Government Actuary's Department

NHS Pension Scheme (NHSPS)

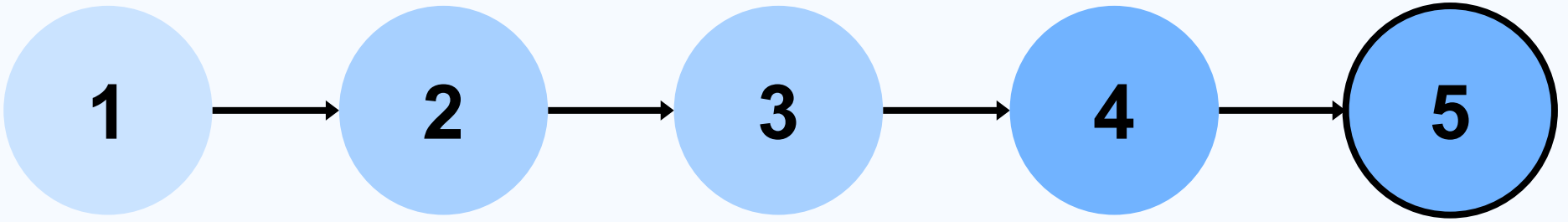
Advice on assumptions

Actuarial valuation as at 31 March 2020

Garry Swann and Louise Fletcher

19 October 2023

Assumptions setting process



GAD analyse experience data and prepare an initial set of recommended 'scheme-set' assumptions.

GAD discuss recommended assumptions with Department of Health and Social Care.

GAD discuss recommended assumptions with the NHS Scheme Advisory Board.

GAD present final recommended assumptions to the Secretary of State for Health and Social Care.

Secretary of State for Health and Social Care decides on the assumptions to be used in our calculations and informs GAD.

Details of our recommended assumptions can be found in Part B of this report.

The purpose of these discussions is to:

- Go through our recommended assumptions to make sure they are reasonable and appropriately reflect scheme experience.
- Provide an opportunity for stakeholders to highlight any relevant additional information they hold which could impact our recommendations.

The Secretary of State for Health and Social Care has ultimate responsibility for setting the 'scheme-set' assumptions covered in this report, after considering GAD's advice.

The Secretary of State for Health and Social Care has decided to adopt all of the recommended 'scheme-set' assumptions set out in this report.

Highlights

	Scheme-set assumptions		Our recommendations	
	Importance relative to scheme-set assumptions		**Size of recommended changes**	**Impact of recommended changes on scheme costs**
Mortality after retirement	Most		Medium	Lower costs
Proportion commuted	Average		Medium	Lower costs
Retirement ages	Average		Small	No impact
Rates of leaving service	Average		Small	Lower costs
Promotional pay increases	Average		None	No impact
Rates of ill-health retirement	Least		None	No impact
Mortality before retirement	Least		None	No impact
Family statistics	Least		None	No impact

This table provides a summary of the 'scheme-set' assumptions and their likely bearing on the valuation results. It is intended to highlight areas of potential focus to aid with the process of deciding on the 'scheme-set' assumptions to be adopted.

These assessments are indicative, rather than precise. More information on the approach used can be found in Section B1.

Be aware that several of the most important valuation assumptions do not appear in this table as they will be directed by HM Treasury. The impact of these 'directed' assumptions could be much greater than that of the impact of 'scheme-set' assumptions.

Advice on assumptions

Contents

Part A: Background

Any terms that appear in this report in underlined text are defined in the Glossary.

At the Government Actuary's Department (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.

Part B: Recommendations

Part C: Appendices

Part A: Background

Introduction

Who is this report for?

This report is addressed to the Secretary of State for Health and Social Care. The Directions require the scheme actuary to carry out a robust analysis of the demographic experience of the scheme. The purpose of this report is to provide our analysis, advice and recommendations on the 'scheme-set' assumptions to be adopted for the actuarial valuation of the NHSPS as at 31 March 2020 as required.

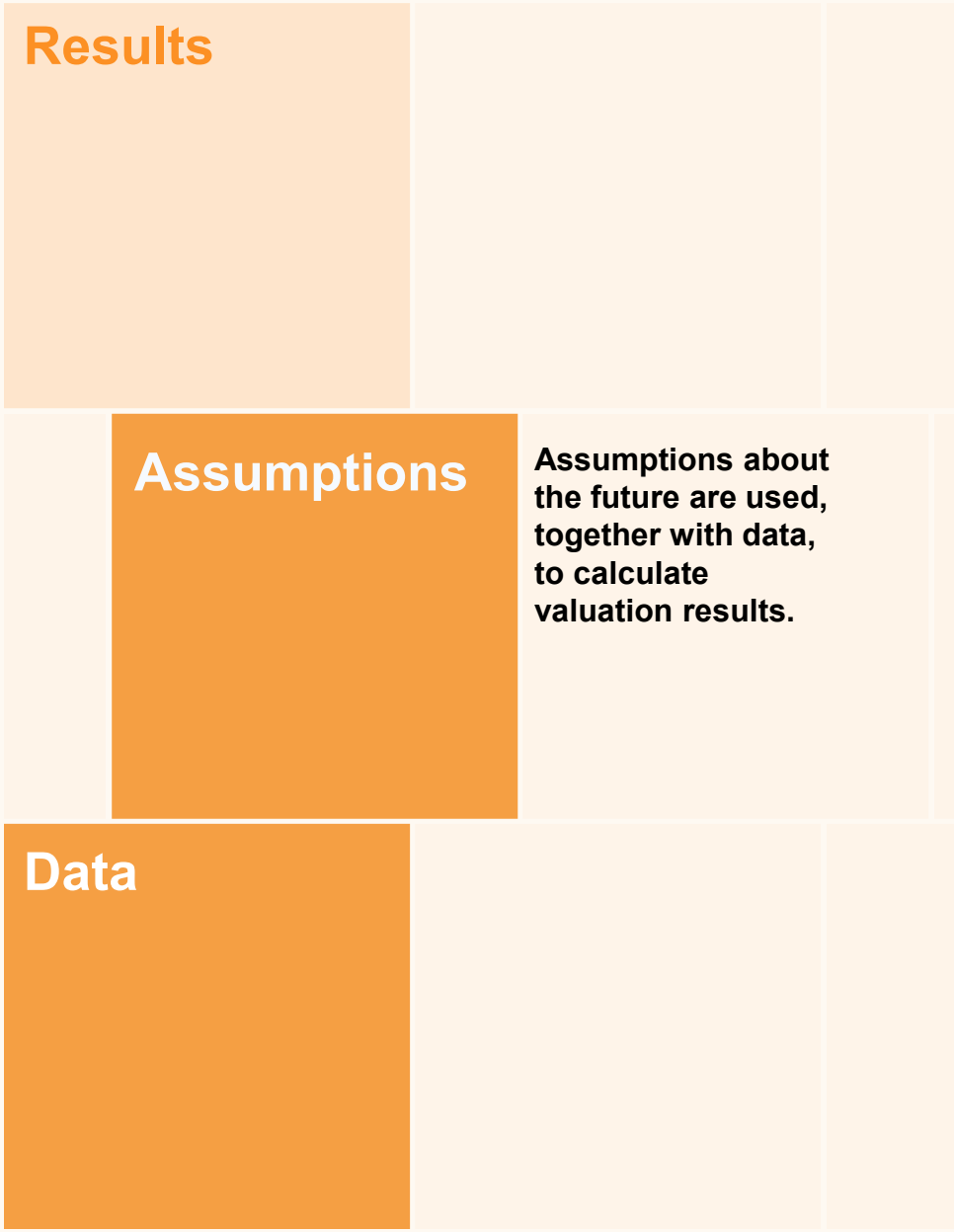
This report is intended to help the Secretary of State for Health and Social Care:

- understand the key assumptions about the future that need to be made in order to carry out the valuation
- understand the impact those assumptions can have on the valuation results
- decide on the 'scheme-set' assumptions to be adopted.

Why are assumptions important?

Assumptions are estimates of uncertain variables needed to carry out the actuarial valuation of the NHSPS as at 31 March 2020, in accordance with HM Treasury Directions.

The results of the valuation are critically dependent on the assumptions adopted. If what actually happens in the future turns out to be significantly different to these assumptions, employers could end up having over- or under-paid contributions, or benefit changes could be made when they otherwise wouldn't be.



Types of assumptions

What assumptions are needed?

There are 2 main types of assumption:

- **Demographic assumptions.** These focus on member characteristics and help to determine when and for how long benefits are expected to be paid.
- **Financial assumptions.** These focus on financial factors and help to determine how much is expected to be paid to members.

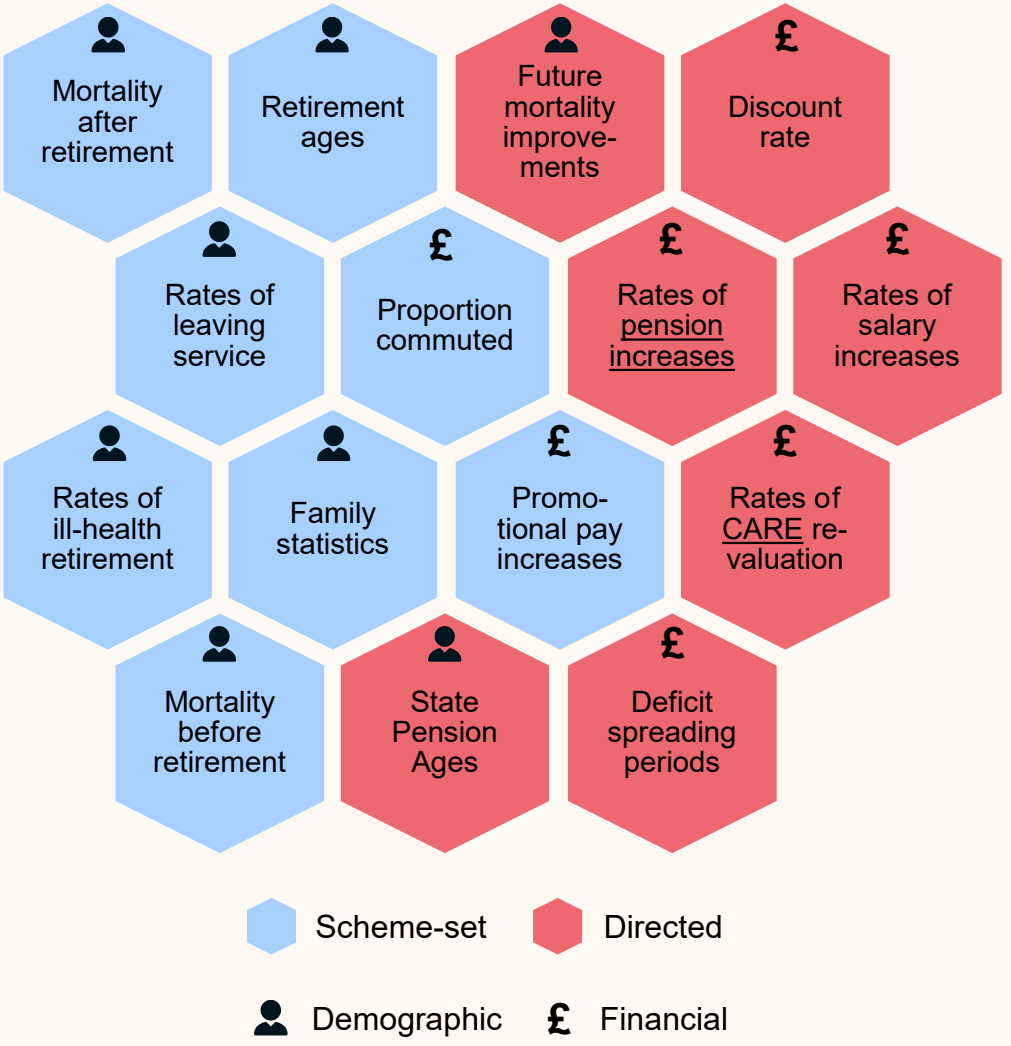
Together these assumptions determine how much needs to be set aside now, in order to meet future payments.

Who is responsible for assumptions?

There are 2 parties responsible for setting assumptions:

- The Secretary of State for Health and Social Care, who is responsible for setting 'scheme-set' assumptions (after taking actuarial advice). These are usually demographic assumptions.
- HM Treasury, who are responsible for setting 'directed' assumptions through legislation. These are usually financial assumptions.

In this report we focus on scheme-set assumptions, but directed assumptions are included for context. Directed assumptions are shown in Appendix C1.



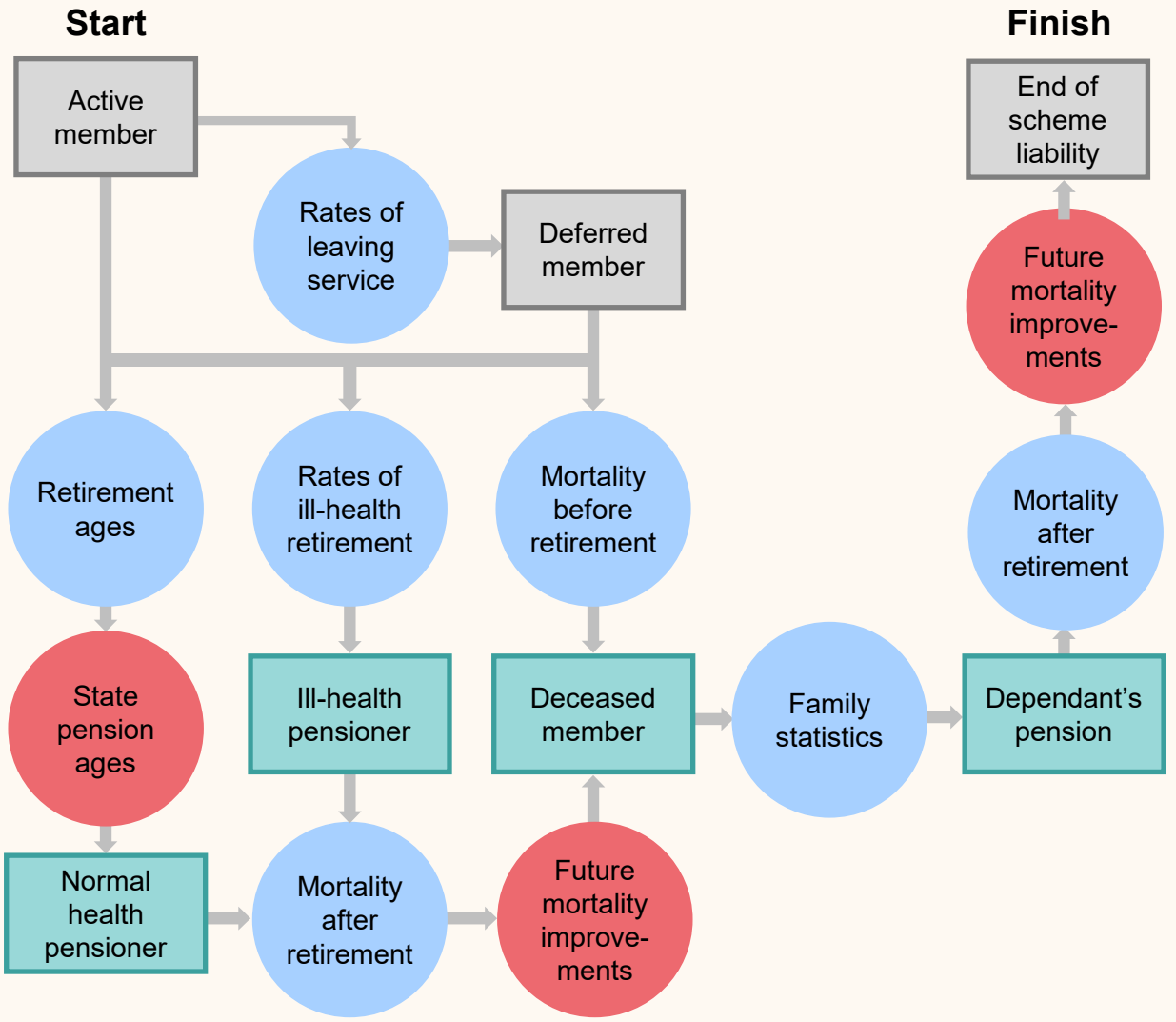
Demographic assumptions

How are the assumptions used?

Demographic assumptions are used to predict what will happen to the status of members in the future, until their liability in the scheme is extinguished.

The chart to the right shows a simplified set of paths that an active member could follow. Demographic assumptions (shown in circles) are used to determine the likelihood that the member follows any given path.

Most demographic assumptions are set by the scheme, rather than directed by HM Treasury.



Member status: **no benefits payable**

Member status: **benefits payable**

Scheme-set

Directed

Financial assumptions

How are the assumptions used?

Financial assumptions are used to predict:

- the size of future benefits due to members
- the current cost of those benefits to the scheme.

The chart to the right shows a simplified summary of how these assumptions are applied.

The only financial assumptions set by the scheme are:

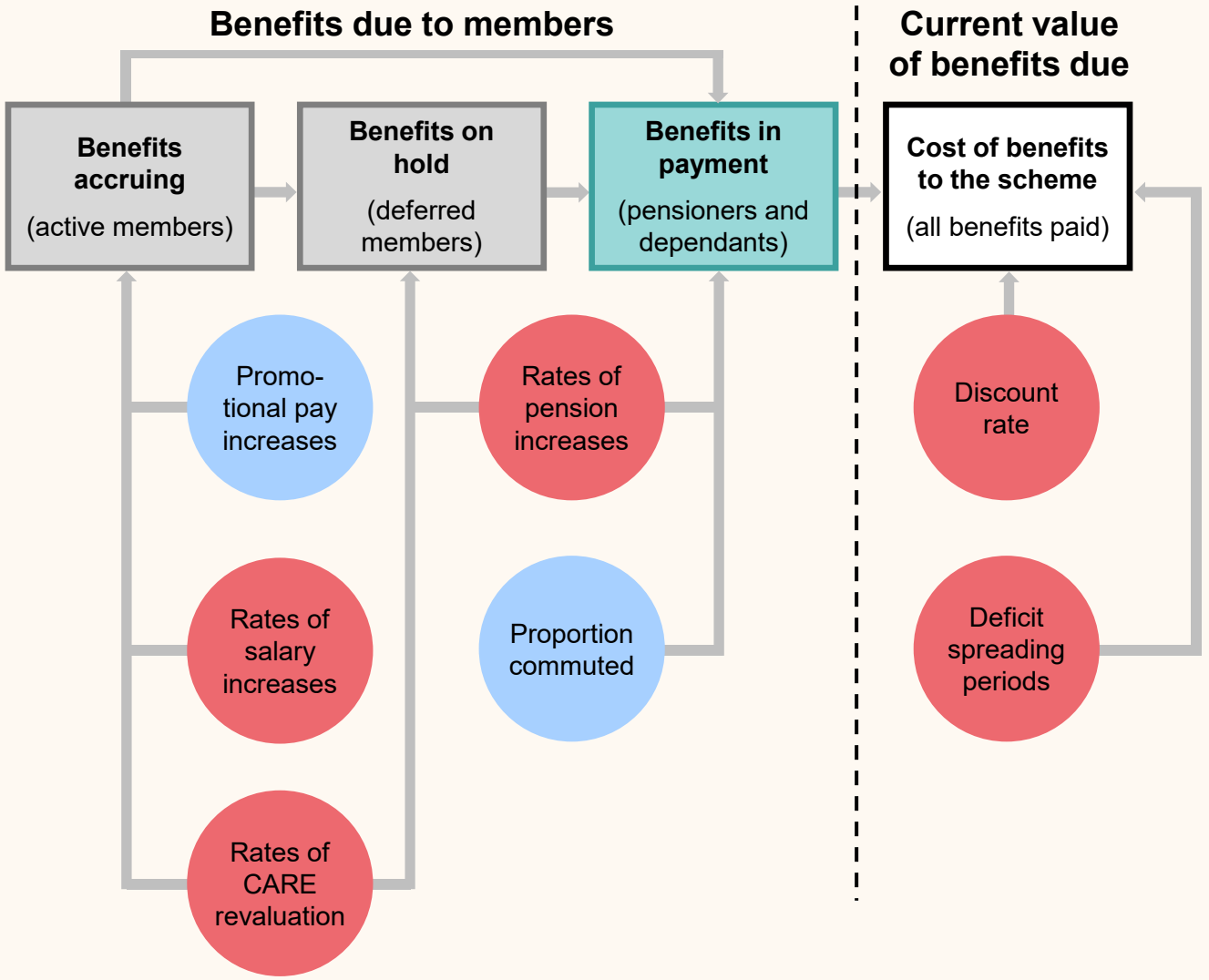
- promotional pay increases
- commutation proportions.

Member status: **no benefits payable**

Member status: **benefits payable**

Scheme-set

Directed



Setting assumptions

How are the assumptions decided?

We recommend 'scheme-set' assumptions after considering all relevant information. The picture to the right summarises the 3 main inputs.

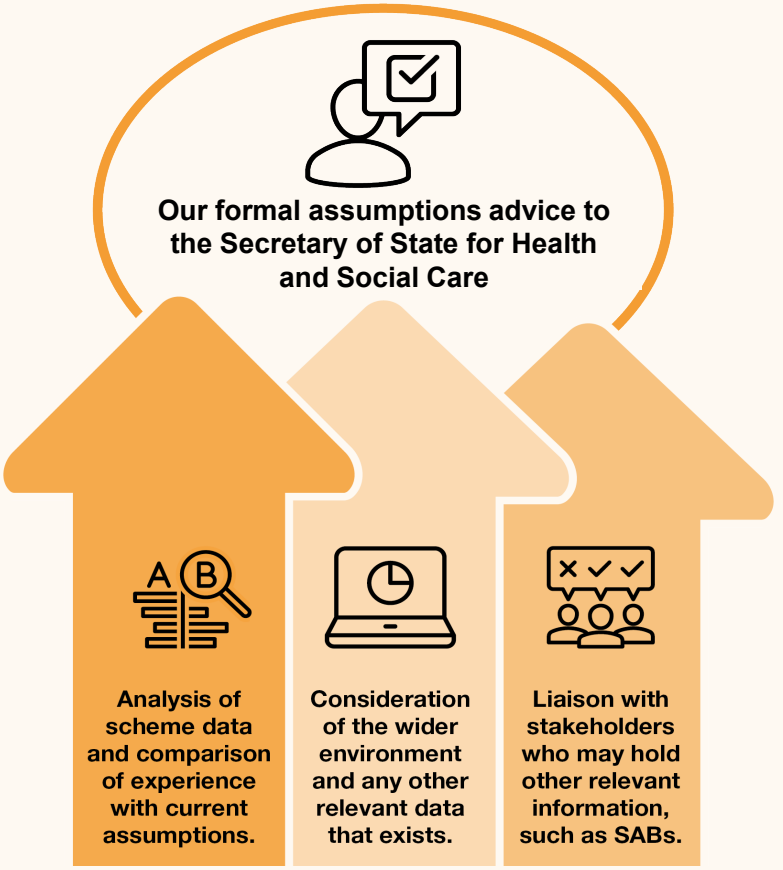
The Secretary of State for Health and Social Care then decides on the 'scheme-set' assumptions to be adopted, after considering GAD's advice.

What rules need to be followed?

HM Treasury Directions specify that 'scheme-set' assumptions must be the Secretary of State for Health and Social Care's best estimates of future experience. This means they cannot include any margins for prudence or optimism.

The Directions also require that assumptions must consider:

- previous valuation assumptions
- an analysis of demographic experience, where there is enough data to perform such an analysis
- any other relevant data, including anything that only became available after the date of the valuation
- Any emerging evidence about historic or expected future long-term trends.



The assumptions are required to be best-estimate, including an allowance for expected future GDP growth and life expectancy progression.

In our Results report dated 19 October 2023 we also consider three future climate scenarios; their potential impact on valuation assumptions; and how these in turn might impact on the cost of future benefits payable from the scheme.

Impact on employer contribution rates

Which assumptions are most important for setting employer contribution rates?

The chart to the right shows the importance of each assumption on employer contribution rates, relative to that of other assumptions. This shows that:

- there is a large degree of variation in the significance of each assumption
- the more significant assumptions tend to be directed by HM Treasury.

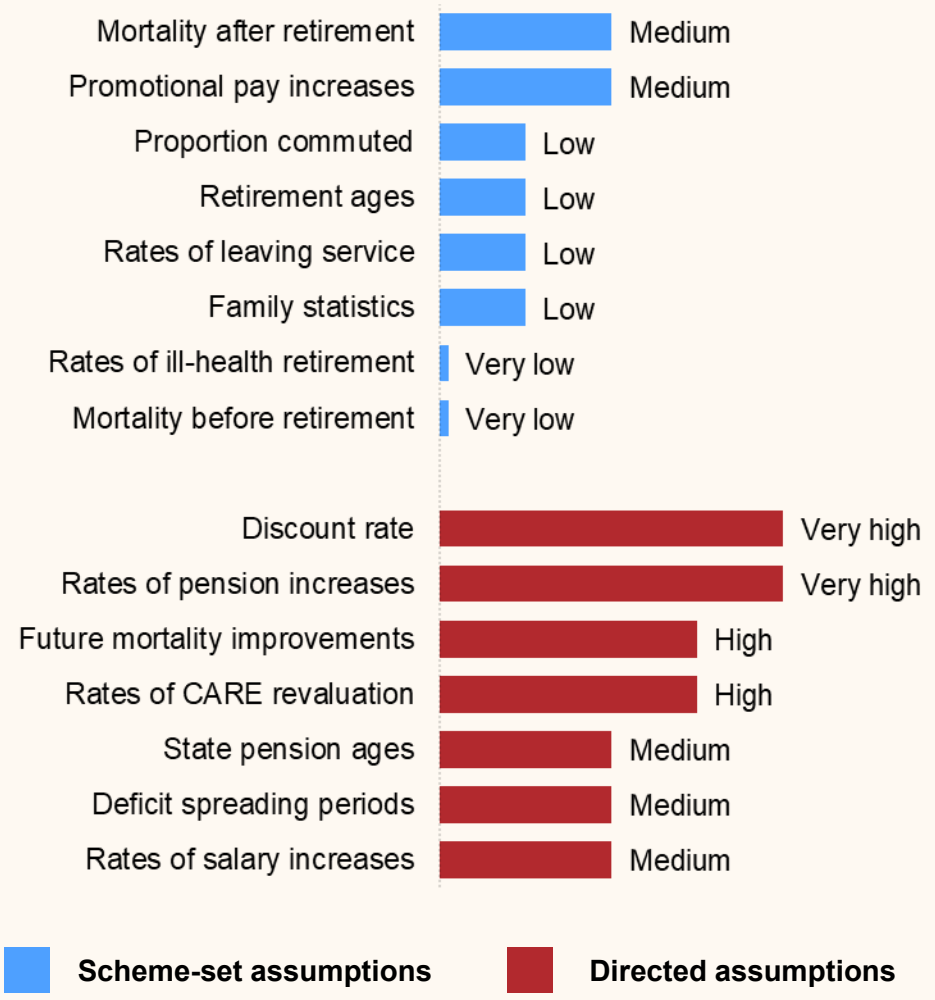
For example, the discount rate is shown as very highly significant compared to mortality before retirement. This means that even if the discount rate changes by a small amount, the impact on employer contribution rates could be very large compared to a fairly large change in mortality before retirement.

For context, the employer contribution rate is currently 20.6% of pensionable pay. In monetary terms, this was equivalent to employer contributions of £12.6 billion in the financial year 2022-23.

The rankings shown are approximate and are based on the relative significance of each assumption only. They are intended as an illustration and are not a prediction of potential future changes.

This comparison considers all assumptions and therefore differs to the earlier Highlights summary and the later Summary statistics.

Importance relative to all assumptions



Impact on the scheme's cost cap cost

Are the same assumptions important for calculating the cost cap cost?

The significance of each assumption on the cost cap cost can be very different to the significance of the same assumption on employer contribution rates. This is because the cost cap process was designed to exclude certain costs.

The chart to the right shows the significance of each assumption on the cost cap cost of the scheme, which itself tends to be lower than the employer contribution rates. This excludes the effect of the economic check.

It's important to be aware that even a small change in an assumption with low significance could result in cost cap thresholds being breached and member benefits being adjusted.

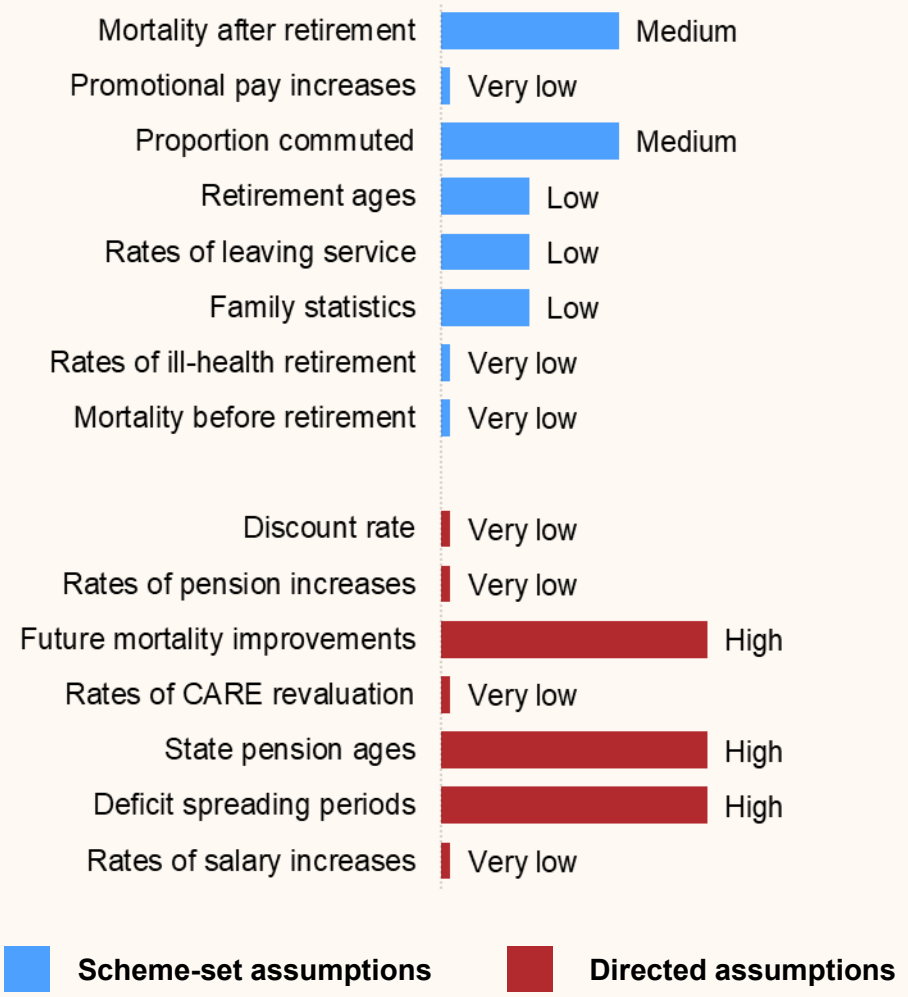
The main differences when compared to the significance of assumptions on the employer contribution rate are:

- Most financial assumptions, such as the discount rate, are not very significant to the cost cap cost
- The significance of directed assumptions (relative to 'scheme-set' assumptions) tends to be lower for the cost cap cost than for employer contribution rates.

For context, the current target cost of the scheme is 11.6% of pensionable pay.

As before, the rankings shown are approximate and are intended as an illustration, not a prediction of potential future changes.

Importance relative to all assumptions



Limitations

Data

In preparing this report, GAD has relied on data and other information supplied by the administrators of the NHS Pension Scheme, the Pensions Division of NHSBSA, as described in our report titled 'Membership data', dated 19 October 2023. The limitations set out in that report apply equally to this report.

Unless stated otherwise, all data adjustments mentioned in that report apply equally to the data used for setting assumptions. Any additional data adjustments made solely for the purpose of setting assumptions are detailed in this report.

Assumptions

We have used the data provided to analyse the scheme experience and develop our recommended assumptions.

When considering appropriate assumptions, experience usually provides the most reliable evidence.

However, robust analysis of scheme experience will only be possible where there is both sufficient quality, and quantity, of data. The level of reliance that can be placed on assumptions derived from the analysis will also vary depending on these two factors.

Our recommended assumptions are long term and are not suitable for predicting short term future experience.

Sharing

This report has been prepared for the use of the Secretary of State for Health and Social Care and the Department of Health and Social Care. This report will be published as part of completing the 2020 valuation of the scheme, and we are content for the Secretary of State for Health and Social Care to release this report to third parties, provided:

- It is released in full
- The advice is not quoted selectively or partially;
- GAD is identified as the source of the report, and;
- GAD is notified of such release.

Other than the Secretary of State for Health and Social Care and the Department of Health and Social Care, no 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.

Part B: Recommendations

B1. Summary

Summary statistics

Scheme-set assumptions	Assumption information		Our recommendations	
	Importance relative to scheme-set assumptions	Volatility of experience and unreliability of data	Size of recommended change	Impact of recommended changes on scheme costs
Mortality after retirement	Most	Low	Medium	Lower costs
Proportion commuted	Average	Medium	Medium	Lower costs
Retirement ages	Average	Low	Small	No impact
Rates of leaving service	Average	Low	Small	Lower costs
Promotional pay increases	Average	High	None	No impact
Rates of ill-health retirement	Least	Low	None	No impact
Mortality before retirement	Least	Low	None	No impact
Family statistics	Least	Medium	None	No impact

This table provides a summary of the 'scheme-set' assumptions and their likely bearing on the valuation results. It is intended to highlight areas of potential focus to aid with the process of deciding on the 'scheme-set' assumptions to be adopted.

These assessments are indicative, rather than precise. More information on the approach used can be found on the next page.

Be aware that several of the most important valuation assumptions do not appear in this table as they will be directed by HM Treasury. The impact of these 'directed' assumptions could be much greater than that of the impact of 'scheme-set' assumptions.

Interpretation of summary statistics

	Importance relative to scheme-set assumptions	Volatility of experience and unreliability of data	Size of recommended changes	Impact of recommended changes on scheme costs
What does it show?	The importance of this assumption on employer contribution rates (ECR) and the cost cap cost (CCC) of the scheme, relative to other scheme-set assumptions	The variability of experience and unreliability of data observed in the past. This can impact the weight we place on current experience.	The size of change we recommend, relative to the assumptions used at the last valuation.	The likelihood of our recommendations leading to higher or lower employer contribution rates (ECR) and cost cap cost (CCC) of the scheme
What is it based on?	Our actuarial judgement and the sensitivity analysis carried out at the last valuation.	Public service pension scheme experience at previous valuations	Assumptions recommended at this valuation and those used at the last valuation.	Our actuarial judgement and the sensitivity analysis carried out at the last valuation.
What are the possible ratings?	**Most** An assumption that could plausibly impact the ECR **or** CCC by more than 1%. **Average** An assumption with an impact in between most and least. **Least** An assumption that could plausibly impact both the ECR **and** the CCC by less than 0.2%.	**High** A current or previous lack of credible data, or large changes in member behaviour. **Medium** Volatility of experience or unreliability of data classified in between high and low. **Low** A large pool of credible data that doesn't tend to change much.	**Large** An average change in assumption of over 25%. **Medium** An average change in assumption of between 10% and 25%. **Small** or **None** An average change in assumption of between 0% and 10%.	**Higher** ECR and CCC likely to be higher. **Lower** ECR and CCC likely to be lower. **Uncertain** Likely impact on the ECR and CCC is still uncertain. For example, if assumptions for different categories move in different directions. **No impact** Likely to be no material impact on the ECR or CCC.

Significance, volatility and size of changes

The diagram to the right shows, for the 'scheme-set' assumptions:

- **Relative importance of assumption.** It's important to pay regard to the more significant assumptions, as any changes can have a big impact. Assumptions placed higher up the page are those that are more significant.
- **Volatility of experience and unreliability of data.** Assumptions placed further to the right of the page are also important to consider, as they are more volatile or have uncertain experience. This means that they are more likely to change substantially.
- **Size of recommended changes.** Larger changes are key as they are more likely to have a large impact on valuation results (although this also depends on how significant the assumption is). The coloured circles signify the size of our recommended change, as specified in the key below.

Key: Size of recommended changes

L Large M Medium S Small N None

B2. Mortality after retirement

Mortality after retirement

What does this assumption represent?

Mortality assumptions are a series of probabilities which represent the likelihood of a member dying at any given age. Different assumptions usually apply to different groups, e.g., for males and females, or normal health or ill-health retirees.

Baseline mortality rates are a scheme-set assumption and are the focus of this section.

Future mortality improvements are a directed assumption, and typically act to reduce baseline mortality rates in future years. They are directed to be in line with the improvements underlying the ONS-2020 population projections, which reflect the latest views on the long-term effect of the COVID-19 pandemic. The rate of improvements can be negative.

Summary statistics

Relative importance of assumption	Volatility of experience and unreliability of data	Size of recommended change	Impact of recommended changes on scheme costs
Most	Low	Medium	Lower costs

Our recommendations and rationale

Our analysis identified an inconsistency compared to previous analysis. We believe this arises due to a previously unidentified issue in the data supplied for the 2012 and 2016 valuations. We now believe the mortality assumptions based on this data understated the rates of mortality likely to be experienced ie overstated life expectancies. More information is set out on the following page.

We recommend updating the baseline mortality rates to be based on the recent experience.

We recommend adopting a single baseline mortality assumption for both current and future ill health pensioners based on recent experience. This differs from the 2016 valuation when the assumption for future ill health pensioners was set equal to the standard ill-health table.

The ONS-2020 population projections allow for the impact of the COVID-19 pandemic, so it would be inappropriate to adjust the baseline mortality assumptions for this.

Baseline mortality rates are set by adjusting the 'S3' standard mortality tables issued in December 2018 by the Continuous Mortality Investigation (CMI). These tables are derived from a larger amount of public service data, and so are more appropriate for the scheme than the S2 tables adopted at the 2016 valuation.

Mortality data issue

The results of the analysis of mortality of NHSPS pensioners for the period 2016-20 has shown an unexpected inconsistency compared to the previous 8 years' analysis and taking into account the similar analysis of the TPS (and other schemes) over the period. This inconsistency means higher rates of mortality have been observed based on the most recent data than expected based on the analysis of prior periods' data. We are now confident that the inconsistency results from an error in the data supplied for the 2012 and 2016 valuations, which were the first valuations for which comprehensive mortality data was provided. Cessation amounts in the 2012 and 2016 data were in many cases inconsistent with previously reported amounts of pension being paid.

There remain some issues with the provision of accurate data to support a robust mortality analysis, which are associated with challenges of updating records for large numbers of new awards and following member deaths. However, the identified error has now been corrected and in our view the data available for the 2020 valuation, though not perfect, is adequate for setting a mortality assumption. Given the previous error this will result in some inconsistency both with the assumption previously adopted and when comparing the NHSPS 2020 valuation results with other schemes' valuation results.

Ordinarily when recommending the best estimate mortality assumption to be used for the 2020 valuation we expect to recommend the analysis for the 2016-20 period be considered in conjunction with the previously set assumption, with some average of the two being concluded. This 'look back' to prior periods is intended to smooth the impact of variations over shorter periods. Given the acknowledged error in the previously set assumption it is difficult to conclude any best estimate assumption should continue to refer to the prior assumption for the NHSPS.

For this reason we recommend aligning the mortality assumption for the 2020 valuation solely to the results of the 2016-20 analysis.

Making this change will reduce the assumed life expectancies. The impact on 2020 valuation results is a reduction in the Employer contribution rate of around 1.7% of pay and a reduction in the Cost cap cost of around 0.8% of pay.

Practical implications

Mortality assumptions can be used to estimate the life expectancy of individual members. Higher life expectancies mean a higher cost of providing benefits, as benefits must be paid for longer periods of time.

The table below shows the impact of our recommended assumptions. For each category shown:

- The **first column** for males and females is the assumption adopted for the 2016 valuation.
- The **middle column** for males and females is the 2016 assumption, but updated to use a valuation date of 2020 and ONS-2020 improvements.
- The **last column** for males and females is the assumption we recommend for the 2020 valuation.

The changes between the first and middle columns show the impact of directed changes to future mortality improvements and the normal passage of time. The changes between the middle and last columns show the impact of our recommended changes to baseline mortality assumptions.

All numbers shown are cohort life expectancies that have been calculated allowing for future mortality improvements.

Life expectancies for normal health pensioners

	Males			**Females**		
	2016 valuation assumption	2016 assumption updated	2020 valuation recommendation	2016 valuation assumption	2016 assumption updated	2020 valuation recommendation
Current pensioners, age 65	89.2	88.3	87.8	90.6	89.9	89.0
Future pensioners, age 45	91.2	90.0	89.5	92.5	91.5	90.5

Recommendations in detail

Category		2016 Assumptions			2020 Recommendations		
		Standard table	Adjustment	Based on	Standard table	Adjustment	Based on
Normal health pensioners	**Male**	S2NMA	83%	Scheme experience	S3NMA	91%	Scheme experience
	Female	S2NFA	85%	Scheme experience	S3NFA	103%	Scheme experience
Current ill health pensioners	**Male**	S2IMA	83%	Scheme experience	S3IMA	134%	Scheme experience
	Female	S2IFA	85%	Scheme experience	S3IFA	134%	Scheme experience
Future ill health pensioners	**Male**	S2IMA	100%	Scheme experience	S3IMA	134%	Scheme experience
	Female	S2IFA	100%	Scheme experience	S3IFA	134%	Scheme experience
Dependants	**Male**	S2NMA	100%	Scheme experience	S3DMA	82%	Scheme experience
	Female	S2NFA	100%	Scheme experience	S3DFA	89%	Scheme experience

Details of our 2020 recommendations are set out in a separate document that will be published alongside this report.

Our approach

Analysis

We have analysed the scheme's mortality experience over the period 1 April 2016 to 31 March 2020.

Our analysis has been carried out on an 'amounts' basis (as opposed to a 'lives' basis).

An 'amounts' analysis gives more weight to members with larger pensions, better reflecting the impact they have on scheme costs. A 'lives' analysis on the other hand gives an equal weighting to every member being analysed.

As members with higher pensions tend to live longer, an 'amounts' analysis usually results in lighter mortality assumptions than a 'lives' analysis would, based on the same data.

Setting recommended assumptions

We recommend that all baseline mortality assumptions are based on the 'S3' series of standard tables.

Our general approach is:

- Identify groups of members we would expect to have different life expectancies, for example by gender and by health at retirement.
- Identify the most appropriate 'S3' table for each group. Where we have enough scheme experience, we carry out a series of statistical tests to find tables which best fit recent experience. This is approximate, so we apply judgement to select the most appropriate table.
- The last four years of experience may not accurately reflect the longer-term, so we generally 'smooth out' any excess volatility by setting adjustments based on an equal allowance for recent experience and the 2016 valuation assumptions, which were set using pre-2016 experience. Due to the historic data issue identified, we do not propose to smooth the assumptions in this way for NHSPS.
- Where there is not enough scheme experience, we look at assumptions from other groups of members or other schemes which may have similar experience, adjusted to allow for any available information.

Scheme experience: overall

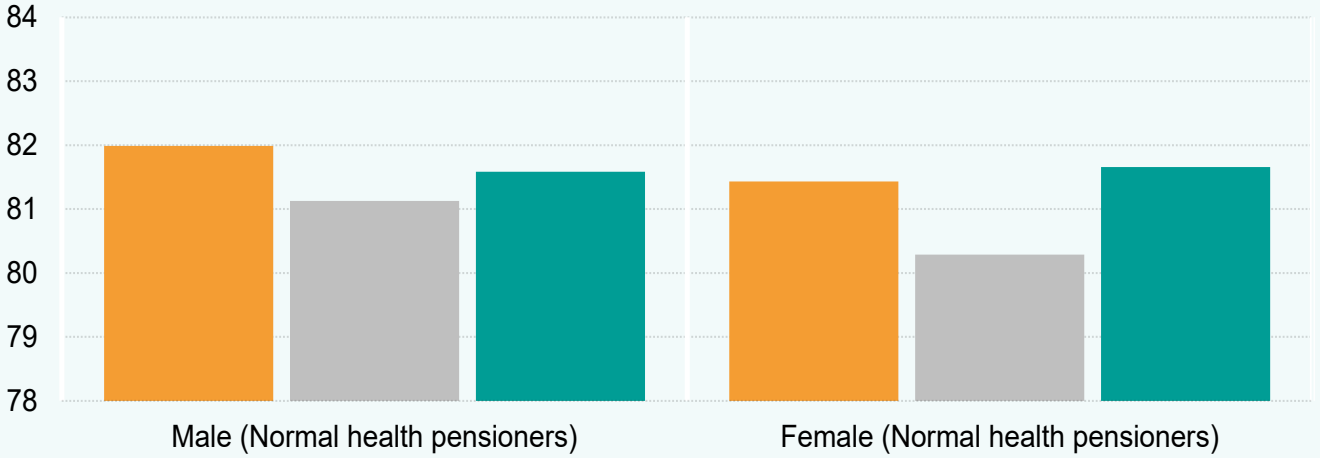
Experience versus expectations show how accurate the assumptions have been in the past and can help inform setting future assumptions.

The chart to the right and those on the following pages compare:

- **actual experience** ( ) on the left – what has happened over the last 4 years.
- **2016 assumptions** ( ) in the middle – what we thought would happen, based on the baseline mortality assumptions adopted for the 2016 valuation. Uses ONS-2020 mortality improvements.
- **2020 recommendations** ( ) on the right – what we would have expected to happen, had our recommended baseline mortality assumptions been adopted for the 2016 valuation. Uses ONS-2020 mortality improvements.

It should be noted that experience can be a very volatile measure for groups with small amounts of data, which then impacts the reliance we place on it.

Experience vs expectations: average age at death



Summary

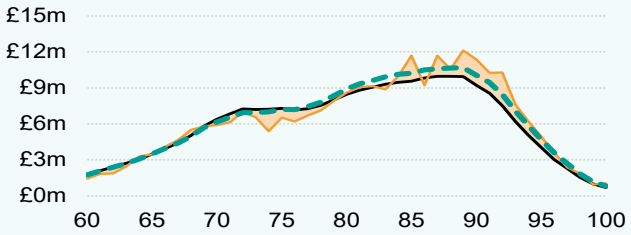
The 2016 assumptions lead to a lower average age at death than recent baseline experience, reflecting the data issue identified. The 2020 recommendations are largely in line with the baseline mortality experience, leading to a higher average age at death than the current assumptions. This can be seen through the average age at death on the chart above and the distribution of deaths by age shown on the next page.

Updating the baseline mortality assumption leads to reduced life expectancies in isolation. Directed future mortality improvements also reduce life expectancies.

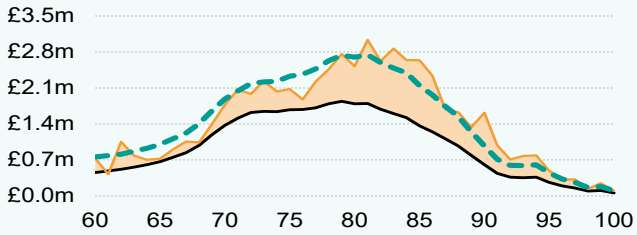
Scheme experience: in detail

Pension ceasing as a result of death by age, split by category

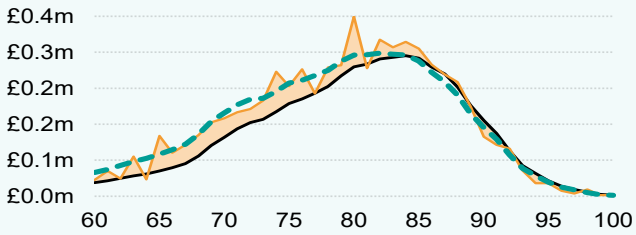
Male - Normal health pensioners



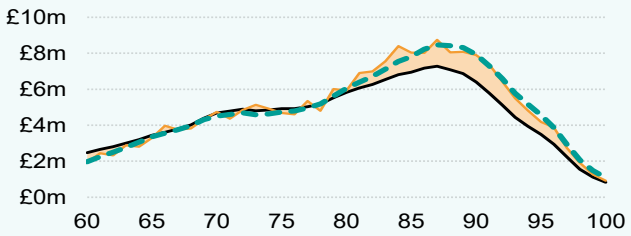
Male - Ill health pensioners



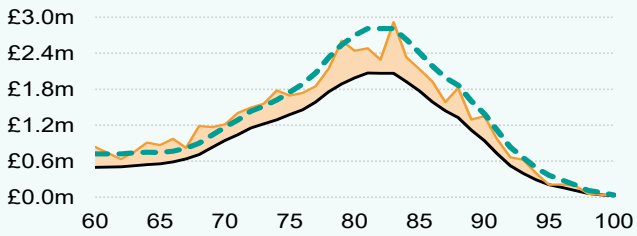
Male - Dependants



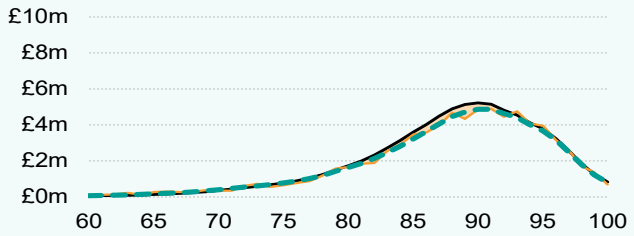
Female - Normal health pensioners



Female - Ill health pensioners



Female - Dependants



Key: **2016 assumptions** **2020 recommendations** **Experience** (line) and difference from 2016 assumptions (shaded area)

Scheme experience: in numbers

Category		**Experience** Actual pension ceasing due to death over 2016-2020	**2016 Expectations** Pension expected to cease under the 2016 assumptions	**Experience ÷ 2016 Expectations**	**2020 Expectations** Pension expected to cease under the 2020 recommendations	**Experience ÷ 2020 Expectations**
Normal health pensioners	**Male**	£265 m	£254 m	105%	£266 m	100%
	Female	£210 m	£194 m	108%	£209 m	100%
Ill health pensioners	**Male**	£64 m	£42 m	151%	£64 m	100%
	Female	£61 m	£44 m	137%	£61 m	100%
Dependants	**Male**	£7 m	£6 m	114%	£7 m	100%
	Female	£79 m	£83 m	95%	£79 m	100%

Details of our 2020 recommendations are set out in a separate document that will be published alongside this report.

Wider environment: COVID-19

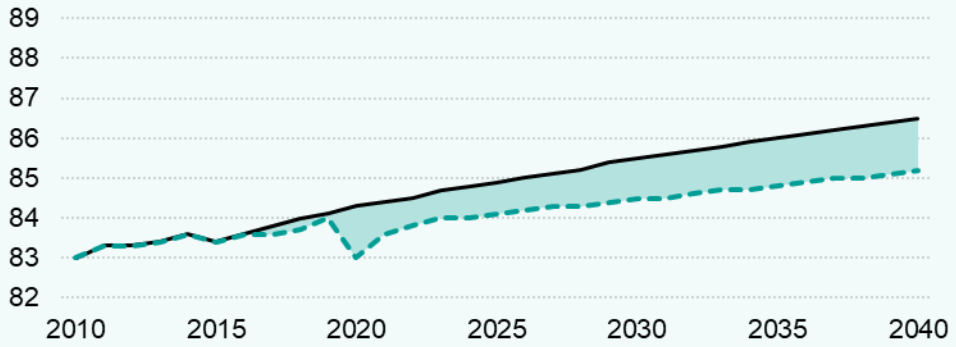
No explicit allowance has been made for the COVID-19 pandemic in our recommended assumptions for **baseline mortality rates**. Our recommendations are based on scheme experience up to 2020 so will only have included deaths from the very start of the pandemic. We do not expect these deaths to have had a material impact on our recommendations.

However, an explicit allowance is included in assumed **future mortality improvements**. These are directed to be in line with the improvements underlying the ONS-2020 population projections.

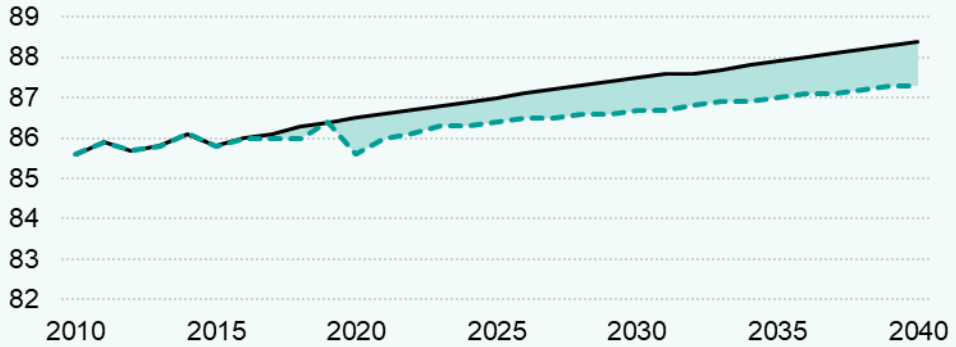
When deriving the ONS-2020 projections, a panel of mortality experts gave their views on the impact of COVID-19 pandemic on mortality rates in the short term. Based on this, short term adjustments were made to the 2019 to 2024 period to allow for estimated deaths in 2021 and an averaging of the experts' views on estimated improvements by age group over this period. Long term rates of future mortality improvement are not projected to change as a result of COVID-19.

The charts on this page show the impact of the ONS-2020 projections on future life expectancies for a typical UK male and UK female, aged 65. There is a clear drop in life expectancies in 2020 as result of the COVID-19 pandemic. In the longer term, even though mortality is expected to start improving again, the 2020 drop means we start from a lower baseline and the impact of COVID-19 will be with us long into the future.

Life expectancies for UK males, aged 65



Life expectancies for UK females, aged 65



Key:

Based on **ONS-2016 projections**, which were adopted for the 2016 valuation

Based on **ONS-2020 projections** (dotted line) and difference from the 2016 projections (shaded area)

B3. Proportion commuted

Proportion commuted

What does this assumption represent?

The proportion commuted represents the fraction of pension that members give up at retirement, in return for a single tax-free lump sum payment (subject to HMRC tax limits).

Commutation is a scheme-set assumption for this valuation. In the 2016 valuation, it was scheme-set for some groups of members and directed for other groups.

The proportion commuted is an important assumption because the value of the lump sum received is often less than the value of the pension given up. Higher proportions commuted therefore tend to lead to lower scheme costs.

The lump sum is typically calculated using a commutation rate of £12 lump sum for every £1 of annual pension given up. The commutation rate is not being reviewed in this valuation.

Summary statistics

Relative importance of assumption	Volatility of experience and unreliability of data	Size of recommended change	Impact of recommended changes on scheme costs
Average	Medium	Medium	Lower costs

Our recommendations and rationale

For the **1995 section**, we recommend increasing the assumed commutation proportion to 10% for males (+2%) and to 12% for females (+1%). This is due to continued higher commutation proportions since 2016, which reduces the employer contribution rate.

For the **2008 section**, we recommend increasing the assumed commutation proportion to 20% for all members (+2.5%). As there are relatively few retirements over the period, this is based on the scheme's own experience combined with experience from other large schemes (CS GB, TPS EW and LGPS EW).

For the **2015 scheme**, we recommend increasing the assumed commutation proportion to 20% for all members (+2.5%). There are too few 2015 scheme retirements to set an assumption, so we looked to the 2008 section assumption to inform our recommendation.

Practical implications

Commutation can drastically alter the timing and amount of benefit payments for individual members.

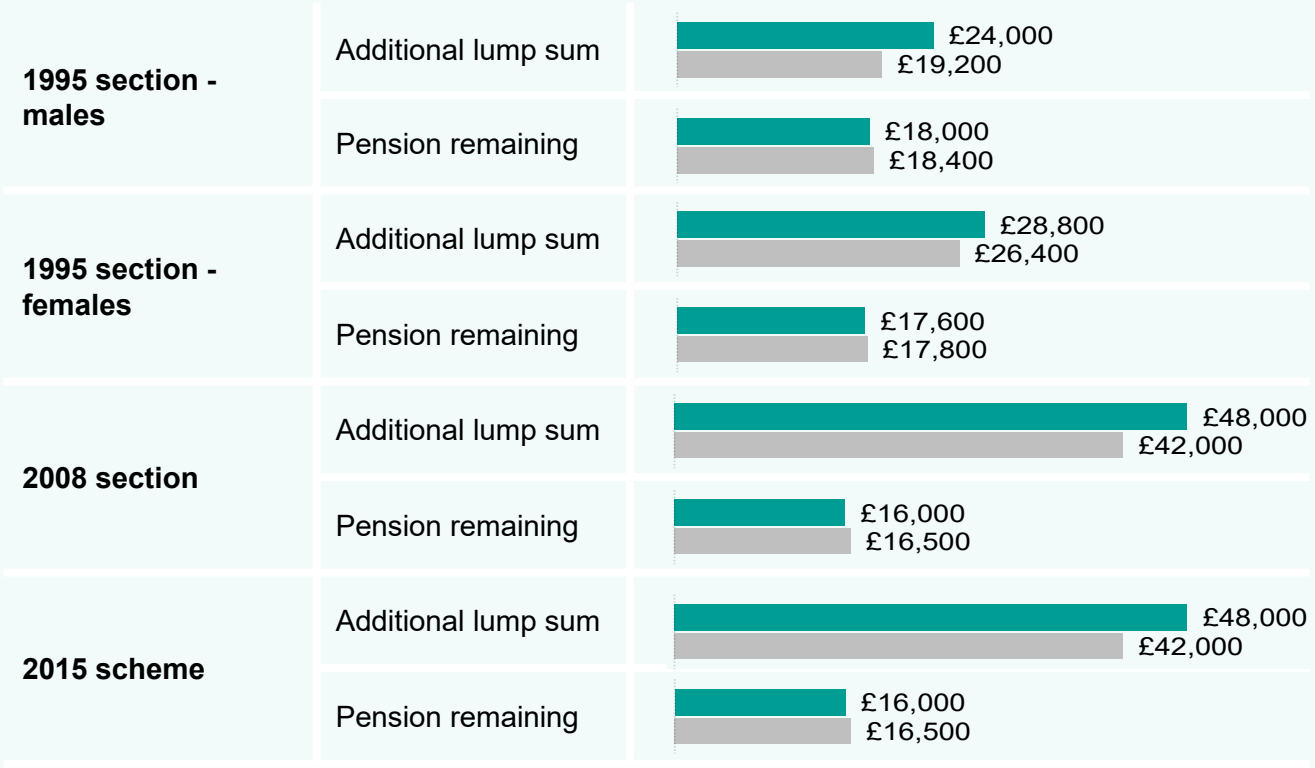
Members choose whether to commute based on their own individual circumstances. For example, their:

- Assessment of their future life expectancy
- Tax circumstances
- Preferences for higher future income vs an immediate lump sum.

The chart to the right shows the impact on assumed benefits of our recommended assumptions. For each category shown:

- The **top line** ( ) shows the impact of the assumptions we recommend for the 2020 valuation.
- The **bottom line** ( ) shows the impact of the assumptions adopted for the 2016 valuation.

Lump sum for a member starting with a £20,000 pension



In the 1995 section, members also receive an automatic lump sum equal to three times pension.

Our approach

Analysis

We have analysed the scheme's commutation experience over the period 1 April 2016 to 31 March 2020.

Our analysis considered total pension that came into payment and total pension that was commuted and was carried out separately for groups expected to behave differently.

This approach places more weight on members with larger pensions, reflecting the bigger impact they can have on scheme costs.

Setting recommended assumptions

Our general approach is:

- Identify groups of members we would expect to commute in different ways, for example by gender, pension amount and scheme section.
- Compare recent commutation experience against the 2016 valuation assumptions.
- Where there is not enough scheme experience, we look at assumptions from other groups of members or other schemes which may have similar experience, adjusted to allow for any available information.
- Recommend a change to the assumption only if evidence points to a material change to the valuation results. In these cases, our recommendation is to fully align the assumption to recent experience, as there is limited evidence for in-year volatility.
- We make no explicit allowance for HMRC limits, which already influence member behaviours, or for the McCloud judgment as this is unlikely to have a significant impact on members' commutation choices.

For the **1995 section**, we remove all deferred members from the analysis as a reasonable simplification to exclude many historic deferred members who have no commutation rights in the scheme.

For the **2008 section**, we remove all 2008 choice optant members from the analysis on the basis that they would not be representative of members who have a free commutation decision.

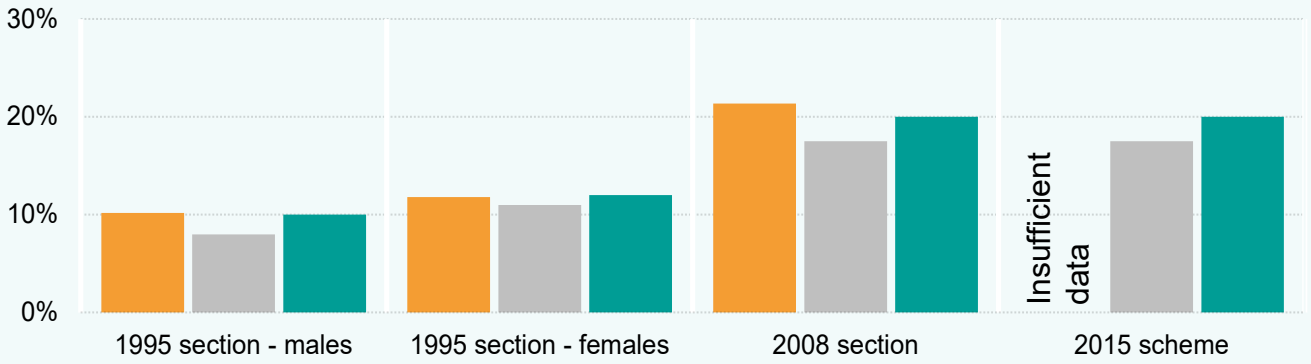
Scheme experience: overall

Experience versus expectations show how accurate the assumptions have been in the past and can help inform setting future assumptions.

- **actual experience** ( ) on the left – what has happened over the last 4 years.
- **2016 assumptions** ( ) in the middle – what we thought would happen, based on the assumptions adopted for the 2016 valuation.
- **2020 recommendations** ( ) on the right – what we would have expected to happen, had our recommended assumptions for the 2020 valuation been adopted for the 2016 valuation.

It should be noted that experience can be a very volatile measure for groups with small amounts of data, which then impacts the reliance we place on it.

Experience vs expectations



Summary

The **1995 section**, for both males and females, has seen a higher proportion of commutation in recent years compared to the 2016 assumption, as shown above. Updating for this experience will reduce the employer contribution rate, but will have no impact on the cost cap.

The **2008 section** has seen a higher proportion of commutation in recent years compared to the 2016 assumption. However, this is over a small number of retirements. Considering both the 2008 section and other large schemes commutation experience the proportion of commutation has been 20% on average.

No analysis was carried out on the **2015 scheme** due to low rates of retirement.

Scheme experience: in numbers

Category	Total pension coming into payment over 2016-2020 (before commutation)	Total pension commuted over 2016-2020	**Experience** Proportion of pension commuted over 2016-2020 (weighted by pension amount)	**2016 Expectations** Proportion of pension expected to be commuted under the 2016 assumptions	**2020 Expectations** Proportion of pension expected to be commuted under the 2020 assumptions
1995 section - males	£450 m	£46 m	10.2%	8.0%	10.0%
1995 section - females	£996 m	£118 m	11.8%	11.0%	12.0%
2008 section	£29 m	£6 m	21.4%	17.5% (**)	20.0%
2015 scheme (*)	N/A	N/A	N/A	17.5% (**)	20.0%
Other large public service schemes	£226 m	£44 m	19.4%	17.5% (**)	20.0%

Other large public service schemes data included data from Civil Service Pension Scheme (GB) – Non-Classic schemes, Teachers' Pension Scheme (England and Wales) – NPA 65 section and Local Government Pension Scheme (England and Wales) – Post 2008 section.

* There were less than 1,000 retirements over 2016-2020 from the 2015 scheme which is insufficient to produce a robust analysis. Therefore, we have not included any output in the table above.

** This assumption was previously HMT directed at the 2016 valuation.

Details of our 2020 recommendations are set out in a separate document that will be published alongside this report.

B4. Retirement ages

Retirement ages

What does this assumption represent?

Retirement age assumptions are a series of probabilities which represent the likelihood of a member retiring and claiming their pension at any given age.

Different assumptions usually apply to groups who are expected to behave differently, e.g., for members with different Normal Pension Ages.

Retirement age affects:

- The benefits members receive e.g. earlier retirement ages for active members means lower benefits, as members will have built up those benefits over a shorter period of time.
- The length of time benefits will be paid for – although in most schemes this impact is offset by early retirement reductions and late retirement uplifts.

Summary statistics

Relative importance of assumption	Volatility of experience and unreliability of data	Size of recommended change	Impact of recommended changes on scheme costs
Average	Low	Small	No impact

Our recommendations and rationale

Actual retirement experience for the 1995 section between 2016-2020 was reasonably close to the expected position at most ages, therefore we recommend no changes to the current assumptions. There is insufficient data for the 2008 section and 2015 scheme to undertake a robust analysis of experience. Therefore, we propose retaining the existing assumptions.

The approach for the 2016 valuation set the same rates for members who transferred to the post-2015 scheme on 1 April 2015 and new joiners thereafter. Different rates were set for those who continued in the 1995/2008 Section after that date. We propose to change the criteria so that the second set of rates are applied more widely to include those up to 7 years' younger than the original cohort of "protected" members. This is intended to reflect retirement behaviour changes resulting from the McCloud remedy. We recognise this will mean 2012-2015 joiners out of scope of remedy will also have their retirement age set with reference to the legacy scheme but we do not consider this to have sufficient impact to warrant a more sophisticated approach.

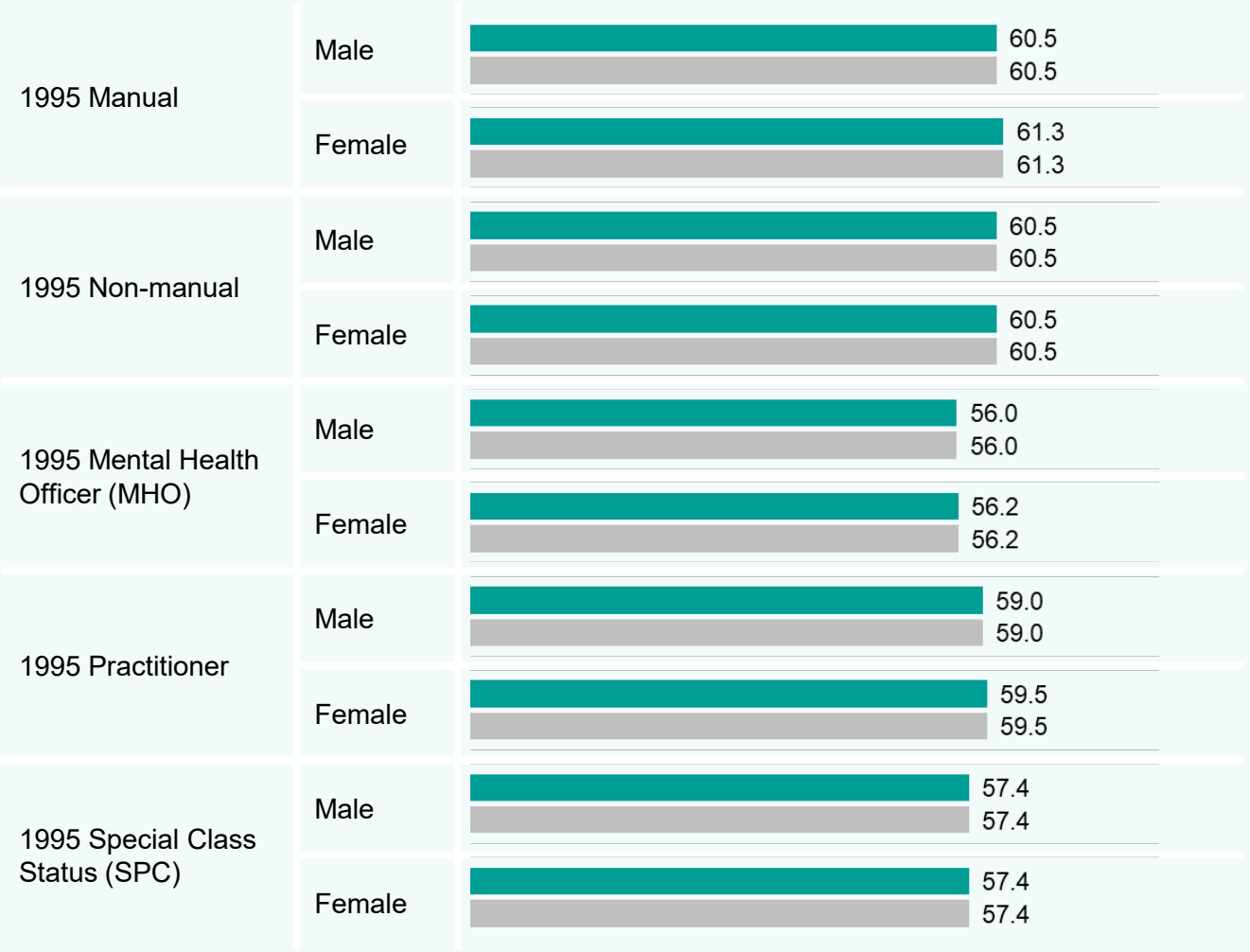
Practical implications

The chart to the right shows the impact of our recommended assumptions. For each category shown:

- The **top line** ( ) shows the impact of the assumptions we recommend for the 2020 valuation.
- The **bottom line** ( ) shows the impact of the assumptions adopted for the 2016 valuation.

The numbers shown in this example assume that members retire from active service. No allowance is made for the possibility of ill-health retirement, leaving service before retirement, or death in service. These assumptions are covered in other sections.

Expected retirement age for members now aged 45



Our approach

Analysis

We have analysed the scheme's retirement experience over the period 1 April 2016 to 31 March 2020.

This analysis is based on active members of the scheme. Deferred members are not analysed and assumed to retire at their Normal Pension Age.

Setting recommended assumptions

Our general approach is:

- Identify groups of members we would expect to have different retirement patterns, for example by gender and scheme section.
- Compare recent retirement experience against the 2016 assumptions.
- Where there is not enough scheme experience, we look at assumptions from other groups of members or other schemes which may have similar experience, adjusted to allow for any available information.
- Recommend that the assumption is updated only if evidence points to a material change to the valuation results.
- We typically only recommend a change to the assumed number of retirements, leaving the age profile of the existing assumption unaltered. We only recommend a change to the age profile if we see evidence of a material and non-temporary step change in membership behaviour.
- The last four years of experience may not accurately reflect the longer-term, so if we recommend a change we generally 'smooth out' any excess volatility by basing our recommendation on an equal allowance for recent experience and the 2016 valuations assumptions, which were in turn set using pre-2016 experience.

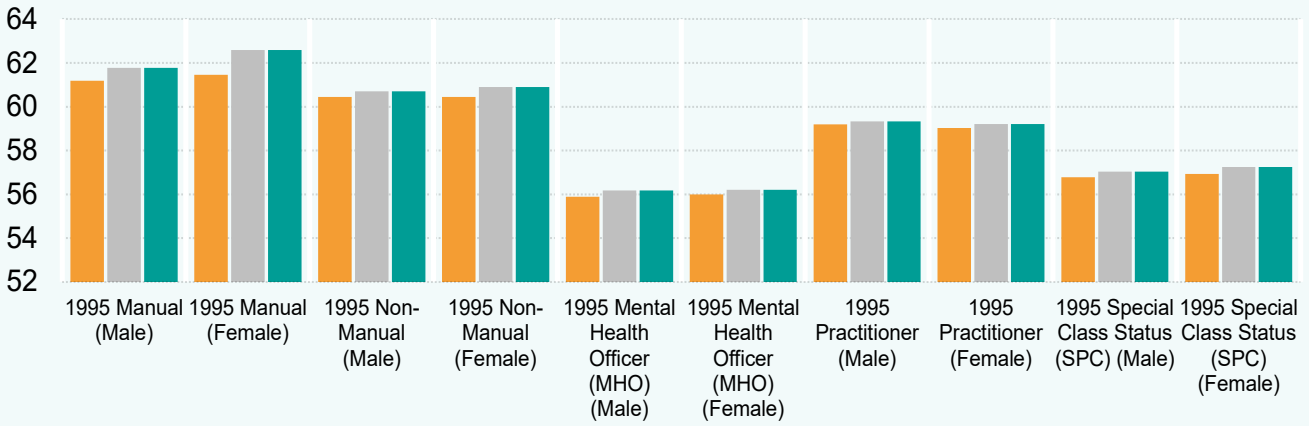
Scheme experience: overall

Experience versus expectations show how accurate the assumptions have been in the past and can help inform setting future assumptions.

- **actual experience** ( ) on the left – what has happened over the last 4 years.
- **2016 assumptions** ( ) in the middle – what we thought would happen, based on the assumptions adopted for the 2016 valuation.
- **2020 recommendations** ( ) on the right – what we would have expected to happen, had our recommended assumptions for the 2020 valuation been adopted for the 2016 valuation.

It should be noted that experience can be a very volatile measure for groups with small amounts of data, which then impacts the reliance we place on it.

Experience vs expectations: average retirement ages



Summary

1995 section members have been retiring very much in line with rates assumed for the 2016 valuation. The average age of recent retirements are close to the 2016 assumptions, as shown above. The number of retirements are also close to the 2016 assumptions, as shown on the next page.

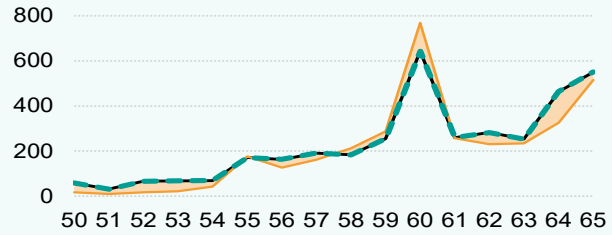
There is insufficient information to test the impact on the 2008 section and the 2015 scheme.

We propose that a change is made to age retirement rates for unprotected members following the McCloud judgment to allow for members potentially having an additional 7 years' service in legacy schemes.

Scheme experience: in detail

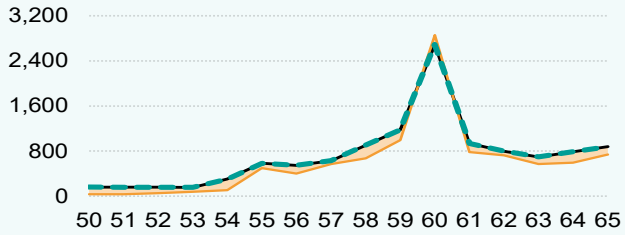
Number of retirements by age, for male members with accrued pension in the specified scheme, split by category

1995 Manual (Male)



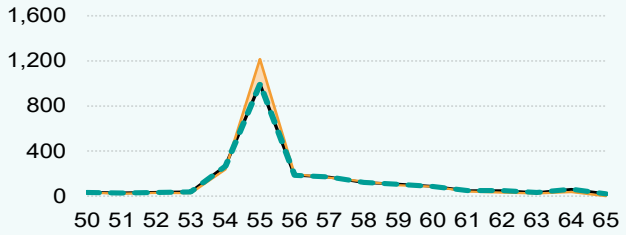
3,716 retirements over 2016-2020

1995 Non-Manual (Male)



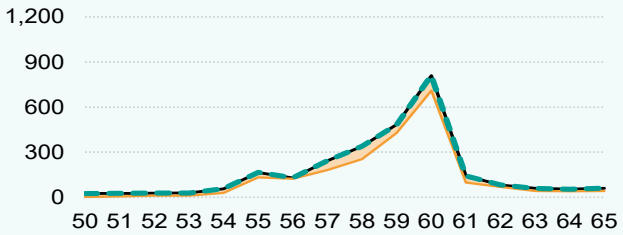
10,321 retirements over 2016-2020

1995 Mental Health Officer (MHO) (Male)



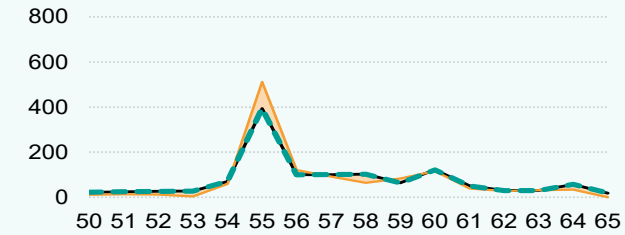
2,362 retirements over 2016-2020

1995 Practitioner (Male)



2,223 retirements over 2016-2020

1995 Special Class Status (SPC) (Male)



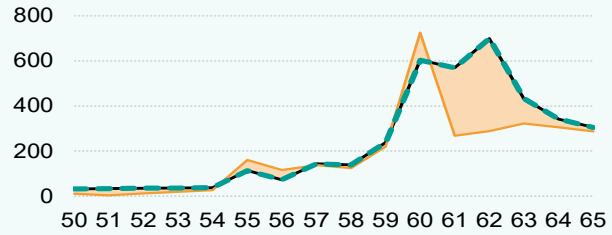
1,216 retirements over 2016-2020

Key: **2016 assumptions** **2020 recommendations** **Experience** (line) and difference from 2016 assumptions (shaded area)

Scheme experience: in detail

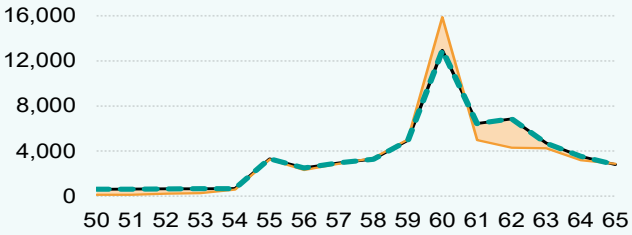
Number of retirements by age, for female members with accrued pension in the specified scheme, split by category

1995 Manual (Female)



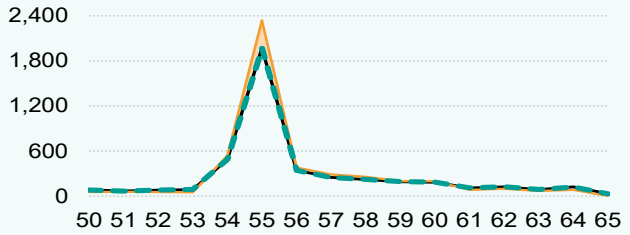
3,423 retirements over 2016-2020

1995 Non-manual (Female)



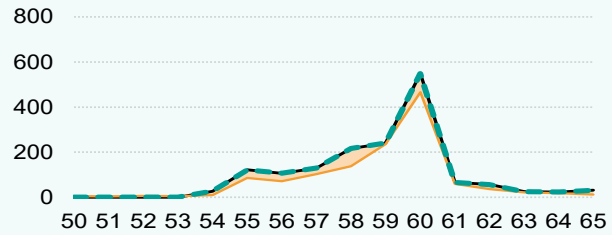
57,000 retirements over 2016-2020

1995 Mental Health Officer (MHO) (Female)



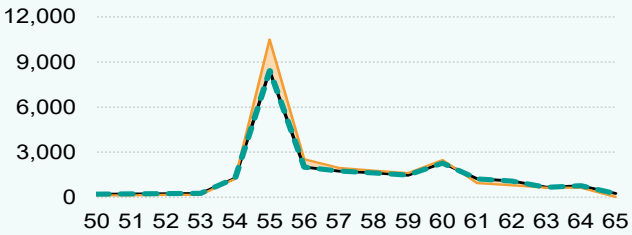
4,748 retirements over 2016-2020

1995 Practitioner (Female)



1,293 retirements over 2016-2020

1995 Special Class Status (SPC) (Female)



25,667 retirements over 2016-2020

Key: **2016 assumptions** **2020 recommendations** **Experience** (line) and difference from 2016 assumptions (shaded area)

Scheme experience: in numbers

Category	Gender	**Data** Number of retirements over 2016-2020	**Experience** Average age at retirement for retirements over 2016-2020	**2016 Expectations** Expected average age at retirement under the 2016 assumptions	**2020 Expectations** Expected average age at retirement under the 2020 assumptions
1995 Manual	**Male**	3,716	61.2	61.8	61.8
	Female	3,423	61.5	62.6	62.6
1995 Non-Manual	**Male**	10,321	60.4	60.7	60.7
	Female	57,000	60.4	60.9	60.9
1995 Mental Health Officer (MHO)	**Male**	2,362	55.9	56.2	56.2
	Female	4,748	56.0	56.2	56.2
1995 Practitioner	**Male**	2,223	59.2	59.3	59.3
	Female	1,293	59.0	59.2	59.2
1995 Special Class Status (SPC)	**Male**	1,216	56.8	57.0	57.0
	Female	25,667	56.9	57.3	57.3

* There was insufficient data to produce a robust analysis of retirements from the 2008 section or the 2015 scheme. There were around 13,000 retirements from the 2008 section and less than 1,000 retirements from the 2015 scheme over 2016-2020.

Details of our 2020 recommendations are set out in a separate document that will be published alongside this report.

Wider environment: McCloud

McCloud judgment

The McCloud judgment could result in many members exchanging up to 7 years' service from the SPa-linked 2015 scheme to earlier NPA legacy arrangements.

We propose that a change is made to age retirement rates for some unprotected members following the McCloud judgment. The change will recognise that retirement behaviours for those up to 7 years' younger than those originally subject to transitional protection are likely to be influenced by the longer period of eligibility for legacy scheme benefits.

There are many other factors that might influence member behaviour, such as changes in the State Pension age and the recent increase in inflation.

Normal Minimum Pension Age

The Finance Act 2022 sets out that the minimum age at which most members can be permitted to draw their pension benefits will rise from 55 to 57 with effect from April 2028, to coincide with the rise of State Pension age to 67.

It is too early to speculate on the effect of this increased minimum age on member behaviours. Therefore, we recommend no change to the age retirement assumptions for the Finance Act 2022.

The effect of the 2022 Act should be kept under review at future valuations, when assumptions could be updated to ensure they mirror prevailing legislation.

Wider environment: Member behaviours

Partial / flexible retirement

DHSC announced in its plan for patients on 22 September 2022 that it would implement permanent retirement flexibilities and extend existing temporary measures to allow the most experienced staff to return to service or stay in service longer. New provisions, including partial retirement in the 1995 Section, have been introduced from 1 October 2023.

As the policy has just started, there is no experience on which to base assumptions about member behaviour. Any change to assumptions for the 2020 valuation would be based on predictions of member behaviour.

Given the uncertainty over the effect on member behaviour, it would be reasonable to make no change at the 2020 valuation and revisit the assumption at the 2024 valuation when some experience data will be available.

We therefore do not recommend making changes to the assumptions at the 2020 valuation in anticipation of the introduction of partial retirement.

Annual Allowance (AA) and Lifetime Allowance (LTA)

The Spring 2023 Budget increased the AA and removed the LTA. The Chancellor made this pension tax reform to incentivise “workers to stay in work for longer”.

This may change member behaviour in future, though at this stage no direct evidence is available on the potential effects. Since the impact on member behaviours is not yet known no adjustment to the retirement patterns is proposed for the 2020 valuation.

Evidence may emerge in due course, at which time it will be considered in relation to the assumptions to be adopted for future valuations.

B5. Rates of leaving service

Rates of leaving service

What does this assumption represent?

Rates of leaving service (sometimes referred to as withdrawal rates) are a series of probabilities which represent the likelihood of a member voluntarily leaving service (without retiring) at any given age.

Different assumptions are usually adopted for groups who are expected to behave differently, e.g., for males and females, or members with pensions in different sections of the scheme.

Summary statistics

Relative importance of assumption	Volatility of experience and unreliability of data	Size of recommended change	Impact of recommended changes on scheme costs
Average	Low	Small	Lower costs

Our recommendations and rationale

Withdrawal experience has been consistently higher than previously assumed across all age groups and this is in line with experience in other public sector schemes. The increase in rates has been highest for those with short service, however we focus our review on those members who stay longer than 3 years as these are the most material members from a financial perspective.

Following engagement with the Scheme Advisory Board, we recommend updating assumptions to make equal allowance for recent experience and the 2016 valuation assumptions individually for each category of service period for the assumption. We also recommend using the unrounded individual rates of leaving at each age. We believe this is a pragmatic approach to update the assumption whilst avoiding excessive fitting to the shape of the experience over the 2016 to 2020 period. This leads to an increase in the rate of leaving service at all ages for each category of the assumption.

Increasing rates of service reduces the employer contribution rate, although the effect is relatively small.

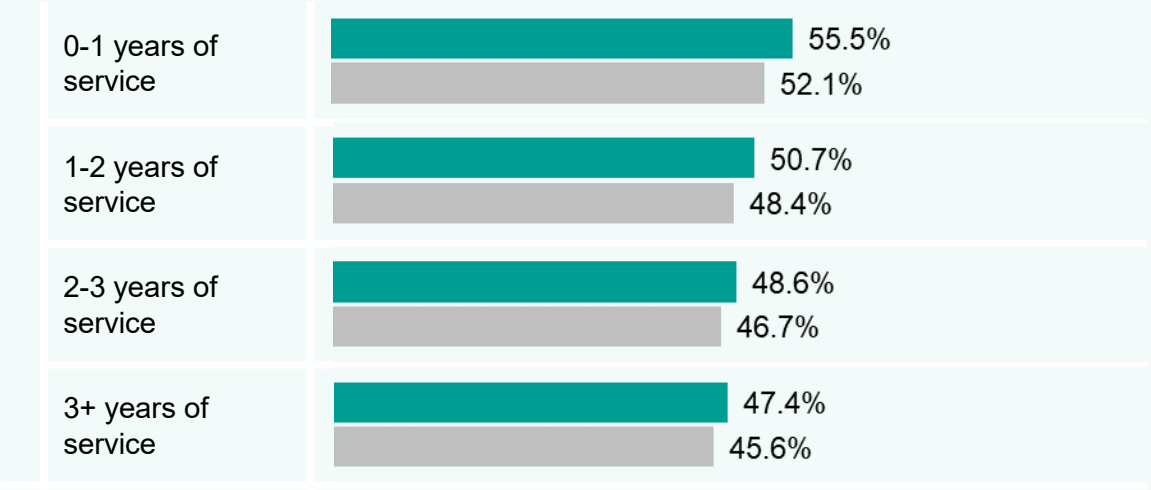
Practical implications

The chart to the right shows the likelihood of a member leaving service before retirement. For each category shown:

- The **top line** ( ) shows the likelihood under the assumptions we recommend for the 2020 valuation.
- The **bottom line** ( ) shows the likelihood under the assumptions adopted for the 2016 valuation.

The numbers shown assume that members either leave service or remain in service until age 65. No allowance is made for the possibility of early retirement, ill-health retirement, or death in service. These assumptions are covered in other sections.

Likelihood of leaving service before age 65 for member now aged 45



Our approach

Analysis

We have analysed the scheme's experience over the period 1 April 2016 to 31 March 2020.

We have excluded all leavers who rejoined within 5 years from our analysis because after rejoining these members are treated as if they had never left the scheme.

Re-entry of members to pensionable service has been modelled by a 'net' withdrawal assumption for active members. This explicitly allows for a proportion of those leaving active service to return and is based on analysis undertaken on relevant member behaviour. No further explicit allowance has therefore been made in the valuation for a proportion of those deferred at the effective date to subsequently rejoin.

Setting recommended assumptions

Our general approach is:

- Identify groups of members we would expect to have different rates of leaving service, for example by gender.
- Compare recent withdrawal experience against the 2016 assumptions.
- Where there is not enough scheme experience, we look at assumptions from other groups of members or other schemes which may have similar experience, adjusted to allow for any available information.
- Recommend that the assumption is updated only if evidence points to a material change to the valuation results.
- We typically only recommend a change to the assumed number of withdrawals, leaving the age profile of the existing assumption unaltered. We only recommend a change to the age profile if we see evidence of a material and non-temporary step change in membership behaviour.
- The last four years of experience may not accurately reflect the longer-term, so if we recommend a change we generally 'smooth out' any excess volatility by basing our recommendation on an equal allowance for recent experience and the 2016 valuations assumptions, which were in turn set using pre-2016 experience.

Scheme experience: overall

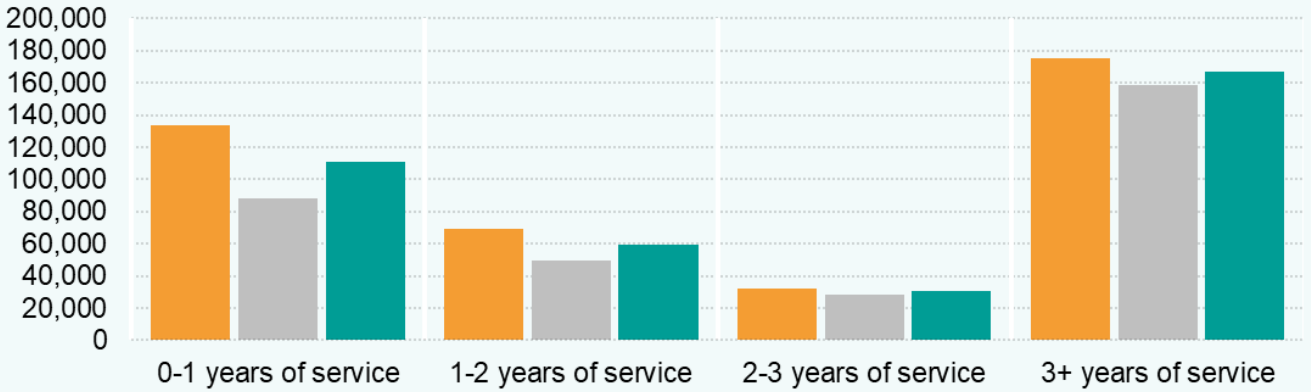
Experience versus expectations show how accurate the assumptions have been in the past and can help inform setting future assumptions.

The chart to the right and those on the following pages compare:

- **actual experience** ( ) on the left – what has happened over the last 4 years.
- **2016 assumptions** ( ) in the middle – what we thought would happen, based on the assumptions adopted for the 2016 valuation.
- **2020 recommendations** ( ) on the right – what we would have expected to happen, had our recommended assumptions been adopted for the 2016 valuation.

It should be noted that experience can be a very volatile measure for groups with small amounts of data, which then impacts the reliance we place on it.

Experience vs expectations: number of leavers



Summary

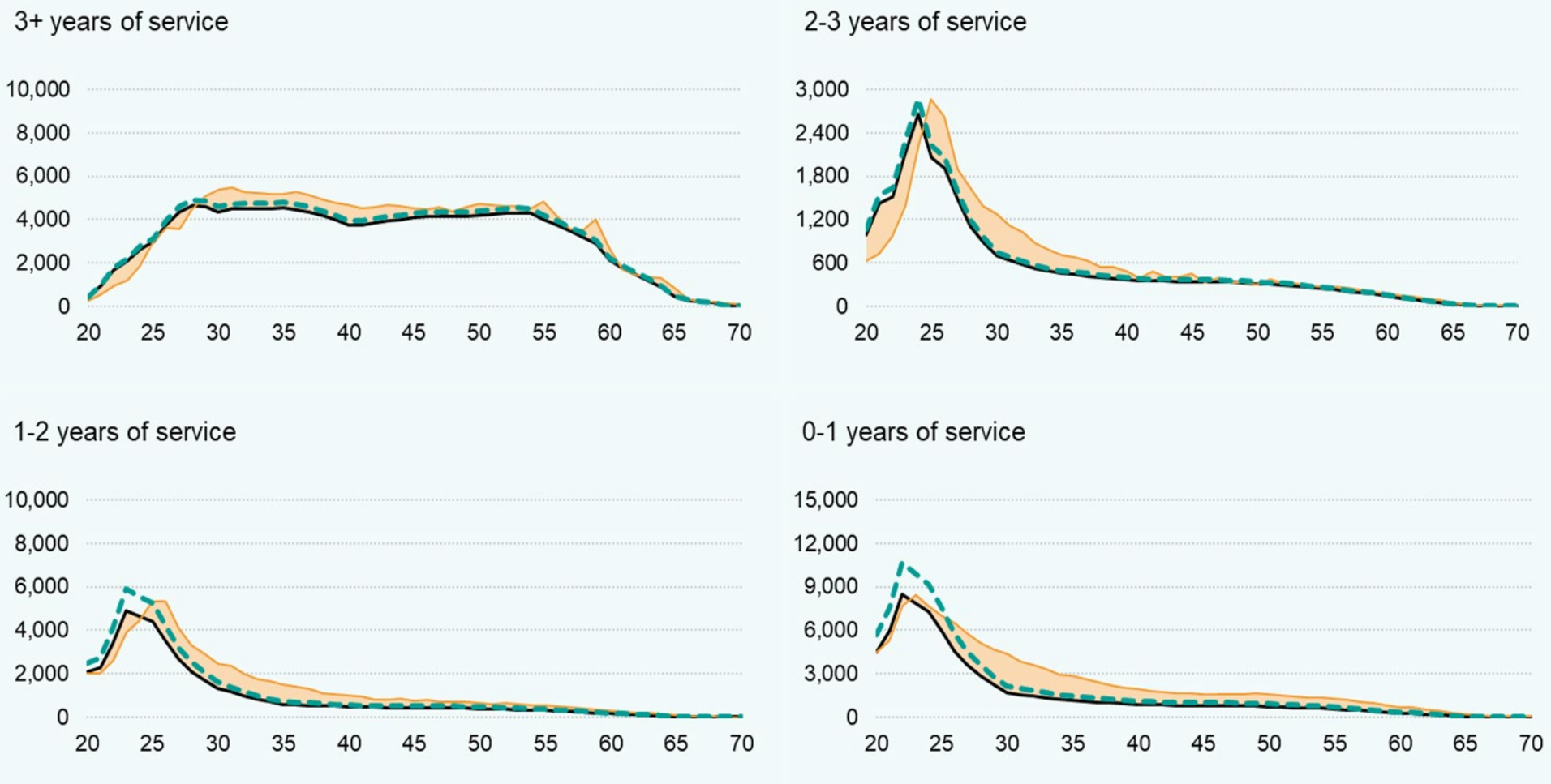
The chart above shows that there has been increase in observed withdrawals compared to the 2016 assumptions. This was particularly observed for males and those with shorter service. It is also in line with observations from other schemes of a general increase in withdrawals and indicative of a wider long-term trend across the public sector.

The charts on the next page show that the 2016 valuation assumed a lower level of withdrawals than emerged in experience.

The 2020 proposed withdrawal assumption allows for an increase in rates for each category of service period.

Scheme experience: in detail

Number of leavers by age, split by category



Scheme experience: in numbers

Category	**Experience** Number of leavers over 2016-2020	**2016 Expectations** Expected number of leavers under the 2016 assumptions	**2020 Expectations** Expected number of leavers under the 2020 assumptions
0-1 years of service	133,655	87,947	110,813
1-2 years of service	68,943	49,360	59,152
2-3 years of service	32,451	28,095	30,278
3+ years of service	175,397	158,855	167,259

Details of our 2020 recommendations are set out in a separate document that will be published alongside this report.

B6. Promotional pay increases

Promotional pay increases

What does this assumption represent?

Promotional pay assumptions are a series of pay increases that members are assumed to receive **in addition to** normal annual salary increases. The assumptions are usually tied to a member's age or length of service.

Promotional pay increases are a scheme-set assumption. **Salary increases** are a directed assumption and are not covered in this section.

Promotional pay increase assumptions are important as they help determine the value of 'final salary' benefits which make up a high proportion of scheme costs. The final salary proportion will reduce over time as more CARE benefits are built up in the reformed scheme, which are less dependent on promotional pay increases.

Costs of the McCloud remedy are highly sensitive to promotional pay increase assumptions

Summary statistics

Relative importance of assumption	Volatility of experience and unreliability of data	Size of recommended change	Impact of recommended changes on scheme costs
Average	High	None	No impact

Our recommendations and rationale

We recommend that the promotional pay increases assumptions adopted for the 2016 valuation are retained for the 2020 valuation.

For manual workers, experience has been higher than assumed for the 2016 valuation. However these members constitute a small proportion of the overall scheme membership.

Adjusting the assumptions for recent experience for these members would not have a material effect on the valuation results.

Practical implications

The number and size of promotional pay increases can dramatically affect member benefits. This is especially true for final salary benefits (which are based on salary at retirement), but also true for career average benefits (which are based on earnings over a member's working lifetime in the scheme).

The chart to the right shows the potential salary at age 65 of a member currently aged 45 and paid £30,000 a year.

For each category shown:

- The **top line** ( ) shows the impact of the assumptions we recommend for the 2020 valuation.
- The **bottom line** ( ) shows the impact of the assumptions adopted for the 2016 valuation.

General (non-promotional) salary increases are set to be zero in the chart so that the impacts of different promotional pay assumptions can be seen more clearly.

Salary at age 65 for a member now aged 45, and paid £30,000

Our approach

Analysis

We have analysed the scheme's salary growth experience over the period 1 April 2016 to 31 March 2020 by identifying members who appear in the data used for both the 2016 and 2020 valuations and analysing their pay growth over the 2016-2020 period. This is known as an "annual increase" analysis.

We have stripped out an allowance for known general pay increases in order to isolate the promotional elements of pay changes.

We have made no allowance for members moving between categories.

Setting recommended assumptions

Our general approach is:

- Identify groups of members where we see different levels of promotional increases. This has included gender in the past, and we continue to examine whether gender differences exist.
- Compare recent levels of promotional increases against the 2016 valuation assumptions
- Where there is not enough scheme experience, we look at assumptions from other groups of members or other schemes which may have similar experience, adjusted to allow for any available information.
- Recommend a change to the assumption only if evidence points to a material change to the valuation results.
- We typically only recommend an overall adjustment to the assumed promotional increases, leaving the age profile of the existing assumption unaltered. We only recommend a change to the age profile if we see evidence of a material and non-temporary change in membership behaviour.
- The last four years of experience may not accurately reflect the longer-term, so if we recommend a change we generally 'smooth out' any excess volatility by basing our recommendation on an equal allowance for recent experience and the 2016 valuations assumptions, which were in turn set using pre-2016 experience.

Scheme experience: overall

Experience versus expectations show how accurate the assumptions have been in the past and can help inform setting future assumptions.

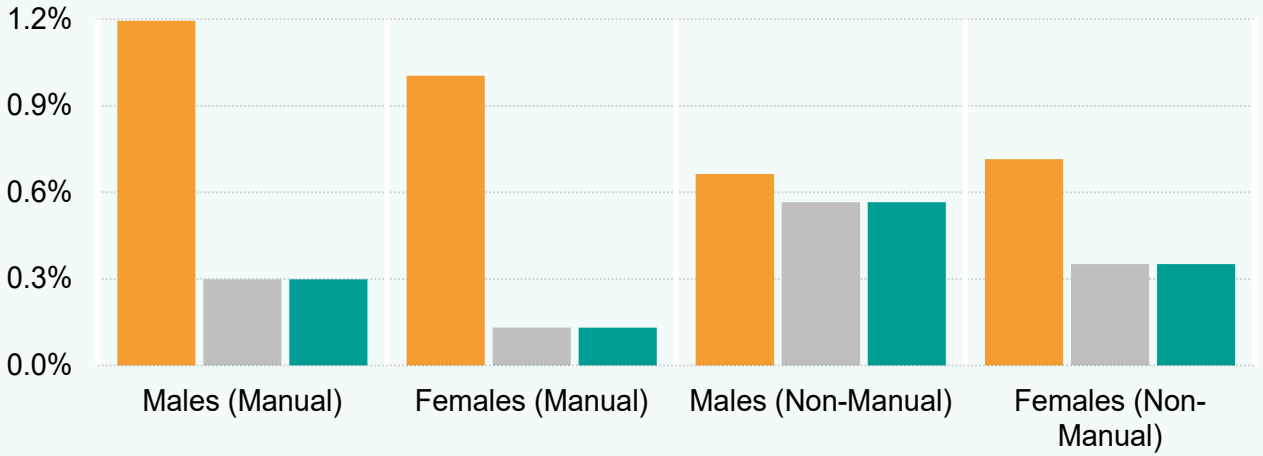
The chart to the right and those on the following pages compare:

- **actual experience** ( ) on the left – what has happened over the last 4 years.
- **2016 assumptions** ( ) in the middle – what we thought would happen, based on the assumptions adopted for the 2016 valuation.
- **2020 recommendations** ( ) on the right – what we would have expected to happen, had our recommended assumptions been adopted for the 2016 valuation.

All numbers exclude general (non-promotional) salary increases.

It should be noted that experience can be a very volatile measure for groups with small amounts of data, which then impacts the reliance we place on it.

Experience vs expectations: average annual increases from age 45 to 65



Summary

Manual members, both males and females, have experienced higher promotional pay increases than expected, based on the 2016 assumptions. However, manual members constitute a small proportion of the overall scheme membership.

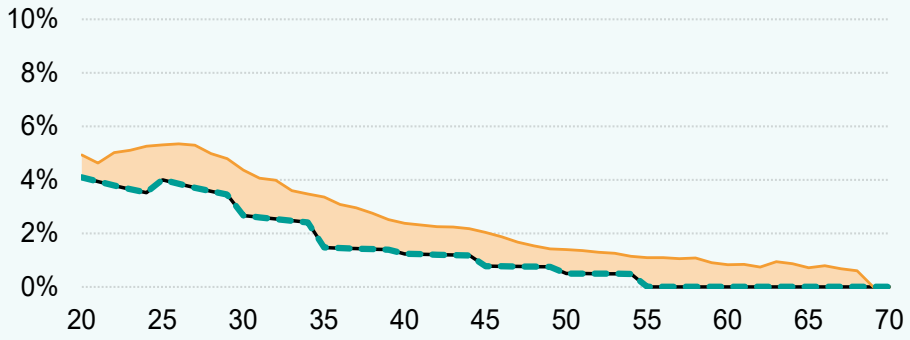
Non-manual members, both males and females, have experienced promotional pay increases that are broadly in line with expectations and are a large proportion of the overall scheme membership.

Adjusting the assumptions for recent experience would not have a material effect on the valuation results.

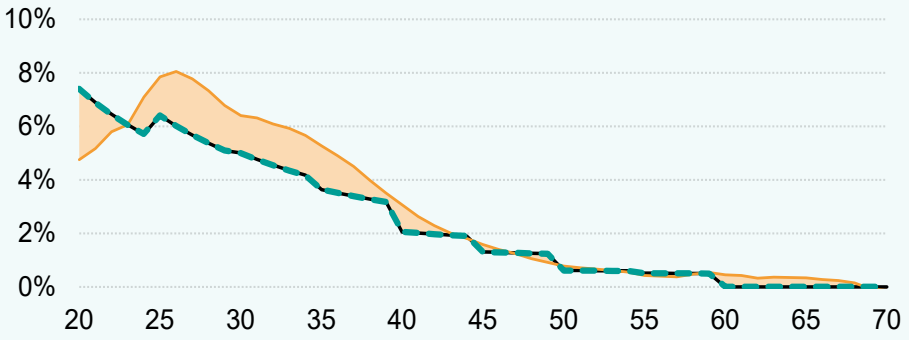
Scheme experience: in detail

Annual promotional pay increases by age, split by category

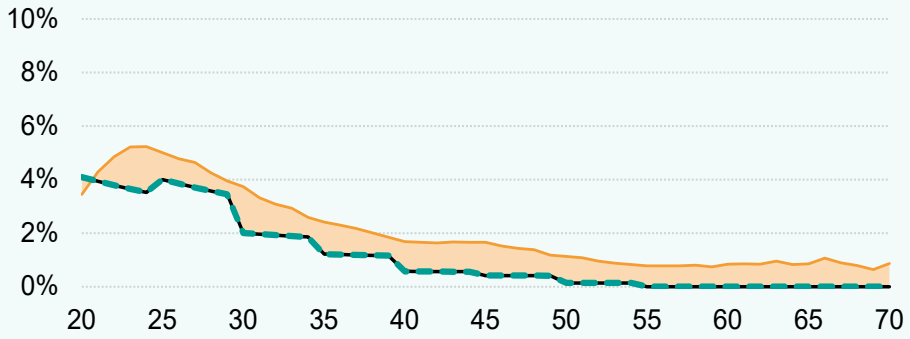
Manual - Males



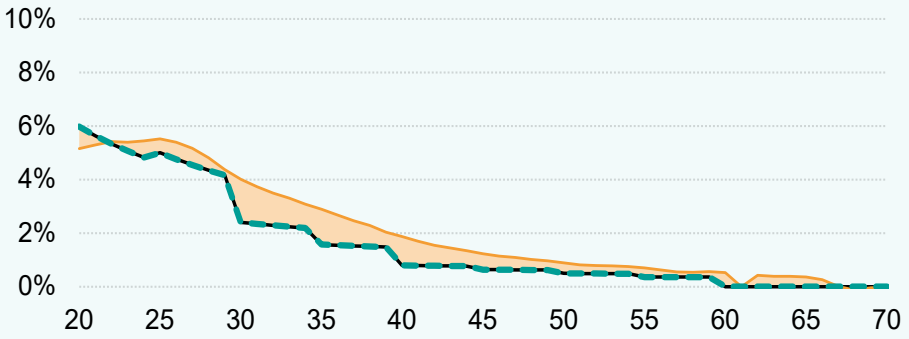
Non-Manual - Males



Manual - Females



Non-Manual - Females



Key: **2016 assumptions** **2020 recommendations** **Experience** (line) and difference from 2016 assumptions (shaded area)

Scheme experience: in numbers

Category		2016 payroll of analysed members	2020 payroll of analysed members	**Experience** Implied annual promotional pay increase, after removal of general salary increases	**2016 Expectations** Expected annual promotional pay increase under the 2016 assumptions	**2020 Expectations** Expected annual promotional pay increase under the 2020 assumptions
Manual	Males	£836 m	£909 m	1.2%	0.3%	0.3%
	Females	£751 m	£805 m	1.0%	0.1%	0.1%
Non-Manual	Males	£8,825 m	£9,725 m	0.7%	0.6%	0.6%
	Females	£24,558 m	£26,444 m	0.7%	0.4%	0.4%

The 2016 payroll figures above include an allowance for known general pay increases from 2016 to 2020. The Experience and Expectations figures shown in the table above show the annual promotional pay increases to age 65 for a member now aged 45. Different rates would apply for different current age and retirement age combinations.

Details of our 2020 recommendations are set out in a separate document that will be published alongside this report.

B7. Rates of ill-health retirement

Rates of ill-health retirement

What does this assumption represent?

Rates of ill-health retirement are a series of probabilities which represent the likelihood of a member retiring in ill-health at any given age.

Members are eligible for either upper-tier or lower-tier ill-health benefits, depending on the severity of their illness.

Summary statistics

Relative importance of assumption	Volatility of experience and unreliability of data	Size of recommended change	Impact of recommended changes on scheme costs
Least	Low	None	No impact

Our recommendations and rationale

Ill-health retirements have been lower than previously assumed, but the ages of those retirements were close to our assumptions. However, adjusting the assumption for recent experience will not make a material change to the valuation results, so we recommend that the 2016 valuations are retained.

Our experience runs to 31 March 2020, and as such misses most of the impact of COVID-19. There is anecdotal evidence that COVID-19 has increased the number of ill-health retirements, which supports retaining the current assumption.

Considering the distribution of experience for the ill health tiers there is a slightly higher proportion of lower tier retirements than expected. As this is not significantly different we propose to maintain the current assumption.

We would not expect the McCloud judgment to impact the number of ill-health retirements directly. However, the tests for the eligibility of members to receive ill-health benefits may differ between the legacy and reformed schemes. We would not expect this to have a material impact on future contribution rates as the legacy arrangements ceased on 1 April 2022.

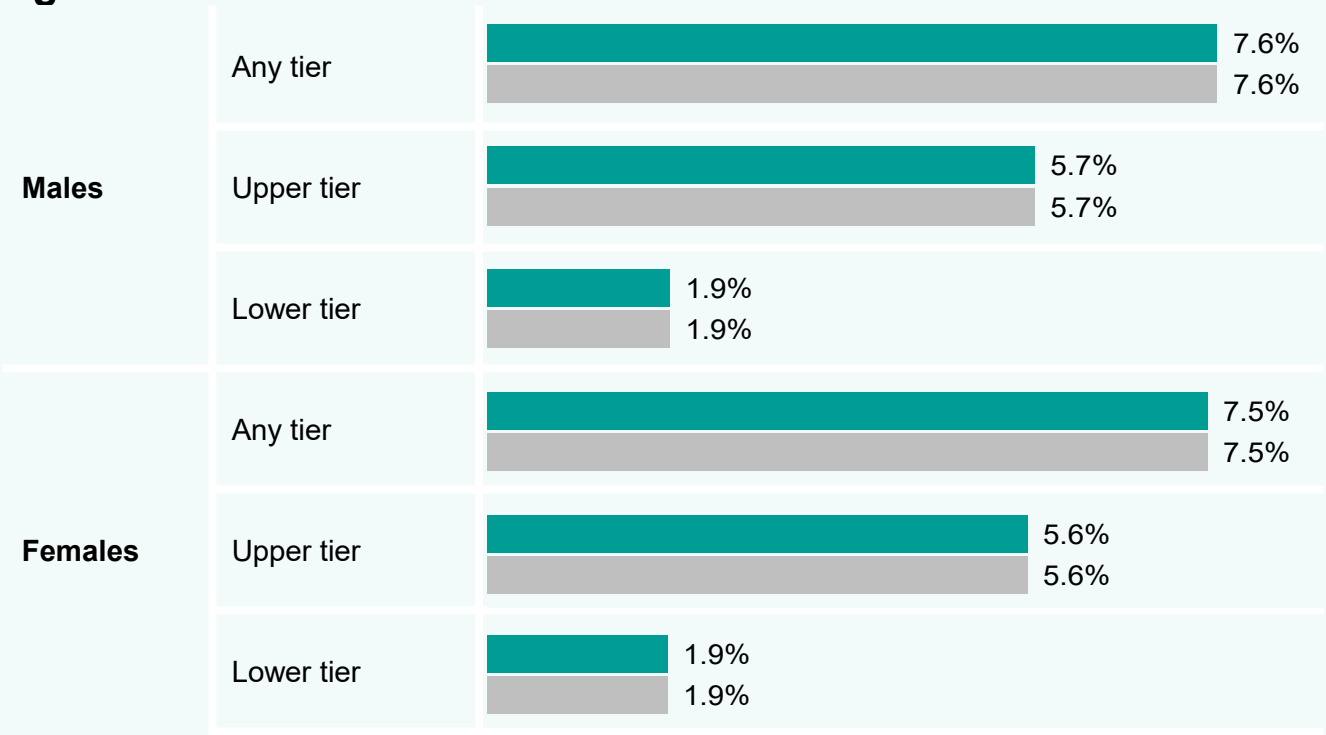
Practical implications

The chart to the right shows the likelihood of members retiring in ill-health before retirement. For each category shown:

- The **top line** ( ) shows the likelihood under the assumptions we recommend for the 2020 valuation.
- The **bottom line** ( ) shows the likelihood under the assumptions adopted for the 2016 valuation.

The numbers shown assume that members either retire in ill health or remain in service until age 65. No allowance is made for the possibility of early retirement, leaving service, or death in service. These assumptions are covered in other sections.

Likelihood of member now aged 45 retiring in ill-health before age 65



Our approach

Analysis

We have analysed the scheme's experience over the period 1 April 2016 to 31 March 2020.

As ill-health criteria sometimes differ between schemes, there is a chance that experience might have been slightly different if members in scope for the McCloud remedy were in a different scheme to currently. We expect the overall impact of this to be immaterial and have made no allowance for this possibility.

Setting recommended assumptions

Our general approach is:

- Identify groups of members we would expect to have different rates of ill-health retirement, for example by gender.
- Compare recent ill-health retirement experience against the 2016 assumptions.
- Where there is not enough scheme experience, we look at assumptions from other groups of members or other schemes which may have similar experience, adjusted to allow for any available information.
- Recommend that the assumption is updated only if evidence points to a material change to the valuation results.
- We typically only recommend a change to the assumed number of ill-health retirement, leaving the age profile of the existing assumption unaltered. We only recommend a change to the age profile if we see evidence of a material and non-temporary step change in membership outcomes.
- The last four years of experience may not accurately reflect the longer-term, so if we recommend a change we generally 'smooth out' any excess volatility by basing our recommendation on an equal allowance for recent experience and the 2016 valuations assumptions, which were in turn set using pre-2016 experience.

Scheme experience: overall

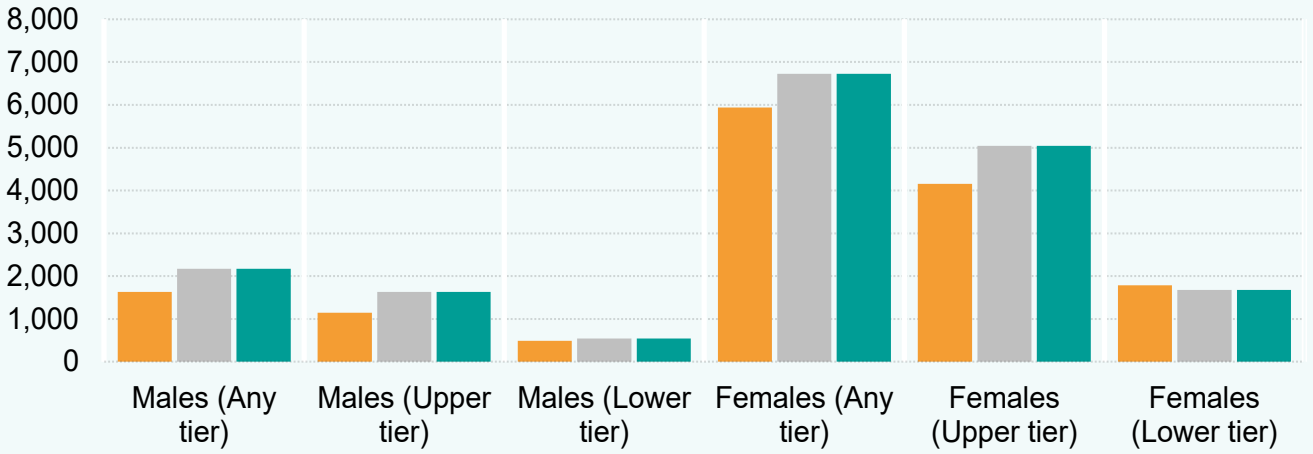
Experience versus expectations show how accurate the assumptions have been in the past and can help inform setting future assumptions.

The chart to the right and those on the following pages compare:

- **actual experience** ( ) on the left – what has happened over the last 4 years.
- **2016 assumptions** ( ) in the middle – what we thought would happen, based on the assumptions adopted for the 2016 valuation.
- **2020 recommendations** ( ) on the right – what we would have expected to happen, had our recommended assumptions been adopted for the 2016 valuation.

It should be noted that experience can be a very volatile measure for groups with small amounts of data, which then impacts the reliance we place on it.

Experience vs expectations: number of ill-health retirements



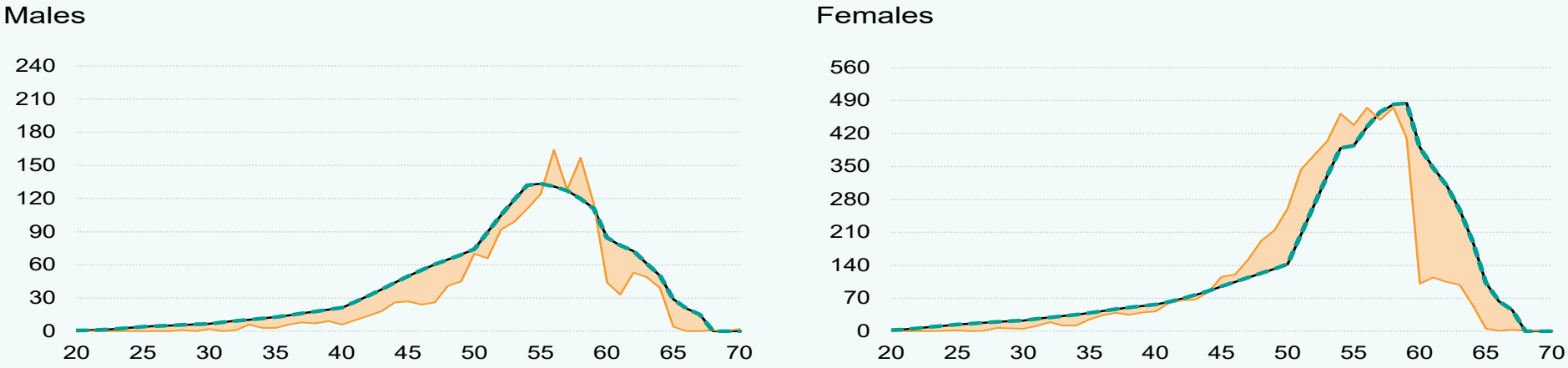
Summary

The chart above shows that there have been fewer ill-health retirements compared to the 2016 assumptions. However, this difference is small and unlikely to be material to the contribution rate and so we would propose retaining the 2016 ill-health retirement decrement assumption for the 2020 valuation

We separately considered the ill-health tiers. For the 2016 valuation 75% of members were assumed to retire with upper-tier benefits when leaving due to ill-health. Our analysis identified that around 70% of actual retirements were with upper-tier benefits. As this is not significantly different we propose to maintain the current assumption.

Scheme experience: in detail

Number of ill-health retirements by age, split by category



Key: **2016 assumptions** **2020 recommendations** **Experience** (line) and difference from 2016 assumptions (shaded area)

Scheme experience: in numbers

Category		**Experience** Number of ill-health retirements over 2016-2020	**2016 Expectations** Expected number of ill-health retirements under the 2016 assumptions	**2020 Expectations** Expected number of ill-health retirements under the 2020 assumptions
Males	**Any tier**	1,634	2,175	2,175
	Upper tier	1,143	1,631	1,631
	Lower tier	491	544	544
Females	**Any tier**	5,938	6,725	6,725
	Upper tier	4,154	5,044	5,044
	Lower tier	1,784	1,681	1,681

Details of our 2020 recommendations are set out in a separate document that will be published alongside this report.

Wider environment: McCloud

McCloud judgment

We would not expect the McCloud judgment to impact the number of ill-health retirements directly. However, the tests for the eligibility of members to receive ill-health benefits can differ between the legacy and reformed schemes.

Therefore, there may be an increased rate of ill-health retirement for in scope members, who may be reassessed under different rules. We would not expect this to have a material impact on contribution rates.

In addition, this ceased to apply from 1 April 2022 when all members moved into the reformed scheme.

B8. Mortality before retirement

Mortality before retirement

What does this assumption represent?

Mortality assumptions are a series of probabilities which represent the likelihood of a member dying at any given age. Different assumptions usually apply to males and females.

Mortality after retirement assumptions are used after members are assumed to retire and these are covered in Part B2.

Summary statistics

Relative importance of assumption	Volatility of experience and unreliability of data	Size of recommended change	Impact of recommended changes on scheme costs
Least	Low	None	No impact

Our recommendations and rationale

Actual death before retirement experience was not materially different to that expected (albeit lower) at most ages. We recommend no changes to the current assumptions as this difference is not material to the contribution rate.

The analysed experience runs to 31 March 2020, and as such misses most of the impact of COVID-19. It is accepted that COVID-19 increased the number of deaths before retirement. However, we have made no allowance for this, as it is unlikely to have any material impact on the valuation results.

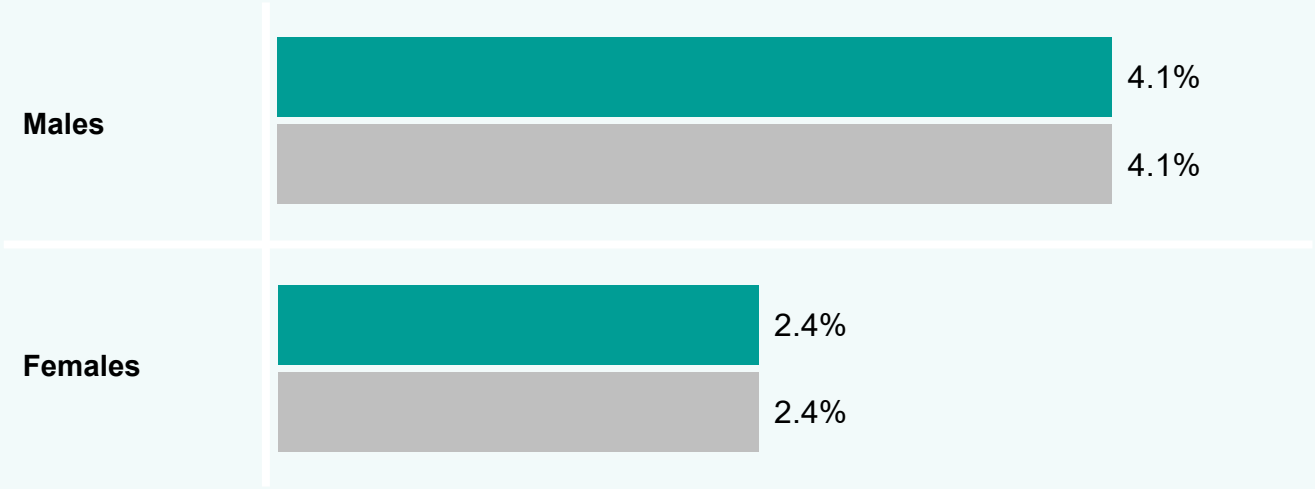
Practical implications

The chart to the right shows the likelihood of dying before retirement. For each category shown:

- The **top line** ( ) shows the likelihood under the assumptions we recommend for the 2020 valuation.
- The **bottom line** ( ) shows the likelihood under the assumptions adopted for the 2016 valuation.

The numbers shown assume that members either die or remain in service until age 65. No allowance is made for the possibility of early retirement, leaving service, or ill-health retirement. These assumptions are covered in other sections.

Likelihood of member now aged 45 dying in service before age 65



Our approach

Analysis

We have analysed the scheme's pre-retirement mortality experience over the period 1 April 2016 to 31 March 2020.

Setting recommended assumptions

Our general approach is:

- Identify groups of members we would expect to have different rates of death before retirement, for example by gender.
- Compare recent pre-retirement death experience against the 2016 assumptions.
- Where there is not enough scheme experience, we look at assumptions from other groups of members or other schemes which may have similar experience, adjusted to allow for any available information.
- Recommend that the assumption is updated only if evidence points to a material change to the valuation results.
- We typically only recommend a change to the assumed number of pre-retirement deaths, leaving the age profile of the existing assumption unaltered. We only recommend a change to the age profile if we see evidence of a material and non-temporary step change in membership outcomes.
- The last four years of experience may not accurately reflect the longer-term, so if we recommend a change we generally 'smooth out' any excess volatility by basing our recommendation on an equal allowance for recent experience and the 2016 valuations assumptions, which were in turn set using pre-2016 experience.

Scheme experience: overall

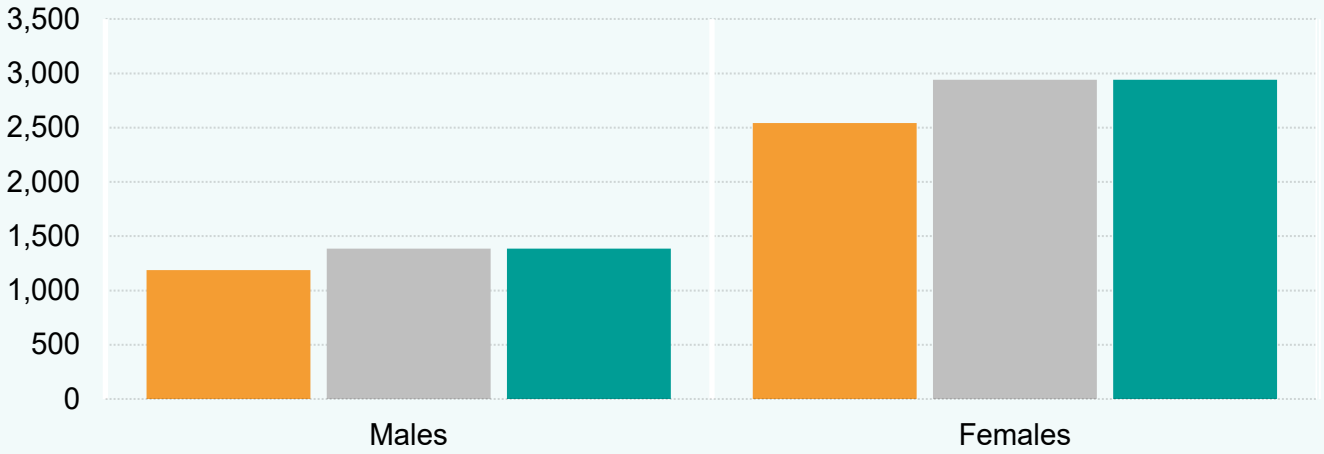
Experience versus expectations show how accurate the assumptions have been in the past and can help inform setting future assumptions.

The chart to the right and those on the following pages compare:

- **actual experience** ( ) on the left – what has happened over the last 4 years.
- **2016 assumptions** ( ) in the middle– what we thought would happen, based on the assumptions adopted for the 2016 valuation.
- **2020 recommendations** ( ) on the right – what we would have expected to happen, had our recommended assumptions been adopted for the 2016 valuation.

It should be noted that experience can be a very volatile measure for groups with small amounts of data, which then impacts the reliance we place on it.

Experience vs expectations: number of deaths before retirement



Summary

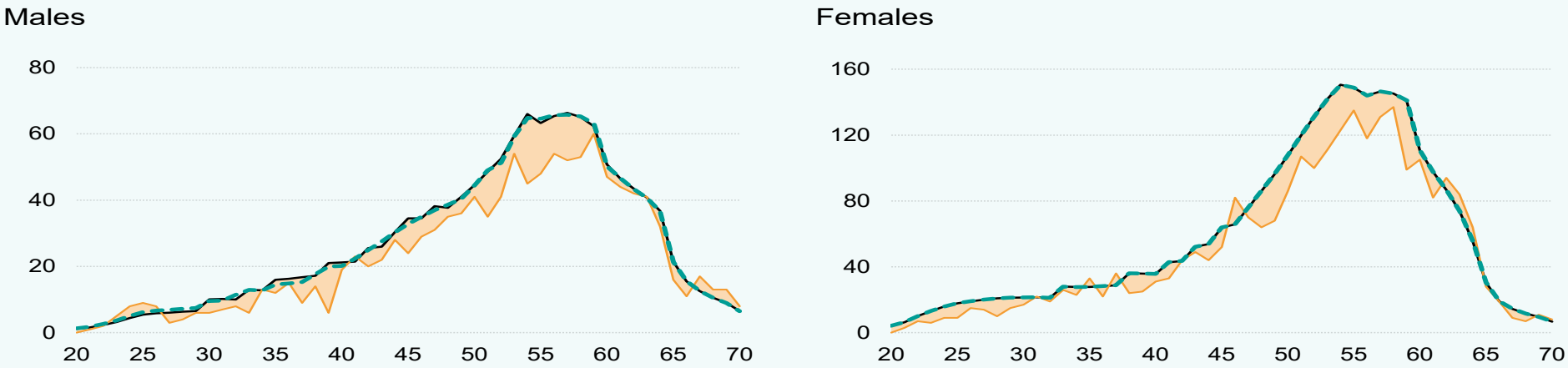
The charts above show that there have been slightly fewer deaths before retirement than expected since 2016.

The charts on the next page show that the age profile of the recent deaths broadly match the 2016 assumptions, with average ages of death of around 52 for men and 51 for women.

The difference between the experience and the 2016 assumed number of deaths is not material to the contribution rate.

Scheme experience: in detail

Deaths before retirements by age, split by category



Key: **2016 assumptions** **2020 recommendations** **Experience** (line) and difference from 2016 assumptions (shaded area)

Scheme experience: in numbers

Category	**Experience** Number of deaths in service over 2016-2020	**2016 Expectations** Expected number of deaths in service under the 2016 assumptions	**2020 Expectations** Expected number of deaths in service under the 2020 assumptions
Males	1,187	1,384	1,384
Females	2,543	2,940	2,940

Details of our 2020 recommendations are set out in a separate document that will be published alongside this report.

B9. Family statistics

Family statistics

What does this assumption represent?

The term 'family statistics' covers several assumptions, including:

- the probability that an eligible partner exists
- the average age of that partner, compared to the member.

The assumptions are used to estimate the likelihood of a dependant's pension coming into payment when a member dies, and how long that pension will be paid.

For existing pensioners, we consider the likelihood of members having an eligible partner on 31 March 2020. For future pensioners, we consider the likelihood of members having an eligible partner at retirement , or earlier death.

Mortality assumptions apply independently to the member and assumed partner.

Summary statistics

Relative importance of assumption	Volatility of experience and unreliability of data	Size of recommended change	Impact of recommended changes on scheme costs
Least	Medium	None	No impact

Our recommendations and rationale

For the **current pensioner proportion married** assumptions (applicable to 1995 section members), we recommend no change to the 2016 assumptions. This is due to experience being broadly in line with the current 2016 assumptions.

For the **current pensioner proportion married/partnered** assumptions (applicable to 2008 section and 2015 scheme members), we recommend no change to the 2016 assumptions. There are too few deaths arising from the 2008 section and 2015 scheme to test the suitability of this assumption, so we looked to the ONS married and married/partnered assumptions to inform our recommendation.

For the **future pensioner proportion married and married/partnered** assumptions, we recommend no change to the 2016 assumptions.

For the **age difference** assumptions, we do not have the experience data to test the auditability of this assumption. We recommend no change to the 2016 assumptions.

For the **minor** assumptions such as minor dependants' pensions, dependants' gender and remarriage, we recommend no change to the 2016 assumptions.

Practical implications

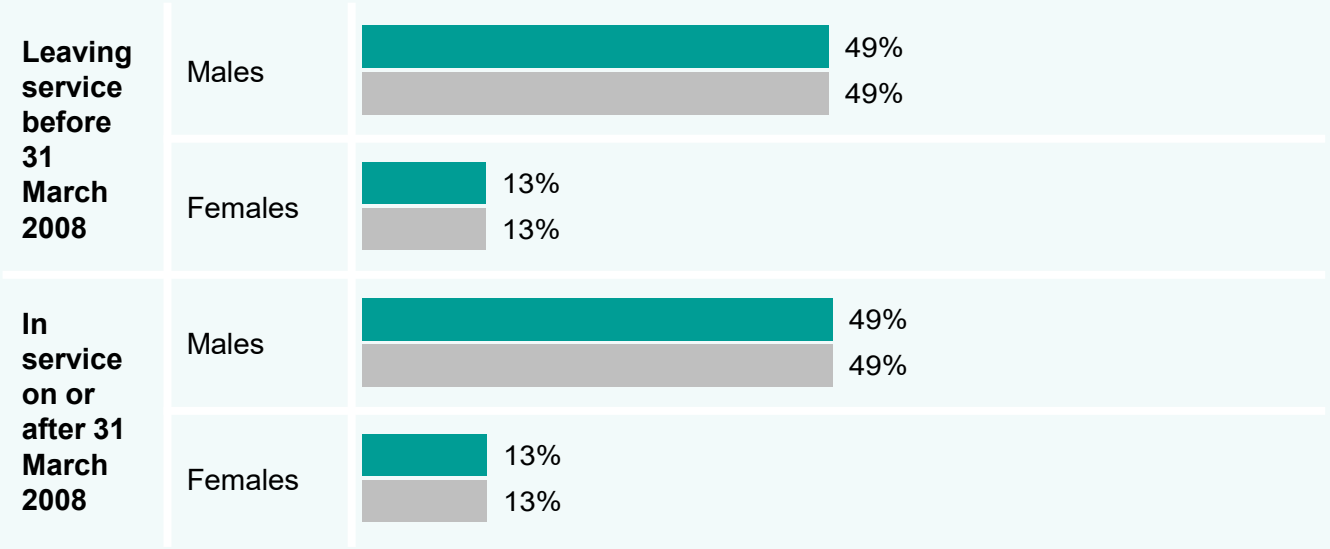
The chart to the right shows the likelihood that an eligible partner exists when a member dies. The likelihoods shown depend on:

- Assumptions about the existence of an eligible partner and that partner's age (discussed in this section)
- Assumptions about the member and partner's mortality (discussed in the mortality after retirement section).

For each category shown:

- The **top line** ( ) shows the likelihood under the assumptions we recommend for the 2020 valuation.
- The **bottom line** ( ) shows the likelihood under the assumptions adopted for the 2016 valuation.

Likelihood of an eligible partner existing at time of death*, for normal health pensioner who retired at age 65



*Assumed age at death for normal health male pensioners is 88 and for females is 89, using the life expectancy assumptions we recommend for the 2020 valuation.

Our approach

Analysis

We have analysed the scheme's experience over the period 1 April 2016 to 31 March 2020.

Our analysis has been carried out on an 'lives' basis reflecting data available.

Setting recommended assumptions

Our general approach is:

- Identify groups of members we would expect to have different family statistics, for example by gender, and by section of the scheme, where there are differences in eligibility.
- Compare recent proportion married for members against the 2016 assumptions.
- Where there is not enough scheme experience, we look at assumptions from national statistics, other groups of members or other schemes which may have similar experience, adjusted to allow for any available information.
- Recommend that the assumption is updated only if evidence points to a material change to the valuation results.
- Recommend that the proportion married/partnered assumption remains aligned to the proportion married assumption in the absence of any experience data or evidence that would justify changing the proportion married/partnered assumption.
- We typically only recommend a change to the overall assumed proportion married or married/partnered, leaving the age profile of the existing assumption unaltered. We only recommend a change to the age difference if we see evidence of a material and non-temporary step change in membership behavior.
- The last four years of experience may not accurately reflect the longer-term, so if we recommend a change we generally 'smooth out' any excess volatility by basing our recommendation on an equal allowance for recent experience and the 2016 valuations assumptions, which were in turn set using pre-2016 experience.

Scheme experience: overall

Experience versus expectations show how accurate the assumptions have been in the past and can help inform setting future assumptions.

The chart to the right and those on the following pages compare:

- **actual experience** ( ) on the left – what has happened over the last 4 years.
- **2016 assumptions** ( ) in the middle – what we thought would happen, based on the assumptions adopted for the 2016 valuation.
- **2020 recommendations** ( ) on the right – what we would have expected to happen, had our recommended assumptions been adopted for the 2016 valuation.

It should be noted that experience can be a very volatile measure for groups with small amounts of data, which then impacts the reliance we place on it.

Experience vs expectations: proportion married or married/partnered at death

Summary

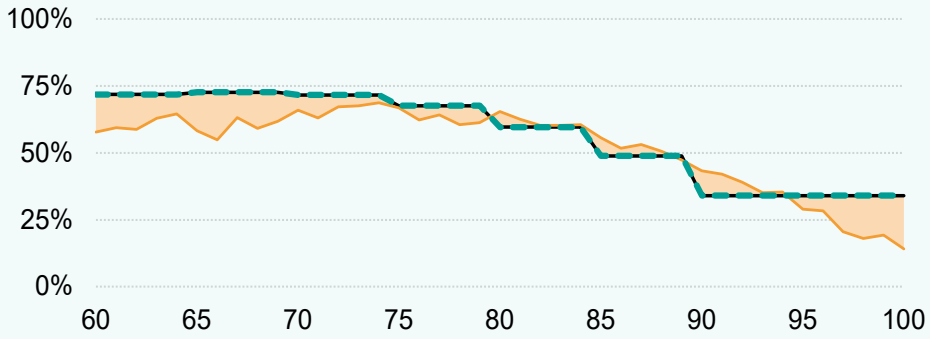
The **1995 section (i.e. members leaving service before 31 March 2008)**, for both males and females, has seen a similar proportion married in recent years compared to the 2016 assumption, as shown above. The charts on the next page show that the age profile of the proportion married for recent deaths broadly match the 2016 assumptions.

There is insufficient information to test the impact on the **2008 section and 2015 scheme (i.e. members in service on or after 31 March 2008)**, due to low rates of deaths and the output above and on the next page is for information only. However, ONS married and married/partnered statistics were considered when informing whether the married/partnered assumption remained appropriate. The ONS data supported no change to the gap between the married and married/partnered assumption.

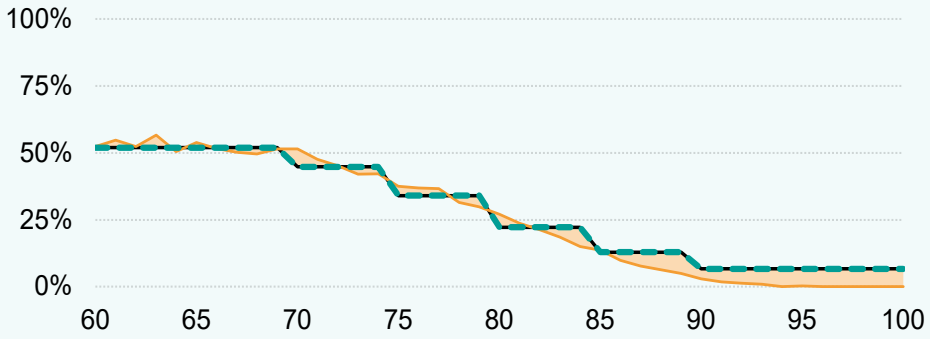
Scheme experience: in detail

Proportion married or partnered at death by age, split by category

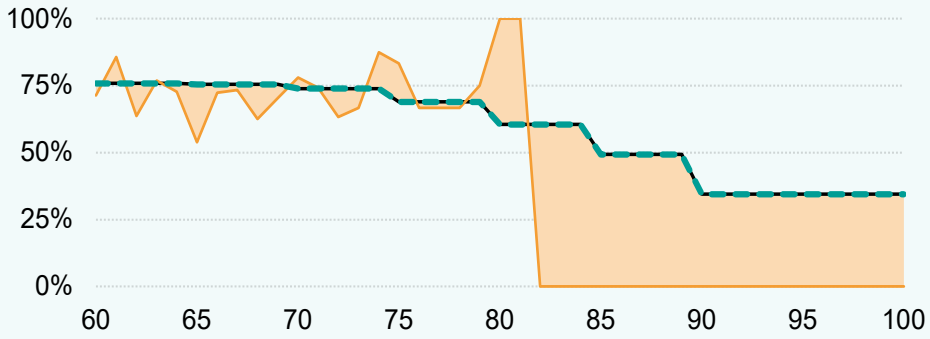
Leaving service before 31 March 2008 (Males)



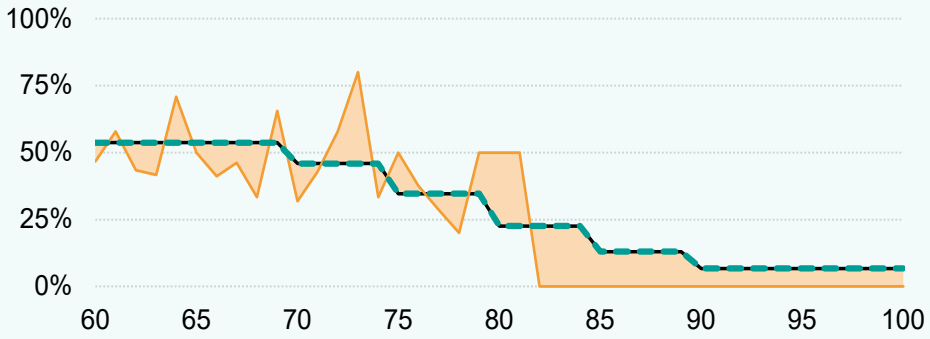
Leaving service before 31 March 2008 (Females)



In service on or after 31 March 2008 (Males)



In service on or after 31 March 2008 (Females)



Key: **2016 assumptions** **2020 recommendations** **Experience** (line) and difference from 2016 assumptions (shaded area)

Scheme experience: in numbers

Proportion married or partnered at death, by age and category

Category		**Experience** Number of member deaths over 2016-2020	**Experience** Actual number of dependant's pension coming into payment over 2016-2020, as a percentage of how many could have come into payment if every member who died had an eligible dependant	**2016 Actual** Expected proportion married or partnered at death under the 2016 recommendations	**2020 Expectations** Expected proportion married or partnered at death under the 2020 recommendations
Leaving service before 31 March 2008	**Males**	21,672	55%	57%	57%
	Females(*)	26,039	38%	38%	38%
In service on or after 31 March 2008 (**)	**Males**	377	71%	75%	75%
	Females	543	51%	51%	51%

*Females members aged 84 and younger.
**There was insufficient data to produce a robust analysis and therefore, the output included in the table above is for information only.

Details of our 2020 recommendations are set out in a separate document that will be published alongside this report.

Scheme experience: in numbers

Age difference between member and spouse or partner, by age and category

Category		**Experience** Number of member deaths over 2016-2020	**Experience** Average age difference between member and eligible spouse or partner at date of death	**2016 Expectations** Expected age difference between member and eligible partner or spouse under the 2016 assumptions	**2020 Expectations** Expected age difference between member and eligible partner or spouse under the 2020 assumptions
Leaving service before 31 March 2008	**Males**	11,925	N/A (*)	+3	+3
	Females	9,896	N/A (*)	-3	-3
In service on or after 31 March 2008	**Males**	266	N/A (*)	+3	+3
	Females	276	N/A (*)	-3	-3

**There was no experience data to produce an analysis of the age difference between member and spouse or partner.

Details of our 2020 recommendations are set out in a separate document that will be published alongside this report.

Wider environment and other assumptions

Walker & Goodwin

The Goodwin legal challenge was brought against The Department for Education (DfE) in respect of survivors' benefits provided in the Teachers' Pension Scheme. The Goodwin challenge follows on from the Walker case (which ruled in 2017 that to treat same-sex spouses/civil partners less favourably than their opposite-sex equivalents constituted unlawful discrimination). TPS provided survivor's benefits to male widowers of female members based on service from 6 April 1988, whereas same-sex partners of male members were provided benefits based on service from 1 April 1972 (or 6 April 1978 if the marriage was after the last day pensionable service). Some other public service schemes have similar provisions and we previously identified that this could have a material effect for those schemes.

The Government announced in July 2020 that it had concluded that changes are required to the TPS to address this discrimination. The government believes this difference in treatment will also need to be remedied in other UK public service pension schemes with similar provisions.

However, the 2016-20 experience reflects survivors pension rules before Goodwin. Therefore, it is reasonable to continue to look at female deaths for members aged 84 and below.

The impact of the allowance on 2020 valuation results is an increase in the Employer contribution rate of around 0.1% of pay.

Age difference at death

We recommend retaining the assumption that male members are three years older than their partners and female members are three years younger than their partners, on the grounds of materiality.

Minor dependants' pensions

No allowance has been taken for short term dependants' pensions or childrens' pensions (other than those already in payment), on grounds of materiality.

Dependants' gender

All dependants are assumed to be the opposite sex of the member, on the grounds of materiality.

Remarriage

No allowance is made for remarriage on the grounds of materiality.

In each case, the approach is the same as that adopted for the 2016 valuation.

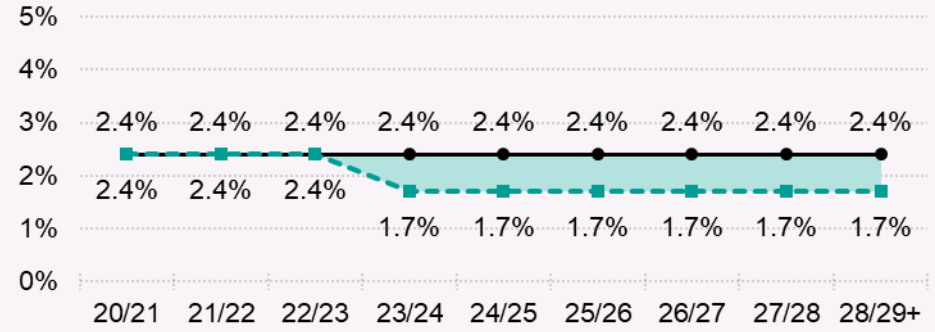
Part C: Appendices

C1. Directed assumptions 1

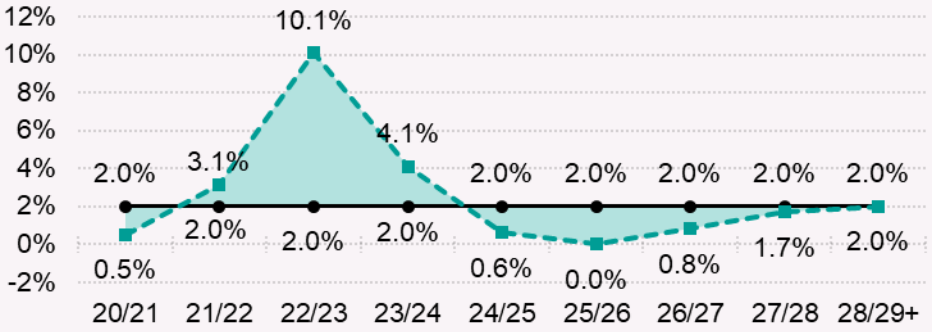
Annual financial assumptions

Taken from Directions dated 30 August 2023.

Discount rate, net of assumed pension increases

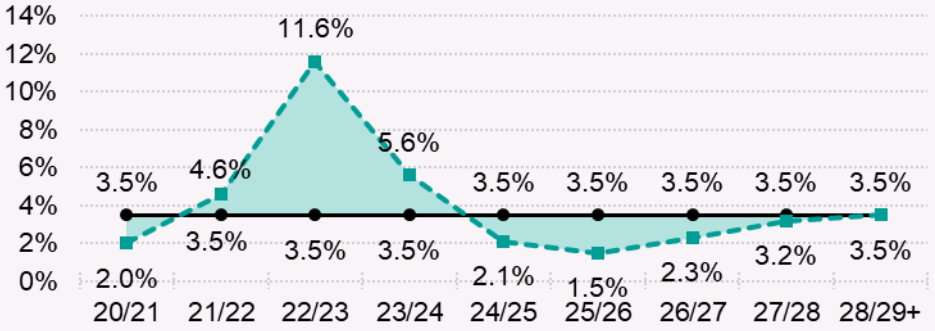


Rates of pension increases



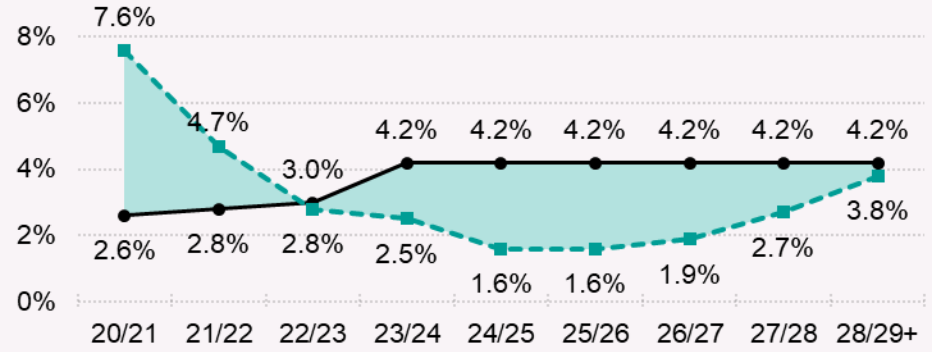
*Note: applicable from April at end of period

Rates of CARE revaluation



*Note: applicable from April at end of period

Rates of salary increases



Key: **2016 assumptions** **2020 assumptions** (dotted line) and difference from 2016 assumptions (shaded area)

C1. Directed assumptions 2

Other directed assumptions

Taken from Directions dated 30 August 2023.

Assumption name	2016 assumption	2020 assumption
Deficit spreading periods	15 years	15 years
Future mortality improvements	In line with 2016-based ONS projections	In line with 2020-based ONS projections
State Pension ages	As legislated for in the Pensions Act 1995, Pensions Act 2007, Pensions Act 2011 and Pensions Act 2014	As legislated for in the Pensions Act 1995, Pensions Act 2007, Pensions Act 2011 and Pensions Act 2014

C2. Other minor assumptions 1

Active membership projections

Direction 12 requires the actuary to use the 'projected unit methodology' to calculate the valuation results. The valuation results require the calculation of the cost of benefit accrual over periods after the effective date (31 March 2020). This implicitly requires the actuary to estimate the membership to future dates in order to determine the valuation results.

Members of the legacy sections ceased to accrue benefits in these sections at 31 March 2022 and future accrual for all members is in the reformed section from 1 April 2022.

The expected cost of accruing benefits over periods after the effective date have been determined by assuming an overall stable population (age and pay profile) to the end of implementation period.

The approach incorporates the following assumptions:

- Members with past service in the legacy sections are assumed to retire in line with recent experience. This provides for some legacy section members to remain in active service in the reformed scheme beyond 2022 due to late retirement.
- The overall profile of the membership in terms of average age and pay distribution is assumed to remain constant over the period.
- The overall active membership will be in receipt of pensionable pay for each relevant year equal to that assumed for forecasting purposes.
- The State Pension age in the projected populations is assumed to be determined by the implied dates of birth and so the State Pension age mix changes over time despite the assumed stable population. This allows for the membership accruing benefits to change over the implementation period.
- Mortality is assumed to be projected forward to the relevant year of use in all cases.

C2. Other minor assumptions 2

Grouping of individual active member records

Individual active members have been grouped together for the purposes of calculating liabilities. This grouping is necessary to accommodate the volume of data within our valuation system. The approach taken to grouping the data has been tested to ensure it does not result in any distortion of the valuation results. The groupings are made for each section/scheme (i.e. 1995, 2008 or 2015), previous protection status (i.e. protected, tapered or unprotected) and within each valuation group (i.e. based on the categorisation by benefit provision or occupation, age and service).

Payroll projection

For the purposes of spreading any past service surplus or deficit, the future payroll estimates are assumed to be projected forward (only) in line with projections provided for the OBR Spring 2023 return to 2027-28, with subsequent payroll figures assuming a stable workforce size and using valuation assumptions.

Member contribution yield over implementation period

The average member contribution yield assumed to apply over the implementation period is 9.8% of pensionable pay. This compares to a target yield of 9.8% of pensionable pay. This assumption is based on the analysis for the new member contribution structure introduced from 1 October 2022, showing that the structure is expected to achieve the 9.8% target yield.

C2. Other minor assumptions 3

McCloud calculation approach

The outcome of the remedy required to address the McCloud judgement is twofold:

- When benefits become payable, eligible members can select to receive them from either the reformed or legacy sections for the period 1 April 2015 to 31 March 2022.
- All active members still in the legacy scheme were transferred to the reformed scheme from 1 April 2022.

Members are likely to choose the option that provides them with the highest benefits. This impact was also allowed for in the 2016 cost cap valuation and we have followed the same approach for the 2020 valuation.

To allow for the McCloud remedy in our calculation methodology we have valued the 'better' benefits for groups of members when comparing benefits in their reformed and legacy sections.

Benefits are valued in each contingency (eg retirement or death), at each future date and for each eligible individual, using the same demographic assumptions (eg retirement ages) for both the reformed and legacy section calculations.

In determining which benefits members will choose, we have taken account of the member's pension after commutation (valuing £1 pa pension as £20) and lump sum (both commuted lump sum and any automatic lump sum).

The chosen benefit structure is then valued using the valuation assumptions (ie pensions are not valued using the 20:1 factor in the final results and explicit allowance is made for contingent survivor pensions).

C3. Glossary 1

CARE	CARE stands for Career Average Revalued Earnings and refers to a methodology whereby earnings over a member's working lifetime in the scheme are used in the calculation of their benefits in the reformed scheme.
CARE revaluation	The rate at which the CARE pension is revalued each year a member is an active member.
Cost cap cost (CCC)	A measure of the cost of benefits being provided from the reformed scheme, which is then compared to a 'target cost'. The NHSPS target cost is set at 11.6% of pay. If the results of the valuation show that the cost cap cost is more than 3% of pensionable pay away from the target cost, and the cost of the scheme still results in a breach once the impact of the economic check is taken into account, changes must be made to the reformed scheme (e.g., to the benefits provided) to bring the cost cap cost back to the target cost.
Directions	A document published by HM Treasury and referred to in the Public Service Pensions Act 2013, which sets out the process and requirements for carrying out valuations, including the results which need to be disclosed. Directions were first published in 2014 and have been amended several times since then.
Employer contribution rates (ECR)	The percentage of scheme members' pensionable salaries which employers are required to pay in order to: • meet the costs of benefits currently being built up by active members • make good any shortfall in the notional amounts set aside to cover benefits already built up. The result is heavily dependent on assumptions about future financial conditions and membership changes.

C3. Glossary 2

McCloud	McCloud refers to a legal judgment made in December 2018. The England and Wales Court of Appeal judgment upheld claims of age discrimination brought by some firefighters and members of the judiciary against 'transitional protection' rules. These rules determined the date on which some members would move between reformed and legacy sections of the scheme.
Normal pension age	The age at which a member in normal health is entitled to unreduced benefits. This age varies in different scheme sections: • Age 60 for (most) legacy scheme benefits (1995 Section) • Age 65 for legacy scheme benefits (2008 Section) • State Pension age (SPA) (ie currently ages 65 to 68 depending on date of birth) for the reformed scheme benefits (2015 Scheme).
Pension increase	Public service pensions are increased under the provisions of the Pensions (Increase) Act 1971 and Section 59 of the Social Security Pensions Act 1975.
Professional actuarial requirements	The professional requirements that we have complied with when completing this actuarial valuation include: 1. Technical Actuarial Standards: TAS 100 and TAS 300, issued by the Financial Reporting Council (FRC) 2. The Actuaries' Code, issued by the Institute and Faculty of Actuaries (IFoA) 3. The Civil Service Code. GAD is also accredited under the IFoA's Quality Assurance Scheme. More details can be found in our terms of reference.

C3. Glossary 3

Reformed and legacy sections	The reformed section of the scheme is the section that was set up in line with the Public Service Pensions Act 2013, and which came into force on 1 April 2015. All non-reformed sections are known as legacy sections. This terminology is used in the McCloud judgment.
Scheme Advisory Board	The Board set up in line with section 7 of the Public Service Pensions Act 2013, with responsibility for providing advice on potential changes to the scheme and other matters relating to the efficient administration and management of the scheme. Scheme Advisory Board is commonly shortened to 'SAB'.
Standard table	The standard tables used for the mortality after retirement assumption are the SAPS tables. These are published by the Continuous Mortality Investigation (CMI) and based on the experience of defined benefit self-administered pension schemes. The 'S2' series are based on experience over the period 2004 to 2011. The S3 series of tables were published by CMI in December 2018 and these updated mortality tables cover experience between 2009 and 2016. The S3 series include tables for pensioners retiring in normal health (S3NXA), in ill health (S3IXA) and all pensioners (S3PXA), as well as for dependants (S3DXA). The tables are also split into "Heavy", "Middle", "Light" and "Very Light" subsets according to pension amount, as well as a table covering all amounts. The "Very Light" tables reflect the highest pension amounts.