



SOCIETY OF
ACTUARIES®

2019 **ANNUAL
MEETING**
& EXHIBIT

October 27-30
Toronto, Canada

Session 165: The 411 on the New Mortality and Longevity Strategic Research Program

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The 411 on the New Mortality and Longevity Strategic Research Program

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Session 165 – October 30, 2019



SOCIETY OF ACTUARIES

Antitrust Compliance Guidelines

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- **Do not** speak on behalf of the SOA or any of its committees unless specifically authorized to do so.
- **Do** leave a meeting where any anticompetitive pricing or market allocation discussion occurs.
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Agenda

- Concept of strategic research
- Strategic research programs
- Research at the SOA
- The MLRPSC
 - Roots
 - Who
 - What
- Outside in and inside out
- ...with a little help from our friends
- A vehicle for your input

Strategic Research

- Historically SOA good at “parochial” research
- Not so good at research across practice areas
- Does not leverage our skill set for the greater good

- Increase the visibility of the SOA as a relevant “force”

SOA Strategic Research Programs

Part of SOA's
2017-2021
Strategic Plan



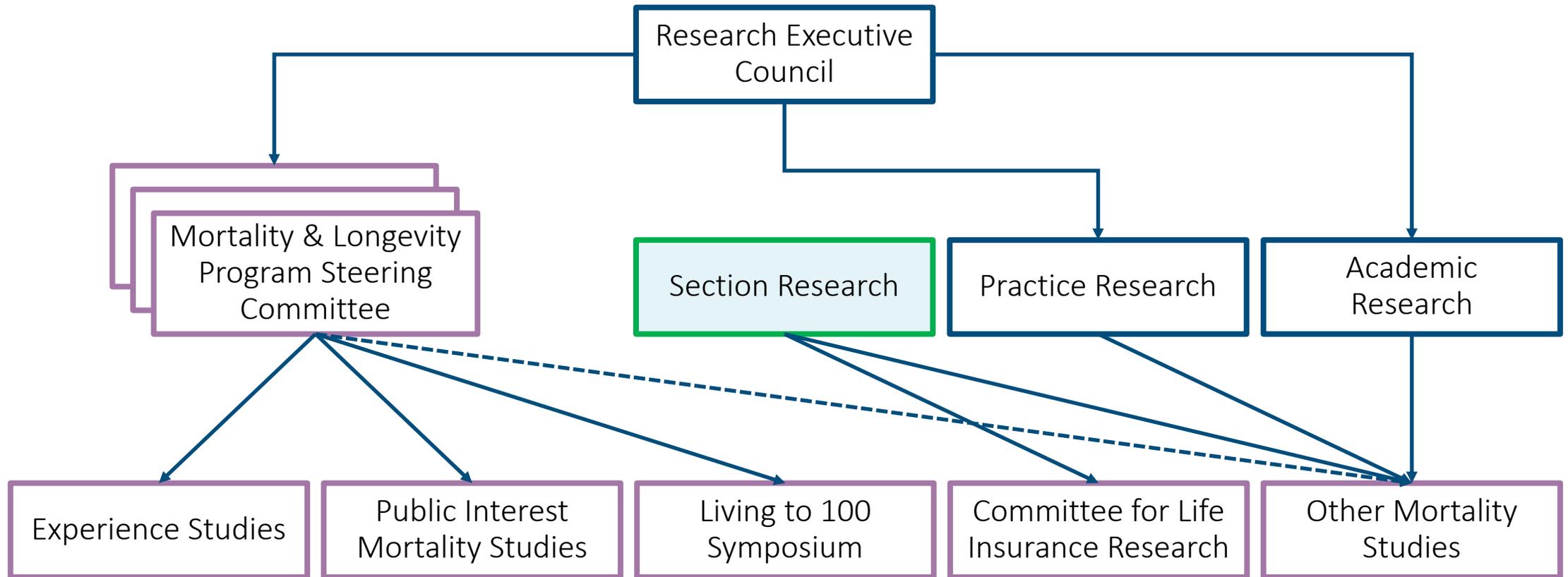


Mortality and Longevity

Examines the factors impacting models and mortality predictions, and the analysis of longevity trends.



(Mortality) Research at the SOA



Know Your Acronyms

REC

MLRPSC
aka M&L

CLIR

Roots of the MLRPSC

- The Longevity Advisory Group
 - Increase the knowledge level of practicing actuaries relating to mortality and mortality modeling
- Do for the Practice Areas what CLIR has done for the Sections:
 - Cut broadly across to facilitate dialog and synchronization of research
 - Create a permanent structure for sharing and input

Who is on the MLRPSC?

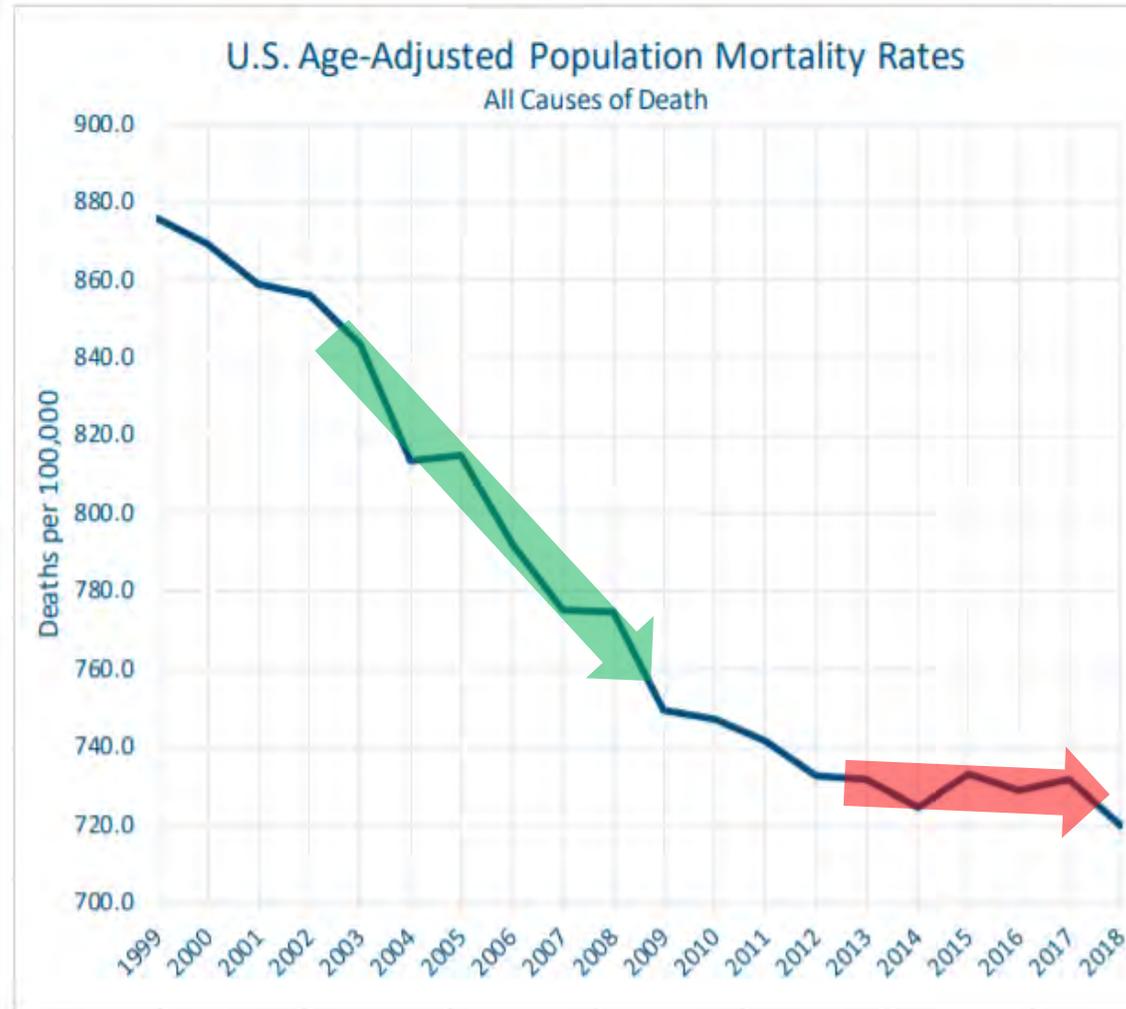
- A diverse group
- U.S., Canada and around the world
- Pension, life, annuities and longevity
- Private, public and academic
- Actuaries and demographers

Goals of the MLRPSC

- Research  Continuing Education
- Investigate
 - Mortality modeling
 - Mortality improvement
- Coordinate, centralize and communicate
- Use our skills for the greater goods: public interest research
 - Good for the public
 - Good for us

Mortality Improvement...?

- Recent U.S. trends of slowing / declining mortality improvement
- August 2019:
 - U.S. Population Mortality Observations - Preview of 2018 Experience



Year	Deaths per 100,000	Year over Year % Change
1999	875.6	n/a
2000	869.0	-0.8%
2001	858.8	-1.2%
2002	855.9	-0.3%
2003	843.5	-1.4%
2004	813.7	-3.5%
2005	815.0	0.2%
2006	791.8	-2.8%
2007	775.3	-2.1%
2008	774.9	-0.1%
2009	749.6	-3.3%
2010	747.0	-0.3%
2011	741.3	-0.8%
2012	732.8	-1.1%
2013	731.9	-0.1%
2014	724.6	-1.0%
2015	733.1	1.2%
2016	728.8	-0.6%
2017	731.9	0.4%
2018	720.2	-1.6%

Mortality Improvement Challenges

- Pulls on mortality improvement across many different causes of death
- January 2019:
 - *U.S. Population Mortality Observations – Updated with 2017 Experience*

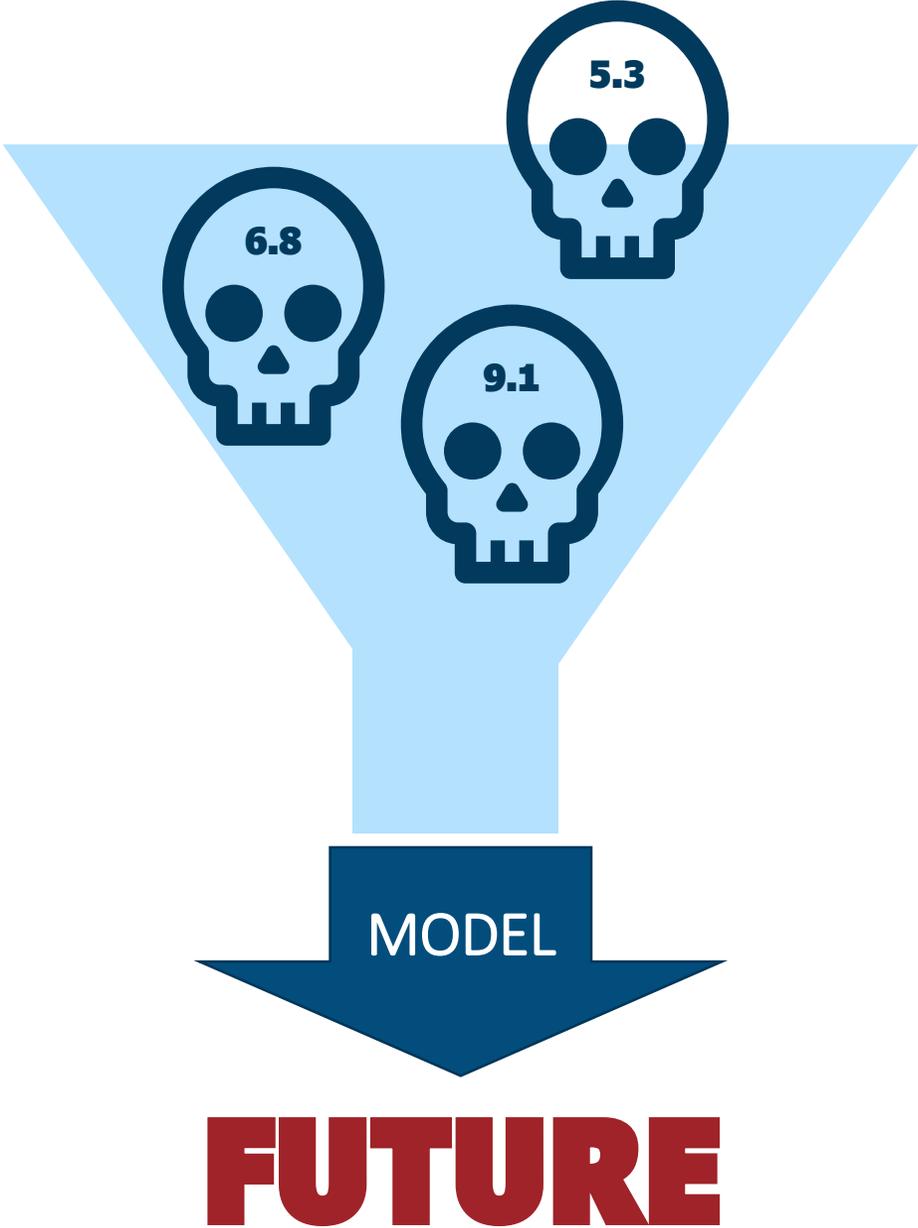
2017 U.S. POPULATION MORTALITY BY COD

Cause of Death	Deaths	%	Age-Adjusted One Year Change	Attribution to All CODs*
Heart Disease	647,457	23.0%	0.2%	0.1%
Cancer	599,108	21.3%	2.1%	0.5%
Alzheimer's/Dementia	239,585	8.5%	-1.3%	-0.1%
Accidents	169,936	6.0%	-4.1%	-0.3%
Pulmonary	160,201	5.7%	-1.0%	-0.1%
Stroke	146,383	5.2%	-0.8%	0.0%
Diabetes	83,564	3.0%	-2.1%	-0.1%
Suicide	47,173	1.7%	-3.9%	-0.1%
Liver	41,743	1.5%	-1.4%	0.0%
Assault	19,510	0.7%	-0.2%	0.0%
Other	658,843	23.4%	-1.5%	-0.3%
All COD	2,813,503	100%	-0.4%	-0.4%

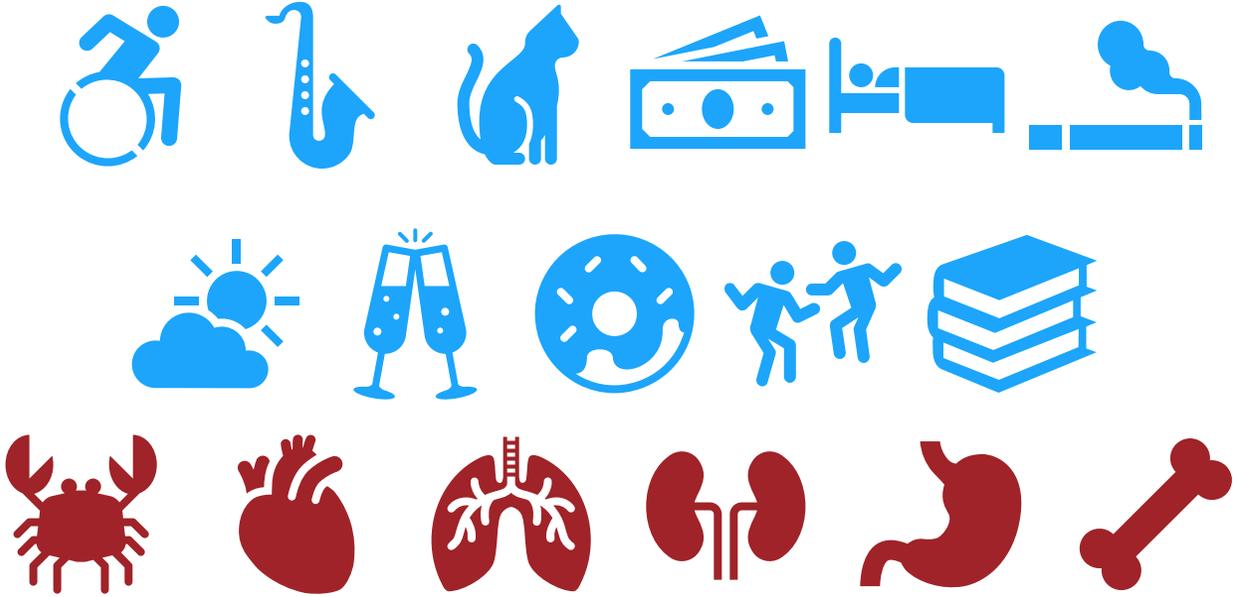
The Old Way



The Current Way



The Future Way



MODEL

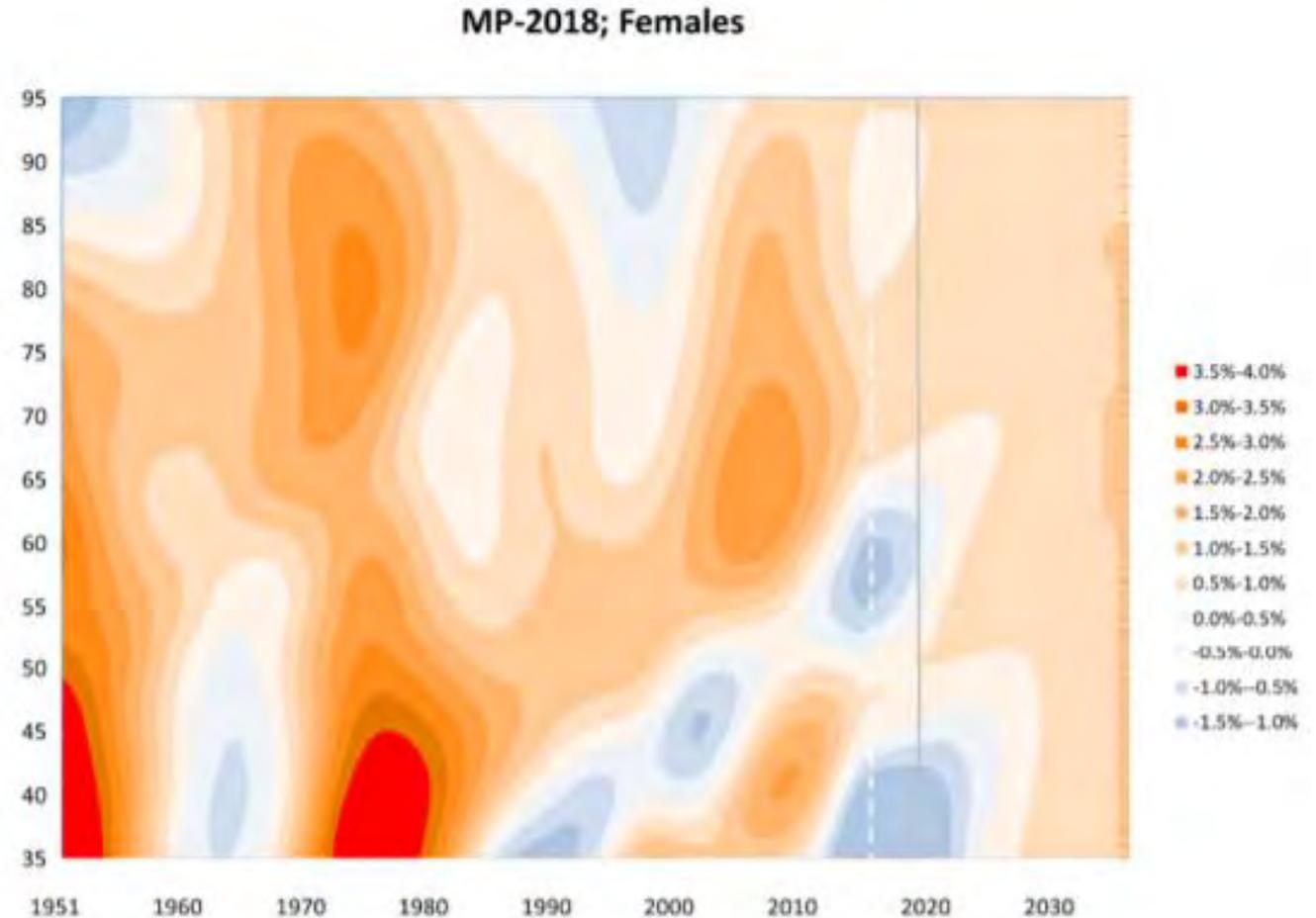
FUTURE

The Best of All Worlds

- Valid and complete data
- Solid statistical analysis
- Sound model development
- Understand the why of the numbers

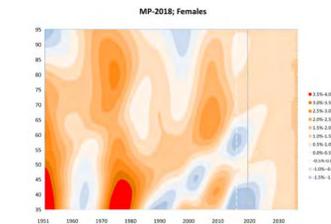
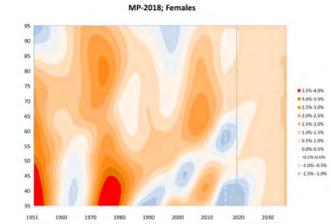
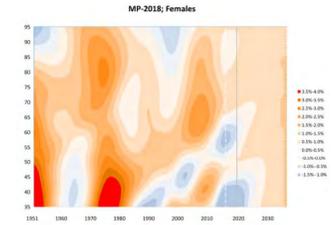
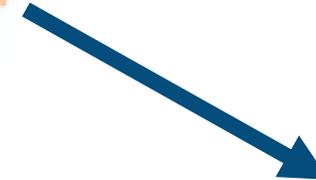
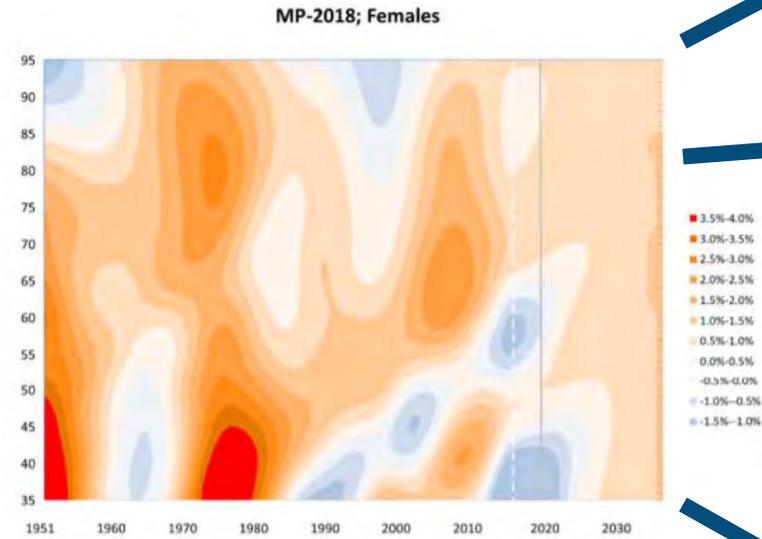
What? *Data*

- Moving from “just recording” to analyzing and using as a source of modeling and forecasting



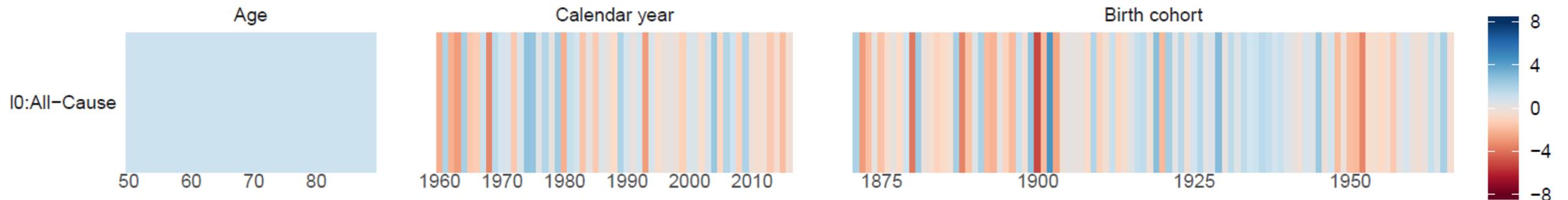
How? *Consistent Framework*

- Consistent mortality framework
- Decomposition of U.S. population into subcategories



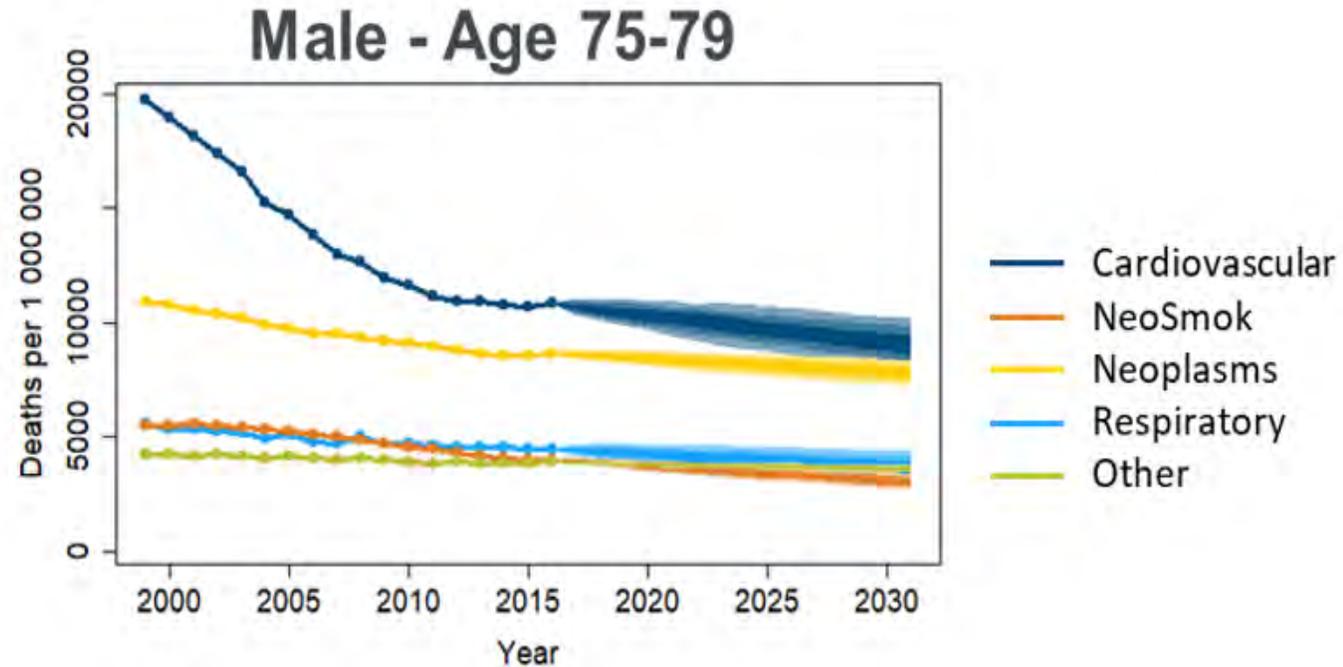
Why? *Looking at Causes*

- Analysis of historical U.S. population mortality improvement drivers (Bajekal, Haberman, Villegas and Zhou)
- Determination as visualization of Age, Period and Cohort effects; All Cause and Cause of Death



Why? *Projecting into the Future*

- Modeling and Forecasting Cause of Death (Boumezoued - Milliman)



Other Useful Information

- Components of historical mortality improvement

<https://www.soa.org/resources/research-reports/2017/2017-comp-hist-mort-impr>

- Review of U.S. population mortality

<https://www.soa.org/research/topics/research-emerging-topics/#population>

- U.S. population mortality by state

<https://www.soa.org/resources/research-reports/2018/us-mortality-database>

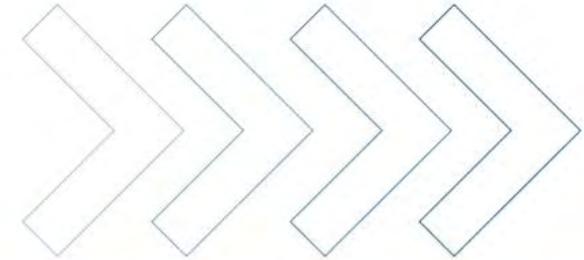
<https://usa.mortality.org>

Why “Why”? *Looking at Drivers*

- Balance of Quantitative and Qualitative Analysis: SOA Expert Panel

<https://www.soa.org/globalassets/assets/files/resources/research-report/2019/drivers-of-us-mortality-improvement.pdf>

- Most important drivers:
 - Individual behaviors
 - SES / Inequality
 - Social policy
 - Environmental issues



What Are Others Doing?

- Mortality improvement insurance company practice survey:
 - Assumptions insurers/reinsurers are using for future mortality improvement for life insurance and annuities
 - How insurers/reinsurers future mortality improvement assumptions might vary assumptions by product, birth cohort, gender or other characteristics
 - Similarities and differences:
 - U.S. vs. Canada vs. UK; Insurers vs. Reinsurers; Life vs. Annuities; Pricing vs. Financial Projections

Additional SOA Mortality Improvement Research

Mortality Improvement Trend - Independent Analysis

Background and Purpose

Mortality improvement is an important assumption for projecting future liability cashflows and has a material financial impact on a company. Mortality improvement is a hot topic in the industry and companies show significant interest in understanding the key factors that differentiate mortality improvement. The focus of this research is to gain a better understanding of the following main drivers of mortality improvement:

- Socioeconomic level (Marital status, occupation, income, education)
- Gender
- Attained age
- Geographical and Demographical differences
- Cause of death
- Calendar year
- Birth-year cohort

A Little Help From Our Friends: Research Partnerships

- Modeling, Measurement, and Management of Longevity Risk (IFoA/CIA/SOA)
- Support further development and enhancement of USMDB and HMD



JAN. 13–15, 2020
ORLANDO, FL

LIVING *to* 100

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INTERNATIONAL SYMPOSIUM

Livingto100.soa.org



Public Interest Mortality Research

- Public Perception of Longevity Survey
- The Longevity Illustrator
- Economic Impact of Non-Medical Opioid Use

Public Perception of Longevity

- The dual purpose of the survey is:
 1. to determine whether people are realistic about their remaining length of life
 2. to measure variations in perception across socio-economic and demographic groups within the population

<https://www.soa.org/resources/research-ops/2019-public-perception-drivers>

Longevity Illustrator

- Update to Actuaries Longevity Illustrator
- Joint project between AAA and SOA

<http://www.longevityillustrator.org>



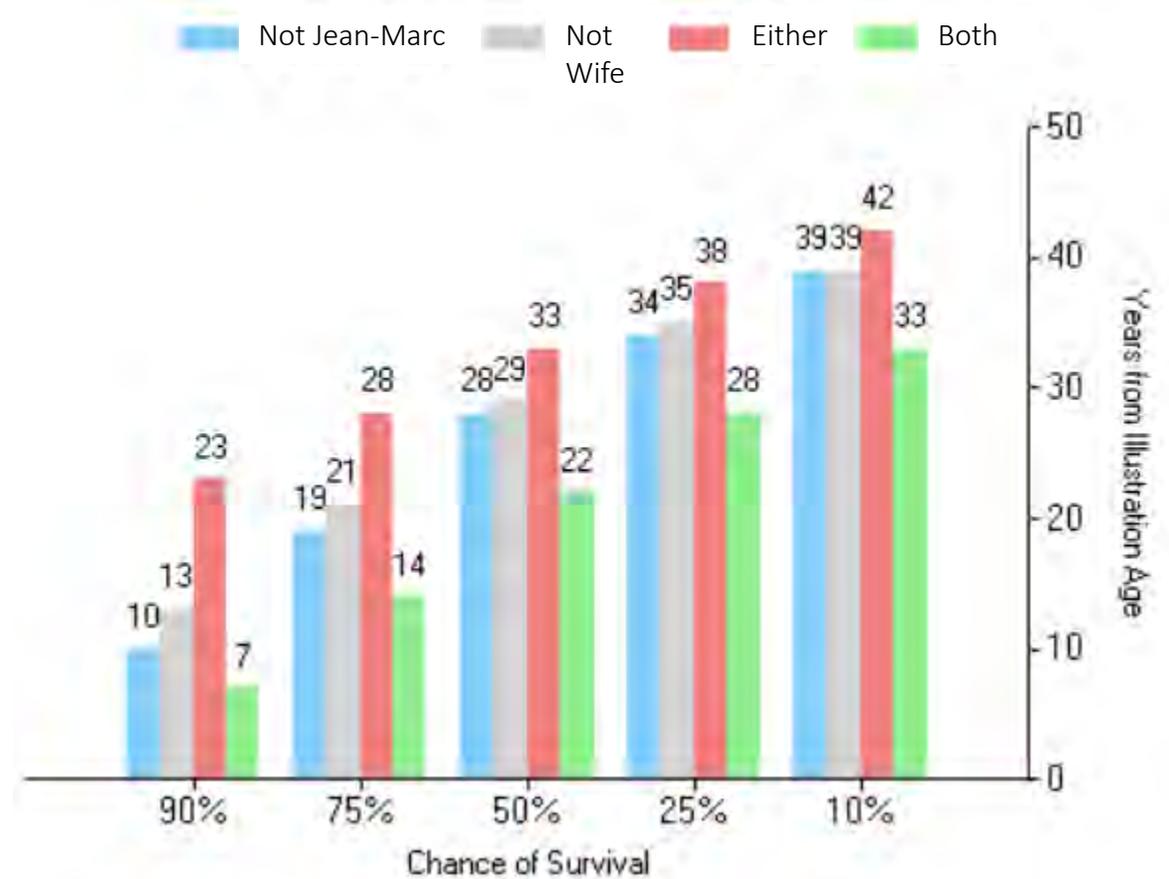
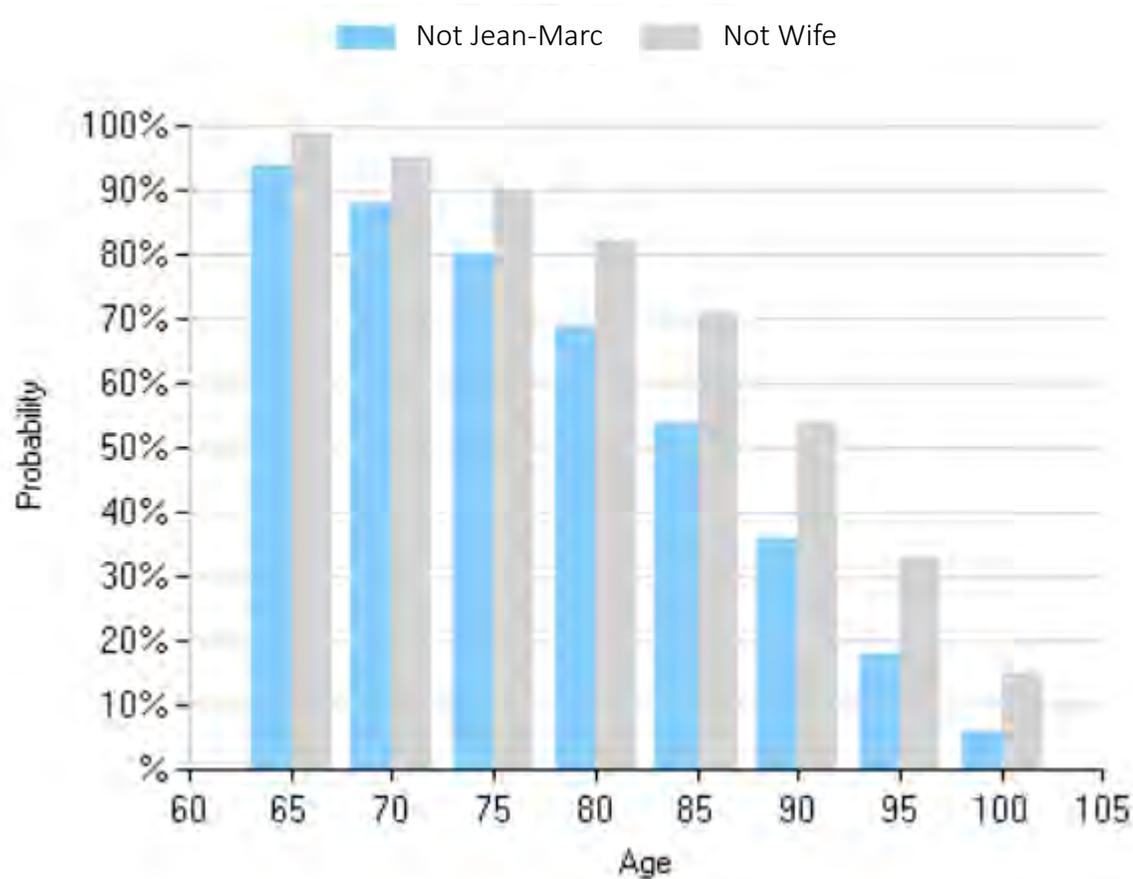
Enter Your Information

In the chart below, under "Person 1," enter your name and date of birth. If you want the illustrations to start later than blank and the illustrations will start at your nearest current age. Also enter your gender, whether you smoke and your the same information (except for the age at which the calculations are to start) in the "Person 2" column. The age for you time the illustrations will start. If you are single or do not wish to use the joint-life features in the program, leave the "P

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

	Person 1	Person 2
First Name	<input type="text" value="First Name"/>	<input type="text" value="First Name"/>
Date of Birth	<input type="text" value="mm/dd/yyyy"/>	<input type="text" value="mm/dd/yyyy"/>
Age for Illustration to Start	<input type="text" value="Illustration Age"/>	

Longevity Illustrator – Sample Results



Opioid Epidemic

- Anecdotal evidence – It still hasn't impacted Individual Life insurance much
- But regardless of the impact on us, the impact on society has been tremendous:
 - Since 2013, the age adjusted death rate for deaths from unintentional drug overdose has surpassed the deaths rate from motor vehicle traffic accidents.*
 - ...but there are many other costs

* NCHS Data Brief, No 343, July 2019

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