

London Borough of Tower Hamlets Pension Fund

Actuarial valuation at 31 March 2022

Advice on assumptions

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For and on behalf of Hymans Robertson LLP

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Use the menu bar above to navigate to each section.

Contents

In this report:

	Page
Summary of recommendations	3
The valuation process	4
Why and how we set assumptions	7
Financial assumptions	13
Longevity assumptions	20
Other demographic assumptions	26
Decisions and next steps	30
Appendices	33

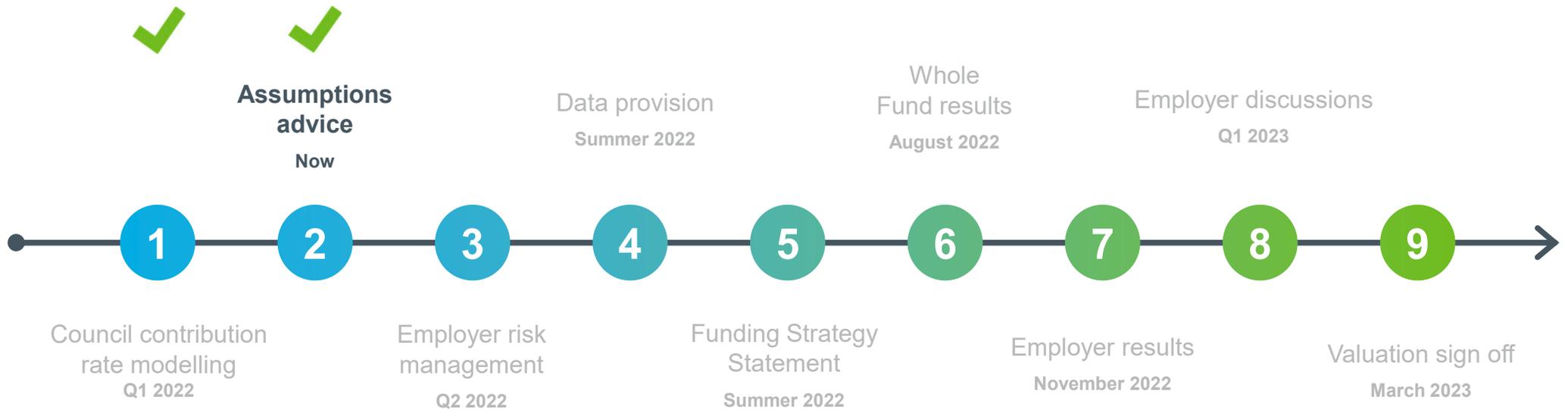
A glossary of technical terms used in this report can be found in Appendix 6

Summary of recommendations

Assumption	Recommended approach	Comments
Future investment return assumption	Based on Hymans Robertson ESS model updated to latest market calibration	Asset class return expectations are generally slightly better than in 2019.
Discount rate	Can be increased from 2.0% to 2.2% above the risk-free rate at the same level of prudence	No significant change in environment to suggest an increase or decrease in prudence levels. Would reduce contributions by 1% to 1.5% of pay. However in 20 years time the Fund would be aiming to hold around 4-6% less assets (all other things being equal).
CPI inflation (benefit increases / CARE revaluation)	Based on Hymans Robertson ESS model	Inflation expectations are slightly higher (c.0.2-0.3% p.a.) than 2019 due to current economic outlook.
Salary increases	CPI inflation (was 0.2% above CPI at 2019)	2022 proposed assumption in line with 2019 long-term salary increase expectations. However, at 2019, allowance was made for short-term expected pay restraint. Given recent increases in National Living Wage and reduced impact on pension liabilities from short-term pay expectations, recommend that no allowance is made for any short-term pay restraint.
Baseline longevity	Based on Club Vita analysis updated to reflect non-Covid related experience	Longevity assumptions are tailored to the Fund's experience and membership.
Future improvements in longevity	Updated to CMI 2021 model with no weight on 2020/21 data with long term improvement of 1.5%	Latest version of CMI model is best practice but avoid projections being affected by short-term Covid-19 experience.
Demographic assumptions (excluding longevity)	Adopt Hymans proposed demographic assumptions	All demographic assumptions have been reviewed against LGPS wide experience with some adjustment to reflect Fund's own experience.

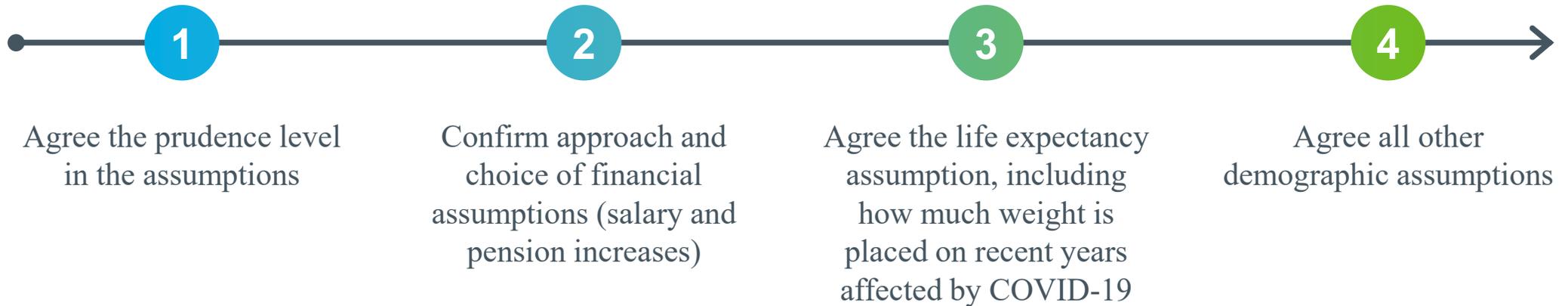
The valuation process

The valuation process



Assumptions advice

It's now time to set assumptions for the 2022 formal valuation, after taking advice from us as your Fund Actuary. As part of this process you need to make four main decisions:



Why and how we set assumptions

Assumptions matter – projecting future benefit payments and assets

To determine the level of employer contributions we carry out two projections.

The **benefit projection** estimates the future payments that will be made to members, allowing for future pension increases, death and other events.

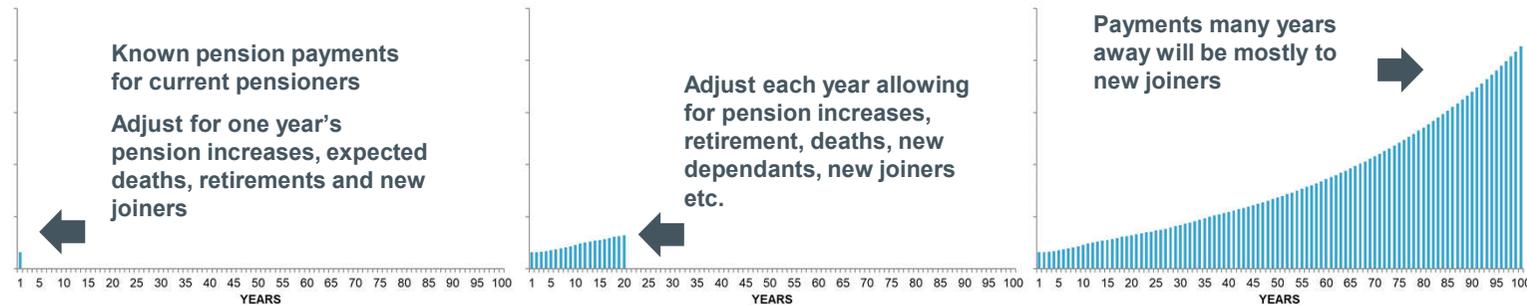
The **asset projection** takes into account future investment returns, contributions and benefits paid to members.

The contribution rates are set so at the funding time horizon, there are enough assets to meet future benefit payments in a sufficiently high number of future economic scenarios – the funding objective.

Because we can't see into the future, the projections mean working with uncertainty and require assumptions.

We review assumptions regularly to make sure they're relevant to the financial, demographic and regulatory environment.

Illustration: how we project benefit payments



Two types of assumptions:

1

Financial assumptions
(like inflation) affect the amount of payments and asset values.

2

Demographic assumptions (like how long members live) affect the timing of payments.

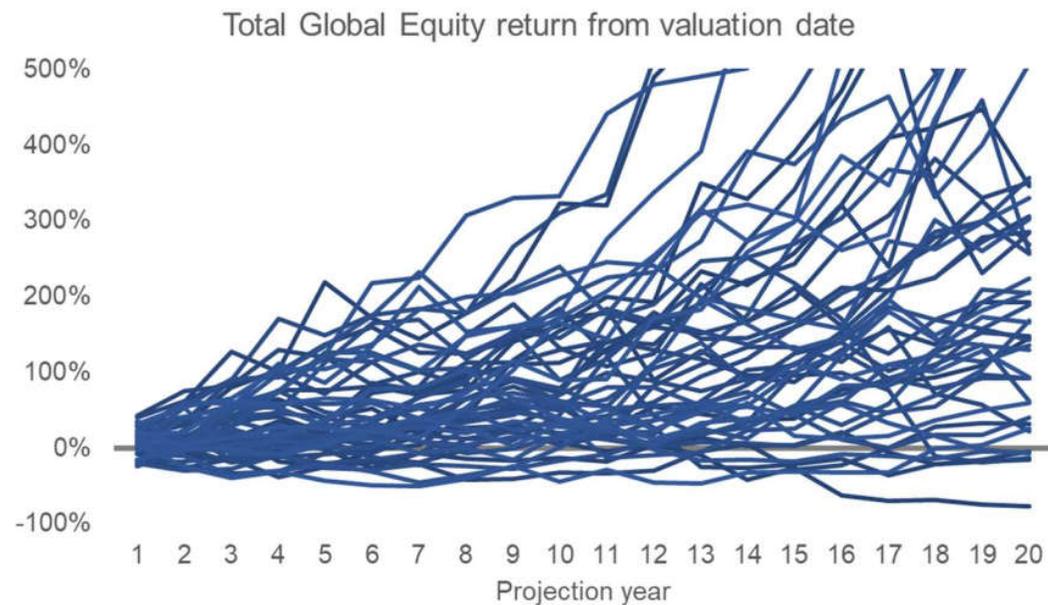
Assumptions and our valuation approach

We use a “risk-based” approach to calculating the benefit and asset projections.

Under this approach, we use an economic scenario generator (Hymans Robertson’s proprietary generator is called the Economic Scenario Service – ESS) to produce 5,000 different simulations of future economic conditions and associated assumptions.

The assumptions in each scenario vary by year i.e. they are not ‘flat’, so they are a better representation of reality than a single, linear assumption.

The chart shows a sample of the 5,000 simulations for future cumulative total returns on global equities over the next 20 years.



This approach allows the generation of a distribution of future benefit and asset projections so all stakeholders in the Fund can better understand risk.

What assumptions are needed

Assumption	Description	Required for
Financial assumptions		
Future investment return	Projected annual returns and volatility on asset classes invested by the Fund e.g. UK equities, property etc.	Asset projection – to project employers’ asset shares to the end of the funding time horizon
Discount rate	Annual rate of future investment return that will be earned on the Fund’s assets after the end of the funding time horizon	Funding objective – to place a present value at the end of the funding time horizon of the future benefit payments
CPI inflation (benefit increases / CARE revaluation)	Future Consumer Price Index inflation	Benefit projection – to determine the size of future benefit payments (LGPS benefits are index-linked to CPI inflation)
Salary increases	Future inflationary salary awards	Benefit projection – to determine the size of future benefit payments (the pre-2014 final salary benefits are linked to salary) Asset projections – to determine future payroll values (and hence contribution income)
Demographic assumptions		
Baseline longevity	How long we expect members to live based on current observed death rates	Benefit projection – to determine how long each member’s benefits are paid for
Future improvements in longevity	How death rates are expected to change in the future (historically life expectancy has improved over time)	Benefit projection – to determine how long each member’s benefits are paid for
Other demographic events	Events such as retirement age, rate of ill health retirement, level of commutation and 50:50 take up	Benefit projection – to determine the size and timing of future benefit payments

How we review and set assumptions

Our approach

1. **Look at the assumptions from the last valuation**
2. **Review evidence and consider the landscape:**
 - Changes in financial/economic conditions
 - Regulation and guidance
 - Population and general pension scheme statistics
 - Fund specific data and experience, especially members' demographic characteristics
 - Future trends
 - Assessment of employers' financial strength
 - Investment strategy
 - Fund views – and employer views in some cases (e.g. salary increases)
3. **Propose, discuss and agree changes to set new assumptions**

Acknowledging uncertainty

There is no certainty about how the future may evolve and it is important to acknowledge this uncertainty during the valuation. Understanding the impact of the future deviating from the assumptions on funding levels and contribution rates is an important aspect of how the Fund manages risk.

Ways of understanding the impact:

- **Stress testing** – measures immediate changes in assumptions by testing alternatives at valuation date. We will stress test the longevity assumptions as part of the valuation.
- **Risk-based modelling** – risk-based approach involves projecting a wide range of possible future outcomes. There is no single figure for an assumption – instead, we work with a future range. We use a “risk-based” approach to calculate the benefit and asset projections and set the underlying financial assumptions.
- **Scenario projection** – considers future projections across different scenarios, bringing together relevant factors for a better understanding of overall impact. We will use different climate change scenarios at the valuation to help you understand this risk.

Most assumptions are a best estimate, set objectively without margins for adverse experience.
A prudent discount rate assumption meets the requirement (from LGPS guidance) for a ‘prudent’ valuation.

Other factors affecting assumptions at the 2022 valuation

Climate change

Climate change will affect many aspects of the Fund's assets and liabilities, for example the return on its assets, the inflation used to revalue benefits and the longevity of its members. The uncertainty around future climate pathways and their impact means that it is impossible to factor climate change considerations meaningfully into every assumption described in this paper.

We will however consider climate change scenarios when setting the long-term longevity improvements assumption, and the Fund will consider climate risk in its funding strategy by testing the resilience of the strategy in three climate scenarios.

Possible benefit changes

McCloud

Benefits accrued by certain members between 2014 and 2022 may be increased in future following the outcome of the McCloud case, which ruled that transitional protections introduced in 2014 to older members were discriminatory. We will make an allowance for the cost of these potential improvements in the 2022 valuation, based on the assumptions agreed here (in particular the salary increase and withdrawal assumptions). The impact is expected to be minimal for the majority of employers.

Cost sharing mechanism

Benefits could also change as a result of the 2016 and 2020 "cost cap" valuations, neither of whose outcome has been completely confirmed. If new assumptions are necessary to value any potential changes we will agree these separately.

Guaranteed Minimum Pension equalisation and revaluation

As per our approach for the 2019 valuation, we will assume that the Fund will fund all increases on GMP for members with a State Pension retirement date after 5 April 2016.

Other legal cases

Benefits could change as a result of other legal challenges (e.g. the "Goodwin" case affecting partner pensions), but at present we do not believe any additional assumptions are needed to value these.

Financial assumptions

Financial assumptions

Approach to setting financial assumptions

1. Hymans' proprietary economic model, the Economic Scenario Service (ESS), is used to generate 5,000 different simulations of the future
2. ESS generates a range of future benefit and asset projections so stakeholders can better understand risk (hence "risk-based" approach)
3. Projections allow for different levels of inflation and returns across all asset classes
4. No single assumption for future investment returns or inflation

Comparison with 2019

Here are how some of the main ESS assumptions have changed since 2019. Full details are in Appendix 1

Assumption	31 March 2019	31 March 2022
CPI inflation	2.2%	2.7%
Global equity returns	5.8%	6.3%
Index-linked gilt returns	0.3%	0.1%
Corporate bond returns	1.9%	2.1%

Figures are median annualised values over years 0-20. ILGs and Corporate Bonds are medium duration, the latter is A rated.

The outlook for inflation is worse compared to 2019, but the returns on many asset classes are slightly better compared to 2019.



Key decision

A discount rate is needed to place a prudent value on the benefit payments due after the funding time horizon. This value determines each employer's funding objective. The level of prudence is a key funding decision.

The discount rate is set relative to risk-free rates so that it varies according to the economic conditions in each of the 5,000 projections.

Investment return and discount rate assumptions

2019 approach

- **Investment return assumptions:** Risk-based approach to generate future investment returns, based on Fund’s investment strategy.
- **Discount rate assumption:** Assumed future investment returns are generated for each asset class from the ESS and combined into an overall portfolio return.
- At 2019, the discount rate was set at 2.0% p.a. above the risk-free rate.

Considerations

Maintaining the same discount rate assumption

- The prudence level is the likelihood of the Fund’s investment strategy achieving the desired excess return over years 20-40.
- At 2019, there was a 65% prudence level associated with a discount rate based on the risk free rate plus 2.0% p.a..
- As at 31 March 2022, the same discount rate assumption is now associated with an increased prudence level of 68%.
- As the prudence level has increased it would be acceptable to maintain this discount rate.

Maintaining the same prudence level

- To maintain the same level of prudence, we have tested the level of return above gilts that has a 65% prudence level.
- The resulting discount rate would be 2.2% above the risk-free rate.
- It would therefore also be acceptable to increase the discount rate assumption to this level.

RECOMMENDATION:

Continue to use the ESS to generate future investment returns.

Increase discount rate assumption to 2.2% p.a. above risk-free rate.

IMPACTS:

The money you are aiming to hold to meet benefit payments and the target for investment return.

SIGNIFICANCE:

Increasing assumed discount rate by 0.2% p.a. will reduce assets the Fund is aiming to hold, by around 4-6%.



The investment strategy used in our analysis is set out in Appendix 2



Benefit revaluation and pension increases

2019 approach	Benefit projections were assumed to be in line with CPI projections from the ESS model.
What's changed since the previous valuation?	Increased inflation expectations, perhaps due to government actions during Covid-19 pandemic and/or Brexit-related supply pressures.
Proposed approach for the 2022 valuation	No change in approach, but use updated ESS calibration reflecting current market outlook in the short-medium term.

RECOMMENDATION:
CPI inflation will be derived from the updated calibration of the ESS model.

IMPACTS:

The increase applied to benefits each year.

SIGNIFICANCE:

Increase in assumed future inflation will increase inflation linked liabilities.

Salary increases

2019 assumption	<p>CPI + 0.2% pa, plus a promotional salary scale. We will only consider the inflationary element here.</p>
2019 approach	<p>At the 2019 valuation, the assumption for 'inflationary' increases was based on an underlying assumption of short-term pay restraint (4.0% p.a. pay growth in 2019/20 and 2.5% in years 2020/21 and 2021/22) followed by long-term increases in line with CPI inflation.</p> <p>After allowing for the expected run-off of the Fund's final salary (pre-2014) linked benefits, this gave an assumption of CPI + 0.2%.</p>
Things to consider	<p>Run off of final salary liabilities: it is expected that this will be more gradual than at previous valuations and therefore the impact of any short-term pay restraint is negated.</p> <p>McCloud remedy: many members' benefits earned between 2014 and 2022 will retain a link to final salary, further negating the impact of any short-term pay restraint.</p> <p>Impact of Covid-19 on budgets: the impact of the pandemic on public and private sector finances may mean lower future salary increases.</p> <p>National living wage increases: recent years have seen an above inflation rise in the National Living Wage (NLW) and an increasing number of employers adopting this as their minimum wage. Although the NLW is aimed at the lowest paid, these recent increases will put pressure on salary rates across the whole workforce as employers may feel the need to keep the increments between staff consistent to adequately reward those with more responsibility or experience.</p>

RECOMMENDATION:
No allowance made for short-term restraint with no change from 2019 long-term assumption of CPI (plus a promotional salary scale)

IMPACTS:
The benefits paid to members with service earned prior to 31 March 2014.

Payroll projections used for contribution modelling.

The estimated cost of the McCloud remedy.

SIGNIFICANCE:
Less significant than in previous valuations.

Reporting the funding level

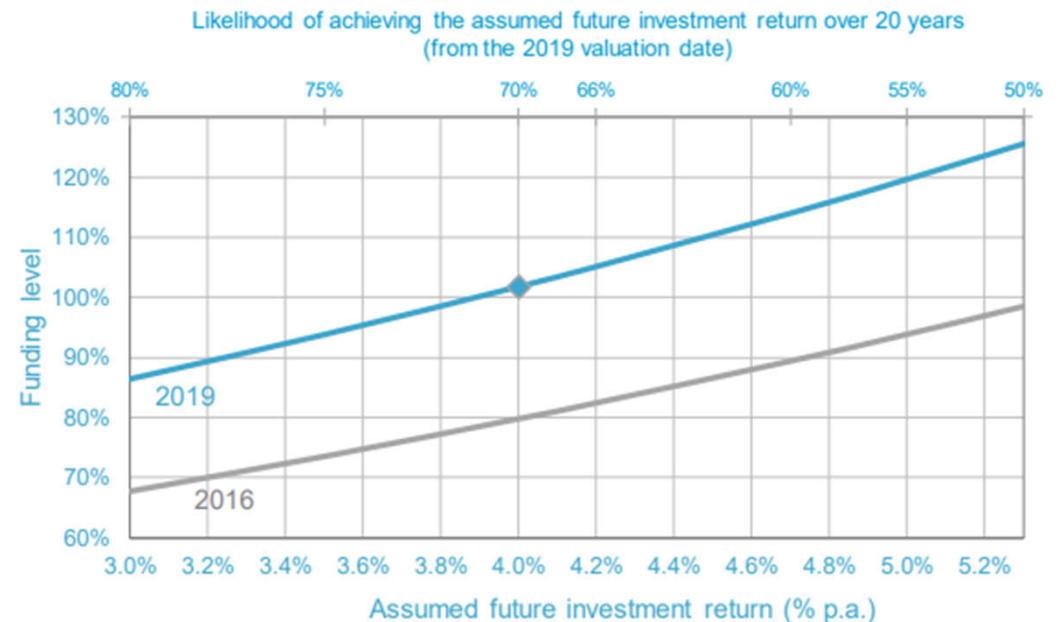
As well as setting contributions, a key output of the valuation is a measurement of past service liabilities at the valuation date itself to determine the funding level.

To report a funding level, we need to use a single value for each assumption (compared to the risk-based approach used for contribution rate setting).

To ensure consistency between the reported funding level and employer contribution rates, we still use the ESS to derive the assumptions used to report the funding level. These assumptions are summary statistics of the 5,000 individual simulations used to project forward assets and benefit payments when setting contributions.

At the 2019 valuation, we showed how the funding level at the valuation date varied with the choice of future investment return and the likelihood of the Fund's assets yielding at least a given investment return (based on the ESS simulations).

This was all detailed in this chart. A similar chart will be shown in your 2022 valuation preliminary results report.



Assumptions for reporting the funding level

2019 approach

Funding level was reported using an assumed investment return assumption of 4.0%, which had an associated prudence level of 70%.
Pension increases were based on market-implied RPI inflation minus 1% p.a..

Proposed approach for the 2022 valuation

In general the approach is the same as already discussed, except that instead of 5,000 projections we choose a single value from those projections as follows:

Assumed investment return

Use the same prudence level as used for the discount rate, i.e. 65% or 68% as appropriate. This gives an assumed investment return of 4.6% or 4.2% respectively.

Pension increases

Use the median projected CPI inflation from the ESS over the next 20 years (equivalent to 2.7% p.a. as at 31 March 2022). This is a change from 2019 due to gilt market supply/demand distortion which affects market-implied inflation metrics.

Salary increases

Assume salary increases equivalent to the median projected CPI as mentioned above.

RECOMMENDATION:

Use prudence level of 65% for the assumed investment return, and assume pension increases in line with the median projected CPI inflation from the ESS.

IMPACTS:

Reported funding level.
Does not affect contributions.

SIGNIFICANCE:

For reporting and tracking the funding level only.

Longevity assumptions

Breaking it down



Your longevity assumptions

How long you expect to pay a pension to each member and their dependants.



Baseline

- A snapshot of how long people currently live
- Measured **objectively** based on recent mortality data
- Use Club Vita analytics for a **tailored best estimate** based on members' characteristics
- Reflects that people with certain characteristics tend to live longer (women, non-ill-health retirees, higher affluence, non-manual workers)



Future improvements

- How life expectancy increases over time
- Shorter-term expectations reflecting recent trends
- Longer-term expectations reflecting historical trends **plus** evidence that improvements may be higher or lower than historical trend
- **Subjective** – wide range of possible outcomes

Evidence based baseline + informed future judgement.

Baseline

2019 approach	Club Vita tables tailored to fit each individual member of the Fund.
What's changed since the previous valuation?	Current assumptions capture the unique mix of people in your scheme using experience across the Club Vita database of similar individuals to identify a baseline longevity assumption for each member. But new evidence on longevity emerges yearly. Since your last valuation more data has been gathered and VitaCurves have been updated.
Proposed approach for the 2022 valuation	Adopt the latest member-specific Club Vita base tables – a consistent approach that captures a more up-to-date experience. We will make an appropriate adjustment to recent data to avoid the assumption being skewed by excess deaths due to Covid-19 in 2020 and 2021
Other comments...	The Covid-19 pandemic has unfortunately resulted in increased morbidity and death since 2020. It is likely that we will see higher than expected death experience since the 2019 valuation. This will result in a decrease in liabilities as the Fund will be paying out less pension than expected. However, our initial estimates for a typical LGPS fund suggest that the reduction in liabilities due to the higher number of deaths will only be a decrease of 0.1-0.2%.

RECOMMENDATION:
Latest member-specific Club Vita mortality base tables, adjusted to avoid being skewed by Covid-19.

IMPACTS:

How long you expect to pay a pension to each member and their dependants.

SIGNIFICANCE:

Small change in base table to reflect up-to-date experience.

Future improvements - recent experience snapshot

- Lower improvements in longevity at population over recent years, however more affluent pensioners have not seen the same level of slowdown. Adopting starting rates based on population-level data risks understating current rates of improvement for your members.
- COVID-19 meant 2020 death rates were significantly higher at population level than previous years.
- The immediate impact from actual experience over the period to a Fund's valuation date will be accounted for in the valuation data. However, for most schemes this impact is relatively low.
- There is uncertainty over how the Covid-19 pandemic will impact the course of future longevity improvements in the medium to longer term.
- This uncertainty means schemes should be wary of weakening mortality assumptions materially from those adopted previously.

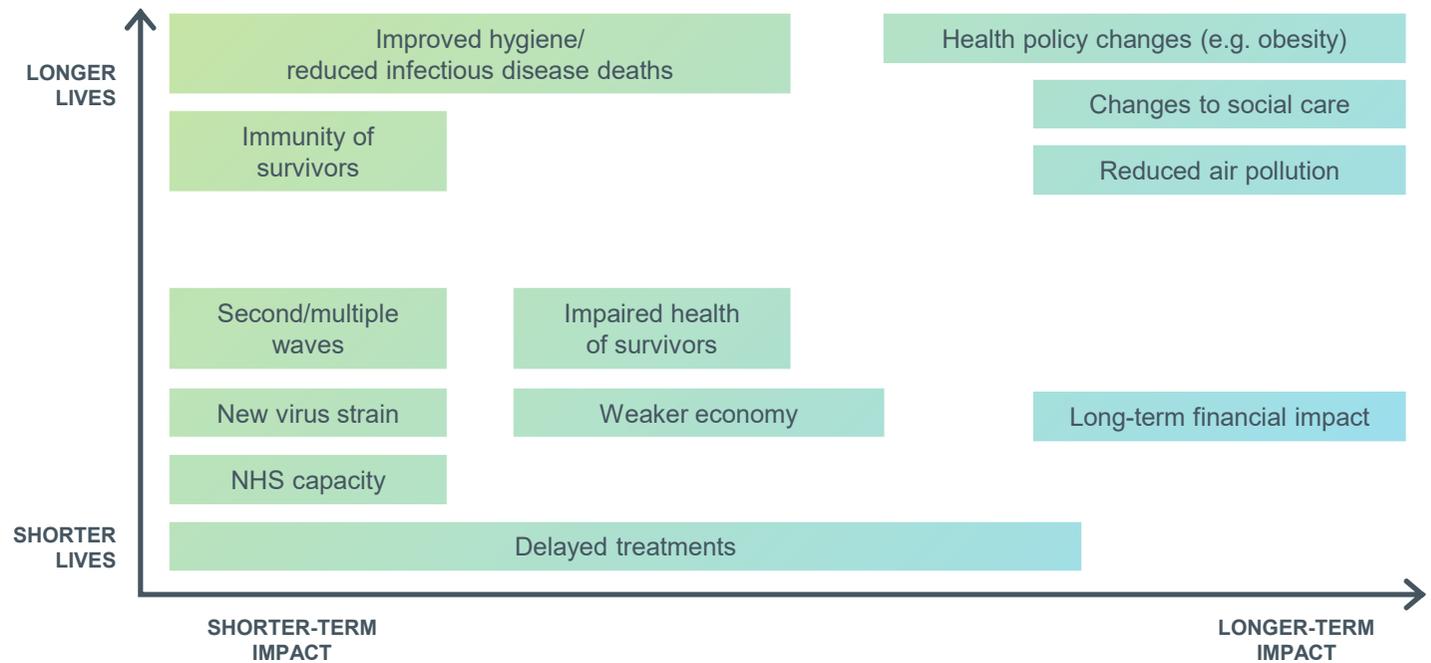
Headline rate of improvement (England & Wales)



Source: Annual improvement in standardised mortality rate, based on data from ONS for England & Wales, as published by the CMI alongside CMI_2020

Future improvements - future COVID-19 impact

- No consensus on the pandemic's impact on mortality for pension schemes.
- CMI model now allows 2020 and 2021 data to be treated differently (or ignored), reflecting that it is an exceptional period not necessarily indicative of a future mortality rate trend.
- Most funds unlikely to make an explicit allowance at this time



Too early to judge future impact – points to no explicit allowance.

Future improvements

2019 approach

The starting point is the Actuarial Profession's CMI model, which is updated annually with the latest observed mortality data. At the 2019 valuation we used CMI_2018 with default smoothing parameters, an initial addition of 0.25% for females/0.5% for males and long-term rate of improvement of 1.25% pa.

Proposed approach for the 2022 valuation

Use the latest available CMI model (CMI_2021) with the parameters adjusted as follows:

Weight placed on 2020 and 2021 experience (W parameters)

Given that both 2020 and 2021 have been significantly affected by the Covid-19 pandemic, **we would recommend that no weight is placed on data from these years**. This will avoid overstating the impact of the pandemic on long-term rates of improvements, as we have little evidence of the long-term effects at this stage.

Adjustment to observed data to reflect scheme membership (A parameter)

The A parameter allows users to adjust the starting point for the projections in the model to reflect the difference between the population-wide data used in the model and the Fund's own membership. Based on analysis carried out by Club Vita, we recommend using an A parameter of 0.25%.

Long-term improvement rate (LTR parameter)

Club Vita analysis suggests a reasonable long-term trend of 1.5% annual improvements in longevity. The strength of this recommendation has increased since the previous valuation and the arguments to keep it at 1.25% (e.g. the LGPS mechanisms which supposedly mitigate longevity risk like the Cost Cap) have weakened, so we now recommend using 1.5%.

RECOMMENDATION:

Latest available CMI model with an A parameter of 0.25%, long-term rate of improvement of 1.5% pa and no weight given to 2020 data.

IMPACTS:

How long you expect to pay a pension to each of member and their dependants.

SIGNIFICANCE:

Increase liabilities by 1-2% vs 2019 assumption.

Further information about the future improvement assumption is set out in Appendix 3

Other demographic assumptions

Other demographic assumptions

Withdrawals (excluding ill-health)	<p>Based on our LGPS experience analysis for the period 2016-2019, we have increased the likelihood of withdrawals at each age.</p> <p>Following the Fund specific analysis, our recommendation is to scale the default assumption by 150% for full-time males, 160% for full-time females, 140% for part-time males and 110% for part-time females. Please see Appendix 4 for detailed results of the fund-specific demographic experience analysis.</p>
Ill-health early retirements	<p>Our LGPS-level analysis shows the incidence of ill-health retirements is slightly lower than expected at 2019. We propose leaving the assumption unchanged due to the potential increase in ill-health retirements as a result of Covid-19.</p> <p>Fund specific analysis shows a slightly higher rate of ill-health retirements than expected. However, as there are only a small number of data points, we do not believe there is credible evidence to adjust the assumption.</p>
Promotional salary scale	<p>Our analysis at LGPS-level does not suggest that any change is required to the default salary scale used at the 2019 valuation.</p> <p>Analysis of the Fund's own results do not suggest any reason to alter the standard assumption.</p>
Death in service	<p>The incidence of death in service is very low. Our LGPS-level analysis shows that the incidence of death in service is less than expected at 2019. Whilst there may have been an increase in the period from 2019 to 2022, we believe that will be temporary. Therefore, we have reduced the expected rate of death in service by 20% (compared to 2019).</p> <p>Similarly, Fund specific analysis does not suggest any reason to alter the standard assumption.</p>



RECOMMENDATION:
 Adopt proposed demographic assumptions based on LGPS wide analysis, adjusted for local experience where appropriate.

IMPACTS:

Timing and magnitude of future cashflows.

SIGNIFICANCE:

Minor impact on liabilities.

Other demographic assumptions

<p>50:50 take up option</p>	<p>At 2019, the Fund's assumption was 0.5% of members would elect to take up the 50:50 option.</p> <p>Take up in the Fund's 2019 data was 0.9%. It is not clear how the take-up of this option will change in the future. Therefore, our recommendation would be to keep this assumption unchanged at 0.5%.</p>
<p>Retirement age</p>	<p>Due to benefit changes in the LGPS, there are a complex set of rules determining the age a member can retire with unreduced benefits. These rules differ by member and the period in which the benefit was earned. However, by 2022, many of the members with complex retirement ages will have retired and therefore the assumptions can be simplified.</p> <p>At 2019 we assumed members retired in the years up to their state pension age, with a chance of retiring at each age from age 55 based on historical data.</p> <p>For 2022, the assumption will reflect the earliest age at which a member can retire with their benefits unreduced. We estimate the impact of this change to reduce liabilities by around 1%.</p>
<p>Cash commutation</p>	<p>At 2019, the Fund assumed that the rate at which members exchanged their pension for tax-free cash at retirement was 50% of HMRC limits for service to 1 April 2008 and 75% thereafter.</p> <p>Based on the Fund's own experience, we propose to update this assumption to 60% of HMRC limits for all tranches of benefit.</p>

RECOMMENDATION:
 Adopt proposed demographic assumptions based on LGPS wide analysis and Fund's own experience.

IMPACTS:

Timing and magnitude of future cashflows.

SIGNIFICANCE:

Minor impact on liabilities.

Other demographic assumptions

Proportion leaving a dependant

This is monitored by Club Vita as part of helping the Fund to manage their longevity risk.

The chart below shows the percentage of members in a sample Fund who are outlived by a partner eligible for an LGPS dependant pension.

For 2022 we will use the latest available Club Vita analysis to set an assumption appropriate to your Fund.

RECOMMENDATION:

Adopt proposed demographic assumptions based on Club Vita analysis

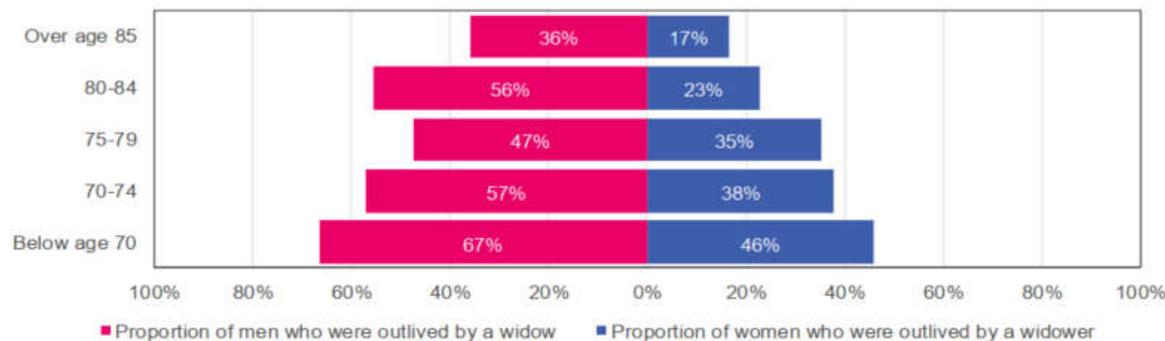
IMPACTS:

Timing and magnitude of future cashflows.

SIGNIFICANCE:

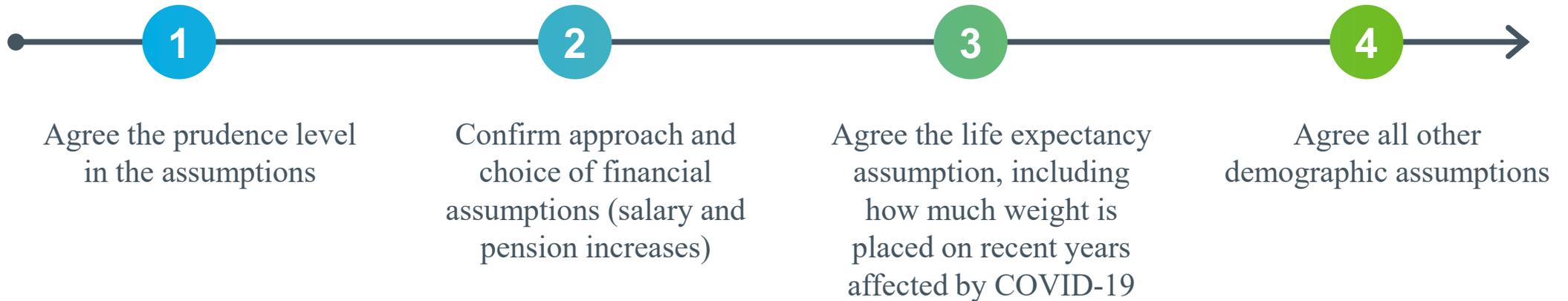
Minor impact on liabilities.

Proportion of pensioner deaths which gave rise to dependants for year ending on 31 August 2021

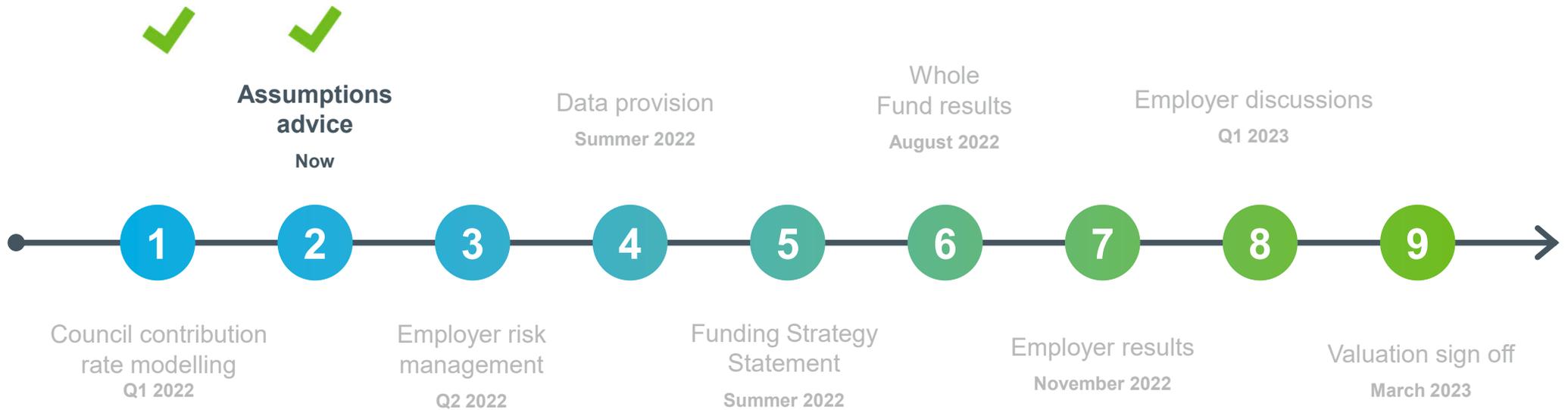


Decisions and next steps

Decisions for today



The valuation process



Appendices

APPENDIX 1

Economic Scenario Service (ESS)

The ESS uses statistical models to generate a future distribution of year-on-year returns for each asset class e.g. UK equities. This approach is also used to generate future levels of inflation (both realised and expected). The ESS is also designed to reflect the correlations between different asset classes and wider economic variables (e.g. inflation).

In the short-term (first few years), the models in the ESS are fitted with current financial market expectations. Over the longer-term, the models are built around our long-term views of fundamental economic parameters e.g. equity risk premium, credit-spreads, long-term inflation etc.

The ESS is calibrated every month with updated current market expectations (a minor calibration). Every so often (annually at most), the ESS is updated to reflect any changes in the fundamental economic parameters as a result of change in macro-level long-term expectations (a major calibration). The following table shows the calibration at 31 March 2022.

		Annualised total returns								
		Index Linked Gilts (long)	UK Equity	Private Equity	Property	Listed Infrastructure Equity	Diversified Growth Fund (low equity beta)	All World ex UK Equity in GBP Unhedged	Multi Asset Credit (sub inv grade)	Inflation (CPI)
10 years	16th %ile	-3.1%	-0.4%	-1.2%	-0.6%	-1.1%	1.4%	-0.4%	1.7%	1.6%
	50th %ile	-0.7%	5.7%	9.4%	4.4%	4.9%	3.2%	5.8%	3.5%	3.3%
	84th %ile	2.0%	11.6%	20.1%	9.5%	10.9%	5.1%	11.9%	5.2%	4.9%
20 years	16th %ile	-2.6%	1.7%	2.4%	1.4%	1.2%	2.1%	1.8%	2.8%	1.2%
	50th %ile	-0.9%	6.2%	10.0%	5.0%	5.6%	3.8%	6.3%	4.4%	2.7%
	84th %ile	0.8%	10.6%	17.6%	8.9%	10.1%	5.7%	11.1%	6.0%	4.3%
40 years	16th %ile	-1.1%	3.2%	4.7%	2.6%	2.6%	2.5%	3.4%	3.6%	0.9%
	50th %ile	0.3%	6.7%	10.3%	5.5%	6.1%	4.4%	6.8%	5.3%	2.2%
	84th %ile	1.9%	10.2%	16.1%	8.8%	9.8%	6.5%	10.4%	7.1%	3.7%
Volatility (Disp) (1 yr)		9%	18%	30%	15%	18%	5%	18%	6%	3%

APPENDIX 2

The Fund's asset allocation

The table sets out the long-term strategic asset allocation we have used for the analysis of the future expected investment returns for the Fund and the subsequent discount rate recommendations.

This asset allocation is as provided by the Fund's investment advisors (Mercer).

Asset class	Allocation
Overseas equities	47.5%
UK equities	2.5%
Infrastructure equities	3.0%
Private equity	3.0%
Property	12.0%
Diversified Growth Fund	20.0%
Multi Asset Credit	6.0%
Long Index Linked Gilts	6.0%
Total	100.0%

APPENDIX 3

Additional detail on longevity assumptions

Longevity improvements – initial addition (A parameter)

The CMI model is based on England & Wales population mortality data. Evidence suggests that most members of an occupational pension scheme (e.g. the LGPS) have experienced higher improvements in life expectancy than the general population in recent years. The A parameter allows users to adjust the starting point for the projections in the model to reflect this differing experience.

To help set this parameter, Club Vita have undertaken some analysis to calculate mortality improvement rates split by socio-economic group. The results are shown in the table along with the England & Wales rates within the core CMI_2021 model.

This analysis is consistent with similar analysis performed by the CMI, which found higher longevity improvements in less deprived population groups (IMD deciles 8-10). These results are also shown in the table for comparison.

	Annualised mortality improvement (2013 – 2018)	
	Men	Women
England & Wales (core CMI)	0.9%	0.6%
Club Vita 'Comfortable'	+0.3% vs. E&W	+0.5% vs. E&W
Club Vita 'Making-Do'	+0.5% vs. E&W	+0.5% vs. E&W
Club Vita 'Hard-Pressed'	-0.2% vs. E&W	+0.7% vs. E&W
CMI analysis IMD deciles 8-10 (more affluent)	+0.1% vs E&W	+0.4% vs E&W

Both analyses show that in recent years, more affluent individuals have enjoyed higher than average improvements in life expectancy. It is these individuals that also tend to dominate the liabilities of the Fund.

The majority most LGPS liabilities relate to those members in the making-do and hard-pressed groups, corresponding roughly to IMD deciles 8-10. Based on the figures above, we recommend using the A parameter to adjust the starting point in the CMI model by 0.25%.

APPENDIX 3

Additional detail on longevity assumptions

Longevity improvements – long-term rate (LTR)

Life expectancy has improved consistently since at least the turn of the 20th century thanks to many factors such as better public health, improved medical treatments, better diet and lower rates of smoking.

We need to consider how (or if) the improvements we have seen in recent years will continue into the long-term. As a starting point, the recent trend (which is arguably the most informative for us) suggests a long-term rate of between 1.25% and 1.5% p.a..

The table on the right summarises possible future drivers of change in the long-term rate of improvement compared to this level.

Slide 22 also included factors specific to Covid-19, and Club Vita have also considered [Covid-19](#) and [Climate Change](#) in detail.

Higher future improvements	Lower future improvements
Stronger government intervention – e.g. to reduce alcohol or red meat consumption	Less scope for future ‘gentrification’ – i.e. the change in affluence levels of pensioners can’t keep increasing at the rate it has done
Medical innovation – as we have seen with the development of new Covid-19 vaccines. Could also include “super drugs” that tackle multiple diseases at once	Smoking – the benefit from widespread quitting has already happened and can’t happen again
Anti-ageing treatments and regenerative medicine – could become a reality	Obesity – rates may increase leading to poorer health in retirement
Climate change – could lead in the UK at least to milder climates and fewer cold-weather deaths	Super-bugs – antibiotic-resistant diseases could make routine medical procedures and treatments untenable
	Climate change – could lead to resource scarcity, higher food prices, less availability of fresh food, etc

APPENDIX 4

Demographic assumptions analysis

The following slides summarise the results of your Fund's demographic experience over the period 2016-2019, which we have used as the basis for adjusting our default LGPS-wide assumptions to your own Fund's profile.

The default assumptions are based on analysis of a combined dataset of all our E&W LGPS clients (around half of all funds). This gives us sufficient data to set robust assumptions even for rare events like ill-health retirements. Where there is sufficient data to justify it, we have proposed adjusting the default assumption to better reflect your Fund's membership profile.

The following assumptions are covered in this section:

- Withdrawal from active service
- Death in service
- Promotional salary scale
- Ill-health retirements

Key to charts

The charts on the following slides use the following colour scheme:

- The black line shows actual experience seen in your Fund
- The blue line shows the expected occurrences based on our LGPS-wide default assumption
- (Where applicable) The pink line shows the adjusted assumption which we recommend for your Fund

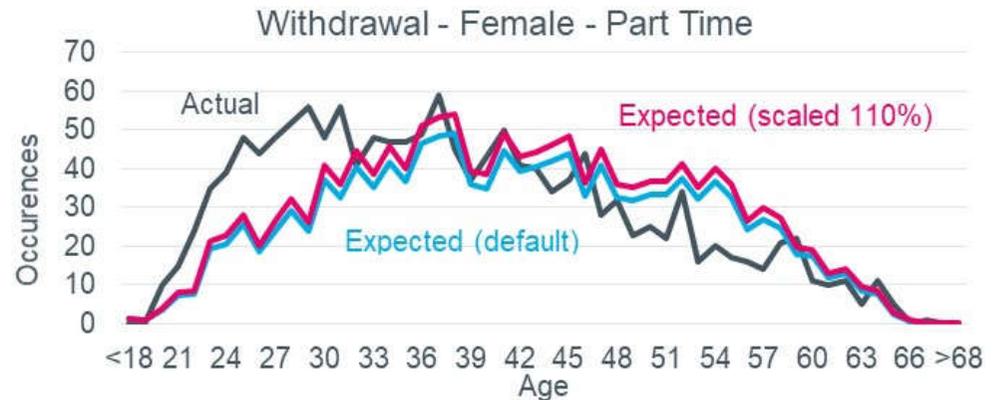
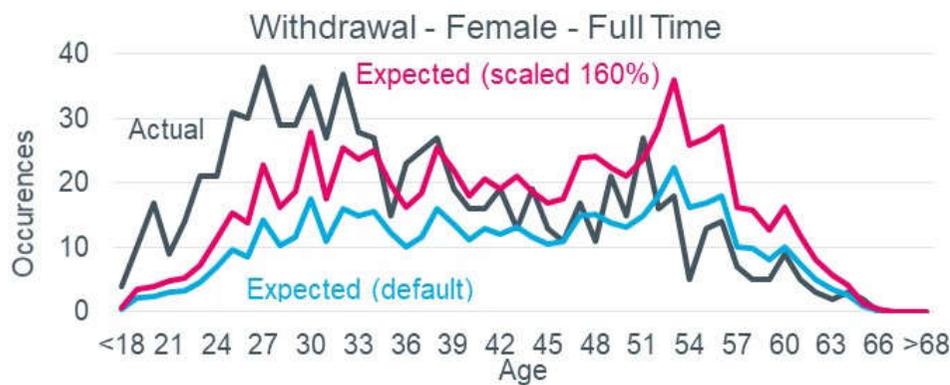
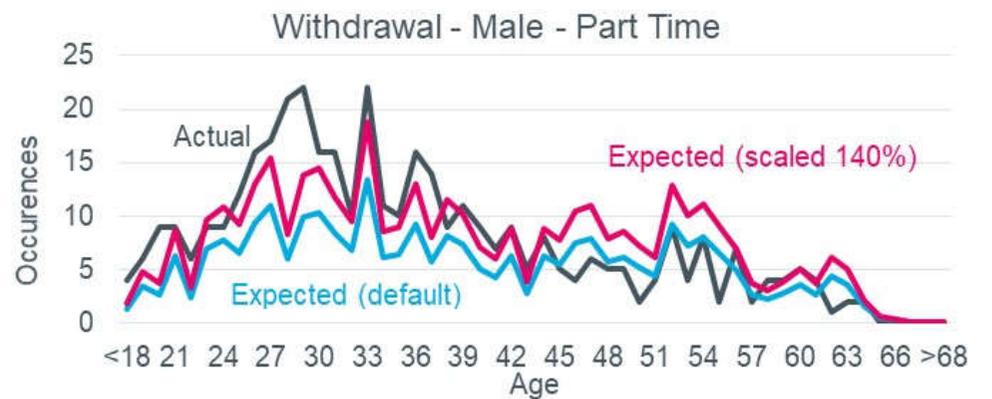
Withdrawal from active service

The following slide shows how withdrawal experience in your Fund (black line) compares with our default LGPS-wide assumption (blue line), alongside the scaled assumption we propose to use for the 2022 valuation (pink line).

The analysis shows that in general the pattern of withdrawals by age does fit the default assumption, but that overall withdrawal rates were higher in your Fund compared to the LGPS average. The default assumption has therefore been scaled to better fit your Fund's own experience to get the recommended assumption for your Fund.

APPENDIX 4

Demographic assumptions analysis - withdrawal



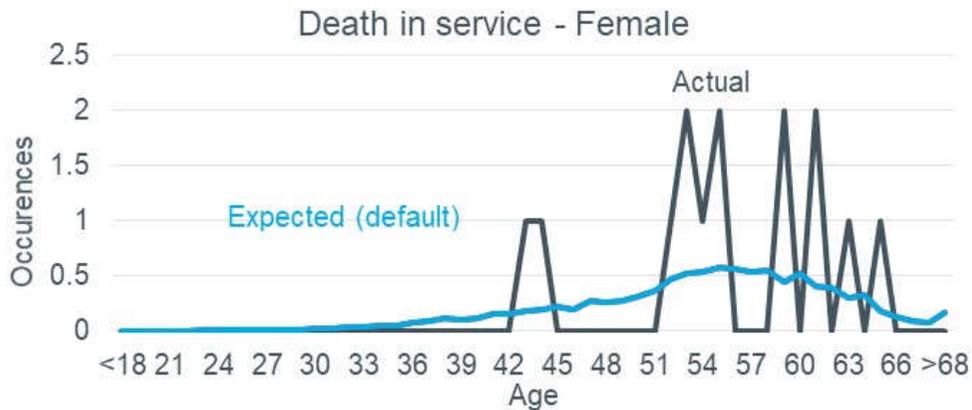
APPENDIX 4

Demographic assumptions analysis – death in service



There were very few deaths in service in the period in question which means it is not possible to make a credible adjustment to the default assumption.

We therefore recommend using our default LGPS-wide assumption for the 2022 valuation.



APPENDIX 4

Demographic assumptions analysis – salary scale



Separating out promotional and inflationary salary awards is very difficult, particularly when breaking it down by age and sex. For our analysis we haven't stripped out any inflationary increases over the period 2016-2019 and have shown increases versus our promotional pay scale (which is the same for men and women).

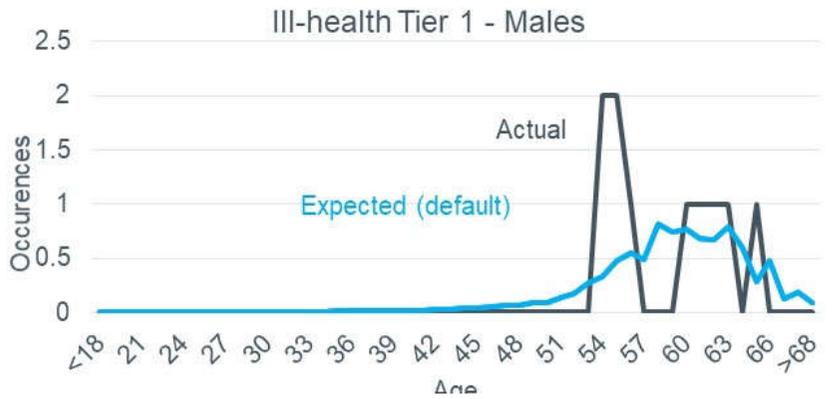
Apart from at lower ages where there are only a handful of members and the analysis is unreliable, the general pattern of promotional increases does approximately fit our default assumption (higher increases at younger ages). The fit is clearer for women than men.

Based on the analysis, we do not believe there is sufficient evidence to justify a departure from our default assumption.



APPENDIX 4

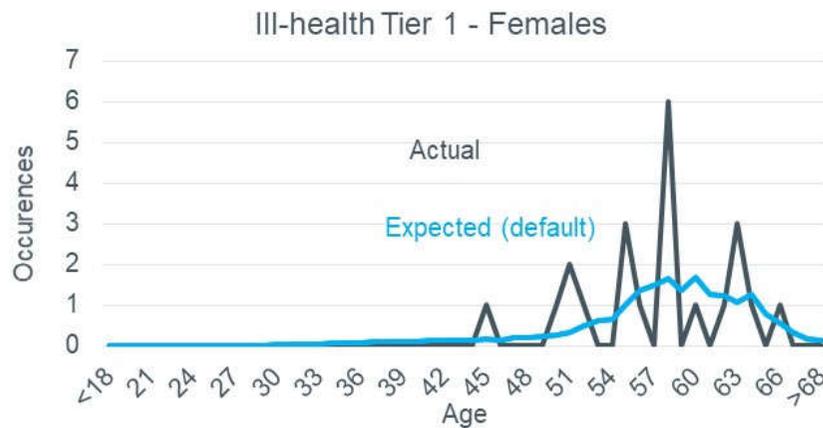
Demographic assumptions analysis – ill-health retirements



There were very few Tier 1 Ill-health retirements in the period in question which means it is not possible to make a credible adjustment to the default assumption.

There were even fewer Tier 2 cases (6 in total) so the analysis has not been shown.

Without sufficient evidence to justify a change we recommend using our default assumption for the 2022 valuation for both T1 and T2 ill-health retirements.



APPENDIX 5

Reliances and limitations

This paper is addressed to London Borough of Tower Hamlets as Administering Authority to the London Borough of Tower Hamlets Pension Fund. It has been prepared in our capacity as actuaries to the Fund and is solely for the purpose of discussing the assumptions for the 2022 formal valuation and setting out our recommendations. It has not been prepared for any other purpose and should not be used for any other purpose.

The Administering Authority is the only user of this advice. Neither we nor Hymans Robertson LLP accept any liability to any party other than the Administering Authority unless we have expressly accepted such liability in writing. The advice or any part of it must not be disclosed or released in any medium to any other third party without our prior written consent. In circumstances where disclosure is permitted, the advice may only be released or otherwise disclosed in its entirety fully disclosing the basis upon which it has been produced (including any and all limitations, caveats or qualifications).

The results of the Fund specific demographic assumptions analysis are wholly dependent on the valuation data provided to us for the 2019 valuation and the assumptions that we use in our calculations.

The assumptions in this document are for the Fund's ongoing employers. Different assumptions may be used for some employers (e.g. more prudent assumed investment return or more prudent longevity improvements assumptions) in particular circumstances. If required, these will be discussed and agreed as part of the 2022 valuation process and will be set out in the Funding Strategy Statement.

The following Technical Actuarial Standards are applicable in relation to this advice, and have been complied with where material and to a proportionate degree:
TAS100; and
TAS300.

APPENDIX 6

Glossary

Term	Explanation
50:50 option	An option for LGPS members to pay half contributions and earn half the retirement benefit (pre-retirement protection benefits are unreduced).
Baseline longevity	The rates of death (by age and sex) in a given group of people based on current observed data.
Club Vita	A firm of longevity experts who Hymans Robertson partner with for longevity analysis. They combine data from thousands of pension schemes and use it to create detailed baseline longevity assumptions at member-level, as well as insight on general longevity trends and future improvements.
Commutation	The option for members to exchange part of their annual pension for a one-off lump sum at retirement. In the LGPS, every £1 of pension exchanged gives the member £12 of lump sum. The amounts that members commute is heavily influenced by tax rules which set an upper limit on how much lump sum can be taken tax-free.
CPI inflation	The annual rate of change of the Consumer Prices Index (CPI). The CPI is the UK government's preferred measure of inflation and is the measure used to increase LGPS (and all other public sector pension scheme) benefits each year.
Demographic assumptions	Assumptions concerned with member and employer choices rather than macroeconomic or financial factors. E.g. retirement age, promotional salary scales etc. Demographic assumptions typically determine the timing of benefit payments.
Discount rate	A number used to place a single value on a stream of future payments, allowing for expected future investment returns. At the valuation the discount rate is used to calculate the value of remaining benefit payments at the end of a given time horizon (e.g. 20 years). It is expressed as a prudent margin above the risk-free rate.
ESS	Economic Scenario Service - Hymans Robertson's proprietary economic scenario generator used to create thousands of simulations of future inflation, asset class returns, interest rates etc

APPENDIX 6

Glossary

Term	Explanation
Inflation	The term for that prices in general tend to increase over time. It can be measured in different ways, with different measures using a different “basket” of goods and using different mathematical formulae.
Liability/ies	An employer’s liability value is the single value at a given point in time of all the benefit payments expected to be made in future to all members connected to that employer. The benefit payments are projected using demographic and financial assumptions and the liability is calculated using a discount rate.
Longevity improvements	An assumption about how rates of death will change in future. Typically we assume that death rates will fall and life expectancies will improve over time, continuing the long-running trend.
Prudence	To be prudent means to err on the side of caution in the overall set of assumptions. We build prudence into the choice of discount rate by choosing an assumption with a Prudence Level of more than 50%. All other assumptions aim to be best estimate.
Prudence Level	A percentage indicating the likelihood that a given discount rate assumption will be achieved in practice, based on the ESS model. The higher the Prudence Level, the more prudent the discount rate is.
RPI inflation	The annual rate of change of the Retail Prices Index. RPI is no longer linked to any LGPS benefits. It still has many legacy uses, notably to determine the payments to holders of index-linked government bonds.
Time horizon (or Horizon)	The period over which we require each employer in the Fund to reach full funding. The Time Horizon is typically long (up to 20 years) for employers who we expect to be in the Fund for the long-term (e.g. local authorities and academy schools) and shorter for employers who are expected to leave (e.g. contractors or employers who don’t admit new staff to the LGPS).
Withdrawal	Refers to members leaving the scheme before retirement. These members retain an entitlement to an LGPS pension when they retire, but are no longer earning new benefits.