

Mortality Improvement

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Agenda

How does Mortality Improvement (MI) impact Life Insurers ?

How does Life Insurance Industry study Mortality Improvement trends ?

How does Life Insurance industry set Mortality Improvement assumptions ?

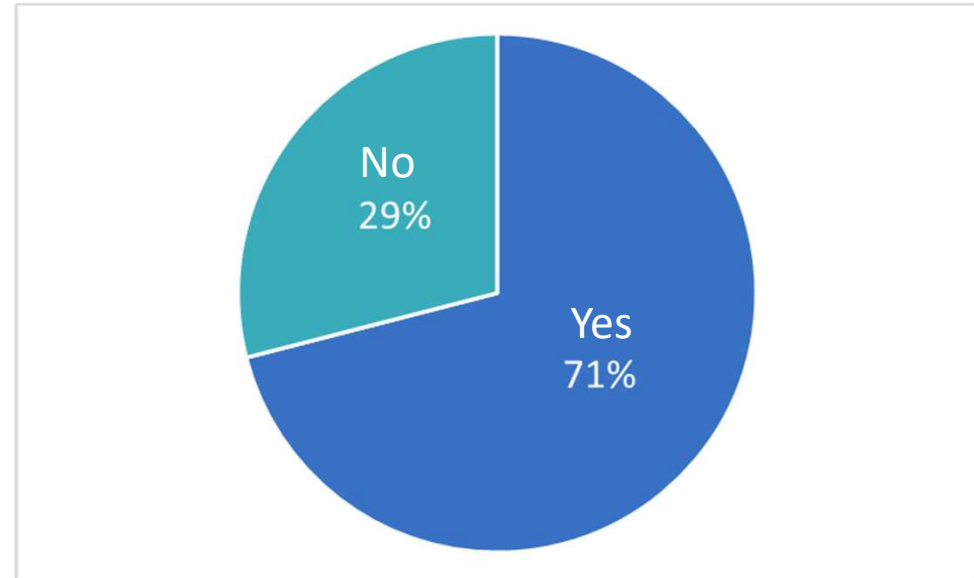
How does Mortality Improvement Impact Life Insurers ?

Impact of MI - Pricing

- For Life Insurance Products, including FMI allows to set more competitive prices, but there is a danger of overestimation
- According to the Munich RE 2019 Mortality Pulse Survey, 29% of companies don't use FMI in their pricing

Munich RE Mortality Pulse Survey:

As of 12/31/2018 does your company reflect FMI in its pricing ?

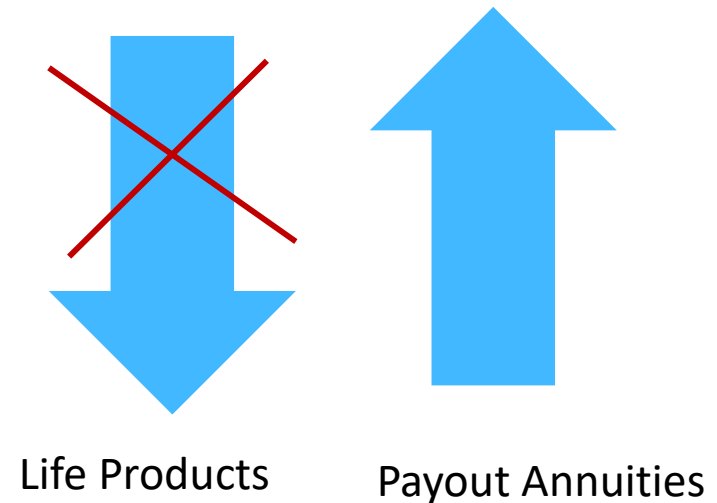


- For Payout annuities and Pension products, FMI is a regular and very important assumption. Higher mortality improvement would add conservatism. Deep studies are usually required to develop the best estimate assumption

Impact of MI – Financial Reporting

- For Life Insurance Products, as of today the use of FMI is beyond valuation date is prohibited for all regulatory purposes
- The only regulatory use of MI is to improve standard table from central date to valuation date (MILWG for AG38 and VM-20)

Direction of Conservatism
for FMI Assumption



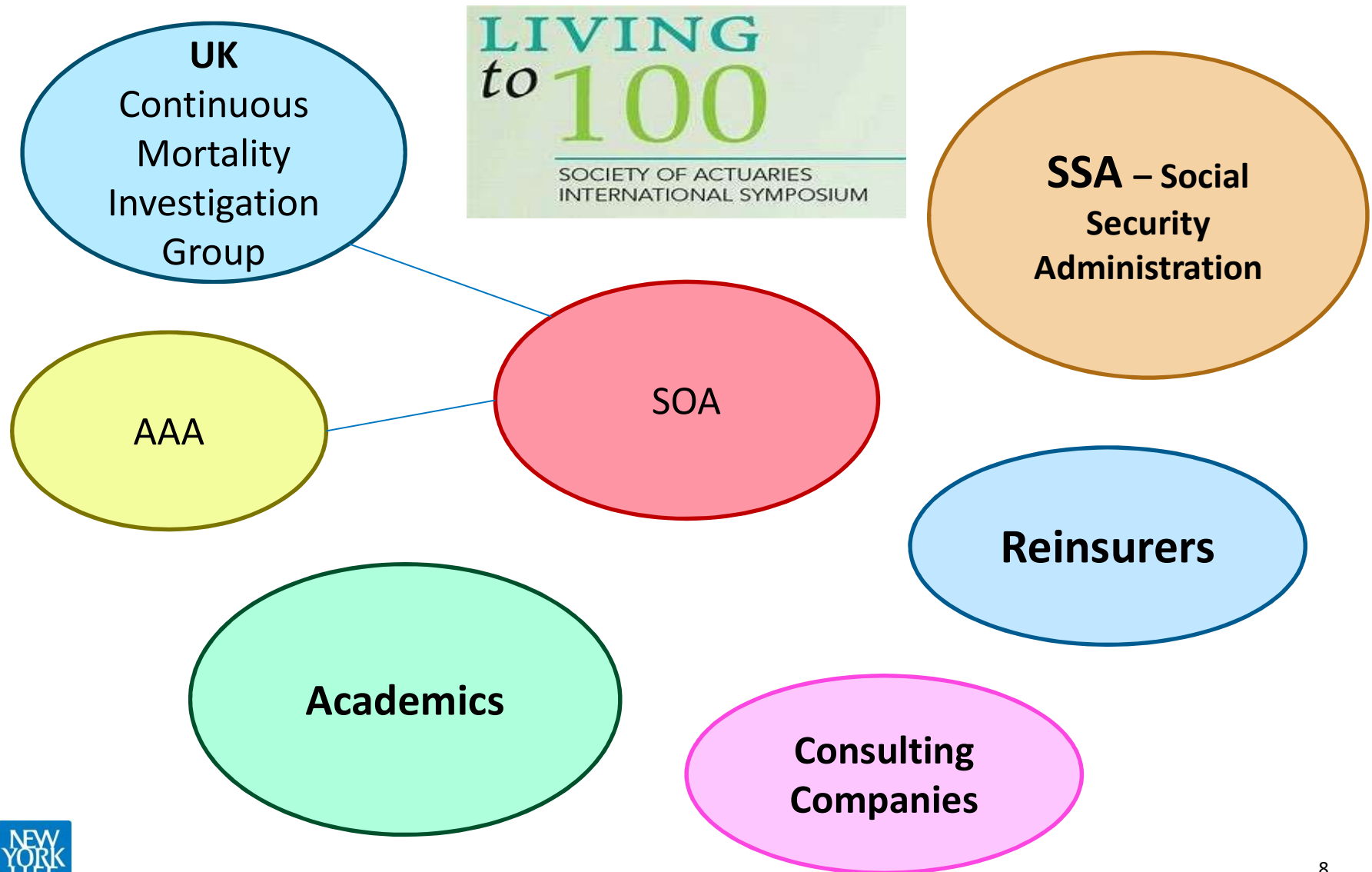
- For Payout annuities and Pension products, the minimum FMI scale is updated by SOA on the annual bases. The latest scale is MP-2019

Impacts of MI - Other

- Evaluation of Reinsurance Deals
 - Reinsurers include MI in their pricing
 - Direct companies need their own view of MI to evaluate attractiveness of RE deals
- Profitability of Inforce Blocks of Business
 - Insurers are searching for ways to improve mortality for their inforce blocks by inciting positive life style changes
 - May increase the value of “Good Will” as much as profitability

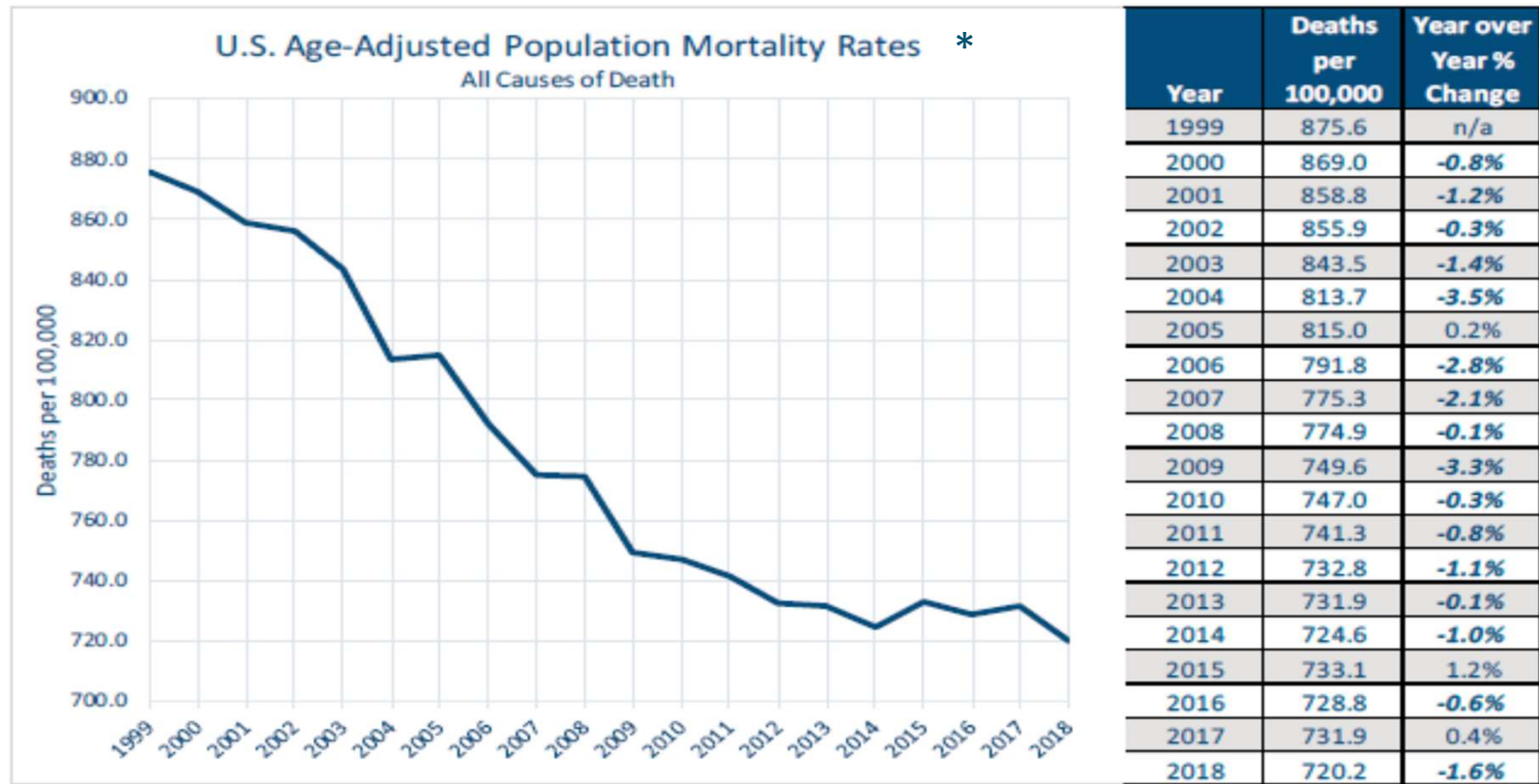
How does Life Insurance Industry Study Mortality Improvement Trends ?

Main Players in MI Research



Current View of Mortality Improvement

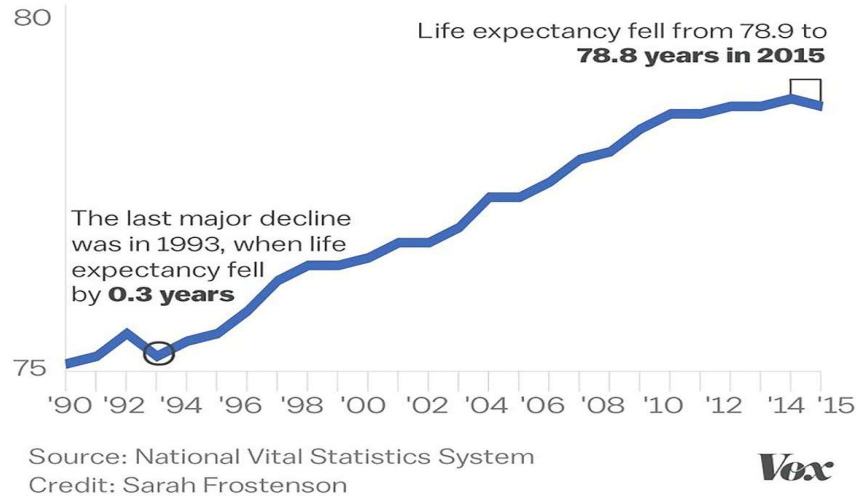
Main Concern: Something changed in the recent past !



Main Question: What does it mean for the future ?

Signs of Trouble

Life expectancy has improved in the US, but a 2015 dip shows that might be changing



The New York Times

Why are White Death Rates Rising ?



“The average American could see his life expectancy reduced by five years due to obesity. “

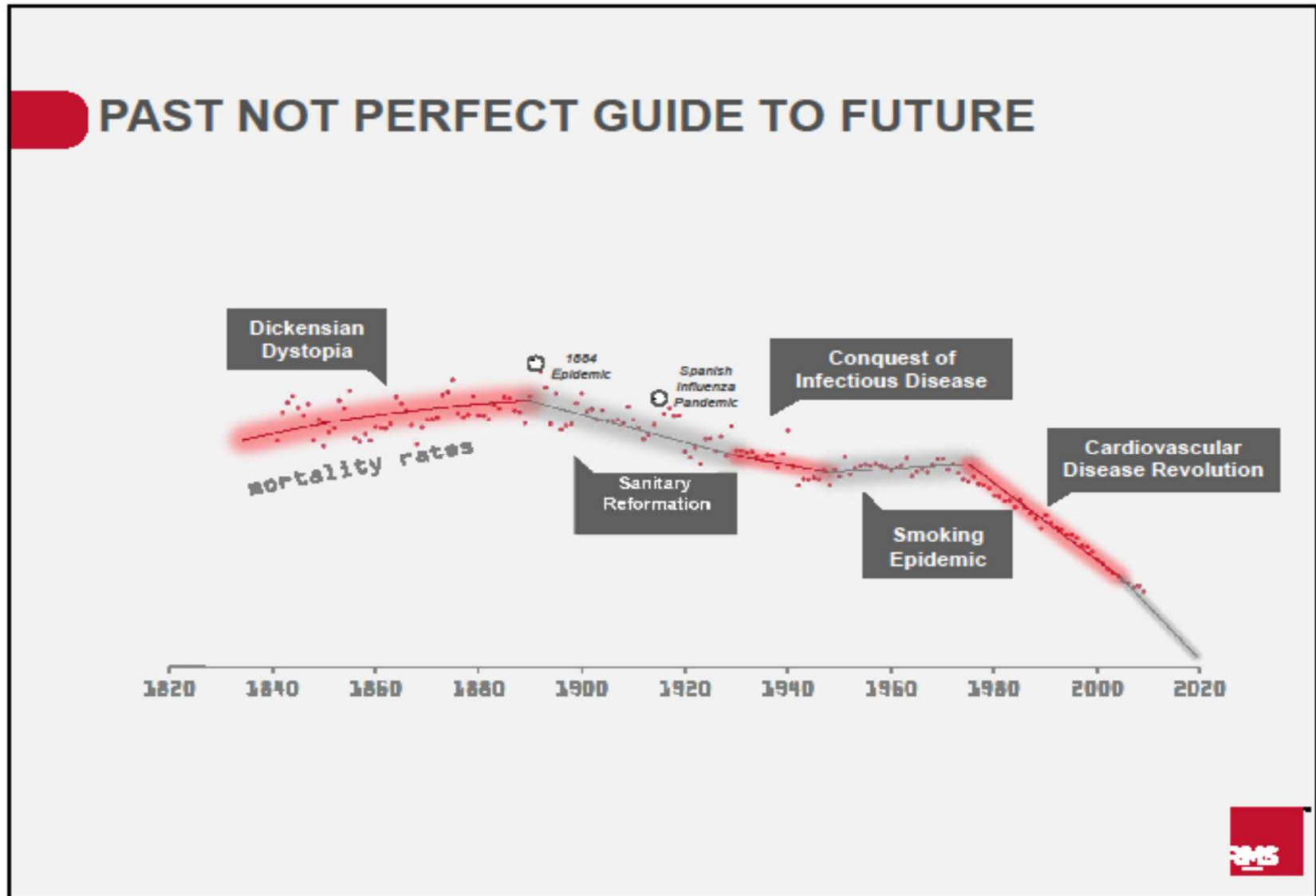


“U.S. Opioid Abuse Fueling Life Expectancy Decline”

The Main Postulates of MI Research

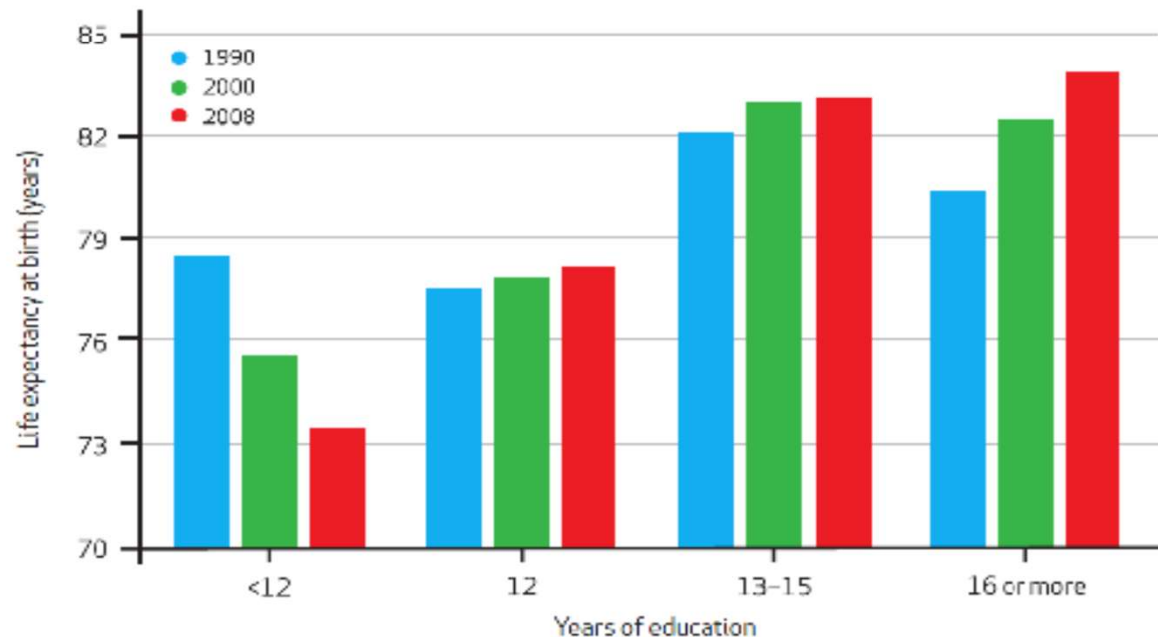
1. Changes in mortality are not linear
2. Mortality Improvement varies by population segment
3. Future mortality improvement may depend on biological limits on lifespan
4. Long term future drivers of MI are possible, but are far from certain

Changes in Mortality are not Linear



Differences in MI by Population Segments

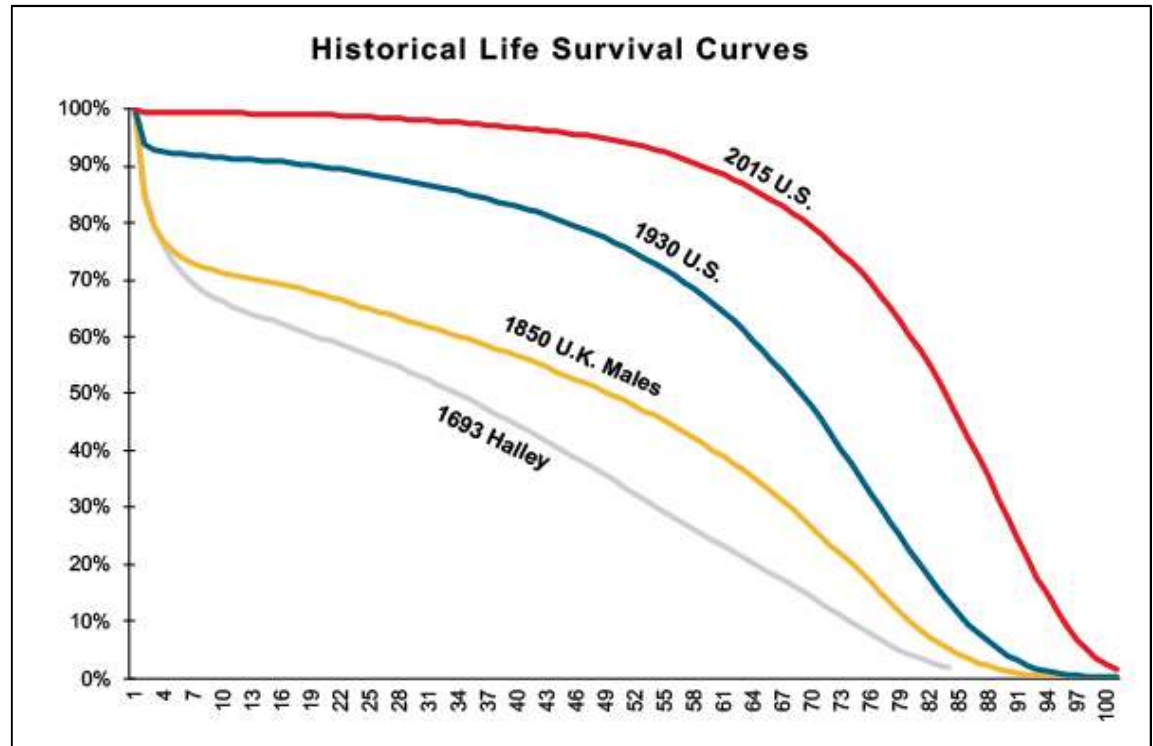
Life Expectancy At Birth, By Years Of Education At Age 25 For White Females, 1990–2008



SOURCE Authors' analysis of data from the National Vital Statistics System and the Census Bureau

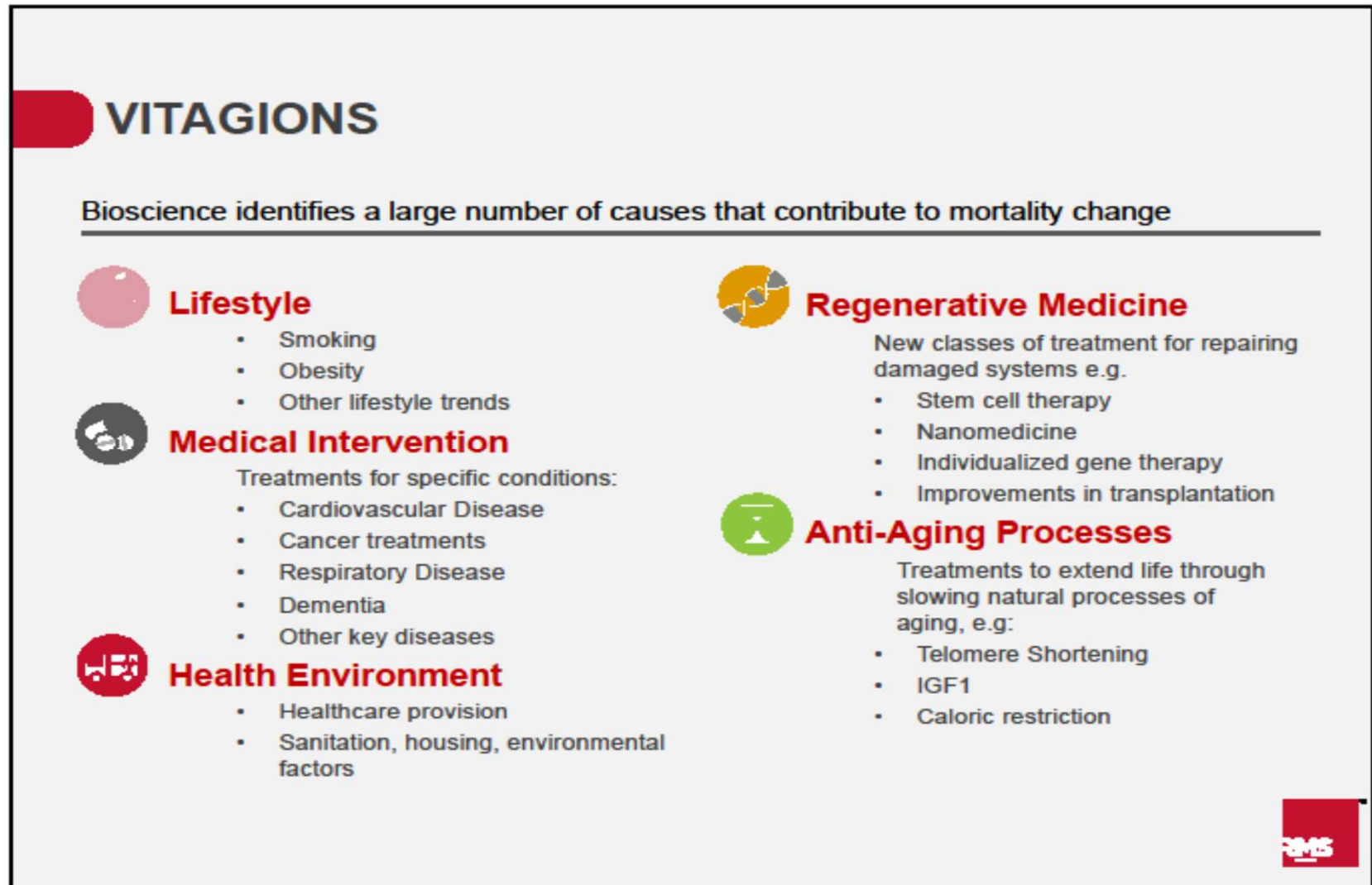
Source: Olshansky et al., 2012. MacArthur Foundation Research Network on an Aging Society, *Health Affairs*.

Biological Limits to MI

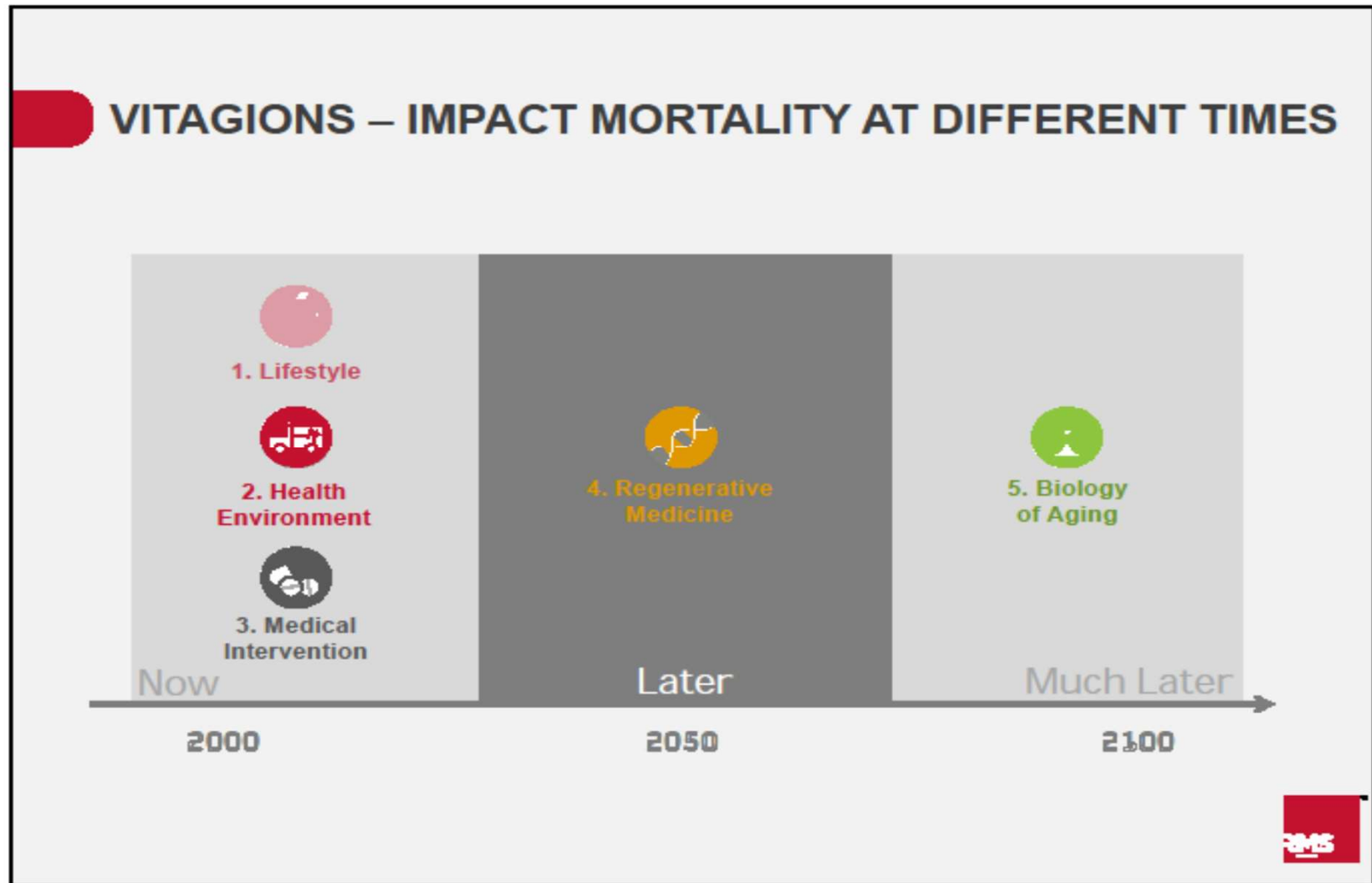


- The running records are still improving, but at a slower rate as they are possibly reaching biomechanical limits of the human body
- The rectangularization of the human survival curve may indicate biological limits for human lifespan

Changes in Mortality are not Linear

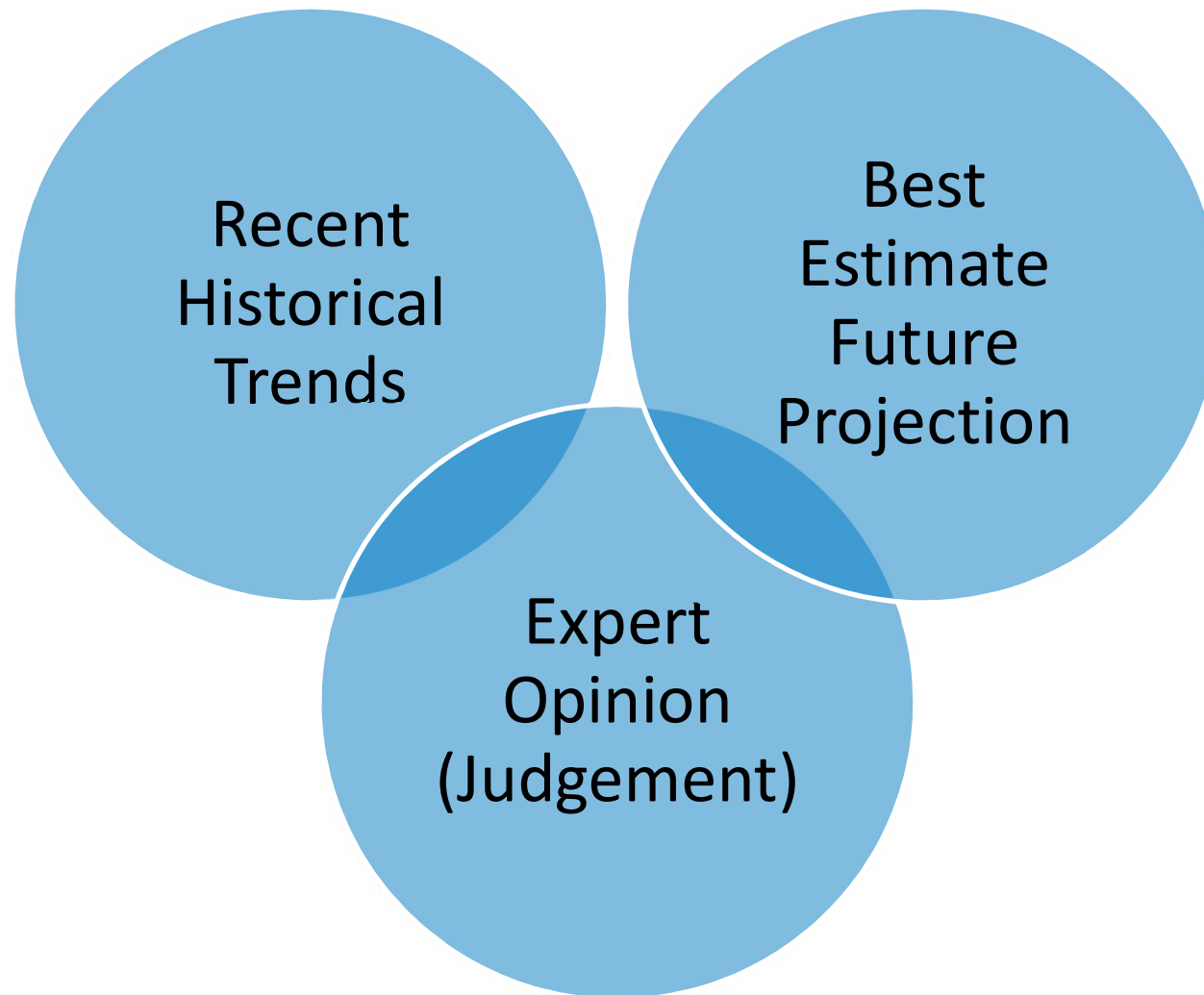


Changes in Mortality are not Linear

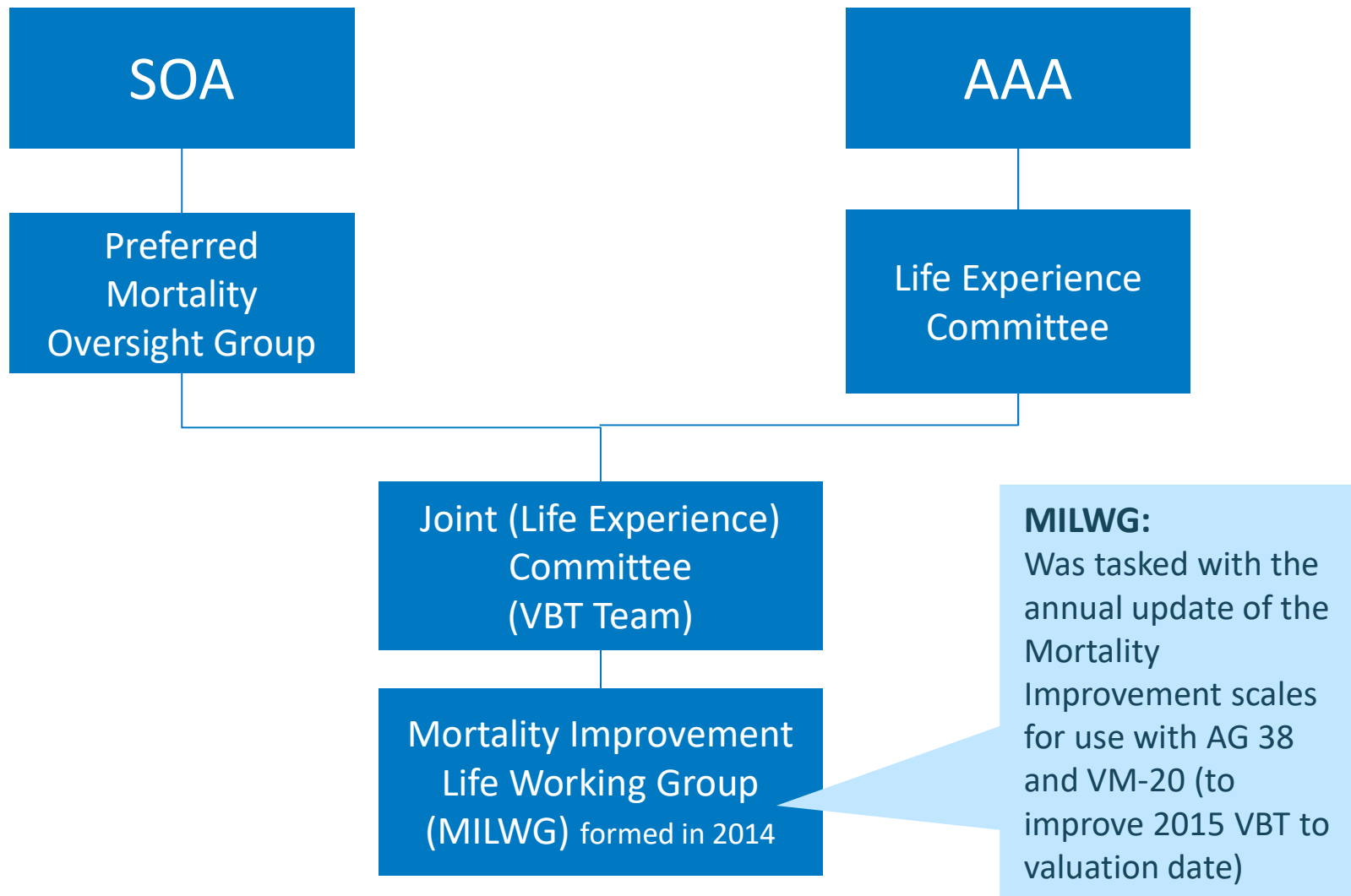


How does Life Insurance Industry Set Mortality Improvement Assumption ?

Current MI Projection Approach



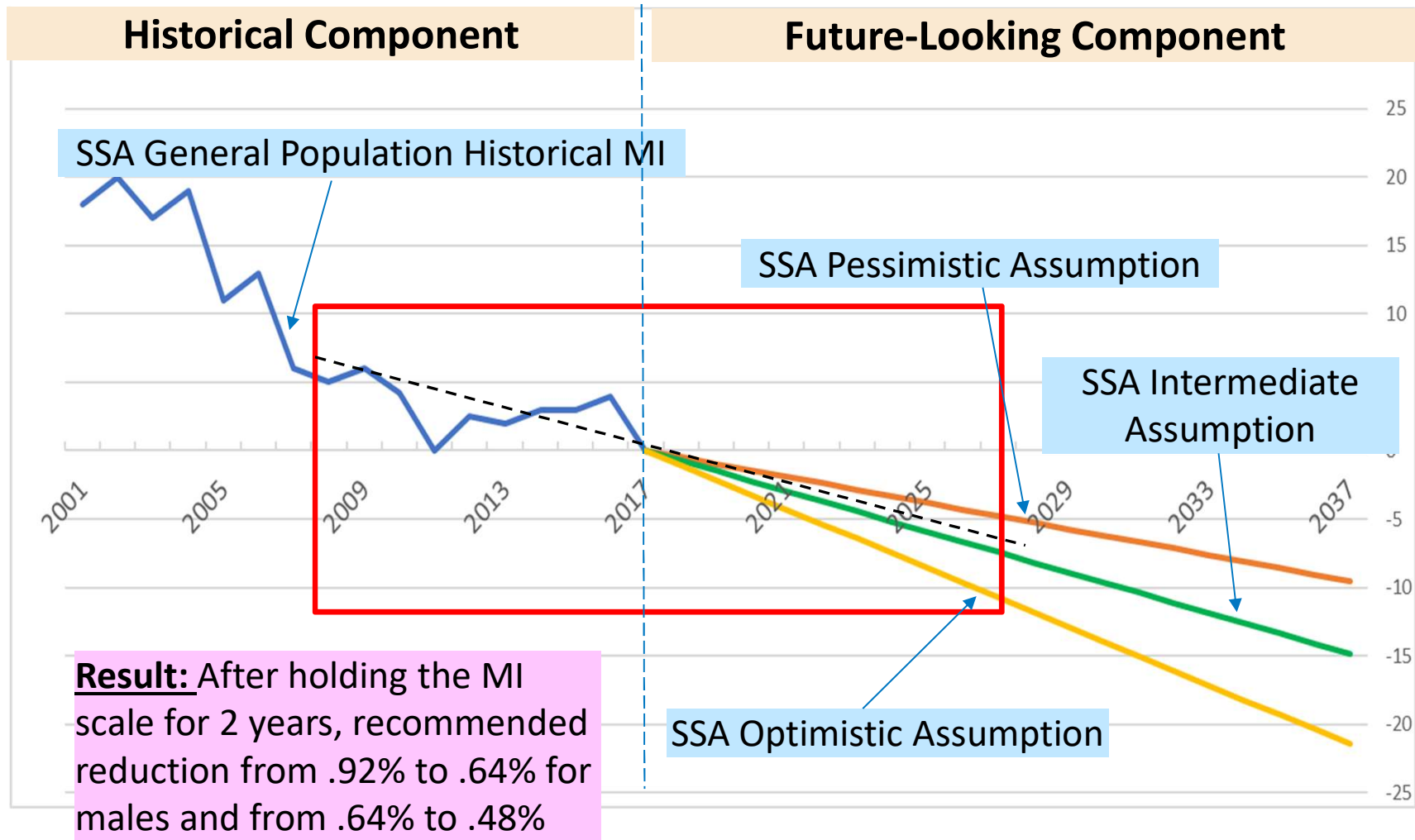
Other MI Projection Methods



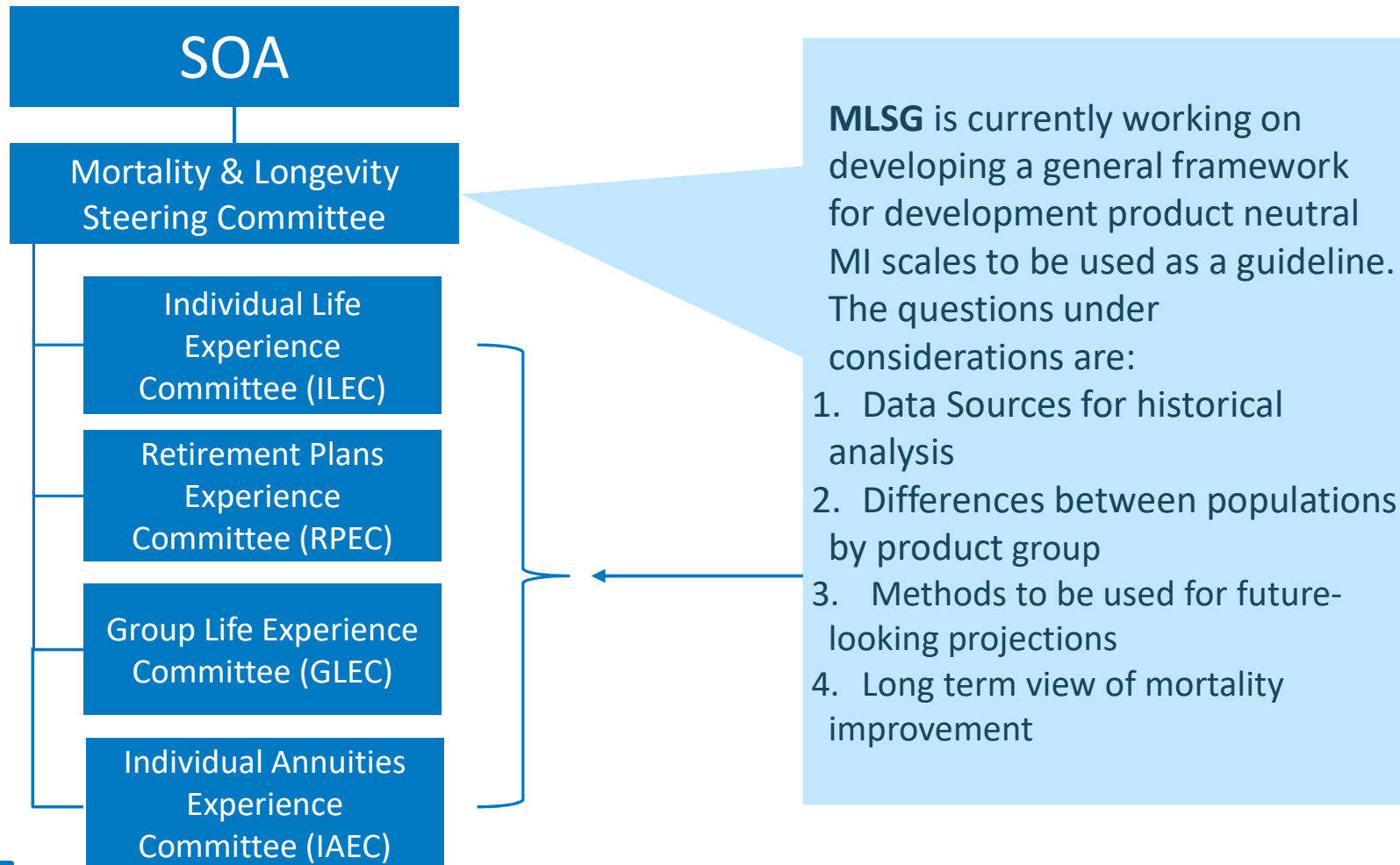
MLIWG Methodology – 2019 Update

1. The raw MI factors are equal to the average of (the average is a simple arithmetic average):
 1. Historical Component: 10-year average annual historical MI from general population published by SSA
 2. Future-Looking Component: 20-year average MI from most recent SSA intermediate assumption
2. Additional considerations are applied to develop the final recommendation:
 1. Additional historical data from Human Mortality Database
 2. The change in historical trend from recent 10 years to 5 years
 3. Expert opinion regarding short-term mortality trends

Method Behind 2019 FMI (AG38)



Future Framework for Development of MI Assumptions



References

- a) U.S Population Mortality Observations, SOA June 2019
<https://www.soa.org/globalassets/assets/files/resources/research-report/2019/us-pop-mort-prev-2018-exp.pdf>
- b) Individual Life Insurance Mortality Improvement Scale Recommendation—for Use with AG 38 and VM-20
<https://www.soa.org/globalassets/assets/files/resources/research-report/2019/drivers-of-us-mortality-improvement.pdf>
- c) Office of the Chief Actuary, Social Security Administration (June 2019). The Long-Range Demographic Assumptions for the 2019 Trustees Report. SSA <https://www.ssa.gov/oact/tr/2019/tr2019.pdf>
- d) Drivers of U.S. Mortality Improvement Expert Panel Forum Report
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- e) M Purushotham et al. (2011). Global Mortality Improvement Experience and Projection Techniques. *Towers Watson*
<https://www.soa.org/research/research-projects/life-insurance/research-global-mortality-improve.aspx>
- f) J Olshansky (U of Chicago), P Smalley (RGA) and D Tolla (RMS). SOA Longevity Webcast Series: Drivers of Future Mortality Webcast. SOA
- g) John Bongaarts and Rodolfo A. Bulatao, Beyond Six Billion: Forecasting World's Population
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