The Pensions Regulator

# Good practice when choosing assumptions for defined benefit pension schemes with a special focus on mortality

## Consultation document

**February 2008**

www.thepensionsregulator.gov.uk

# Contents

# Foreword

The Pensions Regulator is publishing this consultation document to provide an opportunity for discussion about both:

- new guidance for trustees that we propose to publish on good practice when choosing funding assumptions for defined benefit pension schemes, with a special focus on mortality (set out in section one); and
- a proposed amendment to our practice when regulating the funding of defined benefits to implement a new approach for looking at mortality assumptions (set out in section two).

Our proposals are built around the key principles of:

- assumptions being based on all available up-to-date evidence; and
- clarity and transparency in documentation and communication.

There have been significant developments over a number of years in our knowledge of current trends in mortality. Some projections which have been in common use are no longer likely to be considered reasonable assumptions. We wish to bring these developments to the attention of trustees.

Within the document we have identified some specific questions, but respondents are invited to comment freely on any matter they consider relevant.

The executive summary provides an overview of all our proposals. The guidance set out in section one then starts with the key considerations for trustees. Trustees need to own the assumptions on mortality. But given the technical nature of this topic, it will be especially important for trustees to have their actuary guide them through the material in the document, explaining clearly the implications of the different issues that are raised. In particular to aid the actuaries, the guidance has a detailed annex providing the background and discussion, and summarising the development of the evidence over recent years.

**Tony Hobman**
*chief executive, the Pensions Regulator*
*18 February 2008*

# Executive summary

This consultation document is published by the Pensions Regulator, the regulator of work-based pension arrangements. We propose to issue guidance outlining how trustees should go about deciding on funding assumptions for a defined benefit pension scheme. There is a special focus on mortality assumptions with some background material provided. Given the technical nature of this topic, it will be particularly important for trustees to ensure that their actuaries guide them through the issues and explain the implications of different options.

Assumptions are needed in order to make an actuarial calculation of a prudent reserve to hold in a pension scheme against the pension promises employers make to their employees. This reserve is not designed to eliminate all risk but neither is it simply a best estimate of the amount needed to provide for the benefits. The degree of prudence incorporated into the funding reserve will depend on individual circumstances and is a matter of judgement for the trustees of each scheme, but the regulator has a responsibility to inform decisions.

Assumptions about mortality have been a matter of much debate, with the emergence of evidence over a number of years that past allowances for future improvements in life expectancy have been inadequate. This is increasingly being recognised. Indeed at the time of writing, a survey by a leading actuarial firm has revealed that nearly half of the FTSE 100 companies with defined benefit schemes have changed their mortality assumptions for accounting purposes, adding perhaps £6bn to their pension liabilities.[1]

We recognise that those whom we regulate need a degree of certainty about how we will carry out our functions and exercise our powers. This will enable them to understand when and how we may intervene and also what they need to do to protect pension scheme members. We propose to amend our approach when reviewing schemes' funding plans. We also recognise that what we say may influence the actions of employers, trustees and their advisers.

This consultation process will last for 12 weeks. The guidance and the formal statement on our regulatory approach and use of powers will be published following consideration of responses to this consultation.

## Our proposals

The key points of the proposed guidance are:

- Good practice requires assumptions to be:
    - evidence based; and
    - clearly and transparently described.

[1] Watson Wyatt press release, 11 February 2008.

- Trustees should adopt the terminology recommended by the CMI (Continuous Mortality Investigation of the actuarial profession) to aid transparency and understanding.
- Trustees should note that there have been significant recent developments in our knowledge of current trends in mortality, with some projections which have been in common use no longer likely to be considered reasonable assumptions.
- There are two separate decisions for trustees on mortality assumptions:
    - the baseline table for the current rates of mortality; and
    - the allowance for future improvements.
- Whilst the baseline assumption may be scheme specific, individual schemes will not normally have the evidence to make a scheme specific allowance for future improvements and will need to base their choice on broader data.
- The regulator considers that an adjustment made to the discount rate as a proxy for future improvements in mortality does not meet the statutory requirement to adopt a prudent mortality assumption, or achieve good practice in clarity.

New evidence on the continued improvements in mortality above expectations has been emerging for many years. The regulator’s approach to regulating mortality choices has been developed in the light of this, including important statements from the actuarial profession.

The regulator's existing guidance requires that when determining their mortality assumptions trustees will need to demonstrate (supported by actuarial advice) that the assumptions used for future improvement are overall of sufficient strength to be justified given the recent evidence. The regulator takes the view that assumptions on future improvement will not normally have good cause to be scheme specific unless a scheme’s own experience is very extensive.

Given the combination of data emerging over a number of years, the statements by the actuarial profession and the regulator’s experience of the first recovery plans and scheme returns, we propose to build on our current approach for the scrutiny of mortality assumptions.

For recovery plans based on valuations with effective dates from March 2007, mortality assumptions that appear to be weaker than the long cohort assumption will attract further scrutiny and dialogue with the trustees where appropriate. Furthermore, assumptions which assume that the rate of improvement tends towards zero, and do not have some form of underpin, will also attract further scrutiny.

# Section one: The regulator's proposed guidance

## 1 Good practice when choosing assumptions for defined benefit pension schemes with a special focus on mortality

1.1 This guidance outlines how trustees should go about deciding on funding valuation assumptions for a defined benefit pension scheme. There is a special focus on mortality assumptions with some detailed background material provided.

### Key points

1.2 The key points of the proposed guidance on the approach to developing mortality assumptions are:

- Good practice requires assumptions to be evidence based and to be clearly and transparently described.
- Trustees should adopt the terminology recommended by the Continuous Mortality Investigation of the actuarial profession to aid transparency and understanding.
- Trustees should note that there have been significant recent developments in our knowledge of current trends in mortality, with some projections which have been in common use no longer likely to be considered reasonable assumptions.
- There are two separate decisions for trustees on mortality assumptions:
    - the baseline table for the current rates of mortality; and
    - the allowance for future improvements.
- Whilst the baseline assumption may be scheme specific, individual schemes will not normally have the evidence to make a scheme specific allowance for future improvements and will need to base their choice on broader data.
- The regulator considers that an adjustment made to the discount rate as a proxy for future improvements in mortality does not meet the statutory requirement to adopt a prudent mortality assumption, or achieve good practice in clarity.

1.3 The regulator takes the view that prudence:

- with regard to the base mortality as at the valuation date, means taking a margin below best estimate rates where those best estimates are obtained from one or more of:
  - scheme experience (where statistically justifiable);
  - standard tables derived from aggregated relevant experience; and
  - adjustments derived from scheme characteristics known from aggregated analysis to be relevant to observed mortality
- with regard to future mortality improvement rates, means not assuming any rates lower than are reasonable based on the most up-to-date evidence and currently accepted projection methodologies.

The Board for Actuarial Standards (BAS) (the operating body of the Financial Reporting Council responsible for setting technical standards for actuaries) recently consulted on a conceptual framework for actuarial standards in which it floated the possibility of including in its standards how a regulatory requirement for prudence is to be applied by actuaries in a particular context.

## Introduction

1.4 The scheme funding requirements of the Pensions Act 2004 centre on the value to be placed on a scheme's accrued liabilities, known as 'technical provisions'. As with any actuarial calculation, technical provisions require assumptions to be made about the future course of all those factors affecting the cost of providing the benefits. These assumptions must be chosen prudently.[2] Trustees must obtain actuarial advice before choosing assumptions[3] and, unless scheme rules give the trustees unfettered power to set contributions, they must obtain the agreement of the employer.[4] Key assumptions will include inflation, investment return and how long scheme beneficiaries are expected to live (longevity). A mortality rate refers to the assumed probability of dying within a year whereas longevity usually refers to the future expected lifetime derived from any particular set of mortality rates.

1.5 The Pensions Regulator ('the regulator') has issued a code of practice on funding defined benefits ('the code') providing practical guidelines and setting out expected standards of conduct and practice for those who must meet the legislative requirements.

[2] Regulation 5(4)(a) - (c) The Occupational Pension Schemes (Scheme Funding) Regulations 2005 SI 2005 No. 3377.
[3] Pensions Act 2004 section 230(1)(a).
[4] Pensions Act 2004 section 229(1)(a).

1.6 The regulator now has experience, from recovery plans submitted to us, of how trustees have interpreted the requirements of legislation and the code. In September 2007 we published 'Recovery plans: an initial analysis'. There have also been significant new developments in the field of mortality relevant to pension scheme funding, particularly those highlighted by the Continuous Mortality Investigation of the actuarial profession ('CMI').[5] [6]

1.7 Accordingly, the regulator believes it would be opportune and helpful to issue some additional guidance on choosing assumptions. The general principles relating to prudence are of application when considering the adoption of any assumption, though this note focuses on mortality.

1.8 Whilst the guidance is directed to trustees given their responsibility to own the mortality assumptions, the regulator understands that much of the material in this guidance will be unfamiliar to many trustees and is necessarily quite technical in places. Trustees should seek input from their actuary to help their understanding. The regulator will review this guidance as necessary and in the light of developments in the market, and will continue to work with all the relevant authorities such as the Board for Actuarial Standards, the actuarial profession and the CMI.

***Question 1: Do you agree that we should issue guidance on this subject?***

## General principles for choosing assumptions

1.9 All assumptions must be chosen prudently.[7] The regulator interprets prudence as taking a margin on the cautious side of a best estimate (or expected value).[8] However, whilst each assumption must be chosen prudently, the regulator takes the view that an appropriate overall level of prudence in the technical provisions should be the paramount objective. Consequently the regulator accepts that the degree of prudence adopted could differ between assumptions in order to achieve a target level of prudence in the technical provisions as a whole. Indeed, in the extreme, for some less key assumptions it might be appropriate to assume best estimate, as long as overall technical provisions are adequately prudent.[9]

[5] CMI Working Paper 30 and the CMI Library of Mortality Projections.
[6] CMI Working Paper 29 – An analysis of the results of the mortality of male and female pensioners of self-administered pension schemes for the period 2000 to 2004 based on data collected by 30 June 2006.
[7] Regulation 5(4)(a) - (c) The Occupational Pension Schemes (Scheme Funding) Regulations 2005 SI 2005 No. 3377.
[8] Code, paragraph 85.
[9] Code, paragraph 84.

1.10 It is essential for trustees to discuss with their actuary how sensitive the technical provisions are to changes in the value of each assumption.[10] The more sensitive the technical provisions are to variations from the best estimate value of an assumption, the more important it is to choose an appropriately prudent value for it.

1.11 Evidence should form the basis of justification for all assumptions. Such evidence will usually involve considering past experience, current conditions and expected future trends. It is important to relate more general data to the situation of the particular scheme. This will be especially relevant to the choice of demographic assumptions (such as longevity and early leaver rates) where there is wide variation of observed rates within the population or between employers.[11]

1.12 Although trustees are the decision makers when it comes to funding assumptions, they must take advice from their actuary who will be able to advise them on best estimates and on appropriate margins for prudence.[12] This may be by way of stochastic modelling[13] to illustrate the variability of outcomes and their relative likelihood. From such output, trustees will be able to select appropriately prudent assumptions consistent with the confidence they wish to have that the technical provisions will prove adequate to provide the promised benefits.[14]

1.13 Trustees should note that actuaries are required by their professional code to adhere to any relevant technical standards set by the BAS. The BAS will shortly be publishing a discussion paper on mortality assumptions which is likely to lead to standards in due course.

1.14 It is the responsibility of trustees to understand the funding assumptions they have adopted and the reasons for their choice. Trustees can expect their actuary to provide sufficient information and explanation for this to be the case.

***Question 2: Have we identified the appropriate principles to apply when choosing prudent funding assumptions?***

[10] Code, paragraph 79.
[11] Code, paragraph 79.
[12] Pensions Act 2004 s230 (1) (a) and code, paragraphs 39 – 41.
[13] Stochastic modelling is based on many simulations of the future, generated by a computer using a mathematical model with random elements.
[14] Code paragraphs 88 – 91.

## Mortality assumptions and the role of trustees

1.15 The code encourages trustees to pay particular attention to assumptions about future mortality.[15] Trustees should bear in mind that mortality has the following features:

- wide variability is observed between individuals;
- there is variability year-on-year in the whole population;
- long-term trends can be observed in age specific mortality of whole populations; and
- historically, experts have usually underestimated the rate at which mortality will reduce (longevity increase).

1.16 Evidence has shown for many years that mortality is steadily reducing, so that the expectation of life (longevity) is increasing. Detailed analysis of this increase shows that it has occurred at different rates in different generations (the 'cohort effect').[16] Evidence also shows that there is significant variation in pensioner mortality by amount of pension.[17]

## What trustees need to consider with their actuary

1.17 There are two basic decisions the trustees need to take on mortality assumptions:

- the base table (including any adjustment) to reflect the scheme's current mortality experience; and
- the allowance for future improvement.

1.18 Trustees can expect their actuary to analyse the experience of their scheme and advise them of the results and their statistical significance. The extent of the analysis that can be meaningfully carried out will depend on the size of the scheme membership.

1.19 Where a scheme has a sufficiently large membership for the analysis of the scheme's own mortality experience to be statistically significant, attention should focus on how well the proposed table fits the experience of the scheme. It may even be possible to create a bespoke table from the scheme's own experience. Trustees should discuss with their actuary an appropriate margin for prudence in these base table rates.

1.20 Actuaries commonly recommend adjusting a standard table in order to reflect better the evidence of the current experience (or expected

[15] Code paragraphs 80 – 81.
[16] CMI Working Paper 30 and the CMI Library of Mortality Projections.
[17] CMI Working Paper 29 – An analysis of the results of the mortality of male and female pensioners of self-administered pension schemes for the period 2000 to 2004 based on data collected by 30 June 2006.

future experience) of a particular scheme. These adjustments can be by various methods, such as treating members as being older or younger than they actually are, or assuming that mortality is a percentage heavier or lighter than that shown in the table, or even a combination of the two.

1.21 Where a scheme does not have a sufficiently large membership for the analysis of the scheme's own mortality experience to be statistically significant, the choice of appropriate table(s), including any adjustments (see below), will need to be guided by consideration and factors known to be correlated with observed mortality. Many of the factors known to have the most direct influence on mortality will not usually be readily available so that proxies will be needed. These commonly include:

- the average amounts of pension;
- the industry of the employer; and
- the residential location of the membership.

1.22 Care should be exercised, however, not to double count the same effect. For example, if an industry is predominantly low-paid it would be wrong to apply both the average industry and size of pension effects when selecting and/or adjusting a table.

1.23 Trustees should discuss with their actuary:

- how the proposed mortality assumptions are justified by the evidence available; and
- an appropriate margin for prudence.

1.24 Having decided on appropriately prudent base tables, the trustees also need to decide how to allow for future improvements. This is an obvious area of great uncertainty. Discussion is likely to centre on an approach from the CMI 'library' of improvement rates. Trustees need to discuss with their actuary:

- relevant recently published data; and
- the appropriateness of an improvement rate underpin, and any particular value for it.

***Question 3: Have we identified the appropriate matters for trustees to consider with their actuary?***

## Illustrating and presenting the impact of mortality choices

1.25 Trustees should ask their actuary to illustrate the effects of different mortality assumption choices in ways that the trustees can understand and which allow them to appreciate the financial effect on the technical provisions. These illustrations may take a variety of forms, such as:

- mortality rates;
- expectations of life;
- annuity factors; or
- effect on technical provisions.

1.26 The regulator expects all the mortality assumptions to be sufficiently clearly set out in the trustees' Statement of Funding Principles as to enable a reader to accurately reproduce the relevant mortality rates for valuation purposes.

***Question 4: Have you any other suggestions for the effective illustration of the impact of mortality choices?***

## Offsetting adjustments in other assumptions

1.27 The regulator considers that an adjustment made to the discount rate (investment return assumption), to make allowance for future improvements in mortality, does not meet the statutory requirement to adopt a prudent mortality assumption.[18] Additionally, as a matter of good practice, an adjustment to one factor to allow for prudence in another factor lacks clarity and risks clouding understanding.

***Question 5: Are we right to discourage allowance for the effect of a factor by way of adjustment to another assumption?***

## Disclosure matters and terminology

1.28 The regulator expects trustees to require their actuary to use the standard terminology as proposed by the CMI when describing mortality assumptions[19] and, when appropriate, to use it themselves both in communications to us and in their own documents. The guidance and help functions available from the regulator's website will enable the information to be presented clearly when recovery plans are formally submitted.

[18] Regulation 5(4)(c) The Occupational Pension Schemes (Scheme Funding) Regulations 2005 SI 2005 No. 3377.
[19] CMI Library of Mortality Projections – November 2007.

***Question 6: Are we right to encourage adoption of the CMI's recommended notation for describing mortality assumptions?***

## Annex to the guidance: Detailed background on evidence and developments in mortality

### Data and tables

1.29 Data on the mortality experience of pensioner members of occupational pension schemes is gathered by both insurance companies (in the case of pensioners whose benefits have been bought out at retirement) and some pension schemes where benefits are retained in the scheme at retirement. Both pass the data to the CMI for analysis and interpretation. Data on the mortality experience of the UK national populations is analysed and published by the Office for National Statistics (ONS).

1.30 Standard tables have been produced for many years which reflect both currently observed mortality and an allowance for future improvements (reductions in mortality). For example, the CMI produced tables based on experienced mortality centred on 1992 (the '92' series pensioner tables) and incorporated an allowance for future improvements. However, there was an underlying assumption that, in the long term, improvement rates would decline to zero from those being observed. The tables enable the mortality at each relevant age to be read off at any particular calendar year (a two-way table).

1.31 Because experienced mortality is observed to be related to the size of pension, the CMI often produces age-specific mortality tables where the rate at each age is an average weighted by pension amounts. Such tables are known as 'amounts' tables. Tables compiled without such weighting are known as 'lives' tables.

### Two-way tables

1.32 Two-way tables, such as the '92' series pensioner tables described above, can be used in two distinct ways. The age-specific mortality rates in any future calendar year allow a forecast to be made of how many deaths will occur at various ages from a given population in that year. However, for pension scheme valuation purposes, it is more useful to have the mortality rates expected to be experienced for a given group of members of a particular age (a cohort) at the valuation date. These rates are to be found as a diagonal of the two-way table, since 65-year-olds in 2008 will be 66-year-olds in 2009, 67-year-olds in 2010 and so on.

### Recent experience, research and the cohort effect

1.33 In the early 1990s, the Government Actuary's Department (GAD), who were responsible for population projections at the time, identified higher rates of mortality improvement for people born between 1925 and 1945 compared to those born either side of that period (the first time the so-called 'cohort effect' had been identified). And in their

1992-based UK population projections, mortality improvements for those born before 1947 were projected on a cohort (year of birth) basis rather than according to age alone.

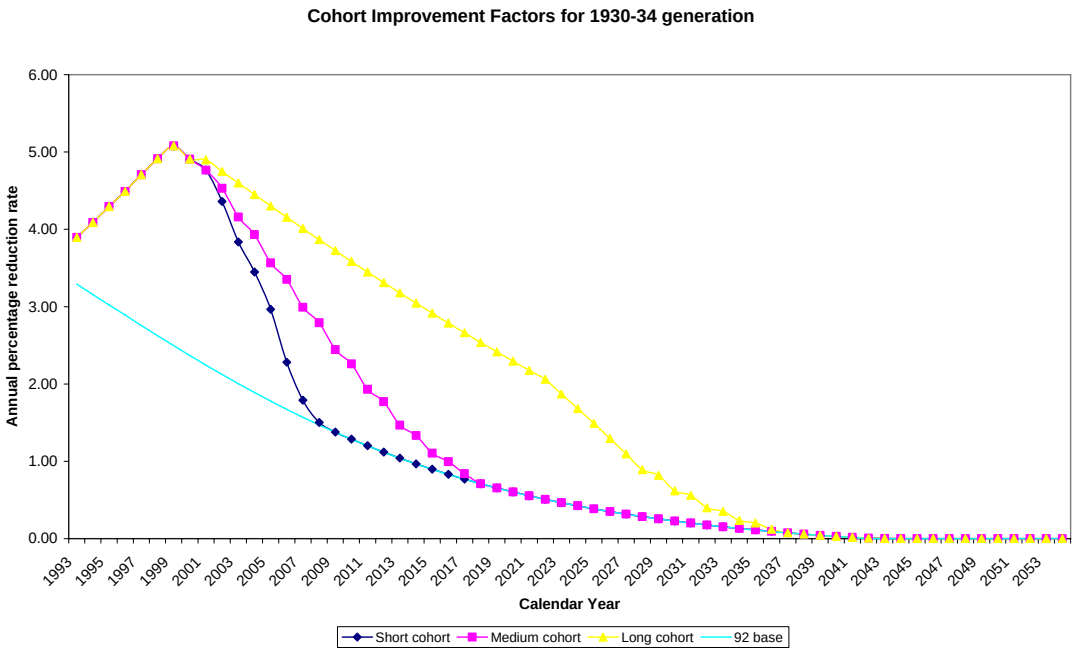
1.34 Research by CMI on their accumulated data in the period after the '92' series tables was published revealed a similar cohort effect to that identified by GAD in respect of those born a few years either side of 1926 (sometimes called the 'golden cohort'). The results of this research were published by CMI in 2001[20] together with three different adjustments to the '92' series tables incorporating higher rates of improvement for this cohort over a number of years, after which the rate of improvement follows the underlying table (whose improvement rates trend to zero). Three adjustments were offered:

- the short cohort, assuming the additional improvement until 2010;
- the medium cohort, assuming the additional improvement until 2020; and
- the long cohort, assuming the additional improvement until 2040.

1.35 The three persistence periods chosen were essentially arbitrary and the CMI offered no opinion as to the relative likelihood of each being actually experienced, nor were any recommended. CMI emphasised, however, that the cohort adjustments offered were an interim step and research into mortality improvements was very much 'work in progress'.

1.36 The chart below illustrates the impact of the cohort adjustments to the '92' series tables in respect of male generations born in the years 1930 to 1934. The upward sloping line from 1993 to 2000 is designed to reflect actual experience from the period on which the original '92' tables were based up to when the adjustments were devised. All three cohort adjustments eventually merge into the improvement rates underlying the basic '92' series table which, as can be seen from the graph, reduce gradually to zero.

[20] See CMI Working Paper 1: An interim basis for adjusting the '92' series mortality projections for cohort effects.




1.37 The importance of the cohort effect is not limited to the golden cohort generation since it is generally assumed that subsequent generations' mortality experience will be lower that of their predecessors.

1.38 In early 2004 a paper was presented to the actuarial profession entitled 'Longevity in the 21st Century'.[21] This did much to raise awareness of current issues in mortality amongst actuaries. The paper noted that *"the last 30 years in particular show a very different pattern to that of the first half of the 20th century. Mortality improvements since 1970 have been strongest in the over 45s and life expectancy for men has been increasing faster than that of women"*. It went on to note that in the 1990s, *"the mortality of people in their 60s has never improved so rapidly"*.

1.39 Also in early 2004 the CMI's mortality sub-committee published a discussion paper[22] on the subject of mortality projections following a joint CMI / GAD seminar on the subject held in October of the previous year at which three key themes had been identified:

- projecting aggregate mortality versus modelling individual causes;
- methodology of projection and statistical methods; and
- limits on human life span and molecular effects on ageing.

[21] 'Longevity in the 21st Century' by RC Willets *et al*, available from actuarial profession's website: www.actuaries.org.uk.
[22] CMI Working Paper 3.

Various projection methods were discussed in the paper including P-Spline and Lee-Carter methods as well as the need to model uncertainty. The intention of the paper was to stimulate discussion. Further papers have followed exploring stochastic approaches and P-Spline and Lee-Carter methods in some depth.[23]

**The '00' Tables**

1.40 In July 2006, the CMI published results of a later investigation relating to the 1999–2002 experience, called the '00' series tables. However, these '00' tables did not incorporate any projections of further improvement. The actuarial profession decided not to adopt an 'approved' projection in association with the '00' tables because of increasing uncertainty surrounding these projections. Instead, it offered users two software methodologies, the P-Spline and the Lee-Carter methods, which could be employed to create projections based on any suitable database of mortality experience. Both methodologies are, in effect, just projections of past experience, though the software allows users to place more or less emphasis on recent trends. Where one or other of these methods is suggested by the actuary for use with a scheme, the trustees should discuss with the actuary the features of the method and why it is being put forward for consideration.[24]

**Population data and projections**

1.41 The ONS analyses population data, publishes mortality tables and makes projections of UK and constituent country populations. They generally publish these projections every two years. The latest projections are based on the 2006 experience and use a methodology which targets a rate of mortality reduction in 25 years' time of 1% pa (with higher rates applicable to cohorts born between 1923 and 1940, peaking at 2.5% pa for those born in 1931). So-called 'variant' projections are also published, targeting 2% and 0% improvement rates respectively. Improvement rates are assumed to move smoothly to the target from currently observed rates and remain at the target thereafter.

**Occupational pension scheme data**

1.42 Since January 2003, the CMI has been collecting and analysing data from self-administered pension schemes (SAPS), that is from schemes which pay pensions directly out of scheme assets rather than purchase annuities from insurance companies. SAPS represent the great majority of defined benefit schemes. Consequently, this experience is likely to be highly relevant when choosing funding assumptions for such schemes. Some initial results were released in 2004 with further updates in 2005 and 2007. The data collected has

[23] See CMI Working Papers 11, 15, 20 and 25.

[24] For more discussion of features and relative merits of P-Spline and Lee-Carter in the UK context see CMI working papers 20 and 25. Other experts in the field have published alternative methodologies, see foe example Pensions Institute discussion paper PI-0611 by Cairns, Blake and Dowd. Some of the methodologies are more able to cope with the cohort effect (such as the golden cohort) than others.

enabled various analyses to be carried out which have revealed a strong relationship between longevity and size of pension, particularly for men. In January 2008, the CMI has published a proposed range of SAPS mortality tables which can be expected to come into common use for future scheme valuations.

**The CMI library and standard terminology**

1.43 In response to the lack of 'official' projections for the latest '00' series tables, the CMI has launched a library of examples of potential projection methods. They have also proposed a standard terminology to describe tables and projections.[25]

1.44 When considering an appropriate allowance for mortality improvements trustees should bear in mind that the CMI informs actuaries that:

- it is very important to note that none of the projections is recommended for any particular situation and their inclusion in the library does not imply suitability;
- the fact that a projection is not included in the library does not imply that it is unsuitable; and
- provision of the library does not take away the need for individual actuaries to use their judgement and make recommendations best suited to the scheme.

**The regulator's experience**

1.45 An analysis of 1,138 recovery plans in the first wave submitted to the regulator and covering valuation dates from September 2005 to April 2006 revealed that:

- 97% of schemes had adopted base tables based on the CMI's '92' series tables and 2% the '00' series26;
- 33% of schemes did not allow for the cohort effect, with 11% adopting the short cohort and 55% the medium cohort;
- 36% of schemes had used a calendar year approximation approach, that is, using rates applicable to a single future year; and
- the average improvement in age 65 mortality rates assumed by schemes over 20 years was 1.9% pa. This compares with the rate of improvement implicit in the '92' tables of some 2.2% pa over the same period.

In addition to the developments in the actuarial profession, the regulator's own experience of the nature and presentation of mortality assumptions in this first group of recovery plans is one of the motivations for this new guidance. As we said in our September 2007

[25] CMI Working Paper 30 and the CMI Library of Mortality Projections.
[26] The "00" series tables were published in August 2006.

initial analysis of these recovery plans, “we would expect future recovery plans to take into account more recent arguments for strengthening assumptions to reflect the latest data”.

## Projection Methods

1.46 Methods of allowing for future improvements in common use, examples of which are to be found in the CMI library, fall into two basic types:

- those which take a volume of past data and project trends forward in some way (though some relationships can be assumed to apply); and
- those which make some assumption about the state of play some time in the future and then project forward by a smooth transition from the current experience.

1.47 The main advantage of the former type is that no view of the future need be taken, as implicitly the future is regarded as being capable of prediction from past trends alone. The disadvantage is that where a view of the future is held, for example based on the pace of medical advances, it is difficult to incorporate. For the latter type these advantages and disadvantages are reversed. Trustees should discuss these approaches with their actuary.

1.48 A third type of model focuses on the underlying causes of death. Most experts currently take the view that these causes, and particularly their interrelationships, are not yet well enough understood to make these models a viable proposition at the current time.

1.49 There will be few schemes with a sufficient volume of past mortality data from which to project a scheme specific trend. Trustees will therefore have to rely on evidence of trends disclosed by research on larger aggregations of data (eg as collected by CMI or ONS).[27] Trustees should discuss with their actuary the merits of the various approaches. The emphasis should be on considering the latest available evidence. In this context trustees should be aware that the so-called ‘cohort’ projections (short, medium and long), originally designed as adjustments to the CMI ‘92’ series tables, all assume (as do those underlying tables) that improvement rates tail off to zero in the long term.

1.50 The regulator considers that the dangers of using projections that assume that the rate of improvement in mortality will tail off to something close to zero in anything other than the long term are such that their use can no longer be considered prudent.[28] The two

[27] CMI Working Paper 30 and the CMI Library of Mortality Projections.
[28] Section 10 of CMI Working Paper 27 has data on improvement rates which does not support a decline from 1992 at pension ages.

presidents of the actuarial profession sent a letter to all actuaries holding scheme actuary certificates on 10 July 2007 in which they wrote: *"The Interim Cohort projections, issued by the CMI in 2002, were only intended as a short-term stop-gap and assumed a fall in the rate of mortality improvement from the levels experienced up to their publication. High rates of improvement have continued since that time, so that the Short Cohort and Medium Cohort projections in particular now imply a rapid tail-off in future rates of improvement in mortality and show a very different pattern from recent data published by the CMI and ONS. The extent to which the pace of improvements in mortality might be sustained in future is a matter on which there is, rightly, a range of views, both within the Actuarial Profession and in the wider community of demographers and other experts. We encourage all actuaries to compare recent experience with the future rates of improvement within any projections they are considering recommending."*

1.51 Some experts are advocating that projected improvement rates for current use should be subject to a minimum value. Evidence for this view comes from past trends. For example, analysis of published mortality for England and Wales centred on 1931, 1961, 1981 and 2003 show the following overall annualised rates of improvement:[29]

| Period | Males | Females |
|---|---|---|
| Last 22 years | 2.0% pa | 1.3% pa |
| Last 42 years | 1.5% pa | 1.3% pa |
| Last 72 years | 1.2% pa | 1.2% pa |

1.52 The Board of the Pension Protection Fund (PPF) chose to apply a 1.5% pa underpin and 1% pa underpin to male and female improvement rates respectively to the long cohort projections. This decision is highlighted in the PPF's Report and Accounts available on its website.

**Illustrating the impact of mortality assumptions**

1.53 It is not always immediately apparent how different mortality assumptions translate into liability values (the technical provisions for example), and this is clearly a matter which trustees will need to discuss with their actuary. The effect for any particular scheme will be highly dependent on the accrued benefit structure by age of the membership. One useful method of illustration, and one used by the CMI,[30] is to compare the cost of a unit of pension (annuity value) at one or more selected ages.

[29] Analysis relates to England and Wales. Based on comparison of 2002–04 Interim Life Tables with English Life Tables for 1930–32, 1960–62 and 1980–82. Source: ONS / GAD.
[30] See CMI Working Paper 27.

1.54 As an illustration, some comparative single life annuity values at age 65 assuming a discount rate of 5% pa are given in the table below.[31] The annuities are based on the '00' series amounts tables.

| Improvements in line with: | Male annuity | Relative value | Female annuity | Relative value |
|---|---|---|---|---|
| '92' series | 12.542 | 100% | 13.444 | 100% |
| Short cohort | 12.815 | 102% | 13.676 | 102% |
| Medium cohort | 13.033 | 104% | 13.879 | 103% |
| Long cohort | 13.503 | 108% | 14.339 | 107% |
| Medium cohort (1.0% minimum) | 13.109 | 105% | 13.977 | 104% |
| Medium cohort (1.5% minimum) | 13.226 | 105% | 14.111 | 105% |
| Long cohort (1.0% minimum) | 13.546 | 108% | 14.393 | 107% |
| Long cohort (1.5% minimum) | 13.601 | 108% | 14.459 | 108% |

**Year of birth and calendar year approximations**

1.55 As noted above, it is the diagonals of mortality tables incorporating future improvements which would most naturally be applied to calculate the relevant annuities for a person of a particular age. Some valuation computer systems in use may not be able handle such a two-way table, in which case an approximate approach will be needed. One common approximation is to choose one particular diagonal for a range of ages. Typically one diagonal may be chosen for all current pensioners, another for non-pensioners. The particular diagonals chosen will be informed by the liability profile of the membership. For example, if the average[32] age of pensioners is 70 at a valuation date in 2008, the diagonal for year of birth 1938 might be chosen and used for all pensioners. Similarly, if the average age of non-pensioners is 45, the diagonal for year of birth 1963 might be

[31] Source CMI Working Paper 27 where the reader will find further details of the annuity values' derivations.
[32] In this context the 'average' age might be obtained after liability weighting.

chosen. Trustees will need to discuss any suggested approximations along these lines with their actuary.

1.56 The Turner Report[33] recommended that illustrations of life expectancy should follow the year of birth (cohort) approach, and the regulator agrees.

1.57 An alternative approximate approach often seen is to adopt rates applicable to some selected future calendar year. As with the approximate year of birth approach described above, a different future year might be adopted for different groups such as pensioners and non-pensioners. For example, for a valuation date in 2008, rates projected to 2018 might be adopted for pensioners with rates to 2038 for non-pensioners. Trustees will need to discuss any suggested approximations along these lines with their actuary. However, the theoretical justification for the calendar year approximation is less clear than for the year of birth approach, not least with respect to how the appropriate years are chosen.

***Question 7: Is this background material helpful? Have you anything further you would like to see included?***

[33] A New Pension Settlement for the Twenty-First Century: the second report of the Pensions Commission, Chapter 7 Section 5.

# Section two: The regulator's proposals for regulating mortality improvement assumptions

## 2 Why we need to modify our approach

2.1 The regulator is concerned to ensure that trustees make appropriately prudent choices for the key assumptions needed for technical provisions. We regard assumptions about mortality as key assumptions.

2.2 Important work by the Government Actuary's Department, the Continuous Mortality Investigation (CMI) of the Actuarial Profession and the Office for National Statistics has for a number of years been highlighting rapid reductions in mortality (increases in longevity). This evidence is discussed in detail in the Annex to the guidance in section one, referencing important publications by the CMI, for example in 2001 and 2004. In July 2007 the two presidents of the actuarial profession noted that high rates of improvements in mortality (which had persisted since projections issued by the CMI in 2002) meant that assuming a very rapid tail-off in future rates of improvement in mortality showed a very different pattern from their recent published data and that of the Office for National Statistics. At the time, the regulator welcomed this important statement.

2.3 In September 2007 the regulator published its initial analysis of filed recovery plans.[34] In line with the statement from the actuarial profession and the growing evidence base on mortality, the regulator said that it would expect future recovery plans to reflect the latest data suggesting that mortality is continuing to decline at historically high rates. Consequently, although the great majority of schemes had adopted future projections now not considered reasonable, we expect later tranches of filed recovery plans to show a move to a strengthening of the assumptions used.

2.4 In valuing their own liabilities for the purpose of their 31 March 2007 accounts, the Board of the PPF[35] have chosen to assume mortality improvements in line with the long cohort projection with an underpin (1.5% pa for men, 1% pa for women). The second edition of the 'Purple Book' (December 2007)[36] highlighted evidence on mortality, showing that two years of extra life could add 5% to pensioner liabilities. In a consultation launched in February 2008, the PPF have

[34] Recovery plans: an initial analysis – the Pensions Regulator, September 2007.
[35] The PPF is responsible for paying compensation benefits to members of eligible defined benefit schemes when the sponsoring employer has suffered a qualifying insolvency event and there are insufficient assets in the pension scheme to cover the PPF levels of compensation.
[36] The Purple Book 2007 (DB pensions universe risk profile) – Pension Protection Fund / the Pensions Regulator.

taken current market experience and, in accordance with their principle of deliberately erring on the side of optimism, have decided that s179 valuations should be based on a mortality assumption of medium cohort with a 1% underpin.

2.5 The regulator's existing guidance requires that when determining their mortality assumptions, trustees will need to demonstrate, supported by actuarial advice, that the assumptions used for future improvement are overall of sufficient strength to be justified given the recent evidence. The assumptions on future improvement will not normally have good cause to be scheme specific unless a scheme's own experience is very extensive and sufficiently stable in comparison.

2.6 Given the combination of data over a number of years, the statements by the actuarial profession and the experience of the first recovery plans and scheme returns, the regulator will build on its current approach for the scrutiny of mortality assumptions.

2.7 **For recovery plans based on valuations with effective dates from March 2007, mortality improvement assumptions that appear to be weaker than the long cohort assumption will attract further scrutiny and dialogue with the trustees where appropriate. Furthermore, assumptions which assume that the rate of improvement tends towards zero, and do not have some form of underpin, will also attract further scrutiny.**

2.8 This approach builds on what we do at the moment when technical provisions breach our trigger levels, in that we look closely at the assumptions chosen. However, our previous emphasis has been on the overall level of technical provisions. Our proposal will now also focus attention on a key assumption for which new evidence has been emerging for a number of years.

2.9 This approach still gives us flexibility to take into account the latest evidence in deciding what is reasonable. It emphasises that the trustees are the decision makers but must make rational decisions based on evidence. This highlights the crucial role of the actuary in explaining this guidance, and the impact of different mortality assumptions. It allows schemes to adopt modern projection techniques if appropriate. It reinforces the key messages from our guidance, and it makes a clear statement about any assumption which incorporates improvement rates tailing off to zero as no longer being considered prudent.

2.10 Schemes should bear in mind that, although stronger mortality assumptions will lead to an increase in liabilities, all other things being equal, the scheme funding provisions and our code of practice, allow employers to meet the extra cost over a period consistent with affordability under a recovery plan.

***Question 8: Do you agree that a focus on mortality improvement assumptions is appropriate?***

***Question 9: Do you agree that our proposal offers the best way for the regulator to identify mortality improvement assumption risks?***

***Question 10: If your answer to question 9 is no, what other approach would you prefer and why?***

# Section three: The consultation process

This section explains how the consultation process works.

## Consultation responses

The consultation will last for 12 weeks from the date of publication.

## Arrangements for written responses

Responses to this document should be sent to:

Peppi Knott
The Pensions Regulator
Napier House
Trafalgar Place
Brighton BN1 4DW
email: mortalitydb@thepensionsregulator.gov.uk

## Publishing a summary of responses

The regulator will publish a summary of responses at: www.thepensionsregulator.gov.uk. Paper copies will be available on request.

This consultation is being conducted in line with the Better Regulation Executive's code of practice on consultation. The code can be accessed at: www.cabinetoffice.gov.uk/regulation/Consultation/Code.htm.

We would welcome any feedback on the effectiveness of this consultation process. If you have any comments, please contact:

Ken Young
Head of Communications
The Pensions Regulator
Napier House
Trafalgar Place
Brighton BN1 4DW
Tel 01273 627648
e-mail: ken.young@thepensionsregulator.gov.uk

## Summary of specific questions for consultees

(Comments on any other relevant matter are welcome)

*Question 1: Do you agree that we should issue guidance on this subject?*

*Question 2: Have we identified the appropriate principles to apply when choosing prudent funding assumptions?*

*Question 3: Have we identified the appropriate matters for trustees to consider with their actuary?*

*Question 4: Have you any other suggestions for the effective illustration of the impact of mortality choices?*

*Question 5: Are we right to discourage allowance for the effect of a factor by way of adjustment to another assumption?*

*Question 6: Are we right to encourage adoption of the CMI's recommended notation for describing mortality assumptions?*

*Question 7: Is this background material helpful? Have you anything further you would like to see included?*

*Question 8: Do you agree that a focus on mortality improvement assumptions is appropriate?*

*Question 9: Do you agree that our proposal offers the best way for the regulator to identify mortality improvement assumption risks?*

*Question 10: If your answer to question 9 is no, what other approach would you prefer and why?*