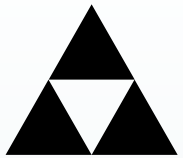
Communicating Longevity Risk to the Public – An Overview of the Actuaries Longevity Illustrator

William "Flick" Fornia, FSA, MAAA, EA, FCA

President, Pension Trustee Advisors

Member, Society of Actuaries International Committee



AMERICAN ACADEMY *of* ACTUARIES

Objective. Independent. Effective.™

Acknowledgement

The original version of this is presentation was created as a joint work product of the American Academy of Actuaries (Academy) and Society of Actuaries (SOA) for the International Congress of Actuaries (ICA) 2018 conference in Berlin, Germany (June 2018). It was originally presented by Ted Goldman, MAAA, FSA, EA (representing the Academy) and Andrew Peterson, FSA, EA, MAAA (representing the SOA).

This presentation is being reproduced with permission from the Academy and SOA.

Copyright 2018, American Academy of Actuaries & Society of Actuaries

About the Speaker

William "Flick" Fornia, FSA, MAAA, EA, FCA

- President, Pension Trustee Advisors
  - Flick@PensionTrusteeAdvisors.com
- SOA Board member
  - Member, SOA International Committee & Latin America Committee
  - Member, SOA Admissions Committee
  - Member, SOA Cultivate Opportunities Team

Society of Actuaries

- Mission: Through education and research, the SOA advances actuaries as leaders in measuring and managing risk to improve financial outcomes for individuals, organizations, and the public.
- Vision: Actuaries are highly sought-after professionals who develop and communicate solutions for complex financial issues.
- Professional association serving 30,000 global members

Agenda

- Framing the longevity issue – why it's so hard to understand
- The Actuaries Longevity Illustrator
- Other resources

Framing the Longevity Issue

The Longevity Challenge

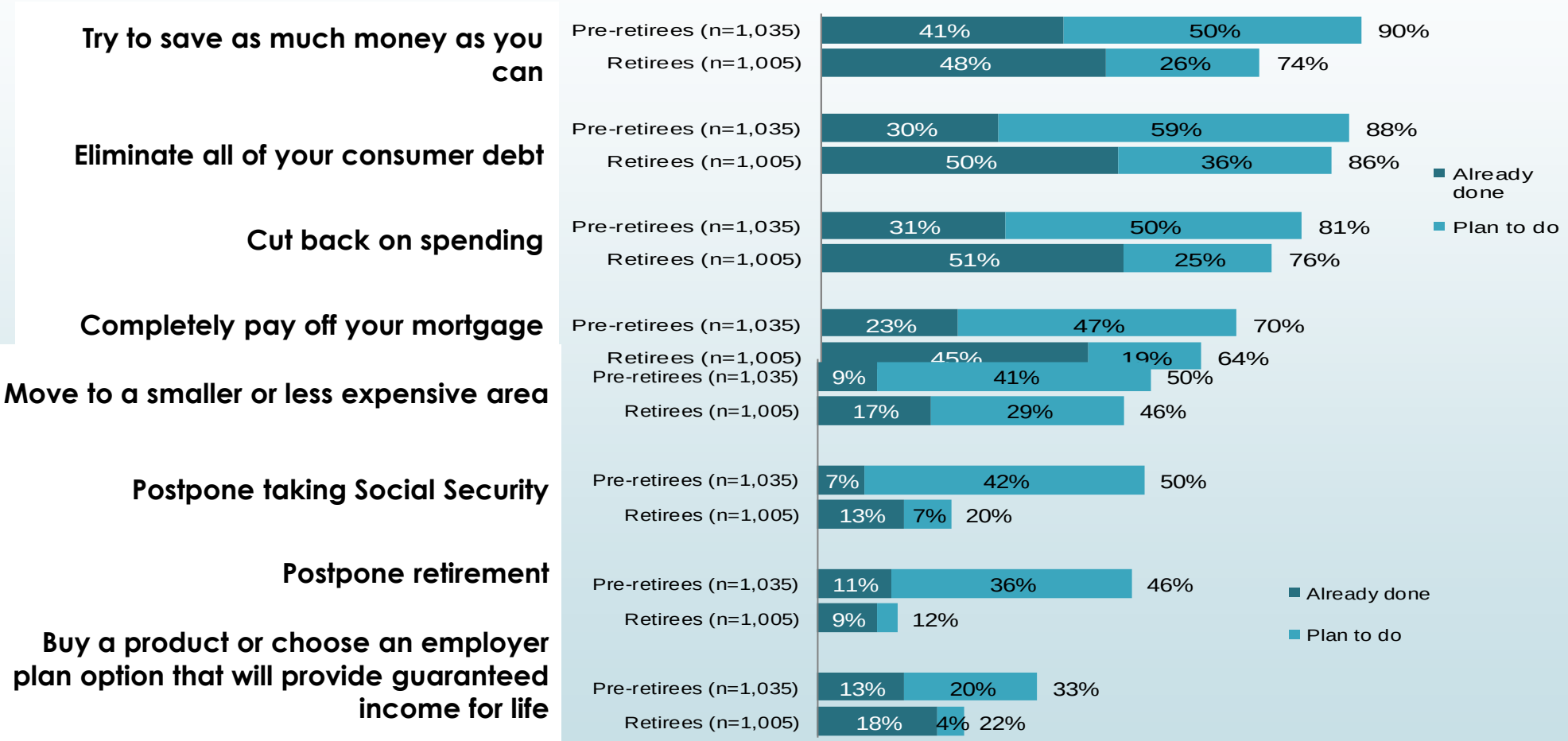
- SOA Post-Retirement Risk Survey series shows retirees:
  - Underestimate how much money needed for their retirement before they retire – retire too early
  - Underestimate how long they will live – plan for shorter than their expected lifetime
  - Do not insure for risks of outliving their money (annuities) nor needing living assistance or long-term care – self-insure risks
  - Underestimate the cost of rising inflation on their basic needs

https://www.soa.org/research/topics/research-post-retirement-needs-and-risks/

The Longevity Challenge: Few plan to use lifetime income annuity options or products to manage retirement risk

Question: *Following is a list of things that some people do to protect themselves financially* ***(WORKER:*** *after they retire****/RETIREE:*** *as they get older****)****. For each, please indicate whether* *you* *(and your spouse/partner) have done that, plan to do that in the future, or have no plans to do that.*

Risk Management Strategies



What is longevity risk?

- Multiple definitions, depend on context
- Longevity: long life
- Risk: a situation involving exposure to danger

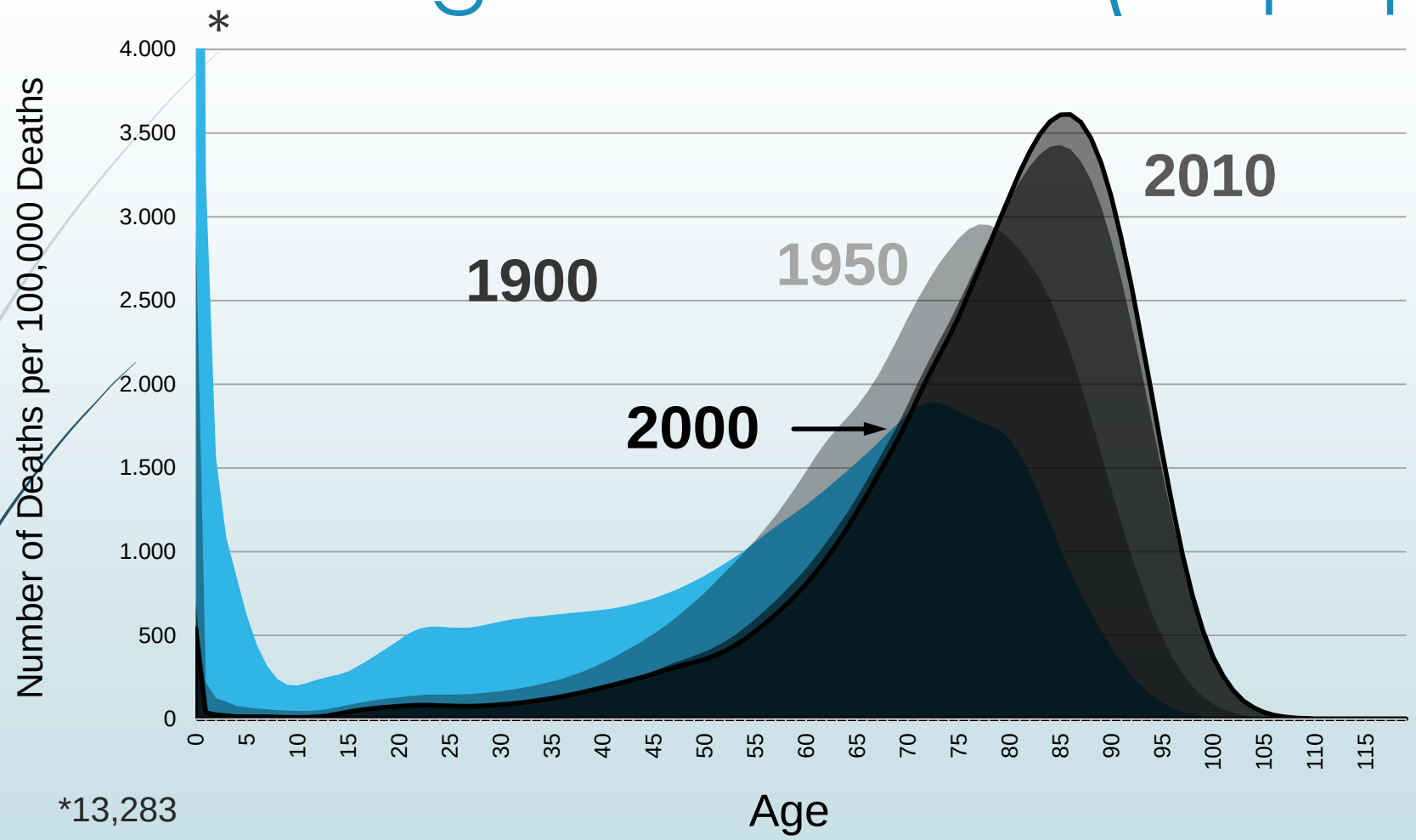
- Longevity Risk: risks associated with long life
  - Can be an individual risk – idiosyncratic (e.g., risk of outliving assets)
  - Can be a collective risk - systemic (e.g., risk of population living longer than expected → impact on social insurance, pension plans, insurance companies, etc.)
- Focus for this presentation is individual perspective

Why understanding longevity matters for individuals…

Risk of underestimating period of retirement – run out of funds

Risk of overestimating period of retirement– settle for lower standard of living

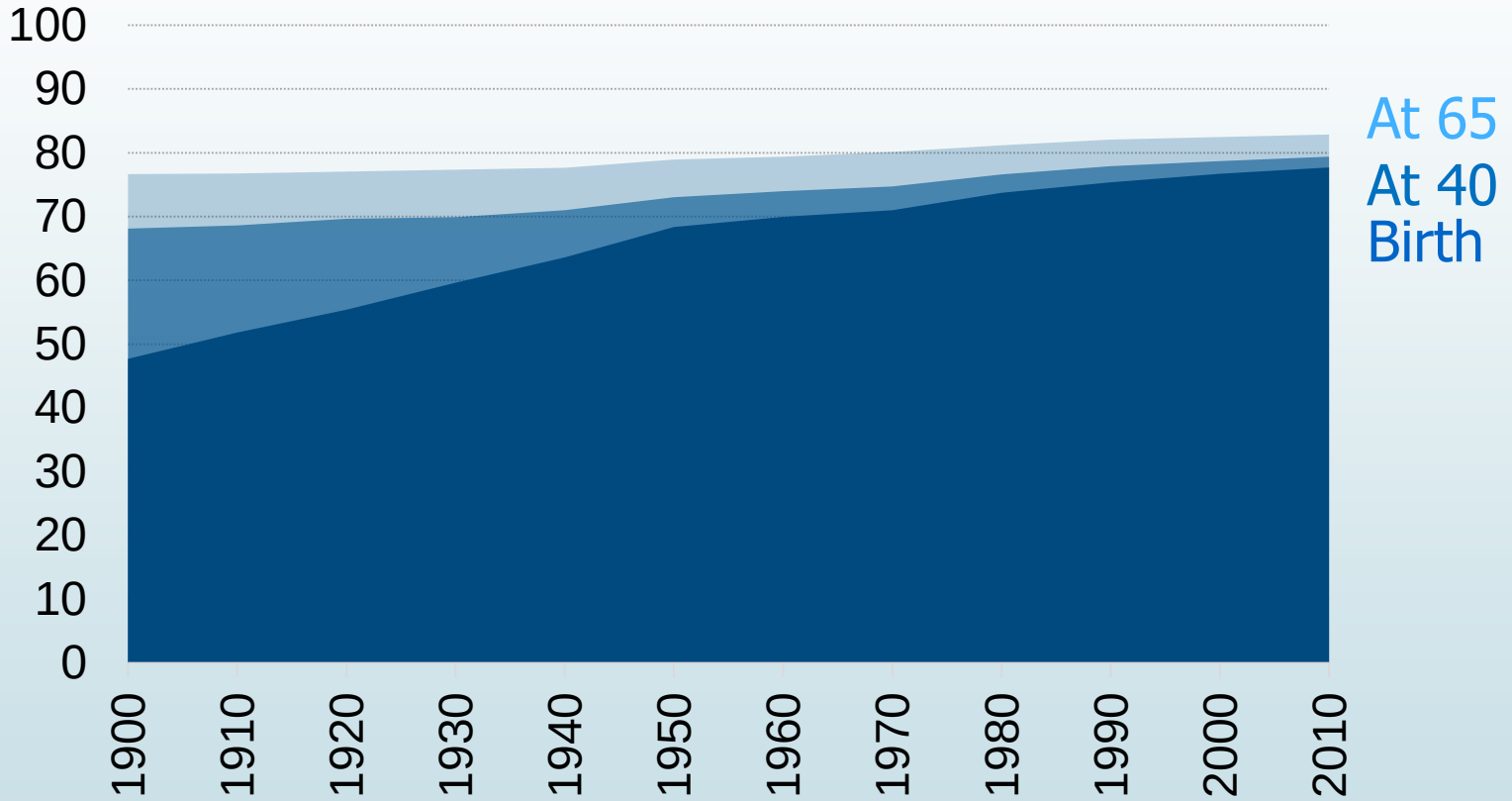
Changes Since 1900 (US population)



*13,283

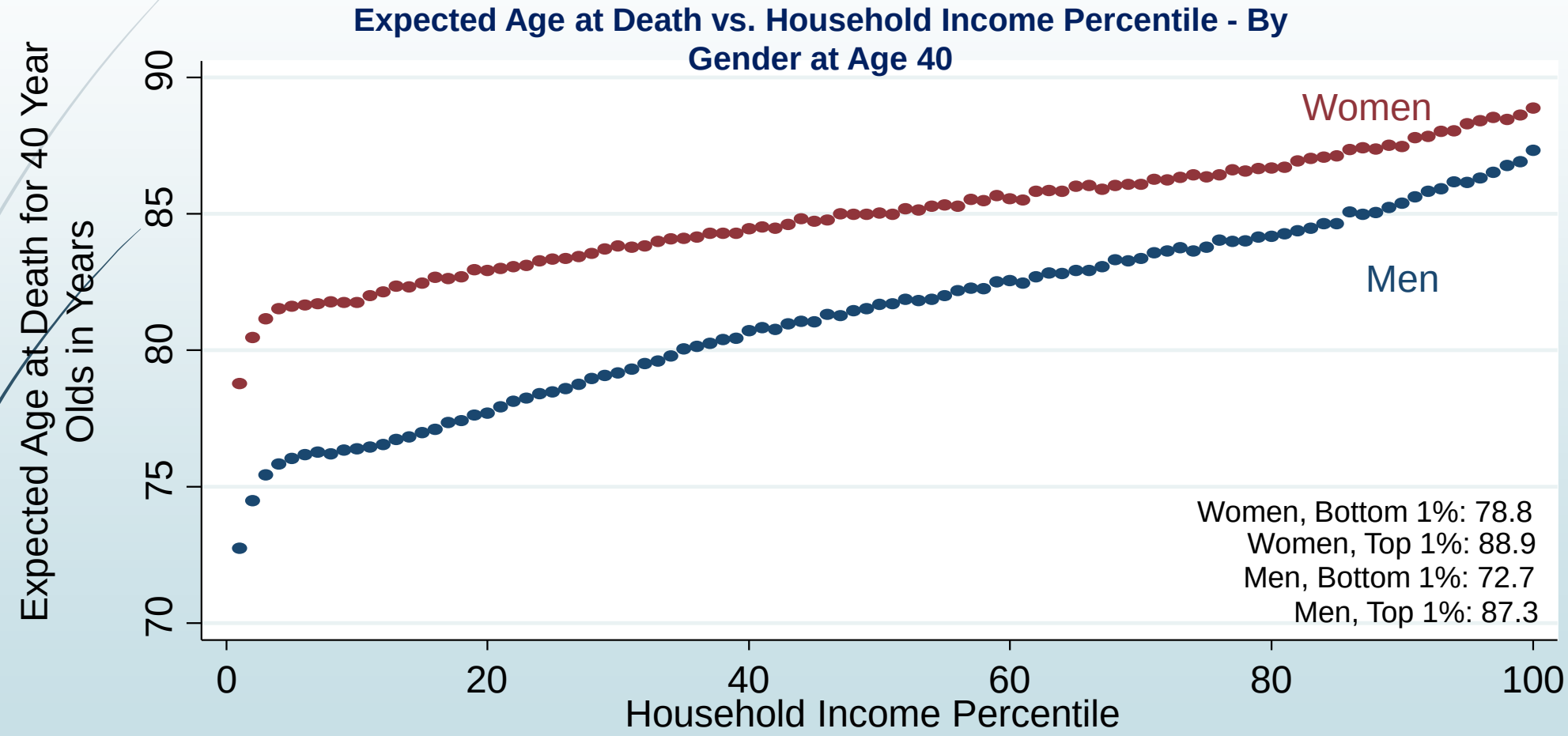
Data: SSA Actuarial Study 120 – Periods 1900-2010, 50% male, 50% female

20th Century Life Expectancy Improvements (U.S. population)



Data: SSA Actuarial Study 120 – Periods 1900-2010, 50% male, 50% female

Findings from "The Health Inequality Project"



Source: The Health Inequality Project, https://healthinequality.org/

Past mortality drivers

- Heart disease treatment / drugs
- Decrease in smoking prevalence
- Improved prenatal / infant care
- Antibiotics and other drugs

➔ Big question is whether these can continue?

Potential future mortality drivers

Negative factors

- Obesity
- Addictions / opioid epidemic
- Drug resistance
- Pandemics
- Access to / availability of quality healthcare
- Income inequality

Positive factors

- Medical advances (e.g. 3-D organ printing, regenerative medicine)
- Technology (e.g. self-driving cars, ingestible sensors)
- Access to / availability of quality healthcare

Context & challenge

- People are living longer (generally)
- Planning for unknown retirement period is a challenge
- Relying on simple life expectancy is recipe for failure

Actuaries

LONGEVITY ILLUSTRATOR

© 2016 Society of Actuaries and American Academy of Actuaries

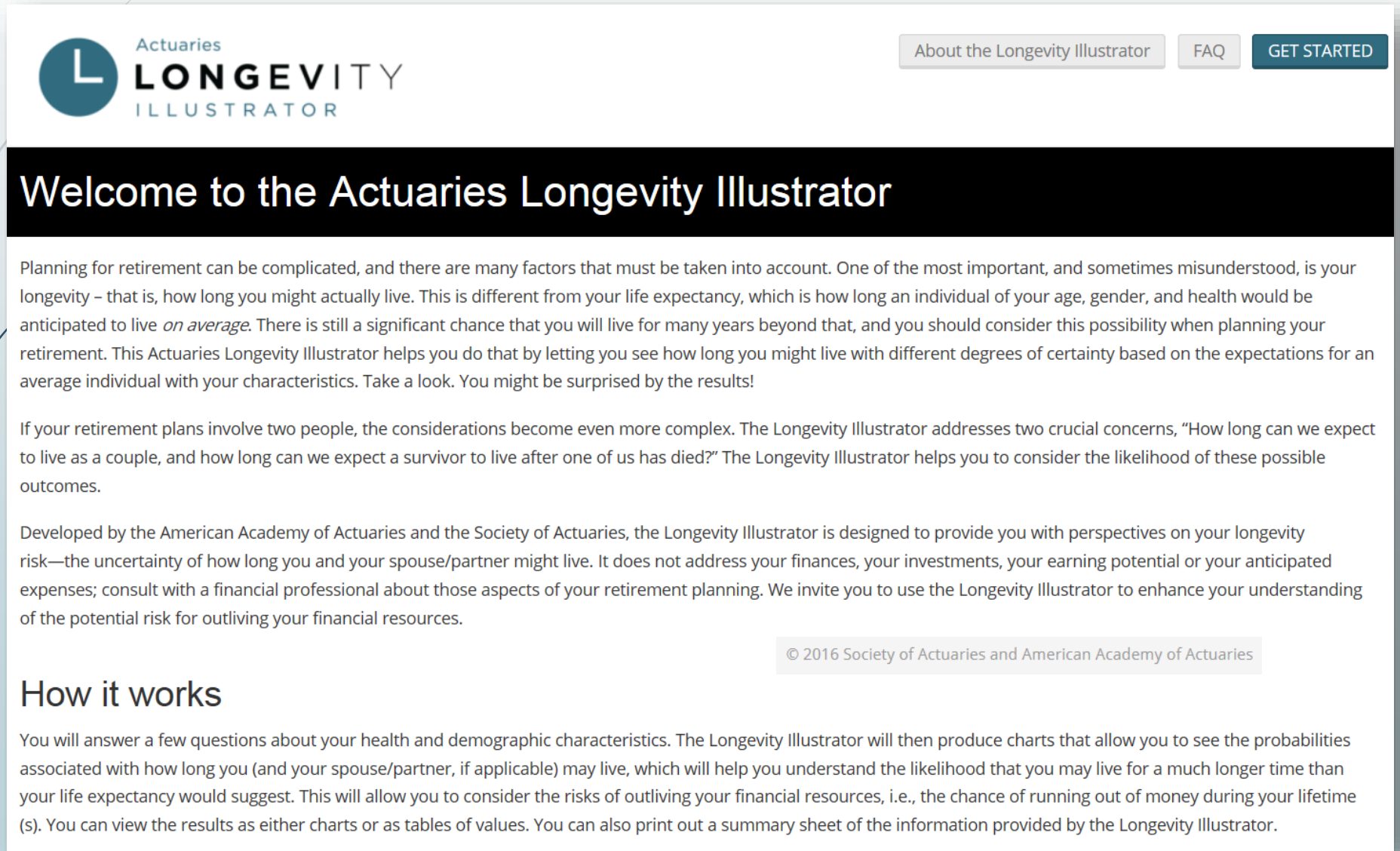
The Actuaries Longevity Illustrator

- Objective/purpose
- Methodology
- Examples
- Experience to-date
- Future iterations

http://www.longevityillustrator.org/

Making the longevity concept more tangible

(Joint Academy and SOA Project) http://www.longevityillustrator.org/



Objective/Purpose

Simple online tool available to the public to:

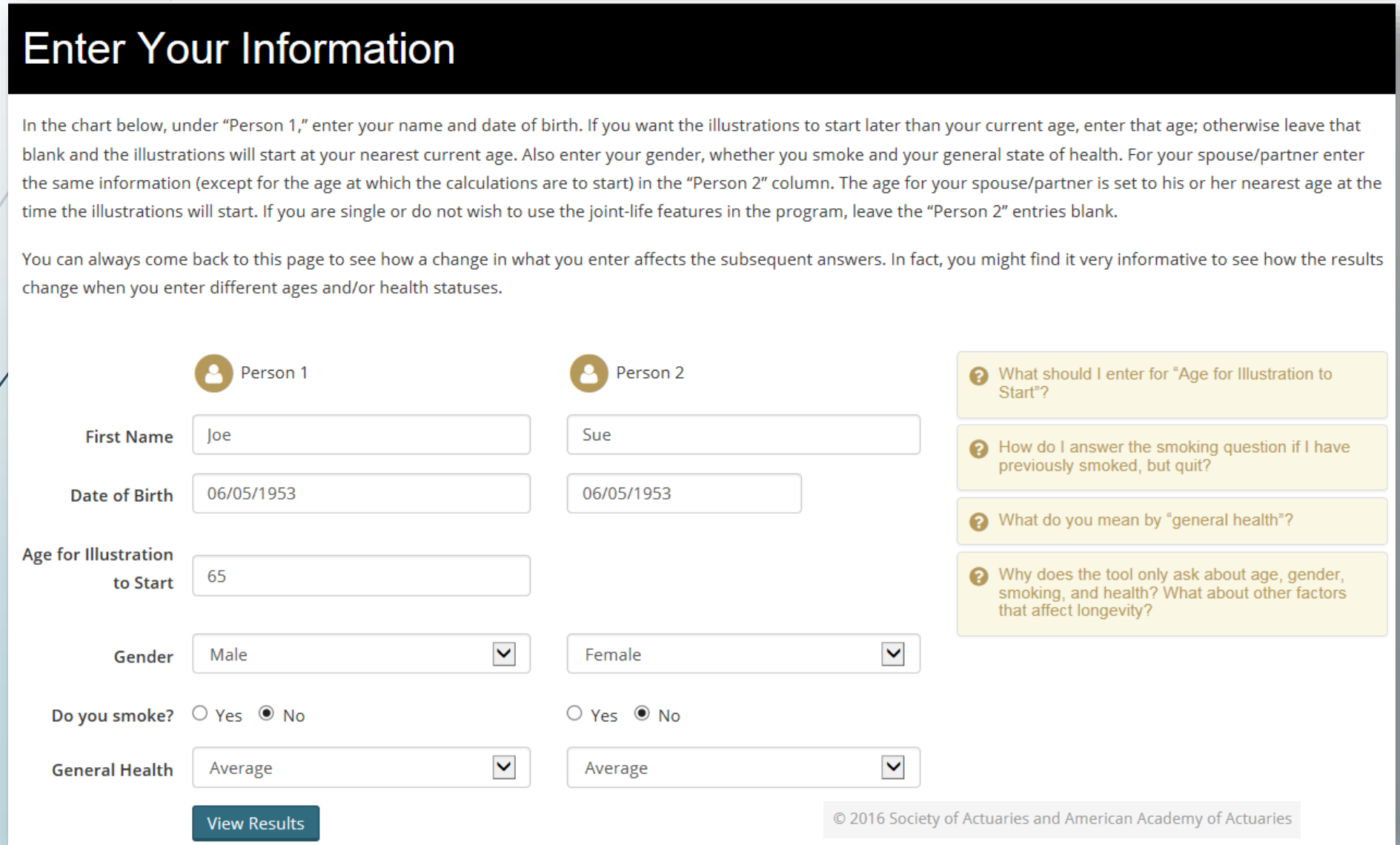
- Address life expectancy misconceptions
- Incorporate simple underwriting criteria
- Emphasize importance of planning for couples

http://www.longevityillustrator.org/

Methodology

- Underwriting criteria
  - Date of birth, current age, gender, smoking status, general health
- Key assumptions
  - Mortality: 2010 Social Security Administration (U.S.) Tables
  - Improvement: SOA MP-2015 Scale
  - Health status factors: 80% to 125% (depending on age)
  - Smoker status factors: 77% to 211% (depending on age)
- No financial component

Example – Retiree and Spouse both age 65, non-smokers, average health



Enter Your Information

In the chart below, under "Person 1," enter your name and date of birth. If you want the illustrations to start later than your current age, enter that age; otherwise leave that blank and the illustrations will start at your nearest current age. Also enter your gender, whether you smoke and your general state of health. For your spouse/partner enter the same information (except for the age at which the calculations are to start) in the "Person 2" column. The age for your spouse/partner is set to his or her nearest age at the time the illustrations will start. If you are single or do not wish to use the joint-life features in the program, leave the "Person 2" entries blank.

You can always come back to this page to see how a change in what you enter affects the subsequent answers. In fact, you might find it very informative to see how the results change when you enter different ages and/or health statuses.

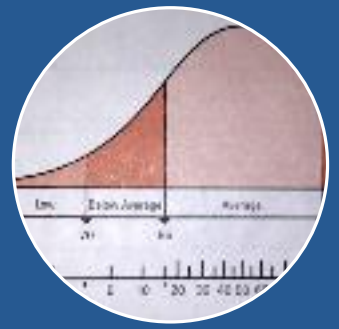
	Person 1	Person 2
First Name	Joe	Sue
Date of Birth	06/05/1953	06/05/1953
Age for Illustration to Start	65	
Gender	Male	Female
Do you smoke?	○ Yes ◉ No	○ Yes ◉ No
General Health	Average	Average

View Results

- What should I enter for "Age for Illustration to Start"?
- How do I answer the smoking question if I have previously smoked, but quit?
- What do you mean by "general health"?
- Why does the tool only ask about age, gender, smoking, and health? What about other factors that affect longevity?

© 2016 Society of Actuaries and American Academy of Actuaries

Valuable graphic outcomes – three perspectives



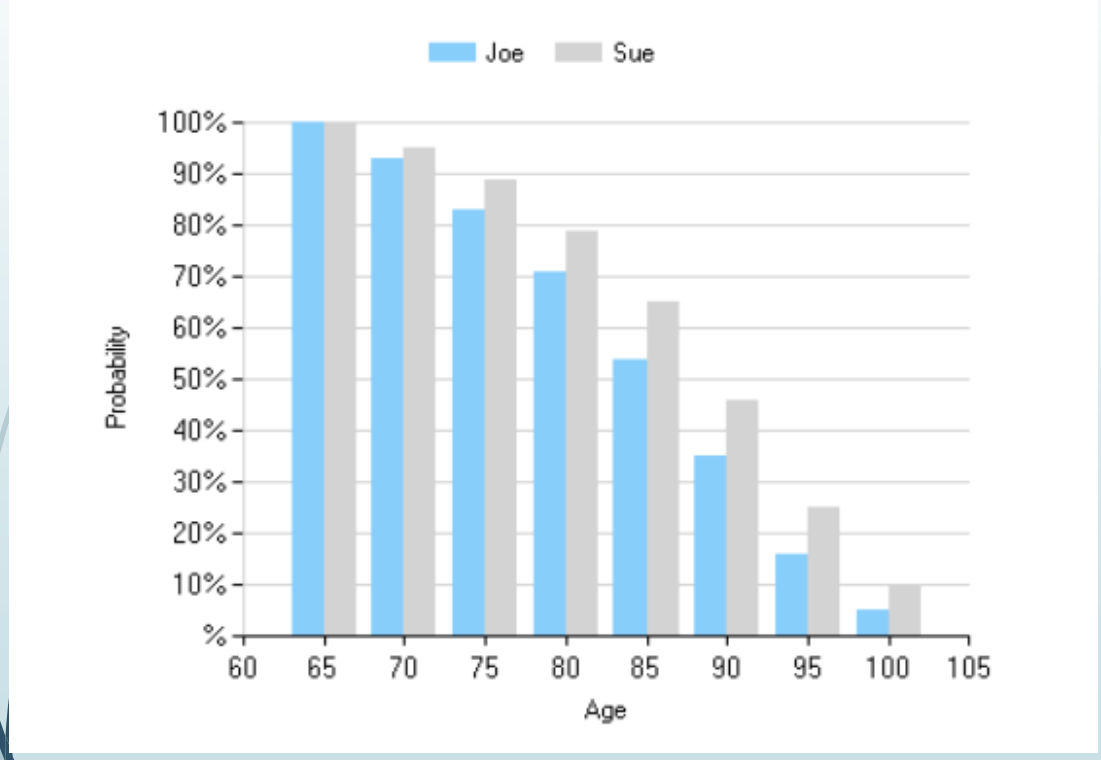
Probability of living to a certain age – introduces the concept of longevity as a range

Planning horizon – arranged in the order of chance of survival and shows single and joint lifetime information

Probability of living for a specified number of years – charts the probability of surviving in terms of years for single and joint lifetimes

Probability of living to a certain age

Graph



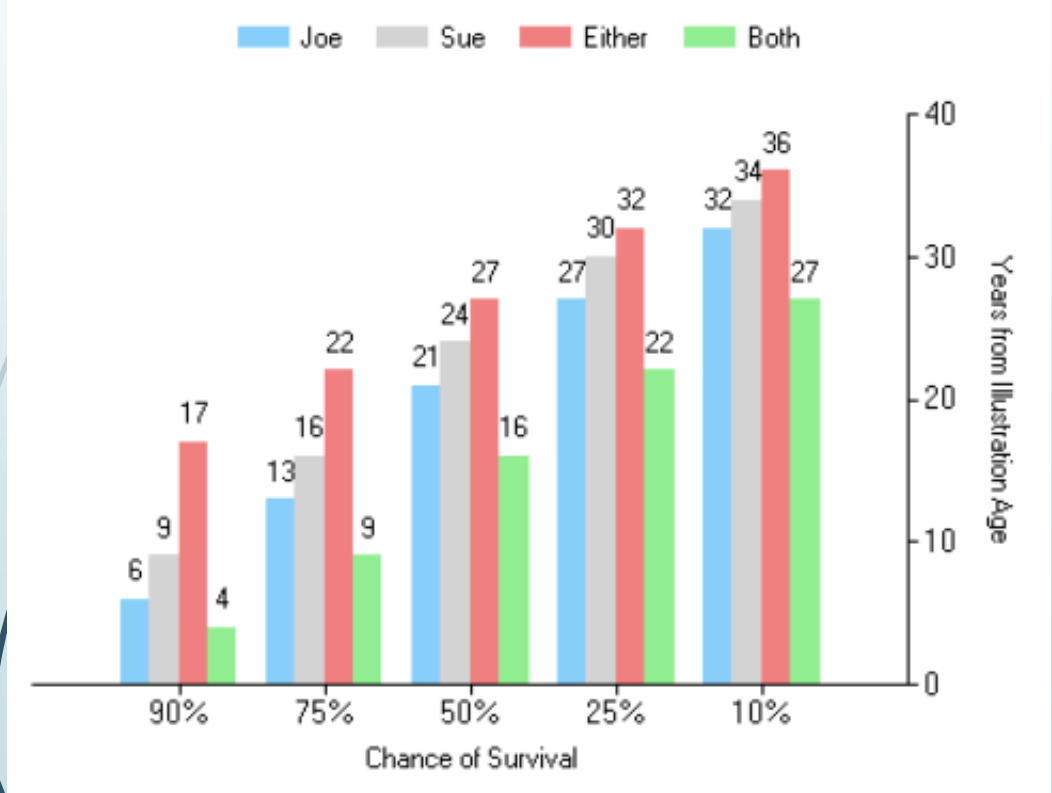
Chart

Age	Joe	Sue
65	100%	100%
70	93%	95%
75	83%	89%
80	71%	79%
85	54%	65%
90	35%	46%
95	16%	25%
100	5%	10%

© 2016 Society of Actuaries and American Academy of Actuaries

Planning horizon

Graph



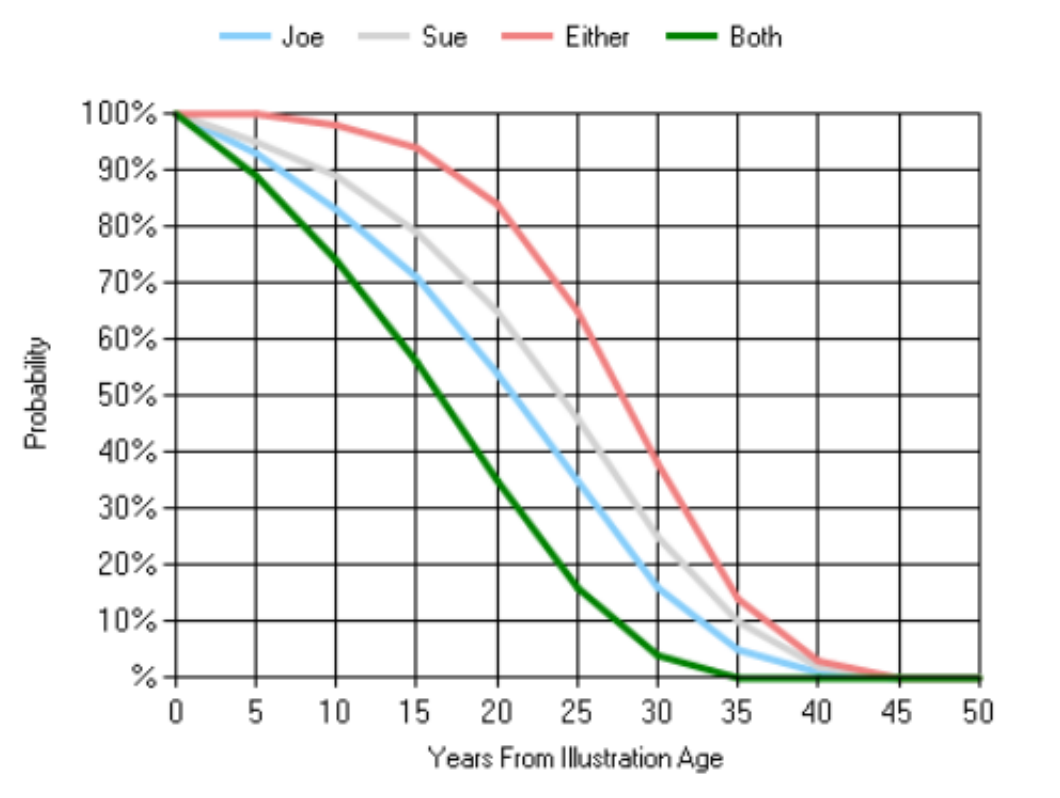
Chart

Probability	Joe	Sue	Either	Both
90%	6	9	17	4
75%	13	16	22	9
50%	21	24	27	16
25%	27	30	32	22
10%	32	34	36	27

© 2016 Society of Actuaries and American Academy of Actuaries

Probability of living a specified number of years

Graph



Chart

Years	Joe	Sue	Either	Both
0	100%	100%	100%	100%
5	93%	95%	100%	89%
10	83%	89%	98%	74%
15	71%	79%	94%	56%
20	54%	65%	84%	35%
25	35%	46%	65%	16%
30	16%	25%	38%	4%
35	5%	10%	14%	0%
40	1%	2%	3%	0%
45	0%	0%	0%	0%
50	0%	0%	0%	0%

© 2016 Society of Actuaries and American Academy of Actuaries

Online assistance/education

FAQs

Send Feedback

Why should I consider using something other than life expectancy for financial planning?

How do these charts help me make plans for retirement?

The Longevity Illustrator will help provide you with additional perspective as you consider your retirement planning options. If you only as long as your life expectancy, you may run out of retirement funds if you live longer than expected. (And there is a reasonat retirement plan assuming you will live to 110, you may find yourself without adequate income in your retirement years. The quest you will not exhaust your savings as you age.

As a default, the Longevity Illustrator shows you how long you might live from your current age. You have the flexibility to change t potential retirement ages.

This tool is meant only to help you analyze your longevity risk and does not take into account financial aspects of your retirement point to help you consider your options for a secure retirement.

What is the source of these tables?

What about other factors that affect longevity?

Why is the number of years that either one or both of us will live (the light red bar) greater than the number of years one of us will live (the blue and grey bars)?

Good question! This is one of the most important concepts for couples to understand when planning their retirement. Simply put, you can be assured that at least one of the two of you will survive (light red bar) at least as long as you will survive (blue bar). Similarly you can be assured that at least one of the two of you will survive (light red bar) at least as long as your spouse/partner will survive (grey bar).

As an example, assume you have an 80% chance of living 15 more years and your spouse/partner has a 90% chance of living that long. The chance that both of you will be alive at that time is determined by multiplying the chance that you will survive 15 years by the chance that your spouse/partner will survive that long. The result (80% times 90%) is a 72% chance that you both will be living in 15 years.

The chance that at least one of you would be alive at that age is more complex. It reflects three possibilities:

1. The chance that both of you will be alive (80% x 90% =72%) plus,
2. The chance that you will be alive, but your spouse/partner will not be alive (80% x 10%=8%) plus,
3. The chance that you will not be alive, but your spouse/partner will be alive (20% x 90%=18%).

The resulting chance that at least one of you will be alive at that age is 98% (72% + 8% + 18%).

In summary, in 15 years:

- The chance that you will be alive is 80% (blue bar).
- The chance that your spouse/partner will be alive is 90% (grey bar).
- The chance that at least one of you will be alive is 98% (light red bar).
- The chance that both of you will be alive is 72% (green bar).

© 2016 Society of Actuaries and American Academy of Actuaries

Illustrating sensitivities

Age	Gender	Smoking Status	Health	Age at Given Chance of Survival		
				75%	50%	25%
65	M	No	Average	78	86	92
65	F	No	Average	81	89	95
65	M	Yes	Poor	71	77	83
65	M	No	Poor	76	84	90
35	M	No	Average	81	88	95
65	F	No	Excellent	83	90	96
35	F	No	Excellent	86	93	99

In the news…

From May 2016 to March 2018:

- more than 250 articles and mentions online media, newspapers, magazines, TV and radio
- Equaling more than 100 million media impressions (number of times articles read)

USA TODAY

Forbes

MONEYWATCH

The New York Times

"How to Make Money Last as Long as You Do"

CNBC

"Failing to Plan for Longevity Can Hurt Your Finances"

Money

"Simple Ways to Fix Your Retirement Savings"

In the news…

TIME

Money

Here's How to Make Sure You Have a Worry-Free Retirement

Super Stock—Getty Images

By **WALTER UPDEGRAVE** November 29, 2017

"As with expenses, you can't determine exactly how long you'll live. But if you go to the Actuaries Longevity Illustrator and enter your age and gender and select your health status (poor, average or excellent), the tool will estimate your chances of living to various ages. Based on that information—and going through the process again every few years in retirement or whenever you experience a significant change in health—you'll be able to make a more informed judgment of how many years you may have to count on your savings to support you."

CNBC

If you're expecting a long life, take time to adjust your financial plan

- "About one out of every four 65-year-olds today will live past age 90, and one out of 10 will live past age 95," according to the Social Security Administration.
- 43 percent of retirees underestimate by at least five years, the life expectancy for someone of their age and gender, the Society of Actuaries reports.
- Planning for longevity might include working longer, adjusting investment strategies, and planning for incapacitating health problems.

Kelli B. Grant | @kelligrant

Published 9:01 AM ET Sat, 13 Jan 2018 | Updated 11:45 AM ET Tue, 16 Jan 2018

"For a quick gut check, there are plenty of longevity calculators like the Actuaries Longevity Illustrator (from the SOA and the American Academy of Actuaries) and Living to 100, that aim to gauge the likelihood of you reaching certain ages and provide financial and health recommendations. Those can provide a launching point for further conversations with your doctors and financial advisor."

Forbes

APR 27, 2017 @ 08:00 AM 1,058

How Likely Are You To Live Past 80?

Wade Pfau, CONTRIBUTOR

Professor @ The American College, Principal @ McLean Asset Management FULL BIO

Opinions expressed by Forbes Contributors are their own.

"The American Academy of Actuaries and the Society of Actuaries created the Longevity Illustrator to help users develop personalized estimates for their longevity based on a few questions about age, gender, and health. Exhibit 1 provides these numbers for sixty-five-year-old males and females based on their health assessment and smoking status."

Broad exposure/utilization

Longevity Illustrator - Summary Website Analytics

Jul 1, 2015 - Mar 15, 2018

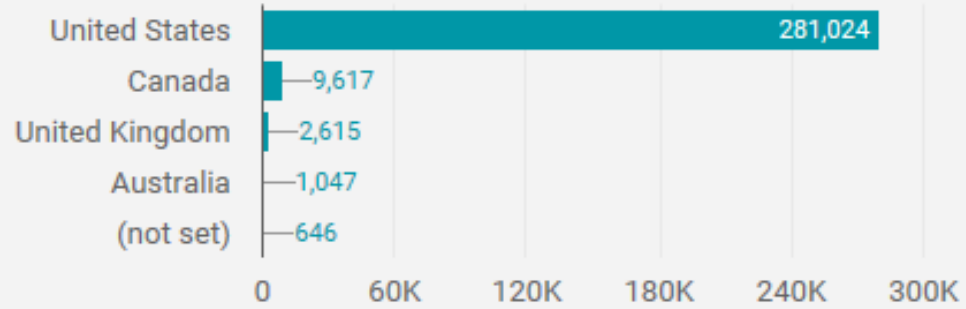
Data From Google Analytics

Users	Sessions	Pageviews	Bounce Rate	Avg. Session Duration
269,838	307,330	1,294,165	19.4%	00:03:45
	490,514.5%	219,421.4%	126,778.9%	-15.3%

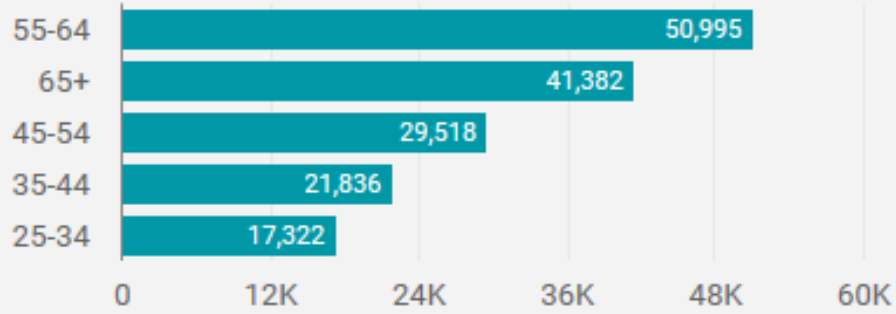
Top referring websites

Source	Sessions
usatoday.com	29,122
realdealretirement.com	21,882
yahoo.com	13,822
bloomberg.com	10,277
cbsnews.com	9,764

Sessions by Country



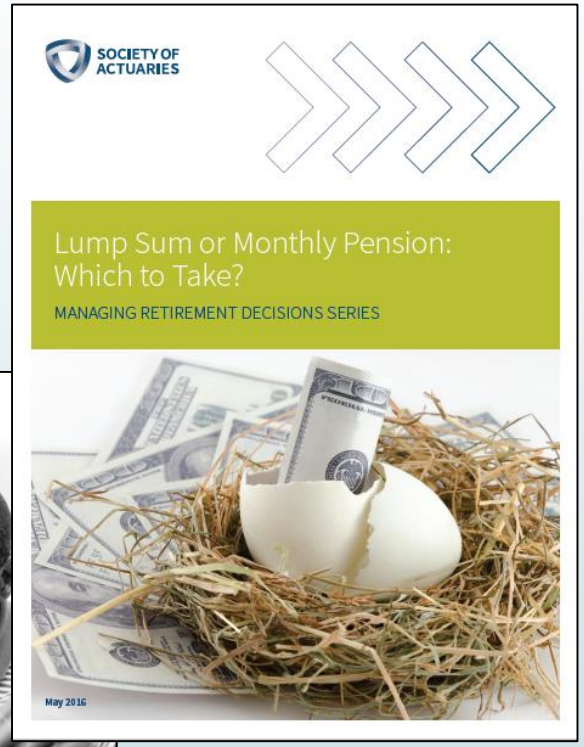
Sessions by Age



Other resources

SOA participant-oriented projects

- Age Wise Infographics
- Managing Retirement Decisions
- Managing Post-Retirement Risks
- Retirement Literacy Briefs



https://www.soa.org/research/topics/research-post-retirement-needs-and-risks/#consumer

Age Wise is a series of infographics to help individuals understand how life expectancy and the decisions they make impact their plans for a happy, healthy and well-funded retirement.

SOCIETY OF ACTUARIES

You may live much longer than you think.

Many people base their planning on what their grandparents or parents experienced, but **individual life expectancies have improved dramatically over the past century**. Current trends suggest that…

1 out of 3 males

&

1 out of 2 females

who are in their mid-50s today **will live to be** **90**

Will your **retirement income plan** be enough?

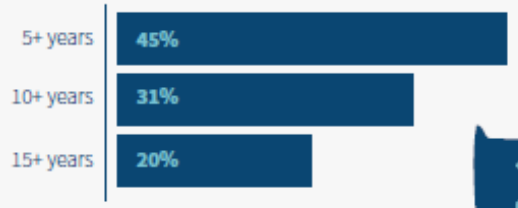
It's not just luck or genes.

Some **factors** that influence how long you live may be **beyond your control**. Others depend upon the **choices you make** every day. A successful retirement plan will address both.

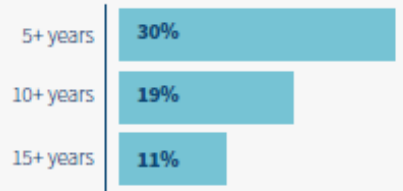
Couples should consider their combined planning timeline.

For a couple who are 65 today…

Odds a wife outlives her husband by…



Odds a husband outlives his wife by …



- Personal Health & Safety Habits
- Medical Knowledge & Access to It
- Social Connections
- Genes / Gender
- Compliance with Medical Advice
- Prenatal & Childhood Conditions
- Education
- Health & Safety of Your Neighborhood

For a personalized look at longevity, see www.longevityillustrator.org

© 2016 Society of Actuaries

Age Wise is a series of infographics to help you understand how life expectancy and the decisions you make impact your plans for a happy, healthy and well-funded retirement.

SOCIETY OF ACTUARIES

Take the Long View: Expect the Unexpected in Retirement

No matter how well we plan, no one can predict all the expenses that could occur during a retirement lasting 30 years or more.

In a study conducted in 2015, the Society of Actuaries identified common expenses, which they labeled "shocks" because of their sudden, disruptive nature.

According to the research

7 out of 10 retirees have experienced at least one "shock" during retirement.

2 of those 7 have experienced three or more shocks.

Many of these expenses aren't so unexpected after all.

Here are three most common "shocks" and what you can do to plan for them:

28%
of retirees reported unexpected expenses for **major home repairs/upgrades**.

Tip:
Consider having a home inspection prior to your retirement date, and periodically after that, to **identify and budget** for **major repairs** and **accommodations**.

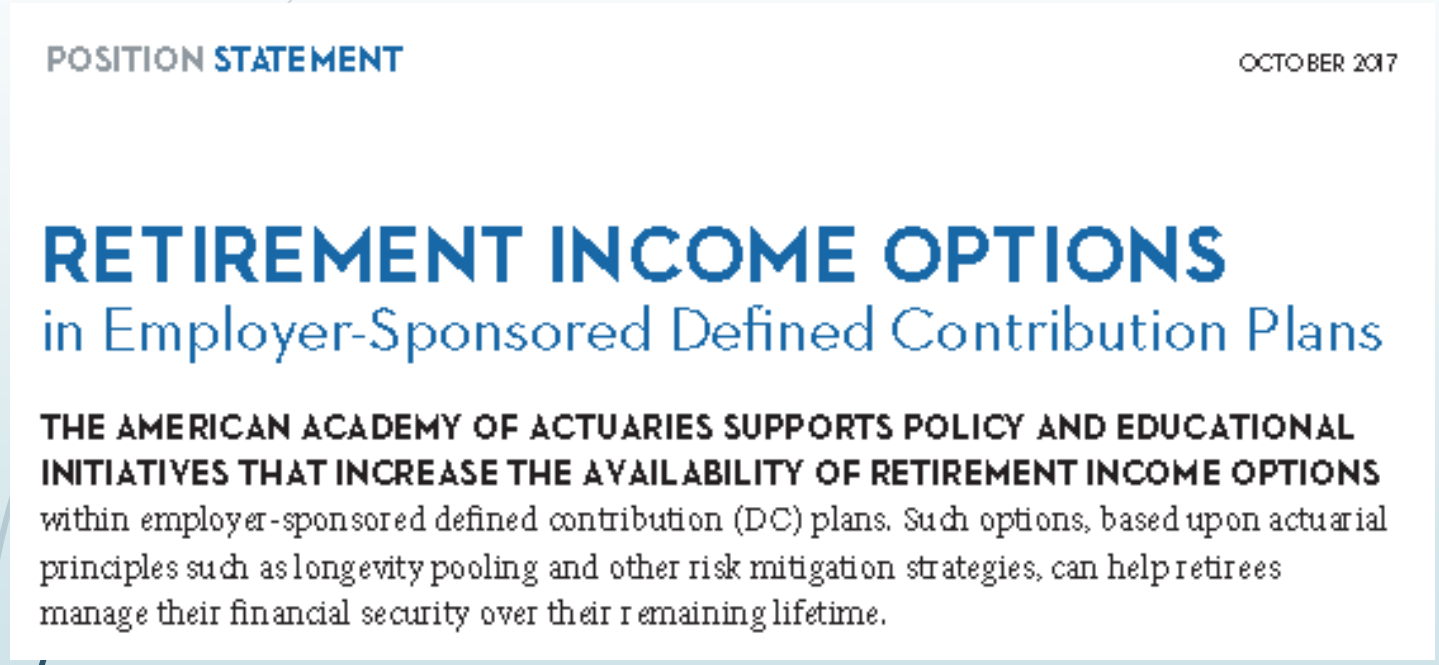
24%
reported unexpected **large dental expenses**.

Tip:
Visit your dentist to determine **what work needs to be done now** and **what you might expect in the future**.

20%
reported unexpected **out-of-pocket medical and prescription drug expenses**.

Tip:
Talk to your doctor about **alternative treatments** and look into retailers', manufacturers', and other group **discount programs**.

The Academy's Position Statement



POSITION STATEMENT

OCTOBER 2017

RETIREMENT INCOME OPTIONS
in Employer-Sponsored Defined Contribution Plans

THE AMERICAN ACADEMY OF ACTUARIES SUPPORTS POLICY AND EDUCATIONAL INITIATIVES THAT INCREASE THE AVAILABILITY OF RETIREMENT INCOME OPTIONS within employer-sponsored defined contribution (DC) plans. Such options, based upon actuarial principles such as longevity pooling and other risk mitigation strategies, can help retirees manage their financial security over their remaining lifetime.

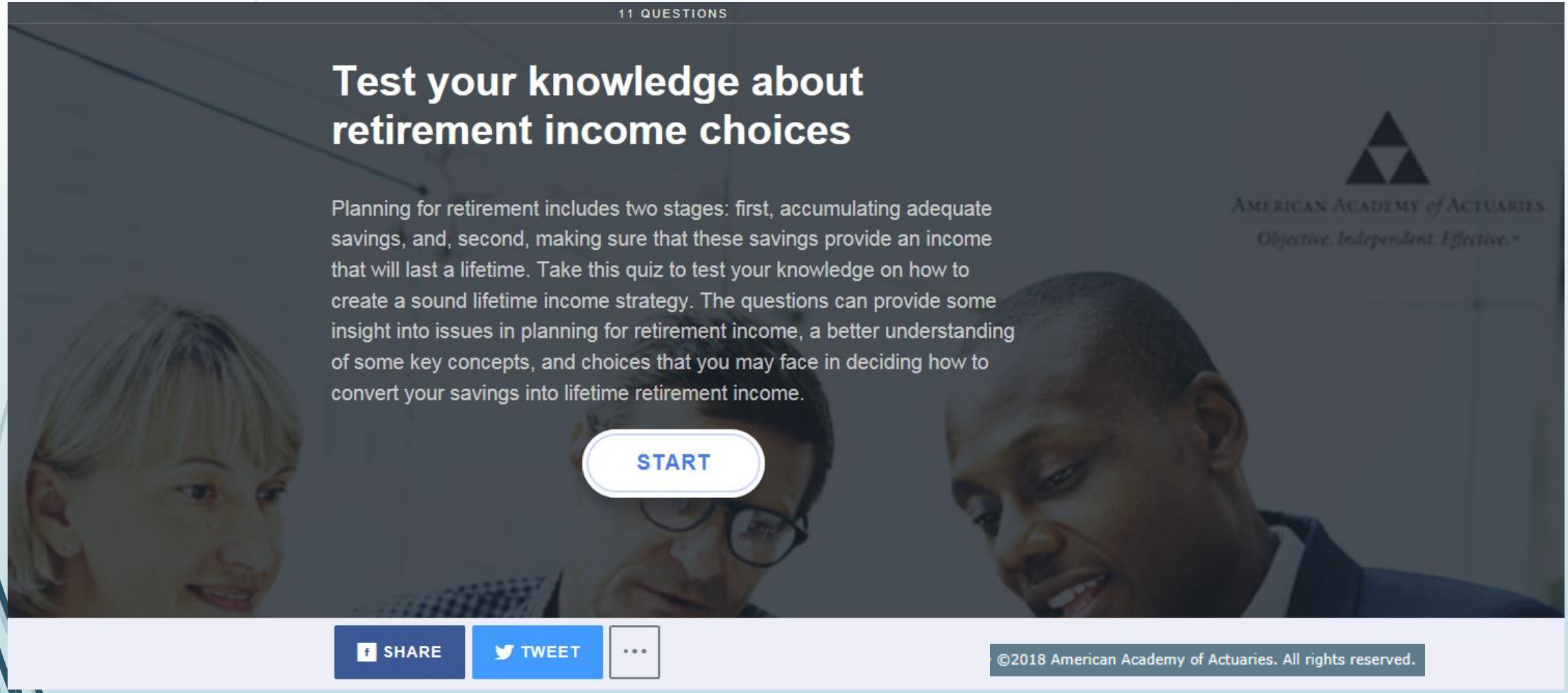
http://www.actuary.org/files/publications/Statement.RetireIncome.10.17.pdf

©2018 American Academy of Actuaries. All rights reserved.

Retirement policy should encourage and enable the development of ***lifetime income*** solutions, tools, policies, and education

An online quiz

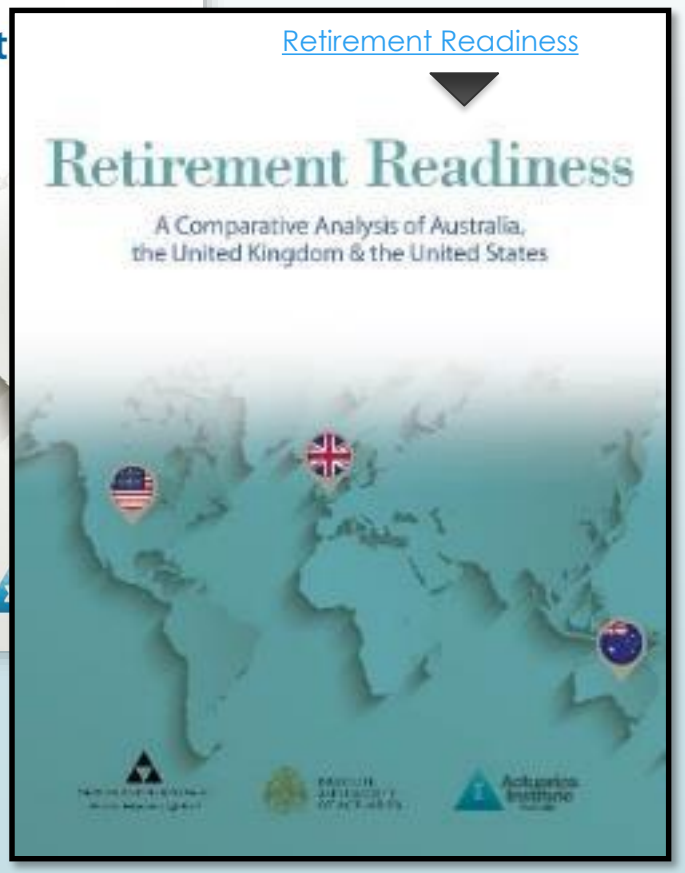
www.actuary.org/lifetime-income-quiz



Additional American Academy of Actuaries Resources

[Making Retirement Last a Lifetime]

[Retirement Readiness]



[http://www.actuary.org/content/lifetime-income-initiative]

©2018 American Academy of Actuaries. All rights reserved.

Summary

- Understanding longevity is a critical step of retirement planning
- Longevity Illustrator is but one tool – goal is to stimulate thinking, not to "get it right" for a given individual
- Possible enhancements – add "how long will it last" calculation; more personal data

Appendix

Actuaries LONGEVITY ILLUSTRATOR

About the Longevity Illustrator | FAQ | GET STARTED

Welcome to the Actuaries Longevity Illustrator

Planning for retirement can be complicated, and there are many factors that must be taken into account. One of the most important, and sometimes misunderstood, is your longevity – that is, how long you might actually live. This is different from your life expectancy, which is how long an individual of your age, gender, and health would be anticipated to live *on average*. There is still a significant chance that you will live for many years beyond that, and you should consider this possibility when planning your retirement. This Actuaries Longevity Illustrator helps you do that by letting you see how long you might live with different degrees of certainty based on the expectations for an average individual with your characteristics. Take a look. You might be surprised by the results!

If your retirement plans involve two people, the considerations become even more complex. The Longevity Illustrator addresses two crucial concerns, "How long can we expect to live as a couple, and how long can we expect a survivor to live after one of us has died?" The Longevity Illustrator helps you to consider the likelihood of these possible outcomes.

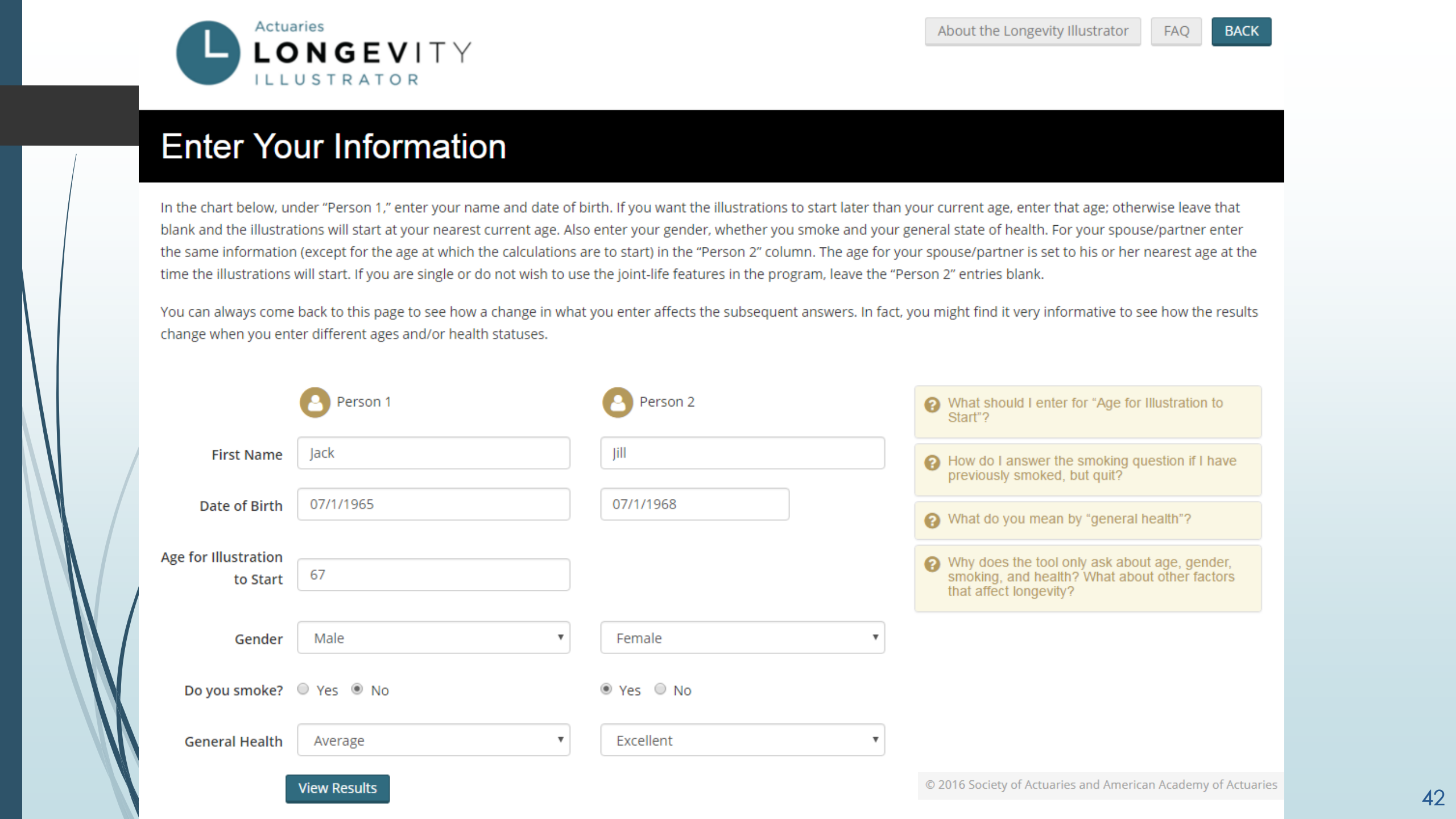
Developed by the American Academy of Actuaries and the Society of Actuaries, the Longevity Illustrator is designed to provide you with perspectives on your longevity risk—the uncertainty of how long you and your spouse/partner might live. It does not address your finances, your investments, your earning potential or your anticipated expenses; consult with a financial professional about those aspects of your retirement planning. We invite you to use the Longevity Illustrator to enhance your understanding of the potential risk for outliving your financial resources.

How it works

You will answer a few questions about your health and demographic characteristics. The Longevity Illustrator will then produce charts that allow you to see the probabilities associated with how long you (and your spouse/partner, if applicable) may live, which will help you understand the likelihood that you may live for a much longer time than your life expectancy would suggest. This will allow you to consider the risks of outliving your financial resources, i.e., the chance of running out of money during your lifetime(s). You can view the results as either charts or as tables of values. You can also print out a summary sheet of the information provided by the Longevity Illustrator.

GET STARTED

© 2016 Society of Actuaries and American Academy of Actuaries


Actuaries
LONGEVITY
ILLUSTRATOR
About the Longevity Illustrator
FAQ
BACK
Enter Your Information
In the chart below, under "Person 1," enter your name and date of birth. If you want the illustrations to start later than your current age, enter that age; otherwise leave that blank and the illustrations will start at your nearest current age. Also enter your gender, whether you smoke and your general state of health. For your spouse/partner enter the same information (except for the age at which the calculations are to start) in the "Person 2" column. The age for your spouse/partner is set to his or her nearest age at the time the illustrations will start. If you are single or do not wish to use the joint-life features in the program, leave the "Person 2" entries blank.
You can always come back to this page to see how a change in what you enter affects the subsequent answers. In fact, you might find it very informative to see how the results change when you enter different ages and/or health statuses.
Person 1
Person 2
First Name
Jack
Jill
Date of Birth
07/1/1965
07/1/1968
Age for Illustration to Start
67
Gender
Male
Female
Do you smoke?
Yes
No
Yes
No
General Health
Average
Excellent
View Results
What should I enter for "Age for Illustration to Start"?
How do I answer the smoking question if I have previously smoked, but quit?
What do you mean by "general health"?
Why does the tool only ask about age, gender, smoking, and health? What about other factors that affect longevity?
© 2016 Society of Actuaries and American Academy of Actuaries

Actuaries LONGEVITY ILLUSTRATOR

About the Longevity Illustrator | FAQ | START OVER | BACK

Results

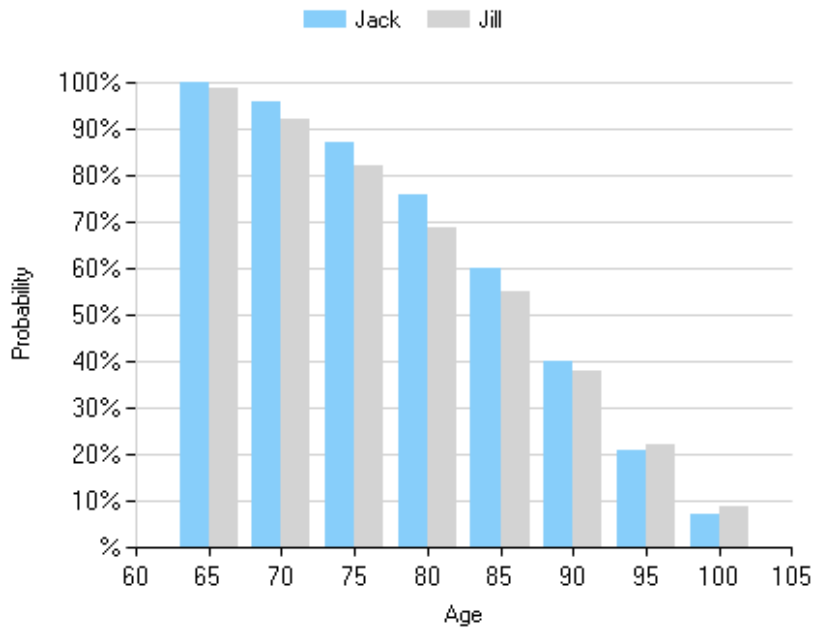
Probability of Living to a Certain Age

This graph introduces the concept of longevity as a range. It illustrates the likelihood that you will live at least to certain ages. If you chose to enter an illustration age later than your nearest age, the calculations assume 100% likelihood that you will live from your nearest age to the age you entered. For instance, the chart shows that the likelihood is 60% that you will live from the later of your nearest age or the illustration age entered to 85, while Jill has a 55% chance of living to 85.

Note that these probabilities are calculated from your nearest age or from the illustration age if you entered one. If you chose to enter an illustration age later than your nearest age, the Longevity Illustrator assumes a 100% chance that you will live to the age you chose and also a 100% chance that Jill will live the same number of years.

Probability of Living to a Certain Age

Show Data Table



© 2016 Society of Actuaries and American Academy of Actuaries

Actuaries LONGEVITY ILLUSTRATOR

About the Longevity Illustrator | FAQ | START OVER | BACK

Results

Planning Horizon

This chart shows a planning horizon based on the information you entered – that is, the number of years you can expect to live from your illustration age with a given probability. This is similar to the information presented in the first chart, but it is arranged in order of chance of survival, not ages. This perspective allows you to consider your retirement spending based on your personal level of comfort or risk tolerance.

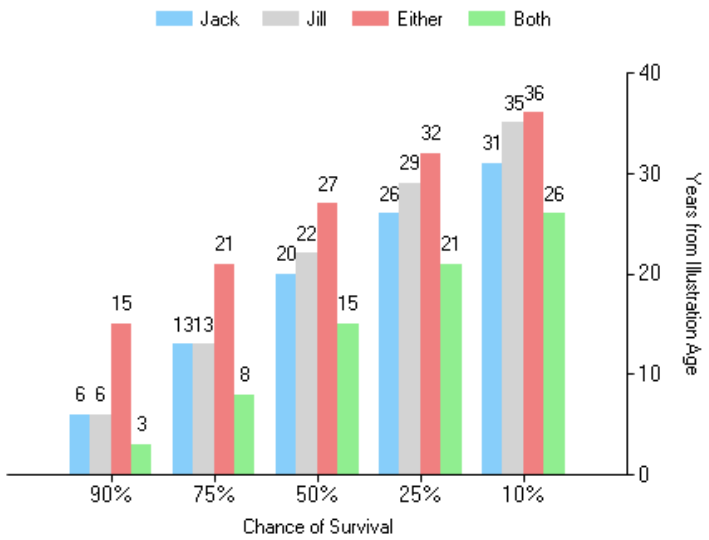
In addition to showing your longevity as individuals (the blue and grey bars), the chart provides key information for you as a couple: It shows the probability that both of you will survive (the green bar), as well as the probability that at least one of you will survive (the light red bar). This lets you focus on your longevity as a couple rather than as individuals. For instance, you may be comfortable setting your planning horizon based on a 25% chance that you will survive at least that long. In this case, based on the chart, you could consider 21 years where you are both still alive (the green bar), and then an additional 11 where one of you survives the other (32 years in total). If you want to be more cautious, you might set your planning horizon looking at the 10% chance you will survive longer (26 years as a couple, and an additional 10 years where one of you survives the other (36 years in total). As the chart shows, the common practice of planning for each spouse/partner separately may lead you to underestimate by several years the length of time at least one of you will live.

Note that these probabilities are calculated from your nearest age or from the illustration age if you entered one. If you chose to enter an age later than your nearest age, the Longevity Illustrator assumes a 100% chance that you will live to the age you chose and also a 100% chance that Jill will live the same number of years.

Why is the number of years that either one or both of us will live (the light red bar) greater than the number of years one of us will live (the blue and grey bars)?

Planning Horizon

Show Data Table



© 2016 Society of Actuaries and American Academy of Actuaries

Actuaries LONGEVITY ILLUSTRATOR

About the Longevity Illustrator | FAQ | START OVER | BACK

Results

Probability of Living for a Specified Number of Years

This chart takes the same information as the previous chart but shows it in a different way. Instead of showing the years you might expect to live with a specific level of certainty, this chart shows the probability that both of you will live a specific number of years in the future from the illustration age you entered. For instance, looking at the 25-year line, there is a 32% chance that you will survive 25 years, but a 41% chance that Jill will survive that same amount of time. In addition, there is a 60% chance that either of you will survive 25 years and only a 13% chance that you both will survive 25 years.

An important point is that it is very likely one of you is going to outlive the other, and you must take this fact into account when making your retirement plans. You should also consider the chance that either of you may live much longer than your average life expectancy.

© 2016 Society of Actuaries and American Academy of Actuaries

Probability of Living for a Specified Number of Years

Show Data Table