



Government  
Actuary's  
Department

# Firefighters' Pension Schemes (England)

Cost cap valuation as at 31 March 2016  
Assumptions, methodology and data

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At GAD, we seek to achieve a high standard in all our work. We are accredited under the Institute and Faculty of Actuaries' Quality Assurance Scheme. Our website describes [the standards](#) we apply.



# Purpose

This report was commissioned by the Home Office (HO) and is addressed to them. We understand it will be made available to the Scheme Advisory Board.

The purpose of this report is to set out our proposed approach to the cost cap valuation as at 31 March 2016 and assist the department with their decision making. It is important that HO test the assumptions and methodology adopted for the 2016 valuation signed in early 2019 in light of the transitional protection remedy. HO will also need to ensure it is content with the approach we have taken in respect of eligibility of members for the transitional protection remedy.

The report provides advice to HO on these matters, as required by Direction 55.

We would be pleased to provide advice on any alternative approaches which HO would like to consider in relation to any of the proposals in this report.

HO should consult with stakeholders as required on the contents of this report and confirm to GAD that it is content with the assumptions, methodology and approach to data that HO will adopt for the 2016 cost cap valuation.

# Next steps

HO should consider the following recommendations and either confirm that they are content or instruct us to adopt alternative approaches:

- 1 No changes from the 2016 valuation assumptions, as set out in section 1
- 2 The calculation methodology we recommend, as set out in section 2
- 3 Derivation of member eligibility from available data, as set out in section 3



# 1. Assumptions



# 2016 assumptions

The assumptions set by HO used in the 2016 cost cap valuation report must be the same as those adopted in the 2016 valuation reports signed in early 2019, **unless those assumptions are not best estimates or are insufficient for the purpose as a direct result of the impact of the transitional protection remedy.** This may apply because the original 2016 assumptions:

1. May be insufficient for the 'better-of' calculations we need to perform to value the remedy
2. May not be best estimate because member behaviour may change in light of the remedy

HO should consider the following recommendation and either confirm that they are content or instruct us to adopt alternative assumptions:

## Recommendation

We recommend no changes from the 2016 valuation assumptions. The assumption about workforce reductions adopted at the 2016 valuation is insufficiently detailed to calculate the cost of remedy. We recommend assuming that these workforce reductions result in a proportionate reduction to the cost of remedy.

In making the recommendations below in Appendices 1C to 1E we have tested that the possible impact of any potential changes driven by analysis of data described does not exceed the 0.25% materiality limit described on appendix 2A.

We set out further details in Appendices 1A to 1F.

# 2. Methodology



# Calculation methodology

HO should consider the following recommendations on calculation methodology and either confirm that they are content or instruct us to adopt alternative approaches:

## Recommendations

- A materiality limit of 0.25% pay (HO may propose an alternative)
- Members choose the higher valued benefit at each mode of exit
- Remedy costs are assessed for the period 2015-2022, with costs in respect of 2015-16 assumed to be equal to the costs in 2016-17
- Allowance is made for differences in pre-2015 and post-2015 scheme member contributions
- There is no allowance for the cost of reinstating members who opted out of the pension scheme
- There is no allowance for the costs of protected members' post-2022 benefits accruing in the post-2015 scheme, rather than their pre-2015 scheme
- Tax and other impacts are excluded from the calculations

We set out further details in Appendix 2A to 2G.





# Remedy cost - components

The Directions list five components of the transitional protection remedy costs. The following table sets out a summary of the calculation of each of these components, based on the methodologies above.

Remedy cost component	Calculation
Change in liabilities for the remedy period	Calculated based on Deferred Choice Underpin
Change in liabilities pre remedy period	Nil: no changes to assumptions
Change in liabilities post remedy period	Assumed nil: treatment of protected members' post-2022 benefits and no change to assumptions
Change in member contributions during the remedy period	Calculated based on projected salaries in the remedy period
Change in member contributions post remedy period	Assumed nil: treatment of protected members' post-2022 benefits and no change to assumptions

# 3. Data: Member eligibility for the transitional protection remedy



# Determining members in scope for remedy

## Summary

It is critical to identify members in the 2016 valuation data who are in scope for the transitional protection remedy. Broadly, as set out in the HMT consultation response, members in service before 1 April 2012 and on or after 1 April 2015 are in scope of the transitional protection remedy. We have identified the following members as being in scope of the transitional protection remedy:

- Date of Joining before 1 April 2012, or
- Protected or Taper Protected Status (even if recorded Date of Joining after 1 April 2012)

However, this will not always accurately identify members in scope, for the reasons set out in the Limitations box.

Following discussions with Home Office, we do not expect these limitations to have a material impact on the results and so we do not require any additional data to prepare the cost cap valuation report.

## Limitations

We have identified the following potential sources of inaccuracy:

- a. The Date of Joining is after 1 April 2012 and reflects the date joined current employment (or current FRA) but the member may have had previous qualifying employments which commenced prior to 1 April 2012.
- b. The Date of Joining item is not always clearly defined and may not be correctly recorded by administrators.
- c. To avoid the issues noted above, we have calculated Date of Joining by deducting the pensionable service recorded from the effective date of 31 March 2016
- d. Date of Joining is before 1 April 2012 but the member may have had a disqualifying break in service (for example, five years or more) or was not an active member of the scheme as at 31 March 2012 or 31 March 2015.
- e. The Date of Joining is after 1 April 2012 and reflects the date first joined scheme but the member may have had previous service in a different public sector scheme which brings them in scope for the transitional protection remedy.
- f. We may be using a later than actual Date of Joining for part-time / retained members.

# Summary

## Summary of active data as at 2016

**32,985**

Active members as at  
31 March 2016

**£877.5m**

Active salary roll as at  
31 March 2016

## Determining members in scope for remedy



Data used is that collected for the valuation as at 31 March 2016. We have not requested any further data since this is not expected to materially alter the results of the valuation and would be a significant undertaking given the multiple administrators.

## Members in scope for remedy

**27,320**

Active members in scope  
for remedy

**92%**

Of the active  
membership as at  
31 March 2016 is in  
scope for remedy\*

\*Based on actual pay

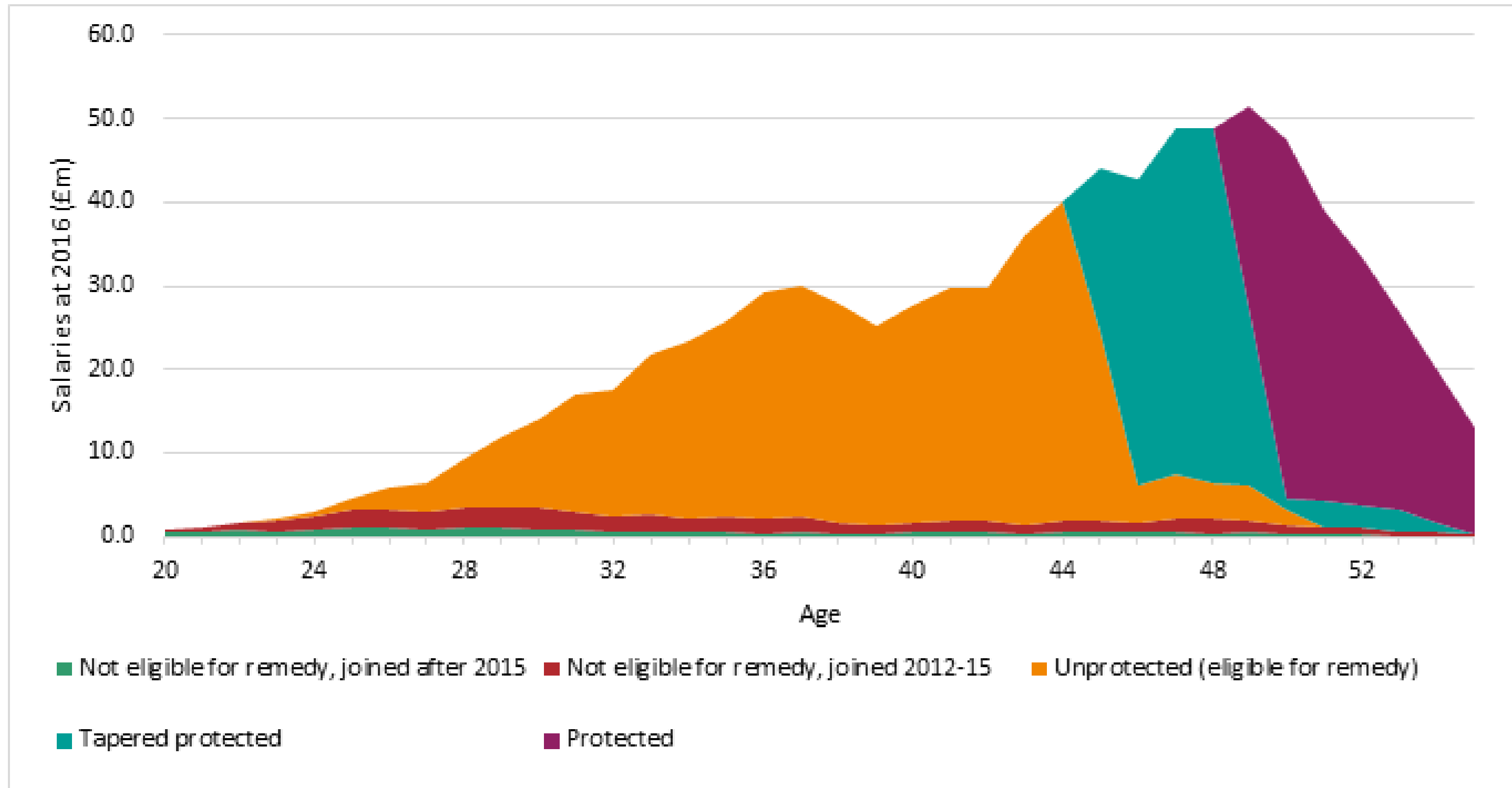
## Data uncertainty

There is **residual data uncertainty** in relation to members in scope for remedy which could affect the valuation results.

An impact of between  
**-1.0% and +1.0%**  
on the cost cap contribution  
rate

The sensitivity to the left shows the impact on the cost cap cost of the scheme if 5% more or less active members are eligible for remedy than assumed.

## Membership in scope for transitional protection remedy

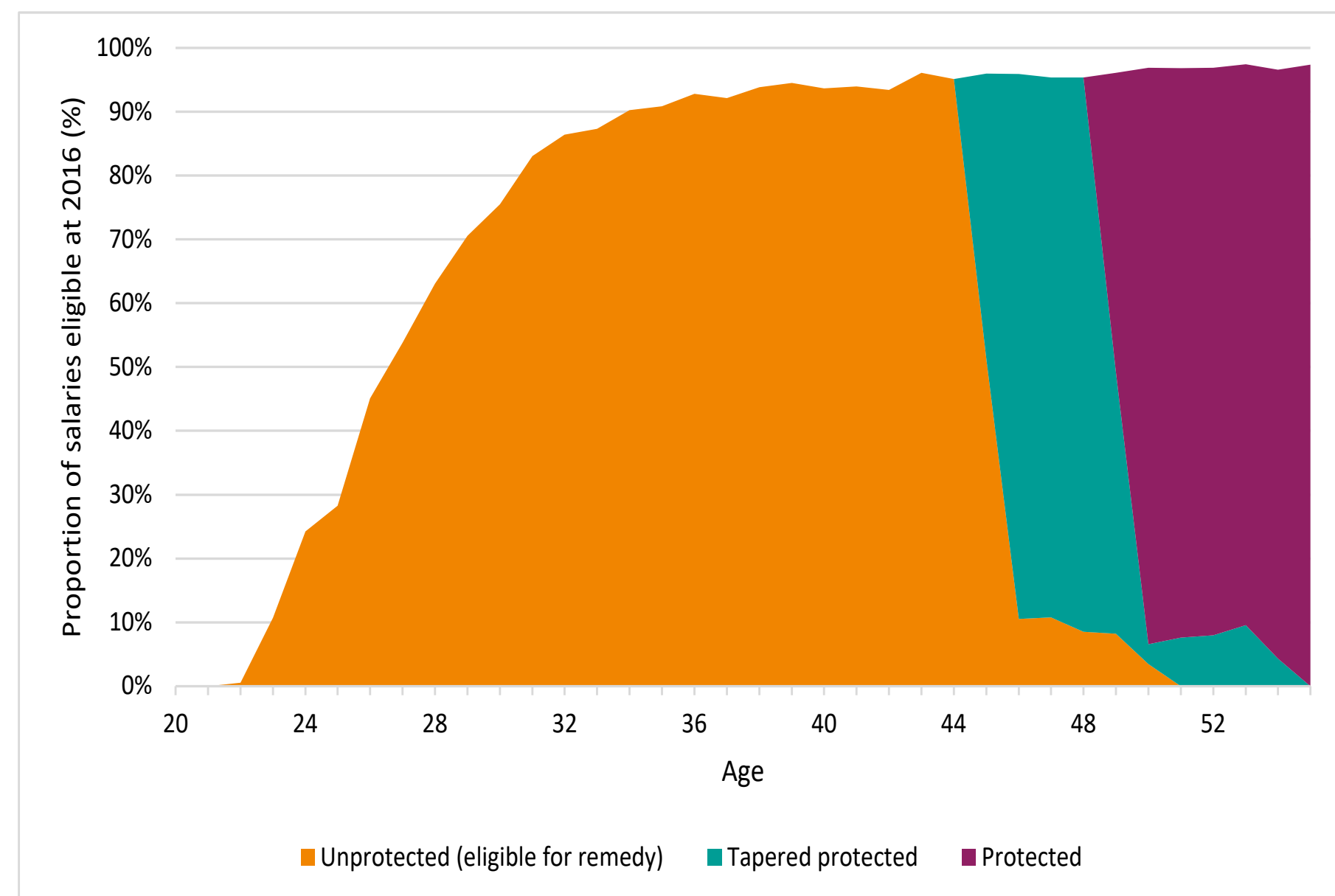


## Tables of summary statistics at 31 March 2016 – Actives

### Protection status of members as at 31 March 2016

Section	Number of members	Salary £m
Protected members	6,212	203.4
Tapered protected members	5,262	171.6
Eligible unprotected members	15,846	428.0
Ineligible - joined between 2012-2015	4,309	53.6
Ineligible - joined after 1 April 2015	1,357	21.0
<b>Total</b>	<b>32,985</b>	<b>877.5</b>

### Proportion of members eligible for the transitional protection remedy

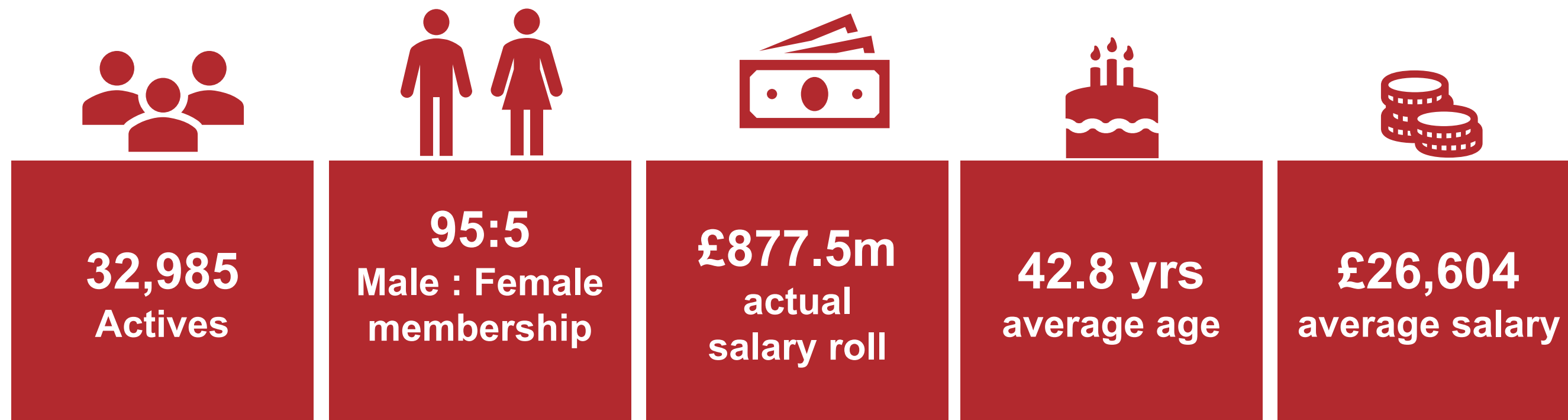


# 4. 2016 data: quality and uncertainties



## Active data as at 31 March 2016

### Summary statistics





# Data quality

## 2016 valuation data adjustments

Each FRA, as scheme manager, has designated responsibility for managing and administering the scheme for their members. They were responsible for providing data to GAD in line with our specifications for the 2016 valuation. This was generally reasonable for the purposes of the valuation calculations, however, some aspects of the data were incomplete and/or unreliable for certain elements of our calculations. The results of this valuation therefore rely on assumptions and adjustments in respect of incomplete and/or unreliable data. As stated in our reports dated 28 February 2019, in GAD's opinion these adjustments are reasonable and appropriate for the purpose of this actuarial valuation. However, it should be noted that the results in the 2016 valuation reports might have been different if more reliable data had been available. GAD have subsequently received data for the valuation as at 31 March 2020, and the process of checking that data and reconciling it with data as at 31 March 2016 is ongoing.

## Where can I find out more?

Details of the 2016 valuation data provided including any checks and adjustments made to the data are set out in the 2016 valuation data report. Details of the assumptions made for data uncertainties are set out in Section 3 and Appendix E of the [2016 report on membership data](#).

# 5. Reliance and limitations



# Limitations

## Data

As set out in the 2016 data report issued on 28 February 2019, GAD has relied on data and other information supplied by each FRA or their appointed administrator as described in the report. GAD has not sought independent verification around its general completeness and accuracy.

Any checks that GAD has made are limited to those described in the report, including those relating to the overall reasonableness and consistency of the data. These checks do not represent a full independent audit of the data supplied.

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.

## Macro-level risks

The Directions permit changes to the 2016 valuation data and assumptions only as a direct result of the impact of the transitional protection remedy. In preparing this advice, we have therefore not made any adjustments for material macro-level risks or uncertainties, such as climate-related risk.



# Reliance

## Reliance and sharing

This report has been prepared for the use of Home Office and will be made available to the Scheme Advisory Board.

No other person or third party is entitled to place any reliance on the contents of this report, except to any extent explicitly stated herein. GAD has no liability to any person or third party for any action taken or for any failure to act, either in whole or in part, on the basis of this report.

## Compliance statement

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.



# Appendix 1: Assumptions



# Appendix 1A: Direction requirements

The Directions require that assumptions set by HO used in the 2016 cost cap valuation report must be the same as those adopted in the 2016 valuation reports signed in early 2019, **unless those assumptions are not best estimates or are insufficient for the purpose as a direct result of the impact of the transitional protection remedy** [Direction 55].

Where this applies, HO must determine new assumptions:

- having obtained advice from GAD
- following such consultation of such persons (or representatives of such persons) as HO considers appropriate
- that are best estimates, and do not include margins for prudence or optimism
- that have regard to:
  - previous valuation assumptions
  - the analysis of demographic experience in the 2016 valuation report
  - relevant data from any other source
  - any emerging evidence about historic long term trends or long term trends expected in the future

# Appendix 1B: Assumptions not affected by remedy

The following summarises assumptions set by the department which we have not considered further as part of this work on the basis that we see no reason why they would be inappropriate as a direct result of the transitional protection remedy:

- Mortality before and after retirement
- Ill-health retirement
- Proportion married / partnered
- Age differences between spouses / partners
- Commutation of pension for a lump sum



# Appendix 1C: Age retirement

## 2016 retirement assumption

The original 2016 age retirement assumptions for the 1992 Scheme distinguished between members depending on protection status and service:

1992 Scheme Membership Group	Retirement Assumptions
Protected members, tapered members and unprotected members with more than 16 years' service at 31 March 2012	Many members retire at on reaching 30 years' service (all assumed to retire by age 60)
Unprotected members with less than 16 years' service at 31 March 2012	No members retire before age 55, many at the later of age 55 or 30 years' service (all assumed to retire by age 60)

## Potential member behaviour

As a result of the transitional protection remedy, those in scope for remedy have the option of taking 1992 Scheme benefits for service up to 2022. Therefore, unprotected members with lower service in 2012 may retire with a greater proportion of 1992 Scheme benefits than previously expected and might be expected to behave more like protected members and retire earlier.





## Analysis

We have considered adjusting retirement patterns for 1992 Scheme unprotected members with less service to consider the impact of these members retiring when they reach 30 years' of service, regardless of age at this date.

Our analysis has shown the impact of a best estimate change in the retirement assumption would be immaterial to the results of this valuation. The increase in value for the final salary element of the pension being taken earlier is offset by the reduced cost of the 2015 Scheme pension element being taken before age 55 and therefore subject to a deferred retirement age of SPA. In the hypothetical scenario where all members change behaviour exactly when it increases the cost of remedy there would be a small but material increase in the cost, but this is the unique scenario that maximises costs and we do not regard it as best estimate.

We recommend that the existing age retirement assumptions continue to be adopted.

For the 2006 Scheme there is a single retirement assumption which covers all protected, tapered and unprotected members. We recommend no change to this assumption.

# Appendix 1D: Salary scales

For the purposes of an actuarial valuation, it can be appropriate to set a long-term assumption that reflects the 'average' expected experience of scheme members. However, this does not take account of more granular variations in pay growth, which may impact on the valuation of an underpin.

## Analysis

We recommend retaining the original salary scale assumptions.

The original 2016 valuation assumptions only differentiate between regular and retained firefighter members.

We have therefore investigated whether adopting three alternative salary scales (low/medium/high) and applying these to the population in-scope of the transitional protection remedy of a typical scheme would materially impact on the transitional protection remedy cost.

Our analysis has shown the impact of such a change in the salary assumption would be immaterial to the results of this valuation.



# Appendix 1E: Withdrawal

Like salary scales, different groups of members may have withdrawal rates that are higher or lower than the average adopted at the 2016 valuation. In theory, this could affect the cost of the transitional protection remedy.

## Analysis

Although it would be possible to further refine the withdrawal assumption by splitting the population into groups (low withdrawal rates, medium withdrawal rates, high withdrawal rates), we would not suggest further work in this area because:

- The analysis we have carried out on salary scales indicates the impacts of changes to salary scale are immaterial. Sensitivity analysis indicates that the transitional protection remedy cost is less sensitive to withdrawals than salary scales.
- The existing withdrawal assumption provides for a probability distribution of withdrawals at each future age, which is more refined than the existing salary scale assumptions and therefore should already better reflect differences between members than the salary scale assumptions.



## Appendix 1F: Turnover

‘Turnover’ is a collective term for the set of assumptions we use to project a population of active members. As part of this valuation, we will project the number of members who are eligible for the transitional protection remedy from the data as at 31 March 2016 out to 31 March 2022. At the 2016 valuation for the purposes of spreading any past service surplus or deficit, it was assumed that the size of the workforce reduced, consistent with the future payroll estimates provided by HO to OBR.

The assumption about workforce reductions adopted at the 2016 valuation is insufficiently detailed to calculate the cost of remedy, because the assumptions adopted at the 2016 valuation did not specify whether the workforce reductions were due to increased member exits or reductions in recruitment (so retirees and other leavers were not replaced by new entrants). We recommend an assumption that the workforce reductions have a proportionate impact on the cost of remedy, by assuming that under the assumed workforce reductions some members in scope of remedy leave earlier than currently assumed in the long term valuation assumptions.



## Analysis

We recommend applying a reduction of 12% to the remedy cost calculated based on the long term assumptions adopted at the 2016 valuation. This is in proportion to the reduction in workforce size from 2016 to 2019-23 assumed at the 2016 valuation.

The assumption that the reductions in the size of the workforce will reduce remedy costs over the remedy period 2015-22 in proportion to the reduction in payroll from 2016 to 2019-23 is necessarily broad brush, noting in particular the different time periods. In some cases reducing the size of the workforce will have no impact on remedy costs (eg exits of members who joined after 2012, or reduced recruitment), but in other cases the impact on remedy cost of an exit will be much higher than the impact on pay (for example, due to the break in the final salary link). This assumption is intended to be best estimate, and does not include margins for prudence or optimism.



# Appendix 2: Methodology



## Appendix 2A: Materiality limits

In preparing the valuation results, we may adopt specific simplifications provided they are not expected in aggregate to have a material impact on the valuation results. In this context, we propose that an estimated aggregate **impact of less than 0.25% of pay** would be regarded as immaterial. HO should let us know if they would like us to work to an alternative materiality limit; in particular it may be appropriate to work to a tighter limit if the valuation results are close to the cost cap ceiling or floor.

### Details

The impact of a simplification is the estimated difference between the valuation results (as calculated using the simplification) and the valuation results if calculated in full detail. Such simplifications may relate to the data requested, the form of assumptions adopted, or the calculations performed. For example, the liabilities in respect of historic added years contracts may be sufficiently small that it would be disproportionate to value them in the same level of details as other liabilities, so we may adopt simplifications.

Note that the data used and the assumptions adopted have a much greater impact on the valuation results. These impacts are discussed at chapter 4 of the [2016 valuation report](#), and for example a decrease in the discount rate of 0.25% pa would increase the employer contribution rate by 11.1% of pay.



## Appendix 2B: Member choice

Under the Directions, eligible members accrue benefits in the pre-2015 final salary scheme, with the assumed right to choose on benefit crystallisation to have accrued pension benefits for the remedy period either in that pre-2015 scheme or in the post-2015 CARE scheme. We assume that on benefit crystallisation the member takes the higher valued benefit.

### Details

We have valued the remedy benefits by projecting the member's benefits for the remedy period in both the pre-2015 final salary scheme and the post-2015 CARE scheme. Benefits are valued in each contingency (eg retirement or death) for each eligible individual, using the same demographic assumptions (eg retirement ages) for both the pre-2015 and post-2015 scheme. The higher valued benefits for each individual in each contingency are chosen.

Note that when choosing the pre-2015 and post-2015 scheme, exits at different ages (eg retirement between ages 55 and 60) are considered together, and no account is taken of any offsetting costs / savings (eg if the pre-2015 scheme were more valuable on retirement at 55, but the post-2015 scheme were more valuable on retirement at age 60). We are content that any such offsetting costs / savings are immaterial, given the design of the schemes.





## Appendix 2C: Remedy benefits accrual period

The costs of remedy are assessed for the remedy period between 1 April 2015 and 31 March 2022, calculated as follows:

- 1 April 2016 to 31 March 2022: Costs are calculated prospectively based on membership data as at 31 March 2016.
- 1 April 2015 to 31 March 2016: Costs assumed to be in line with cost for service from 1 April 2016 to 31 March 2017.

### Details

The direct calculation of costs for the period 2015 to 2016 is challenging both in terms of data requirements and calculation methodology. Since the data we would require is unlikely to be available and the overall impact of this period is small compared with the overall uncertainty in the calculation, the approach above appears the most reasonable and practical.



# Appendix 2D: Member contributions

The contribution rates in the pre-2015 and post-2015 schemes are different, with;

- the 1992 Scheme having higher rates than the 2015 Scheme
- the 2006 Scheme having lower rates than the 2015 Scheme

at all salary levels.

As part of the transitional protection remedy it will be necessary to make good any under or over payment of contributions by members who are currently in one scheme but opt for benefits in the other.

## Analysis

We have estimated the potential under or over payment of contributions during the remedy period by projecting the 2016 active salary data to the end of the remedy period in 2022 and calculating the difference in contributions between the pre-2015 and post-2015 scheme (including allowance for 2015/16). We have made no allowance for tax.



## Appendix 2E: Opt-outs

Some individuals would have been eligible for the transitional protection remedy but opted out of the scheme. We understand that members who opted out due to the changes to the pension schemes may be eligible to apply to have their opt-out reversed and benefits reinstated. This may lead to an additional cost for accrual prior to 2016 and may also have an effect on the cost of benefits accruing after 2016.

### Analysis

We have limited data on which to assess the number of members who would be eligible for this reinstatement, and it is not clear whether all those eligible will choose to be reinstated and pay their backdated member contributions. The limited evidence we do have suggests that the costs of reinstating all eligible members might be small but material; however, if take up is in line with previous similar exercises (eg O'Brien/Matthews) the cost might not be material.



## Appendix 2F: Protected members: post-2022 benefits

Under the 2015 scheme reforms, protected members would accrue benefits in the pre-2015 scheme until retirement, which could be after 2022 if members work beyond their expected retirement date. These members will now be moved into the 2015 scheme from 2022.

### Analysis

Our analysis shows that the costs associated with protected members working beyond 2022 would be immaterial.



# Appendix 2G: Exclusions

The calculated costs of remedy make no allowance for the following:

- Any tax impact on members or HMRC, consistent with the treatment at the 2016 valuation
- Any impact of tax compensation schemes associated with the remedy
- Members' additional voluntary contributions, additional pension benefits or transfers-in, the value of which are assumed to be unchanged as a result of remedy
- Pension debits and credits on divorce, which are assumed to be cost neutral to the scheme
- Any adjustments made in respect of Public Sector Transfer Club transfers

