INSURED VERSUS UNINSURED RETIREMENT PRODUCTS

EXPLORING THE DIFFERENCES

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Redesigning Retirement

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Under the Retirement Income Covenant (RIC), superannuation trustees are required to develop strategies to assist members to achieve and balance three core objectives: maximising retirement in-come; managing risks; and providing access to capital. The government expects trustees to consider new types of retirement products that can balance these objectives more effectively. Only offering an account-based product (ABP) is unlikely to be sufficient as, in aggregate, ABPs pay around 30% of total assets as death benefits in old age instead of using those assets to deliver higher retirement incomes.

One class of product that superannuation product managers are considering is commonly referred to as a group self-annuitisation scheme (GSA). This paper raises issues about the potential deficiencies and risks of using a self-insured pool. Notably, there is a significant likelihood that the actual lifespans of members of the pool are different to the actuary's assumptions – which results in a 'hidden' variability for each person's future income.

This is not to undermine confidence in lifetime products or account based pensions generally but highlights the need to put in place life insurance-type arrangements that absorb this uncertainty to meet the RIC.

When designing products, it is important that superannuation trustees be aware of the inherent uncertainty when predicting future mortality rates for any group of people. Products that do not insure this risk may add significant instability to the longer-term member outcomes.
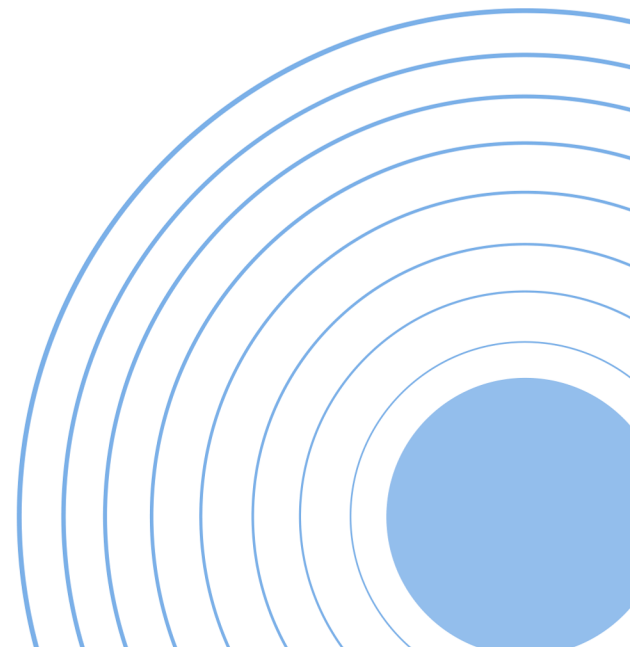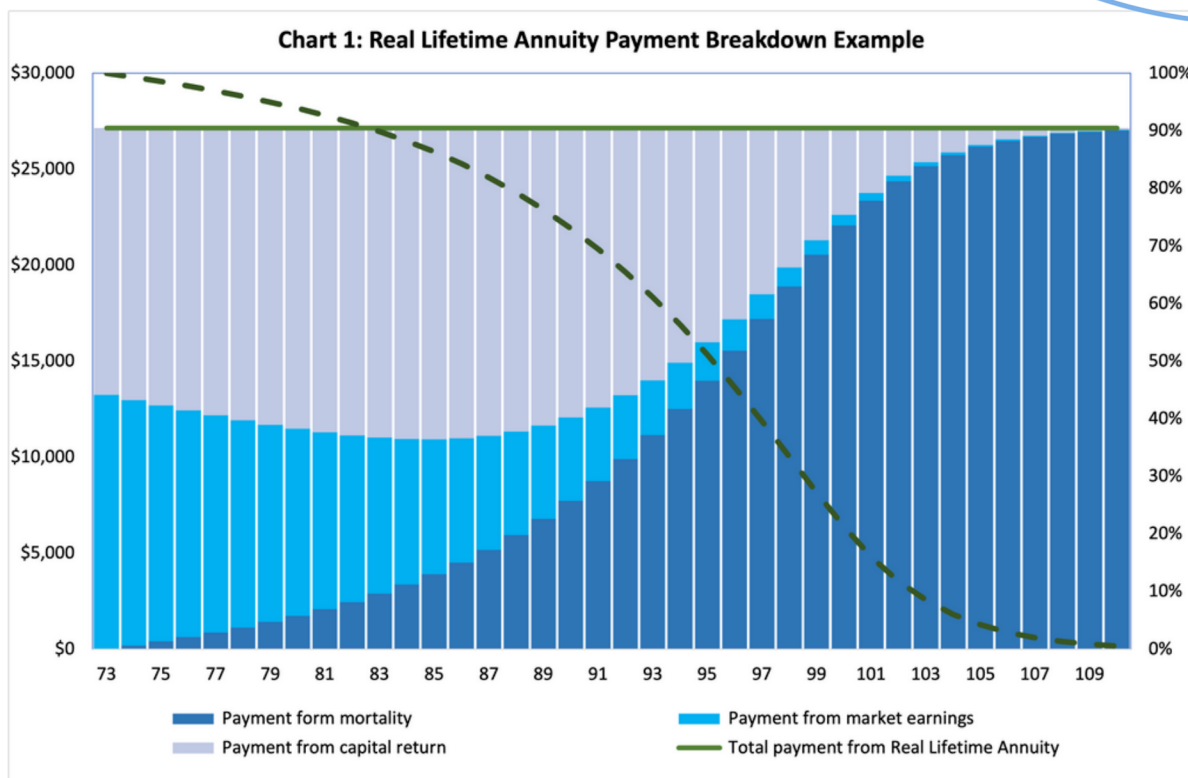
Solving the longevity risk problem

The retirement product currently offered by most superannuation funds is the ABP. This product is really a lump sum that the retiree draws down by regular payments in retirement- in other words it is a 'drawn down' product.

Nobody can make an ABP last exactly as long as they do, and main- tain a high income in real terms – as they do not know how long they will live. There is a wide range for how long different people live in retirement, with the standard deviation around the average life expectancy being around eight years. This means that around 70% of women entering retirement today will live between the ages of 81 and 97.

The age when income is no longer needed for a particular individual can be anywhere between tomorrow and the end of the Australian Life Tables at age 109, or longer.

If an ABP member sets a long time frame, it means drawing a low level of income to make the balance last. Conversely, if they assume a shorter lifetime, then they can draw higher income but with an increased risk of outliving their savings.

Chart 1: Real Lifetime Annuity Payment Breakdown Example

Legend:
- Payment form mortality
- Payment from capital return
- Payment from market earnings
- Total payment from Real Lifetime Annuity

Innovative lifetime income products solve this 'lifespan uncertainty' problem by guaranteeing each customer they will not outlive their income, no matter how long they live.

This is achieved through two important concepts:

• Pooling risk: instead of each individual retiree having their own lump sum, they enter into a contract that defines a level of lifetime income plus a benefit in the event of an early death.

• Repurposing the lump sum benefits that ABPs typically pay on death at older ages, typically to members in their 80s and 90s. That is, instead of paying a lump sum on death in old age, lifetime products pay more income to members who are alive – because the reserves stay in the fund to pay the pensions of the continuing members/retirees.

The underlying investments of a lifetime product can be identical as those for an ABP. The difference is that the fund will benefit from a regular – for instance monthly – 'longevity credit' that arises from the balances of those in the pool who die. This adds significantly to the fund's investment performance.

For a couple entering retirement in reasonable health, lifetime products have the potential to pay up to 30% more total income in retirement than an ABP with the same underlying investment mix. For people over age 70, or those in poorer health, the uplift in monthly payments can be higher still as depicted in **Chart 1**. Several lifetime income product designs can achieve this, showing that it is possible for a lifetime product to insure the investment performance, the longevity risk or both.

Some lifetime products work by operating as a self-insured pool or GSA where the longevity credits will emerge gradually from the actual deaths in the pool. Other products use insurance – for example an investment-linked annuity provided via an insurance company – where the longevity credits are defined in advance using assumptions, and any difference between the longevity credits from actual deaths and what was assumed is absorbed by an insurer.

It is important for superannuation trustees to know the diference between the insured versus uninsured approaches and the pros and cons of each.

Insured versus uninsured lifetime income products

For both insured and uninsured products, an actuary sets assumptions for the pricing of the product. This determines the starting level of income offered to each new customer.

Behind the scenes, the actuary sets up a life table to capture the percentage of customers who are expected to survive to each age over time based on statistics and projections. From this, the actuary can estimate the level of expected longevity credits over time and thus calculate the starting level of income based on some assumptions. However, like all assumptions, it is extremely unlikely that the assumed longevity credits will be exactly right. This is because actual mortality rates and, thus, lifespans of any group will vary from expected – sometimes more, sometimes less. There are several reasons for this, some of which are outlined in the following section.

The key difference between an 'insured' and 'uninsured' lifetime income product is how this variation from expected lifespan impacts member outcomes. In the first place, it will affect the cashflow from the longevity credits. This variability will, in turn, affect the annual pension payments that can be afforded. In addition, insurance companies will charge for taking on the risk.

Longevity risk and groups of people

As mentioned previously, there is considerable uncertainty around how long any individual might live. This is because individual lifespans are subject to randomness, and each individual has a chance they might die within a year – for instance they could be hit by a bus, or they could live until age 109 or even longer.

Within groups of people, there is a very low probability that the entire group will either be hit by a bus in the first year or survive to the end of the life tables. Nevertheless, there is still a chance they could be a very lucky or very unlucky group compared to the broader or average population. In addition, some socio-economic groups have longer lifespan expectations than others.

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Once you look at extremely large groups of people, the effects of randomness in overall mortality experience starts to stabilise. Some refer to this effect as the 'Law of large numbers'.

For example, in a group of 500,000 retirees of typical health and demographics, it is unlikely, as a group, that they will be luckier or unluckier than the broader population. Conversely, due to chance, small groups of retirees can be much luckier or unluckier than the broader population.

Even for large groups, however, it still does not mean the actuary's assumptions will be correct as two important risks remain – Selection risk and Population longevity risk.

Selection risk

Selection risk refers to the risk that the health/demographics of the customers who choose the product are different to what was assumed. An actuary may have assumed that the customers of a particular product will have a particular life expectancy because they come from a representative sample of members of a superannuation fund.

But in practice, it is often only the very healthiest customers who choose to use the product. This would mean customers of the product live longer than was assumed when their pension incomes were set. It would mean fewer people pass away in their 60s, 70s and 80s than expected. Depending on the rules governing the product, this would either mean a lower benefit or that the pool would run down its assets more quickly than was assumed or expected – as more customers are alive than assumed or expected. Different products deal with this in different ways.

Selection risk can be reduced by underwriting applications for new products. This gives more information about future mortality experience and allows those in poorer health or from socio-economic groups with lower life expectancies to be given higher annual incomes. Experience in the UK is that about a third of applicants can be offered higher rates.

Population longevity risk

Population longevity risk refers to the chance the entire population's life expectancy changes. There are many reasons why this may occur, and it is why the Australian Life Tables are carefully updated every five years. For example, if a cure is found for cancer, then life expectancy will increase for most Australians.

Alternatively, if there were another global pandemic, this could result in higher mortality rates than expected and cause lower life expectancies. These issues mean the actual experience of any lifetime income product will always be different to the assumptions made by the actuary. In the past century, actuaries and demographers have notoriously underestimated the actual or achieved increases in human life expectancies. For example, more baby boomers are alive now than expected. The COVID-19 pandemic has interrupted the trend – but hopefully, this is just temporary.

> " When designing products, it is important that superannuation trustees be aware of the inherent uncertainty when predicting future mortality rates for any group of people. Products that do not insure this risk may add significant instability to the longer-term member outcomes.

Uninsured products

With a self-insured pool – for example a GSA, when the number of deaths is different from that assumed, there will be a direct impact on the GSA's ability to pay benefits. As a result, income payments will continue for a different number of members than was assumed, and the pool's assets and the pensions payable will be lower or higher than assumed.

The actuary must then attempt to equitably share the resultant excess or deficit in pool assets. A formula will be used to allocate the pool's financial gain/loss to members. It means that the rate of income each retiree receives would need to decrease or increase. This makes the income payments to members more volatile – in addition to any volatility due to investment markets. A GSA cannot guarantee the longevity credits and hence cannot specify the income a customer will receive for life – as it depends on the actual experience relative to the assumptions.

An example of the impact of this is shown in **Figure 3** found on page 7 of this paper.

Because a GSA passes on this risk to members, its overall costs are likely to be slightly lower than an insured lifetime income product that will charge for insuring the mortality risk.

In a scenario where too much income was paid out to existing members, potentially because they were 'living too long', then the actuary also needs to be very careful about how this affects the product's attractiveness to new members:

• If existing members' incomes fall more than expected, then new members may lose confidence that the product will deliver them good future outcomes by way of future income.

• Trustees need to consider the risk – in advance – how losses are shared as it may result in inequity between various groups of members. For example, if the profit from existing members is used to subsidise new members or vice versa. If the scheme is perceived as unfair, then it will be less attractive and may even be penalised by regulators.

A GSA that becomes unattractive to new members because they are being required to subsidise existing members, will reduce in size over time – which exacerbates the small pool risks discussed earlier. It can also cause problems where fixed running costs need to be shared by a reducing number of customers.

Chart 2: Ratio of the mortality rates of different wealth groups to average – Males (UK)
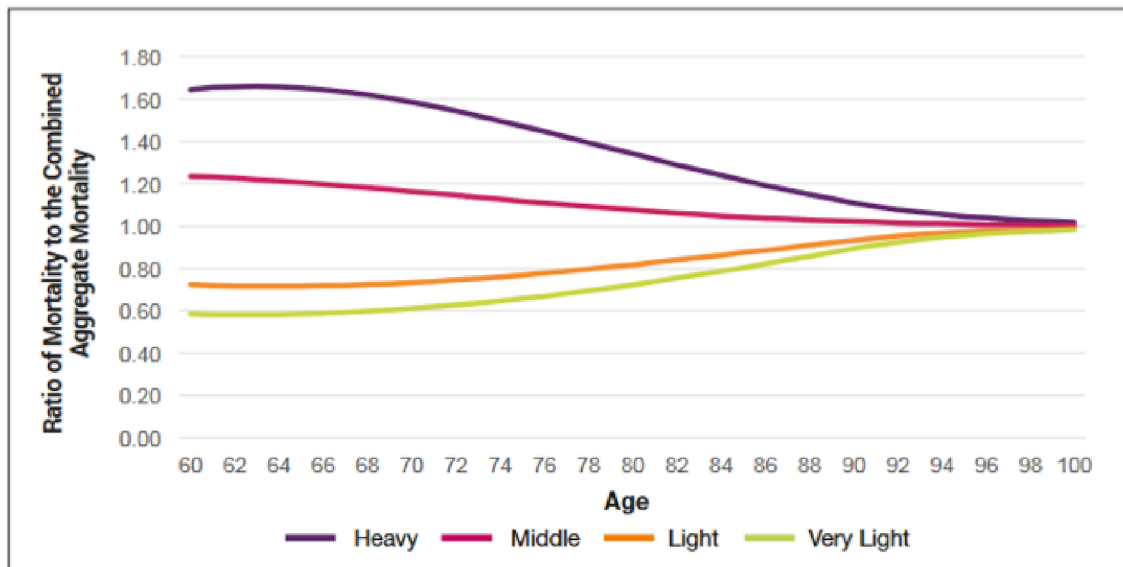
Source: Exploring Annuitant Mortality, Actuaries Institute of Australia

Insured products

These problems can be managed by partnering with an insurer. For example, with an insured lifetime income design, if the actual mortality of customers is different to assumed, then the insurer absorbs this from their profits on other lines of business and capital reserves.

Insurers have a range of risk management techniques to mitigate the risks. This is achieved by insuring multiple groups of lives – potentially across a range of different countries – or utilising reinsurance arrangements that can pool the experience of hundreds of thousands of lifetime income stream customers globally. The insurers charge a premium for this protection.

The risk management techniques available to an insurer allow a much wider range of product designs to be used and more tailored options for different sub-groups of customers. In addition, an insured product can provide guarantees of the dollars per annum or the units of income per annum paid for life.

Because insurers and reinsurers have more exposure to mortality experience, they can provide valuable insight into setting and monitoring assumptions. The longevity credits that will be provided by the insurer can be guaranteed over a short period such as three years which is common for current life insurance arrangements, or for the life of the current policyholders. The short-guaranteed period removes short term fluctuations but leaves the long term risk with the pool.

Members can be underwritten for health and socio-economic status whether the risks are insured or not, but it is unlikely that trustees would be able to develop the underwriting system without help from insurers.

> " The key difference between an 'insured' and 'uninsured' lifetime income product is how the variation in actual mortality rates from expected lifespan impacts member outcomes. In the first place, it will affect the cashflow from the longevity credits. This variability will, in turn, affect the annual pension payments that can be afforded.
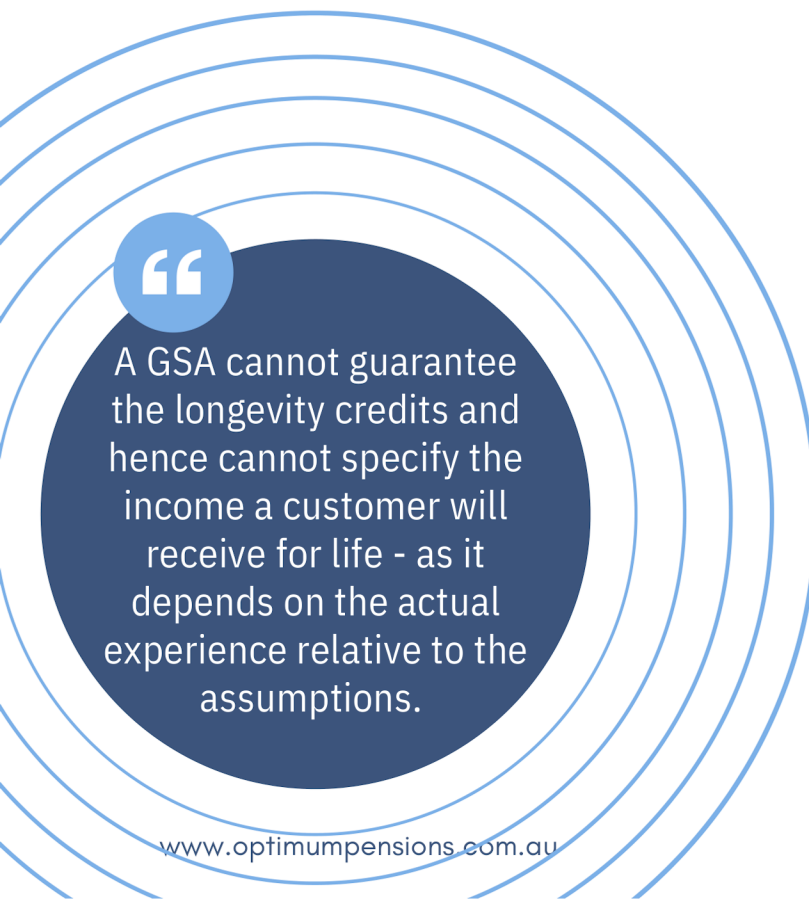
Assessing risk impacts on member outcomes

Insured products

Before implementing an insured solution, superannuation trustees would need to make the product design choices and then select an insurer. This process may be an iterative one, initially considering what features would suit the membership of the fund and the pricing of different features. Once the product design is settled, a tender process should naturally be used to select the insurer. This process may include the cost of the insurance, the expertise they bring, system and integration requirements, as well as the insurer's financial stability and that of any reinsurers, where present.

Uninsured products

Prior to implementing an uninsured retirement income product, superannuation trustees still need to undertake the process to make the design choices that would suit their fund membership. As part of this, the trustees should ensure that stress testing is undertaken to determine what will happen to member outcomes when the assumed mortality experience is different to actual experience. This stress testing should cover a range of plausible scenarios that may emerge. The results of such testing would need to be communicated to members in some appropriate manner.

> "
> A GSA cannot guarantee the longevity credits and hence cannot specify the income a customer will receive for life - as it depends on the actual experience relative to the assumptions.

For example, three scenarios that trustees should stress-test to understand the impact on member's incomes are:

1. Scenarios for mistaking the demographics of members

Different groups of people experience vastly different life expectancies. For example, Australian Bureau of Statistics (ABS) data shows that life expectancy for different statistical areas within Australia differs by over ten years. North Sydney and Hornsby in NSW are the highest for males, whereas the Northern Territory and Tasmania are the lowest.

When an actuary sets assumed mortality rates for a product, they will be making an assumption for the demographics of future members. However, this will never be 100% accurate and must be regularly reviewed.

Trustees should test in advance and, say, annually in future what the impact will be on future member outcomes - rates of income paid to members over time - if the actual members who buy a product turn out to have different demographics than assumed.

To understand the significance of this, **Chart 2** on the previous page, shows mortality rates for different wealth segments in the UK. Wealthy retirees—labelled as 'light' and 'very light' — have much lower mortality rates than less affluent groups. This results in them living longer than other wealth segments.

2. Scenarios for population longevity improvement

Trustees should stress test possible longevity improvement scenarios that Australia may see in the future.

As an example of this type of thinking, **Figure 1** on the following page sets out eight scenarios designed by longevity specialists for UK pension funds. Conceptually, these eight scenarios can be considered to span a spectrum from declines in life expectancy through to material increases. The difference in life expectancy for a 65-year-old male - of comfortable wealth - under these scenarios is different by around five years and significantly impacts how retirement products must be managed.

Each of these scenarios are possible, but it is unknown in advance which one Australia will experience.

3. Small pool scenarios

This is where the number of members purchasing the product at their retirement is low. If the number of retirees does not grow, this results in an increased chance of being a 'lucky' or 'unlucky' group compared to what was assumed because of pure randomness. Small pool risk can greatly impact member outcomes - that is future income levels - if the gains or losses that emerge are shared between a small group of people.

Figure 1: Future Health Scenarios

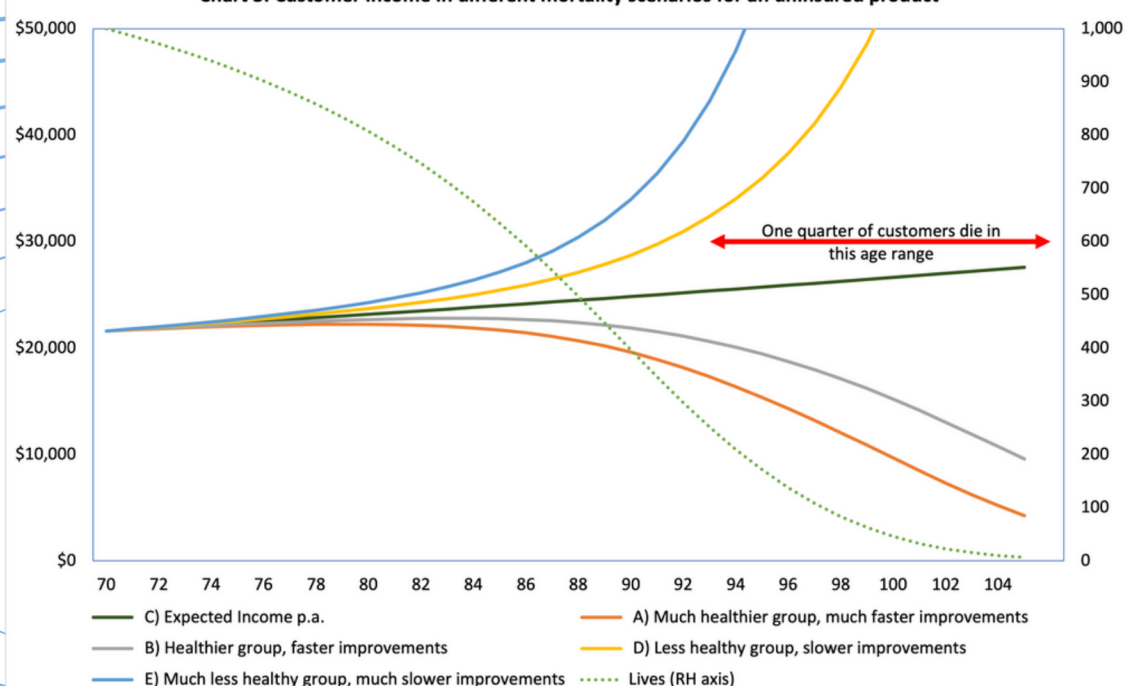|	Scenario	Description
Lower trend scenarios	L1: Back to the 50s	Rapid decline in life expectancies ultimately heading down towards those seen in 1950s.
	L2: Challenging times	Resource constraints impact on cost/availability of healthy lifestyles, strength of economy etc.
Central(ish) scenarios	C1: Low for longer	Impact of low growth economy and austerity on health and social care budgets reduce pace of improvement in life expectancy.
	C2: Improvement decline	Slow down in impact of medical advances, combined with lifestyle changes/obesity impacts, reduces pace of improvement in life expectancy.
	C3: Alzheimer's wave	Deaths attributed to Dementia/Alzheimer's continue to increase rapidly over the next 5 years, after which a cure is implemented over the following 5 year period.
	C4: Health cascade	Improvements driven by changes in health behaviours 'cascade' down over time from more affluent to less affluent, leading to 'waves' of improvement.
Higher trend scenarios	H1: Cancer revolution	Cure for all cancer deaths discovered, coming into effect in 10 years time, with full efficacy achieved by 2032.
	H2: Extended youth	Return to rapid increases in life expectancy seen over 2000-2010 which then continue for several decades.

Source: "Longevity Trends" June 2017 Pensions and Lifetime Savings Association (PLSA) and Club Vita LLP (CV LLP) [5]

Table 1: Scenario results

Scenario:	A	B	C	D
Socio-economic group mortality assumption	20% lower at retirement[6]	10% lower at retirement	10% lower at retirement	20% lower at retirement
Population mortality scenario	1.5% p.a. less than expected	0.75% less than expected	0.75% more than expected	1.5% more than expected
Description	Much healthier lives than assumed, and Australian lifespans increase much faster than assumed	Healthier lives than assumed, and Australian lifespans increase faster than assumed	Less healthy lives than assumed, and Australian lifespans increase slower than assumed	Much fewer healthy lives than assumed, and Australian lifespans increase much slower than assumed

Chart 3: Customer income in different mortality scenarios for an uninsured product

- C) Expected Income p.a.
- B) Healthier group, faster improvements
- E) Much less healthy group, much slower improvements
- A) Much healthier group, much faster improvements
- D) Less healthy group, slower improvements
- Lives (RH axis)

One quarter of customers die in this age range

The product is designed with a 5% assumed interest rate. This means instead of the rate of income growing with net returns of 6% p.a. it commences at a much higher level but then only increases with net returns over and above 5% p.a. This delivers more income at the start of retirement, which increases less rapidly with age.

The thin labelled lines show what would happen if actual mortality was different to expected under four different possible scenarios as described in **Table 1.**

In each scenario, the in-force pensions are adjusted for each member to allow for the surplus/deficit reserves that occur from the extra/fewer deaths. This was done by projecting the updated reserve levels and dividing them by an annuity factor for each age. To highlight longevity risk, the arrowed range in **Chart 3** indicates the ages where one quarter of members will die.

Conclusion

The customers of any retirement product can have much higher or lower lifespans than that assumed. If this uncertainty is not insured, then pooled products must pass the impacts on to members. Trustees should test the impact of various plausible scenarios upon their member outcomes.

Insured products

Superannuation fund trustees that partner with an insurer to offer a lifetime product can worry less about these risks as members' incomes may vary according to investment returns but not mortality experience variations. Hybrid designs are also possible where some, but not all, of this risk, is passed to members.

Uninsured products

Superannuation funds that self-insure or ignore their longevity risk to save costs should be aware of these risks and how to model them. There also could be a considerable risk for a trustee from not disclosing to members how much their incomes will change due to variations in mortality experience - as it may be seen as misleading members.

If a member group has consistently lower mortality experience than assumed when the pool was established, then those members' incomes will decline relative to the income they expected.

> " With an insured lifetime income design, if the actual mortality of customers is different to assumed, then the insurer absorbs this from their profits on other lines of business and capital reserves.

ABOUT THE AUTHORS

DAVID ORFORD

David, an actuary, founded Financial Synergy, which became Australia's leading provider of superannuation administration software. After successfully selling the business to IRESS in 2016, he is now devoting his time to researching and creating innovative retirement solutions, and directing The Orford Foundation.

JIM HENNINGTON

Jim is a recognised thought leader on retirement income strategy and modelling. An actuary, he is involved in product design and developing modelling tools to make Optimum Pensions' products accessible to superannuation funds, financial planners and retirees.

Optimum Pensions was launched in 2017 with a single mission – to help Australians lead a comfortable retirement. The Optimum Pensions innovative retirement income solutions are specifically developed to address longevity risk and provide greater peace of mind for all retirees; no matter how long they live.

The Optimum Pensions, award-winning LifeSpan Calculator builds confidence around personal life expectancy and retirees' possible retirement planning horizon.

OPTIMUM PENSIONS