SOCIETY OF ACTUARIES

# Exploring Longevity Initiatives:
## The Role of the SOA in Addressing Longevity Risk

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Actuaries
Risk is Opportunity.®

# Agenda

- Longevity: Challenges for the Actuarial Profession
- SOA Longevity Initiative
- SOA Pension Plan Mortality Table Project

# Longevity: Challenges for the Actuarial Profession

# Why Does This Matter for Actuaries?

- Key roles of actuaries:
  - Measure and manage longevity risk for providers of life insurance, annuities, pensions and long-term care
  - Help to ensure solvency of annuity, pension and social insurance systems

# Actuarial profession & longevity

- Professional associations must serve multiple stakeholders:
  - Public
  - Members
  - Regulators
  - Policy-makers

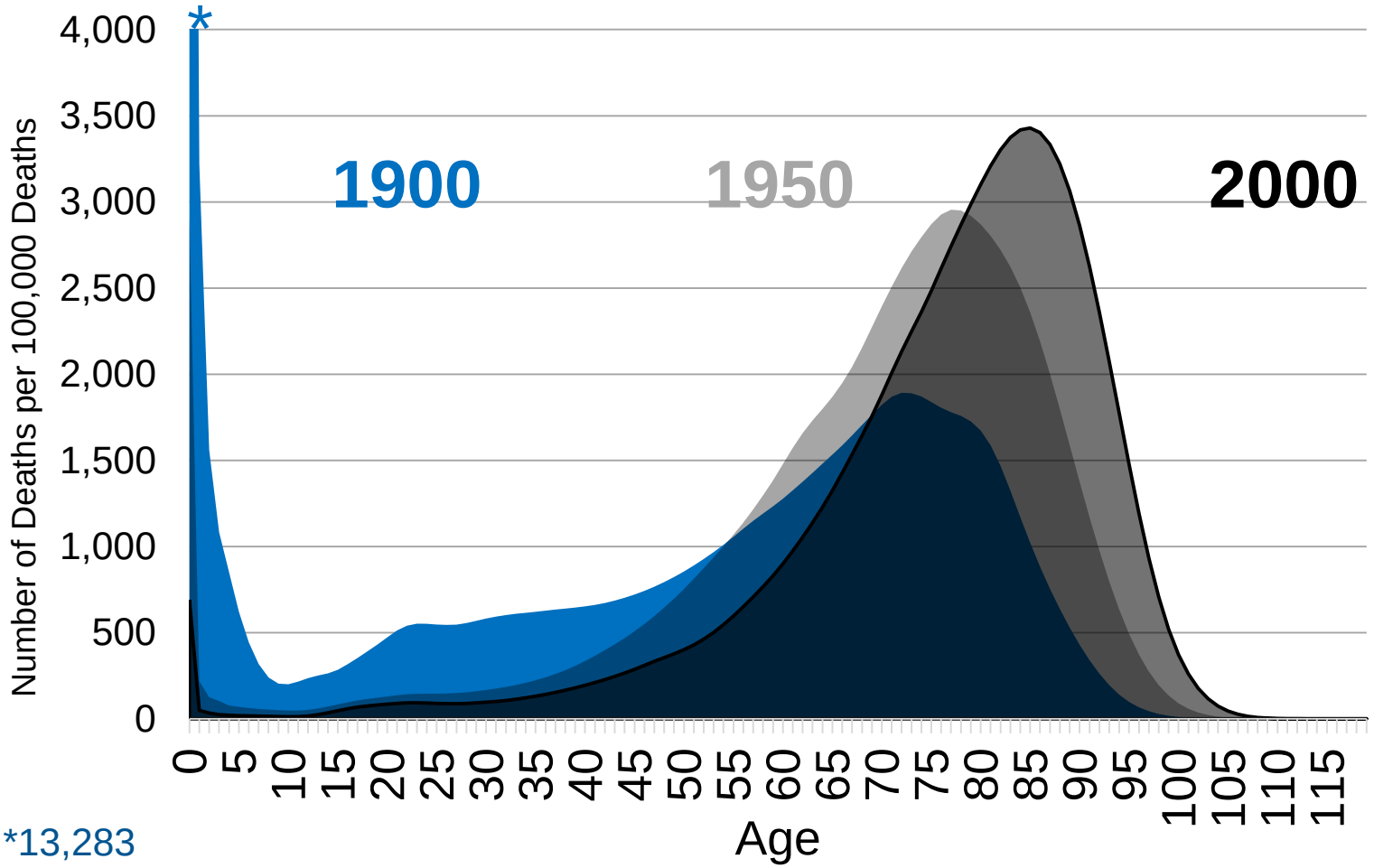
# SOA & longevity

- Historical role
  - Experience studies for members / regulators
  - Education of members
  - Research & Conferences
    - (NAAJ, *Living to 100* Symposium series)
- Evolving role
  - Meet multiple stakeholder needs
  - Understand evolution of longevity “science”
  - Encourage “best practice” methods

# Challenge #1: Longevity risk is important

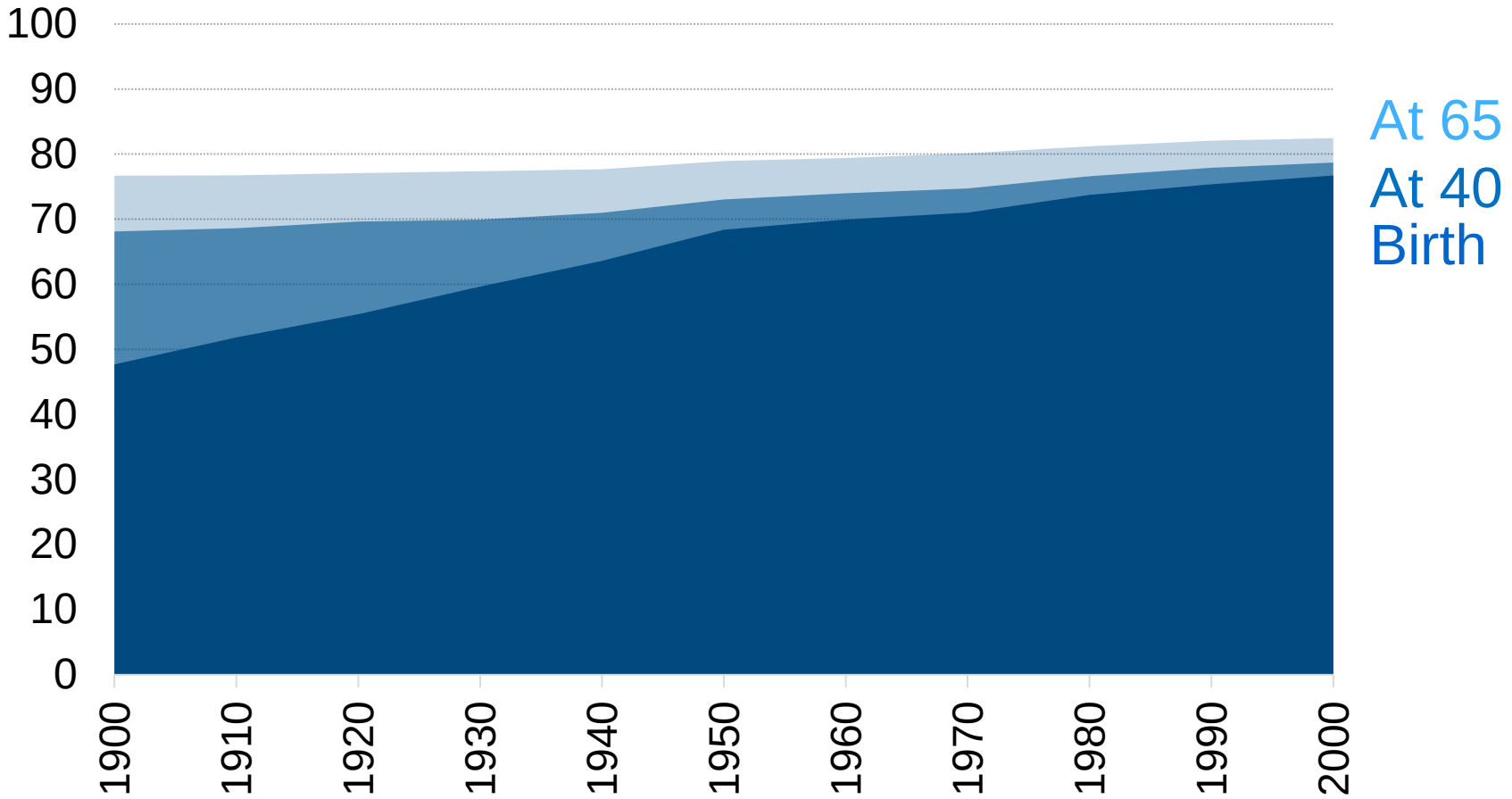
- Longevity risk is systemic, not idiosyncratic
- Matters for pricing
  - Pooling hedges idiosyncratic risk (for free)
  - Systemic risk can't be managed with pooling
    - Must build cost into pensions, annuities
    - If can't hedge this (in markets), must build wide margin into pricing (or benefit structure)

# Challenge #2: History Shows Steady Longevity Improvement




Data: SSA Actuarial Study 120 – Periods 1900-2000, 50% male, 50% female

# US Population - 20th Century Life Expectancy Improvements

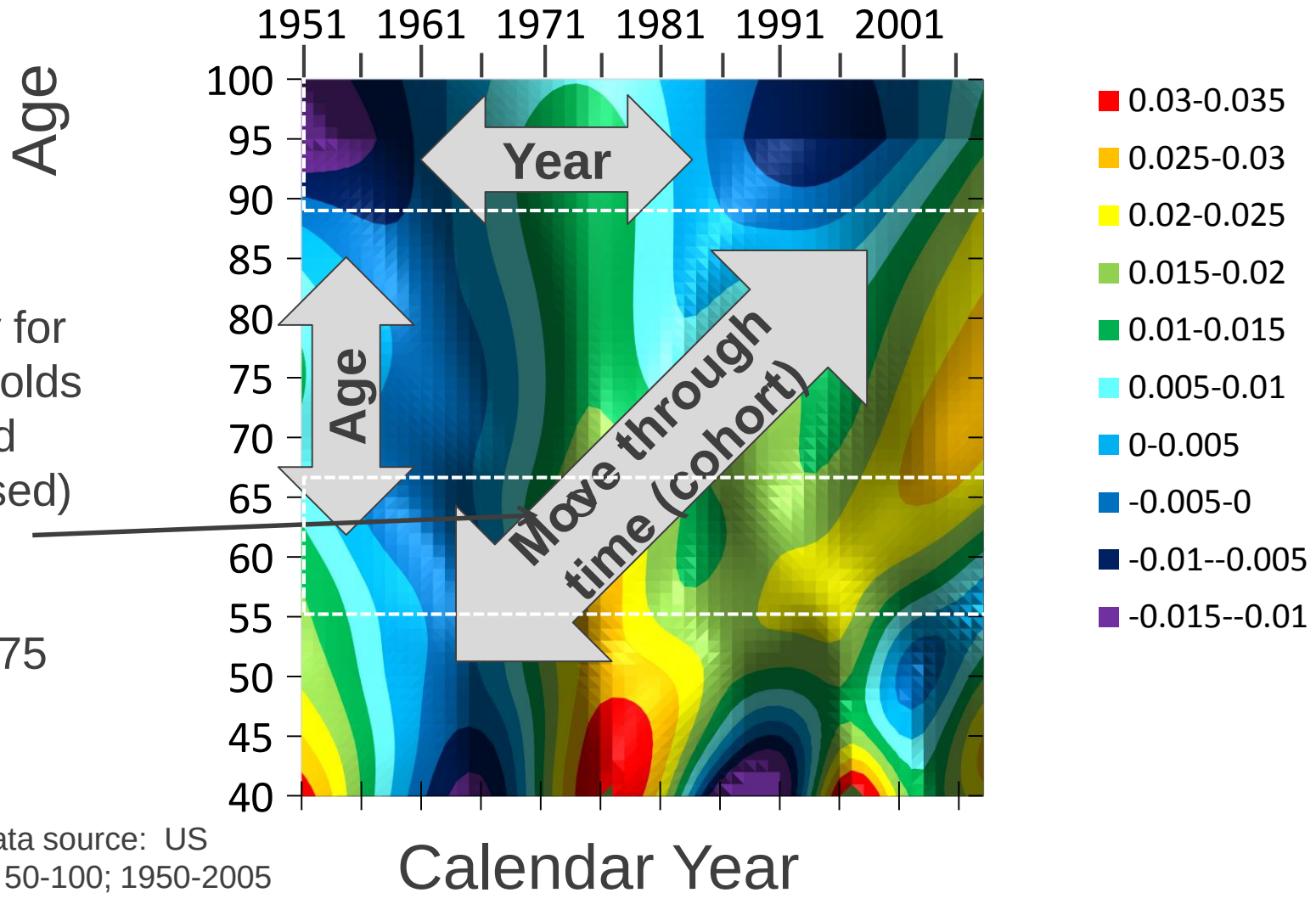



Data: SSA Actuarial Study 120 – Periods 1900-2000, 50% male, 50% female

# Challenge #3: Need to take into account "improvement" in mortality rates

- Pre-1990: **Table margins** (loads)
  - *Adverse deviation,* ***improvement***
- Today: Publish explicit improvement rates (male & female)
  - One dimensional: age
  - Two dimensional: age & calendar year

# Mortality Improvement Rates



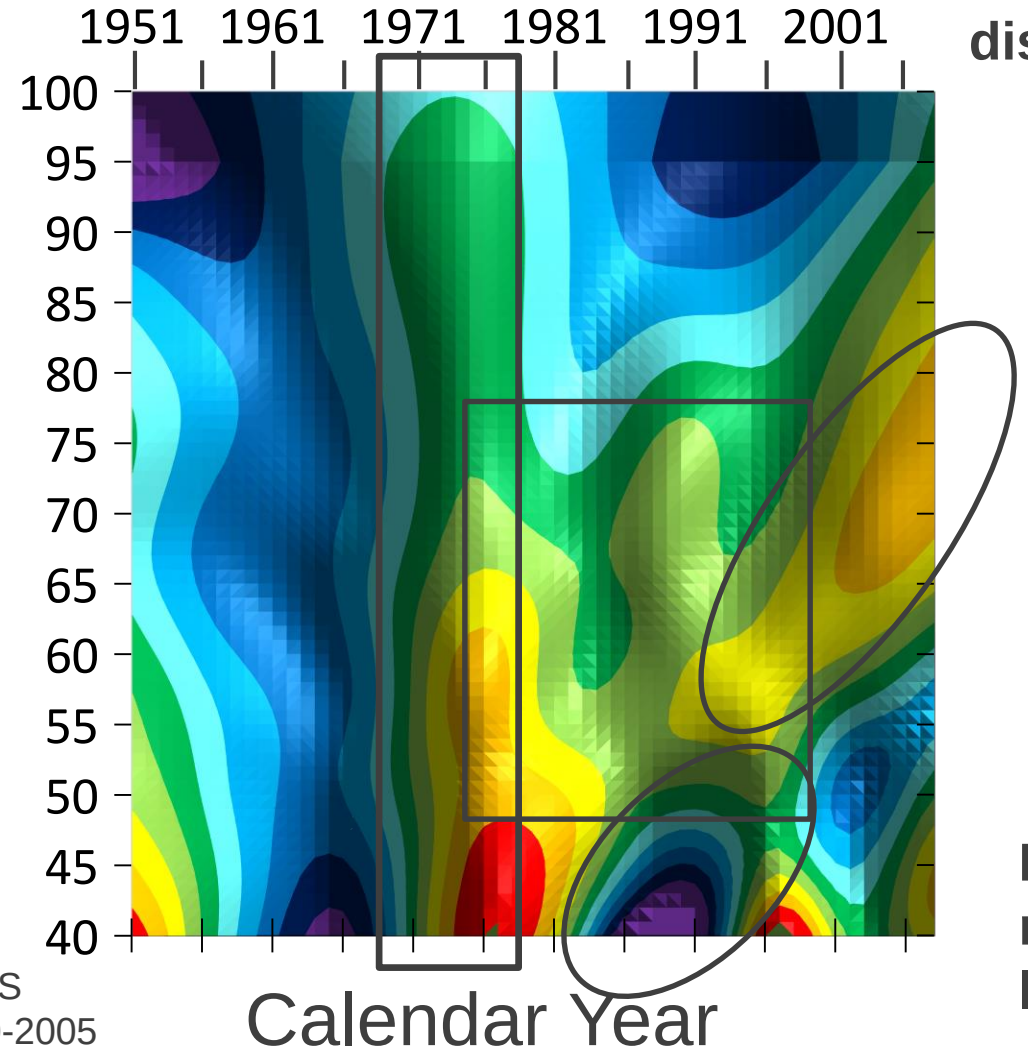

Mortality for 65-year-olds improved (decreased) by 2.5% between 1974-1975

Historical data source: US (SSA) Male 50-100; 1950-2005

# Males: MI Rates

**Medicare began in 1966; mortality improved for all ages.**

**Lagged effect of 1960's anti-smoking campaigns**

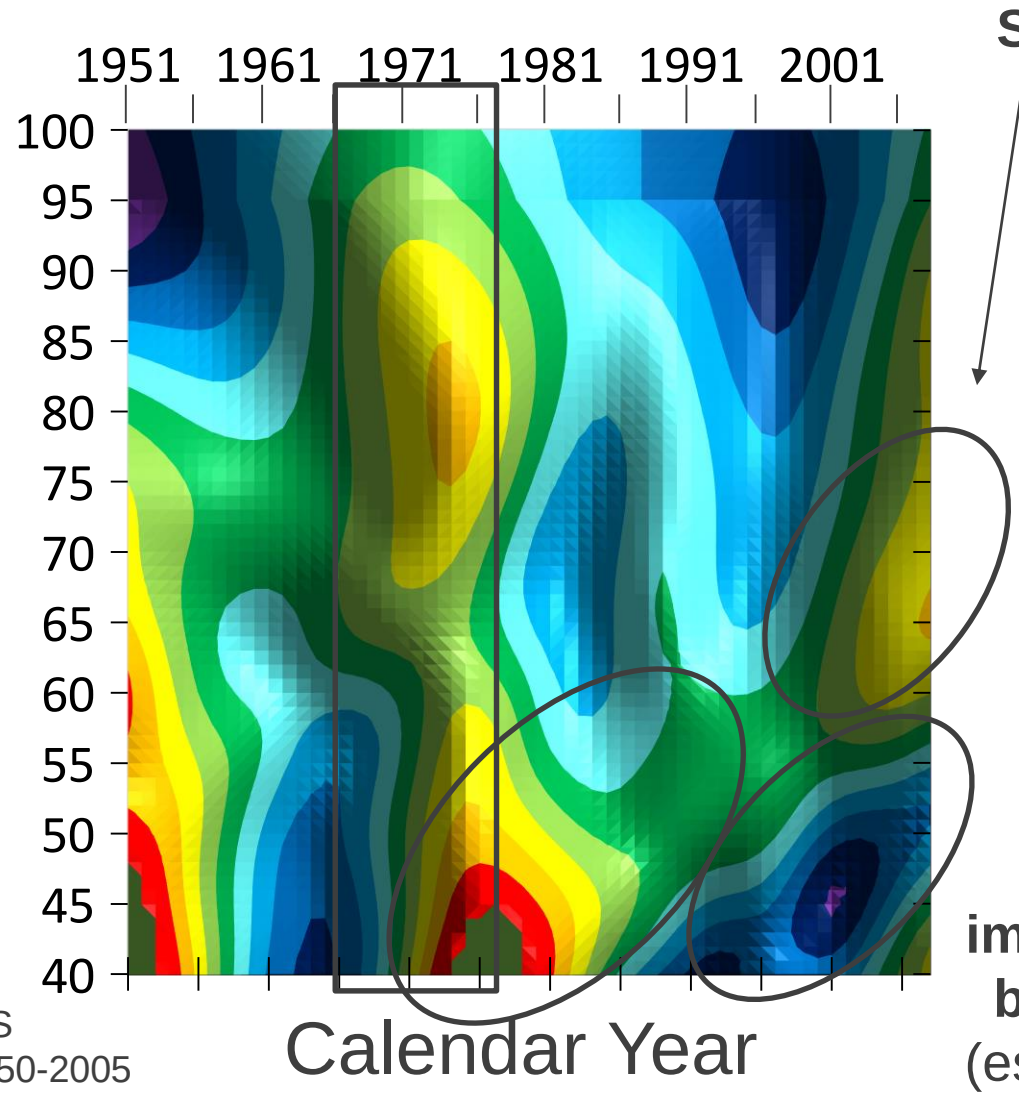



**Statin drugs reduced cardiovascular disease**

**HIV/AIDS reduced longevity**

Historical data source: US (SSA) Male 50-100; 1950-2005

# Females: MI Rates




**Medicare "Mountain Range"**

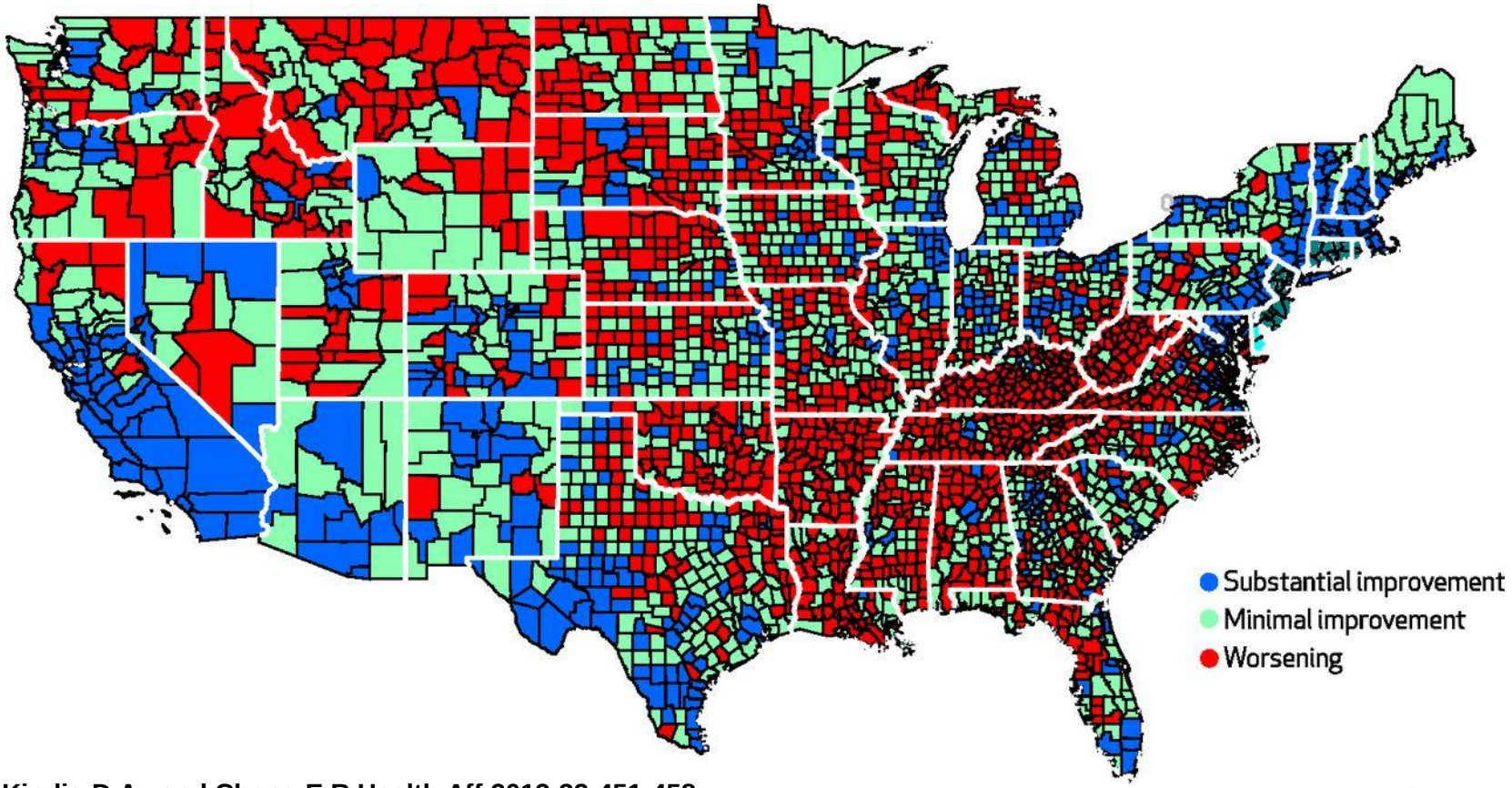
**"Silent generation"** enjoyed relatively high improvement rates

**Less improvement for baby boomers** (esp. born ~1955)

Historical data source: US (SSA) Female 50-100; 1950-2005

# Challenge #4: Improvement rates aren't uniform across populations

**Change In Female Mortality Rates From 1992–96 To 2002–06 In US Counties**



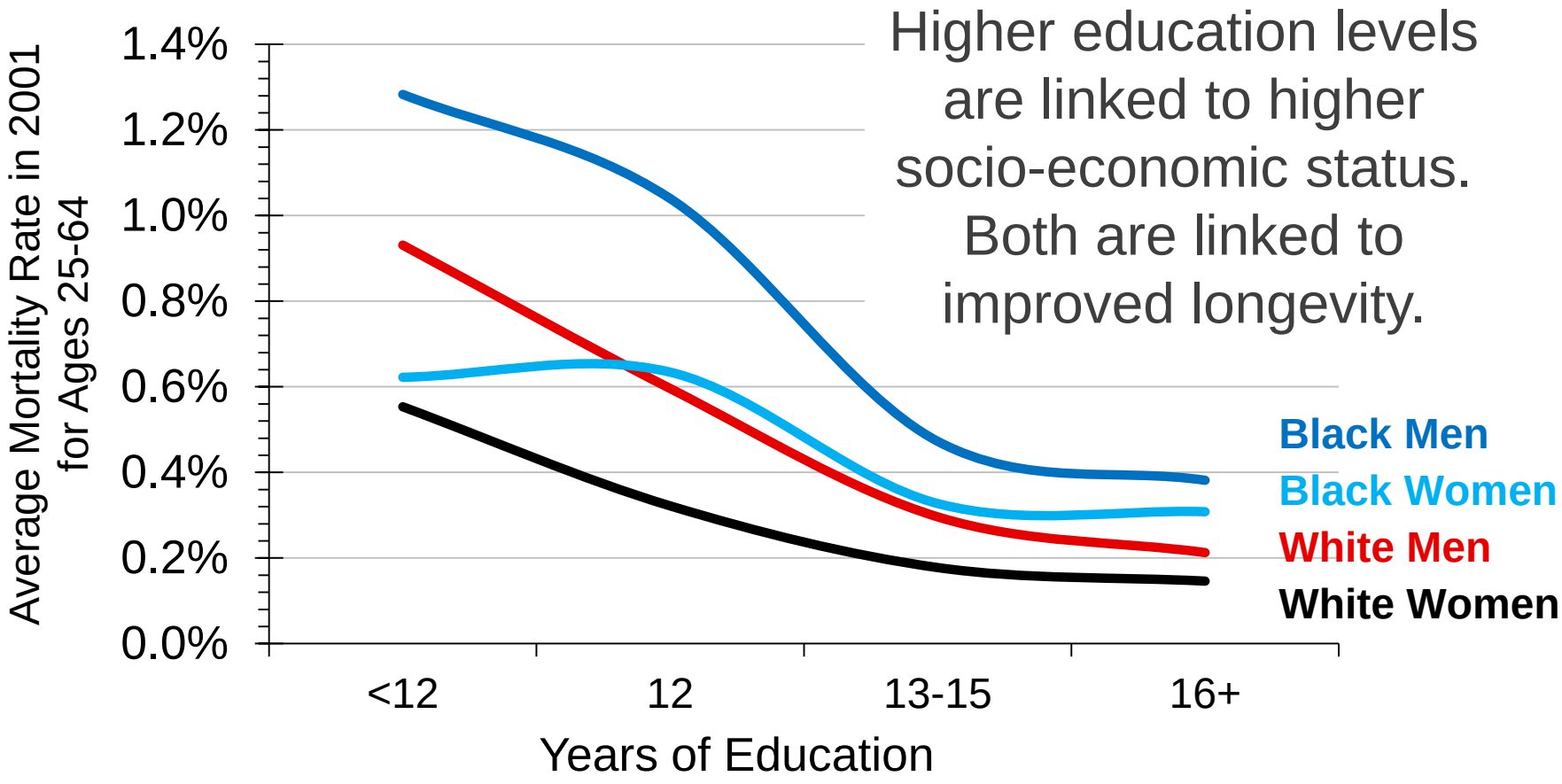

**Kindig D A , and Cheng E R Health Aff 2013;32:451-458**



HealthAffairs

# Variation by Education

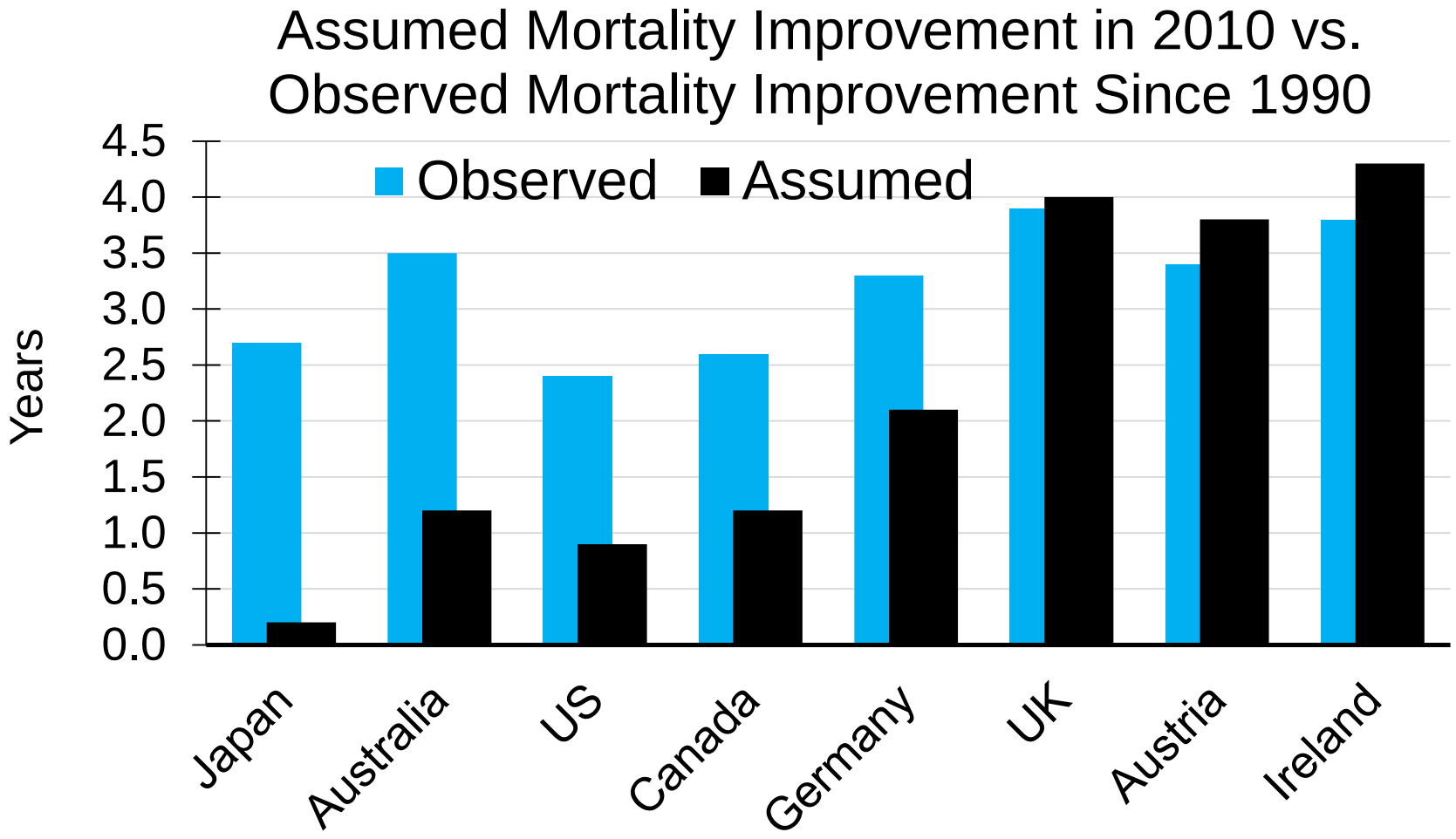
## US Educational Levels Impact on Mortality




Source: Jemal A, Ward E, Anderson RN, Murray T, et al. (2008) Widening of Socioeconomic Inequalities in U.S. Death Rates, 1993–2001. PLoS ONE 3(5): e2181. doi:10.1371/journal.pone.0002181

# Variation by Country

## Pension Valuations Around the Globe




Source: IMF Global Financial Stability Report, 2012

# Challenge #5: Modeling is imperfect

- Modeling is a combination of
  - Science
  - Art
  - Educated guess
- Data is always going to be imperfect and out of date
  - Doesn’t come with “life history”
  - Worst for extreme old ages (inaccurate, thin)

# Challenge #5: Modeling is imperfect (cont.)

- Complexity may not yield accuracy
- Don’t know future drivers of mortality improvement
  - Overall population vs. specific subsets
- For actuaries, finding correlations is helpful
  - Helps create market hedges
  - Allows underwriting for annuities

# SOA Longevity Initiative

# SOA Longevity Task Force

- SOA Board level task force established in 2012
- Task force charged to consider:
  - What actions SOA should take in response to the rapidly changing science
  - How can the SOA be more proactive in serving the needs of key stakeholders (members, public, policy-makers, regulators)

# Task Force Work

- Core premises:
  - **Longevity risk is an issue of social and economic importance**, and
  - Actuaries have a key role to play in the measurement and management of risk to financial institutions (public and private) that provide income in old age

# Key Findings

- Longevity improvement is becoming a key social issue
- Actuaries must be better positioned to manage mortality/longevity as a risk
- Actuaries as a profession (in N.A. context) have not been keeping up with the evolving science
- SOA experience studies are both a strength and weakness

# Four Recommended Goals

1. SOA members recognize the impact of changing longevity as a key risk to be managed
2. SOA members play a public leadership role in longevity impact risk management
3. The SOA supports actuaries so that they can be leading experts on longevity risk management
4. SOA members and volunteers recognize the expertise of others in longevity and use that expertise

# Tactics

- Education
  - Targeted for key volunteers & thought leaders
  - Expanded for candidates & members
- Research & resources
  - Improve & go beyond experience study work
- Partnerships

# What's Next…

- Implementation – 2014 and beyond
- Continued support of *Living to 100*
- Partnering with events like the *Longevity Conference* series

# SOA Pension Plan Mortality Table Project

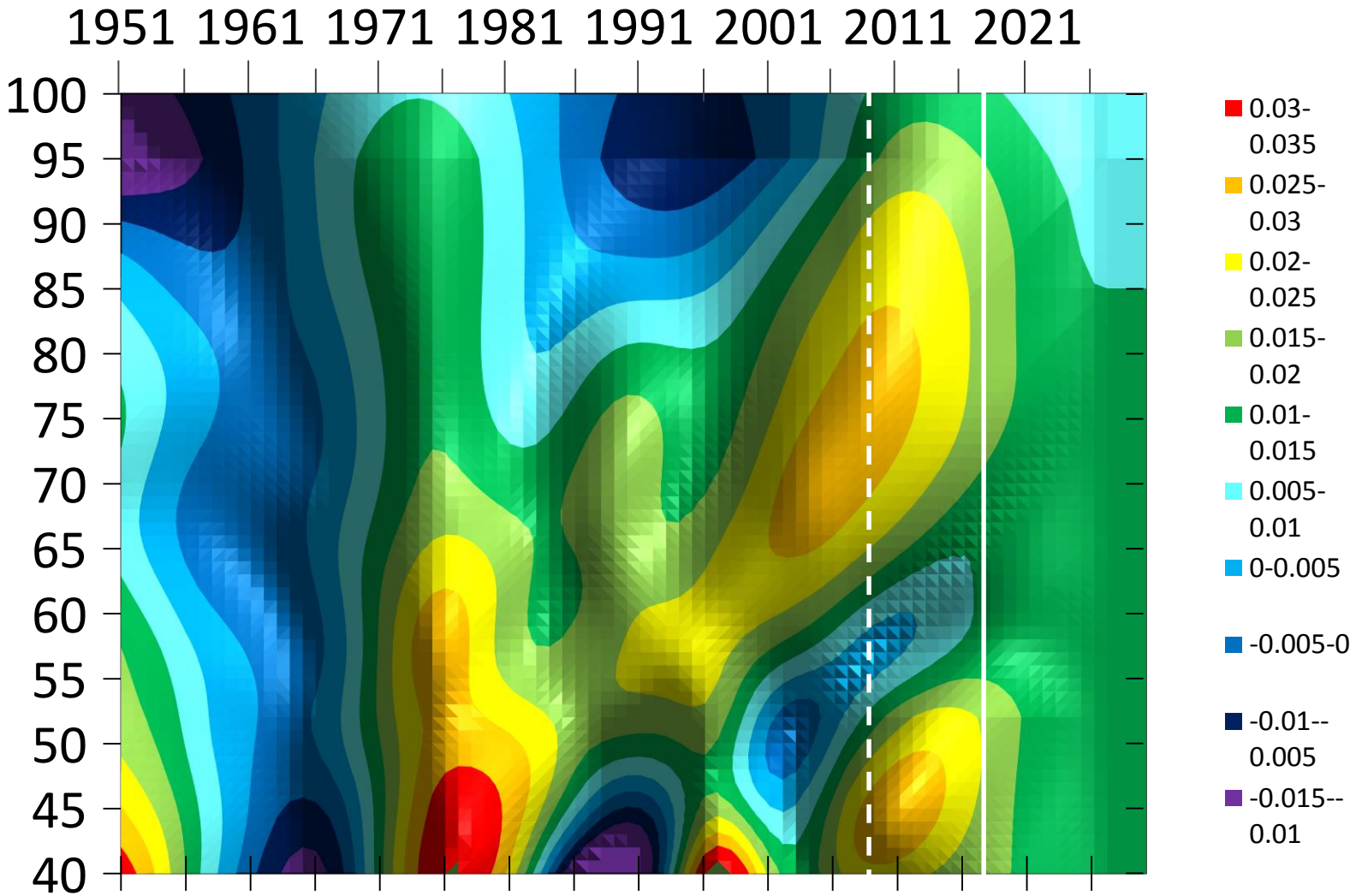
# New Mortality Table for Pension Plans

- Base table RP-2014 replaces RP-2000
  - Private pension plan experience over 2004 – 2008 totaling 10.2 million life-years
  - Rates adjusted to 2014 using the new MP-2014 projection scale
- Variations for blue/white collar employees and annuitants, by benefit amount and disabled persons
- Intended for use with pension plans; may not be appropriate for insured products

# New Mortality Improvement Scale for Pension Plans

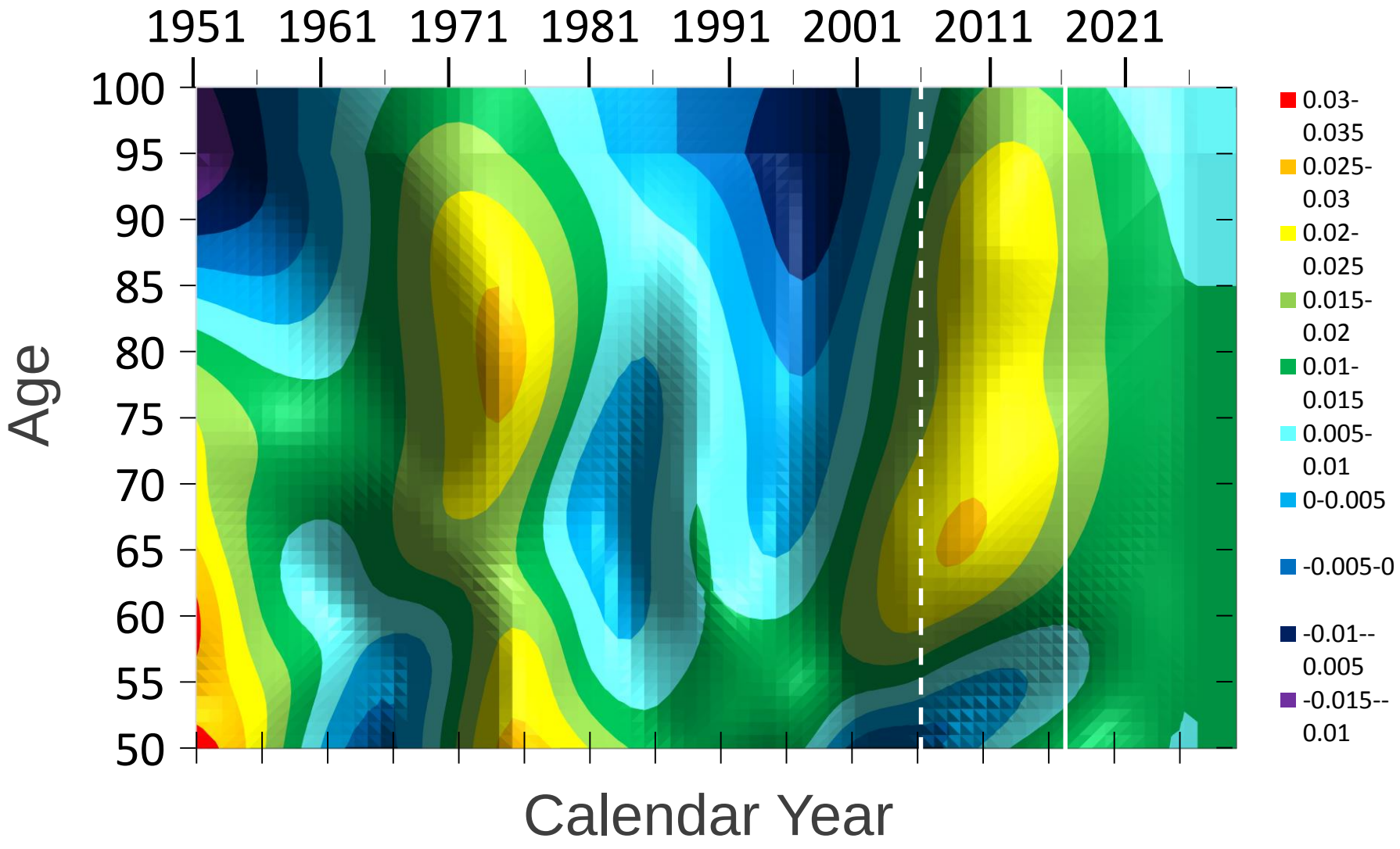
- Scale MP-2014 replaces Scales AA and BB
- Two dimensions for each gender reflect cohort variations in mortality improvement:
  - Age
  - Calendar year
- Intended for use with pension plans; may not be appropriate for insured products

# Males: Observed MI and MP-2014

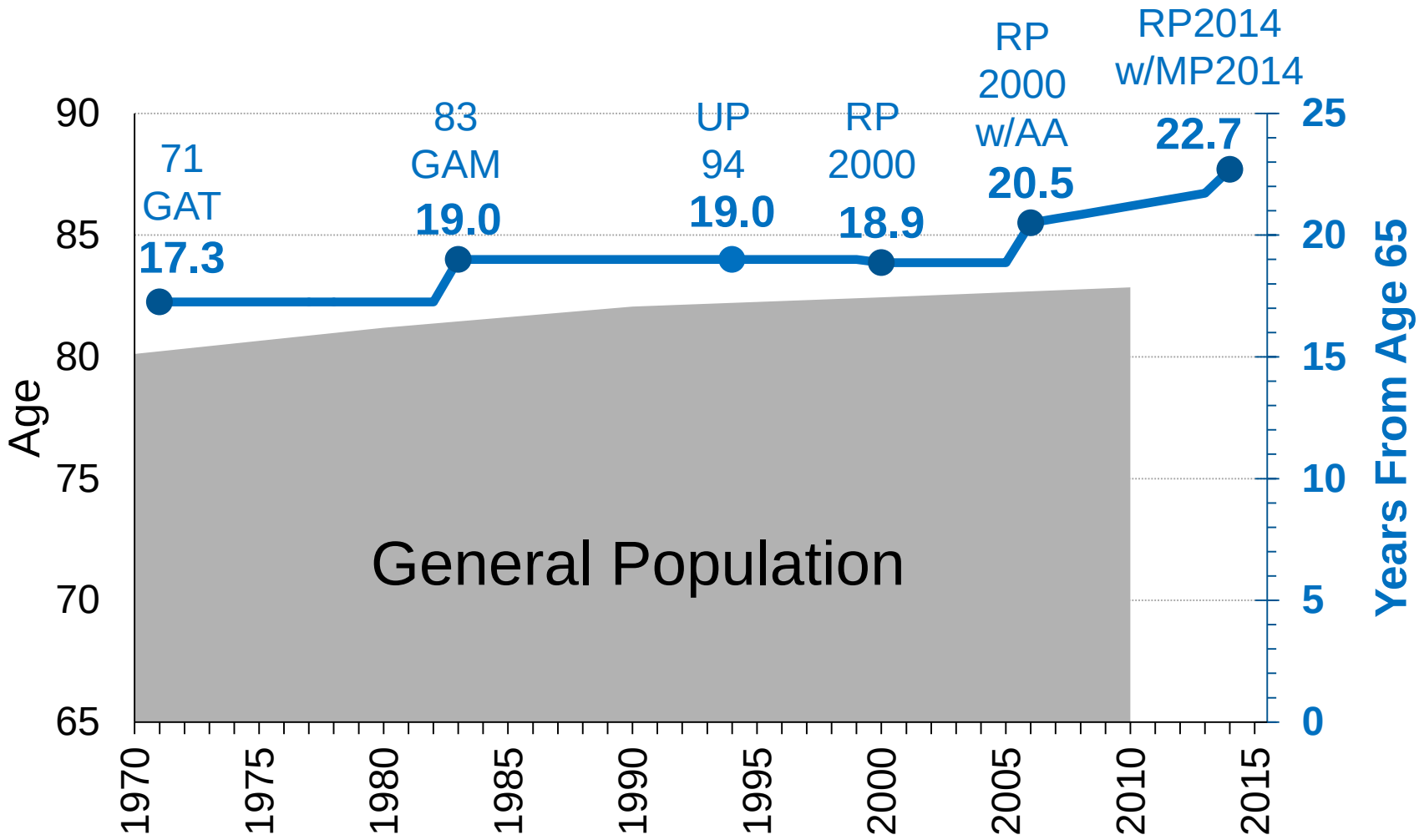



Historical data source: US (SSA) Male 50-100; 1950-2005

# Females: Observed and MP-2014

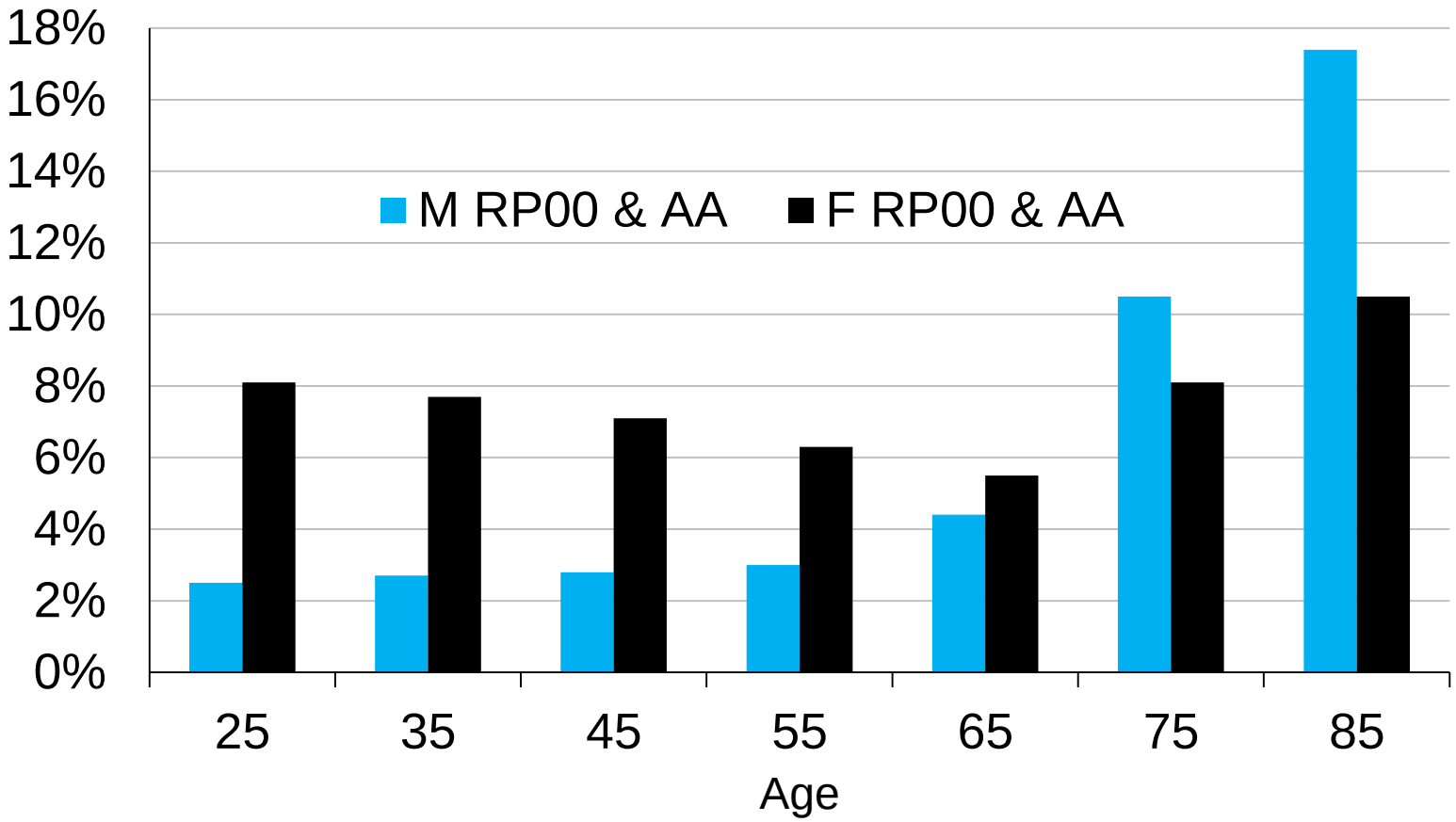


# Remaining Life Exp. At 65




Population Data: SSA Actuarial Study 120 – Periods 1900-2000, non-decade years interpolated. Mortality Tables: 71GAT, 83GAM, UP-94,RP-2000 unprojected, RP-2000 (AA generational), RP-2014 (MP-2014 generational). All 50% male, 50% female.

# Financial Impact of New Tables From RP2000 (AA) Percentage Increase in Liability*




* Monthly deferred-to-62 annuity due values at 6.0% interest; for RP-2014, Total Employee Rates through age 61 and Healthy Annuitant Rates for ages 65 and above; RP-2000 combined rates with generational projection

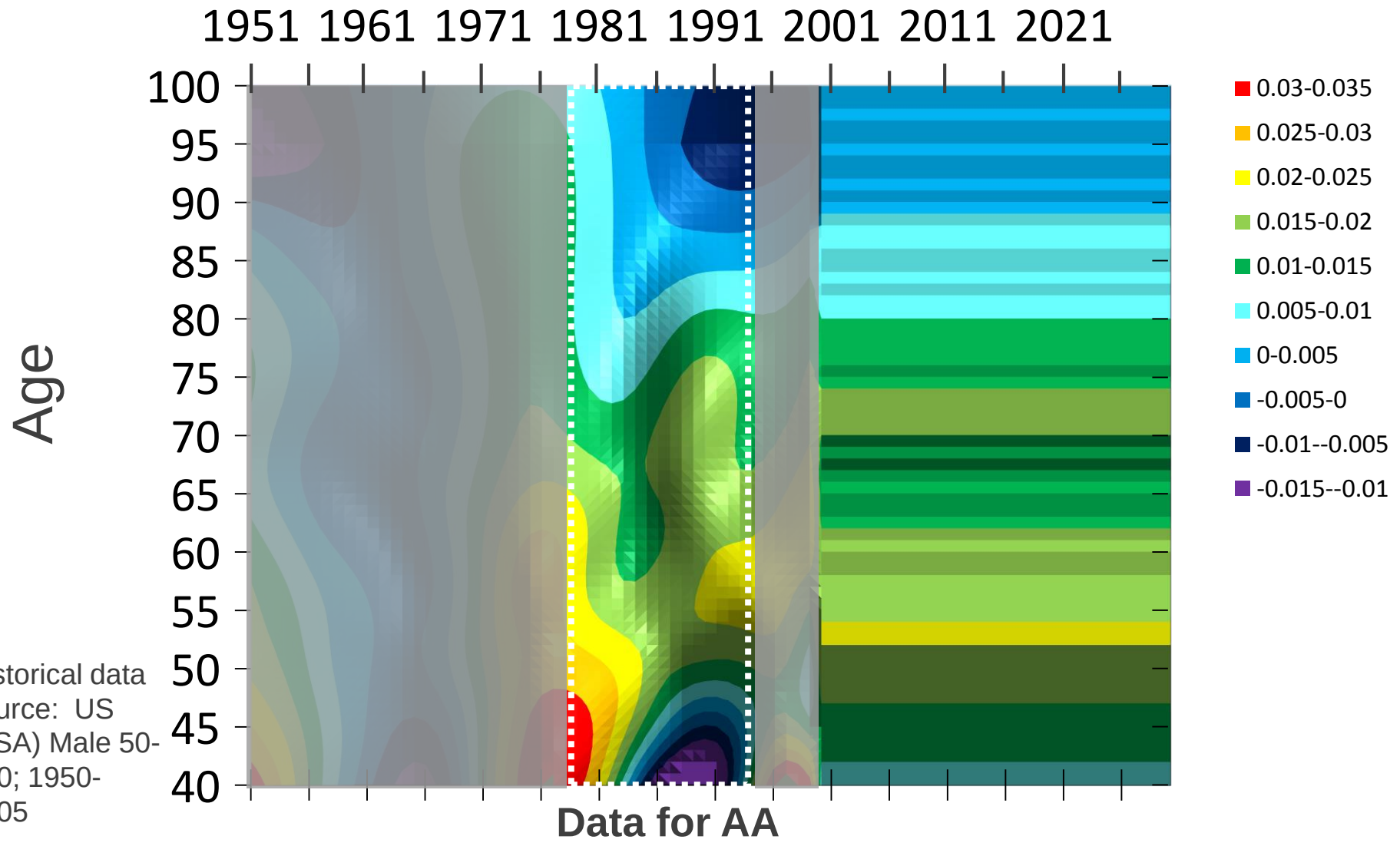
# Summary

- Updated assumptions better reflect the way that longevity has been improving
- New tables enable more effective valuation and modeling
- Specialized tables enable reflection of certain specific characteristics that may be present in a pension plan population

# Thank you

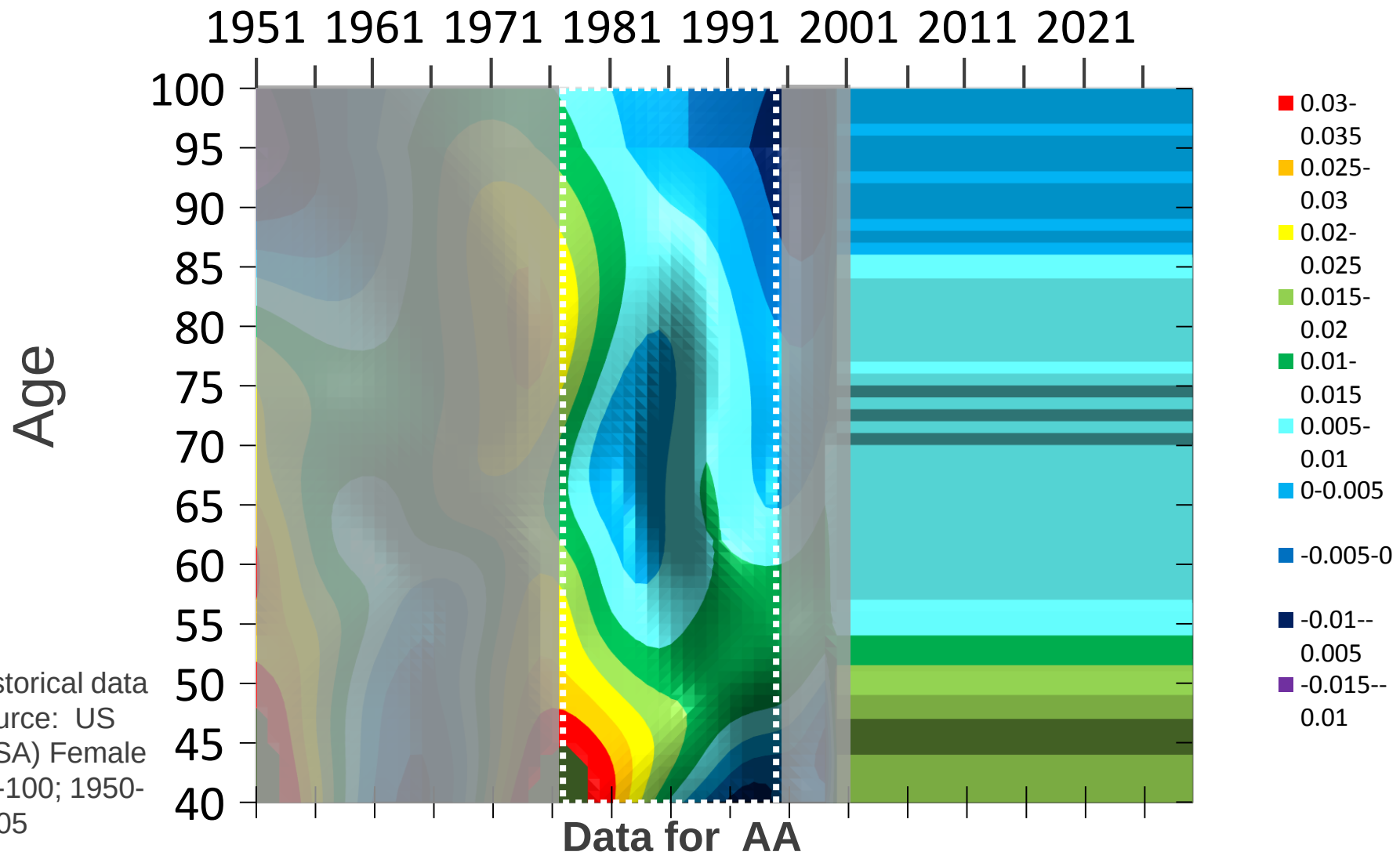
# Appendix

# Males: Observed MI and AA



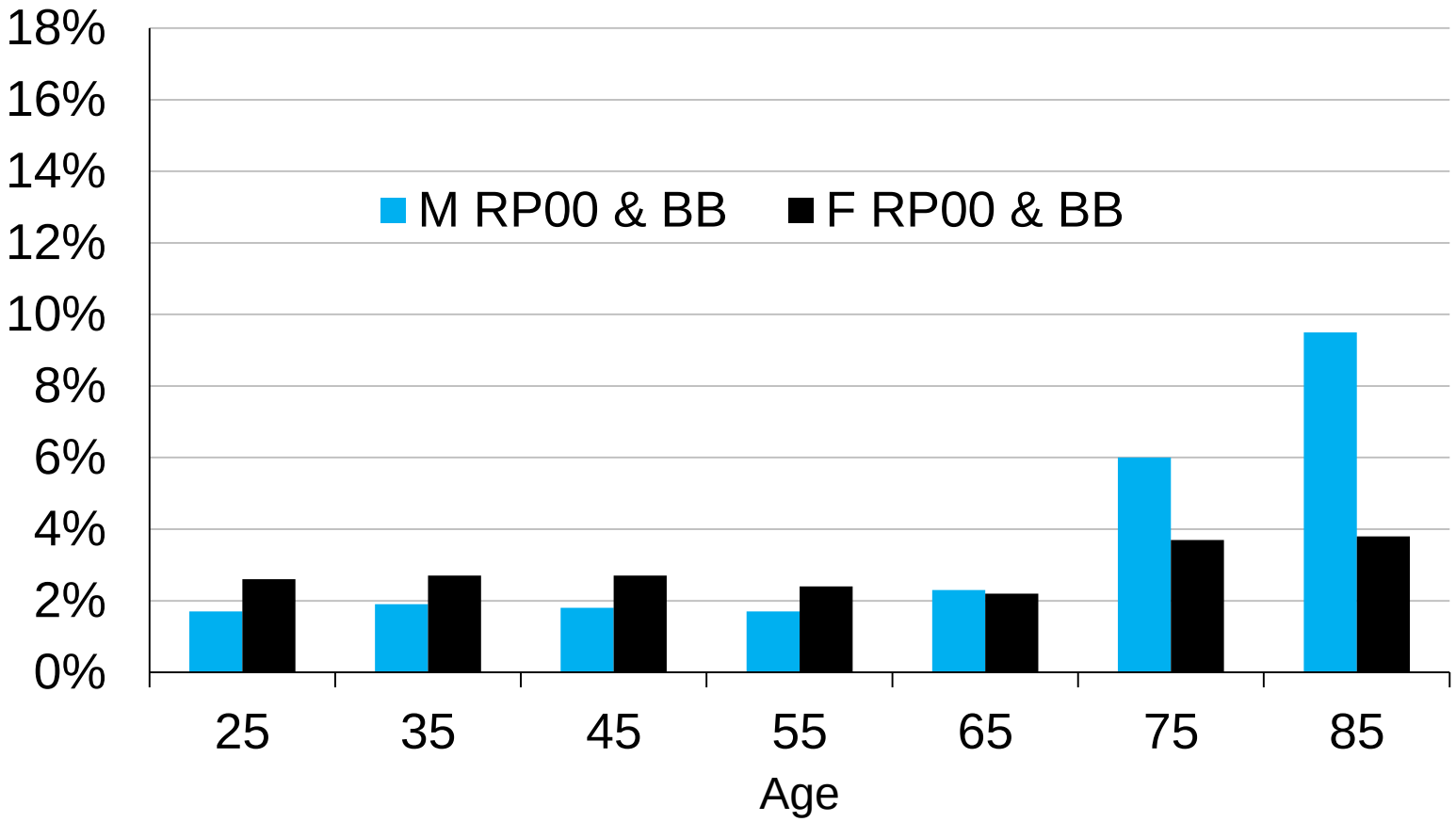

Historical data source: US (SSA) Male 50-100; 1950-2005

# Females: Observed MI and AA



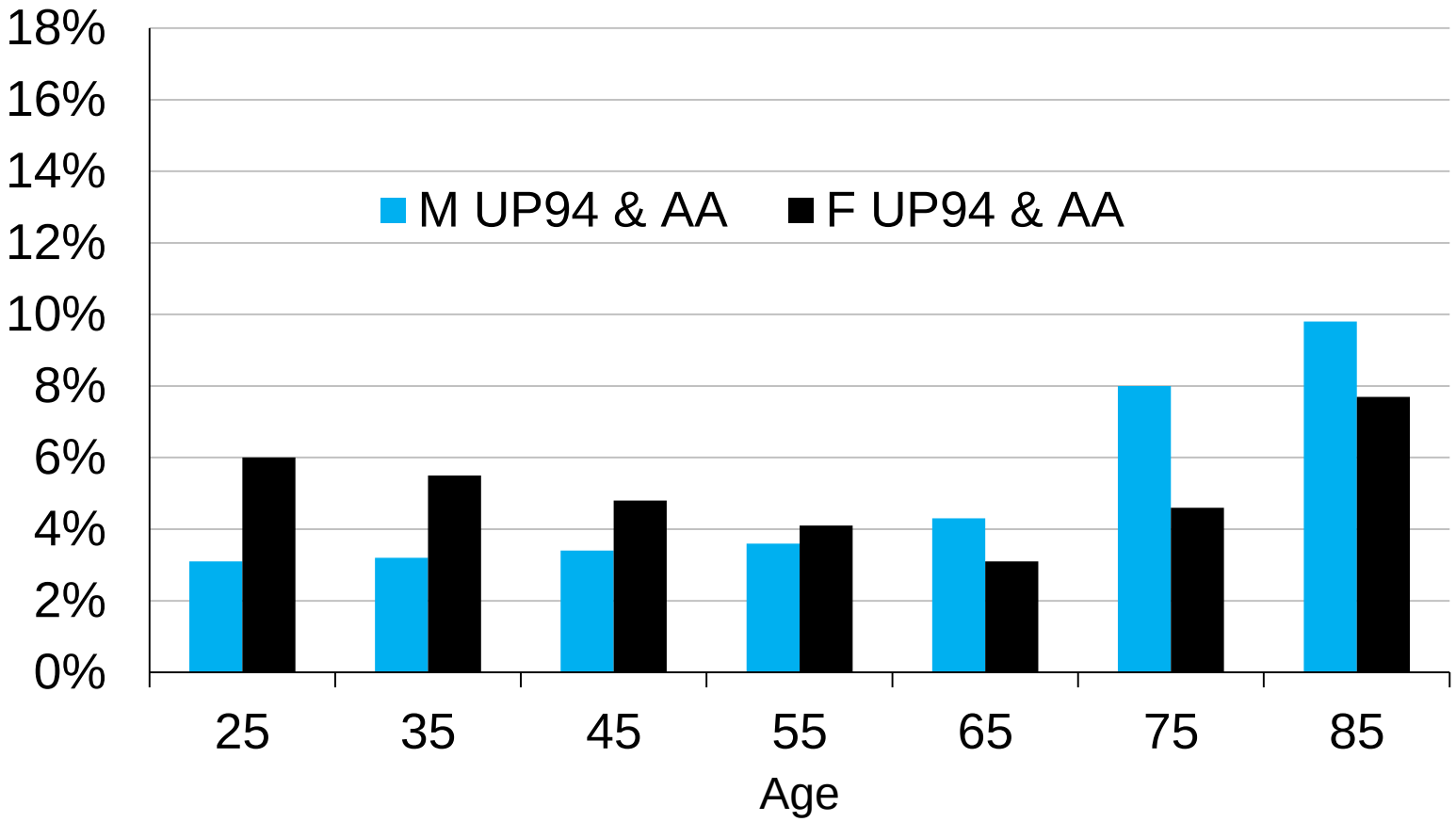

Historical data source: US (SSA) Female 50-100; 1950-2005

# Financial Impact of New Tables From RP2000 (BB) Percentage Increase in Liability*



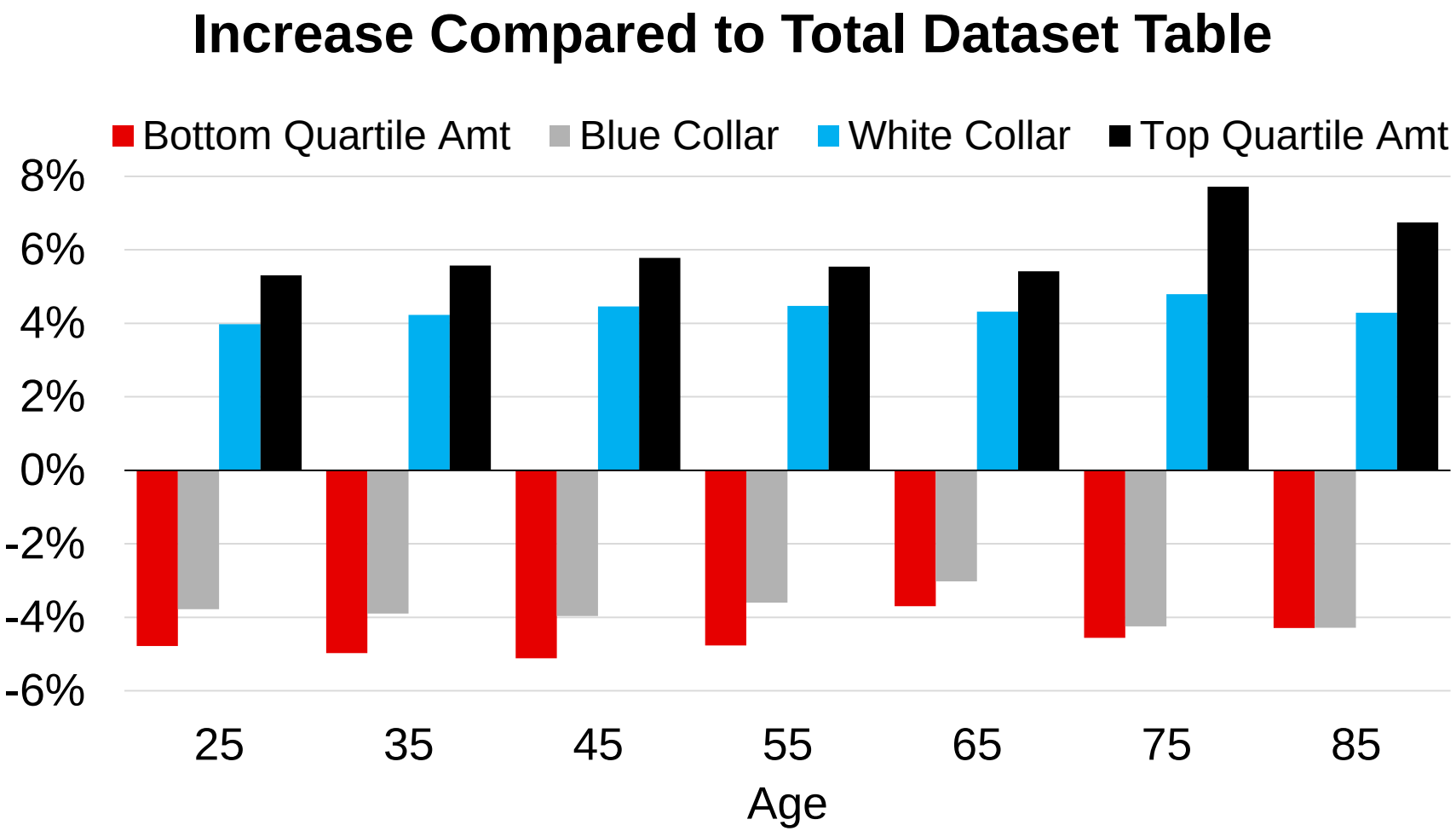

* Monthly deferred-to-62 annuity due values at 6.0% interest; for RP-2014, Total Employee Rates through age 61 and Healthy Annuitant Rates for ages 65 and above; RP-2000 combined rates with generational projection

# Financial Impact of New Tables From UP94 (AA) Percentage Increase in Liability*



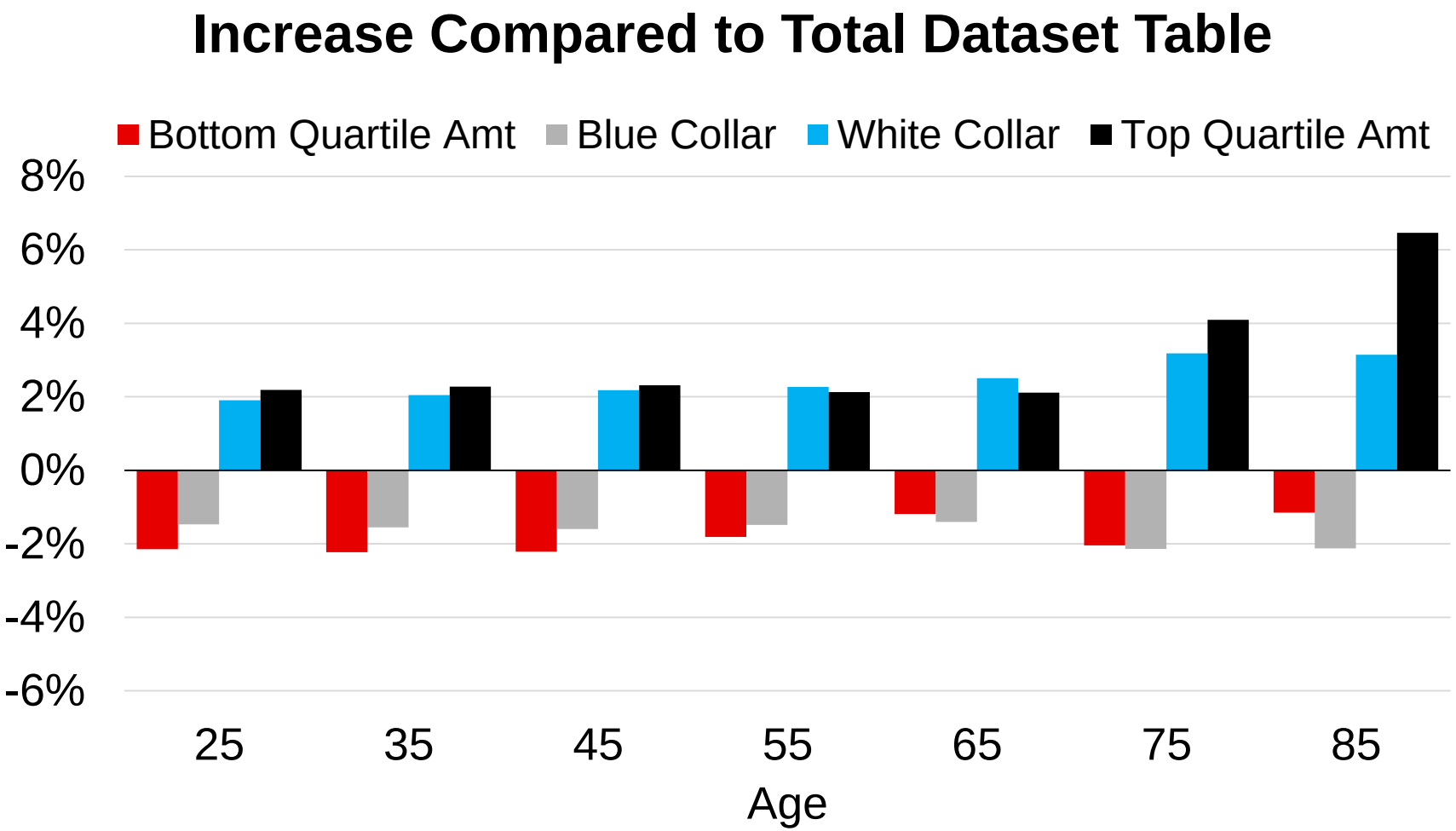

* Monthly deferred-to-62 annuity due values at 6.0% interest; for RP-2014, Total Employee Rates through age 61 and Healthy Annuitant Rates for ages 65 and above; RP-2000 combined rates with generational projection

# Liability* Comparison of RP-2014 Specialized Tables: Male




*Monthly deferred-to-62 annuity due values using RP-2014 with MP-2014 generational projection and 6% interest

# Liability* Comparison of RP-2014 Specialized Tables: Female




*Monthly deferred-to-62 annuity due values using RP-2014 with MP-2014 generational projection and 6% interest