

## Pensions Newsletter No 12

### Mortality assumptions for public service pension schemes

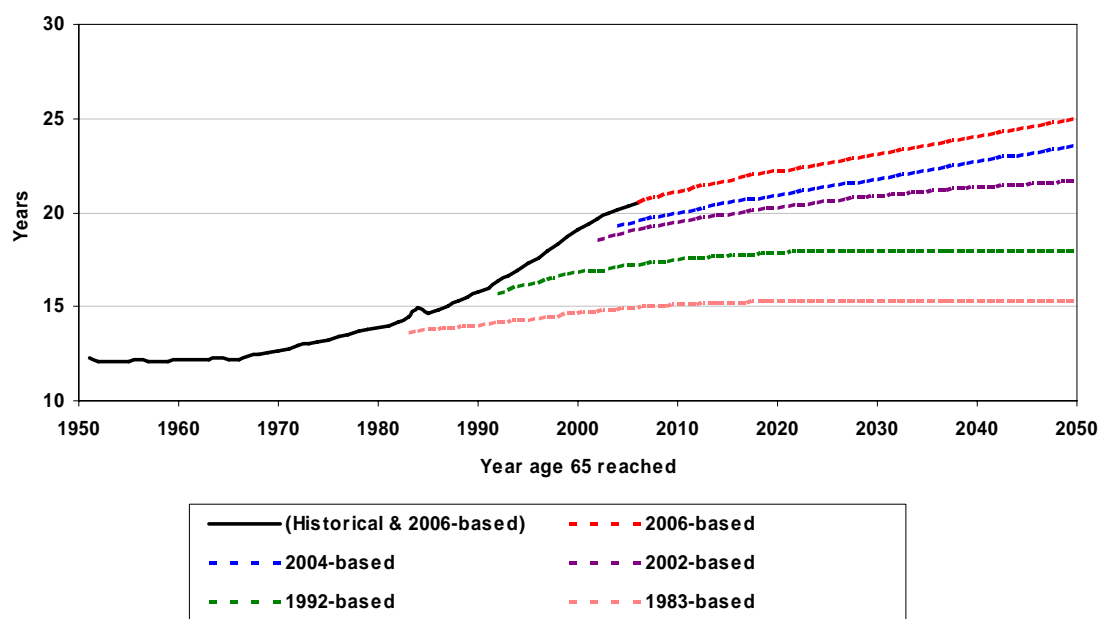
#### Introduction

Actuarial calculations rely on a number of assumptions, both financial and demographic. One of the most important is how long people will live after retirement. We all die at some point. When we are likely to do so depends upon many factors such as our age, gender, where we live and what we earn. Mortality has also improved considerably over time. As an illustration, those aged 50 to 70 in the UK were about twice as likely to die within a year 50 years ago compared to now.

The rapidity of change creates a challenge: how much change will there be in future? There are many studies which have tried to answer this critical question. Some have looked at the main drivers of past change: for example, decreases in smoking and medical advances, and tried to predict how similar developments might emerge in future. Others have argued that there are new factors which will bring improvements to an end such as obesity or resistant strains of previously treatable diseases. Some have simply extrapolated the past trends. In short, views vary enormously. But the consensus is that life will continue to lengthen even if we don't know by how much.

The graph below shows how the expected length of life for a man at age 65 has developed and how assumptions for the future have changed.

Male cohort expectation of life\* at age 65



\* These life expectancies are cohort life expectancy figures: a measure which incorporates actual and projected future mortality improvements. For, say, a 65 year old in 2008 the life expectancy is worked out assuming that the pensioner experiences the projected mortality rate for age 65 in 2008, age 66 in 2009, age 67 in 2010 and so on.

If we underestimate future improvements the cost of the pensions paid in coming decades will also be underestimated. And the contributions made as a financing mechanism for pension schemes will, all other things being equal, be too low. On the other hand, if people don't live as long as assumed we may have locked money away unnecessarily. So how can mortality assumptions be set?

**Setting mortality assumptions**

The developments over recent years lead us to model mortality by a two-stage process. First we estimate current mortality for the pension scheme, ideally using its own experience data. Then we apply a set of improvements to obtain assumptions for future years. But what improvements do we use?

GAD's policy has been to assume, as a starting point, future levels of improvement in mortality broadly in line with those used for the UK national population projections. These improvements build on the views of experts in and beyond government – including GAD. The membership of public service schemes across the UK is diverse: not dissimilar to the general population. And these assumptions are used for the assessment of other long term costs falling on the public purse.

**Revised assumptions**

In 2007, the Office for National Statistics published the 2006-based UK national population projections. Using these new projections results in a significant change from our previous assumptions, which reflected the 2004-based population projections. In part this comes from the projection changes and in part from a fuller alignment than we had previously. The table below shows the relative levels of future improvement assumed in life expectancies of a 65 year old in the 2004 and 2006 based population projections, in order to illustrate the degree of change in our assumptions.

**Life expectancies (years) at 65**

	Males		Females	
	2004-based projections	2006-based projections	2004-based projections	2006-based projections
Life expectancy in 2008 with no future improvements	17.6	17.8	20.1	20.2
Life expectancy* for a current pensioner (age 65 in 2008) with future improvements	19.8	20.8	22.4	23.3
Life expectancy* for a future pensioner (age 65 in 2028) with future improvements	21.6	22.9	24.1	25.2

\* These life expectancies are cohort life expectancy figures.

**Presentation**

The actuarial profession publishes standard tables of mortality rates derived from extensive analysis of information it collates from insurance companies. A new standard table based on data from 1999 to 2002, known as the PN00 series, was released in September 2006. The previous tables are known as the PA92 series, based on mortality rates for 1991-94 and projected forwards. (The profession is currently working on a project to produce a series of tables using data from pension schemes, to be known as the SAPS tables.)



The PN00 series gives a snapshot of mortality. Accompanying them is an extensive library of assumptions for future improvements. This is a tool to help actuaries advising those running schemes to develop their assumptions. (The SAPS tables are likely to provide a similar snapshot of mortality rates.) By contrast, the PA92 series was published with one principal set of future improvements and a small number of variants.

In keeping with common actuarial practice we previously expressed our mortality assumptions in terms of the PA92 series, but in a way which approximated our objective of broadly matching the population projection assumptions. It is not inappropriate to continue to use the PA92 series in this way – but it may appear so. Presentationally we think it will be better if we use the latest tables and make our assumptions on future changes in mortality more transparent. We have developed our calculation tools to allow us to do this.

For accounting calculations as at 31 March 2008 we described the scheme specific mortality in terms of the PA92 series and used future mortality improvements in line with the latest, 2006-based, population projections. We will be moving to express the scheme mortality in terms of the PN00 tables as full scheme valuations are undertaken and we can determine the best fit for each scheme.

We will also be analysing the SAPS tables when they become available, with a view to expressing scheme mortality in terms of the SAPS tables in due course. The timing of any move to the SAPS tables will again be determined by the valuation cycle.

### **Impact**

The effect of a change in the mortality basis on a scheme's liabilities depends on individual factors such as the age and gender profile of the membership, the balance between current and former members and of course the benefits payable.

On its own, a strengthening of longevity as explained above would be expected to increase the cost of accruing benefits in a typical public service scheme by around ½% to 1% of pensionable pay, together with a much more significant increase to allow for the effect on past service liabilities. Remember that changing the allowance for expected future life expectancy will be only one factor affecting the outcome of the next actuarial valuation. There may well be others which may act in the same or the opposite direction.

### **To find out more ...**

... or to discuss the potential impact this might have on your scheme please contact your usual GAD advisor or email [research@gad.gov.uk](mailto:research@gad.gov.uk).

**September 2008**