

London Borough of Hackney Pension Fund

VITAMONITOR

Monitoring longevity experience for the London Borough of Hackney Pension Fund

March 2019

CLUB VITA

CLUB VITA LLP

Welcome to VitaMonitor...



Welcome from all the Club Vita team to your annual **VitaMonitor** report.

Longevity is one of the largest risks that any pension scheme runs, yet typically one which is monitored less frequently – often leading to nasty surprises at triennial valuations. Over the last decade the funding positions of most pension schemes will have been repeatedly revised downwards in light of emerging longevity patterns. We cannot promise to always be the bearer of good news, but we hope that you will find our regular monitoring useful in managing your longevity risk.

Our report is split in to two sections, and whilst we have tried to explain any jargon as we go along, we have included a jargon buster in Appendix A:

What has been happening? (page 5 onwards)

As trustees you have had to make an assumption as to how long people will live for. However have the members of your scheme been living (and dying) in accordance with the funding assumption? In sections 1-5 we see how:

- more pensions remain in payment at the year ending 31 August 2018 than anticipated under your funding assumptions. However, last year's experience has overall been broadly neutral to the value placed on your liabilities
- the experience over the last three years has been varied - with some years having fewer pensions surviving than would have been anticipated, and some years with more pensions surviving than anticipated.
- the estimated net effect of this experience has been, allowing for the ages of members for which any extra pensions are payable, broadly neutral since your last valuation at 31 March 2016
- we can also consider the combined evidence for all Club Vita subscribers. If you were to update your longevity assumptions to reflect the latest experience from Vita it would decrease the value placed on your liabilities by 1.2%



Steven Baxter



Andrew Gaches



Steve Hood

For and on behalf of
Club Vita LLP

CLUB VITA LLP

**Managing longevity risk (page 16 onwards)**

For most schemes longevity ranks in the top three risks faced by trustees, and as such deserves actively monitoring and managing. In particular the behaviours of your membership can influence your risk exposure which we explore in section 8 and summarise in a **longevity risk register** in section 9. Our observations include:

- we estimate that 10% of your liabilities are concentrated in just 1.2% of your members - how long these members actually live for will play an important role in the ongoing funding position of the fund
- the average age of new retirees (from active service) within your fund has been variable over the last decade but is generally lower than other LGPS Schemes
- 2% of active members who retired over year to 31 August 2018 did so on grounds of ill health and a decreasing proportion of members have been retiring on ill health

CLUB VITA LLP

Contents

What has been happening?

1	Emerging experience at a glance	6
2	Your experience	7
3	Understanding your experience	9
4	Updating your assumptions for the passage of time	11
5	Trends	12

Helping you to manage longevity risk

6	Understanding longevity risk	16
7	Concentration hurts	17
8	Demographic trends	18
9	Your longevity risks at a glance	22

Appendices

Appendix A	24
Appendix B	25
Appendix C	26
The Small Print...	27

CLUB VITA LLP

What has been happening?

March 2019

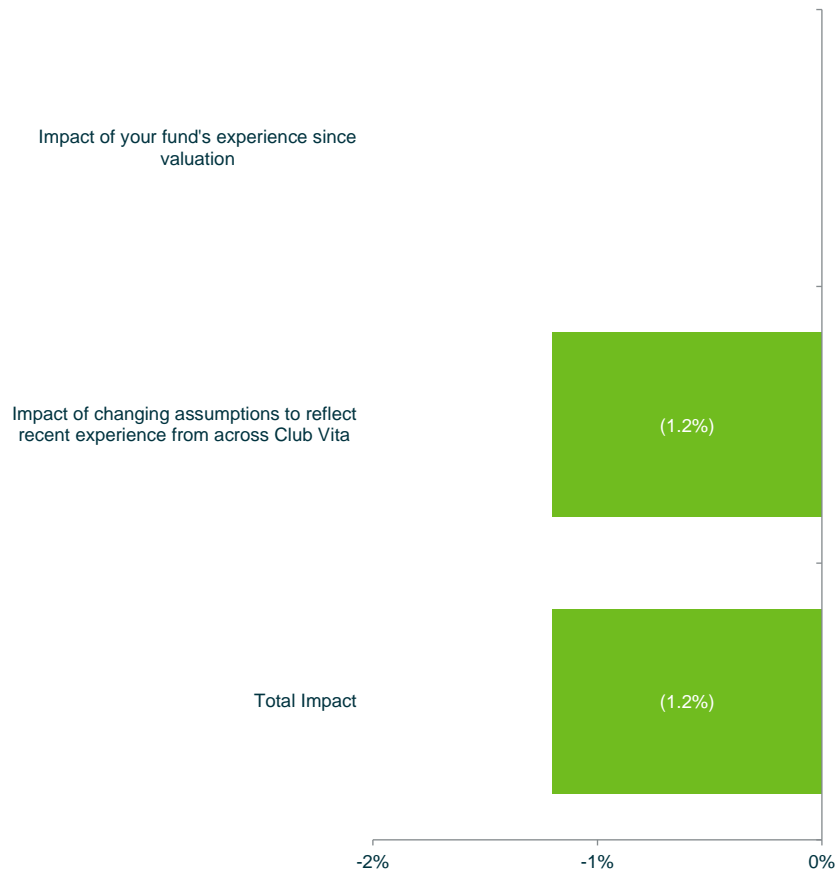
CLUB VITA LLP

1 Emerging experience at a glance

The financial impact

Over recent years estimates of how long people are living for have seemed to steadily risen, often increasing much faster than anticipated by trustees and sponsors alike leading to a succession of increases in the valuation of pension scheme liabilities.

In this section we provide a summary of the impact of the longevity experience of your fund since your last valuation and identify how the emerging insights from Club Vita may lead to you taking a different view in subsequent valuations. In sections 2 to 5 we then explore this summary picture in more detail.



More pension remains in payment in your fund at 31 August 2018 than would be expected under your current funding assumptions. However, we estimate that, all else being equal, this has had a broadly neutral effect on your liabilities since your last valuation. **(Section 3)**

Although more pensions are in payment than anticipated this does not necessarily mean your assumptions about how long people are currently living for are wrong. Your membership has a variety of individuals as seen in your VitaCurves report. Looking across the data for all Club Vita subscribers we see that allowing fully for this variety in the mortality assumption you use would decrease your liabilities. **(Section 4)**

The combined impact of the two items above – the actual survivorship of your members, and reflecting our latest longevity insights – suggests a decrease in your liabilities of 1.2%.

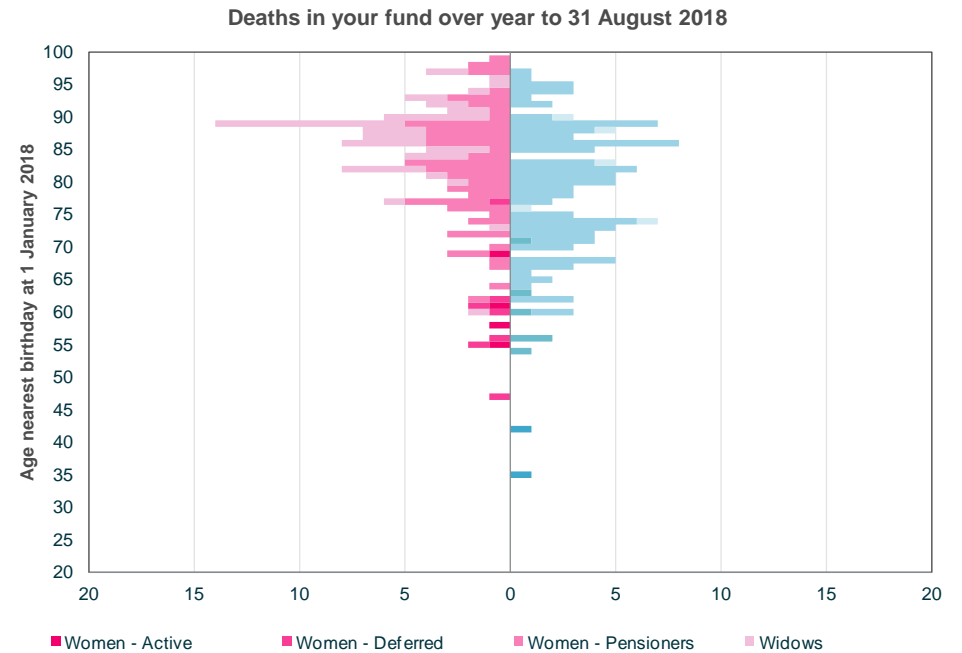
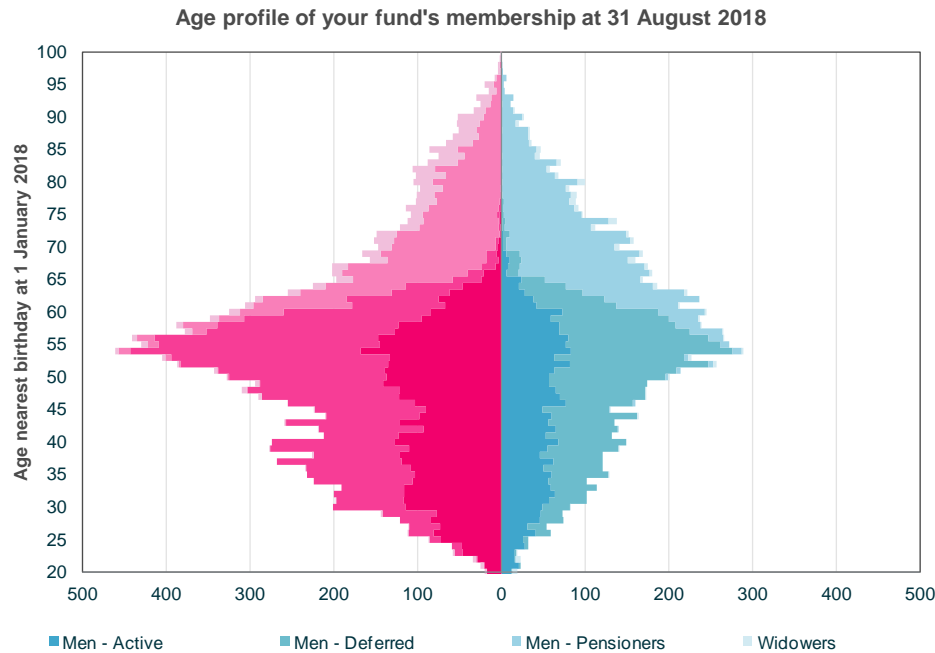
This impact reflects actual experience and is therefore objective. Within your assumptions you will also be making a subjective allowance for how longevity will change in the future. In light of recent experience and the information on emerging trends in **Section 5**, you may wish to review your allowance for future improvements.

CLUB VITA LLP

2 Your experience

A matter of life and death

The 'population pyramids' below show the number of members in the scheme at each age (left) and the profile of the deaths which occurred over the year to 31 August 2018:



We see that the majority of the membership of the fund is aged below 70. However, the chances of dying before age 70 are very low, and consequently most of the deaths occurred at older ages.

When funding for future payments you will have made an allowance for the pattern of deaths with age. This will have assumed a smooth pattern of deaths with age. In contrast the charts above show actual deaths have been 'spiky'. This begs the question were more, or fewer, members alive as at 31 August 2018 than anticipated under your funding plans?

CLUB VITA LLP

2 Your experience (con't)

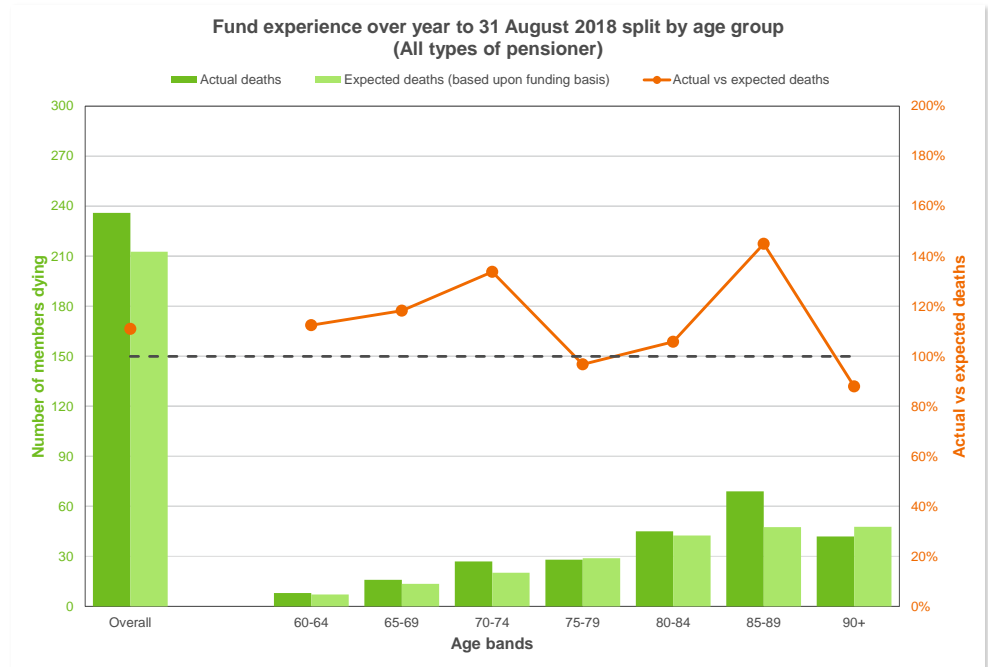
What you expected to happen

In order to identify whether more, or fewer, members survived the year to 31 August 2018 than anticipated under your funding plans we start by contrasting the number of members who died during the year with the number expected to have died under your funding assumptions.

In the chart to the right the dark green bars show the actual number of deaths for different age bands, with the total across all ages shown in the leftmost bar. This is contrasted with the number of deaths which would have been expected had experience been in line with your funding assumptions¹ (the light green bars).

The ratio of the actual deaths to the expected deaths is shown as the orange line and dots. An actual vs. expected deaths of 100% suggests that the number of deaths has been in line with expectations, whilst if it is less than 100% then fewer deaths have occurred than anticipated. We can see that:

- Overall more deaths have occurred than anticipated
- There has been considerable variation in experience with age; for example:
 - amongst those aged 90+ the actual deaths have been lower than expected; whilst
 - amongst those aged 85-89 the actual deaths have been higher than expected.



As (overall) more deaths have occurred than anticipated, fewer people are alive at the end of the year than anticipated.

However, in the world of pension funding it is less important whether the ‘correct’ number of people died but rather who died and who survived, and whether the amount of pension in payment at the end of the year is higher or lower than expected.

¹ Our interpretation of your current funding assumptions can be found in Appendix C

CLUB VITA LLP

3 Understanding your experience

Just a good year?

The chart on the right looks at the experience over the three years to 31 August 2018 for your fund and contrasts the actual amount of pension ceasing (dark green bars) to the expected amount ceasing (light green bars) at each age under the trustees' funding basis. The ratio of these two numbers is shown as a dark orange line.

Experience over last three years

The chart to the right shows that over the last three years:

- fewer pensions ceased than expected at some ages (e.g. 75-79)
- whilst at other ages (e.g. 65-69) more pensions ceased than expected

Financial impact of this experience

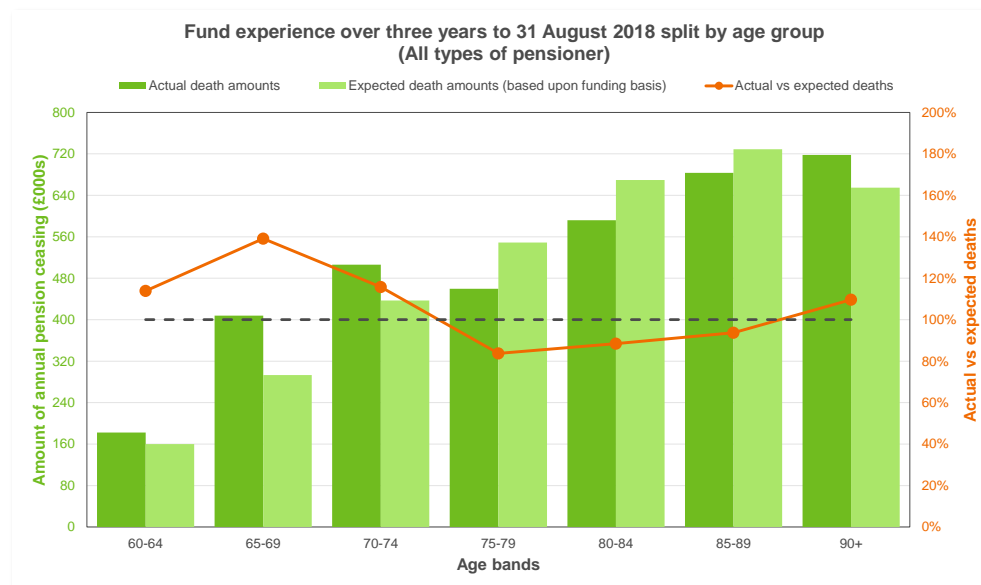
Ultimately, the pattern of deaths and amount of pensions ceasing with age is crucial - fewer pensions ceasing than expected is most costly at the youngest ages. This is because we would expect this 'additional' pension to be paid for longer.

The table to the right shows that:

- the last three years have been varied in terms of more or less pension surviving each year compared to expectation
- we estimate the net effect of experience since the last valuation has been broadly neutral to the value placed on the liabilities

Time to update assumptions?

However, to what extent has your experience over the last three years been unique to your fund and, does it mean you should review your assumption as to how long people are currently living for?



Impact on liabilities of membership survival

	Year ending			Since last valuation
	31 August 2018	31 August 2017	31 August 2016	
Extra (less) pension alive at year end (£k)	41	(16)	(56)	1
Estimated % increase (decrease) in liabilities	0.0%	0.0%	0.0%	0.0%

The impact since the last valuation is based on proportional allocation of experience within years ending on 31 August and so actual impact may differ slightly from that shown here.

If you have received Monitoring reports in earlier years then the table above may show slightly different values to previous reports. This will be due to a combination of any changes to the assumptions we are comparing against (for example if you have finalised a valuation report since last year), any extra information in your most recent data, and any changes to the financial assumptions we have used (see Appendix C for the financial assumptions used in this report).

NB. Pension amounts have been revalued in line with RPI to previous years in order to remove the effect of pension increases. To the extent your fund provides pensions that increase at a different rate to inflation the expected amounts ceasing may differ to those shown here.

CLUB VITA LLP

3 Understanding your experience (con't)

Knowing your members

Actuarial assumptions tend to assume a certain chance of surviving a year – or put another way, that a certain proportion of the membership will die each year. The unique characteristics of your individual members will mean that we would expect some differences from your funding assumptions – for example the healthy members of your membership will have a greater chance of surviving the year than the less healthy members.

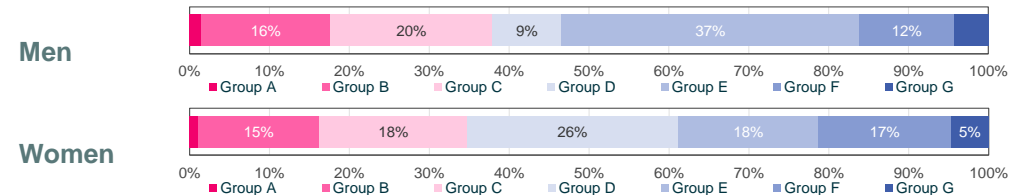


The rest of this section recaps on the three main longevity characteristics – namely lifestyle, affluence, and retirement health of your 'Demographic DNA', more details of which are provided in our VitaIndex and 'Tailoring VitaCurves' reports.

The demographic DNA of your pensioners

Lifestyle

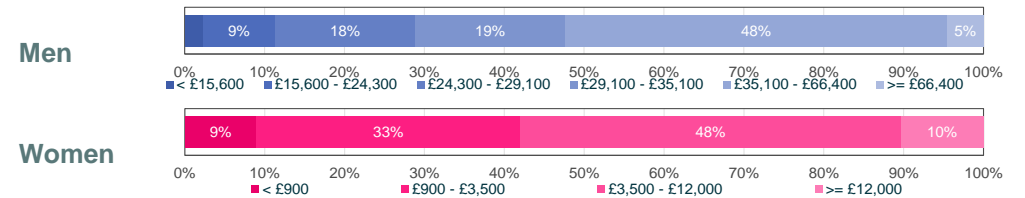
One of the most important predictors of longevity is an individual's lifestyle. The chart to the right illustrates the mix of lifestyles within your fund for those individuals where their postcode is known. Please note that Group G are those with the healthiest lifestyles and so longest life expectancies.



Affluence

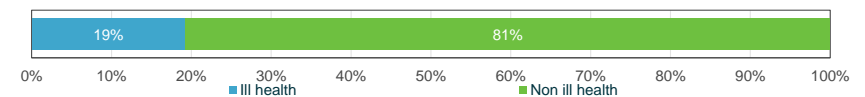
How people spend their money, their lifestyle, is important to longevity. However it is also important how much they have to spend. The larger an individual's income the longer he or she will tend to live.

The charts to the right show the spread of salaries for men (blue bars) and the spread of pensions for women (pink bars) within your fund for those individuals where this information is known.



Retirement health

Those who retire on grounds of ill health typically have a shorter lifespan than those who retire on grounds of normal health. The chart to the right shows the mix within your fund.



CLUB VITA LLP

4 Updating your assumptions for the passage of time

The assumptions you currently use for funding capture the unique mix of people found in your scheme and use the experience across our database (VitaBank) of similar individuals to identify an appropriate 'baseline' longevity assumption for each member known as VitaCurves. This is described in our 'Tailoring VitaCurves' report (see also 'Bill and Ben').

Since your last valuation we have continued to gather data, and regularly update our assumptions to ensure they reflect the most recent experience possible.

We estimate that the impact of changing your assumptions for current longevity to reflect the emerging Club Vita experience is to decrease the value placed on pensioner liabilities by 1.2%. Taking into account the characteristics of your actives and deferred pensioners we estimate that the overall impact is to decrease the value placed on liabilities by 1.2%. This decrease reflects the following:

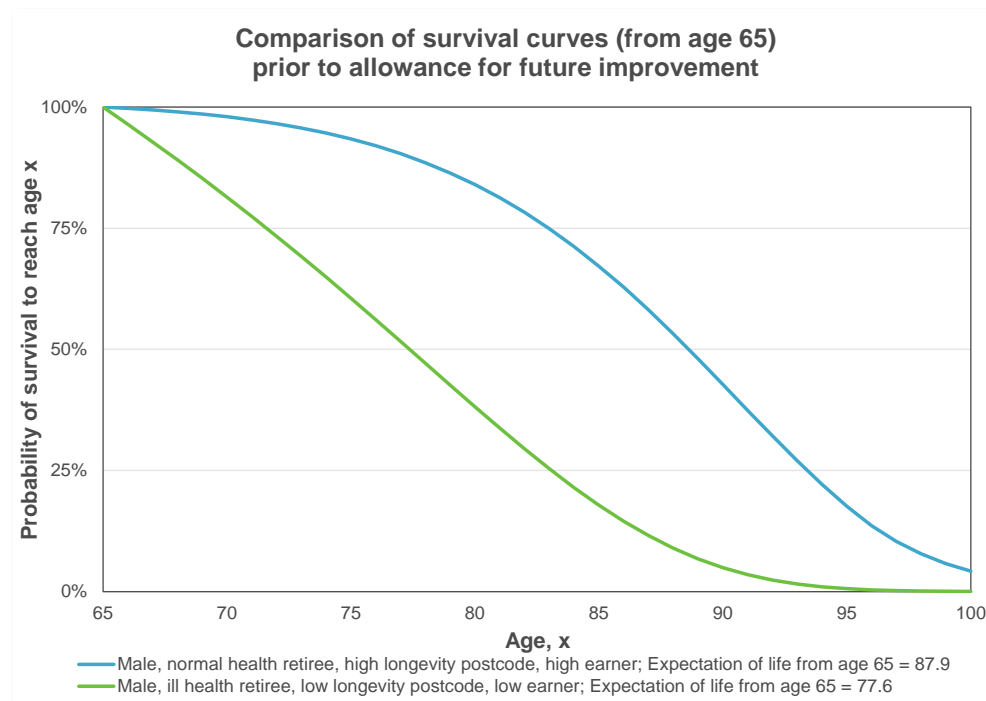
- Actual emerging longevity improvements compared to those assumed in your latest funding valuation
- Any extra data available to Club Vita which was not available when identifying the characteristics of your members, and so the VitaCurves, used for the funding valuation
- Refinements to VitaCurves to reflect the latest emerging insights – for example we have recently been able to incorporate additional information on very high earners

Impact on funding position



We estimate that the overall impact of changing your assumptions for current longevity to reflect the emerging Club Vita experience is to decrease the value placed on your fund's liabilities (for all members) by 1.2%.

If you have received Monitor reports in earlier years then the overall impact of changing your assumptions to reflect VitaCurves shown above may differ from that shown in previous years. The likely reasons for this are set out in our accompanying 'Tailoring VitaCurves' report.



Bill and Ben...

Bill and Ben have both recently retired. They are both 65, yet Bill can reasonably expect to survive to age 88, whilst Ben can consider himself fortunate if he survives to age 78. Why is this? Bill retired in normal health, from a well paid job and has a healthy lifestyle – his chance of surviving to older ages is the blue line in the chart above. In contrast, Ben retired in ill health, from a low paid job and has a less healthy lifestyle – he is the green line in the chart above.

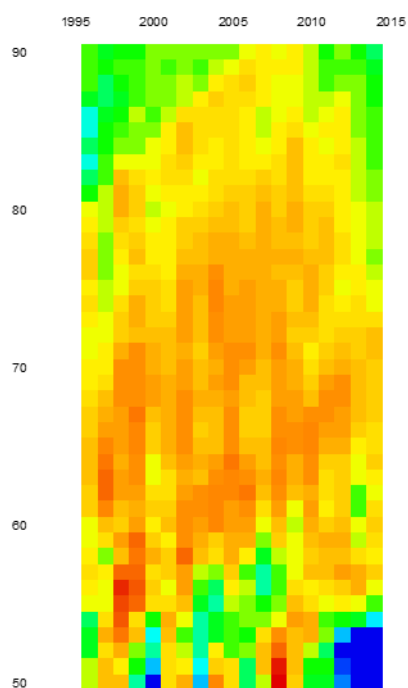
CLUB VITA LLP

5 Trends

Golden generations

So far we have considered how recent experience has impacted your fund. However in setting a longevity assumption you also need to consider how longevity will evolve in the future. One thing most people will agree on is tomorrow's world is likely to be very different from today's world – and life expectancy is just one such difference. However whether longevity will continue to increase, and if so how quickly is open to debate. In the short to medium term though – wars, pandemics or magic cures aside – we would expect life expectancy to be a gentle continuation of patterns in recent experience. But what are these patterns?

Men

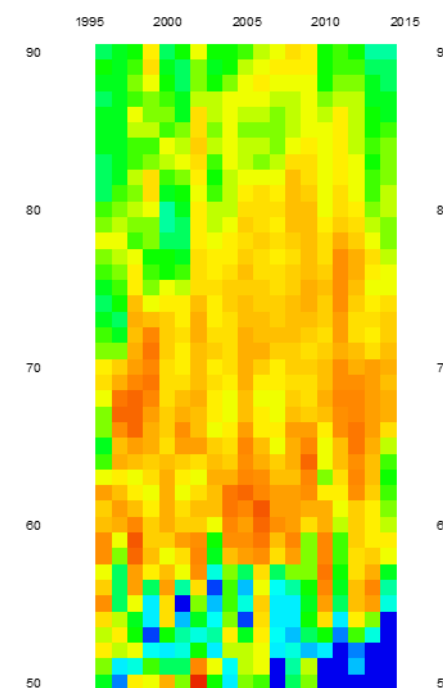


One way to visualise recent trends is via the colourful images to the right and left. In these charts ages run from bottom to top, and time from left to right – and crucially individuals born at similar times (cohorts) move along diagonals from the bottom left to top right. The colours represent how much mortality rates have been falling. The 'warmer' the colour (i.e. the deeper the orange and red) the higher the fall.

Looking at men, we see that there is a diagonal of strong oranges, broadly centred on those currently aged in their early 70s. This suggests that there is a 'golden generation' born around the early 1940s for whom life expectancy is rapidly improving. There is a further cohort centred on those aged in early 80s. There appears to be some 'cooling' of this cohort in recent years, particularly amongst older members. Some commentators have suggested that this is a sign of a slowdown in improvements. Our 2017 research with the PLSA into experience of different socio-economic groups found that over 2010 to 2015 the most affluent pension scheme members saw steady improvements, while less affluent members saw some slowdown. At Club Vita we will of course continue to monitor how mortality rates are developing over time, and your Club Vita consultant will be able to provide the latest update when you next meet.

The situation for women is slightly different. There is less evidence of different cohorts of experience, suggesting that longevity trends have been impacting men and women differently. Why might this be? One possible reason may be the differences in smoking cessation – men born in the mid 1930s were much more likely to give up smoking.

Women



Want to know more about how to read these heat maps? Please see Appendix B.

CLUB VITA LLP

5 Trends (con't)

The big killers (1)

Changes in longevity can also be looked at in terms of the underlying causes of death, and what has caused the changes seen in those causes of death. The vast majority of members of occupational pension schemes are expected to reach age 75 – for example nearly 70% of all men (and 80% of all women) currently aged 40 can expect to reach age 75, even if there are no future health improvements. It is informative therefore to focus in on the causes of death amongst those aged 75 and older.

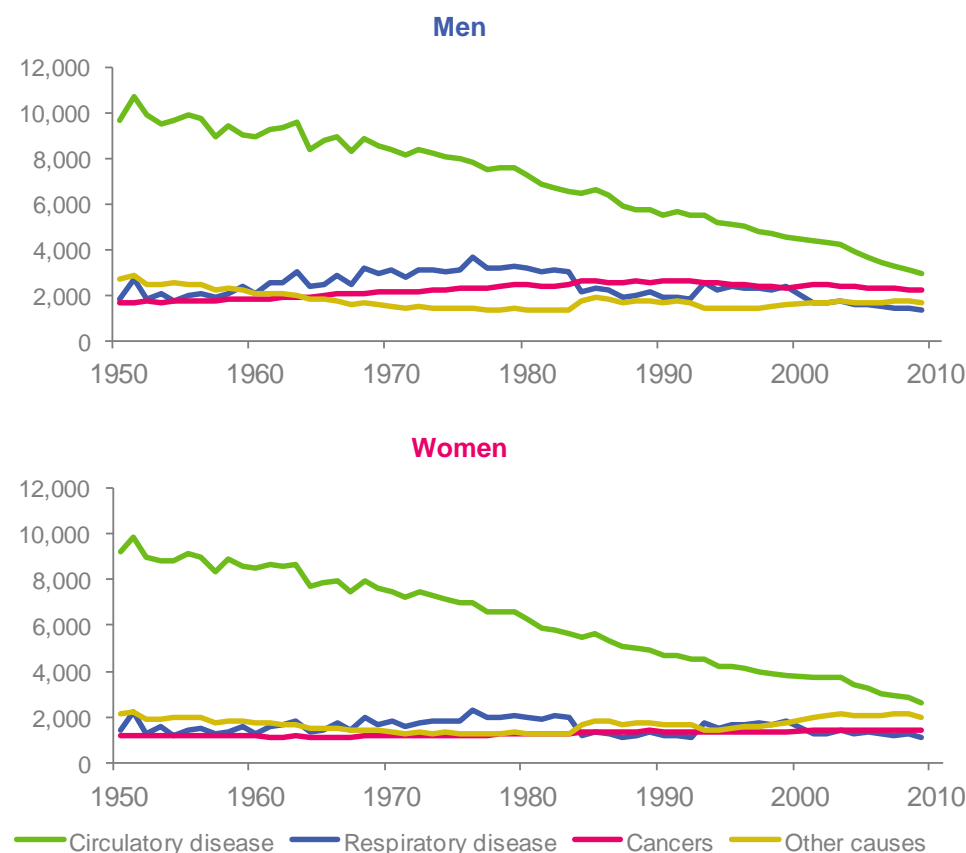
The charts to the right consider the number of deaths amongst over 75 year olds by each of the major causes of death at older ages, namely cancers, circulatory disease and respiratory diseases for each year since 1950. We see that:

- **circulatory disease** (e.g. heart attacks and strokes) deaths are continuing the sustained decline which has been seen over the last 60 years
- **cancer** mortality has stayed fairly level over the last 30 years for women but increased for men, reaching a peak in the late 1980s. For men it is the second most common cause of death amongst the over 75s. *(this pattern is most likely due to men having historically been more likely to smoke, with smoking rates amongst men peaking in the 1940s and 1950s, combined with the latency period of in excess of 20 years between smoking and lung cancer)*
- the number of deaths from **respiratory diseases** (e.g. pneumonia) has been falling over recent years *(the 'dip' between 1983 and 1993, and after 2000 relates to changes in the rules for classifying the underlying cause of death)*
- **'other'** causes of death (e.g. 'old age') have overtaken respiratory diseases to be the second most common cause of death amongst women

The long term prospects for longevity are likely to be determined by the prospects for medical treatments which prolong life and/or cures, along with trends in individuals' lifestyle choices such as smoking, diet and exercise. We explore this further on the next page.

Technical note: The profile of the UK population has changed a lot since 1950. To compensate for this the charts are based on 'standardised' rates i.e. as if the population had the same age profile as seen in 2008.

Deaths per 100,000 lives from major causes amongst aged 75 and over in UK (based on 2008 UK age profile)



5 Trends (con't)

The big killers (2)

Respiratory Diseases

One of the major contributors to respiratory disease deaths is COPD (a form of lung disease) which accounts for over 30% of all respiratory deaths amongst the over 75s. Other major contributors include occupational related diseases such as mesothelioma from asbestos exposure.

The British Thoracic Society estimates that 44% of all respiratory diseases are associated with social inequalities. In July 2011 the Department of Health launched a new strategy for tackling COPD and Asthma in England, with particular focus on these social inequalities.

Cancers

Cancer mortality is dominated by the 'big four' – **lung, colorectal, breast and prostate** cancer.

Cancers range from the very aggressive (lung cancer) to those which respond well to surgery (colorectal and breast cancer), making it hard for medical science to make unilateral breakthroughs.

Smoking, diet and exercise are recognised risk factors for many cancers. Continued smoking cessation means declines in cancer rates in the short term are likely. The Department of Health has also launched campaigns to raise public awareness of the symptoms of both lung and bowel cancer to aid early diagnosis.

Other causes

Other causes include infections, 'old age' (senility without psychosis) and dementia. One of the main reasons for recent increases in this group is the increasing recognition that factors such as dementia are the root cause of deaths.

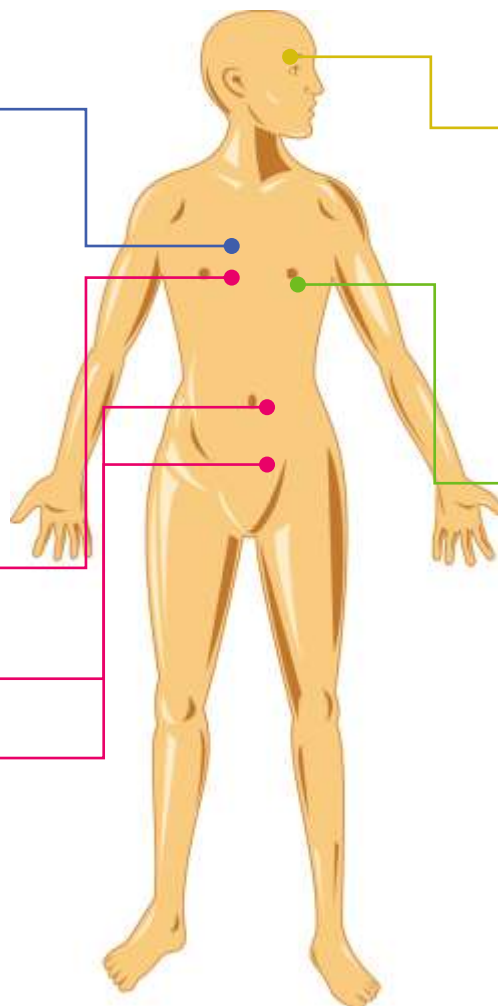
In March 2012 David Cameron outlined plans to increase funding for dementia research, aiming to make the UK a world leader in dementia care and research.

Circulatory Diseases

Despite death rates dropping to barely a third of levels in the early 1960s, diseases of the heart and circulatory system remain the single biggest killer of the elderly.

Medical treatments, such as low dose aspirin and balloon angioplasty to help open up blocked arteries have had an important role to play in this dramatic fall. However, direct treatment only accounts for approximately 40% of the fall – the rest being due to behavioural changes such as smoking cessation and increased management of blood pressure / cholesterol.

Continued benefits from smoking cessation, bans on smoking in public places, increased use of statins and government targets all suggest continued falls in future. For example the Scottish Government has a stated aim to "Reduce mortality from coronary heart disease among the under 75s in deprived areas".



CLUB VITA LLP

Managing longevity risk

March 2019

CLUB VITA LLP

6 Understanding longevity risk

Being prepared

Money, interest and death

A one year change in life expectancy increases the value placed on your liabilities by around 3%. For most schemes longevity risk is second only to investments and sponsor covenant in terms of importance. At Club Vita we split longevity risk into four key parts.

Individual risk

A typical pension scheme valuation identifies the necessary funds if each member were to survive to his or her life expectancy. In practice some members will live longer than their 'allotted time' and some will die prematurely.

Funding valuations assume that these variations will 'average out'. However, if the liabilities of a scheme are concentrated in just a few members of the scheme, then a key risk is how long these members **actually** live for. We explore this in **Section 7**.



Estimation risk

Your members will not live and die precisely in line with the actuarial funding schedule ('individual risk'). But what if the schedule is wrong?

Estimating current longevity is a bit like trying to guess the number of sweets in the jar at a school fete – it is very hard to get it spot on. However by allowing for the different shapes and sizes of the sweets (or the longevity of your members through VitaCurves) we can get a better estimate.



Trend risk

In making an assumption about the longevity of your members it is necessary to project how longevity will change in the future.

Inevitably, future experience will differ from the projections you are using and this leads to the risk that future trends differ from predictions in a financially material way.



Geared risk

For some schemes the financial risk of members living longer is increased owing to the knock-on consequences of individuals living longer on the sponsor covenant.



For example Insurer Plc sells annuities. If life expectancy increases in an unexpected way, so annuities sold previously become less profitable. The pension scheme of Insurer Plc may find itself needing more money during tough times for Insurer Plc.

Your exposure to these risks can change over time. For immature schemes dominated by actives and deferred pensioners the long time horizon of the benefit promises makes the scheme particularly sensitive to long term trends in mortality. As a scheme becomes dominated by pensioners so shorter term trends and the concentration of liabilities in certain individuals become key.

Your exposure to longevity risk also changes owing to the choices members make – for example commuting pension for cash reduces the amount of benefit payments linked to the vagaries of future longevity. We explore this further in **section 8**.

CLUB VITA LLP

7 Concentration hurts

Individual risk

In funding for pension scheme liabilities, trustees typically aim to have sufficient funds to pay pensions for as long as an individual is *expected* to be alive. However individuals continue to defy expectations. For example, how many pension schemes would have anticipated, back in 1961, when the late Henry Allingham was 65, that a member of their scheme could go on to become the oldest lived man ever in the UK, collecting a pension for some 48 more years!

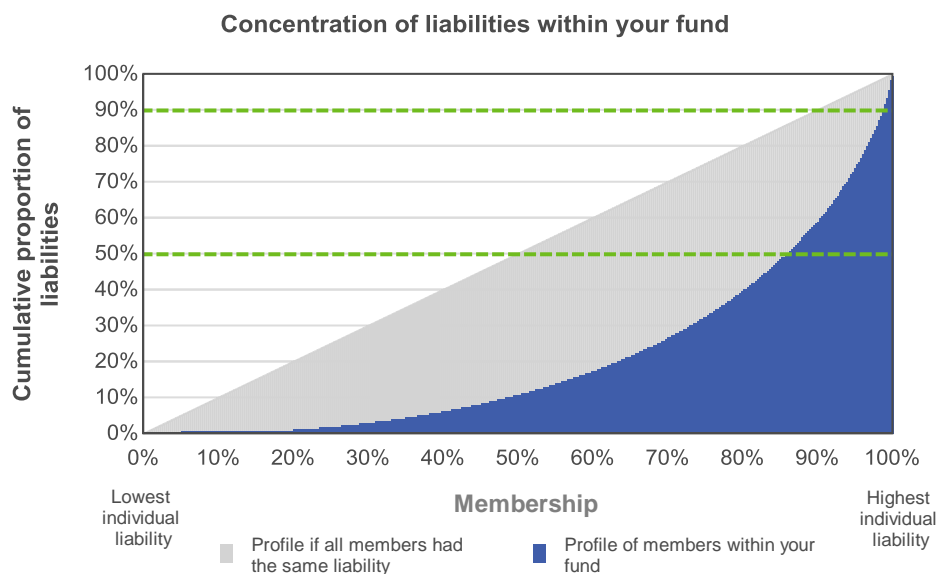
One thing is certain – not everyone in your pension scheme will live to the age anticipated in your trustees' funding assumptions. However, it is hoped that this will broadly average out, with some members living longer than expected and some dying prematurely. This is fine if the pension scheme is large, and everyone has similar size benefits and similar life expectancies. In practice though the liabilities can be concentrated in a handful of members and so the *idiosyncrasies* of how long these members **actually** live for can be key to the financial health of the pension fund.

In any pension scheme the different ages and pensions of different members means that they have different liabilities and so some concentration of liabilities is to be expected. One way to visualise how concentrated the liabilities are is using the chart to the right. In this chart members are listed from left to right in order of increasing liabilities. The blue area shows the total liabilities as we move through the members. We can see that:

- 50% of the liabilities are concentrated on 14% of your members
- 10% of the liabilities are concentrated in just 1.2% of your members (i.e. 273 members)

How big an issue is this?

If each member represented a similar liability then in the chart to the right the blue area would fill the grey triangle. One way to measure the extent of this risk (and so monitor from year to year or indeed compare to other funds) is to consider how much of the grey triangle is visible – the more visible it is the greater the concentration risk. On this measure your concentration risk is currently 59% which is fairly low.



In the chart above, members have been listed from left to right in order of increasing liabilities – i.e. the member with the single largest liability is at the far right. The blue area shows the total liabilities as we move through these members.

CLUB VITA LLP

8 Demographic trends

Retirement trends

Living longer & working longer?

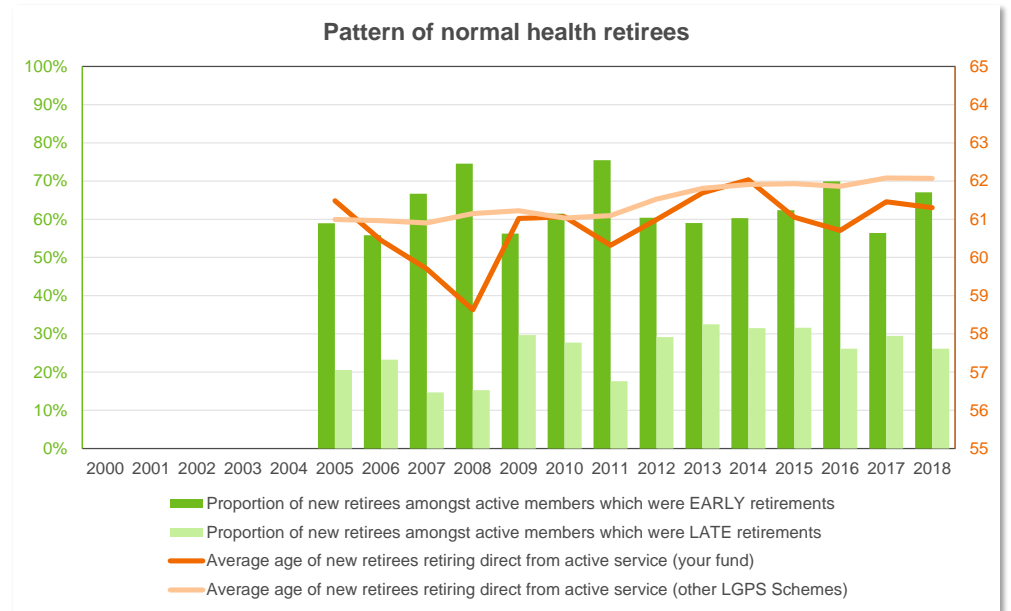
Over recent decades there has been a sustained trend towards people living longer – but are the members spending some of this extra lifetime working? Put another way are members retiring at older ages than in the past?

The age at which members retire is also important in terms of the fund’s sensitivity to changes in life expectancy. A one year increase in life expectancy has a bigger impact for those retiring late than those retiring early since the increase represents a bigger proportion of the total payments. However, with late retirements the fund may also have more opportunity to spot trends in longevity and to therefore adjust the benefits before they come into payment (via late retirement factors) to reflect these trends.

The chart to the right looks at the pattern of retirements from active service. In order to avoid distortions arising from the changes in ill health retirement patterns we have excluded those members retiring in ill health. We see that:

- the proportion of members who retire early each year has been variable over the last decade
- the average age at which members have been retiring in your fund has been variable over the last decade
- the average age of retirement within other LGPS Schemes has generally been increasing
- the average age of new retirees (from active service) within your fund has generally been lower than other LGPS Schemes

Technical Note: For the purposes of this chart (and the one on the following page) we have treated an early retirement as one before age 60 (or 'rule of 85' age if later) and a late retirement as after age 65 (or 'rule of 85' age if earlier)



Information is shown in respect of other LGPS Schemes for 2018 though note that not all schemes have submitted data spanning the year to 31 August 2018 yet.

CLUB VITA LLP

8 Demographic trends (con't)

In sickness and in health...

Typically, the fewer the retirements that are happening due to grounds of ill health, so the healthier your new retirees are, and so the longer the members are expected to live. In this section we consider the ill health retirement patterns within the fund. Since ill health retirements typically occur from active status rather than amongst deferred pensioners we focus on retirements from amongst the active members.

The top chart to the right shows that:

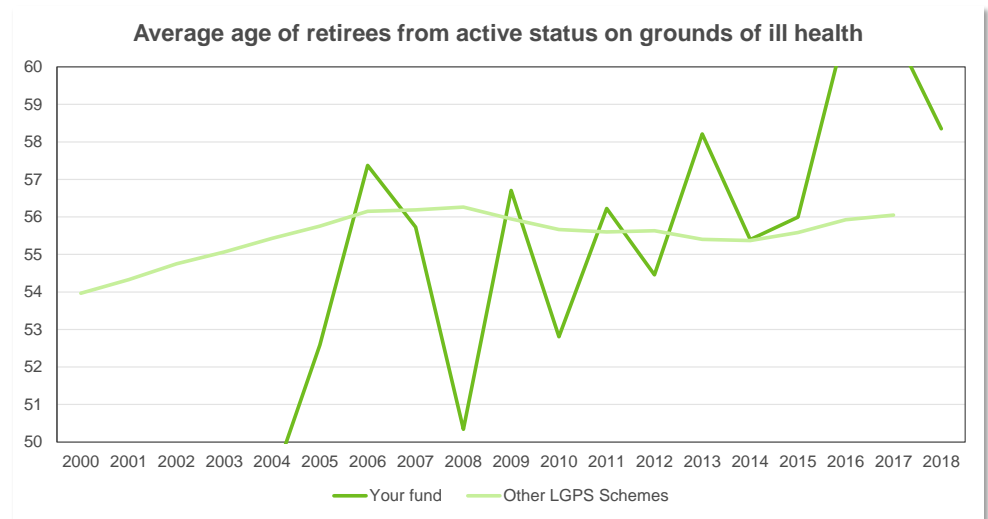
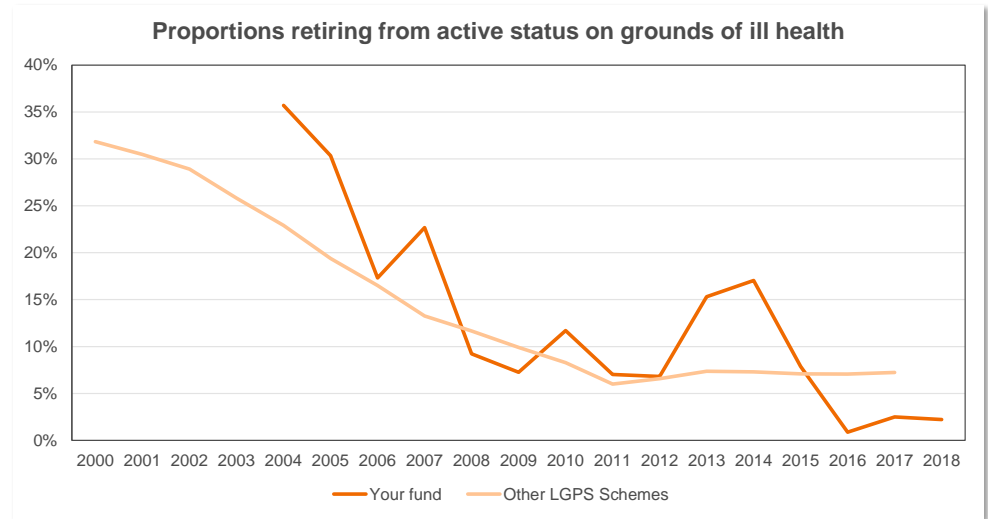
- 2% of active members who retired during the year to 31 August 2018 did so on grounds of ill health.
- a decreasing proportion of your new retirees are retiring on grounds of ill health each year.

The lower chart considers the average retirement age of new ill health retirees. We see that:

- the average retirement age of your ill health retirees has been volatile, but has, on the whole, been increasing, however in contrast, the average ill health retirement age has been relatively stable across other LGPS Schemes.

Of course, these trends are not always a reflection of changing health of your membership – for example changes in the eligibility rules or discretion exercised by trustees and companies over time may explain these trends.

Ill-health retirement trends



No information is shown in respect of other LGPS Schemes for 2018 as not all schemes have submitted data spanning the year to 31 August 2018 yet.

CLUB VITA LLP

8 Demographic trends (con't)

Old widows tail

Marital bliss?

The longer members live for in your fund the longer the benefits are paid for. However the total amount of benefit which is ultimately paid to each member also depends on the extent to which the member is outlived by an eligible dependant.

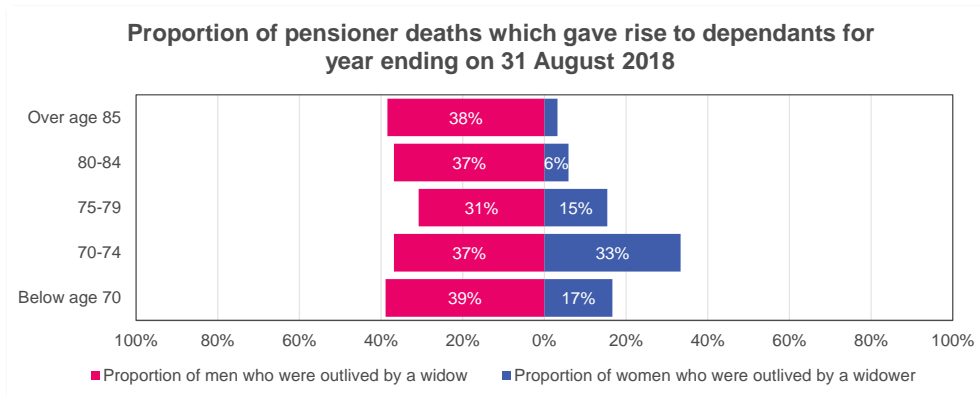
The chart to the top right looks at the proportion of the deaths over the last year which gave rise to a dependant's pension within your fund. We can see that:

- females dying at older ages were generally less likely to leave a dependant. *This is unsurprising as the older a female is when they die the greater the chance that their spouse will have died before them.*
- men were generally more likely to leave a dependant than women. *Women tend to live longer than men, which makes it more common for a woman to outlive her husband than the reverse.*

These patterns often receive little attention, yet can be significant, particularly if you are considering risk transfer options.

The chart to the bottom right considers how these patterns have been changing over time. We see that:

- at younger ages the proportion of members leaving a dependant has been variable reflecting the relatively low number of deaths happening each year at these ages within the fund. *As longevity increases so the deaths at younger ages tend to reflect 'premature' deaths and so, all else being equal, are more likely to leave a spouse.*
- at older ages the relatively low number of deaths happening each year within your fund means the proportion of over 85 years old leaving a dependant has been variable.



Keeping up with the Jones'

For many schemes the only way we can 'link' a widow(er) back to an original member is by identifying members who died just before the widow(er)'s pension commenced, and have the same surname. Of course, common names like 'Jones' can cause some false matches and this may distort the figures shown above.

CLUB VITA LLP

8 Demographic trends (con't)

Age differences

Mind the gap

It is not just whether a member leaves a widow(er) which is important to pension schemes, but also how old he or she is. The younger the widow(er) the longer the benefit will be paid for and the greater the potential exposure to future increases in longevity.

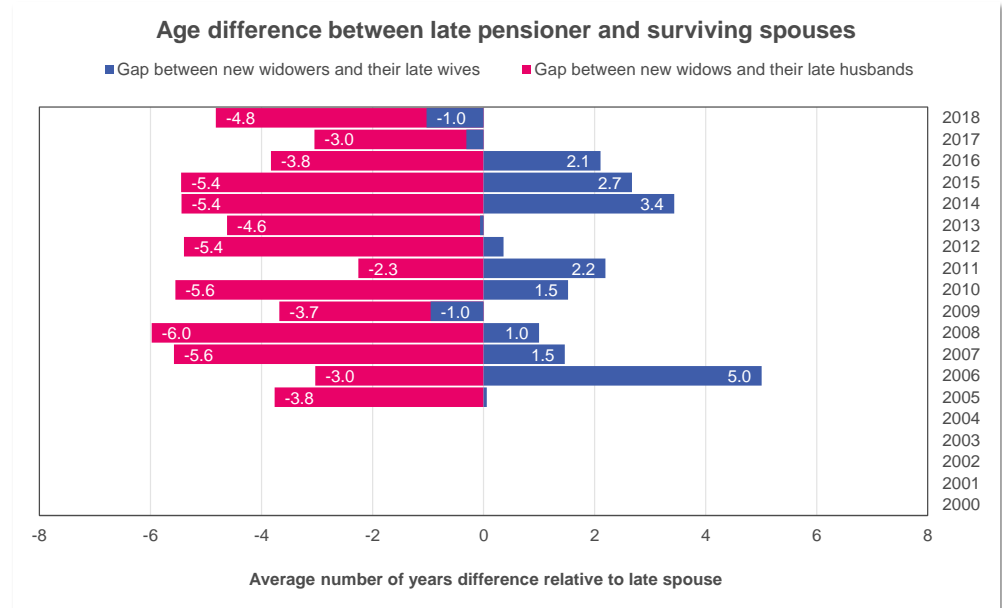
The chart to the right shows – for deaths in recent years in your fund – how much older or younger the surviving spouse was compared to the member.

It is well known that men tend to marry younger women. The older member of the marriage – typically the man – is more likely to die first. It is no surprise that we therefore see that:

- widows have generally been younger than their late husbands
- the age gaps are in the opposite direction for new widowers' pensions, but generally smaller (men who outlive their wives are likely to be those closest to their wife in age or indeed younger than their wife)

We can also see that over the last 14 years the age gap between:

- widows and their late husbands has been variable
- widowers and their late wives has been variable



CLUB VITA LLP

9 Your longevity risks at a glance

Risk register

The tables below summarise your current level of exposure to longevity risk and the demographic trends in your fund. Those items identified in green are those where the trustee(s) (possibly in collaboration with the sponsoring employer) may be able to take proactive actions to manage longevity risk.

Risk Measure	Current value	Change over year	Overview
Concentration risk	59%	↔	The more the liabilities are concentrated with a few individuals the greater the exposure to the risk that those particular members live longer than expected.

Demographic trend	Current value	Change over year	Overview
Proportion of new retirees, retiring early (actives, exc. Ill health retirees)	67%	↑	The more members that retire early the lower the exposure to longevity risk – if members live a year longer than expected then this extra year is a smaller proportion of the total number of payments than would have otherwise been the case. Similarly the older the average age of new retirees so the greater the longevity risk.
Ill health retirements	2%	↓	Members retiring in ill health tend to have shorter life-spans, reducing the exposure to longevity trend risk, although the benefits paid will typically be higher.
Proportion of men (women) aged over 85 who died leaving a widow(er)	38% (3%)	↑ ↑	The more members who leave a spouse, the greater the exposure to the survival of a second life.
Age gap between late pensioners and surviving spouse for men (women)	-4.8 (-1.0)	↓ ↓	The younger members' husbands and wives are, the greater the risk that they will outlive the member, resulting in benefits being paid for longer.

CLUB VITA LLP

Appendices, Reliances and Limitations

March 2019

CLUB VITA LLP

Appendix A

Jargon buster

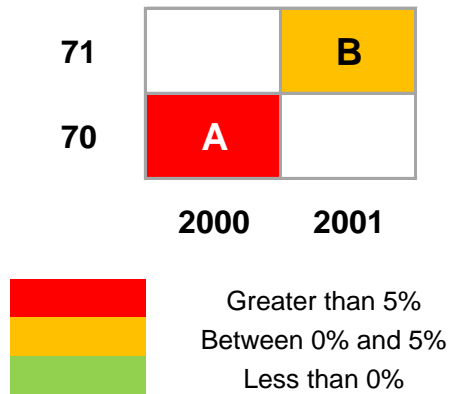
Actual vs. expected deaths	The ratio of the actual number of deaths observed to the number we would have expected to observe had the pattern of deaths with age and time been in line with some specified rate e.g. your funding assumption.
Baseline	This is the part of a longevity assumption which is, in principle, objective and refers to how long people have been living for in recent years.
Cohort	A group of individuals born around the same time.
COPD = Chronic Obstructive Pulmonary Disease	A form of lung disease characterised by slow, progressive and largely irreversible reduction in the capabilities of the lung. The limitations to breathing are caused by varying combinations of diseases to the airways and destruction of lung tissue (emphysema).
Demographic DNA	The unique mix of longevity characteristics within your membership.
Future improvements	This is the subjective part of a longevity assumption and relates to how life expectancy may change in the future. Whilst changes at the personal level may be positive i.e. increasing life expectancy, or negative i.e. decreasing life expectancy, you will often see future changes referred to as future improvements.
Liability	The financial value placed upon the benefits promised to members. The value is uncertain and based upon a number of assumptions, including how long individuals will live for. Ultimately, the fund is liable for the full benefit promise and so the actual cost may be higher or lower than the value placed on that promise.
Life expectancy	Life expectancy is the average length of time an individual can expect to live. Life expectancy can either be future life expectancy (for example 20 years for someone aged currently aged 65) or as total life expectancy (for example 85 for someone currently aged 65). In this report we use total life expectancies.
Longevity	Longevity describes how long people will live for.
Mortality	This describes how likely it is that someone will die within a specific timeframe, usually the next year.
Monoclonal antibodies	Monoclonal antibodies are antibodies designed to specifically bind to certain substances in the body. Within cancer treatments the hope is that by designing monoclonal antibodies that bind to cancer cells it will be possible, for example, to deliver a specific toxin to destroy these cells.
Predicted A/E	The A/E ratio we would have expected to see for your fund had the actual number of deaths you experienced been in line with the wider VitaBank experience, where the wider experience is weighted in line with the mix of longevity characteristics in your fund (i.e. your demographic DNA).
VitaBank	The pooled data from all schemes participating in Club Vita.

CLUB VITA LLP

Appendix B

The ‘hot and cold’ of life and death

The image below shows an example of a heat map, which covers two ages, 70 and 71, and two calendar years, 2000 and 2001. We will use this chart to explain how to read heat maps.



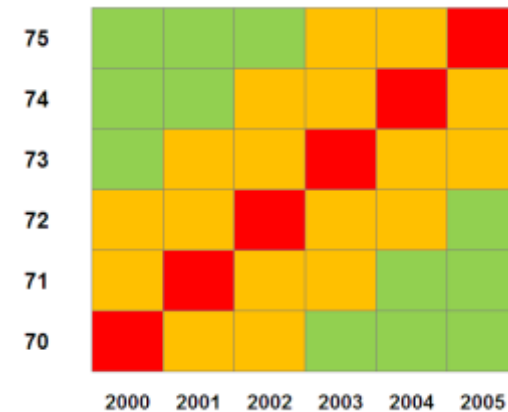
In a heat map each square represents the change in the death rate at a certain age compared to the rate in the previous year. In the example to the left, the square marked A represents how much lower the death rate was amongst 70 year olds in 2000, compared to the previous year, 1999. Since the square is a bright red this tells us that there was more than a 5% reduction in deaths per thousand for 70 year olds in 2000 compared to 1999.

Similarly, the square marked ‘B’ indicates that the death rate amongst 71 year olds in 2001 was lower, by up to 5%, than it was in 2000. So, if, for example, 100 in every one thousand 71 year olds died in 2000, then perhaps only 96 in every thousand 71 year olds died in 2001.

How to read heat maps

‘Golden’ cohorts

When reading heat maps it is also important to know that individuals born at similar times – known as *birth cohorts* – move along diagonals in these charts. For example someone aged 70 in 2000 will be aged 71 in 2001.



In the chart above we can see a strong diagonal of hot colours – reds – concentrated on those aged 70 in 2000, 71 in 2001 etc. This suggests that those born around 1930 (and so aged 70 in 2000 etc.) have been especially fortunate in seeing very beneficial changes in later life. This is often referred to as a ‘golden cohort’ and underlies the ‘cohort’ effect which your actuary may have referred to.

A Technical Note – Being smooth,,,

In practice the year-on-year changes, even in a large dataset like **VitaBank™** can give a very multicoloured pattern to these ‘maps’. In order to avoid this, some smoothing of the underlying rates is usually necessary – throughout this report the heat maps relate to smoothed data.

CLUB VITA LLP

Appendix C

Disclosure of assumptions

In comparing the experience of your fund against your funding assumptions, and assessing the financial impact of your fund's experience we have had to both interpret your current longevity assumptions, and make a number of other assumptions. We disclose these below.

Your current longevity assumption

We usually express a longevity assumption in two parts – an assumption about current longevity (the 'baseline') and an assumption about future improvements.

Baseline (2015):

For the purposes of expressing the 'current' longevity assumption we have described it in terms of the assumption which applied in 2015. We have chosen this year as it is also the same year to which our most recent VitaCurves relate.

Current male pensioners

VitaCurves (calibrated to data spanning 2012 - 2014) with future improvements in line with Club Vita calibrated CMI 2013 projections with a long term rate of improvement of 1.25% p.a.

Future male pensioners

As above.

Current female pensioners

VitaCurves (calibrated to data spanning 2012 - 2014) with future improvements in line with Club Vita calibrated CMI 2013 projections with a long term rate of improvement of 1.25% p.a.

Future female pensioners

As above.

Future improvements (from 2015):

As per your current funding assumption which we have interpreted to be:

Improvements in line with Club Vita calibrated CMI 2013 projections with a long term rate of improvement of 1.25% p.a.

Other assumptions specific to your scheme

We have assumed the following:

- A normal retirement age of 65
- That active members will retire early at, on average, age 62, whilst deferred members will retire at 65
- A lump sum benefit is payable at retirement of 3 times pension
- Upon death after retirement a spouse's pension is payable of 50% of the member's pension prior to any commutation

Please note that our analysis of the financial impact of experience is sensitive to these assumptions, as described in Appendix B of your 'Tailoring VitaCurves' report.

Assumptions which are not specific to your scheme

We have made the following financial assumptions, which are designed to broadly reflect a market consistent basis:

- Net discount rate whilst member in active service of 0%
- Net discount rate whilst member in deferment of 1%
- Net discount rate whilst benefits are in payment of 0.0%

We have also made the following general assumptions:

- Husbands are 3 years older than their wives
- 80% of members are married at retirement or current age if older
- Active members remain in service until they retire
- No allowance to be made for death prior to retirement
- No allowance for members opting to take transfer values

CLUB VITA LLP

The Small Print...

Reliances and Limitations

This report is provided for the benefit of the party set out on the cover page. It has been prepared by Club Vita LLP for the London Borough of Hackney Pension Fund (the 'fund'), pursuant to your membership of Club Vita LLP as governed by the Club Vita Rules (the "Rules"). It has been prepared for your exclusive use and must be used by you solely for the purpose of you monitoring the longevity experience of your pension fund (the "Purpose"). It must not be used for any other purpose, recited, referred to, published, quoted, replicated, reproduced or modified (in whole or in part) except as required by law, regulatory obligation or as set forth in the Rules, without Club Vita LLP's prior, written, express consent. The sole exception to this is that you may share this report for the Purpose, with your Scheme Actuary and/or sponsoring employer(s) and/or appointed longevity consultant ("Permitted Third Parties"), but without creating any duty or liability to them on the part of Club Vita LLP or its licensors. Prior to sharing this report with any Permitted Third Parties you must inform such Permitted Third Parties, that the contents of this report are confidential, must not be disclosed to any other party, replicated, reproduced, published, referred to or quoted, whether in whole or in part, without Club Vita LLP's express written consent and that if they, or any other third person, place reliance on the report they do so at their own risk and have no recourse against Club Vita LLP or its licensors in respect of such reliance.

This report contains commercially sensitive and proprietary confidential information (including copyright and other intellectual property rights) of Club Vita LLP and its licensors. You shall not do anything to infringe Club Vita or its licensors' copyright or intellectual property rights.

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 13 March 2019. 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 and historic data held by the fund's administrators. This was supplied to us by Bruce Barry of Equiniti Pension Solution Operations on 22 November 2018. This data is summarised in our VitaCleansing™ report. 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, it is likely that some residual variation remains explicable by factors other than those identified here. 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 Borough of Hackney Pension Fund to appreciate the impact of these factors on longevity.

Simplifying assumptions

In analysing the experience of the fund we have made a number of assumptions. In addition to the assumptions disclosed in Appendix C the main simplification made is to calculate expected deaths amongst widow(er)s based upon the actual widow(er)s alive during the year rather than, for pensioners which die during the year, allowing for the chance each death will result in a widow(er) who could then go on to die during the year.

March 2019

CLUB VITA LLP

In identifying whether a member gave rise to a dependant pension upon death we have sought to use any connections in the unique member key syntax where this has been made available to us. Beyond this we rely on deducing connections by assuming that a dependant's pension coming into payment to an individual within 30 days of the death of a member with the same surname.

Compliance statement

This report (in combination with your VitaCleanse, VitaCurves and VitalIndex reports) complies with the requirements of Technical Actuarial Standard 100 as effective from 1 July 2017.