



# Long Term Drivers of Future Mortality – A Podcast Series - Chapter 2 - Aging

Podcast Transcript

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## SUMMARY KEYWORDS

Aging, Mortality, Longevity, Chronic Illnesses, Dementia, Frailty, Loneliness, Social Isolation, Biological Aging, Senolytics, Young Blood Infusions, Lifestyle Habits, Health Span, Future Mortality, Research Insights.

## SPEAKERS

Al Klein, Erik Pickett, Ronora Stryker

## TRANSCRIPT

### RONORA STRYKER 00:07

Hi listeners, and welcome to the Research Insights Podcast. I'm Ronora Stryker, a Senior Practice Research Actuary here at the Society of Actuaries Research Institute. And welcome back to our special podcast series focusing on an informative paper that was written as part of the Mortality and Longevity Strategic Research Program 2023 Living to 100 Symposium. The title of the paper is Long-Term Drivers of Future Mortality, authored by Yair Babad, professor emeritus at the University of Illinois Chicago, and Al Klein, principal and consulting actuary at Milliman. Today, we're going to be diving into chapter two, which is on aging. And as usual, I'm joined by two members of the Mortality and Longevity Strategic Research Program Steering Committee. Our first member is also one of the authors of the paper, Al Klein, welcome Al!

### AL KLEIN 01:07

Thanks, Ronora, and welcome everyone from near and far!

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**RONORA STRYKER 01:11**

We're also very fortunate to have Erik Pickett. Erik is the other member of our steering committee, and he's the Actuary and Chief Content Officer at Club Vida.

**ERIK PICKETT 01:21**

Hello, Hello! It's great to be here!

**RONORA STRYKER 01:24**

Okay, listeners, I know you want to get started, but before we do, I want to make sure you all know how to navigate to this paper. Just go to SOA.org and click on the research institute tab under research by topic, click on the words mortality and longevity, and it will take you to the M and L landing page. In the upper right-hand corner, you will find a link to the landing page for this paper as well as the podcast!

**AL KLEIN 01:59**

Thanks, Ronora. As Ronora mentioned, today we're diving into Chapter Two where we explore aging, possibly the most significant driver of mortality.

**ERIK PICKETT 02:10**

Yeah absolutely. Now, I think, with a modern lens on drivers of mortality, we sometimes focus very much on capturing differences in mortality by things like lifestyle, affluence, environment and other factors like that. Sometimes, though, we can take for granted that age is actually by far the most impactful factor on differences in mortality rates. If we think back to those first historic life tables developed by Graunt and Halley in the 1600s they were revolutionary in their attempt to capture the differences in mortality rates at different ages.

**AL KLEIN 02:45**

Erik, thanks for that history. It is interesting! In the chapter, aging is defined as the process of growing old, often marked by declining physical and mental functioning, reduced quality of life, and ultimately increased probability of death. What's interesting is how the impact of aging extends to nearly every cause of death. As we age, the likelihood of age-related conditions like heart disease, Alzheimer's and cancer increases significantly.

**ERIK PICKETT 03:16**

Exactly, and so any interventions that could either reduce the impact of these age-related conditions or even slow the ageing process itself, they could have a profound impact on future mortality.

**AL KLEIN 03:29**

I agree! By delaying aging, this would likely improve the quality of life by reducing the onset and severity of chronic conditions and possibly extend life as well. Although, from my reading, there appears to be a biological limit to lifespan.

**ERIK PICKETT 03:45**

Yeah, I'm a little less certain on that last point. I still hear quite a lot of active debate around the existence of a limit to lifespan.

### AL KLEIN 03:53

I actually agree with you, Erik, but there isn't enough time in this podcast to go into the details on this debate. Let's next touch on the theories of aging discussed in the report. Do you want to give us a description of these?

### ERIK PICKETT 04:07

Sure, so a lot of research has been devoted to interpreting how and why the body deteriorates as we grow older. I'm not going to go into all the details here, but there are four broad categories that encompass most of these theories.

- First of all, **programmed theories**: these suggest that aging follows some kind of biological timetable imposed by the systems responsible for the maintenance, repair and defense of the body.
- There are **damage or error theories** that argue that aging results from accumulated environmental damage to cells and tissues.
- There are **evolutionary theories** that look at aging as a resultant trade off between advantages and disadvantages in persistent genes in the species over time.
- And there are **psychological theories** that examine the social and psychological effects of aging, such as changes in societal roles and progressing views of the self.

These theories can all be used to define certain markers to identify how people are progressing against a defined aging timetable... in effect, giving us a way to measure if an individual is aging faster or slower than the average for their chronological age.

These different markers can then be used to define different measures of age, such as a person's biological age or epigenetic age, and different lifestyle and environmental experiences can then result in these other measures of age being quite different to chronological age for some people. This has spawned a whole genre of books, magazines, podcasts, for people questing to keep their biological age as low as possible as they age chronologically.

But aging isn't just a theoretical process. It's a journey that affects us all through many stages of our lives, and we'd now like to explore some of the more thought-provoking and tangible elements of the chapter, starting with chronic illnesses.

### AL KLEIN 06:06

Erik, I agree, aging is personal. Chronic illnesses are one of the most significant consequences of aging today. Back many years ago, Cave men and women often died from the elements or were eaten by wild animals, so they didn't have a chance to reach the older ages many people see today.

As we get older, the prevalence of conditions like heart disease, diabetes and arthritis increases, but one condition that stands out for its devastating impact is dementia. Dementia, which includes more than just Alzheimer's, is often referred to as one of the biggest challenges of aging. It doesn't just affect the individual, it ripples through families and communities. The chapter describes dementia as one of the leading causes of disability and dependency among older adults.

And it's not just about memory loss. Dementia impacts decision making, communication and even physical functioning in its advanced stages. What's particularly alarming are some projections on dementia. One study I saw indicated that dementia cases could triple globally, from 57 million in 2019 to 153 million in 2050. Another indicated the risk of developing dementia after age 55 was 40%.

**ERIK PICKETT 07:10**

That really is a staggering statistic there Al, but let's not forget that there are things we can do to tackle dementia. Research shows that up to 40% of dementia cases could be delayed or even prevented by addressing risk factors like poor diet, hypertension, social isolation and physical inactivity.

**AL KLEIN 07:40**

That is an important point that we have some control over this. It's also a reminder that while aging increases the susceptibility to chronic conditions, there's still room to mitigate the impact with proactive measures.

**ERIK PICKETT 08:14**

Indeed. Now let's move on to talk about an interesting comparison raised in the chapter of weight versus frailty. Frailty is often seen as a hallmark of aging, characterized by reduced strength, slower movement, and vulnerability to various stresses. But how does it relate to weight?

**AL KLEIN 09:17**

Erik, I'm going to cover this in maybe a little different way than you were thinking. Overweight and obesity, which we usually think of as a health risk, might actually protect against frailty in some cases. People with a little bit of extra weight tend to have better reserves to draw from which can reduce frailty related risks, like being more prone to accidental falls.

Now I'm not suggesting that one should be obese, because obese and even overweight can contribute to chronic diseases. So, while it may shield against frailty, it introduces a whole new set of problems.

Yair, my co-author, and I found this to be an interesting dilemma, which is why we included it in the paper. One way to describe it is, like in Goldilocks, you don't want to be too fat or too thin. You want to aim for being just right. Now, what is "just right" will vary person to person. In addition to weight, trying to maintain muscle mass and strength with nutrition and exercise is also very important throughout one's life.

**ERIK PICKETT 09:40**

Yeah, I completely agree. So, it seems that some form of strength training could really be a game changer for older adults, helping to combat both frailty and some of the risks associated with obesity. So, if you're listening mum, keep up with those Pilates classes.

**AL KLEIN 09:34**

Besides chronic illness, one of the most devastating aspects of aging covered in the chapter is loneliness. As people age, they often lose close connections, spouses, friends and even extended family members.

**ERIK PICKETT 09:48**

Yeah, the statistics in the chapter really were heartbreaking. For many people over 75 their primary companions are their televisions or their pets.

**AL KLEIN 09:58**

That said, having pets has been shown to extend life expectancy. One just can't die because someone needs to take care of the pets.

But back to loneliness. Loneliness isn't just an emotional burden; it can also be a significant health risk. It's linked to higher rates of depression, anxiety and even physical conditions like heart disease.

I like to say that when you're older, the keys to living longer are to stay active, socially, mentally and physically, and every one of these is important. Social isolation has been compared to smoking 15 cigarettes a day in terms of its impact on health.

**ERIK PICKETT 10:35**

Yeah, that is a powerful comparison Al, but there is some hope, community programs, senior centers, and even simple tech solutions like video calls can help older adults stay connected. So, the Zoom revolution that we saw through the COVID 19 pandemic may have actually given us some better outcomes, reducing social isolation in the future.

**AL KLEIN 10:57**

Right. I also think AI may bring some solutions in the future, such as human-like robots to help the elderly.

But let's talk about the broader support networks. Traditionally, family played a central role in caring for aging members, but that model is under strain.

Younger generations are increasingly mobile, moving to different cities or even different countries for work. That leaves aging parents or grandparents without the support they may have had in the past.

And then there's a "sandwich generation" – adults who are caring for both their children and their aging parents. The financial and emotional stress on these caregivers can be overwhelming.

**ERIK PICKETT 11:36**

Yeah, right, which is why societal support systems are so crucial now. Programs like senior daycare centers, assisted living communities and government funded caregiver relief can all act to fill the gaps left by traditional family networks.

But these solutions aren't without challenges. Funding, staffing and accessibility issues can limit their effectiveness, and we're probably going to see these issues increase as our population ages and grows.

Now let's shift gears to a more optimistic topic then: the slowing or even the reversing of aging. This is where science can start to feel a little bit like science fiction. The idea is that if we are able somehow to alter the biological processes of aging, we can get our bodies and minds to behave like younger incarnations of ourselves, reducing the susceptibility to and impact of age-related conditions, and hopefully resulting in longer and healthier lives. It's covered a little bit in the paper, and we're going to touch on a few new examples here today. Personally, I'm not so excited by the possibility of a few more years of lifespan at the age of 95 however, if I could have a few more years at the age of 25, I'm in!

**AL KLEIN 12:51**

I'd be in for that too! This topic has always been of interest to me. That is why, as an actuary, I chose to focus on mortality and longevity. Before I describe one method I have read about, there are two approaches that can be helpful here. One is to slow the aging process. This can potentially be done through lifestyle habits, for example, diet, exercise and overall behaviors. In fact, this is where most of the research is focused on today, on slowing the aging process.

The other approach is on reversing aging, and that is what I'm going to talk about. One approach I read about some time ago was on the exchange of blood from a younger individual to an older individual. This was tested with mice years ago and worked both ways. That is, when an older mouse received the blood of a younger mouse, it got younger, more physically able to do things and exhibited younger behaviors. However, the opposite was also true, that when a younger mouse received the blood of an older mouse, it got older.

Fast forward to a January 2025 article in Life Extension Magazine and I quote, “healthy young plasma contains tens of thousands of extracellular vesicles, exosomes, cytokines, growth factors, regulatory proteins and other molecules that may revitalize organ integrity in elderly individuals”. Quite a mouthful, but this approach may have some “young” legs.

#### **ERIK PICKETT 14:19**

Yeah, that's fascinating Al and I would also like to point out, though, that young blood infusions are still considered among very new research. As of December 2024, the FDA was still cautioning consumers against receiving young donor plasma infusions, stating that they are an unproven treatment. As with a lot of these cutting-edge techniques, we really need to see some more scientific research before anything is applied, although I can also see some real ethical concerns with this application around potential exploitation of donors and the classification and regulation of donations, so care will be needed.

Switching from procedural interventions to another type of treatment, I'm also excited about research on something known as senolytics. Senescent cells are damaged cells that can no longer replicate themselves. They build up in our bodies as we age and are believed to trigger various physical signs of aging. Senolytics, then, are a class of drugs or supplements that are aimed at removing senescent cells from the body. And if senolytics can replicate in humans the results that have been seen in mice, it's possible that there could be a wide scale reduction in biological age across the population. Again, research continues in this area

#### **AL KLEIN 15:37**

It's a fascinating time for aging research. While these approaches are still in their early stages, they may open the door to possibilities we could only dream about a few decades ago.

#### **ERIK PICKETT 15:48**

So, I think that just about covers a good number of the highlights from the chapter. Hopefully, listeners, we've whetted your appetite to read the rest of the detail in there. Before we wrap up for today, though, Al, would you like to run through a summary of the impact table included at the end of the chapter?

#### **AL KLEIN 16:05**

Yes, of course. As a reminder at the end of each chapter, Yair and I included a table where we highlight our outlook on the impact of the different areas covered in that chapter. The key drivers included in the table for this chapter were:

- biological aging,
- chronic maladies,
- psychological and mental health considerations,
- social interaction,
- physical activity, and
- age slowing or reversing.

Of these drivers, we projected modest impacts, if any, in the short term, but we thought chronic maladies and mental health deterioration in old age are likely to have a large negative impact on longer term future mortality rates.

**ERIK PICKETT 16:45**

Thanks, Al. And it's important to note that this is your best estimate outlook for the general population. Tail events that are low likelihood and high impact, or events that are more likely to affect specific subsets of the population, such as the age slowing interventions we mentioned earlier, won't really show up strongly in such an analysis.

**AL KLEIN 17:06**

Yes, Erik, that's a good point. And it also means that it is important to make your own assumptions based on the specific population and purpose for the work you are doing related to modeling or predicting the future of mortality.

So, Erik, what do you think the listeners should walk away with from this discussion?

**ERIK PICKETT 17:25**

Yeah, so to summarize the key points, then:

- First, I think, when thinking about different factors that contribute to differences in mortality rates between individuals, let's remember that age is the most important factor.
- Second, to understand aging's impact on future mortality, we're going to need to monitor both developments in addressing age related conditions and any advances in slowing the age process itself.
- Finally, with an aging population in the US, our society has a vested interest in keeping people healthier and productive for longer. Essentially, we really need to make progress in this area!

**AL KLEIN 18:05**

Well said, Erik. It's clear that the science of aging holds the key to improving not just lifespan, but also health span. It's an area that I will continue to keep a close eye on in the future, and I think you will as well.

That is all for now. Please join us for our next podcast on lifestyles, maybe of the rich and famous, you'll need to join us next time to find out! Back to you, Ronora to close out the podcast.

**RONORA STRYKER 19:22**

Thanks Al and Erik. I really appreciate your time and sharing your thoughts and expertise about lifestyle and how it might impact future mortality. Okay, listeners, that's all we have time for today. Join us at the end of next month for our next episode, which is focused on chapter four, Inequality and its impact on longevity. We'd love to hear your feedback on this podcast series and thoughts on topics for future research. Just email us at [Research-ML@soa.org](mailto:Research-ML@soa.org). Thank you, listeners, for joining us on our chapter-by-chapter journey through The Long-Term Drivers of Future Mortality podcast series. We always appreciate your support and engagement. For the Mortality and Longevity Strategic Research Program Steering Committee and the Research Insights Podcast, I'm Ronora Stryker for the Society of Actuaries Research Institute.

**ROSE NORTON 19:22**

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