



Government Actuary's Department



Police Pension Schemes (Scotland)

Actuarial valuation as at 31 March 2016

Report on membership data

Date: 15 February 2019

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1 Introduction

- 1.1 This report is addressed to the Scottish Public Pensions Agency (“SPPA”). It is also being made available to the Scottish Police Pension Scheme Advisory Board as part of the consultation process relating to the actuarial valuation which is being carried out as at 31 March 2016.
- 1.2 Pension scheme membership data for members of the 1987 Scheme, 2006 Scheme and 2015 Scheme, referred to collectively in this report as ‘the Schemes’ is required for the actuarial valuation of the Schemes as at 31 March 2016, carried out in accordance with The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014 (as amended) (‘the 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 Schemes’ 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.
- 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 to GAD by SPPA. Supplementary financial information for the Schemes has been provided by Police Scotland for independent checking purposes.
- 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.



- 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 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 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 data used for the 2012 valuation. Detailed tables are set out in Appendix A.

Chart 2.1: Number of active members

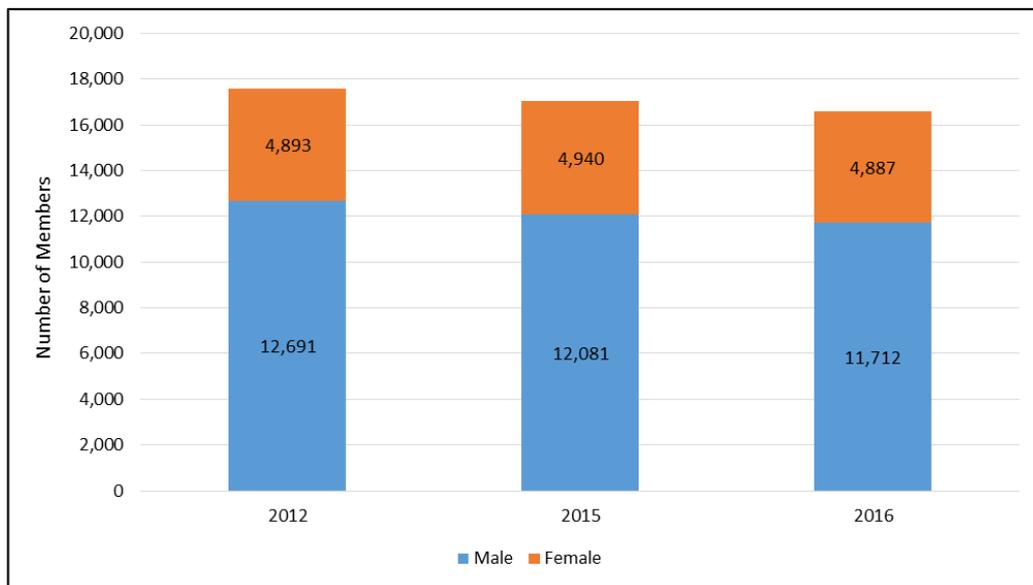


Chart 2.2: Active total pensionable pay (actual annualised pay)

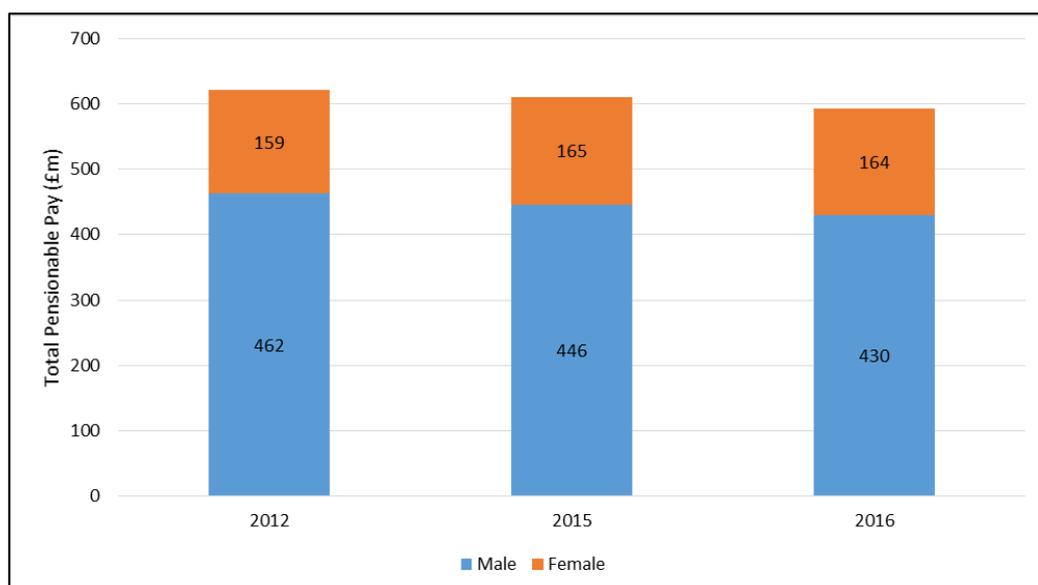




Chart 2.3: Number of deferred members

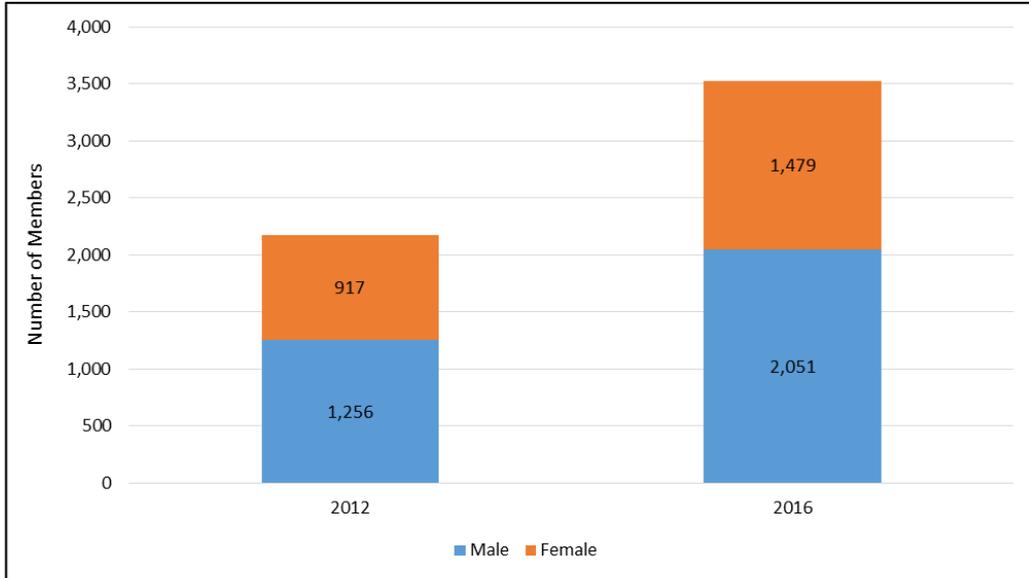
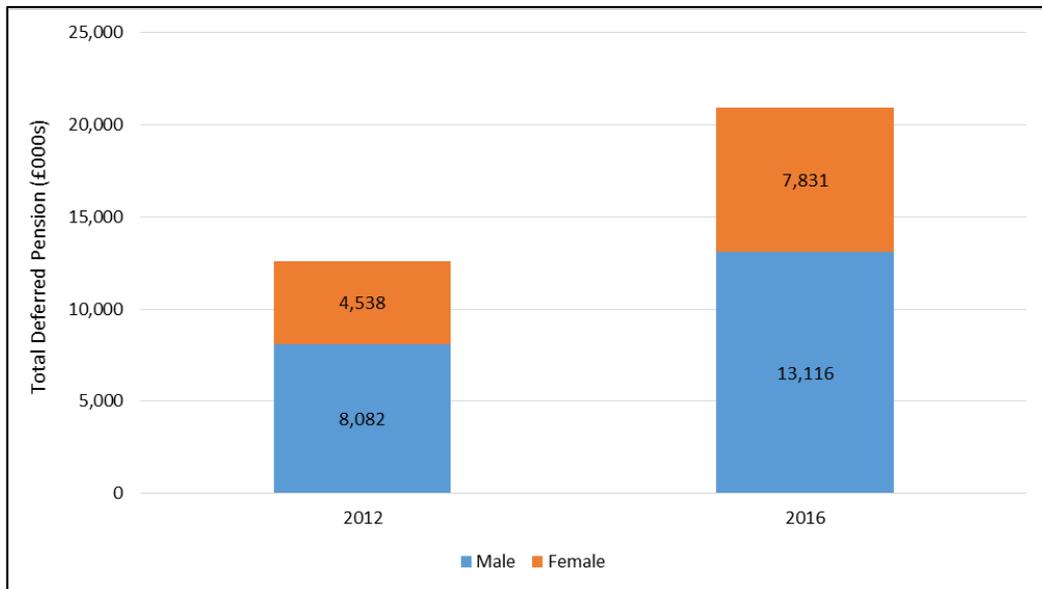


Chart 2.4: Total deferred pension¹



¹ Including pension increases awarded in April following extract date.



Chart 2.5: Number of pensioners and dependants

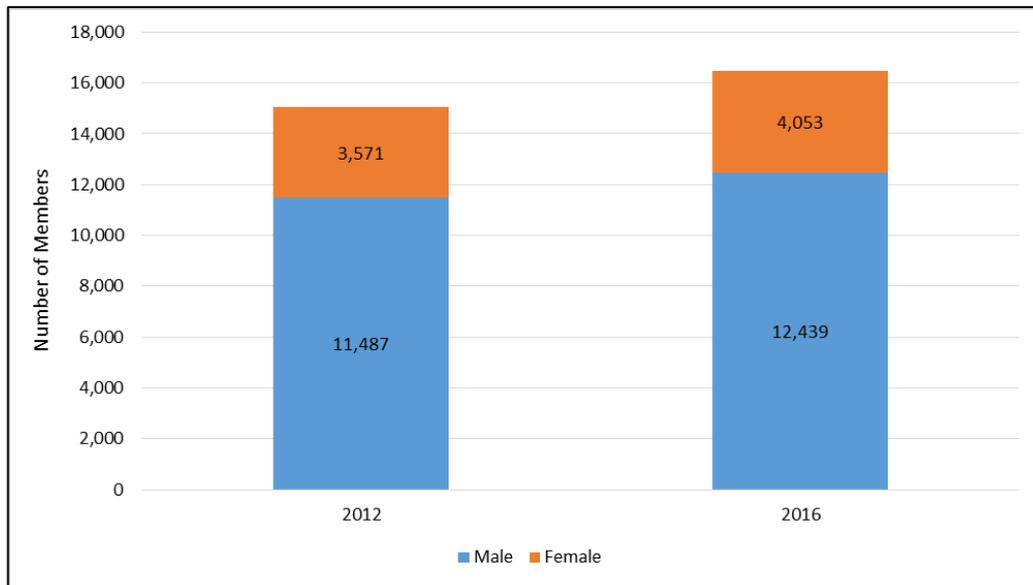


Chart 2.6: Total pension in payment (pensioners and dependants)²



2.2 The graphs above show a decrease between 2012 and 2016 in the active headcount and total salary roll. There has been an increase between 2012 and 2016 in the deferred and pensioner (including dependant) membership by both headcount and total pension. The large increase in deferred headcount and total deferred pension is caused by the significant number of withdrawals observed over the period.

² Including pension increases awarded in April following extract date.



- 2.3 Around 37,000 records were provided to GAD across all three membership categories (active, deferred and pensioner) as at 31 March 2016. Checks were applied to these records to ensure all key data items were provided and reliable for valuation purposes. Records with key data items either missing or unreliable were excluded and remaining data uprated, where appropriate. 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.

Table 2.1: Uprating factors

	Uprating factor	Uprating factor
	2016	2015
Active members	1.0185	1.0225
Deferred members	1.0109	n/a
Pensioners	1.0005	n/a
Total membership	1.0096	1.0225

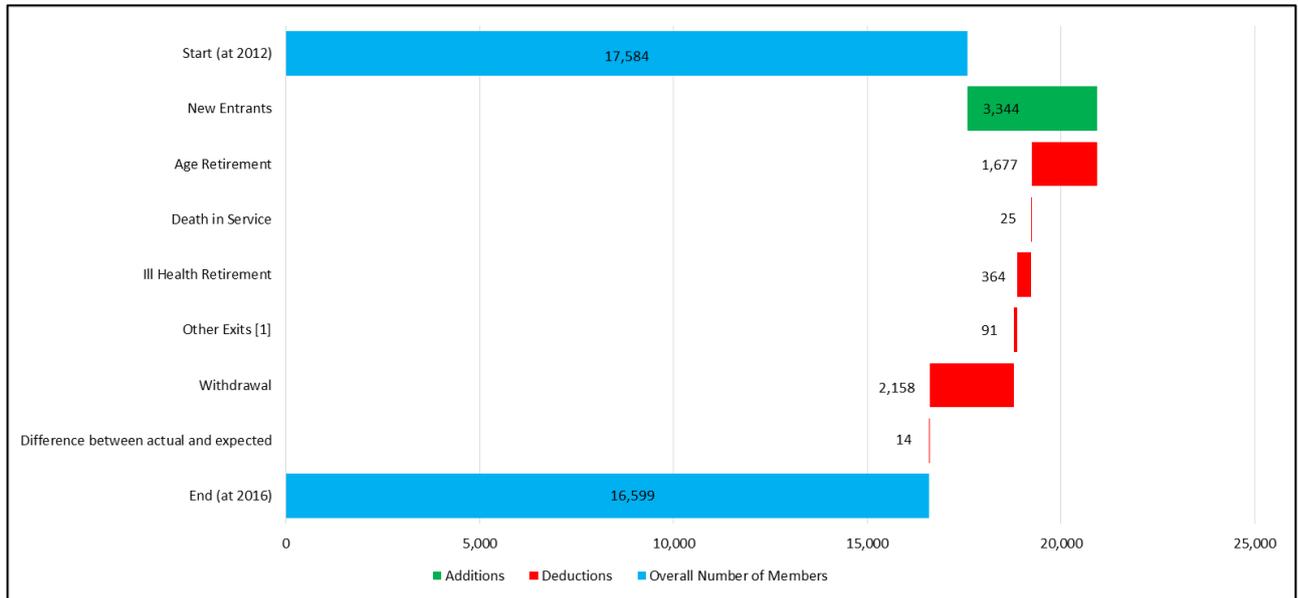
- 2.4 Making assumptions about missing data and allowing for known members with unusable data by uprating introduces uncertainty into the valuation results. In our opinion the data used as summarised above is adequate for the purposes of the valuation.

Movements data 31 March 2012 to 31 March 2016

- 2.5 The movements data provided is used for the purposes of informing the demographic assumptions to be used for the 2016 valuation. The graphs below show a reconciliation of the movements between 2012 and 2016. The underlying numbers and some further information are set out in Appendix B.



Chart 2.7: Active membership reconciliation



[1] : These records have no reason_ceased. Ninety of these records have no service and in the as-at data this record would be excluded, but rated up and therefore included in the 2016 stock figure shown.

Chart 2.8: Deferred membership reconciliation

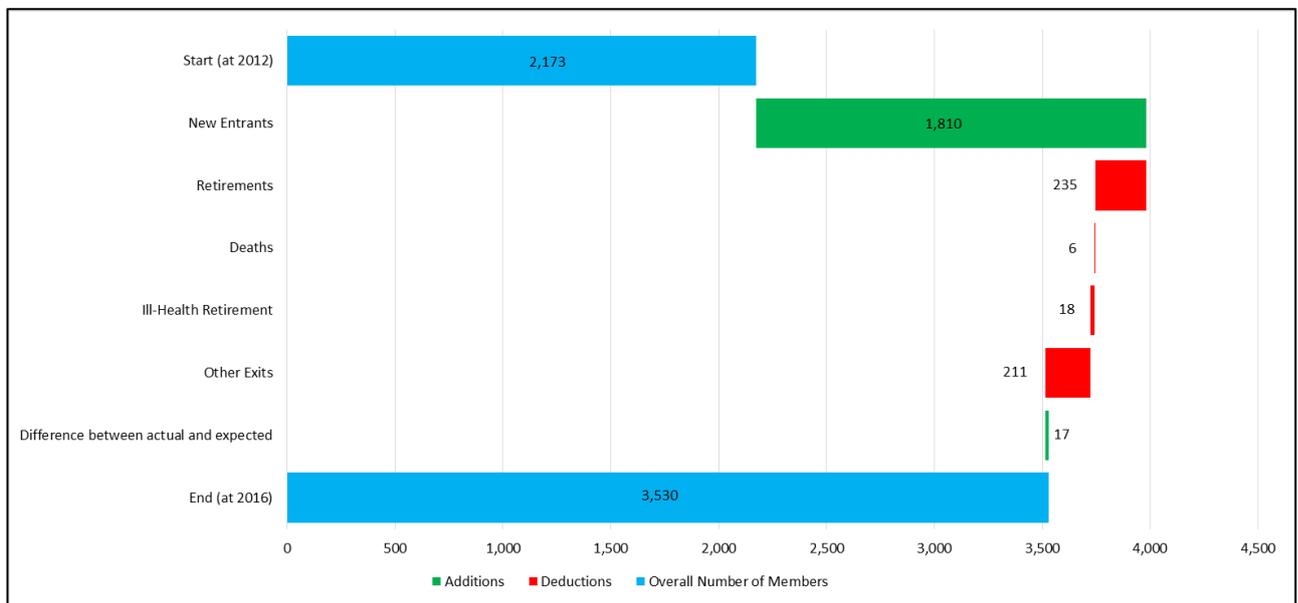
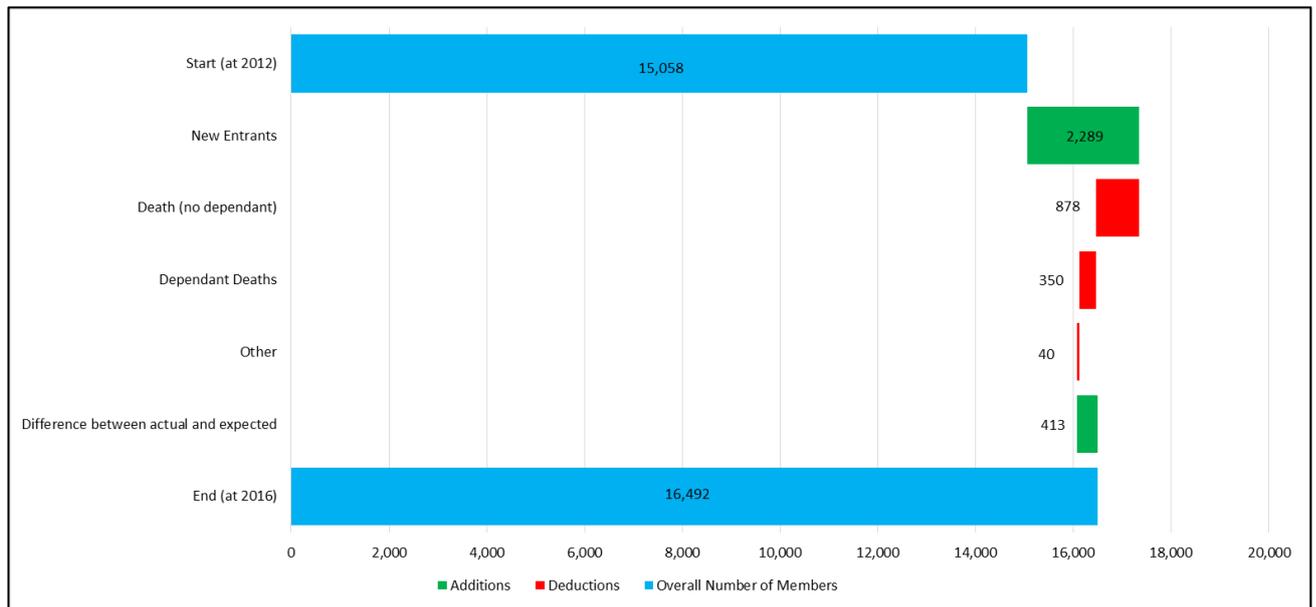




Chart 2.9: Pensioner membership reconciliation



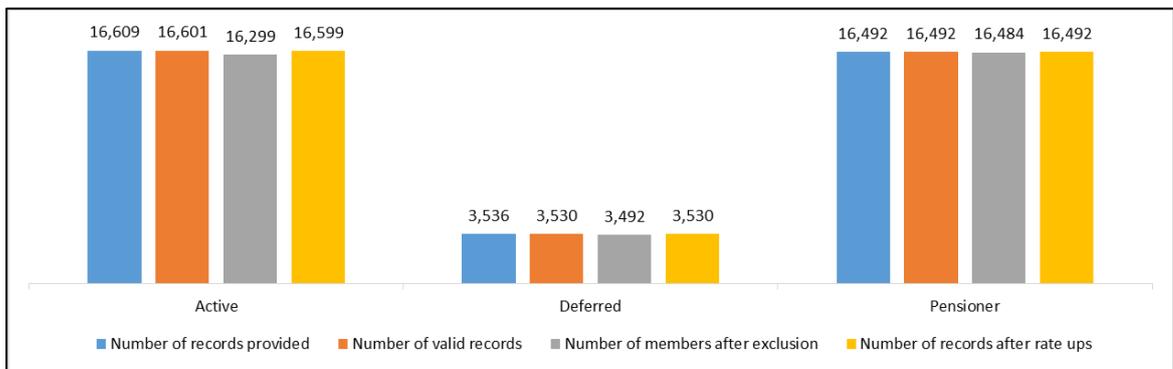


3 Data provided and checks and adjustments made

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.
- 3.2 The graph below shows the total number of records provided, the number of valid records (ie the member was present in the pension scheme at the valuation date), the number of records after records with missing or unreliable data were excluded and the number of records after rating up for the excluded data.

Chart 3.1: Summary of data provided and excluded



Checks made and adjustments applied

- 3.3 All key data items were checked against the specification requested for both completeness and consistency.
- 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 after exclusion. Implicitly this uprating approach assumes that excluded records have the same average profile (ie age, gender, pay, service) as included records. Tables 3.1 and 3.2 show the derivation of the uprating factors³.

³ In practice uprating factors are determined for each identifiable valuation group.



Table 3.1: 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	16,601	302	16,299	1.0185
Deferred members	3,530	38	3,492	1.0109
Pensioners	16,492	8	16,484	1.0005
Total membership	36,623	348	36,275	1.0096

Two records could not be uprated for the active membership – all records within their respective group were excluded so no remaining record could be uprated.

Table 3.2: Derivation of uprating factors (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	17,021	374	16,647	1.0225

Movements data – 31 March 2012 to 31 March 2016

- 3.5 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.

Independent data check

- 3.6 Police Scotland provided financial data for the Schemes which has been used to perform independent checks on the dataset supplied. These checks and the data used are set out in Appendix E.

Benefit information

- 3.7 A summary of the benefits provided to members of the Schemes is given in Appendix H. The only uncertainty about the form of benefits that the Schemes are 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

Actives

Table A1: Summary data for 1987 Scheme active members as at 31 March 2016: split by protection status

<i>Protection (i)</i>	<i>Gender</i>	<i>Number of members</i>	<i>Total Pensionable Salary (FTE⁴) £m</i>	<i>Average Pensionable Salary (FTE) £</i>	<i>Total Actual Pay £m</i>	<i>Average Age (ii) years</i>	<i>Average Service (iii) years</i>	<i>Total 2015 Scheme pension £000</i>
Protected	Male	2,824	121.6	43,071	121.6	49.8	25.4	0.0
	Female	670	27.5	41,038	27.7	48.9	25.1	0.0
	<i>Total</i>	<i>3,494</i>	<i>149.1</i>	<i>42,681</i>	<i>149.3</i>	<i>49.6</i>	<i>25.3</i>	<i>0.0</i>
Taper	Male	1,553	63.2	40,696	63.1	45.8	20.2	4.4
	Female	507	19.5	38,372	19.4	45.3	20.3	0.1
	<i>Total</i>	<i>2,060</i>	<i>82.7</i>	<i>40,124</i>	<i>82.5</i>	<i>45.7</i>	<i>20.2</i>	<i>4.5</i>
Unprotected	Male	2,655	103.0	38,807	102.9	38.7	13.4	1,878
	Female	1,385	50.0	36,117	47.8	38.6	13.5	859
	<i>Total</i>	<i>4,040</i>	<i>153.0</i>	<i>37,885</i>	<i>150.7</i>	<i>38.7</i>	<i>13.4</i>	<i>2,737</i>
All 1987 Members	Total	9,594	384.8	40,112	382.5	44.5	19.2	2,741

- i. This table includes tapered protection and unprotected members who had moved to the 2015 Scheme by 31 March 2016. The final column shows the total 2015 Scheme pension accrued for these members.
- ii. Weighted by actual salary.
- iii. Final salary service up to date of transition to the 2015 scheme in calendar years, including transferred in service.

⁴ Full time equivalent.



Table A2: Summary data for 2006 Scheme active members as at 31 March 2016: split by protection status

<i>Protection (i)</i>	<i>Gender</i>	<i>Number of members</i>	<i>Total Pensionable Salary (FTE) £m</i>	<i>Average Pensionable Salary (FTE) £</i>	<i>Total Actual Pay £m</i>	<i>Average Age (ii) years</i>	<i>Average Service (iii) years</i>	<i>Total 2015 Scheme pension £000</i>
Protected	Male	87	3.0	34,286	3.0	51.8	10.5	0.0
	Female	33	1.1	33,582	1.1	51.2	11.3	0.5
	<i>Total</i>	<i>120</i>	<i>4.1</i>	<i>34,092</i>	<i>4.1</i>	<i>51.6</i>	<i>10.7</i>	<i>0.5</i>
Taper	Male	145	4.7	32,576	4.7	46.7	10.5	1.8
	Female	108	3.5	32,647	3.5	41.6	10.0	0.0
	<i>Total</i>	<i>253</i>	<i>8.2</i>	<i>32,606</i>	<i>8.2</i>	<i>44.5</i>	<i>10.3</i>	<i>1.8</i>
Unprotected	Male	3,874	120.0	30,984	120.0	32.0	5.1	2,131
	Female	1,925	59.4	30,842	57.9	31.8	5.1	1,008
	<i>Total</i>	<i>5,799</i>	<i>179.4</i>	<i>30,937</i>	<i>177.9</i>	<i>31.9</i>	<i>5.1</i>	<i>3,139</i>
All 2006 Members	Total	6,172	191.7	31,066	190.2	32.9	5.4	3,142

- i. This table includes tapered protection and unprotected members who had moved to the 2015 Scheme by 31 March 2016. The final column shows the total 2015 Scheme pension accrued for these members.
- ii. Weighted by actual salary.
- iii. Final salary service up to date of transition to the 2015 scheme in calendar years, including transferred in service.



Table A3: Summary data for 2015 Scheme active members (new joiners since 1 April 2015) as at 31 March 2016

<i>Protection</i>	<i>Gender</i>	<i>Number of members</i>	<i>Total Pensionable Salary (FTE) £m (i)</i>	<i>Average Pensionable Salary (FTE) £ (i)</i>	<i>Total Actual Pay £m</i>	<i>Average Age (ii) years</i>	<i>Average Service (iii) years</i>	<i>Total 2015 Scheme pension £000</i>
New joiners	Male	575	n/a	n/a	14.2	27.2	0.5	98.2
	Female	258	n/a	n/a	6.4	27.0	0.5	43.4
All 2015 Members		833	n/a	n/a	20.6	27.1	0.5	141.7

- i. A full time equivalent pensionable salary is not used for the valuation of 2015 Scheme benefits.
ii. Weighted by actual salary.
iii. Active service up to valuation date, including transferred in service.

Table A4: 1987 Scheme actives data as at 31 March 2016: Comparison with data as at 31 March 2012

2012		2016										
	<i>Number of members</i>	<i>Total Pensionable Salary (FTE) £m</i>	<i>Average Salary (FTE) £</i>	<i>Average Age (i) years</i>	<i>Average Service (ii) years</i>	<i>Number of members</i>	<i>Total Pensionable Salary (FTE) £m</i>	<i>Average Salary (FTE) £</i>	<i>Average Age (iii) years</i>	<i>Average Service (iv) years</i>	<i>Total 2015 Scheme Pension £000</i>	<i>Total Actual Pay £m</i>
Male	9,240	365.0	39,502	42.7	18.1	7,031	287.8	40,936	44.9	19.7	1,882.0	287.7
Female	3,086	116.4	37,719	39.5	14.4	2,563	97.0	37,851	42.9	17.9	859.4	94.8
Total	12,326	481.4	39,056	41.9	17.1	9,594	384.8	40,112	44.5	19.2	2,741.4	382.5

- i. Weighted by full-time equivalent pensionable pay at the relevant date.
ii. Active service in the scheme plus transferred-in service.
iii. Weighted by actual salary.
iv. Final salary service up to date of transition to the 2015 scheme in calendar years, including transferred in service.



Table A5: 2006 Scheme actives data as at 31 March 2016: Comparison with data as at 31 March 2012

2012						2016						
	Number of members	Total Pensionable Salary (FTE) £m (i)	Average Salary (FTE) £	Average Age (ii) years	Average Service (iii) years	Number of members	Total Pensionable Salary (FTE) £m (i)	Average Salary (FTE) £	Average Age (iv) years	Average Service (v) years	Total 2015 Scheme Pension £000	Total Actual Pay £m
Male	3,451	97.9	28,369	30.2	3.8	4,106	127.7	31,110	33.0	5.4	2,133	127.7
Female	1,807	51.3	28,390	29.9	3.8	2,066	64.0	30,980	32.7	5.5	1,009	62.5
Total	5,258	149.2	28,375.8	30.1	3.8	6,172	191.7	31,066	32.9	5.4	3,142	190.2

- i. Weighted by full-time equivalent pensionable pay at the relevant date.
ii. Active service in the scheme plus transferred-in service.
iii. Weighted by actual salary.
iv. Final salary service up to date of transition to the 2015 scheme in calendar years, including transferred in service.

Table A6: 2015 Scheme actives data (new joiners since 1 April 2015) as at 31 March 2016: Comparison with data as at 31 March 2012

2012						2016						
	Number of members (i)	Total Pensionable Salary (FTE) £m	Average Salary (FTE) £	Average Age years	Average Service years	Number of members	Total Pensionable Salary (FTE) £m (ii)	Average Salary FTE (ii)	Average Age (iii) years	Average Service (iv) years	Total 2015 Pension £000	Total Actual Pay £m
Male	-	-	-	-	-	575	n/a	n/a	27.2	0.5	98.2	14.2
Female	-	-	-	-	-	258	n/a	n/a	27.0	0.5	43.5	6.4
Total	-	-	-	-	-	833	n/a	n/a	27.1	0.5	141.7	20.6

- i. There were no 2015 Scheme members in 2012.
ii. A full time equivalent pensionable salary is not used for the valuation of 2015 Scheme benefits.
iii. Weighted by actual salary.
iv. Active service up to valuation date, including transferred in service.



Table A7: Summary data for all active members as at 31 March 2016: Comparison with data as at 31 March 2012

2012					2016							
	Number of members	Total Pensionable Salary (FTE) £m	Average Salary ((FTE) £m	Average Age (i) years	Average Service (ii) years	Number of members	Total Pensionable Salary (FTE) £m (iii)	Average Salary (FTE) £ (iii)	Average Age (iv) years	Average Service (v) years	Total 2015 Scheme Pension £000	Total Actual Pay £m
Male	12,691	462.8	36,467	40.0	14.2	11,712	429.8	36,698	40.8	14.3	4,113.0	429.6
Female	4,893	167.8	34,294	36.5	10.5	4,887	167.4	34,246	38.4	12.4	1,911.7	163.7
Total	17,584	630.6	35,862.1	39.1	13.1	16,599	597.2	35,976	40.1	13.8	6,024.7	593.3

- i. Weighted by full-time equivalent pensionable pay at the relevant date.
- ii. Active service in the scheme plus transferred-in service.
- iii. These figures exclude 2015 Scheme members who joined since 1 April 2015.
- iv. Weighted by actual salary.
- v. Active service up to date of transition to the 2015 scheme in calendar years, including transferred in service.



Table A8: Summary data for active members as at 31 March 2015

<i>Protection</i>	<i>Gender</i>	<i>Number of members</i>	<i>Total Pensionable Salary (FTE) £m</i>	<i>Average Pensionable Salary (FTE) £</i>	<i>Total Actual Pay £m</i>	<i>Average Age (i) years</i>	<i>Average Service (ii) years</i>
Protected (iii)	Male	5,120	215.3	42,060	215.3	47.8	22.6
	Female	1,382	53.7	38,886	53.7	46.7	21.4
	<i>Total</i>	<i>6,502</i>	<i>269.1</i>	<i>41,385</i>	<i>269.0</i>	<i>47.6</i>	<i>22.3</i>
Unprotected	Male	6,961	230.7	33,144	230.6	34.0	8.4
	Female	3,558	113.8	31,989	111.3	33.9	8.5
	<i>Total</i>	<i>10,519</i>	<i>344.5</i>	<i>32,753</i>	<i>341.9</i>	<i>34.0</i>	<i>8.4</i>
All Members	Total	17,021	613.6	36,050	610.9	40.0	13.7

- i. Weighted by actual salary.
- ii. Final salary service up to valuation date, including transferred in service.
- iii. Includes tapered members.



Deferreds

Table A9: 1987 Scheme deferred data as at 31 March 2016: Comparison with data as at 31 March 2012

2012					2016				
	Number of members	Total Deferred Pension (i) £000	Average Pension £	Average Age (ii) years	Number of members	Total Deferred Pension (i) £000	Average Pension £	Average Age (ii) years	Total 2015 Scheme Pension £
Male	1,167	7,943	6,806	46.1	1,399	11,517	8,230	46.1	30,115
Female	863	4,459	5,167	45.9	1,057	6,848	6,481	46.0	12,714
Total	2,030	12,402	6,109	46.0	2,456	18,365	7,478	46.0	42,829

- i. Including pension increases awarded in April following the valuation date.
ii. Weighted by deferred pension.

Table A10: 2006 Scheme deferred data as at 31 March 2016: Comparison with data as at 31 March 2012

2012					2016				
	Number of members	Total Deferred Pension (i) £000	Average Pension £	Average Age (ii) years	Number of members	Total Deferred Pension (i) £000	Average Pension £	Average Age (ii) years	Total 2015 Scheme Pension £
Male	89	139	1,567	34.0	652	1,599	2,452	34.2	53,992
Female	54	79	1,458	34.2	422	983	2,328	33.7	32,896
Total	143	218	1,526	34.1	1,074	2,581	2,403	34.0	86,888

- i. Including pension increases awarded in April following the valuation date.
ii. Weighted by deferred pension.



Table A11: Summary data for all deferred members as at 31 March 2016: Comparison with data as at 31 March 2012

	2012				2016				
	Number of members	Total Deferred Pension (i) £000	Average Pension £	Average Age (ii) years	Number of members	Total Deferred Pension (i) £000	Average Pension £	Average Age (ii) years	Total 2015 Scheme Pension £
Male	1,256	8,082	6,435	45.9	2,051	13,116	6,394	44.6	84,107
Female	917	4,538	4,948	45.7	1,479	7,831	5,296	44.4	45,611
Total	2,173	12,620	5,808	45.8	3,530	20,947	5,934	44.5	129,718

- i. Including pension increases awarded in April following the valuation date.
- ii. Weighted by deferred pension.



Pensioners

Table A12: Summary data for all pensioner members as at 31 March 2016: Comparison with data as at 31 March 2012

		2012				2016				
		Number of members	Total Pension (i) £m	Average Pension £	Average Age (ii) years	Number of members	Total Pension (i) £m	Average Pension £	Average Age (ii) years	Total 2015 Scheme Pension £ (iii)
Age Retirement	Male	8,488	172.1	20,272	63.6	9,410	209.8	22,293	64.2	0
	Female	273	5.0	18,497	58.2	451	8.7	19,218	58.5	0
	<i>Total</i>	<i>8,761</i>	<i>177.1</i>	<i>20,217</i>	<i>63.4</i>	<i>9,861</i>	<i>218.4</i>	<i>22,152</i>	<i>64.0</i>	<i>0</i>
Ill-Health Retirement	Male	2,900	43.7	15,063	61.8	2,915	46.8	16,068	63.9	8,310
	Female	608	6.1	9,951	51.3	744	8.2	11,043	53.2	3,307
	<i>Total</i>	<i>3,508</i>	<i>49.7</i>	<i>14,177</i>	<i>60.5</i>	<i>3,659</i>	<i>55.1</i>	<i>15,046</i>	<i>62.2</i>	<i>11,617</i>
Dependants (iv)	Male	17	0.1	5,173	46.2	26	0.2	7,173	55.6	0
	Female	2,608	22.9	8,779	73.8	2,768	28.0	10,109	74.7	0
	Children	164	0.5	3,224	18.7	178	0.6	3,595	19.4	0
	<i>Total</i>	<i>2,789</i>	<i>23.5</i>	<i>8,430</i>	<i>72.4</i>	<i>2,972</i>	<i>28.8</i>	<i>9,693</i>	<i>73.4</i>	<i>0</i>
All	Male	11,487	216.1	18,812	63.1	12,439	257.1	20,671	64.1	8,310
	Female	3,571	34.3	9,596	67.1	4,053	45.2	11,149	67.3	3,307
	Total	15,058	250.4	16,627	63.7	16,492	302.3	18,331	64.6	11,617

- i. Including pension increases awarded in April following the valuation date, where applicable.
- ii. Weighted by pension.
- iii. Included in Total Pension.
- iv. Including pension credit members.



Chart A1: Active Members actual pay by age

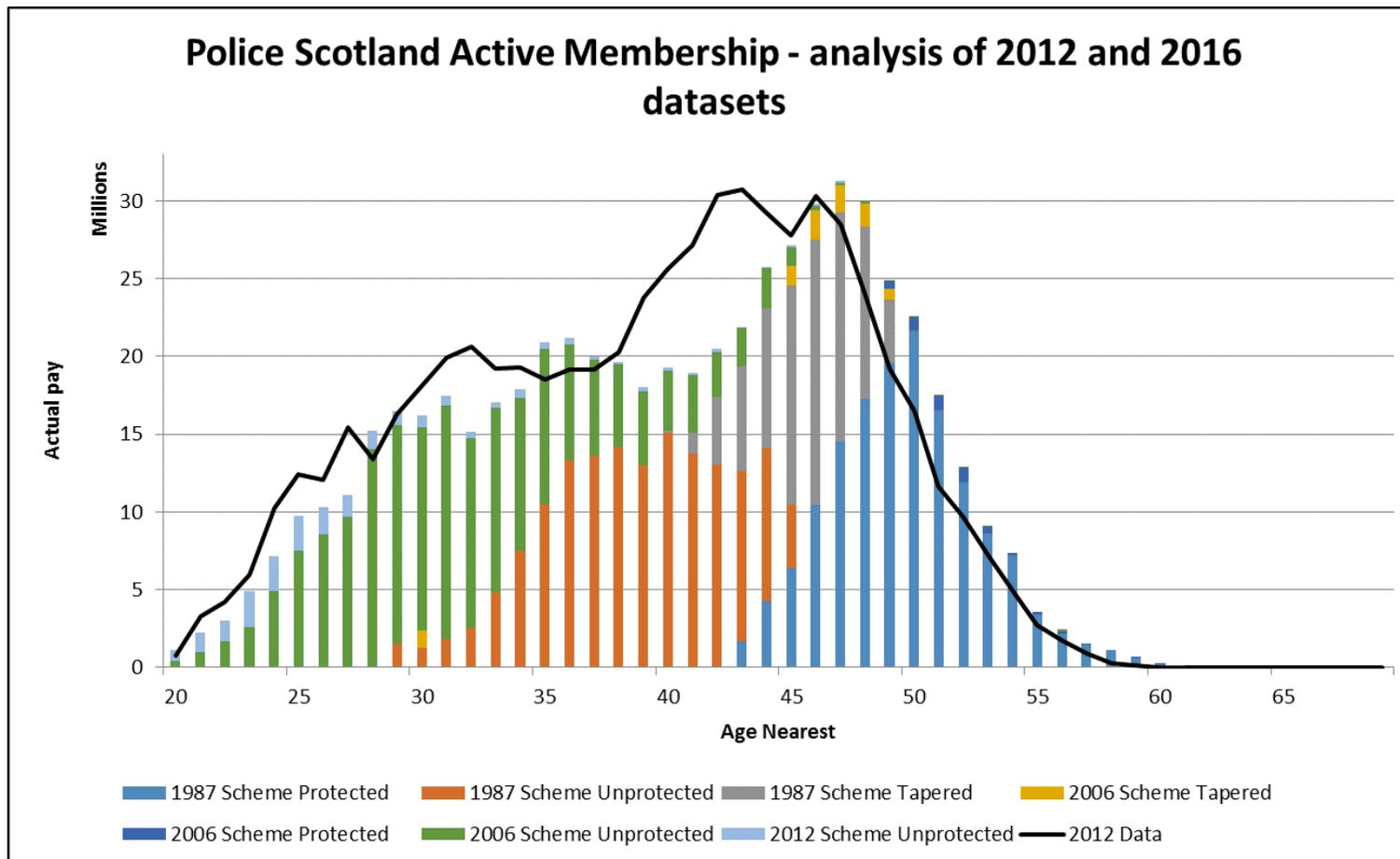




Chart A2: Deferred pension data by age

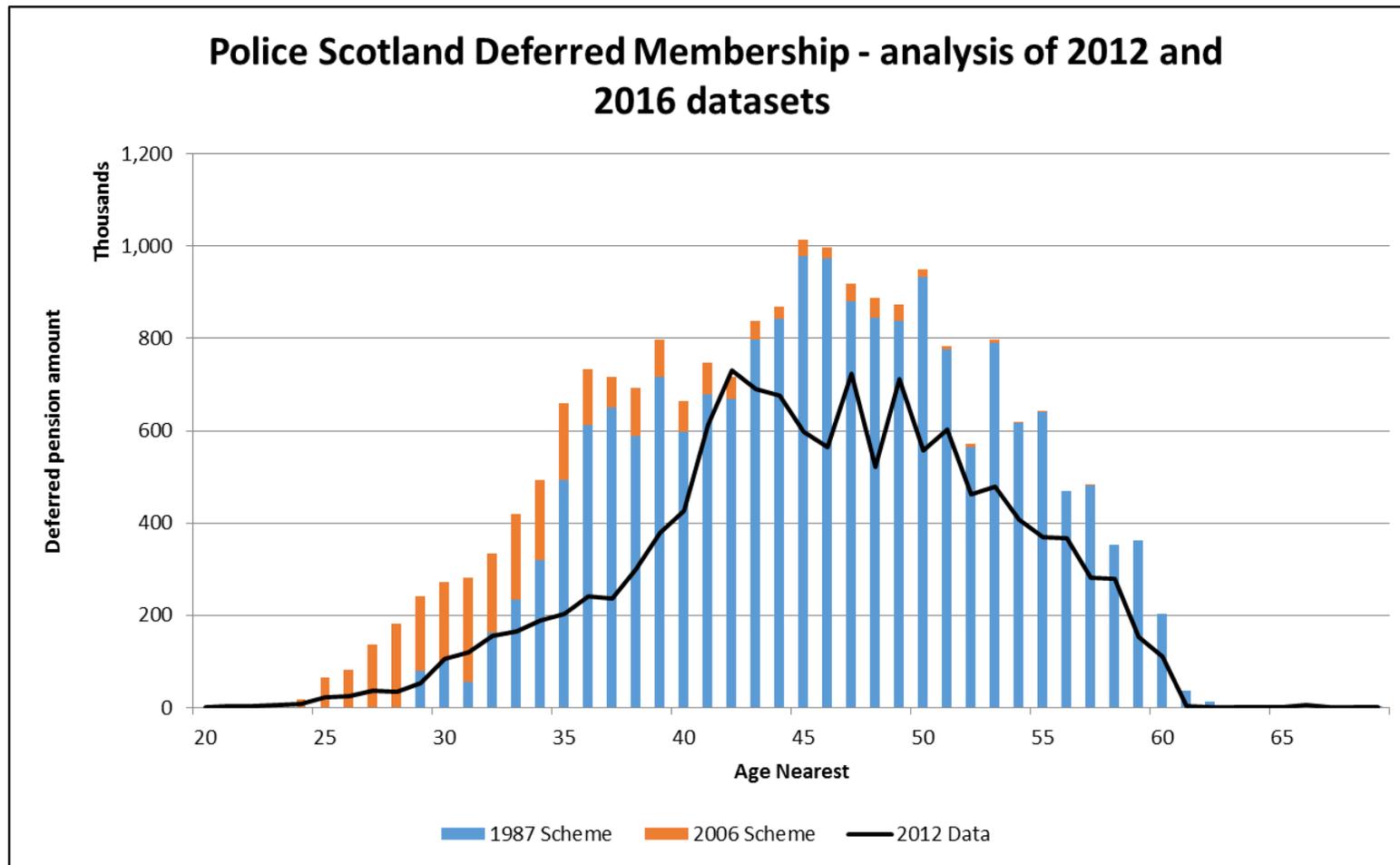




Chart A3: Summary of pension in payment amount by age

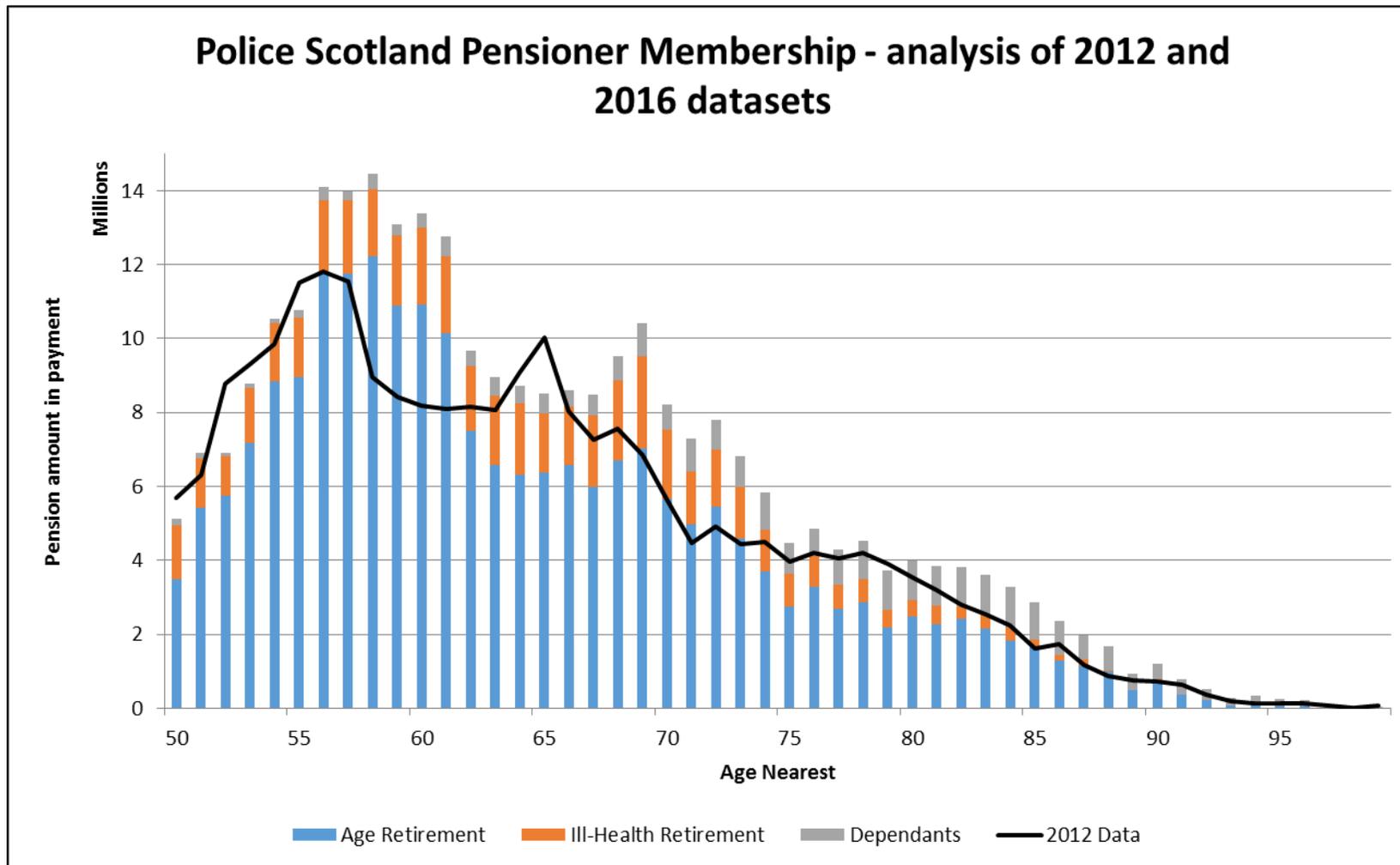




Chart A4: Active membership: Distribution of actual pay as at 31 March 2016

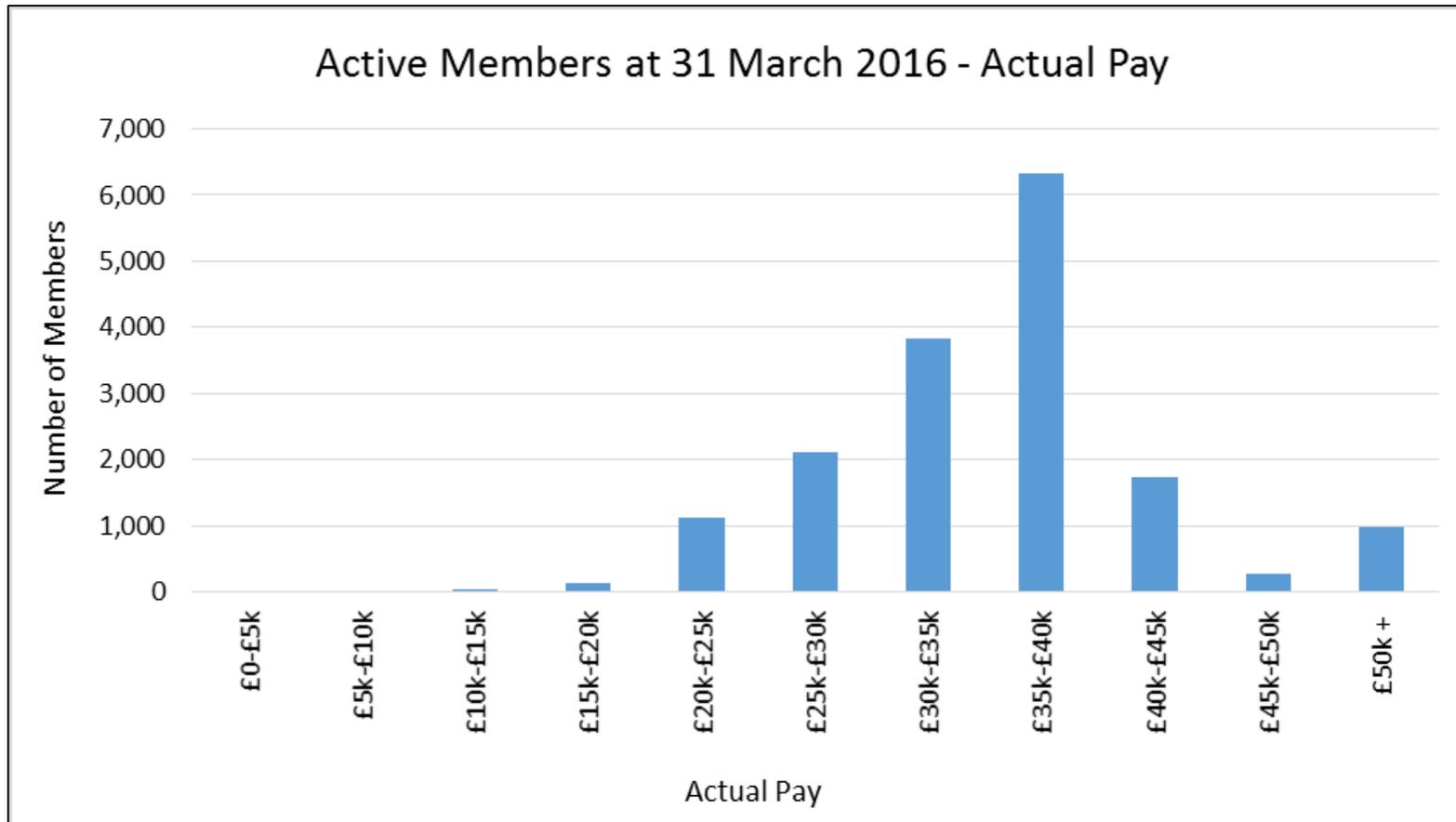
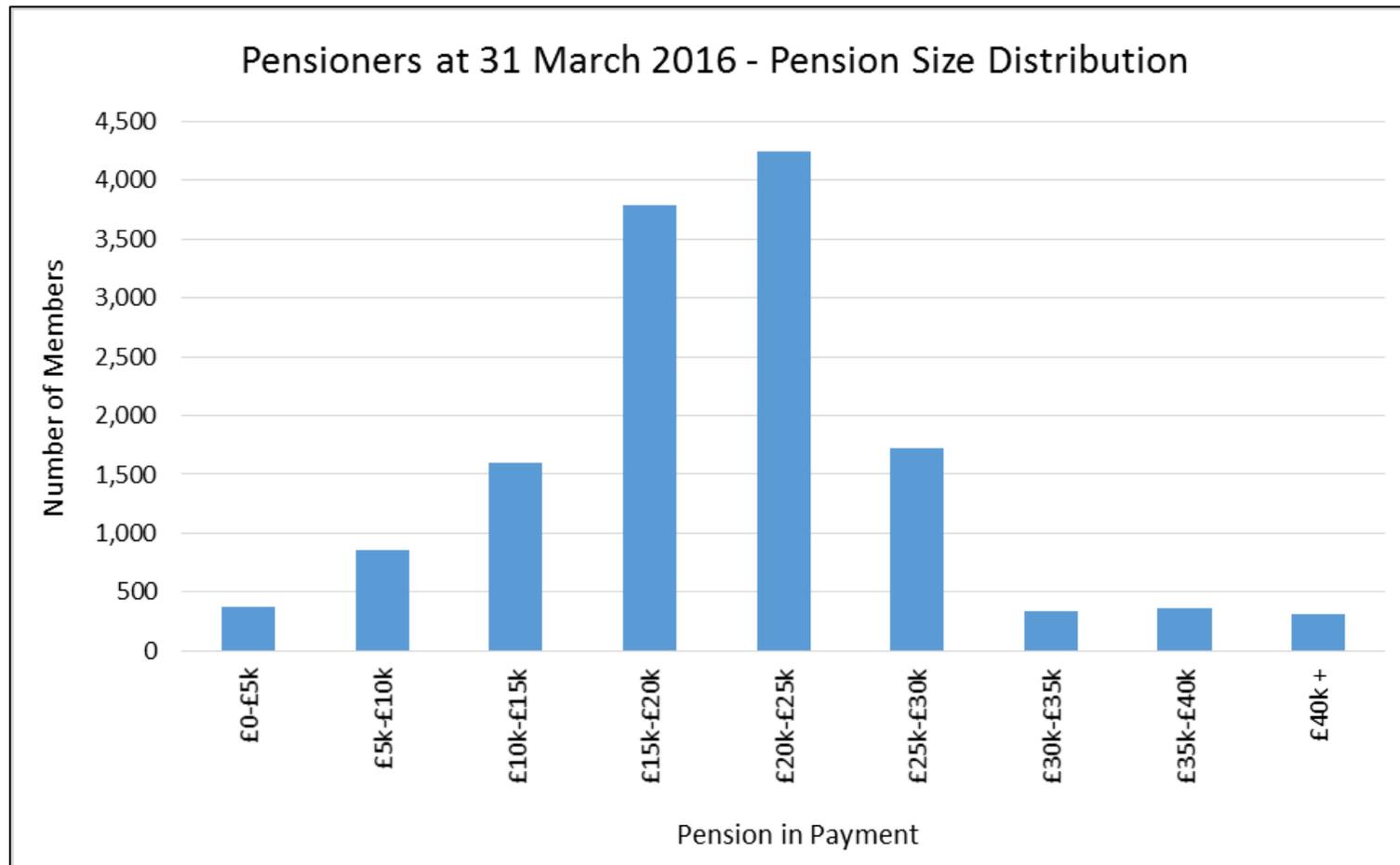




Chart A5: Pensioner membership: Distribution of pensions in payment as at 31 March 2016 (excluding dependants)





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 of membership over intervaluation period 2012-2016 000s	Prior intervaluation period 2008-2012 000s
Actives		
Number at 31/3/12	17,584	17,230
Additions		
• New entrants	3,344	*
Deductions:		
• Deaths	(25)	(17)
• Retirements	(2,041)	(1,549)
• Withdrawals	(2,158)	(613)
• Other exits	(91)	-
Number expected at 31/3/16	16,613	-
Valuation data at 2016	16,599	17,584
Deferreds⁵		
Number at 31/3/12	2,173	1,901
Additions		
• New deferreds	*	*
Deductions:		
• Deaths		
• Retirements	(6)	*
• Rejoiners to active	(253)	*
• Other exits	(211)	*
Number expected at 31/3/16	-	-
Valuation data at 2016	3,530	2,173
Pensioners		
Number at 31/3/12	12,269	11,293
Additions		
• New pensioners	2,289	*
Deductions:		
• Deaths	(878)	(696)
• Other cessations	(2)	(2)
Number expected at 31/3/16	13,678	-
Valuation data at 2016	13,593	12,269
Dependants		
Number at 31/3/12	2,789	2,685
Additions		
• New dependants	*	*
Deductions:		
• Deaths	(350)	(354)
• Other cessations	(38)	(67)
Number expected at 31/3/16	-	-
Valuation data at 2016	2,899	2,789

*Figures not available

⁵ Includes pension credit members



Table B2: Summary of Active Experience

Movement Type	Number of movements	Average Age of movement
Entrant	3,344	27.4
Death	25	43.4
Ill Health Retirement	364	46.0
Normal Health Retirement	1,677	51.7
Withdrawal	2,158	33.0
Other	91	46.5

Table B3: Summary of Deferred Pensioner Experience

Movement Type	Number of movements	Average Age of movement
Death	6	53.4
Ill-Health Retirement	18	49.3
Ordinary/ Short Service Pension	235	57.1
Other	211	38.2

Table B4: Summary of Pensioner Experience (includes Dependants)

Movement Type	Number of movements	Average Age of movement
Entrant	2,289	51.4
Death (Normal Health)	659	78.5
Death (Ill Health)	219	70.5
Death (w dependant)	350	85.5
Other	40	24.5



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.

Actives

- > NI number
- > Previous final salary scheme (if any)
- > Gender
- > Date of Birth
- > Date Joined Scheme
- > Pensionable Salary (final salary scheme) (Annual rate of full-time equivalent pensionable pay in respect of final salary benefits at valuation date)
- > Average Pensionable Pay (Average full-time equivalent pensionable pay received in year to valuation date. Annualised equivalent for those not in service the full year)
- > Active Service (final salary scheme) (Pensionable service in final salary scheme to valuation date excluding doubling, transferred-in service and added years).
- > Active Service on full-time basis (final salary scheme) (As active service (final salary scheme), but part-time service reckoned as full-time)
- > Transferred-in Service (final salary scheme)
- > Part-time proportion
- > Current scheme (member is accruing benefits in)
- > Actual rate of pensionable earnings (Police 2015 scheme)
- > Annual rate of pensionable earnings (Police 2015 scheme)
- > Accrued 2015 scheme pension at extract date
- > Public Sector Transfer Club (PSTC) transfer in indicator
- > 2015 scheme (Club) pension subject to CPI + 0% increases
- > 2015 scheme (Club) pension subject to CPI + 1.25% increases
- > 2015 scheme (Club) pension subject to CPI + 1.5% increases
- > 2015 scheme (Club) pension subject to CPI + 1.6% increases
- > 2015 scheme (Club) pension subject to earnings increases
- > Active service on full-time basis (2015 scheme)

Notes

Pensionable Salary: Where an individual is in receipt of a lower level of remuneration for any reason (eg maternity leave, sick leave etc) SPPA were asked to provide a notional “normal” pensionable salary.

Part time working: For future service calculations we assume part-time staff will continue to work the same proportion of full time hours as they are working at 31 March 2016 (part-time proportion data item)



Deferred pensioners

- > NI number
- > Previous final salary scheme (if any)
- > Gender
- > Date of Birth
- > Rank
- > Current Deferred Pension (final salary scheme) (Includes transferred in service and added years)
- > Date Payable
- > Current Deferred Pension (2015 scheme) (Includes transferred in service and added years)

Pensioners

- > NI number
- > Previous final salary scheme (if any)
- > Gender
- > Date of Birth
- > Rank
- > Date Joined Scheme
- > Date final salary pension began
- > Type of Pension
- > Member's Current Pension (final salary scheme)
- > Abated Pension
- > Pension Increases
- > Injury Award
- > Members Current Pension (2015 scheme)
- > Date 2015 scheme pension began
- > Member's pre-commutation pension (final salary scheme)

Dependants

- > NI number
- > Final salary scheme (if any)
- > Gender
- > Date of Birth
- > Dependant Type
- > Dependant Date
- > Dependant's final salary pension
- > Dependant's Current Injury Award
- > Dependant's 2015 scheme pension



Added years

- > NI number
- > Scheme contract relates to
- > Gender
- > Date of Birth
- > Purchase type
- > Purchase start date
- > Cessation date
- > Contract in force
- > Added years
- > Added 2015 scheme pension
- > Added 2015 scheme partner's pension

Pension debit

- > NI number
- > Scheme
- > Gender
- > Date of Birth
- > Current final salary pension debit
- > Current 2015 scheme pension debit



Appendix D: 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:

- > NI number
- > Scheme
- > Gender
- > Date of Birth
- > Date Joined Scheme
- > Date Left
- > Reason Ceased
- > Part-time
- > Service at Leaving
- > Previous final salary scheme (if any)
- > Total non-retirement related lump sum benefits payments from 2015 scheme
- > Total retirement related lump sum benefits payments from 1987 scheme
- > Total retirement related lump sum benefits payments from 2006 scheme
- > Total retirement related lump sum benefits payments from 2015 scheme

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:

- > NI number
- > Scheme
- > Gender
- > Date of Birth
- > Date Left
- > Date Ceased
- > Reason Ceased
- > Total non-retirement related lump sum benefits payments from 2015 scheme
- > Total retirement related lump sum benefits payments from 2015 scheme



Pensioners

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

- > NI number
- > Scheme
- > Gender
- > Date of Birth
- > Date Ceased
- > Reason Ceased
- > Dependant Date of Birth
- > Dependant NI number
- > Total pension in payment at death
- > Type of pension
- > Total pensioner related lump sum payments in 2015 scheme

Dependants

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

- > NI number
- > Scheme
- > Gender
- > Date of Birth
- > Dependant Type
- > Date Ceased
- > Reason Ceased
- > Total pension in payment at death



Appendix E: Checks and adjustments applied to the membership data

Checks and exclusions

Exclusions and upratings were identified as follows.

Table E1 – Active members as at 31 March 2016

Reason for Exclusion	Number of exclusions+
Actual salary missing or outside reasonable range (£0-£270,000)	114
Past service salary missing or outside reasonable range (£0-£270,000)	145
Part time proportion outside acceptable range (0-100%)	19
Full-time service record inconsistent with scheme section	109
Full-time service record including transferred in service inconsistent with scheme section	65
Age at joining outside reasonable range (18-60)	20
Member could not be categorised	8
Total number of exclusions	310
Total exclusions for rating up	302

* If a record fails for more than one reason it is included multiple times in the breakdown shown and therefore the total exclusions may not be exactly the same as the sum of the components shown

Table E2 – Active members as at 31 March 2015

Reason for Exclusion	Number of exclusions+
Past service salary missing or outside reasonable range (£19,000-£270,000)	300
Full-time service record inconsistent with scheme section	2
Total number of exclusions	301
Total exclusions for rating up	301

* If a record fails for more than one reason it is included multiple times in the breakdown shown and therefore the total exclusions may not be exactly the same as the sum of the components shown

Table E3 – Deferred members as at 31 March 2016

Reason for Exclusion	Number of exclusions+
Date of deferment was after the valuation date	6
Deferred pension missing or outside reasonable range (£0-£180,000)	38
Total number of exclusions	44
Total exclusions for rating up	38

* If a record fails for more than one reason it is included multiple times in the breakdown shown and therefore the total exclusions may not be exactly the same as the sum of the components shown



Table E4 – Pensioners and dependants as at 31 March 2016

Reason for Exclusion	Number of exclusions+
Pension missing or outside reasonable range (£0-£145,000) for pensioners	2
Total pension missing or outside reasonable range (£0-£120,000) for dependants	6
Total number of exclusions	8
Total exclusions for rating up	8

+ If a record fails for more than one reason it is included multiple times in the breakdowns shown and therefore the total exclusions may not be exactly the same as the sum of the components shown

Table E5 – Summary of total exclusions to as at 31 March 2016 data

	Total number of excluded records (valid and no liability ⁶)	Total number of valid records excluded
Actives	310	302
Deferreds	44	38
Pensioners and dependants	8	8
Total exclusions	362	348

Table E6: Total data supplied (31 March 2016)

31 March 2016	Total number of records provided	Notified immediate exclusions	Valid records
Actives	16,609	8	16,601
Deferreds	3,536	6	3,530
Pensioners and dependants	16,492	0	16,492

Table E7: Total data supplied (31 March 2015)

31 March 2015	Total number of records provided	Notified immediate exclusions	Valid records
Actives	17,021	0	17,021

Table E8: 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	16,601	302	16,299	1.01853
Deferred members	3,530	38	3,492	1.01088
Pensioners and dependants	16,492	8	16,484	1.00049
Total membership	36,623	348	36,275	1.00959

⁶ Indicates initial exclusions which are assumed to have no attaching liability and therefore we have not uprated for these members (ie invalid records).



Table E8: 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	17,021	374	16,647	1.02247

Checks on uprated dataset

Information taken from an independent source of data gathered by Police Scotland was used to perform independent checks on the dataset supplied.

For actives, the total pensionable payroll in the adjusted actives data as at 31 March 2016 (£593.3m) was compared with pensionable pay derived from employer contributions over 2015/16 as provided in the independent source of data gathered by Police Scotland (£608.9m). The pensionable payroll from the data is 2.6% lower than that implied from employer contributions. Since membership has fallen over 2015-16 by around 2.5% we would expect the independent data from 2015/16 to give a higher figure than the membership data as at 31 March 2016. This result does not look unreasonable.

For pensioners and dependants, the total pensioner payroll in the adjusted pensioner data (£302.3m) was compared with total pensions paid over 2015/16 as recorded in the independent data sources gathered by Police Scotland (£300m) which reconciles within 0.8%. Over recent years, the pensioner payroll has been growing which suggests that the pensioner payroll provided in the data does not look unreasonable.

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



Appendix F: 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 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 F1 – Active members

Reason for Exclusion	Number of exclusions
Removed records which were inter-force transfers	48
Total number of members removed	48

Table F2 – Deferreds

Reason for Exclusion	Number of exclusions
Removed records where the reason ceased is invalid or blank	4
Total number of members removed	4

The pensioner movements data was used to analyse mortality experience, family statistics and commutation of pension. No exclusions were made for analysis purposes as the data looks reasonable.



Appendix G: Uncertainty in valuation results arising from data deficiencies

The table below indicates the extent to which the valuation results might be incorrect owing to the approach taken to dealing with data deficiencies. For each category we illustrate the potential impact on the results were the adjustment applied, which assumes an average liability for each missing member, to prove incorrect and in fact under/overstates the actuarial liability for these members by 10%.

	Impact of error in assumption for missing data (as % of pay)	
	Uncorrected employer contribution rate	Employer contribution correction cost
Actives (uprating applied: 1.85%)	0.1%	0.1%
Deferreds (uprating applied: 1.1%)	Not material	Not material
Pensioners (uprating applied: <0.1%)	Not material	Not material

More detail on the uncertainties arising from data deficiencies can be found in Appendix C of our report *Police pension schemes (Scotland) Actuarial valuation at 31 March 2016: Advice on assumptions* dated today.

Movements data

Setting assumptions

1. 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 our report *Police Pension Schemes (Scotland) Actuarial valuation at 31 March 2016: Advice on assumptions* dated today.

Cost Cap Net Leavers Liability (CCNLL)

2. The CCNLL 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 who 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.
3. To accurately calculate CCNLL 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 CCNLL in the absence of fully complete data is provided in the Assumptions Report.



4. We expect that the uncertainty introduced by the approach above is not more than $\frac{1}{4}\%$ of pay. Although it should be noted that the deficiencies in the membership data discussed above could compound this scale of uncertainty.



Appendix H: Summary of benefits

The Directions require the pre and post 2015 Police Pension 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.

		1987 Scheme	2006 Scheme	2015 Scheme
1.	Type of Scheme	Final Salary	Final Salary	Career Average Revalued Earnings
2.	Contracted out/in prior to 2016	Contracted out	Contracted out	Contracted out
3.	Employees Covered			
	Before 1 April 2015	Members who joined before 6 April 2006.	Members moving from 1987 Scheme to 2006 Scheme on or after 6 April 2006 New entrants joining between 6 April 2006 and 31 March 2015	N/A
	On or after 1 April 2015	Protected 1987 Scheme members ⁷	Protected 2006 Scheme members ⁵	New entrants joining on or after 1 April 2015 and unprotected members ⁵
4.	Normal Pension Age (NPA)	After 30 years' service at any age, or after 25 years' service at age 50 and above, or otherwise at age 55 (some	55	60 Flexible retirement from age 55 subject to benefits being actuarially reduced

⁷ Details of criteria for protection are set out at the end of this Appendix



		1987 Scheme	2006 Scheme	2015 Scheme
		senior officers have higher retirement ages) NB: Deferred pension age 60	NB: Deferred pension age 65	NB: Deferred pension age equal to State Pension Age
5.	Pensionable Pay (PP)	Basic Salary plus competency related threshold payment (but not including any other allowances)	Basic Salary plus competency related threshold payment (but not including any other allowances)	Basic Salary plus competency related threshold payment (but not including any other allowances)
6.	Final Pensionable Pay (FPP)	Highest of 1 year average of PP in last 3 years	Highest of: <ul style="list-style-type: none"> • 1 year average of PP in last 3 years • 3 year average of PP in last 10 years 	Not required
7.	Member's Contributions	Contribution scale tiered by PP	Contribution scale tiered by PP	Single tier contributions
8.	Normal Retirement			
	Pension to Member	1/60 th for first 20 years of actual service plus 2/60 per year of service in excess of 20 years, subject to a maximum of 30 years of actual service.	1/70 th per year of actual service subject to a maximum of 35 years.	1/56.1 th of earnings in each year, revalued in line with the Consumer Prices Index (CPI) + 1.25% No cap on service



	1987 Scheme	2006 Scheme	2015 Scheme
Lump Sum	By commutation at actuarially neutral rates Generally option to commute up to 25% of pension	4/70 th per year of actual service subject to a maximum of 35 years Option to exchange lump sum for additional pension	By commutation at £12:£1. In accordance with HMRC limits and regulations
Spouse's Pension	50% of member's pre-commutation pension The pension paid to female officer's surviving spouses may be reduced in respect of periods of service before 1990 and for male officers in respect of service before 1972	50% of member's pension (excluding amounts awarded in place of lump sum)	50% of member's pre-commutation pension
9. Pension Increases	Governed by Pensions (Increase) Act	Governed by Pensions (Increase) Act	Governed by Pensions (Increase) Act
10. Ill Health Retirement	Single tier – unable to perform ordinary duties No reduction for early payment Service enhanced: < 5 years – no uplift 5-10 years – pensionable service doubled	Two tier Lower tier – unable to perform ordinary duties No reduction for early payment No enhancement to service	Two tier ⁸ Lower tier – unable to perform normal duties No reduction No enhancement to service

⁸ In addition to the 2015 scheme benefits, former members of the 1987 Scheme will receive ill health benefits under the 1987 scheme (based on service to 31 March 2015). Former members of the 2006 Scheme will also receive a lower tier ill health pension under the 2006 scheme.



	1987 Scheme	2006 Scheme	2015 Scheme
	10-13 years – pensionable service increased to 20 years	Higher tier – unable to engage in any regular employment	
	> 13 years – pensionable service increased by 7 years (at 1/60 th accrual)	No reduction for early payment Service enhanced: < 5 years – pensionable service plus the lower of: > total accrued service multiplied by 3 > half of prospective service from date of retirement to earliest of NRA or 35 years' service > 5 years – pensionable service increased by half prospective service from date of retirement to NPA or 35 years' service, whichever is the earlier	Higher tier – unable to engage in any regular employment No reduction Lower tier benefit plus half of prospective service to 60 multiplied by 1/56.1 of the members' annual full-time equivalent rate of PP
11.	Dependant's Pension on Death in Service	50% x Ill-health Pension Maximum 33% x FPP Pension paid to female officer's surviving spouses may be reduced in respect of periods of service before 1990 and for male officers in respect of service before 1972	50% of Higher tier Ill-health Pension Maximum 25% x FPP
		50% of Higher tier Ill-health Pension Maximum 25% x FPP	50% of Higher tier Ill-health Pension ⁹ Maximum 25% x FPP

⁹ In addition to the 2015 scheme benefits, surviving eligible dependants of former members of the 1987 Scheme will receive a pension based on ill health benefits under the 1987 scheme (based on service to 31 March 2015). Surviving eligible dependants of former members of the 2006 Scheme will also receive a pension based on the lower tier ill health pension under the 2006 scheme.



		1987 Scheme	2006 Scheme	2015 Scheme	
12.	Dependant's Short Term Pension	Death in Service	13 weeks' full pay	None in excess of the long-term level of pension	None in excess of the long-term level of pension
		Death after Retirement	13 weeks' at member's rate	None in excess of the long-term level of pension	None in excess of the long-term level of pension
13.	Lump Sum Death Benefits	Death in Service	2 x PP In addition, there is an employee contributions underpin	3 x PP In addition, there is an employee contributions underpin	3 x PP In addition, there is an employee contributions underpin
		Death after Retirement	There is an employee contributions underpin	There is an employee contributions underpin	There is an employee contributions underpin
14.	Children's Pensions	Child must be under 16 years of age or under 23 and in full-time education or full-time training 18.75% x member's current/deferred pension or ill-health pension, in the case of death in service, for up to 2 children* *If there are more than 2 children then 37.5% will be shared equally	Child must be under 19 years of age or under 23 and in full-time education 25% x member's current/deferred pension or higher tier ill-health pension, in the case of death in service, for up to 2 children* * If there are more than 2 children then 50% will be shared equally	Child must be under 19 years of age or under 23 and in full-time education 25% x member's current/deferred pension or higher tier ill-health pension, in the case of death in service, for up to 2 children* * If there are more than 2 children then 50% will be shared equally	



		1987 Scheme	2006 Scheme	2015 Scheme
15.	'Dependant' provision	Widow(er) Civil partners Children – including stepchildren/adopted children/other children dependant at time of death	Widow(er) Civil partners Unmarried partners (subject to certain conditions) Children – including stepchildren/adopted children/other children dependant at time of death	Widow(er) Civil partners Unmarried partners (subject to certain conditions) Children – including stepchildren/adopted children/other children dependant at time of death
16.	Withdrawal Benefits on Leaving			
	At least 2 Years' Total Reckonable Service	Deferred pension is payable from 60	Deferred pension is payable from age 65	Deferred pension is payable from State Pension Age
	Preserved Benefits	Generally proportionate to the pension based on service to age 55 – accrual between 1/60 and 1/45 If >25 years' service, accrued pension from age 50	1/70 + 4/70 lump sum	1/56.1 of earnings in each year, revalued in line with CPI + 1.25% in service
	Increases before retirement	Governed by Pensions (Increase) Act	Governed by Pensions (Increase) Act	Governed by Pensions (Increase) Act
	Death before retirement	50% of member's deferred pension	50% of member's deferred pension	50% of member's deferred pension
	Transfer Value	Yes	Yes	Yes



	1987 Scheme	2006 Scheme	2015 Scheme
Less than 2 Years' Total Reckonable Service	If the member has at least three months' service they may opt for a cash equivalent transfer value to be paid into another pension scheme. Otherwise, an immediate refund of their contributions (less the cost of reinstatement into S2P) is paid.	If the member has at least three months' service they may opt for a cash equivalent transfer value to be paid into another pension scheme. Otherwise, an immediate refund of their contributions (less the cost of reinstatement into S2P) is paid.	If the member has at least three months' service they may opt for a cash equivalent transfer value to be paid into another pension scheme. Otherwise, an immediate refund of their contributions (less the cost of reinstatement into S2P) is paid.
17. Cessation on remarriage or cohabitation	Yes	No	No



Criteria for scheme membership after 31 March 2015

Protected and tapered Members

Statutory based transitional protections exist for certain members as follows:

1. All active 2006 Scheme members who, as of 1 April 2012, have 10 years or less to their current Normal Pension Age (i.e. age 55) will see 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 will be achieved by the member remaining in their current scheme until they retire.
2. All active 1987 Scheme members who, as of 1 April 2012, have 10 years or less to age 55 or have 10 years or less to age 48 and are 10 years or less from a maximum unreduced pension, will see 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 will be achieved by the member remaining in their current scheme until they retire.
3. There will be a further period of tapered protection for up to 4 years for scheme members. Members who are within 4 years of qualifying for transitional protection, as of 1 April 2012, will have limited protection so that on average for every month closer to qualifying for transitional protection they gain about 53 days of protection. The period of protected service for any member under these tapering arrangements will have finished by 31 March 2022. At the end of the protected period, they will be transferred into the 2015 scheme. These members fall into four categories:
 - (a) 1987 or 2006 Scheme members who on 1 April 2012 are aged 41 – 45 years with less than 20 years service;
 - (b) 1987 Scheme members who on 1 April 2012 are aged 34 – 38 years with more than 20 years service;
 - (c) 1987 Scheme members who on 1 April 2012 are aged over 38 years with 16 – 20 years service; and
 - (d) 1987 Scheme members who on 1 April 2012 are aged 34 – 38 years with 16 – 20 years service whose age plus service is at least 54 years.

Where a member falls into both categories (a) and (c), the greater number of days of protection will be given.

For further details, see

<http://www.gov.scot/Resource/0047/00472346.pdf>