

Charting mortality trends: signposts for an uncertain journey

LCP longevity report
August 2019



Part of LCP's 'Chart your own course' series

INTRODUCTION



+ **Chris Tavener**

Head of LCP's mortality group
and report author



+ **Michelle Wright**

Head of LCP Trustee Consulting

Welcome to LCP's longevity report

One of the key risks to understand for both trustees and sponsors of final salary pensions schemes is how long members of their pension scheme are going to live. This is becoming more important as pension schemes de-risk their investment strategies, and longevity becomes one of the key remaining uncertainties.

In this report we summarise recent trends in mortality and how they might affect pension schemes, and take a look at what might happen in the future.

This report builds on our previous [Longevity report](#) published in November 2017. Much of that report remains relevant, so in this report we focus on various new developments.

ACTIONS

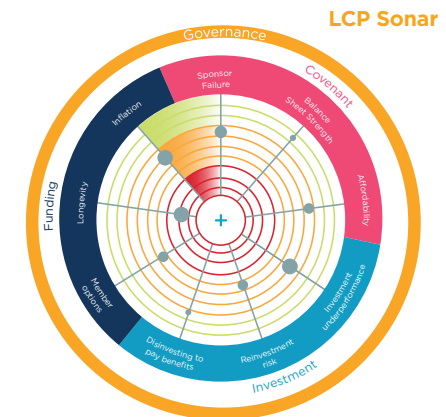
Future levels of mortality are unpredictable.

Key actions for trustees and sponsors of final salary pension schemes include:

- + Understand the demographics of your pension scheme members (such as their socio-economic class) to get an informed view on their current rates of mortality;
- + Consider moving to the latest model for projections, and discuss with your advisor how to fine tune the model to meet your needs;
- + Understand how material longevity risk is to your scheme, for example by using LCP's Longevity risk modelling tool, LCP's Life Analytics or our risk profiling tool, LCP Sonar;
- + Understand how sensitive the financial position of your scheme is to changes in longevity by considering sensitivities, scenarios or value at risk metrics; and
- + Consider the options for hedging longevity such as through a buy-in or longevity swap.

Please contact one of LCP's mortality team or your usual LCP contact if you wish to explore how this analysis could help you.

Understanding and managing longevity risk is a key part of journey planning, described in LCP's 'Chart your own course' series.



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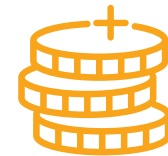
- + New models reduce future projected life expectancies



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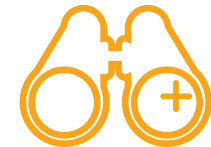
- + LCP Life Analytics can help you assess longevity risk



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- + Technology will have a significant impact on managing health



WHY KEEPING UP TO DATE IS IMPORTANT



Chris Tavener
Partner

+ Chris is an actuary with over 20 years' experience advising companies and trustee boards on a wide range of UK pension issues. He is head of LCP's Mortality Group, with responsibility for keeping LCP's actuaries informed of the latest developments and trends relating to life expectancy.

+44 (0)20 7432 0671
chris.tavener@lcp.uk.com

A key theme over recent years is the continuing slowdown in mortality improvements in England and Wales since 2011. When this ongoing trend was reflected in the recently published CMI 2018 projection model, it led to lower projected life expectancies. Updating projections which allow for this trend in falling life expectancies can have significant financial implications for running a pension scheme, so it is important to be aware of them and consider with your advisers the extent to which it is appropriate to reflect them in financial calculations for your scheme.

The number of deaths reported so far in 2019 is lower than for recent years. However, it is too early to conclude this is a reversal in the trend. Based on data half-way through the year, we currently expect the adoption of the next version of the CMI projections model, CMI 2019, to produce slightly longer life expectancies to CMI 2018 due to the in-built smoothing of year-on-year improvements in the model.



Number of deaths in the first half of 2019 is 5% lower than at the same point in 2018

Adopting up to date projections which allow for the latest trends in life expectancies may have the following important implications for your scheme:

- + **De-risking:** long-term funding targets may be closer than originally thought, so de-risking may now be within reach.
- + **Investment:** schemes may be more hedged than expected if LDI benchmarks were originally calibrated to cashflow projections reflecting longer life expectancies.
- + **Investment:** triggers for reallocating assets to a matching portfolio may be hit if linked to an improving funding level due to lower life expectancies, accelerating de-risking.
- + **Scheme funding:** deficit contributions from scheme sponsors could be reduced, or recovery periods shortened.
- + **Scheme funding:** unintentional prudence could be accumulating in the calculation of technical provisions if the improvement assumptions haven't been updated since the previous valuation.
- + **De-risking:** decisions regarding if, and when, to proceed with a buy-in or longevity swap can be affected as updates can influence perceived 'value for money' of such solutions.
- + **Member options:** when next reviewed, transfer values may be reduced, and the terms for pension increase exchange exercises affected.

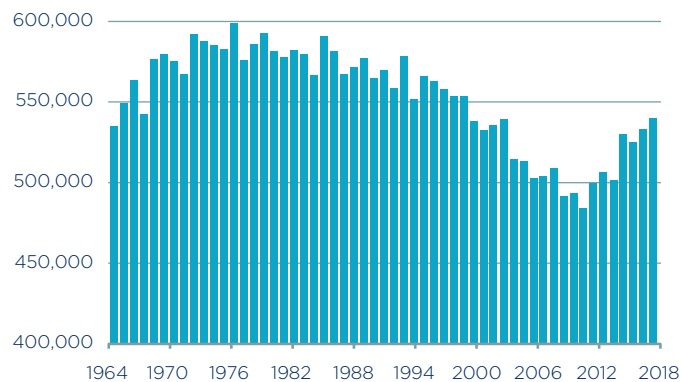
TRENDS IN MORTALITY

HIGHEST NUMBER OF DEATHS FOR TWO DECADES

2018 had the highest number of deaths since 1999 in England & Wales (E&W), according to data published by the Office for National Statistics (ONS).

The chart below highlights the dramatic change in progress since 2011. The rising number of deaths is because the growth of the population in E&W, particularly at the older ages, is no longer being offset by the fall in mortality rates.

Number of deaths in England & Wales

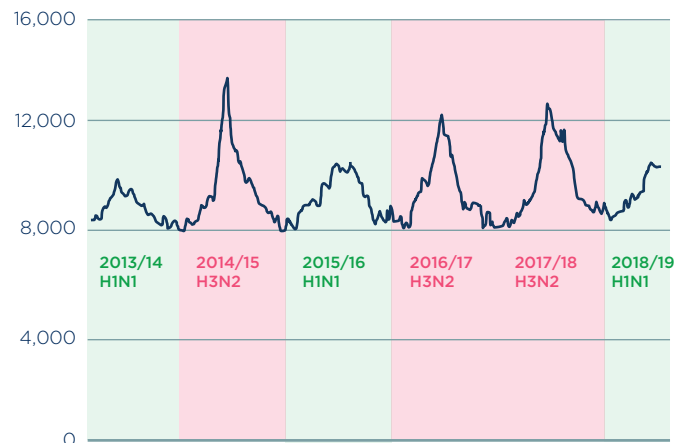


Source: Office for National Statistics

2018 started with an unusually high number of deaths. E&W experienced severe cold weather in February/March, the so-called 'Beast from the East'. However, for the rest of the year the number of deaths was relatively light.

As well as 2017/18, there were also a high number of deaths in the winters of 2014/15 and 2016/17. A report by the ONS found that these winters (highlighted in pink on the chart below) coincided with circulation of the dominant influenza A subtype H3N2, which typically causes more hospitalisations and deaths in older people. The lower deaths in 2013/14 and 2015/16 (highlighted in green) were dominated by H1N1. The dominant subtype of flu, and the vaccine effectiveness, appear to have been the most important factors in determining the number of deaths in recent winters. The dominant flu type for the winter of 2018/19 was H1N1, and we have seen a fall in the number of deaths compared to the previous two winters.

Number of weekly deaths in England

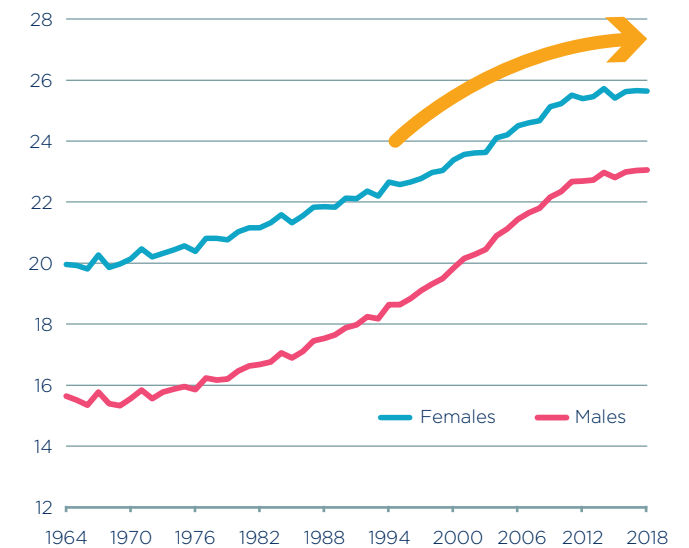


Source: Office for National Statistics and EURO MOMO

Although excess winter deaths are influencing the trend, there has been a slowdown in improvements in the summer months also, so other factors are at play too.

We saw a continuation in 2018 of the slowdown in improvements in mortality rates observed since 2011, with improvements close to nil. The chart below shows the practical stalling of the increasing trend in life expectancy.

Life expectancy at age 65 in England & Wales
(based on mortality rates in each calendar year)

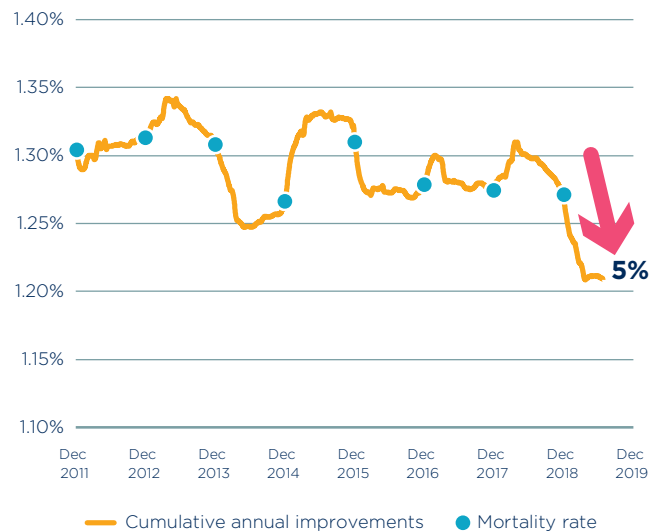


Source: Office for National Statistics & LCP calculations

TRENDS IN MORTALITY CONTINUED

Since the end of 2018, we have seen a buck in the recent trend with a lower number of deaths than previous years. The chart below shows standardised mortality rates in England & Wales, and the effect of cumulative improvements up to each point in the calendar year compared to the previous year.

**Annual standardised mortality rates
(persons, ages 20 to 100)**



Source: Office for National Statistics & LCP calculations

An interesting repercussion of the slow down in deaths in 2019 from the Q1 2019 quarterly update of one of Britain's biggest undertakers, Dignity, was that the "operating performance in the first quarter was below the Board's expectations as a result of the significantly lower than expected number of deaths".

Overseas trends

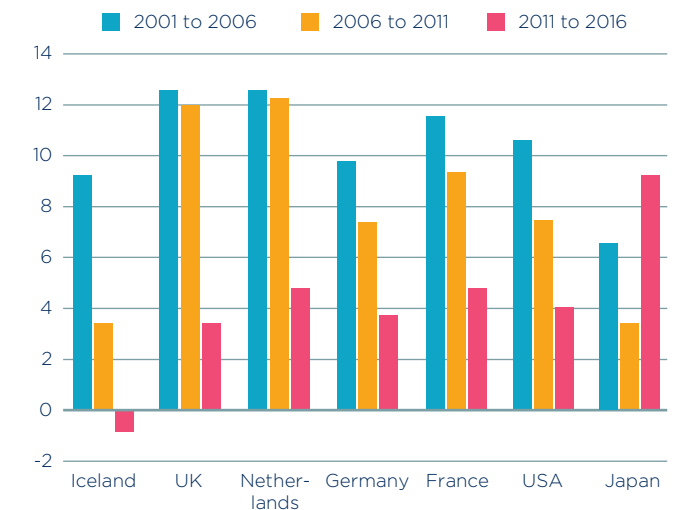
The slowdown in mortality improvements has not only been observed in England & Wales. By examining data from the Human Mortality Database, we can see there has been a slowdown in many developed countries. As well as the UK, Netherlands, Germany, France and the USA have all seen a significant deceleration in male life expectancy improvements since 2011.

However, there are some countries that have experienced contrasting mortality trends to those seen in the UK.

For example, while mortality improvements have slowed in most developed countries, they have generally not dropped to a level where life expectancies are falling. Iceland is an exception as their life expectancy did fall marginally over the five-year period to 2016, albeit from one of the highest life expectancies in the world.

A further example can be seen in Japan, which interestingly has bucked the trend seen in most developed countries by having a slowdown and then bouncing back to experience higher rates of mortality improvement, showing a period of slowdown can be reversed. Perhaps this is a sign of what's to come for the UK?

**Annualised change in life expectancy at age 65
for selected countries (Males, weeks)**



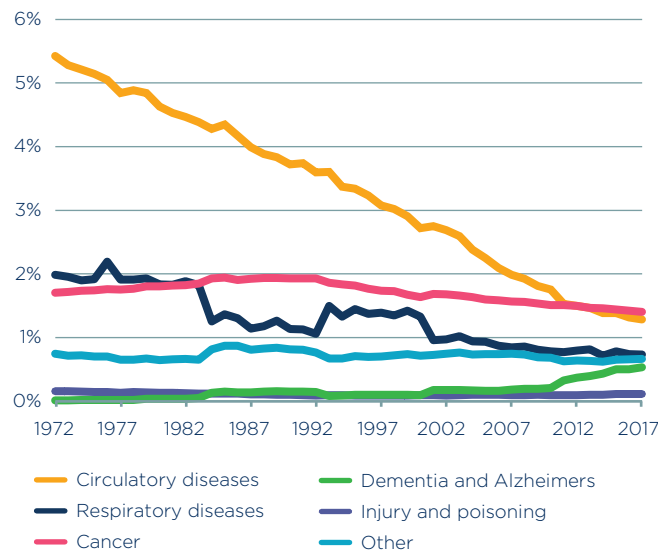
Source: Human Mortality Database & LCP calculations

CAUSES OF DEATH

INCREASING PROPORTION OF DEATHS FROM DEMENTIA

The ONS published a noteworthy paper on the causes for the slowdown in December 2018. The findings in the paper suggest that the slowdown in improvements in E&W is due to factors operating across a wide range of age groups, locations and causes of death. It was not possible to attribute the slowdown to any single cause and was likely that several factors were operating simultaneously.

Mortality rates by cause of death group
(England & Wales, Males over age 65, standardised)



Source: Office for National Statistics & LCP calculations

Reductions in mortality from circulatory diseases, which were the leading cause of death, have historically been the main driver for improvements in life expectancy.

It can be seen from the chart that deaths due to dementia recorded on death certificates have significantly increased since 2010. Dementia is an umbrella term used to describe a range of progressive neurological disorders. There are many different types of dementia, of which Alzheimer's disease is the most common.

Rather than an increase in the underlying condition, the rise since 2010 is most likely due to improvements in diagnoses, changes to recording practice and greater awareness by healthcare professionals and the general public. The increase in recorded deaths due to dementia will have inevitably led to a decrease in the death rates recorded against other causes.

A slowdown in the improvement in mortality rates from these causes, together with the increased deaths reported due to dementia, have been attributed to have a sizeable impact on the slowdown in life expectancy increases.

Can your scheme financially survive a cure for cancer?

"Finding the cure for cancer is proving to be more complex than mastering the engineering and physics required for spaceflight" T Moynihan, MD.

Cancer covers a large group of diseases caused in many different ways. Despite advances in diagnosis and treatment, doctors still have much to learn about what triggers a cell to become cancerous, and it is likely that each strand of cancer requires different treatments. It is unlikely that all cancers will have a known cure in the short term.

To put this into context, our modelling implies that if there are major developments in cancer diagnosis and treatments, such that the next 20 years the proportion of deaths in E&W that have cancer recorded as the primary cause of death are eradicated, then average life expectancies increase by around two years. This might increase the value of liabilities for a typical scheme by 6-8%.

Although a significant financial strain, such a medical innovation is probably financially manageable for most schemes over 20 years.

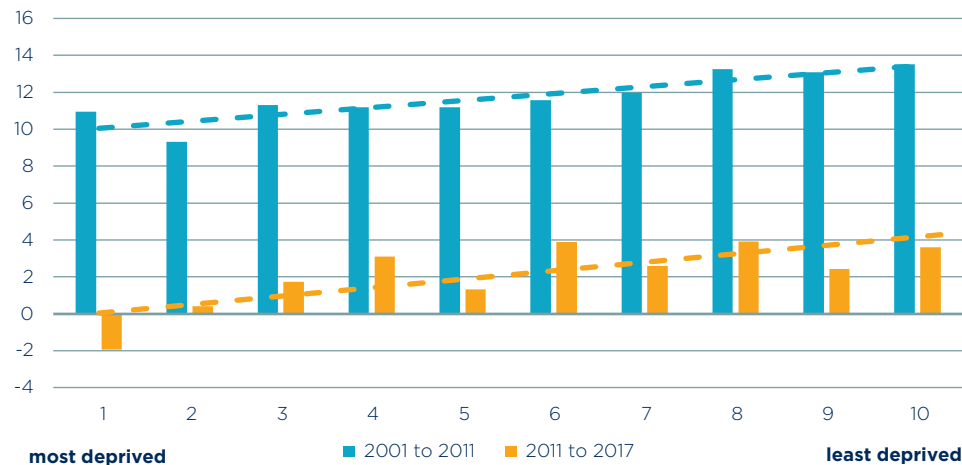
Our modelling implies that liabilities for a typical scheme might increase by 6-8% if major developments in cancer treatments mean the proportion of deaths due to cancer are eradicated over next 20 years.

VARIATIONS IN LIFE EXPECTANCY BY DEGREE OF DEPRIVATION

It should come as no surprise that the more affluent live longer than the poor. Various studies have concluded that there is a correlation between mortality rates and socio-economic factors such as income, education, marital status, wealth and occupation.

Taking a look at data from the ONS, they have graded each area in England by degree of deprivation, based on combining multiple measures, such as income, employment, education, health and living environment. Life expectancies are higher for those living in the least deprived areas of England compared to most deprived, and this gap has been increasing over the previous 20 years.

Annual increase in life expectancy at age 65 (weeks) by deprivation area: Females in England



Source: Office for National Statistics & LCP calculations

In fact, their data shows that people living in the most deprived areas in England were around four times more likely to die of an avoidable cause in 2017 than those in the least deprived areas.

The chart shows the annual increase in life expectancy (based on mortality rates in each calendar year) over different periods. It can be seen the increase is lower for individuals living in the most deprived areas, and there has been a slow down in improvements for all levels of deprivation.

But what does this mean for pension scheme members? Data from the Continuous Mortality Investigation (CMI) suggests that the average defined benefit pensioner has experienced higher rates of improvement than the general population in recent years. This would tally with members of defined benefit pensioners being a select group who have been in employment, leading them to generally be allocated to the less deprived categories.

Therefore, although the headlines may say that improvements in life expectancies have slowed or even stopped, it is worth bearing in mind that these statistics are based on an "average" person in the England and Wales – the story may be different for an average pension scheme member. The latest CMI Projection introduces a new parameter which now provides a mechanism for adjusting for this if relevant for your scheme (see page 10).

Although the headlines are that improvements in life expectancies for an average person in England and Wales have stalled in recent years, the story may be different for an average pension scheme member.

POSSIBLE IMPACT OF CLIMATE CHANGE



Claire Jones
Principal

+ Claire is head of responsible investment at LCP, helping our clients to include environmental, social and corporate governance (ESG) factors in their investment processes, with the aim of delivering sustainable long-term financial returns.

+44 (0)1962 873 373
claire.jones@lcp.uk.com

Climate change and responsible investment are on the agendas of most Trustee boards at the moment. But how might climate change affect the longevity risk of a pension scheme?

The impact of climate change on life expectancy in the UK is currently uncertain. Climate change can affect health through various ways. The Committee on Climate Change, an independent statutory body established under the Climate Change Act 2008 to advise the UK Government, made several interesting observations in its 2017 Climate Change Risk Assessment. These include:

+ Higher temperatures

In general, high temperatures have a detrimental impact on human health, particularly for the elderly. Indoor exposure to heat is likely to drive much of the risk, as people in the UK spend the vast majority of their time indoors. Poor building design and lack of air conditioning adds to the risks from heatwaves.

In England, around 2,000 deaths each year are attributed to high temperatures. However, it is not clear whether excess mortality during hot weather are additional deaths, or a case of people (particularly those who are frail) dying a little earlier than they would have anyway. Although there are predictions for the number of heat related deaths to increase over the next 30 years by several fold, the impact that would have on the total number of UK deaths is still likely to be relatively small.

+ Colder temperatures

On the other hand, cold-related mortality is significant – there are over 20,000 cold-related deaths per year in England. Poor quality housing (eg cold homes) is thought to be one of the major determinants, so higher temperatures from climate change may reduce the risk of cold-related deaths in the UK.

+ Floods, storms & snow

Floods, storms, snow, cold weather and heatwaves affect the provision of health care by impacting staff, buildings and equipment. Bad weather can make it difficult for healthcare professionals to get to work and delay ambulances on time-critical journeys. Heatwaves cause problems with how hospitals function, as well as the comfort of patients and staff.

It is thought that there is considerable potential for cost-effective changes to existing hospitals and the design of new buildings to improve comfort and operational resilience during heat waves. However, plans are needed that consider how the future move towards more home-based care to alter the risks.

Other commentators have noted that the indirect effects of climate change may be more significant than the direct ones outlined above. Macroeconomic impacts could include lower economic growth and higher food prices, which would affect spending on health and social care and the quality of diets. However, in summary, the impact on life expectancies due to climate change is uncertain, but it isn't expected to be significantly financially adverse for UK pension schemes over the next 20-40 years.

The impact on life expectancies due to climate change is uncertain, but it isn't expected to be significantly financially adverse for UK pension schemes over the next 20-40 years.

UPDATE ON MORTALITY MODELLING



Lydia Dutton
Associate Consultant

+ Lydia is an associate consultant in LCP's pensions actuarial practice, and member of LCP's Mortality Group. She works with a variety of corporate and trustee clients, assisting them with projects such as liability management exercises and longevity de-risking work.

+44 (0)1962 672 935
lydia.dutton@lcp.uk.com

The CMI released the latest version of its SAPS series of mortality tables in March 2018. The latest series of tables, S3, is based on the experience of pension scheme members over an eight-year period from 2009 to 2016, with a central year of 2013. The tables have been created using 21 million years of exposure including over 500,000 deaths from 453 schemes (plus data from schemes in the PPF).

By using new techniques, the CMI have been able to gain more insights from the data and have now produced 30 tables, up from 18 tables in the previous S2 series. This allows users to choose a table that better represents the characteristics of the members of their pension scheme, which reduces the risk of actual future experience being different from assumed.

The CMI has also produced the latest version of its mortality projection model in March 2019, referred to as 'CMI 2018'. The updated model has three notable changes from the previous model.

- + Firstly, the model has been updated to reflect data up to 2018 on the observed rates of mortality improvements in the general population of England & Wales. With mortality improvements stalling, the latest model produces lower life expectancies due to this update.
- + Secondly, the model has been adjusted to place more emphasis on recent experience, by reducing the level of year-on-year smoothing (the default value of the smoothing parameter S is now 7 rather than 7.5). Although less smoothing means the model follows the recently observed mortality improvements closer, it makes annual updates for data less predictable. In the current environment, as improvements are slowing down, less

smoothing results in lower rates of improvement, so lower life expectancies and lower projected pension benefit payments. You can read more about the CMI's smoothing parameter in our previous [longevity report](#).

- + Finally, there is a new parameter (A) which allows the user to increase or decrease the smoothed rates of improvement. This is desirable if you believe that the members of your scheme will experience different rates of improvement compared to the general population of E&W to which the CMI model is calibrated, for example due to the deprivation effects described on page 8.

The impact of moving to this latest CMI projections model from a previous core version will typically reduce projected life expectancies and hence the value of a pension schemes' liabilities. The older the previous version being used is, the greater the reduction in life expectancies will be due reflecting more years of relatively low improvements.

A scheme previously using CMI 2015 three years ago when they last performed a funding valuation, might see life expectancies reduce by as much as 5% if they move to CMI 2018.

ASSESSING THE FINANCIAL RISK OF MORTALITY



Ben Rees
Consultant

+ Ben is an actuary in LCP's Pensions Actuarial practice. He is a member of LCP's specialist de-risking practice, advising clients looking to address longevity risk in their scheme. He has particular expertise within the firm on mortality and longevity.

+44 (0)20 7432 0699
ben.rees@lcp.uk.com

As many schemes become better funded with higher levels of hedging of both interest rate and inflation risk, longevity is starting to take centre stage as the key remaining risk.

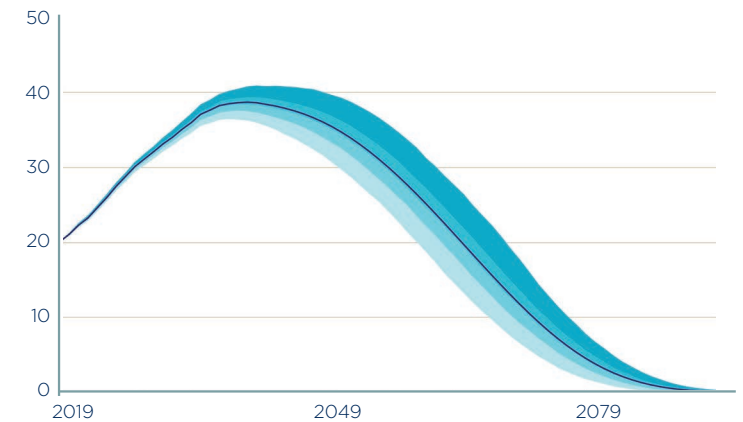
At LCP, we have developed a modelling framework to help you understand the risk. Whilst the ultimate mitigation may be an insurance product, first understanding the risks held within the scheme can guide you towards the most appropriate product for you.

Using **LCP LifeAnalytics** we simulate thousands of different outcomes of future benefits cashflows to ascertain the potential variation and hence risk associated with longevity. For each simulation and member, we model:

- + The risk that current mortality rates have been mis-estimated (base table risk);
- + The risk that future improvements in mortality rates have been mis-estimated (trend risk); and
- + The risk due to timing of individual member deaths (idiosyncratic risk).

Many schemes are exposed to higher longevity risk in their pensioners than their non-pensioners

Example outcome of simulated benefit payments



Insights from this approach that LCP have observed:

- + Younger members have higher risk associated with trend risk than older members
- + Base table and idiosyncratic risk are lower for younger members due to higher certainty of early cashflows making their overall liability more predictable

Overall, these two competing forces mean that many schemes are exposed to higher longevity risk in their pensioners than their non-pensioners. Hedging longevity risk through a pensioner buy-in or longevity swap can therefore be a cost-effective way to materially reduce risk in a pension scheme. You can read more about the current de-risking market in our **2019 de-risking report**.

LOOKING FORWARD

Chart your own course report



It was fairly inevitable that the downward trend in the mortality rates could not continue indefinitely and would slow down.

Mortality rates are affected by a variety of factors - biological, physiological, environmental, etc. Future changes to life expectancy are going to be driven by the factors influencing the younger cohorts, born after 1940. A recent Health Foundation report stated that the gains made in improving the health of previous generations may well be eroded by the precariousness and instability of the lives some young people are facing.

Future developments in prevention and avoidance of deaths due to cancer and dementia will influence future reductions in mortality rates for pensioners. The Alzheimer's Society reported that by 2021, over a million people in the UK will be living with dementia - the recently published 'NHS 10 Year Plan' includes steps to prevent such long-term health conditions.

For reasons both of fairness and of overall outcomes improvement, the NHS is taking a concerted and systematic approach to reducing health inequalities, attempting to narrow the gap in life expectancy by deprivation.

LCP Sonar

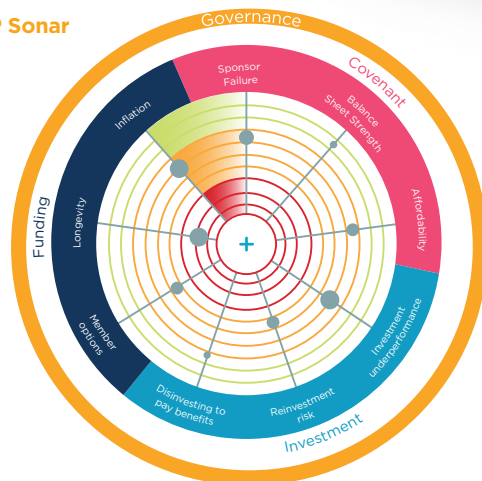


Chart your own course sets out a blueprint for trustees to navigate the journey to securing member benefits and managing the risks along way.

LCP Sonar, our risk profiling tool, benchmarks your scheme against other pension schemes, covering covenant, funding and investment risks.



Technology is bound to have an influence,

perhaps in ways we can't currently imagine. The advancement of wearable tech, directly linked via 5G to your GP or even a bot with Artificial Intelligence could lead to quicker treatment and even prevention of illnesses. This shift to automatic intervention, rather than being triggered via the traditional visit to your GP would be transformative. Imagine waking up to a text saying a prescription is being delivered that morning due to an abnormal temperature/heart beat having been detected whilst you were asleep.

Contact us

For further information please contact our team.



Chris Tavener - Partner

chris.tavener@lcp.uk.com
+44 (0)20 7432 0671



Michelle Wright - Partner

michelle.wright@lcp.uk.com
+44 (0)20 7432 3073



David Brims - Senior Consultant

david.brimms@lcp.uk.com
+44 (0)1962 872 762



Ben Rees - Consultant

ben.rees@lcp.uk.com
+44 (0)20 7432 0699



Lydia Dutton - Associate Consultant

lydia.dutton@lcp.uk.com
+44 (0)1962 672 935



At LCP, our experts provide clear, concise advice focused on your needs. We use innovative technology to give you real time insight & control. Our experts work in pensions, investment, insurance, energy and employee benefits.

Lane Clark & Peacock LLP London, UK Tel: +44 (0)20 7439 2266 enquiries@lcp.uk.com	Lane Clark & Peacock LLP Winchester, UK Tel: +44 (0)1962 870060 enquiries@lcp.uk.com	Lane Clark & Peacock Ireland Limited Dublin, Ireland Tel: +353 (0)1 614 43 93 enquiries@lcpireland.com	Lane Clark & Peacock Netherlands B.V. (operating under licence) Utrecht, Netherlands Tel: +31 (0)30 256 76 30 info@lcpnl.com
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