

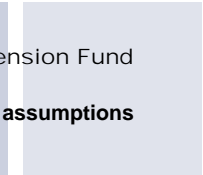
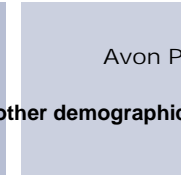
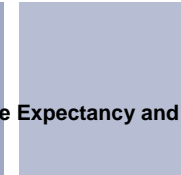
Avon Pension Fund

Life expectancy and other demographic assumptions

Summary Report

September 2010





Avon Pension Fund

Life Expectancy and other demographic assumptions

Summary

Executive Summary – cost/saving impacts

Future changes in life expectancy

In the UK, life expectancy has increased from year to year for a long period of time, with higher improvements being seen over the last 25 years, particularly for men.

Baseline life expectancy – key results comparison with 2007 valuation assumptions

- Males – no change in life expectancy for normal health members.
- Females – reduction in life expectancy for normal health members. The change at age 65 is a reduction of around 0.2 years.
- An increase in life expectancy for ill health retirees and a reduction in life expectancy of dependant members.
- Liabilities broadly unchanged due to baseline life expectancy.



Allowance for future improvements from revised baseline assumption

We recommend increasing the allowance for improvements in the longer term and at the same time adopting new projection methods released by the CMI. The financial effect of this is an increase of around 5% on past service liabilities. The combined effects of the changes to life expectancy are to increase the value of past service liabilities by around 5% and increase the future service contribution rate by around 0.9% of pay.

Dependants and ill health retirement assumptions

The analyses show that there is justification for modifying the assumptions adopted at the 2007 valuation. The impact of making the recommended changes to the assumptions for both dependants' benefits and ill health retirements would be for a reduction, on average, in the future service contribution rate by approximately 1.0% of pay and a reduction of approximately 2.5% of past service liabilities.

Overall Impact of changes to Demographic Assumptions

- An increase of 2.5% on past service liabilities
- A saving of 0.1% p.a. of pay on future service contribution rate

Benchmarking

Section 2 of the report shows the range of outcomes in terms of baseline life expectancy for all the LGPS Funds included in the study. It shows that the Avon Fund life expectancy is towards the higher end of the spectrum of outcomes.



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Appendices

- A. Results expressed as adjustments to a standard actuarial table

This summary report is addressed to the Administering Authority of the Avon Pension Fund (“the Fund”) for the purpose of setting appropriate life expectancy and other demographic assumptions for the 2010 actuarial valuation:

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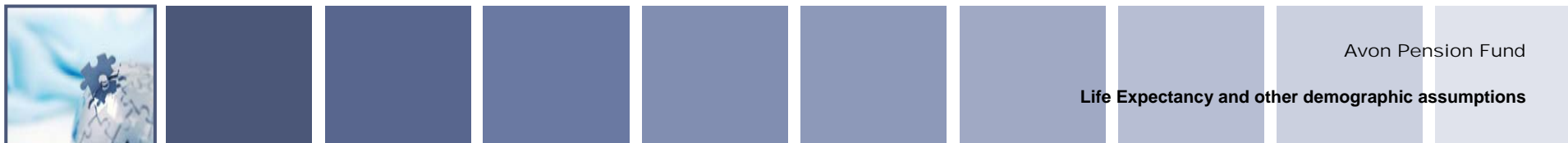
Results and Recommendations

Introduction

- 1.1 The figures in this report relate to the Fund as a whole and the impact on individual employers may well vary from the Fund-wide position.
- 1.2 The life expectancy study focussed on the experience of retired members. Consequently, we do not recommend applying the results of the study to members during the period prior to retirement. Therefore, for active and deferred members, we have retained the same level of prudence for pre-retirement life expectancy as was adopted at the 2007 valuation.

Choosing a life expectancy table

- 1.3 The table currently used by the Fund is based on the experience data from UK life insurance companies in the early 1990s. Since the Fund's last valuation, new tables have been released from an academic study carried out into the life expectancy of members of a large number of UK occupational pension schemes (the SAPS study). The actuarial tables resulting from the study are not only the most up-to-date tables available for general use in the UK but are also the most relevant for the Fund given that they are based on the experience of beneficiaries of UK occupational pension schemes.
- 1.4 We recommend that you adopt these new SAPS tables as the basis of your baseline life expectancy assumption. The names of the table which you will see in formal documents are:



- For female dependants - the S1DFA table – based on the experience of female dependants
- For all other members – the S1PMA or S1PFA tables based on the experience of male and female normal retirements respectively.

Full details are set out in the Appendix.

Adjusting the table for the Fund beneficiaries’ characteristics

- 1.5 We have carried out a study of our LGPS clients’ beneficiaries’ life expectancy. By analysing the data in aggregate for a number of clients, we were able to consider a large set of data, which increases the reliability and credibility of our findings. The study observed over 1.5 million years of life which is broadly similar to the data set used as the basis for the PA92 table that you currently use. The study considered how the life expectancy of LGPS beneficiaries varied by the characteristics of the schemes’ beneficiaries.
- 1.6 A number of academic studies have demonstrated that a beneficiary’s age, gender, wealth and lifestyle collectively go a long way to explaining variations in life expectancy. Beneficiaries’ postcodes are used to capture the “lifestyle” factors.
- 1.7 These factors are used to sort the beneficiaries into notional groups with similar characteristics. Equating the Fund beneficiaries in each group to pensioners with the same characteristics in the wider LGPS study gives a credible estimate of the life expectancy of the Fund’s beneficiaries.

Results

- 1.8 **Figure 1** shows the assumption in a number of ways:
 - The average life expectancy at age 65;
 - How the assumption compares to the Fund’s existing life expectancy assumption at age 65.
 - The impact on the Fund’s liabilities

Remember that these measures are before considering future changes in life expectancy.



Figure 1: Pensioners - baseline life expectancy	Life expectancy at 65 in 2010	Difference to existing assumption*	Approximate liability impact
Males normal health	20.1	0.0	Liabilities broadly unchanged
Female normal health	22.7	-0.2	
Males ill health	17.6	+1.7	
Female ill health	20.2	+1.5	
Male dependants	18.7	-1.4	
Female dependants	22.1	-0.8	

*The results shown above are illustrated as life expectancies at age 65. The life expectancies used for the 2010 valuation will be taken from a full actuarial table and the impact will vary with age.

The life expectancies and liability impact are before considering future changes in life expectancy which are discussed below.

Future changes

- 1.9 Increases over time in actual lifetimes are not new – they have been observed across the UK population for over a hundred years and a large volume of data and many studies exist for both the UK and internationally.
- 1.10 **Figure 2** shows life expectancy at age 65 for males, based on an average for the UK in general, and highlights the acceleration in increases in life expectancy in recent years.
- 1.11 All available data relates to past increases in life expectancy only. Based on this information, you need to estimate future changes in life expectancy.

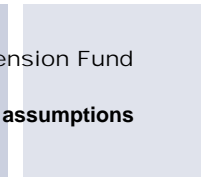
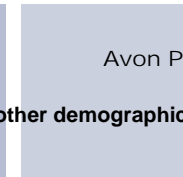
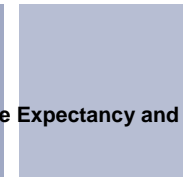
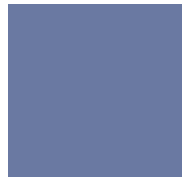
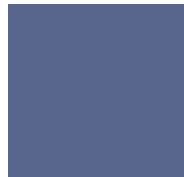
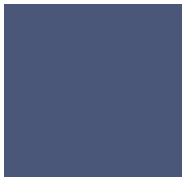
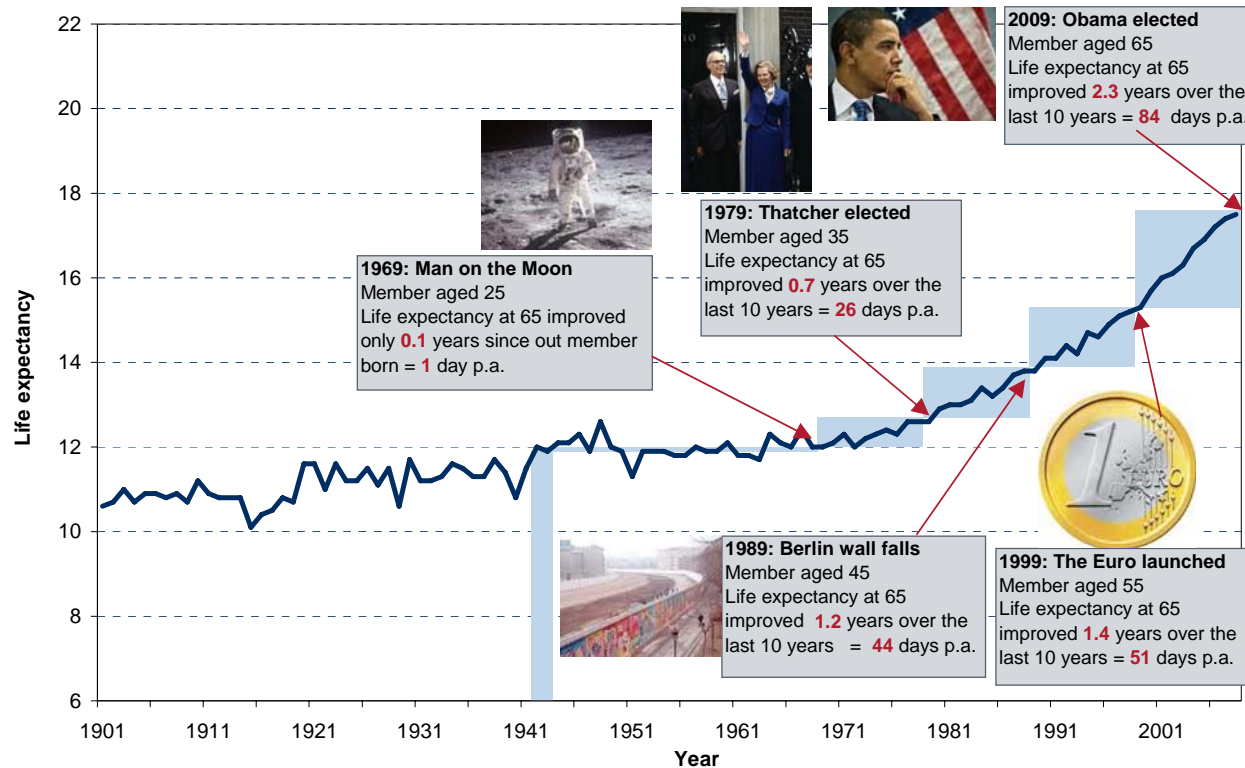


Figure 2: Male UK life expectancy since 1901



The above chart shows the increase in average UK male life expectancy at age 65 (dark blue line), allowing only for improvements up to the year in question. The paler blue boxes illustrate how life expectancy has increased in recent years for a male aged 65 in 2009. The key observations are that:

- For much of the 1940s, 1950s and 1960s, increases in life expectancy were gradual, improving at an average of 1 day per year



- Since 1969, increases in life expectancy have been higher in each decade, with each decade showing successively higher increases than the previous one.
- Over the last forty years, life expectancy has increased by 5.6 years. This represents an increase of nearly 50% on the life expectancy of a male aged 65 forty years ago.

A new way to estimate future changes in life expectancy

- 1.12 In late 2009, the Continuous Mortality Investigation (the “CMI”, a body established by the UK actuarial profession to carry out research into life expectancy) released a new methodology for estimating future changes in life expectancy. This new methodology replaces the Cohort Projections.
- 1.13 **Figure 3** considers three alternative scenarios for the long-term change in life expectancy based on the CMI methodology, plus the Fund’s existing assumption. Set out in the table are life expectancies from age 65 for normal health pensioners for both a member aged 65 now and a member currently aged 45. The figures under the future improvement scenarios represent the improvements in addition to the proposed baseline life expectancy in the first row. In addition, the approximate impact on the Fund’s liabilities is shown.

Figure 3:	What it corresponds to in terms of past observations	Life expectancy at 65, aged 65 now)		Life expectancy at 65, aged 45 now		Overall liability impact
		Male	Female	Male	Female	
New baseline:	Changing the baseline as per section 1. No further changes beyond the current date. Other scenarios below adopt the new proposed baseline.	85.1	87.7	85.1	87.7	n/a
Existing future	The Fund’s current assumption of Medium Cohort	+1.1	+1.2	+2.1	+2.1	Reference point



Figure 3:	What it corresponds to in terms of past observations	Life expectancy at 65, aged 65 now)		Life expectancy at 65, aged 45 now		Overall liability impact
		Male	Female	Male	Female	
Scenario 1: CMI model with 1% p.a. long term	Broadly equivalent to past increases observed over the last 100 years. Short-term increases continue at recently observed levels in the short term (around 70 days per year over the last 20 years), but falling to around 25 days per year as an individual currently aged 45 turns 65.	+1.9	+1.9	+3.3	+3.5	+2%
Scenario 2: CMI model with 1.5% pa long term	Slightly above the last 50 years' average. Short-term increases continue at recently observed levels but fall to around 35 days per year as an individual currently aged 45 turns 65.	+2.4	+2.5	+4.7	+5.0	+5%
Scenario 3: CMI model with 2% pa long term	Broadly equivalent the last 25 years' average. The trend continues close to the last 25 years' average with increases of around 50 days per year as an individual currently aged 45 turns 65.	+3.0	+3.2	+6.2	+6.5	+7%

Conclusion

- 1.14 Changes to life expectancy can only ever be known with certainty with the benefit of hindsight. The long-term value for change in life expectancy is inherently more subjective than the baseline life expectancy and we recognise that there is a range of assumptions for the long-term value which could be considered reasonable.
- 1.15 Scenarios 1 and 2 set out in **Figure 3** above represent increases in life expectancy observed in the UK over prolonged periods of time. Scenario 3 represents a scenario broadly in line with improvements for males over the last 25 years, however part of the increases over this period are explained by the Cohort Effect.

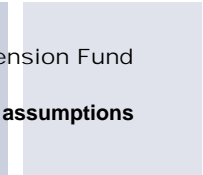
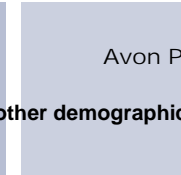
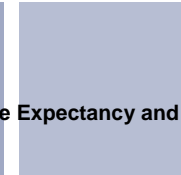


Avon Pension Fund

Life Expectancy and other demographic assumptions

Recommendation

- We recommend that the Fund adopts the CMI methodology with long term improvements of 1.5% p.a. (i.e. scenario 2 under section 1.13) in determining assumptions for future changes to life expectancy.
- This builds in a long term improvement over the baseline table in life expectancy, from age 65, of 2.4 years for a male member currently aged 65 and 4.7 years for a male member currently aged 45. This is consistent with historical evidence from the last 50 years which we have assumed applies to the Fund's beneficiaries as described earlier.
- The minimum future improvement rate of 1.5% p.a. gives an additional reserve against adverse experience (and therefore a higher probability that the assets will be sufficient to meet the required benefits).
- The formal names of the actuarial tables are set out in Appendix A.
- The combined effects of the changes to life expectancy are to increase the value of past service liabilities by around 5% and increase the future service contribution rate by around 0.9% of pay.

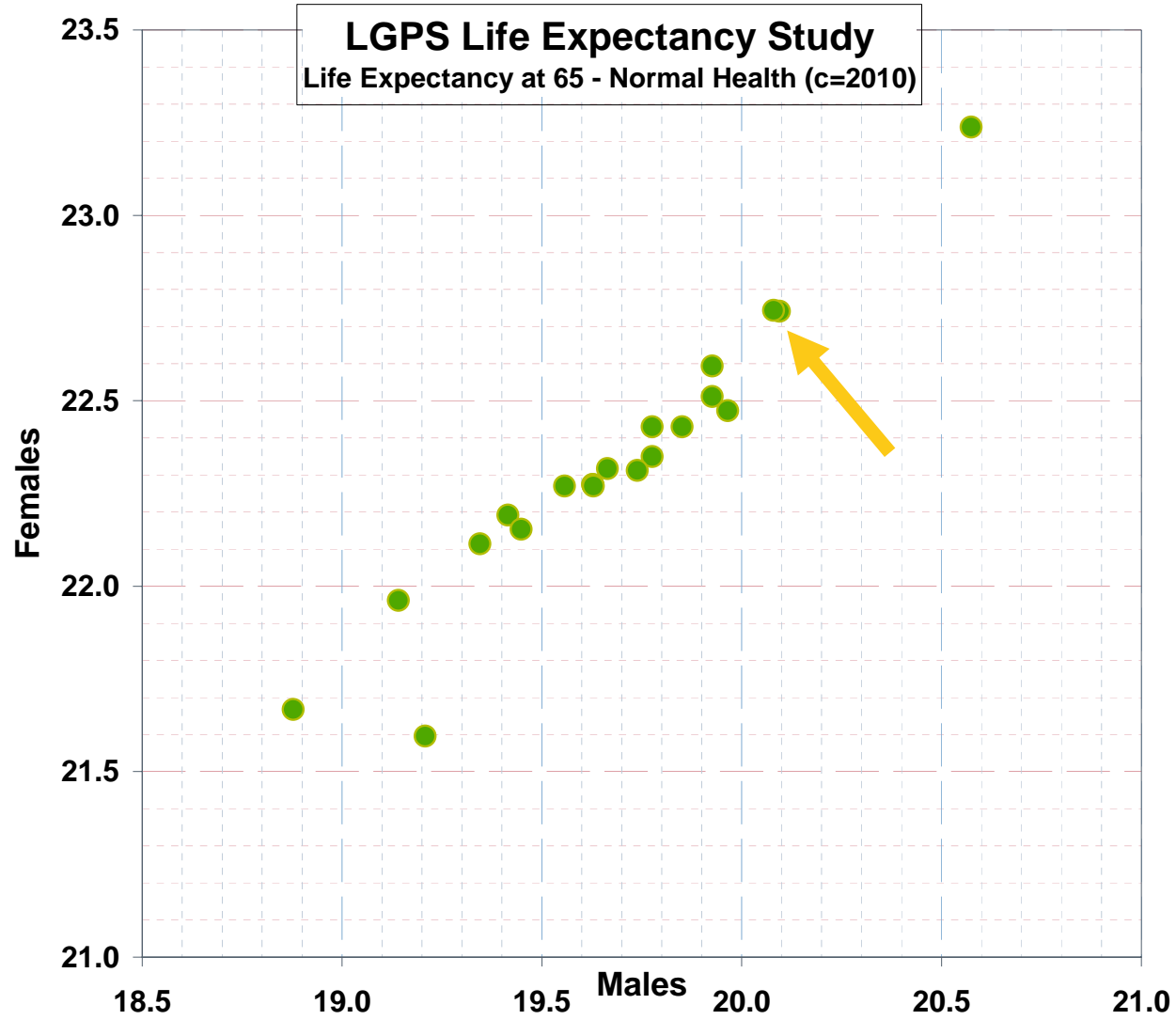
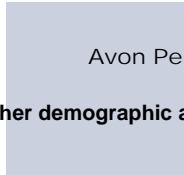
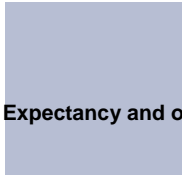


Life Expectancy and other demographic assumptions

2

Benchmarking

- 2.1 A range of life expectancies across LGPS Funds emerges from this exercise. This is summarised in the following chart, with your Fund indicated by the arrow.
- 2.2 This shows current life expectancies (before future improvements) ranging from 83.8 years to 85.7 years for males, and from 86.5 years to 88.2 years for females.





Dependants and Ill health assumptions

Dependant's assumptions

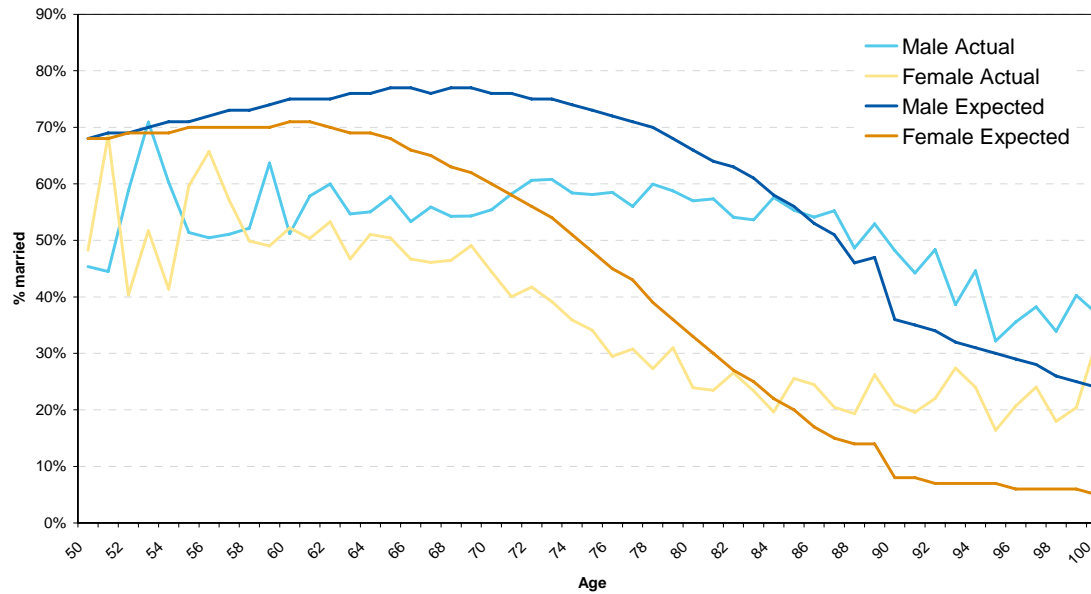
- 3.1 We have carried out a study of our LGPS clients' data, analysing the proportion of pensioner deaths that resulted in a contingent pension becoming payable. By analysing the data in aggregate for a number of clients, we were able to consider a large set of data, which increases the reliability and credibility of our findings. Our study considered approximately 65,000 deceased pensioners from 20 different LGPS Funds, covering a period of almost 10 years.

- 3.2 The Office for National Statistics (ONS) publishes marriage statistics and we can also look to this data when setting the assumption. **Figure 4** shows the ONS 2008 figures for proportions married together with the aggregate experience. These recent tables provide a better fit to the experience data than the current assumption although the actual experience is below that implied by the ONS tables up to ages 80-85 after which point the experience data is generally above the ONS tables.



Figure 4

Proportion married Actual vs Expected



Recommendation

- We propose that the “proportion married” assumption be revised to 85% of the ONS 2008 tables, subject to a minimum level of 25% married for females and 45% married for males.
- The impact of adopting this recommendation would be to reduce the accrued past service liabilities of the Fund by approximately 2.5%. Additionally, the future service contribution rate would be reduced by approximately 0.4% of pay.



III health retirement

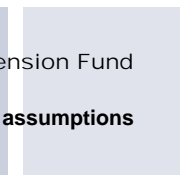
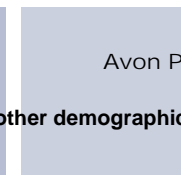
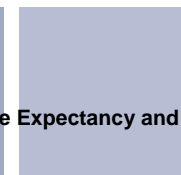
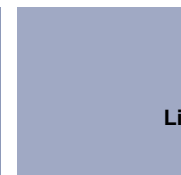
- 3.3 We have carried out a study of our LGPS clients' data, analysing the incidence of ill health retirements since the new eligibility criteria and benefit structure came into force. By analysing the data in aggregate for a number of clients, we were able to consider a large set of data, which increases the reliability and credibility of our findings. Our ill health retirement study considered approximately 570,000 active members from 20 different LGPS Funds, covering the period since 1 October 2008 (the date the previous benefit structure "underpin" expired).
- 3.4 The analysis of the aggregate database shows that during the period of examination, the proportion of ill health early retirements falling into each, split by males and females, were as set out below:

	Tier 1	Tier 2	Tier 3
Males	72%	9%	19%
Females	73%	14%	13%

- 3.5 The results above show that the large majority of ill health early retirements occurring under the post April 2008 structure are being classed within tier 1 and therefore qualify for the greatest enhancement. Having said that, compared to the pre April 2008 structure, the numbers of ill health retirements have fallen substantially (largely due to the stricter eligibility criteria) and so to consider the full cost implications, both effects need to be considered simultaneously.

Recommendation

- Our recommendation is to revise the 2010 valuation assumption adopted in conjunction with the wider study, based on the aggregate database results, rather than attempting to create a Fund-specific assumption at this stage. This assumption should be kept under review at subsequent valuations to ensure the underlying assumption adopted remains appropriate.
- The impact of revising the assumption **and** building in an allowance for the enhancements applicable under each tier would be for a reduction in the future service contribution rate by approximately 0.6% of pay. There is no material impact on past service liabilities.



Avon Pension Fund

Life Expectancy and other demographic assumptions

Appendix A

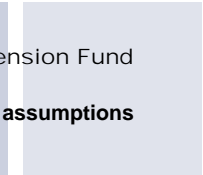
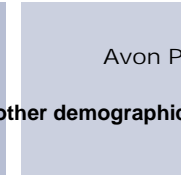
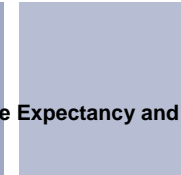
Results expressed as adjustments to a standard actuarial table

The name of the table which you will see in formal documents and the adjustments are set out in the table below.

The CMI_2009 represents the CMI model released in 2009 with a long-term rate of improvement in mortality rates of 1.5% p.a..

The formal table names and adjustments are set out in figure A1 below:

	Table	Adjustment
Males normal health pensioners	S1PMA CMI_2009_M [1.5%]	97%
Female normal health pensioners	S1PFA CMI_2009_F [1.5%]	90%
Males ill health pensioners	As for male normal health pensioners +3 years	
Female ill health pensioners	As for female normal health pensioners +3 years	
Male dependants	S1PMA CMI_2009_M [1.5%]	117%
Female dependants	S1DFA CMI_2009_F [1.5%]	99%
Male future dependants	S1PMA CMI_2009_M [1.5%]	102%
Female future dependants	S1DFA CMI_2009_F [1.5%]	94%



Avon Pension Fund

Life Expectancy and other demographic assumptions

An **age rating** applied to an actuarial table has the effect of assuming that beneficiaries have a life expectancy equal to those older (or younger) than their actual age.

For example, a “+1 year” rating would mean beneficiaries are assumed to have the mortality of someone one year their senior which has the effect of reducing their life expectancy and hence reducing the assessed value of the corresponding liabilities.

A **weighting** applied to an actuarial table has the effect of increasing or reducing the chance of survival at each age, which increases or reduces the corresponding life expectancy.

For example, a “106%” weighting would mean beneficiaries have mortality rates 6% higher than the unadjusted table which reduces the assessed value of the corresponding liabilities.

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MARSH MERCER KROLL
GUY CARPENTER OLIVER WYMAN

Mercer Limited
Mercury Court, Tithebarn Street
Liverpool L2 2QH
0151 236 9771

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