

	Reconcilation of membership over intervaluation period 2012-2016 (000s)	Prior intervaluation period 2008-2012 (000s)
Actives		
Number at start of period Data adjustment	665 26[1]	654
Additions • New entrants • Rejoiners and re-employed	} 717	215 174[2]
Deductions: • Deaths • Retirements • Withdrawals	(1) (72) (659)	(1) (82) (223)[2]
Number expected at end of period	676	737
Valuation data at end of period	671[3]	657
Deferreds		
Number at start of period	459	403
Additions • New deferreds	658	199[2]
Deductions: • Deaths • Age retirements • Rejoiners to active • Other exits	(3) (44) (477) (7)	(1) (38) (176)[2] (11)
Number expected at end of period	586	376
Valuation data at end of period	576[3]	459
Pensioners		
Number at start of period	618	523
Additions • New pensioners including new dependants	143	140
Deductions: • Member deaths • Dependant deaths & other cessations	(48)[4] (18)	(42) (8)
Number expected at end of period	695	613
Valuation data at end of period	692	618

[1] Data adjustment reflects late employer returns (see section 3.8). The members reflected by this adjustment were included in the final data used for the 2012 valuation.

[2] A different method of recording the number of withdrawals and re-entries was adopted for the 2012 valuation. As a consequence, only the net amounts (ie. withdrawals less rejoiners) are comparable between valuations.

[3] Pre global rate up/down

[4] This reflects 17,822 deaths with dependants and 30,671 deaths without dependants

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

Appendix C: 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.

Non-pensioners

> TP reference number
> Pemp ID (identifier)
> gender
> date of birth
> protection status
> member's latest section
> member's previous section
> date last joined active membership
> total reckonable NPA 60 service subject to deferred revaluation
> total reckonable NPA 65 service subject to deferred revaluation
> total deferred NPA 60 pension including pension increases
> total deferred prospective NPA 60 spouse's pension including pension increases
> total deferred NPA 65 pension including pension increases
> number of years for which the standard reduction has been bought out
> total deferred career average section pension that is not subject to buy-out election including pension increases
> total deferred career average section pension that is subject to buy-out election including pension increases
> total Average Salary at last service date recorded as active on ASR – final salary section
> actual pensionable salary over the year from ASR – final salary section
> annual pensionable salary at last service date recorded as active on ASR – final salary section
> FTE pensionable salary at last service date recorded as active on ASR – final salary section
> actual pensionable earnings over the year from ASR – career average section
> annual pensionable earnings at last service date recorded as active on ASR – career average section
> total NPA 60 reckonable service for member's benefits linked to salary increases (i.e. counting as continuous pensionable service at last ASR date)
> total NPA 60 reckonable service counting for spouse's pension linked to salary increases (i.e. counting as continuous pensionable service at last ASR date)
> total NPA 65 service linked to salary increases (i.e. counting as continuous pensionable service at last ASR date)
> accrued career average section pension at extract date linked to in-service revaluation (i.e. qualifying as continuous service) that is not subject to a buy-out election
> accrued career average section pension at extract date linked to in-service revaluation (i.e. qualifying as continuous service) that is subject to a buy-out election
> number of years for which the standard reduction has been bought out

Pensioners and Dependants

> TP reference number
> Pemp ID (unique identifier)
> Linked Pemp ID (for dependants, the identifier of the member)
> Gender
> date of birth
> protection status
> total final salary section pension in payment, including pension increases
> total career average section pension in payment, including pension increases
> total final salary section prospective spouse's pension, including pension increases
> total career average section prospective spouse's pension, including pension increases

Appendix D: Data items - movements data

Non-pensioners

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

a. TP reference number
b. Pemp ID (identifier)
c. gender
d. date of birth
e. protection status
f. pension credit indicator
g. member's latest section
h. member's previous section
i. workforce section
j. pensionable salary over year of service on ASR – final salary section
k. pensionable earnings over year of service on ASR – career average section
l. date of joining/rejoining
m. reason for joining/rejoining
n. date of prior exit
o. In active service the day before joining/re-joining?
p. reason for exit
q. date of exit
r. calendar service at exit
s. total non-retirement related lump sum benefits payments from final salary section
t. total non-retirement related lump sum benefits payments from career average section
u. In active service the day before exit?
v. last ASR submitted by employer
w. Date of leaving
x. Withdrawal indicator
y. Date of subsequent re-entry

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. TP reference number
b. Pemp ID (identifier)
c. Linked Pemp ID (for dependants, the identifier of the member)
d. gender
e. date of birth
f. protection status
g. member's latest section
h. member's previous section
i. pensioner group
j. reason for entry to pensioner status
k. date of pension commencing
l. NPA 60 pension coming into payment before commutation
m. NPA 60 pension coming into payment after commutation
n. NPA 65 pension coming into payment before commutation
o. NPA 65 pension coming into payment after commutation
p. career average section pension coming into payment before commutation
q. career average section pension coming into payment after commutation
r. lump sum paid from NPA 60 scheme as a result of commutation
s. lump sum paid from NPA 65 scheme as a result of commutation
t. lump sum paid from career average section as a result of commutation
u. date of cessation
v. reason for cessation
w. final salary section pension at date of exit
x. career average section pension at date of exit
y. date of birth of spouse or partner where a dependant's pension comes into payment
z. total pensioner related lump sum payments from NPA 60 section
aa. total pensioner related lump sum payments from NPA 65 section
bb. total pensioner related lump sum payments from career average section
cc. One-off payments – final salary section
dd. One-off payments – career average section

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

Appendix E: Checks and adjustments applied to the membership data

Checks and exclusion

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

Table E1 – Active members

Reason for Exclusion	Number of Members
Reckonable service outside reasonable range (0 to 45 years)	2
FTE pay outside reasonable range (£7,000 to £350,000)	141
Part-time Proportion outside acceptable range (0 to 1)	1
Total no of exclusions	144

Table E2 – Deferred members

Reason for Exclusion	Number of Members
Age outside the appropriate range	2,184
Members couldn't be assigned a category (negative pension/limited information on record)[+]	122
Total no of exclusions	2,306

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

Table E3 – Pensioners

Reason for Exclusion	Number of Members
Pension was unreasonable or missing	158
Age was unreasonable	10
Total number of exclusions	168

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

Adjustments applied to data for included members

> Active and deferred datasets were provided as a joint non-pensioner dataset. We have split these into active and deferred membership groups and then applied the global adjustments described in section 3 of this report to produce the final dataset.

> For active and deferred members of the scheme, the pension amounts used in respect of the career average section of the scheme have been calculated using all four relevant fields provided in the data (see non-pensioner items in Appendix C).

> Where the actual salary field would otherwise be zero or blank, it has been replaced by the maximum of the Annual Pensionable Salary and the Annual Pensionable Earnings provided (see Appendix C).

> 847 Pensioners and Dependants whose category was unknown were categorised based on their age at the valuation date and their contingent spouse's pension.

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

Checks on uprated dataset

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

Actives as at 31 March 2016 and 31 March 2015
The global uprating of the active dataset described in section 3.5 of this note benchmarks the total actual (not-FTE) pensionable payroll in the final dataset against the equivalent amount derived from the employer contributions shown in the scheme accounts. This process ensures consistency between the two datasets.

Pensioners – as at 31 March 2016
For pensioners, the total pensioner payroll in the adjusted pensioner dataset (£8.088bn) was compared with the total pensions paid during 2015/16 recorded in the accounts (£8.034bn). The accounting figure will be an average over the year, whereas the pension in the membership data reflects the rate payable at the end of the period. For the comparison, the accounting data was therefore uplifted by around 1.6% to reflect the differences in the timing of payments. This uplift was based on comparisons of previous successive year's accounting data. The outcome of this comparison was that the pensioner payroll from the data was only 0.9% lower than our accounting based estimate of the pensioner payroll. Given the approximate nature of the check this does not suggest any adjustment to the data is required.

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

Total non-pensioner pension amounts

Section 3 of this note describes the global uprating of the active dataset, and the global down rating of the deferred pensioner dataset, that were applied as part of our data processing. To check consistency, we have compared the total accrued pension amounts in these final datasets with the equivalent amount provided in the original non-pensioner data. This check showed that the overall pension amount had increased by £80m, and confirms that our data processing has not increased the total accrued pension amount to a greater extent than we would expect. This expectation is based upon the expected accrual of pension and earnings growth for members assumed to have been misclassified as deferred based on the annual returns.

Appendix F: Uncertainty in valuation results arising from data deficiencies

The most significant issue affecting the TPS data relates to the classification of active and deferred members at the valuation date. Paragraphs 3.4 to 3.7 discuss this issue further and describe the adjustments made to allow for this. This approach implicitly assumes that the misclassified members have the same average characteristics as the members recorded as actives (but significantly higher liabilities than those recorded as deferreds) and this introduces some uncertainty into the valuation results.

Additionally, Paragraph 3.11 notes that some active members' service records may be affected by delayed, missing or incomplete annual service returns, in relation to previous scheme years. No adjustment has been made to the valuation results, as it is assumed that the impact of this will not have a material impact on the overall service totals across the whole of the active membership. However this does introduce some uncertainty into the valuation results.

Very few members are excluded from the data as a result of missing or unrealistic key data items. Adjustments made for these will not have a material impact on the uncorrected employer contribution rate or employer contribution correction cost.

Possible impacts on the uncorrected employer contribution rate

If the members who are classified as deferred in 2016 based on the data provided but who should, in fact, be active members have liabilities that are about 10% different from typical actives in 2016 this will impact the uncorrected employer contribution rate by around 0.2% of salaries. The contribution rate would increase if these members have higher than assumed liabilities (and this were correctly recognised). There would also be an impact if the age profile of these members is different from typical actives. However, a difference in average age of 2 years is expected to have an impact on the uncorrected employer contribution rate of less than 0.1% of salaries.

If, however these members have liabilities that are about 10% different from the assumed amount when they are removed from the deferred data set this will impact the uncorrected employer contribution rate by around 0.1% of salaries. The contribution rate would decrease if these members have higher than assumed liabilities (and this were correctly recognised). It is likely therefore that any errors relating to the classification of any such members (as to whether they should be active or deferred) will offset to some extent.

TP has indicated that in an initial extract of data for the 2015 accounts about 2% of active members were affected by delayed, missing or incomplete annual service returns. Many of these issues are corrected over time. Work on a previous valuation data extract suggested about half of the omissions were corrected within 12 months with further improvements over time. With the introduction of annual benefit statements, which include a full history of the service and salary provided to TP by employers, it is likely that data completeness has increased but some data will still be absent from records. To illustrate the possible impact, if ½% of service is excluded from records until being corrected at retirement then the liability of non-pensioners would be understated by about 1% and this would increase the uncorrected employer contribution rate by 0.1-0.2% of salaries.

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

Aggregating the impact of these three known points, may therefore suggest a resulting combined level of uncertainty on the uncorrected employer contribution rate of around 0.2% of pensionable pay.

Possible impacts on the employer contribution correction cost

If the members who are misclassified in 2016, based on the data provided to TP by employers, have liabilities that are about 10% different from members affected by the same issue in 2015, this will impact the cost cap past service cost of the scheme by around 0.2% of salaries. There would also be an impact on the cost cap future service cost if the age profile of these members is different from typical actives. However, a difference in average age of 2 years is expected to have an impact on the employer contribution correction cost of less than 0.1% of salaries.

Aggregating the impact of these known factors may therefore suggest a resulting combined level of uncertainty on the employer contribution correction cost of around 0.2% of pensionable pay.

Uncertainty at future valuations

As noted in paragraph 3.15, the introduction of Monthly Data Collection by TP and proposed improvements to the reconciliation of contribution and service/salary information should reduce the uncertainty at future valuations.

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

Appendix G: 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. The following exclusions were applied to records which did not meet this criteria. No further checks were undertaken other than to ensure the overall number of movements compared reasonably with the comparable figures shown in the accounts.

The active movements data is used to analyse experience of members who retire, die or leave active service. For these purposes only relevant records and those with reasonable critical data were used for analysis purposes. The subset of data used, checks applied and resulting numbers of exclusions are shown below.

Table G1 – Active members

Reason for Exclusion	Number of exclusions
Number of exits from active status in raw data	1,189,248
Removed assumed duplicates	66
Total exits form active status analysed	1,189,182

The following adjustments were made to the non-pensioner movements data received:

> The combined non-pensioner movements data was split into active and deferred datasets.
> Movements were assigned as withdrawals where the date of leaving field was not empty.
> 17,283 movements records had items that were missing information which is used to determine the relevant section of the scheme. All members recorded as joining the scheme are assumed to have joined the section open at the time of entry (either the NPA 65 section or the career average section). All members leaving the scheme during the period under consideration are assumed to have left the NPA 60 section.

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

The pensioner movements data was used to analyse mortality experience, family statistics and commutation of pension experience. For these purposes only relevant records and those with reasonable critical data were used for analysis purposes. The subset of data used, checks applied and resulting numbers of exclusions are shown below.

Table G2 – Pensioners

Reason for Exclusion	Number
Number of exits from active status in raw data	101,570
Removed assumed duplicates	2,191
Removed normal health retirees now re-employed	31,613
Removed those receiving further awards	7,057
Removed movements outside of inter-valuation period	2,662
Total exits form active status analysed	66,375*

* Total reflects that if a record fails for more than one reason it is included in the table above multiple times.

The following adjustments were made to the pensioner movements data received:

> Dates of death for a number of records were updated using an additional data source provided by TP.
> 608 pensioner movements were re-categorised to reflect their status in the membership data provided as at 31 March 2015.

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

Appendix H: Summary of benefits

The Directions require that the TPS and the new scheme introduced for the teachers' workforce from 1 April 2015 ('the 2015 Scheme') are taken into account in aggregate for the purposes of the current valuation. The summary of benefits provided is shown separately for the TPS and the 2015 Scheme. The criteria by which Scheme membership is determined from 1 April 2015 is also shown.

TPS (for pre-2015 entrants)

The main benefit provisions of the Scheme for each category of member are shown in Table H1.

Table H1: Main benefit provisions of TPS for pre-2015 entrants

	NPA 60 Section	NPA 65 Section
Basis of provision	Final salary	Final salary
Contracted out/in prior to 2016[+]	Contracted out	Contracted out
Normal Pension Age (NPA)	60	65
Pension accrual rate	1/80	1/60
Retirement lump sum accrual rate	3 x pension plus commutation at £12:£1pa	Cash by commutation only (£12: £1pa)
Final pensionable pay	Better of a) last 12 months' pensionable pay b) average of best 3 consecutive years' pensionable pay in last 10 years (revalued in line with the Pensions Increase (PI) Act to date of exit)	
Dependant benefits	50% of member pension (pre-commutation)	37.5% of member pension (pre-commutation)
Ill health pension	Total incapacity benefit – Pension based on actual service plus half of potential service to NPA	
	Incapacity benefit – Pension based on actual service (but no reduction for immediate payment)	
Pension increases	In payment – increased in line with the PI Act, on excess over GMP (for members over GMP payment age)	
	In deferment – total pension increased in line with the PI Act	

[+]future benefits unaffected by contracting-out status

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

2015 Scheme (for post-2015 entrants and transitional members)

The main benefit provisions of the 2015 Scheme are shown in Table H2

Table H2: Main benefit provisions of 2015 Scheme

	2015 Scheme
Basis of provision	Career average with revaluation of CPI + 1.6% pa whilst in service
Contracted out/in prior to 2016+	Contracted out
Normal Pension Age (NPA)	Higher of a member's State Pension age and 65
Pension accrual rate	1/57
Retirement lump sum accrual rate	Cash by commutation only (£12: £1pa)
Final pensionable pay	Not applicable
Dependant benefits	37.5% of member pension (pre-commutation)
Ill health pension	Total incapacity benefit – incapacity benefit plus 50% prospective service to NPA, multiplied by 1/57 of the member's annual rate of pensionable earnings Incapacity benefit - accrued pension, no reduction
Early retirement	Benefits reduced for early payment. The reduction is actuarially neutral on a deferred benefit basis, except that for retirements directly from active status the reduction applying to the period between age 65 and NPA is 3% a year (up to a maximum of 3 years)
Pension increases	In payment – increased in line with the PI Act, on excess over GMP In deferment – total pension increased in line with the PI Act

+benefits unaffected by contracting-out status

Government
Actuary's
Department

Teachers' Pension Scheme (England and Wales)

Actuarial valuation as at 31 March 2016
Report on membership data

Criteria for scheme membership from 1 April 2015

Protected Members

All active members who, as of 1 April 2012, have 10 years or less to their current Normal Pension Age (i.e. NPA 60 section members who are aged 50 and over on 1 April 2012, and NPA 65 and Mixed Service section members who are aged 55 or over on 1 April 2012) saw no change in when they can retire, nor any decrease in the amount of pension they receive at their current Normal Pension Age. This protection was achieved by the member remaining in their current scheme until they retire.

Tapered Members

Active members who, as of 1 April 2012, are between 10 and 13½ years of their Normal Pension Age (i.e. NPA 60 section members who are aged between 46½ and 50 on 1 April 2012, and NPA 65 and Mixed Service section members who are aged between 51½ and 55 on 1 April 2012) had limited protection with linear tapering so that for every month of age that they are beyond 10 years from their Normal Pension Age, they lose 2 months of protection. At the end of the protected period, they will be transferred into the new pension arrangements.

Unprotected members

All other active members transferred to the new arrangements on 1 April 2015.