



# VitaCurves

Tailoring VitaCurves to the London Pensions Fund Authority  
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For and on behalf of Club Vita LLP

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A key assumption in assessing pension scheme liabilities is how long members will live for (**longevity**); or to put it in the possibly more familiar, and morbid, language of pension scheme funding, the chance that individuals will die at each age (**mortality rates**).

Through collecting a very large volume of data on the experience of schemes participating in Club Vita, we have been able to identify a number of characteristics which distinguish some people as being longer or shorter lived than others – for example affluence and lifestyle. These characteristics are described in our VitaIndex report.

By considering the characteristics of your individual members we are able to identify the mortality rates currently applicable to each and every member of the London Pensions Fund Authority. We call these rates **VitaCurves**. In particular this means that for each member a longevity assumption is used which reflects his or her individual longevity characteristics.

### Tailoring VitaCurves to your fund

In practice not all of the characteristics which predict longevity are stored on the membership records of all funds. Also it makes little sense to consider using predictors which are only reliably recorded for a small proportion of your membership.

Our analysis of the data you have supplied to Club Vita suggests that the following predictors of longevity are both widely available within the membership data held by your administrator and appropriate to use.

Members / Predictor	Gender	Lifestyle (postcode based)	Salary	Pension	Occupation	Retirement health
Active members	✓	✓	✓	n/a	✗	n/a
Deferred pensioners	✓	✓	✓	✓	✗	n/a
Pensioners	✓	✓	✓	✓	✗	✓
Dependants	✓	✓	n/a	✓	n/a	n/a

Further information on our analysis is supplied in Sections 2 and 3 of this report.

### Impact of adopting VitaCurves

We estimate that adopting **VitaCurves** tailored to the characteristics of your individual members will, in isolation:

- decrease the value placed on the fund's liabilities by approximately 1.1%
- decrease the cost of benefits accruing to the fund's liabilities by approximately 1.6% (i.e. if the previous cost was 20% of salaries we estimate that this will change to 19.7% of salaries)

compared to the assumption used at the last actuarial funding valuation (we have actually assessed the impact by considering an aggregate assumption as an approximation of the assumptions used in the active and pensioner sub funds).

### VitaCurves<sup>LITE</sup>

Tailoring the longevity assumption to individual membership characteristics can lead to a large number of different assumptions – in extreme a different assumption for every member (along with an assumption for the longevity of any spouse). In practice we usually find a smaller number of assumptions are used as many of the members will fall into similar affluence bands, lifestyles etc... For example men with salaries between £15k and

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£22.5k have, all other characteristics being equal very similar longevity and so the same assumption (VitaCurve) is used for these members.

Our analysis uses 203 individual VitaCurves with your fund. We appreciate though that your advisors may prefer, for the practicality of valuation calculations, to use a smaller number of different longevity assumptions. With this in mind we are able to provide your advisors with a composite assumption known as **VitaCurves<sup>LITE</sup>**. Please be aware that:

- The assumption would reflect an average<sup>1</sup> of the underlying VitaCurves for each of active members, deferred pensioners and pensioners. These would be a separate assumption for men and women and for members and any contingent beneficiaries.
- These composite curves will (inevitably) be less precise than using the VitaCurves for each group of members with like longevity characteristics, but may offer a balance between precision and number of assumptions preferable to some advisors.
- Particular care should be taken in using the composite approach where liabilities and/or costs of accrual need to be accurately apportioned between subsections of the scheme or between participating employers.

### Time does not stand still

Both the individual VitaCurves and the alternative composite curves, **VitaCurves<sup>LITE</sup>**, relate to recent **observed** mortality rates – i.e. what your actuarial advisor may refer to as the *baseline assumption*. This is the objective element of the longevity assumption. It would be usual for the VitaCurves to be combined with some allowance for *future changes* in mortality.

The decision as to the appropriate allowance for future changes is more subjective and should be discussed with your actuarial advisor in light of emerging trends. However, when making allowance for future improvements please be aware that the VitaCurves relate to our observations of mortality being experienced over the period 2005-2007.

### Next steps

The next steps upon consideration of this report are:

- 1 Decide whether you wish to use the individual VitaCurves or the composite assumption and inform your usual Club Vita contact.
- 2 **If you use the individual VitaCurves:** In advance of your advisor wishing to use the curves in actuarial calculations we will need to supply them with information on the individual VitaCurves and details of which members each VitaCurve is applicable to.

*In order to ensure we provide information based upon the appropriate membership we ask that your advisor supplies us a copy of the valuation data file they are using. Consequently it is advisable for them to contact us well in advance of needing this information to discuss our requirements and timescales.*

- 3 **If you use VitaCurves<sup>LITE</sup>:** We will supply these curves direct to your actuarial advisor.

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<sup>1</sup> the averaging approach being designed to provide a comparable overall liability value to using the individual curves

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# 1 Introducing VitaCurves

In placing a value on the benefits earned, and continuing to be earned, by members of any pension scheme, a key assumption is how long after retirement members are expected to live for (the **longevity assumption**) – i.e. how long into retirement pensions will be paid for. The individual characteristics of members means that some members are expected to live considerably longer than others. By using the large volume of data collected within Club Vita we are able to identify which individuals have a different life expectancy, and assess that life expectancy. By identifying the mix of people within the London Pensions Fund Authority (the ‘fund’) we are able to suggest a set of (post-retirement) longevity assumptions which are tailored to your fund.

## Jargon buster

**Longevity** describes how long people will live; whilst **mortality** and **mortality rates** describe how likely it is that someone will die.

## Reducing the uncertainty

A longevity assumption is usually described in terms of two elements:

- **Baseline assumption:** This relates to how long your members are *currently* expected to live for, prior to any allowance for future changes. It relates to mortality currently being experienced and can be objectively measured.
- **Future changes:** In the context of pension scheme funding we care about how long people will live for in the future i.e. how long benefits will be paid for. It is highly unlikely that mortality rates, and so life expectancies, will remain static at current rates. We can reasonably expect them to change, but by how much and in which direction? Whilst no one knows the right answer, a *subjective* assumption needs to be made about how longevity will change in the future. Since the assumption is usually that life expectancy will increase, it is often referred to as the allowance for *future improvements*.

Within this report we focus on how the insights from Club Vita can be used to more precisely tailor a baseline assumption to the specific longevity characteristics of your membership. By using the large volumes of data collected in Club Vita to tailor the assumption to the characteristics of the membership, the potential for estimation error is reduced compared to alternative approaches for setting the longevity assumption.

The baseline assumptions suggested in this report can be used with any future improvement assumption you and your advisors choose.

## Everyone is different



Within Club Vita we have seen considerable differences in the observed life expectancies<sup>2</sup> of members within different schemes – some four years variation for men and five years variation for women (see section 5 of your VitaIndex report). These differences in life expectancy are unsurprising - each fund is made up of a unique mix of individuals, each of whom have different life expectancies.

For example consider Fred and Sam below:

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<sup>2</sup> Technical note: This relates to period life expectancy which represents how long members would be expected to live for if the mortality rates observed over recent years were unchanged in the future i.e. the average life expectancy of members under the baseline assumption.

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<b>Fred</b>		<b>Sam</b>	
	Salary: £20,000 p.a. at retirement		Salary: £40,000 p.a. at retirement
	Lifestyle: Unhealthy		Lifestyle: Healthy
	Retiring in: Normal health		Retiring in: Normal health
Club Vita life expectancy from age 65: <b>80 years, 1 months</b>		Club Vita life expectancy from age 65: <b>84 years, 10 months</b>	

Specifically, we identified within our VitalIndex report that the following characteristics are particularly important in predicting the longevity of pensioners:

- Gender
- Reason for retirement (normal or ill-health)
- Geo-demographics (as determined by lifestyle and socio-economic indicators from an individual's full postcode)
- Affluence – which appears to be best measured by pay at retirement (or earlier exit) for men and pension for women where they are available
- Occupation – whether an individual carried out a manual or non-manual role.

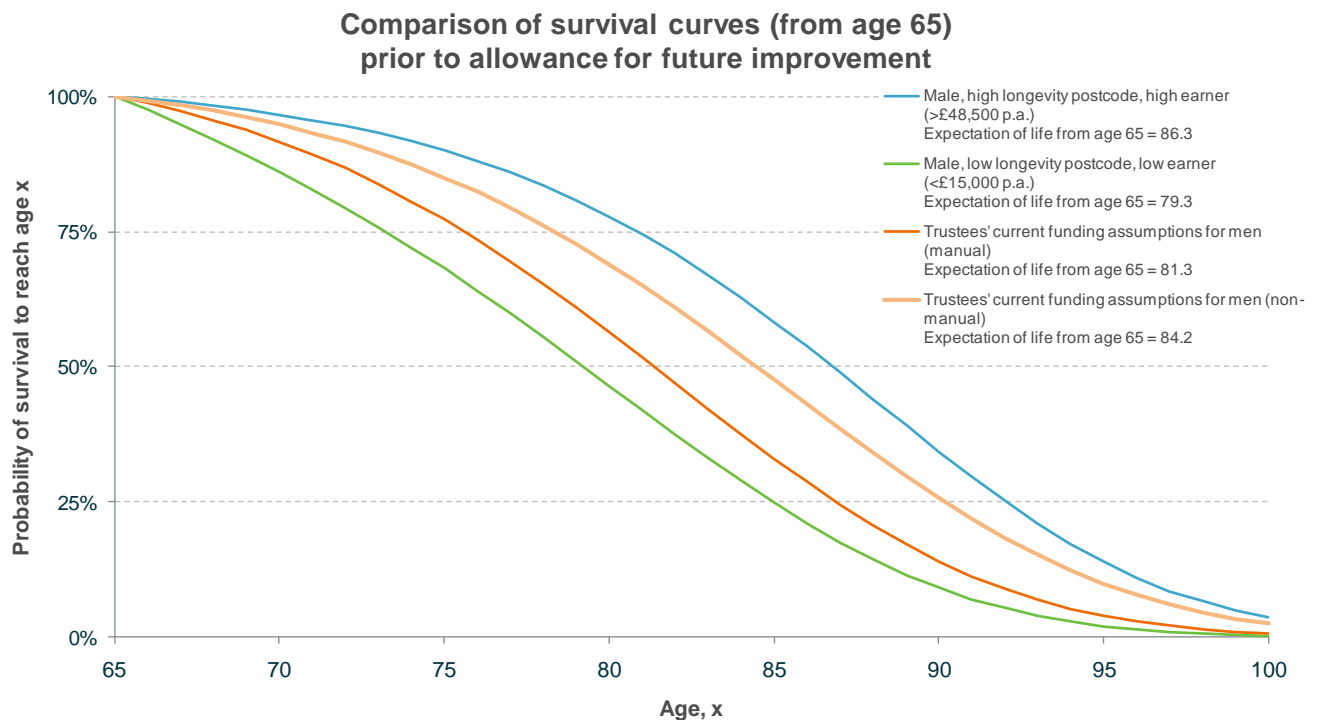
Within Club VITA study we have used statistical techniques designed to isolate the impact of each of the above factors.

We are able to identify the likelihood of a retiree, say aged 65, reaching each subsequent age depending on his or her personal characteristics. These 'survival curves' are an alternative way of looking at the longevity assumption. They consider the proportion surviving to a certain older age rather than traditional 'mortality tables' which focus on the likelihood of dying at any given age<sup>3</sup>. We call these curves **VitaCurves** and each curve relates to individuals with similar longevity characteristics. For example Fred and Sam – who have very different characteristics - would each have a different VitaCurve.

The following chart illustrates two such curves for men where we have considered the impact of different geo-demographic groups and different affluence groups for members retiring in normal health. The blue curve represents the 'best' such group in terms of life expectancy, and the green curve the 'worst' such group.

<sup>3</sup> Please note that when we supply the VitaCurves to your actuarial advisors we do so in the traditional format.

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Note that the above chart compares mortality rates applicable in 2006, since our VitaCurves relate to experience over the period 2005-2007. The “funding assumptions” shown represents the aggregate assumption that we have used as an approximation of the assumptions used in the active and pensioner sub funds.

### A collection of individuals

The range of life expectancies in the above chart - 7 years - is stark; especially as this is prior to making allowance for such factors as whether a member retired in ill health rather than normal health or whether the member did a manual or non-manual role. It is highly likely that your membership will have a range of individuals for each of whom the best estimate survival curve (for members retiring in normal health) lies somewhere between the two lines shown, and indeed for some members outside of these curves

In contrast the orange lines represents the baseline funding assumptions used by the trustees of the fund for current and future pensioners at the most recent actuarial valuation. We can see that the current funding assumptions give a life expectancy which lies between the blue and green curves. In practice, though the members of your scheme have differing pensions; those with the largest pensions also tend to be the most affluent and have the healthiest lifestyles i.e. are more likely to lie towards the blue rather than the green line.



In **Section 3** we estimate the impact of allowing for the ‘best estimate’ life expectancies reflecting the individual longevity characteristics of your members. First though we explore in **Section 2** the availability of data on the different longevity characteristics within your fund to identify which characteristics can be used in tailoring a longevity assumption to your membership.

## 2 The profile of your membership

Gender, lifestyle (via members' postcodes), salary, pension, occupation and retirement health are all predictors of individual lifespan (longevity). However, with the exception of gender these are typically only available within the administration records for certain members in certain schemes. An important first step in grouping members with similar longevity characteristics is to identify which of the characteristics your administration records hold clean data for. For further information on what we consider to be 'suspicious' data please consult our [VitaCleansing](#) report.

### Which longevity characteristics are available for your fund?

In general the more longevity characteristics we look at, the greater the number of different groups which we divide your membership into. This in turn increases the number of different VitaCurves that we would suggest you use. Consequently, where a characteristic is only available for some of your members there is a balance to be struck between the benefit of refining the longevity assumption for some members, and increased complexity of a greater number of assumptions.

#### Rule of Thumb



As a rule of thumb we suggest that clean data should be available for at least 60% of your members in order to use a specific characteristic to predict longevity. Where the characteristic is available for less than 60% of the members we believe that the benefit of the extra insights gained by looking at that characteristic does not warrant the complexity of introducing additional VitaCurves, and so we do not attempt to use it in refining the longevity assumption for your members.

Since some characteristics are often more readily available for some members than others – for example salaries are nearly always available for active members - we look at each of actives, deferred pensioners, pensioners and dependants in turn. Based upon our analysis of the 31 March 2009 membership data supplied to Club Vita by your administrator we believe that it is practical to use the following characteristics to predict the longevity of your members:

Members / Predictor	Gender	Lifestyle (postcode based)	Salary	Pension	Occupation	Retirement health
Active members	✓	✓	✓	n/a	✗	n/a
Deferred pensioners	✓	✓	✓	✓	✗	n/a
Pensioners	✓	✓	✓	✓	✗	✓
Dependants	✓	✓	n/a	✓	n/a	n/a

Note: Salary is a better predictor of longevity than pension for men where it is available, to the extent that pension provides no additional insights into longevity where the salary is available. In contrast we find that pension is the better predictor of longevity for women with the salary of women offering no additional insights where pension is available. Where a fund has membership groups where both salaries and pension are ticked in the above table, we will use the salary for predicting male longevity, and the pension for predicting female longevity. Further, we do not use pension as a predictor of longevity for active members since the accrued pension is only part of the pension which they will ultimately accrue.

It is important to realise that where a characteristic such as postcode is available for more than 60% of members and so is ticked in the above table, there may be some members for whom it is not available. For these members we have used whichever of the other ticked characteristics are available to identify a 'best estimate' longevity assumption for the member (except where pension and salary are both ticked – see note above).

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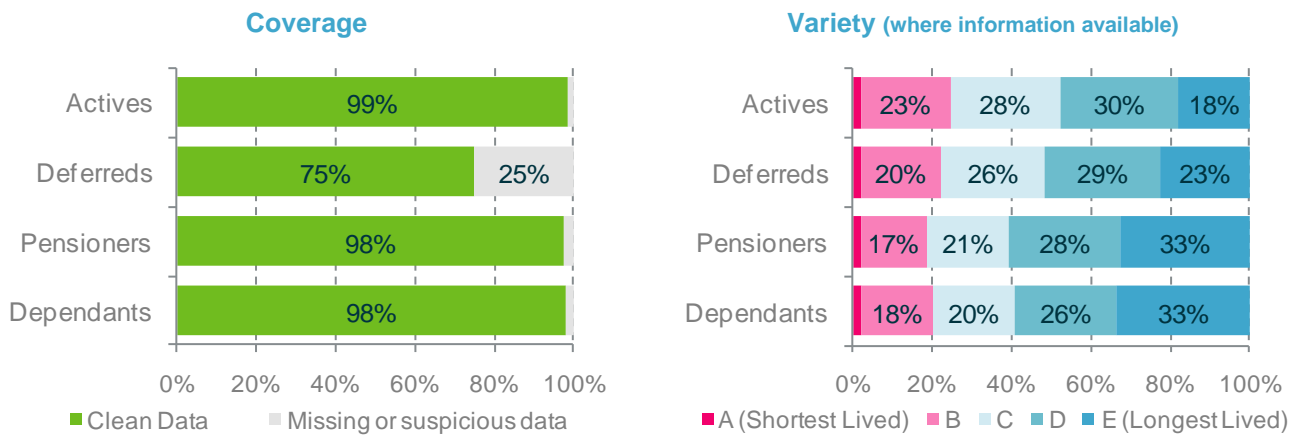


The rest of this section of our report looks at the profile of the longevity characteristics of your membership in more detail – the impact of allowing for these longevity characteristics is considered in **Section 3** of this report.

**Geo-demographics / lifestyle (postcode based)**

We determine the lifestyle of individuals by collating information from marketing databases purchased from third party providers. These databases provide a rich insight into the likely lifestyle and socio-economics (collectively known as geo-demographics) within each and every one of the UK’s 1.7m different postcodes. Based upon this information our statistical analysis has identified that members of occupational pension schemes can be characterised as being in one of five different longevity groups which, for simplicity, we label A to E (in order of shortest to longest lived<sup>4</sup>).

The charts below summarise the postcode information we received on the members of your fund, and the variety of lifestyle groups this suggests are present in your membership<sup>5</sup>:



**Salary at retirement (or earlier exit)**

More affluent individuals tend to live longer, and within Club Vita we have sought to identify the best way of measuring affluence for an individual. Traditionally affluence has been measured by pensions in payment. Increasingly though, we find the pension payable from one pension scheme is only part of the retirement income of an individual – this is especially the case for short serving members for whom the pension from the scheme can suggest a misleadingly low level of affluence<sup>6</sup>.

One of the key observations of our **VitalIndex** report is that where salary at exit (or earlier retirement) is available it is a far better indicator than pension of post-retirement longevity for men<sup>7</sup>. Further, for active members, where pension accrued to date is only part of the total pension we believe salary is a better predictor

<sup>4</sup> For those who enjoy alternative ways of remembering things you may find it helpful to think of A through to E as Ants, Bees, Cats, Dolphins and Elephants. Not only do Elephants have long memories, but they also have a long life expectancy!

<sup>5</sup> Please note that we have refined our methods for optimising the lifestyle groups into which different postcodes fall. As a consequence, the allocation of members between different longevity groups illustrated above may differ from that shown in your VitalIndex report.

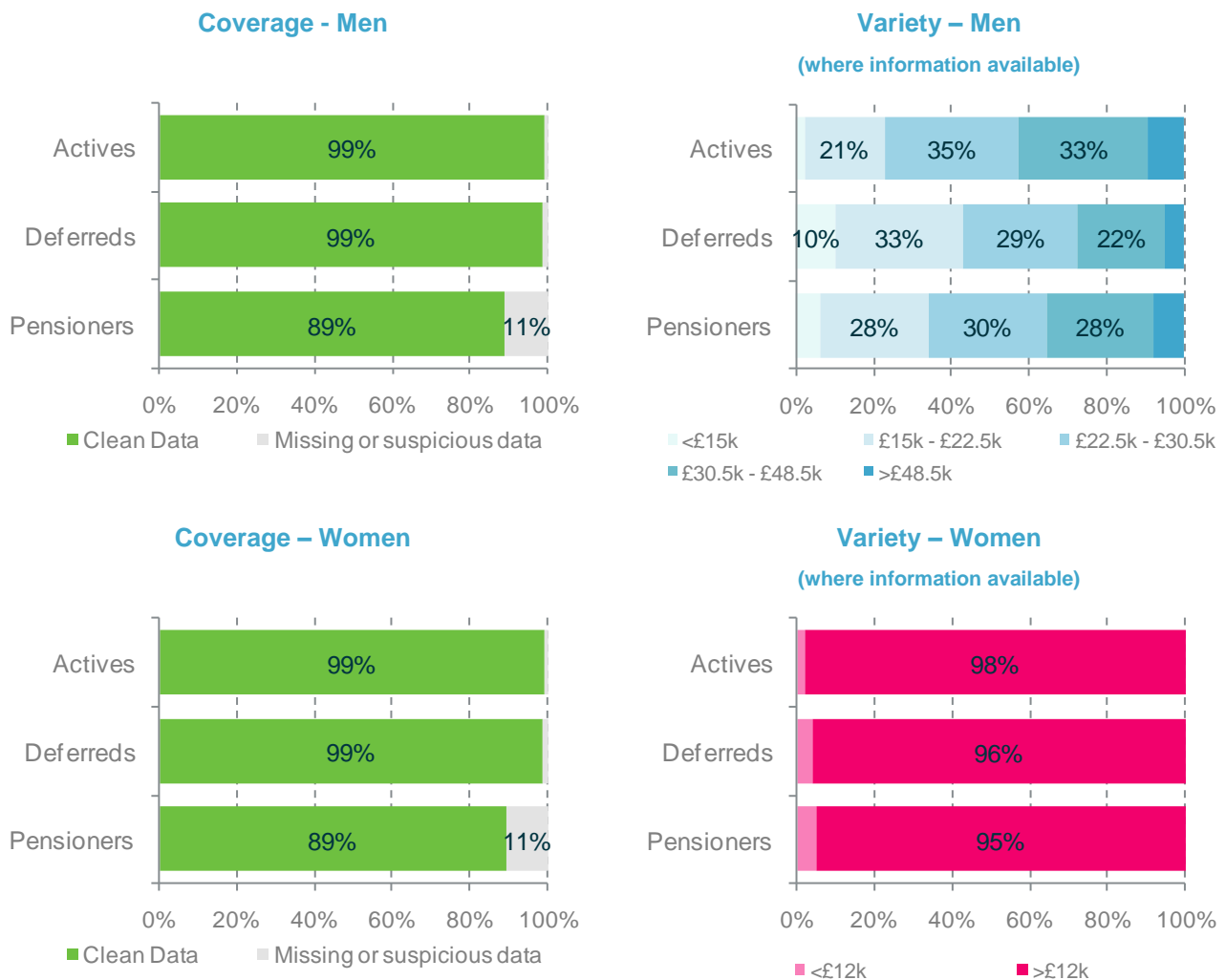
<sup>6</sup> Compare a member in an 80ths scheme with just 3 years of service but a £80,000 p.a. salary to another member of the same scheme who has been there 20 years on a £12,000 p.a. salary – both have earned a £3,000 p.a. pension but they are very different in terms of overall affluence!

<sup>7</sup> For women this appears not to be the case - instead pension is a better measure of relative chance of dying amongst women currently in receipt of pensions. We believe this is due in part to the fact that the women who are currently receiving pensions the overall household income is more important than their personal income due to the gradual emancipation of women in the workforce.

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of longevity. Consequently we would usually seek to group active members (men and women), deferred male pensioners and male pensioners by salary for purposes of predicting longevity.

By analysing the large volumes of data within Club Vita we have identified five salary bands for men (<£15,000p.a., £15,000 - £22,500p.a., £22,500 - £30,500p.a., £30,500 - £48,500p.a., >£48,500p.a.) and two salary bands for women (<£12,000p.a., >£12,000p.a.) which provide the optimum balance between predicting life expectancy and simplicity (i.e. smaller number of bands). The charts below summarise the salary information we received for the members of your fund, and how it is spread across these different salary bands. In each case the salary is either the current salary (for active members), or the salary at retirement or earlier exit revalued to 2008 in line with price inflation<sup>8</sup>.



**Pension**

For female pensioners and deferred pensioners, and for men for whom salary is not available as a measure of affluence, pension is an important indicator of affluence and so of longevity prospects. By analysing the large volumes of data within Club Vita we have identified two pension bands for women (<£1,500p.a., >£1,500p.a.) and five pension bands for men (<£5,500p.a., £5,500 - £8,500p.a., £8,500 - £14,500p.a., £14,500 - £24,000p.a., >£24,000p.a.) which provide a good balance between predicting life expectancy and simplicity<sup>9</sup>. The following

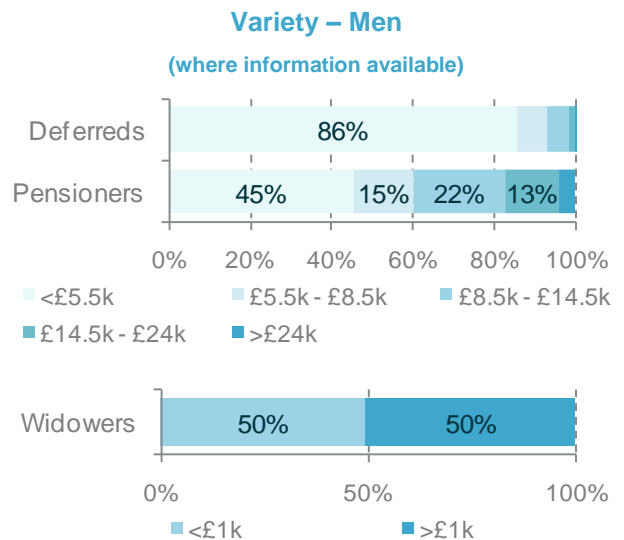
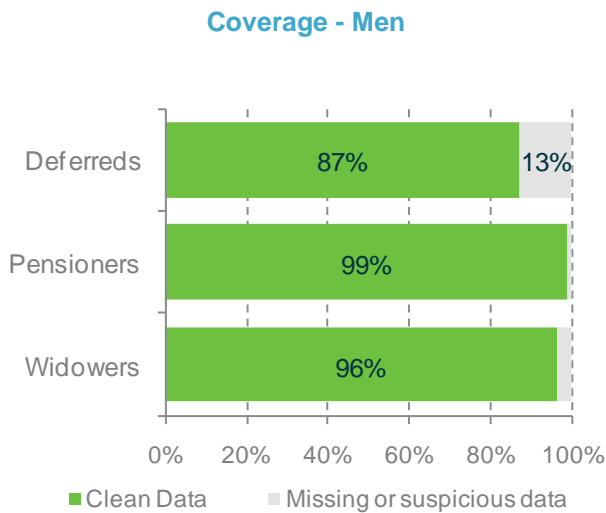
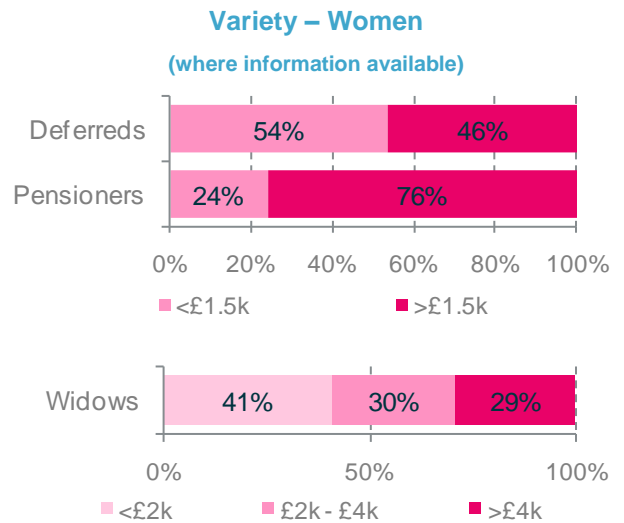
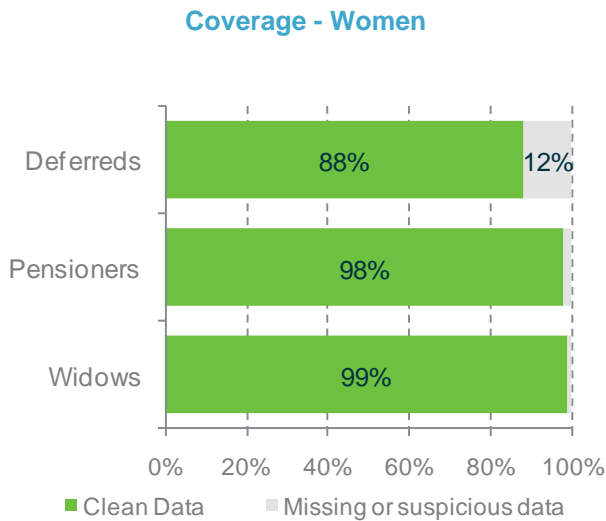
<sup>8</sup> In each case we have also requested that the salary is a full time equivalent for any part-time workers.

<sup>9</sup> Since the pension payable to dependants is lower than that payable to the member, different bands are used for dependants, namely <£2,000p.a., £2,000 - £4,000p.a., >£4,000p.a. for widows and <£1,000p.a., >£1,000p.a. for widowers.

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charts summarise the pension information we received on the members of your fund, and how it is spread across these different bands.

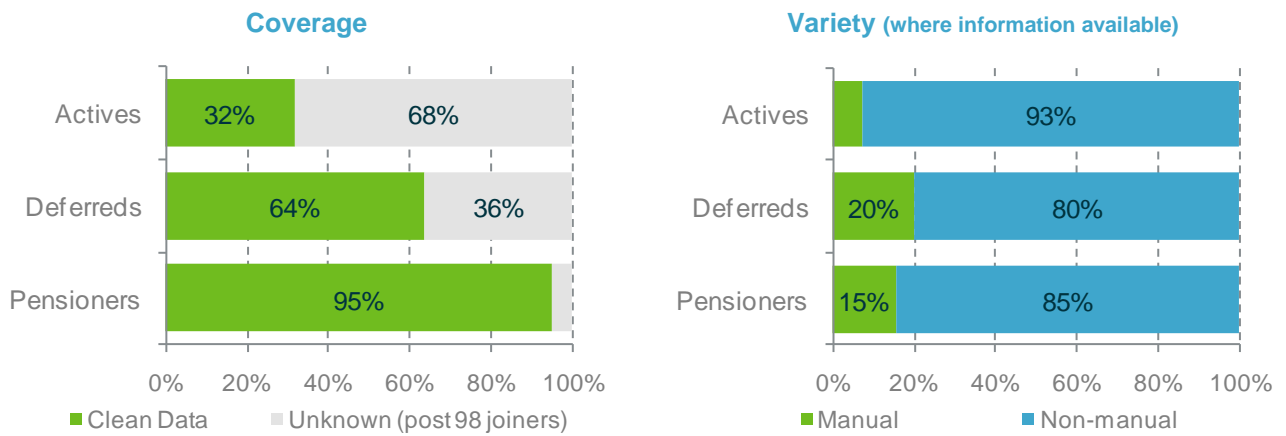
In each case the pension bands relate to the current pension. For deferred pensioners where we received the pension at exit this has been revalued to September 2007 in line with price inflation.



**Occupation**

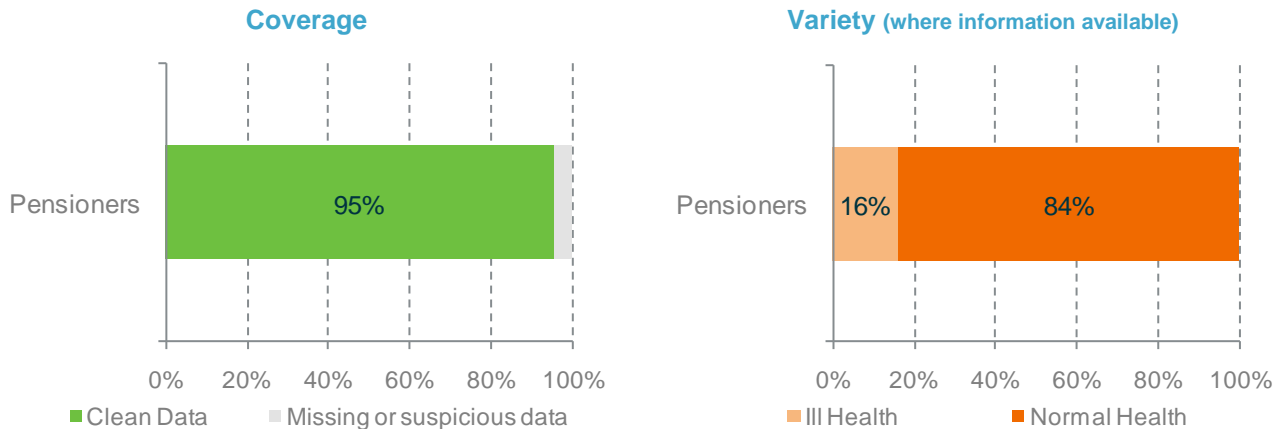
Our analysis shows that where it is available occupation provides some additional insight into the longevity characteristics of members. Specifically the difference between a manual and non-manual employee with similar affluence and lifestyle is approximately ½ a year in life expectancy from age 65. This is considerably less than the difference between the extremes of lifestyle (3 - 3½ years) and of affluence (3 - 4 years) meaning that where affluence and postcode information is available it is less important for us to have information on members' current or former occupation. Therefore, we have not sought to use information held regarding occupation at this time.

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**Retirement health**

If it is known whether or not a pensioner retired on grounds of ill health this can be an important factor in assessing their life expectancy. Within our VitalIndex report we identified that, where all other longevity characteristics such as affluence and lifestyle are the same, an individual retiring in normal health could expect to live an extra 2-3 years from age 65. The charts below summarise the information we have received on retirement health for members of your fund:



### 3 Applying VitaCurves to your fund

In the previous section we saw which characteristics could be used to refine the *baseline* longevity assumption for your members. In this section we consider the approximate impact of using this refined assumption, on the funding liabilities of your fund.

#### Overall impact (approximate)

The table below shows the approximate overall impact of using VitaCurves as a best estimate assumption for recent mortality rates compared to your current funding assumption:

#### Past service liabilities

Membership group	Approximate change in value placed on liabilities if use VitaCurves rather than current funding assumption <sup>(1)</sup>
Actives <sup>(2,3)</sup>	-1.1%
Deferred Pensioners <sup>(3,4)</sup>	-1.4%
Pensioners and Dependants <sup>(4)</sup>	-1.0%
<b>Overall</b>	<b>-1.1%</b>

#### Future service contribution rate

Change to future service contribution rate <sup>(5)</sup>	-1.6%
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#### Notes:

- The assessment of the impact of applying VitaCurves is based upon a number of assumptions, the key ones of which are detailed in Appendix A. To the extent that the calculations produced by your actuarial advisors use different assumptions the actual impact of applying VitaCurves may differ from that shown above.  
Our calculation has been based upon a membership of 19,900 active members, 26,449 deferred pensioners, 26,945 pensioners and 6,208 dependants as at 31 March 2009. For more information on these membership numbers please see our VitaCleansing report. When comparing these numbers to those in your VitaCleansing report please be aware that a small number of members have been excluded on grounds of having data which is 'suspicious' and may distort our analysis.
- For active members we have approximated the impact on liabilities and future service rates using an estimated pension amount – please see Appendix A for further information.
- For simplicity we have based our assessment upon active members and deferred members retiring in normal health. In practice we would also supply curves to your advisor to use when these members are assumed to retire on grounds of ill health.
- Some deferred pensioners (12.2%) and pensioners (0.0%) have pensions which were missing or recorded as zero in the data we have received. For the purposes of the above assessment we have assumed that these are the correct pensions. If these individuals have pensions payable which are a liability to the fund then this may result in the impact of moving to VitaCurves differing from the above estimate.
- An impact of +10% on the future service contribution rate means that if the contribution rate was 20% on the current funding assumptions it would be 22% if VitaCurves were used as a baseline mortality assumption.

#### A changing future

The approximate impact above makes an allowance for improvements in line with original 92 series. This is based on our understanding of the assumption used by the trustees at the most recent actuarial valuation. Please note that this is for illustration purposes only and does not reflect an opinion of an appropriate allowance

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for future improvements. In practice when using VitaCurves (or the composite curves described in Section 4) you will need to make an allowance for future changes in longevity – and you should discuss an appropriate allowance with your actuarial advisor and/or longevity consultant. If you adopt either the full VitaCurves or the composite curves described in the next section we will confirm to your advisor the date to which the curves relate<sup>10</sup> in order that they can apply future improvements from an appropriate point in time.

### Range of life expectancies

Using the approach described in Section 2 we have grouped your members into different groups of individuals with like longevity characteristics. This has resulted in us using 203 different VitaCurves for your members. We appreciate that this is a large number of different curves and that some actuarial advisors may prefer to use a smaller number – we consider this further in Section 4. Before we do so though, it is useful to appreciate the range of life expectancies, from age 65, these groups suggest for members of your fund:

#### Men

Membership group	Minimum life expectancy	Maximum life expectancy	Range of life expectancies within which 75% of all accrued pensions lie	Average life expectancy (weighted by liability)
Current pensioners	77.4	86.3	81.8 - 85.9	83.9
Future pensioners	79.3	86.3	82.1 - 85.9	83.9

#### Women

Membership group	Minimum life expectancy	Maximum life expectancy	Range of life expectancies within which 75% of all accrued pensions lie	Average life expectancy (weighted by liability)
Current pensioners	81.2	87.0	84.0 - 87.0	85.8
Future pensioners	83.5	87.5	85.6 - 87.0	86.3

Note: The minimum life expectancy for pensioners is lower than for active members and deferred pensioners as it includes members known to retire on grounds of ill health. All the life expectancies shown above are prior to allowance for future improvements.



The use of the full selection of VitaCurves can give rise to a large number of different assumptions. For your scheme it would lead to 203 VitaCurves. In **Section 4** we consider how you could use a smaller number of average assumptions. This would lose some precision but may be preferable to some actuarial advisors.

<sup>10</sup> currently the curves have been calibrated to data spanning 2005-2007 and so broadly relate to mortality in 2006.

## 4 Using an ‘average’ of the individual VitaCurves

The approach described in previous sections allows for the different groups of longevity characteristics which exist in your membership by using a different assumption for each. The advantages of using this approach are:

- The resulting longevity assumption (and so the assessment of provisions to hold in respect of liabilities and the emerging cashflows for investment strategy work) is more reliable
- Changes in membership characteristics between current and future retirees are automatically captured
- Calculations for different subpopulations can be carried out on assumptions appropriate to that membership for example if:
  - different contribution rates are calculated for different employers
  - liabilities need to be apportioned to different employers for section 75 debt purposes or for bulk transfers

However, these advantages need to be balanced by the extra complexity (and so calculation costs) introduced by having lots of different longevity assumptions. Consequently it is important that you discuss the implications of using the full selection of longevity assumptions with your actuarial advisor.



The rest of this section introduces the possibility of using an ‘average’ of these individual curves. Although the use of an ‘average’ curve reduces some precision we appreciate that this may be preferable to some actuarial advisors.

### A lighter approach to life

Instead of using assumptions specific to the different group of members it is possible to supply your actuarial advisor with a ‘composite’ assumption designed to give comparable liability values for the membership as a whole to using the more detailed assumptions. Under this approach, which we call **VitaCurves<sup>LITE</sup>**, we would supply your actuarial advisor with an assumption applicable to each of active members, deferred pensioners, and pensioners and dependants combined split by men and women. This leads to a total of twelve longevity assumptions as for each group we need an assumption for the longevity of the member and an assumption for the longevity of any surviving spouse.

The table below contrasts the number of longevity assumptions we would supply to your advisor under the two different approaches.

	Full VitaCurves	VitaCurves <sup>LITE</sup>
Number of different curves to use for longevity of member	203	6
Number of different curves to use for longevity of members’ spouses	42	6
Number of different <i>pairs</i> of curves for the longevity of members and their spouses <sup>11</sup>	412	6

<sup>11</sup> Technical note: For some advisors it may be that it is the number of different combinations of assumptions for the members’ mortality along with assumptions for the longevity of his or her spouse which determines the complexity of VitaCurves.

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These composite curves represent, for a particular membership group such as deferred men, a carefully constructed average of the VitaCurve for each individual member in that group. They are designed to ensure that the **overall liability value** is similar for each of active members, deferred pensioners, and pensioners and dependants for each of men and women to using the full precision of the underlying VitaCurves.

We are happy to supply your advisors these composite curves. However, please be aware that whilst they will provide a similar overall liability value to using the individual curves, they are unlikely to provide as reliable an estimate of emerging cashflows or the longevity for specific subgroups of members e.g. by employer.



Where it is important for you to have robust calculations for certain subgroups of the membership, and your actuarial advisor would prefer not to use the individual curves, then it may be possible for us to provide a composite curve for each of those groups. In these circumstances please contact your usual Club Vita contact to discuss possible options.

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## 5 Next steps

We would suggest that the next steps are:

- 1 Decide, in discussion with your usual actuarial advisor, whether you would like us to provide your actuarial advisor with:
  - 1.1 the individual VitaCurves; or
  - 1.2 the composite assumption (VitaCurves<sup>LITE</sup>); or
  - 1.3 neitherand inform your usual Club Vita contact.
- 2 **If you would like to use the individual VitaCurves:** In advance of your advisor wishing to use the curves in actuarial calculations we will need to supply them with information on the individual VitaCurves and details of which members each VitaCurve is applicable to.

*In order to ensure we provide information based upon the appropriate membership we ask that your advisor supplies us a copy of the valuation data file they are using. Consequently it is advisable for them to contact us sufficiently in advance of needing this information to discuss our requirements and timescales.*

- 3 **If you would like to use the composite VitaCurves (VitaCurves<sup>LITE</sup>):** We will supply these direct to you actuarial advisor. Please be aware that those supplied as standard are:
  - 3.1 designed to be used across scheme as a whole
  - 3.2 designed to be used where the same assumptions is used for normal health and ill health retirees
- 4 *If you wish to use a composite based upon subsections of the scheme, or require a different average assumption for normal health and ill health retirees please call your usual Club Vita contact to discuss possible options.*

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## Appendix A – Basis used for approximate liability impact calculations

In assessing the approximate impact of adopting VitaCurves as a baseline mortality assumption we have needed to make a number of assumptions. The most material of these are summarised below.

### Current baseline assumption

The VitaCurves used in this report are based upon the Club Vita experience data spanning 2005-2007. As such they are, in effect, mortality rates which apply in 2006.

In determining the impact of moving from the current funding assumption to VitaCurves as a baseline assumption we approximated an aggregate assumption to be equivalent to the assumptions adopted in the active and pensioner sub-funds in 2006. The funding assumptions are:

Members	Men	Women
Current pensioners: Active sub fund	PMA92 projected forward to 2006 with original 92 series projections. These tables have been rated up by 3 years for manual employees, 8 years for manual ill health pensioners and 6 years for non-manual ill health pensioners.	PMA92 projected forward to 2006 with original 92 series projections. These tables have been rated up by 2 years for manual employees, 7 years for manual ill health pensioners and 5 years for non-manual ill health pensioners.
Pensioner sub fund	PNMA00 with allowance for improvements at 80% of the medium cohort improvement factors. These tables have been rated up by 4 years for manual employees and for manual and non-manual ill health pensioners. No age rating has been applied to non-manual employees.	PNFA00 with allowance for improvements at 80% of the medium cohort improvement factors. These tables have been rated up by 3 years for manual employees and for manual and non-manual ill health pensioners. No age rating has been applied to non-manual employees.
Future pensioners	As above	As above

### Longevity improvements (from 2006)

The active sub fund improvements are based around the original 92 series improvements, projected to 2017 for current pensioners and 2033 for other members. The pensioner sub fund adopts a different set of improvements, however, for simplicity we have used the active sub fund improvements in our assessment noting, in doing so, that the results produced are not particularly sensitive to this assumption.

### Other assumptions

The following assumptions have also been made. Please note that these are Club Vita's own assumptions and may differ from those used in your actuarial valuation.

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Assumption type	Assumption	Assumption used
Financial	Net discount rate whilst benefits in payment	1.5%
	Net discount rate whilst benefits in deferment	3.0%
	Net discount whilst member in service	2.0%
Demographic	Guarantee period	<b>Actives &amp; Deferreds:</b> 5 years <b>Current pensioners:</b> 5 less any period benefits already been in payment for (to floor of 0)
	Age difference	Husbands 3 years older than wives
	Early Retirement	<b>Actives:</b> Assumed 62 average early retirement age <b>Deferred pensioners:</b> Nil
	Late Retirement	Nil – but if over NRA immediate retirement
	Withdrawals	Nil
	Allowance for option to take transfer value	Nil
	Death before retirement	Nil
Demographic	Married proportion	80% at retirement or currently if older
	Spouse's pension as a percentage of pension in payment (current pensioners)	50.0%
	Spouse's pension as a percentage of accrued pension (future pensioners)	50%
	Percentage of pensions commuted at retirement	Nil
	Commutation factor for those taking cash at retirement	

We have also interpreted the benefit structure of the scheme as follows:

- NRA of 65; and
- A cash lump sum at retirement of 3 times the pension payable.

### Pensions for Active members (where relevant)

In estimating the impact of changing the baseline longevity assumption we have needed to estimate the accrued pension for active members, and the amount of pension accruing over the forthcoming year. These have been estimated as:

Pension	Method for calculating
Accrued pension	$1/80 * \text{Pensionable Service} * \text{Salary}$ where pensionable service is estimated as the period between joining the scheme and 31 March 2009
Extra pension accruing over the forthcoming year	$1/80 * \text{Salary}$

### Important Note

Please be aware that the impact of moving to VitaCurves is dependent upon the above assumptions. In particular:

- If *higher (lower)* net discount rates are assumed then the impact of adopting VitaCurves will typically be *lower (greater)* than shown in the main body of this report.

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- If a *greater (lower)* proportion of members are assumed to commute pension for cash at retirement then the impact on active and deferred liabilities of adopting VitaCurves will typically be *lower (greater)* than shown in the main body of this report.
- If a *greater (lower)* proportion of members are assumed to be married then the impact of adopting VitaCurves typically will be *greater (lower)* than shown in the main body of this report.
- If members retire *earlier (later)* than assumed here then the impact on the active and deferred liabilities of adopting VitaCurves typically will be *lower (greater)* than shown in the main body of this report.

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**Reliances and Limitations**

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For the avoidance of doubt, this report does not constitute actuarial advice. Furthermore, this report should not be construed as providing advice on the appropriateness of any mortality assumption for the purposes of scheme funding as required under Part 3 of the Pensions Act 2004 and The Occupational Pension Schemes (Scheme Funding) Regulations 2005.

The information in the report has been compiled by or on behalf of Club Vita LLP and is based upon our understanding of legislation and events as at 25 September 2009. It should be noted that Club Vita LLP does not provide legal services and therefore, we accept no liability to you or to any other third party in respect of any legal opinions expressed in this report. You are advised to take independent legal advice in respect of any legal matters arising out of this report.

**Utilisation of Data**

The contents and conclusion of this report are reliant upon the extract of the current data held by the fund's administrator. This was supplied to us by John Crowhurst of LPFA on 16 July 2009. This data is summarised in our VitaCleansing report dated January 1900. Whilst we have carried out a number of checks on the data to ensure that it is suitable for the purposes of longevity analysis, the results of which are summarised in our VitaCleansing report, please be aware that the checks we have performed are designed to verify the data as adequate for the purposes of longevity analysis and does not warrant the data as suitable for other purposes.

Within this report we have identified a number of predictors of longevity which explain a considerable proportion of the variation observed in the mortality experience of the contributing schemes. However, not all of the variations between schemes are explained by the factors identified within this report. It is likely that there are additional factors which explain the residual variation in mortality experience. To the extent that some of these additional factors are found more or less frequently in the membership of the fund it may be particularly important for the trustees of the London Pensions Fund Authority to appreciate the impact of these factors on longevity.