

# **Mortality**

**ECON 499: Economics of Inequality**

**Winter 2018**

## **What are the consequences of inequality?**

- Philosophical debates on inequality are hard to resolve
- Can instead focus on outcomes
- Does inequality make people worse off in an objective way?

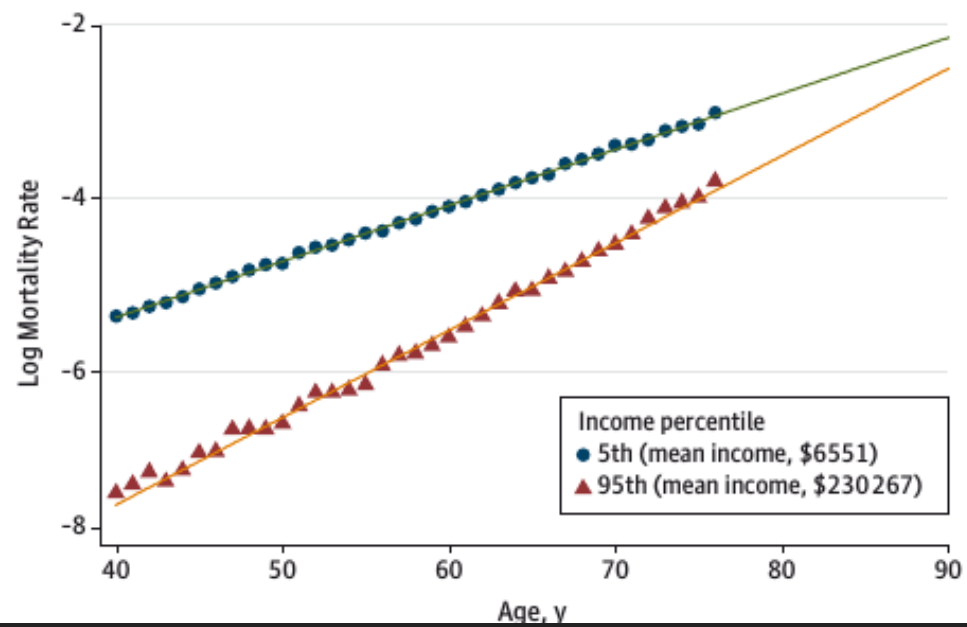
## Chetty et al (2016)

- *The Association Between Income and Life Expectancy in the United States, 2001-2014*

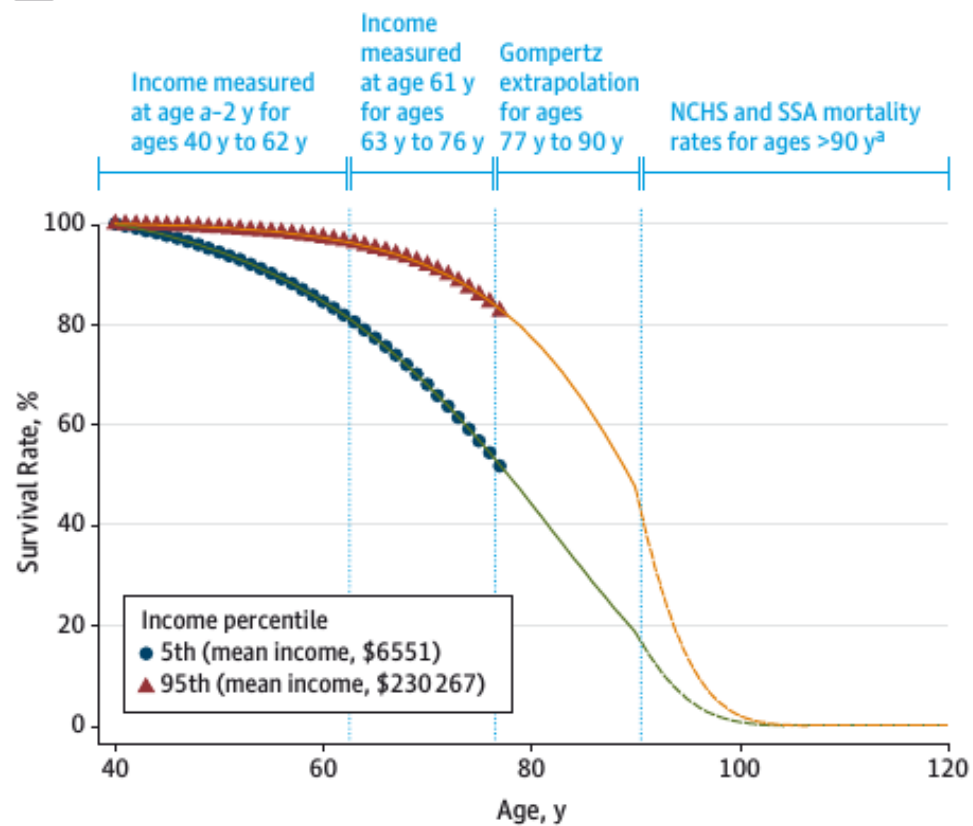
## Life expectancy

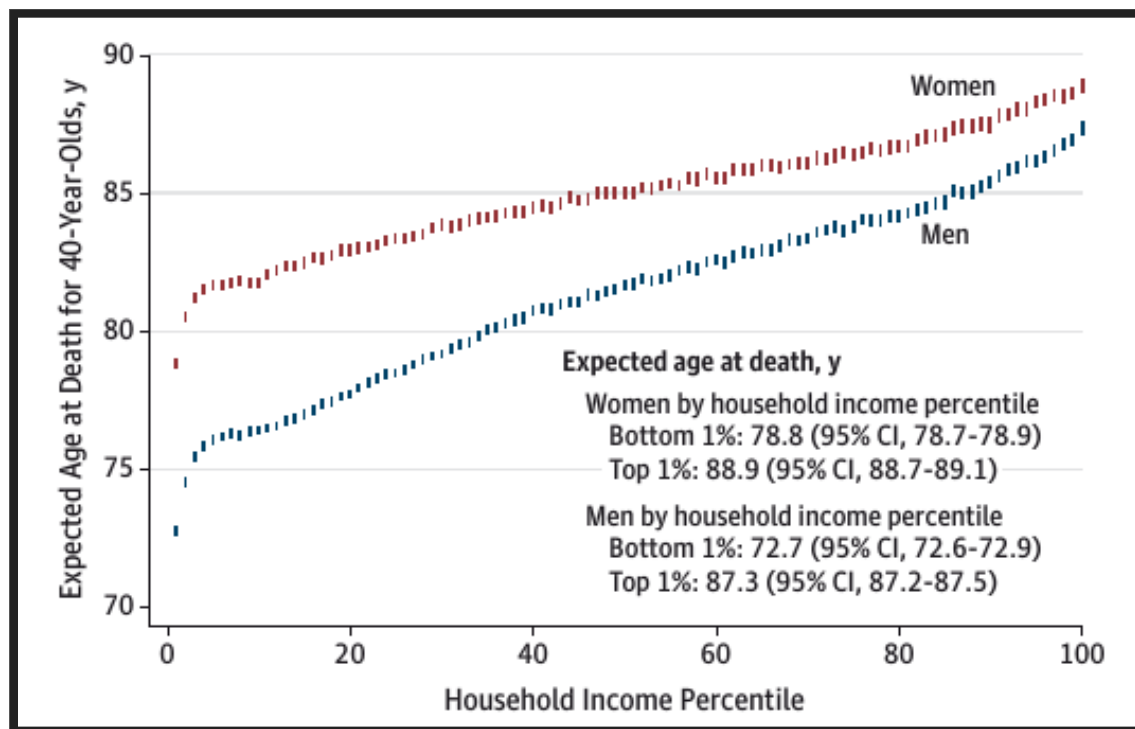
- Calculate the mortality rates for the cross section of every age
- Use the mortality rates to calculate life expectancy at any given age
- Alternatively, calculate the percentage of people who survive to a given age
- Compare that to the distribution of income at each age

**A** Log mortality rates for men



**B** Survival curves for men



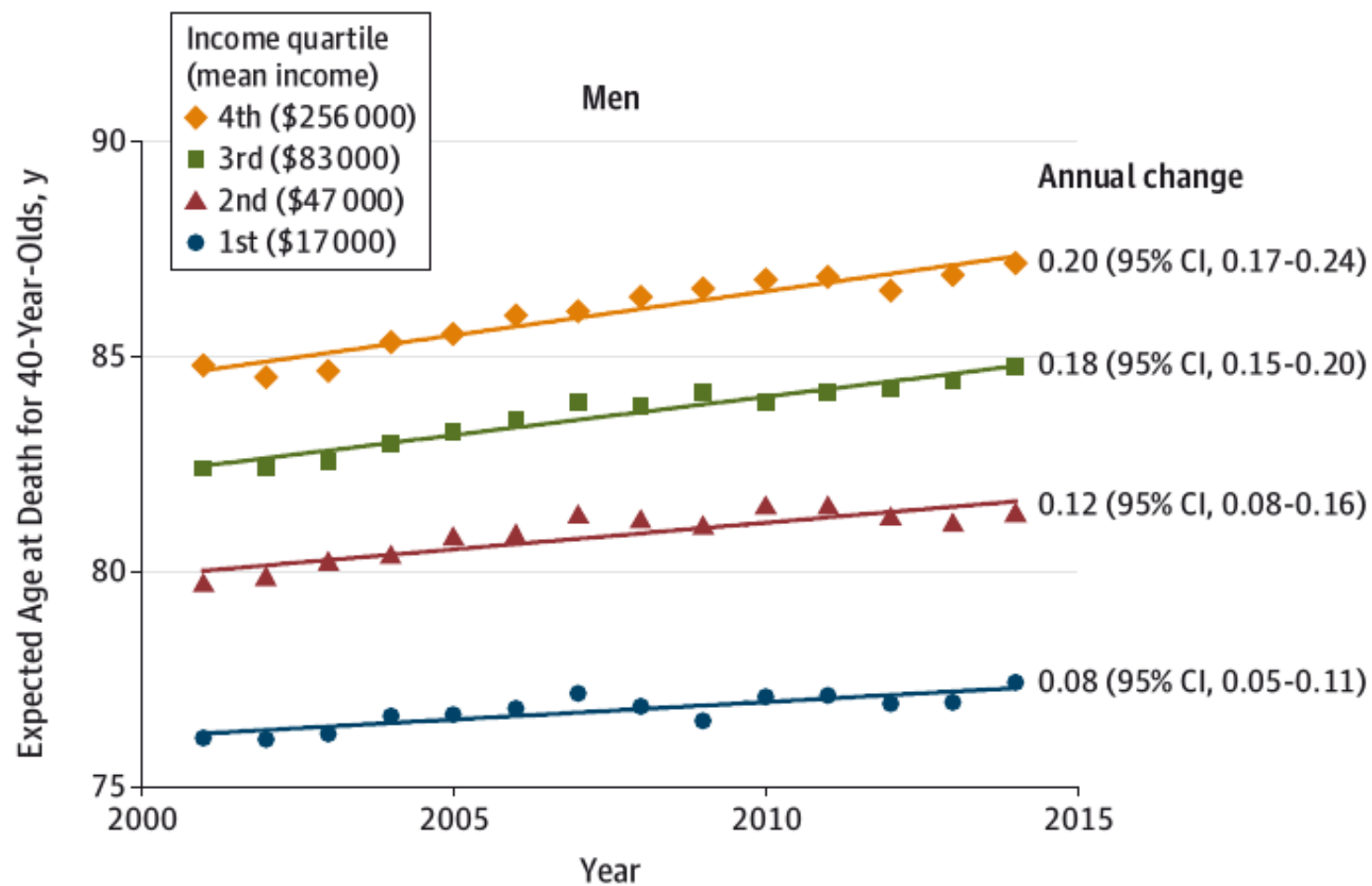


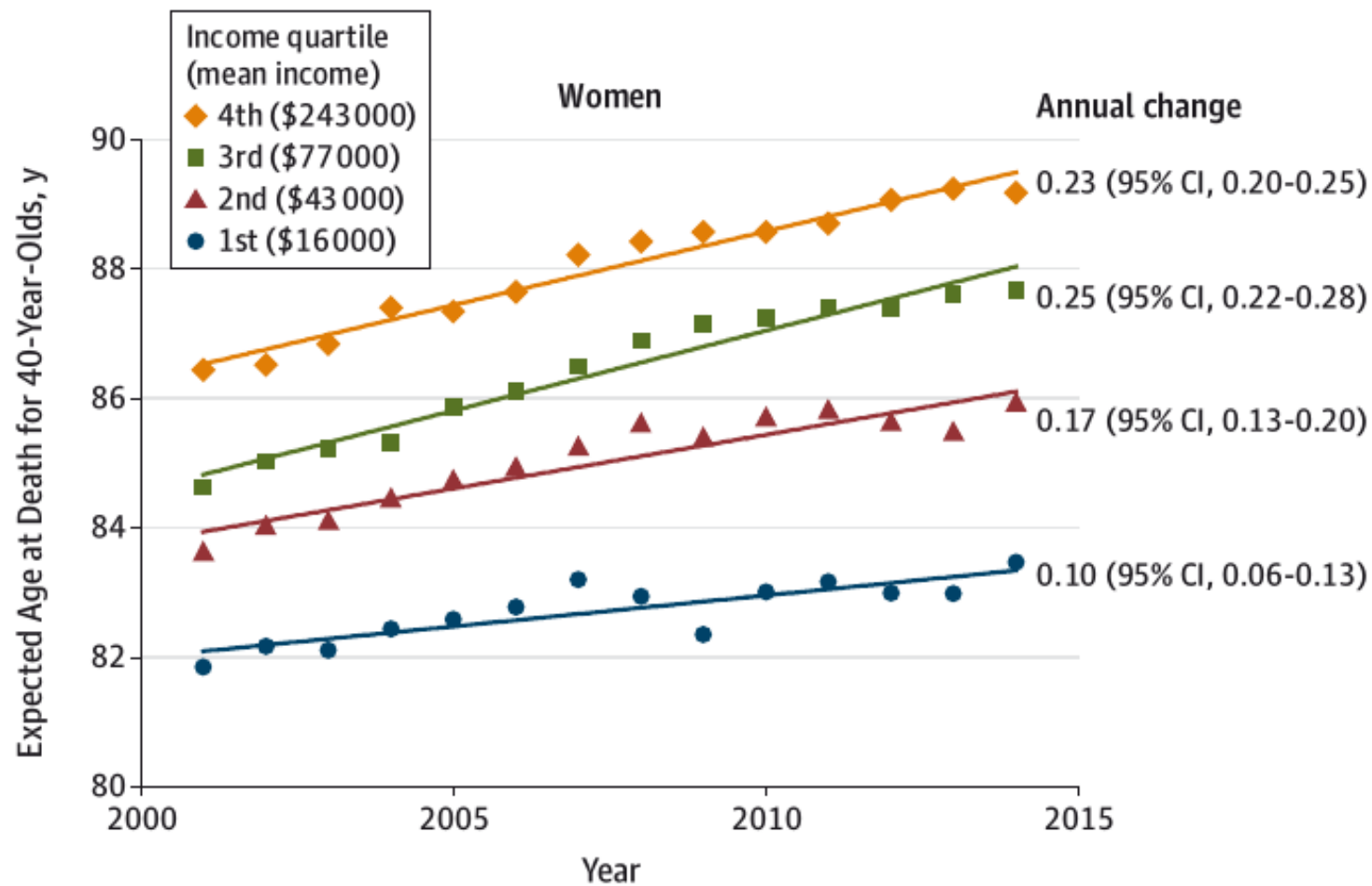
## Life expectancy and income

- Men in the top 1% live 14.6 years longer than men in the lowest 1%
- Women in the top 1% live 10.1 years longer than women in the lowest 1%
- Gap between men and women lower at high incomes
- How has this changed over time?



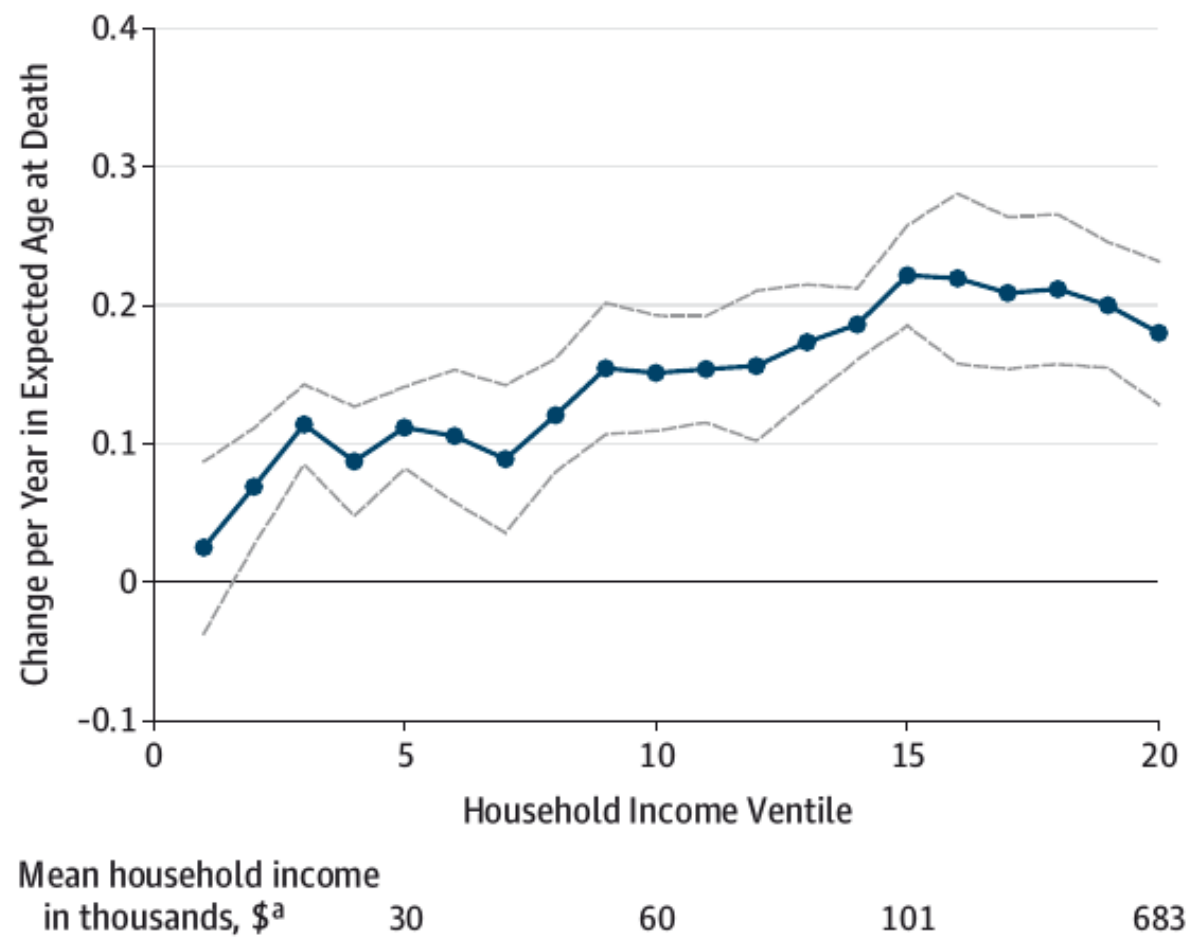
**A** Life expectancy by income quartile by year



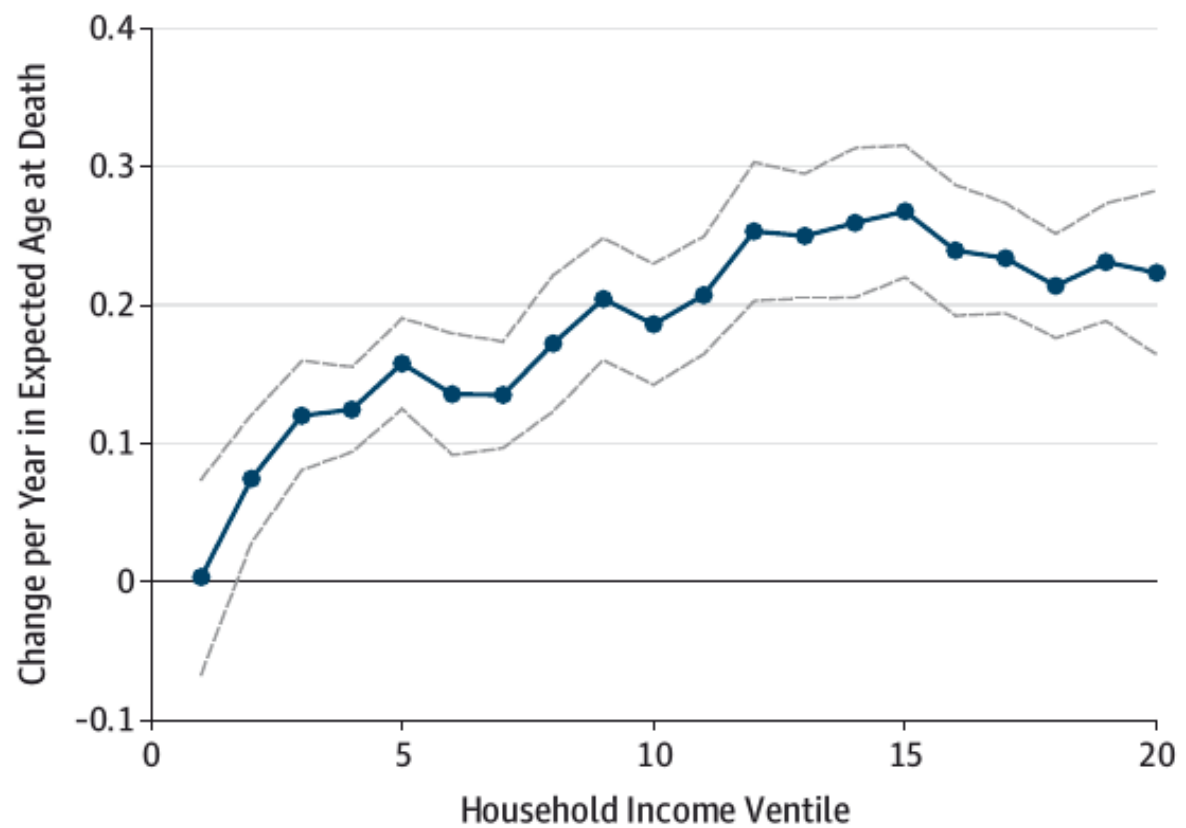


**B** Mean annual change in life expectancy

Men



### Women



Mean household income  
in thousands, \$<sup>a</sup>

27

54

95

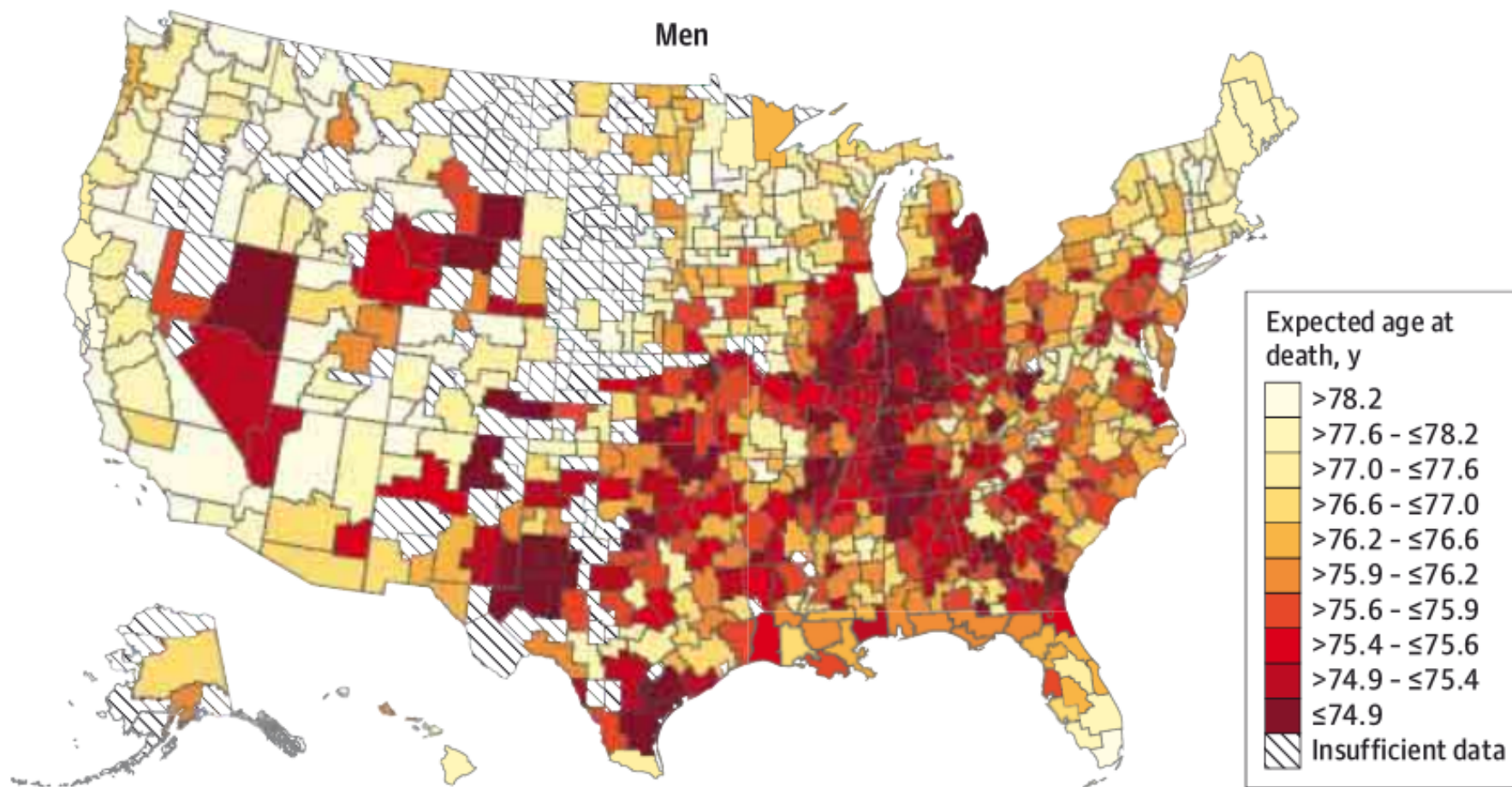
653

## Change in life expectancy

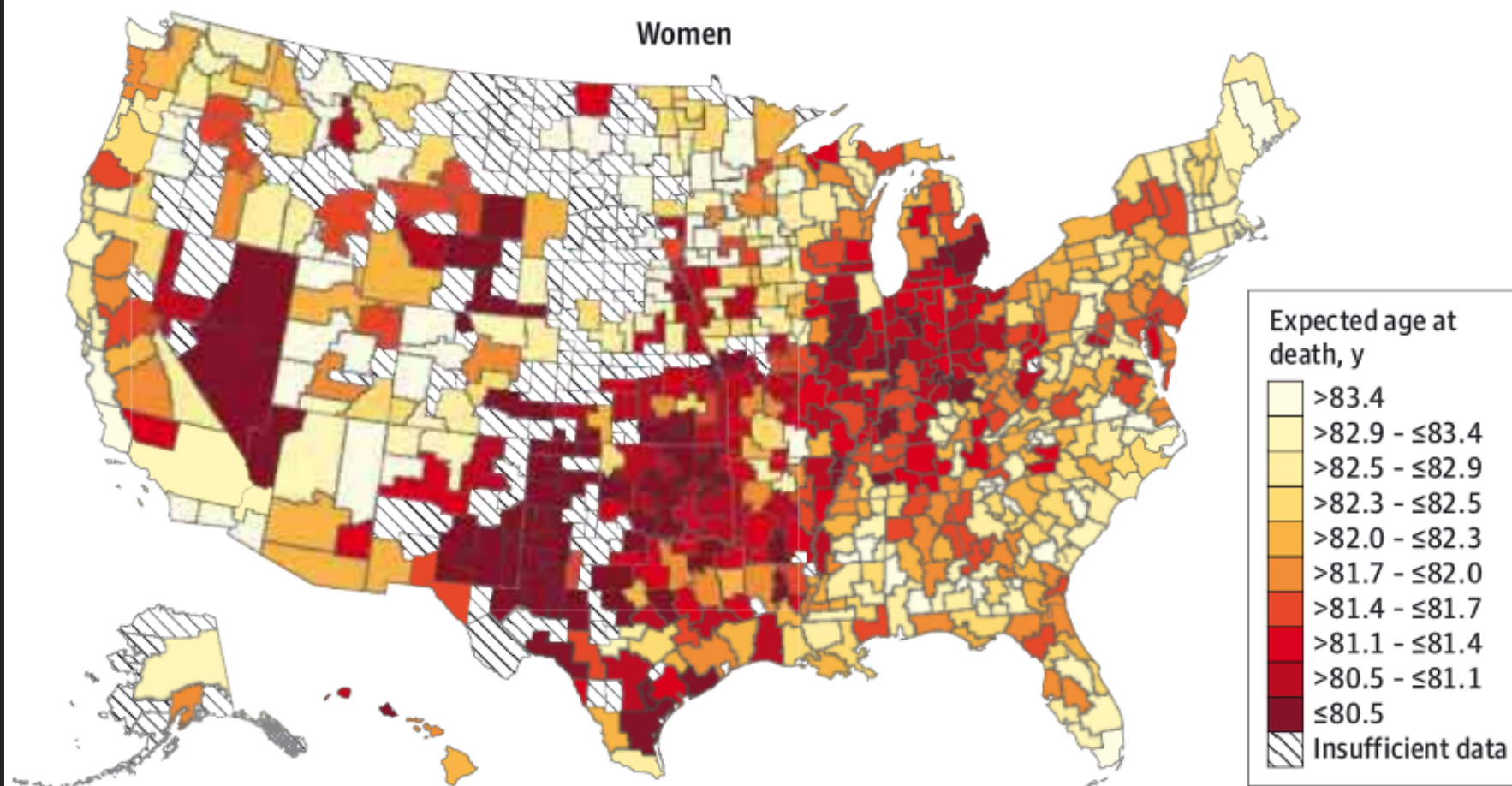
- Life expectancy across most income groups growing
- Growing slowly for people low in the distribution, higher for the wealthy
- Poorest 5% do not appear to be living longer at all

**A** Life expectancy for bottom income quartile

Men



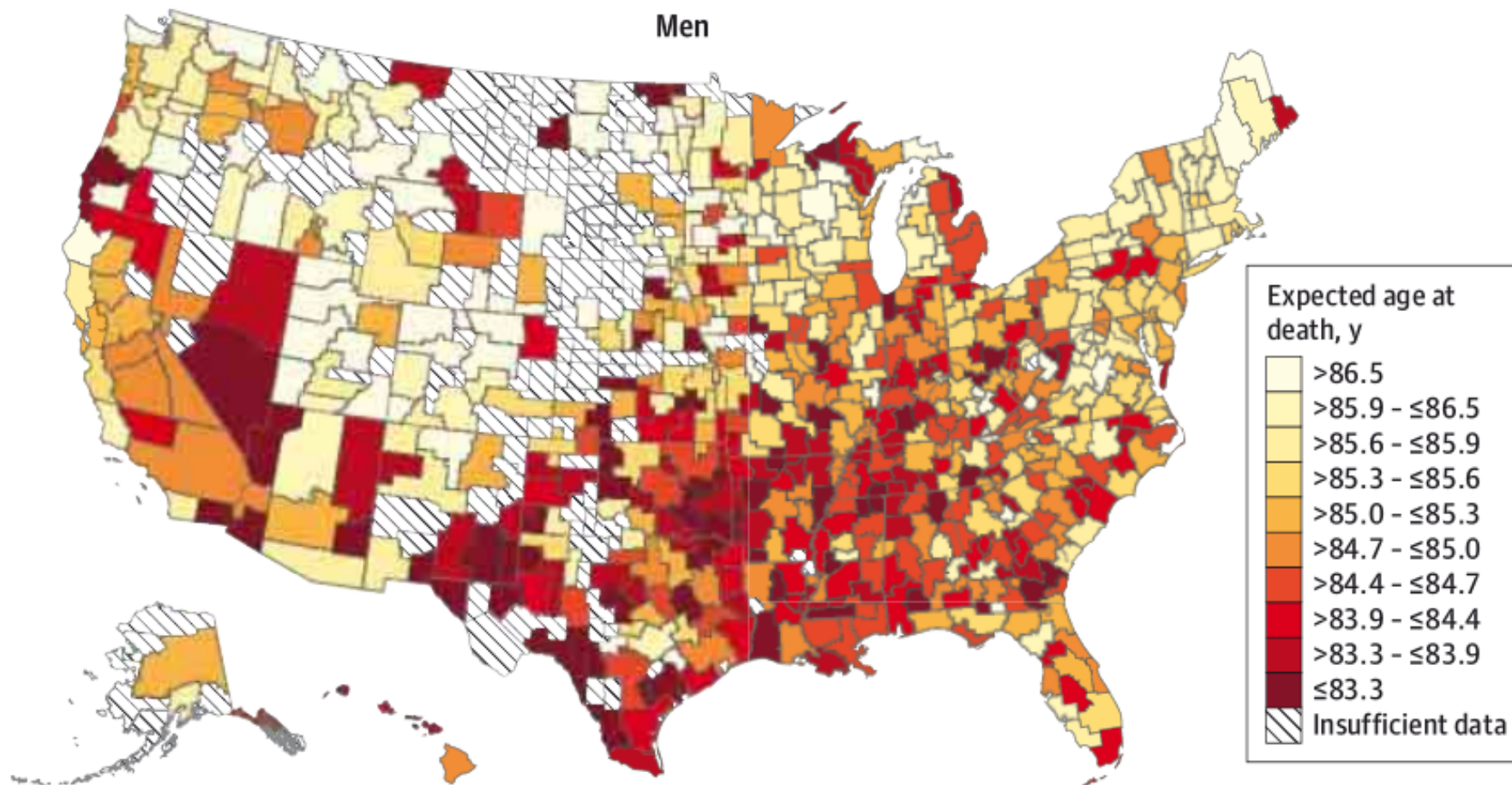
# Women





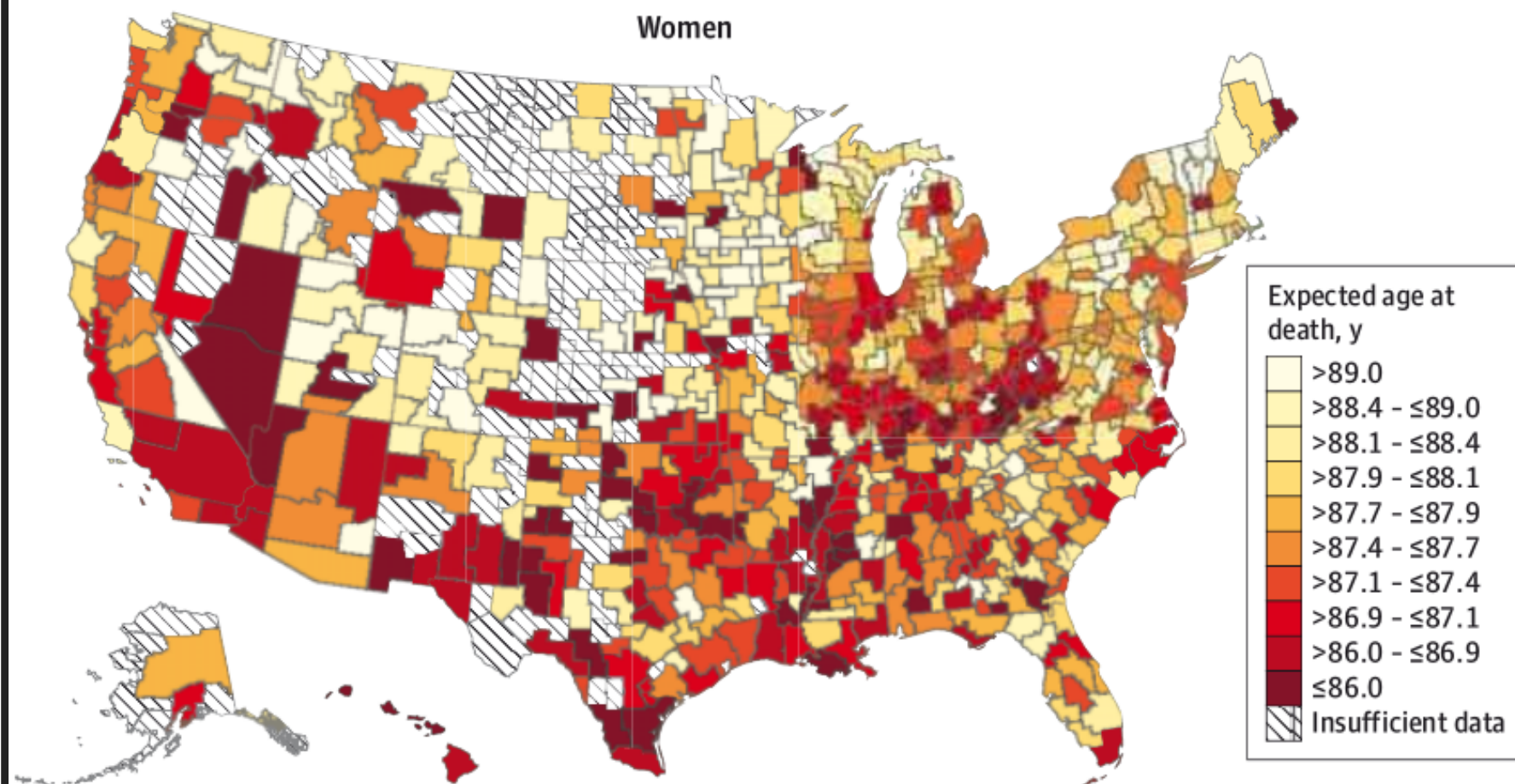
**B** Life expectancy for top income quartile

Men





## Women






## Geography and mortality

- There are large geographic variations in mortality rates
- Low-income people die more frequently in the rust belt, midwest, south, and southeast
- High-income people in coastal areas living longest




## Causes

- Geographical variation allows to compare other geographical outcomes
- Calculate correlation between life expectancy in bottom quartiles and local characteristics
- Use top quartile and bottom quartile (top 25%, lowest 25%)

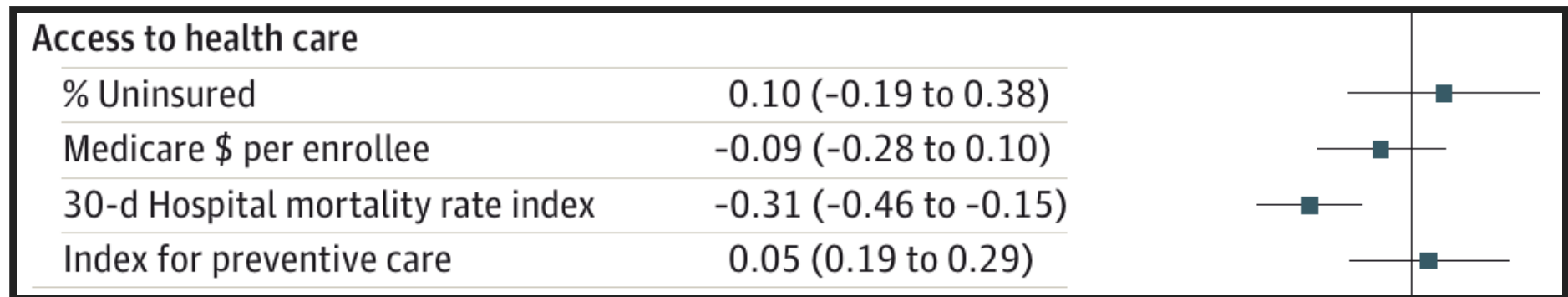
Bottom quartile

		Pearson Correlation Coefficient (95% CI)	
Health behaviors <sup>a</sup>			
Current smokers	-0.69 (-0.86 to -0.52)		
Obesity	-0.47 (-0.67 to -0.26)		
Exercise rate	0.32 (0.11 to 0.52)		

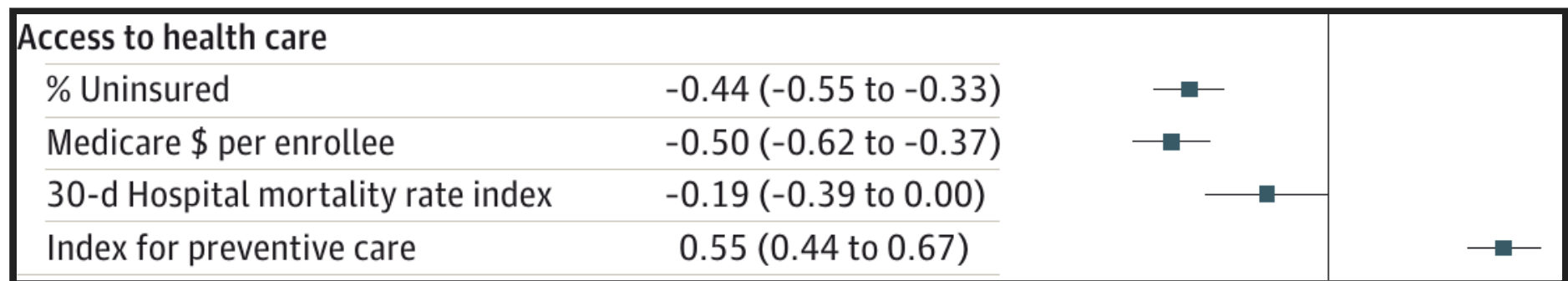
Top quartile

Health behaviors <sup>a</sup>			
Current smokers	-0.33 (-0.51 to -0.15)		
Obesity	-0.29 (-0.46 to -0.12)		
Exercise rate	0.46 (0.35 to 0.58)		


## Bottom quartile



## Top quartile



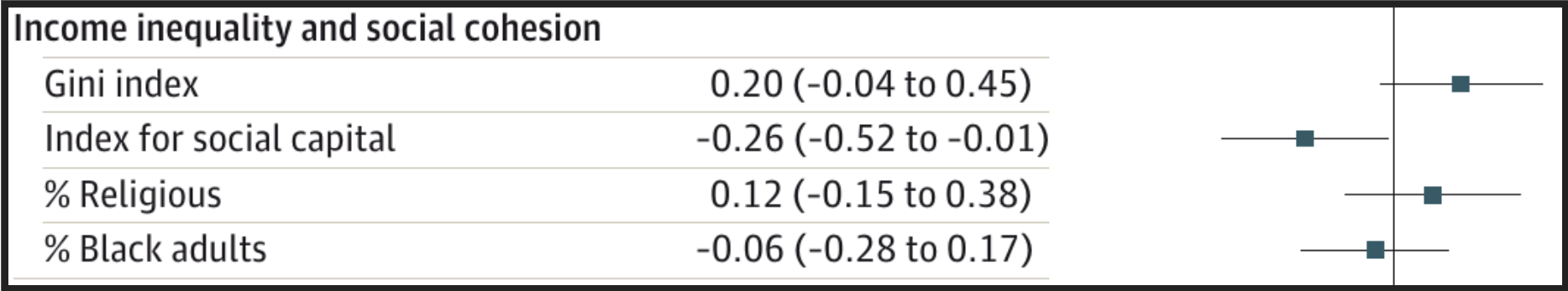
Bottom quartile

Environmental factors		
Income segregation	0.26 (0.02 to 0.51)	

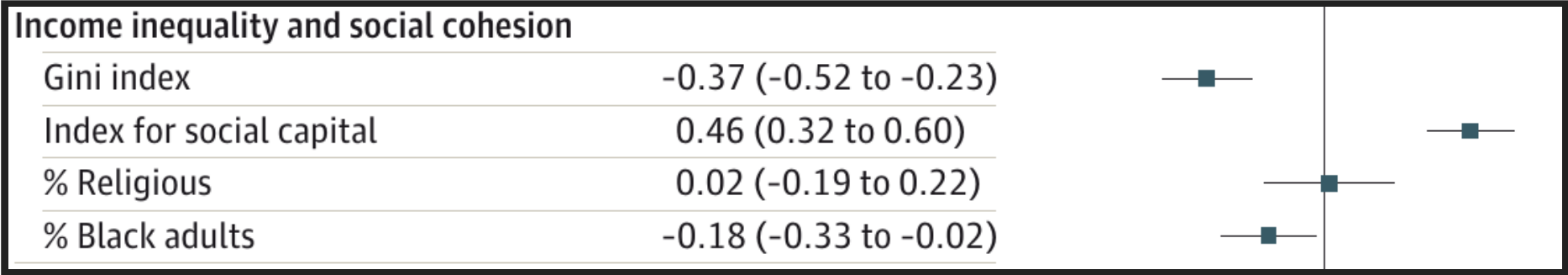
Top quartile

Environmental factors		
Income segregation	0.03 (-0.13 to 0.19)	




Bottom quartile






Top quartile



## Bottom quartile






Local labor market conditions		
Unemployment rate in 2000	0.11 (-0.01 to 0.23)	
% Change in population, 1980-2000	0.16 (-0.09 to 0.41)	
% Change in labor force, 1980-2000	0.09 (-0.12 to 0.29)	

## Top quartile






Local labor market conditions		
Unemployment rate in 2000	-0.38 (-0.54 to -0.21)	
% Change in population, 1980-2000	-0.04 (-0.27 to 0.20)	
% Change in labor force, 1980-2000	0.08 (-0.15 to 0.31)	



## Bottom quartile

Other factors			
% Immigrants	0.72 (0.60 to 0.84)		
Median home value	0.66 (0.50 to 0.83)		
Local government expenditures	0.57 (0.38 to 0.75)		
Population density	0.48 (0.38 to 0.58)		
% College graduates	0.42 (0.30 to 0.55)		

## Top quartile

Other factors			
% Immigrants	-0.21 (-0.37 to -0.04)		
Median home value	0.10 (-0.16 to 0.35)		
Local government expenditures	0.05 (-0.20 to 0.31)		
Population density	0.03 (-0.06 to 0.13)		
% College graduates	0.41 (0.25 to 0.56)		

## Mechanisms

- We've only described correlations, not causation
- Public policy (smoking bans, public services, etc)
- Peer effects—wealthier, healthier neighbors may induce healthy behavior
- Compositional/sorting

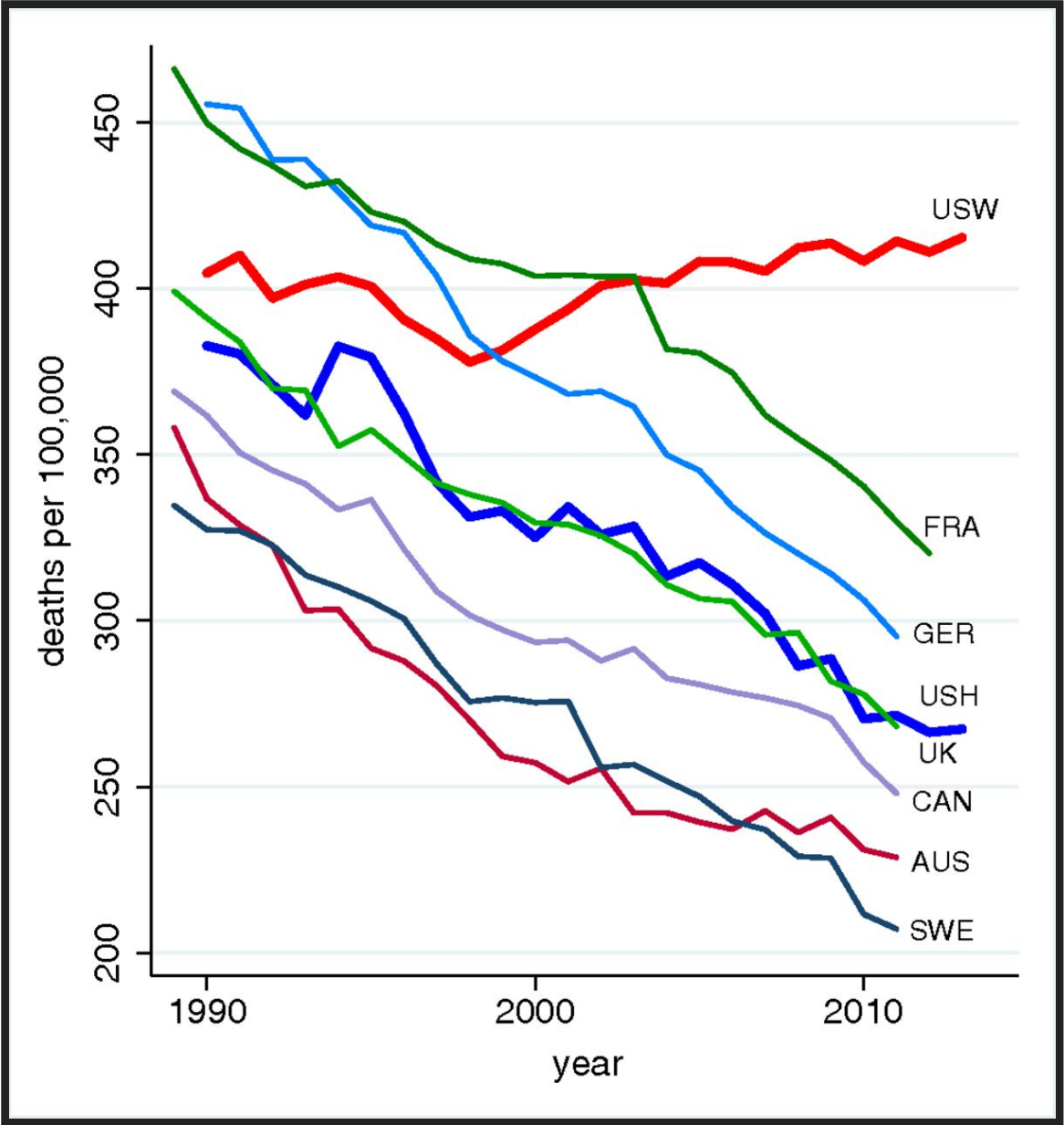
## Case and Deaton (2015, 2017)

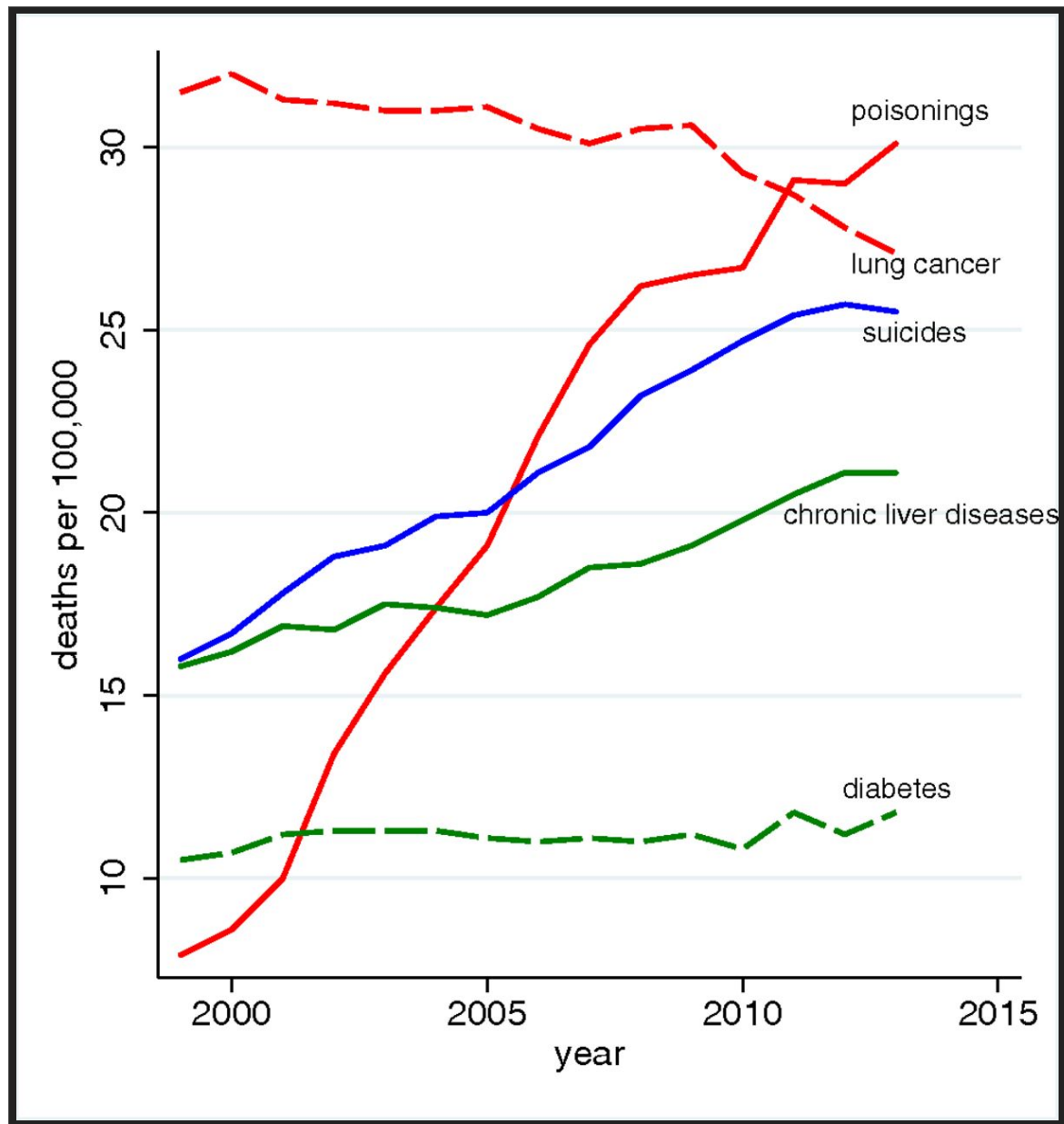
- *Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century* (2015)
- *Mortality and morbidity in the 21st century* (2017)
- Look at mortality by race and gender instead of income

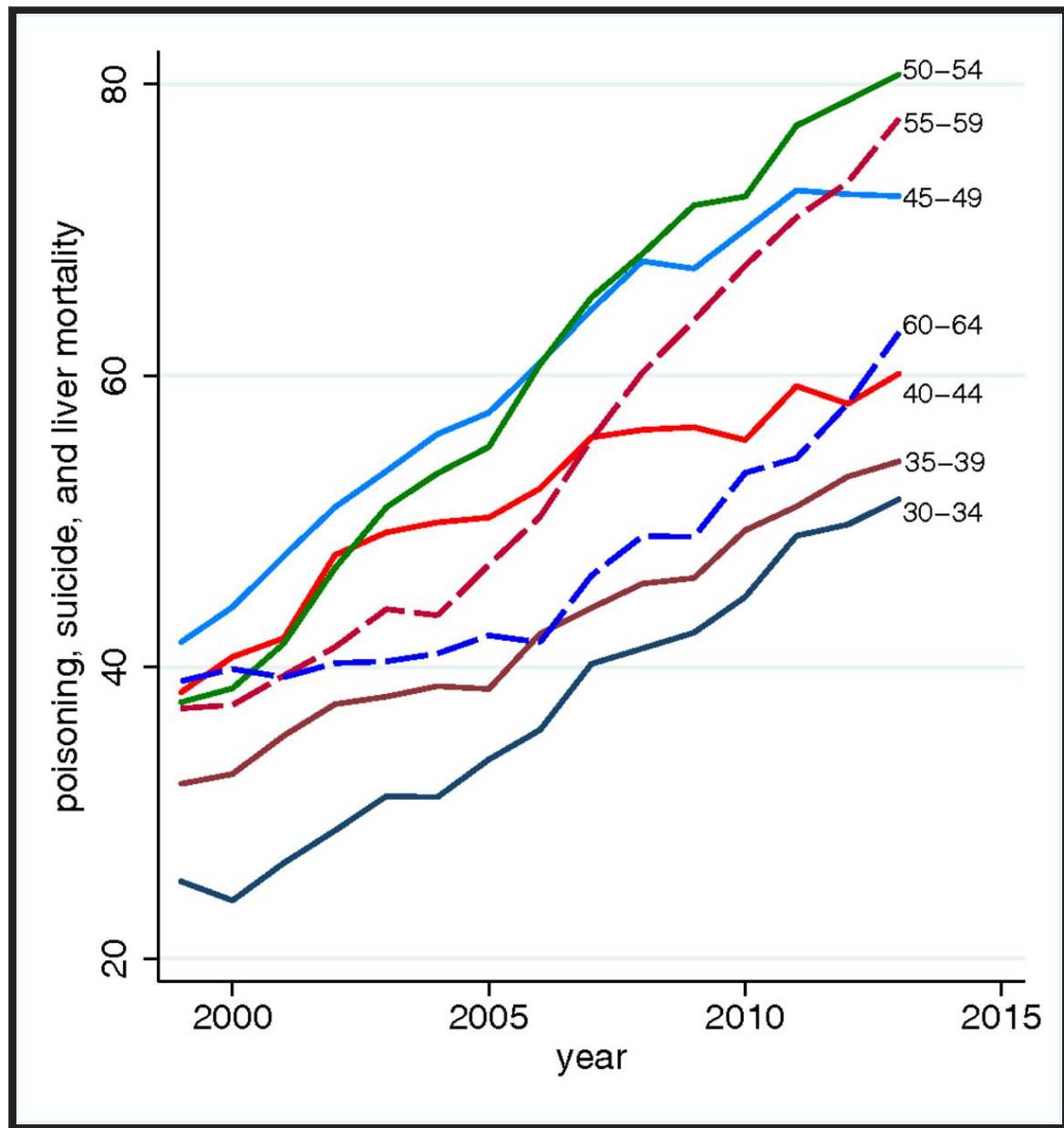
'Deaths of despair' are cutting life short for some white Americans



# All-cause mortality, ages 45-54







## Mid-life mortality

- Deaths due to drug and alcohol poisoning, suicide, and liver disease are increasing for all age groups of non-Hispanic white men
- For middle-age, it has increased enough to reduce overall life expectancy



Figure 1.1 All-cause mortality by race and ethnicity, ages 50-54

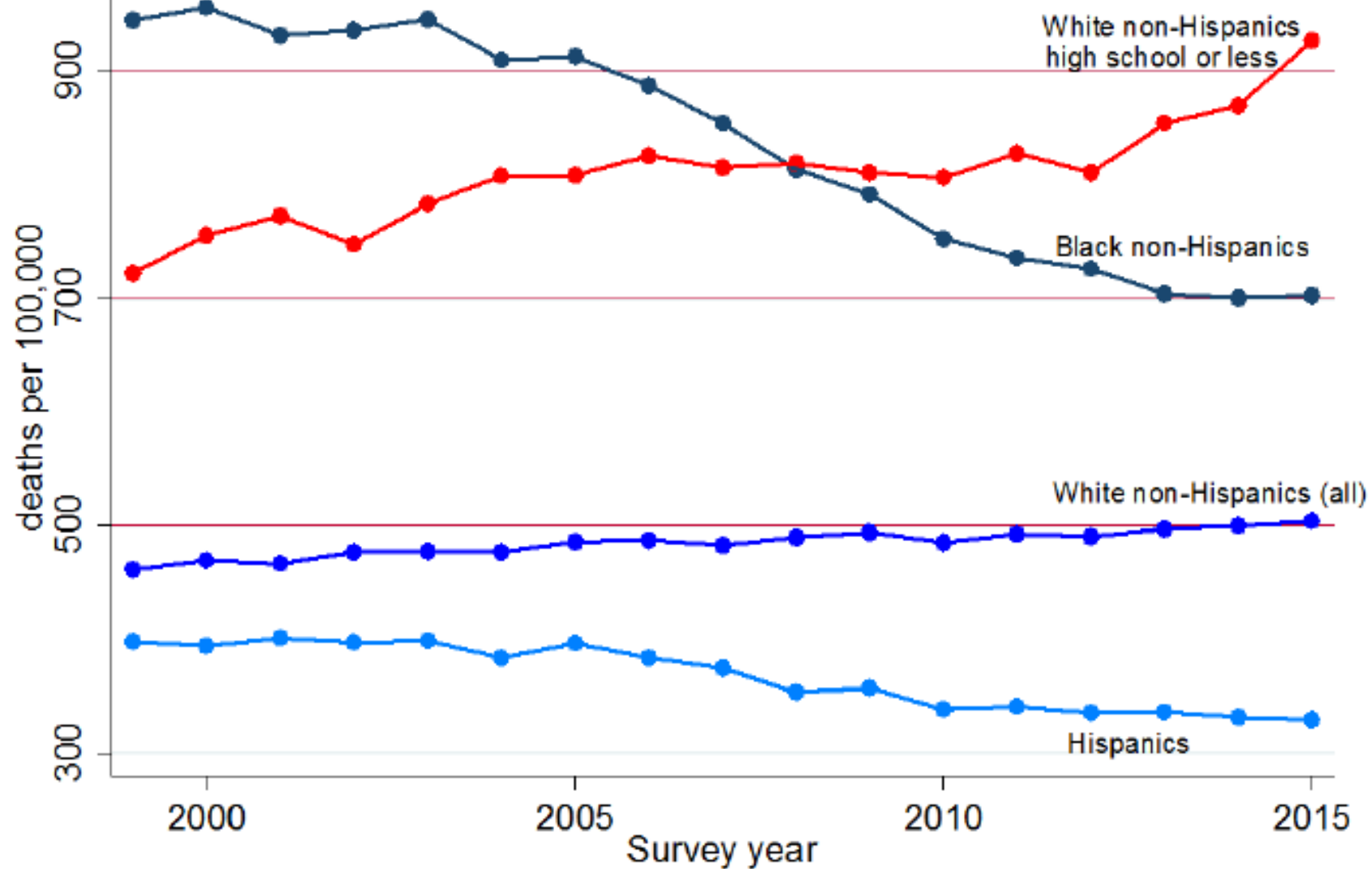


Figure 1.7 Drug, alcohol and suicide mortality by birth cohort, white non-Hispanics, less than BA

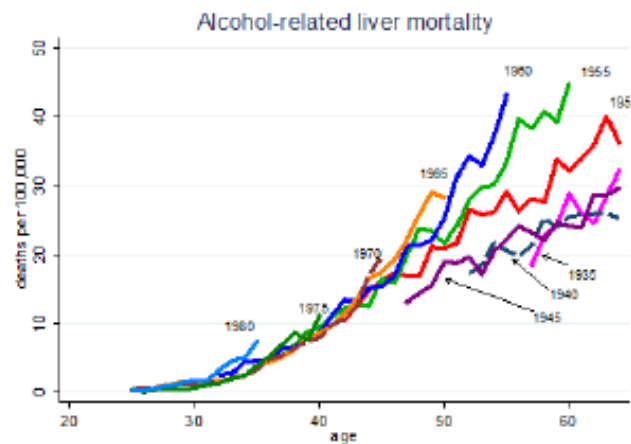
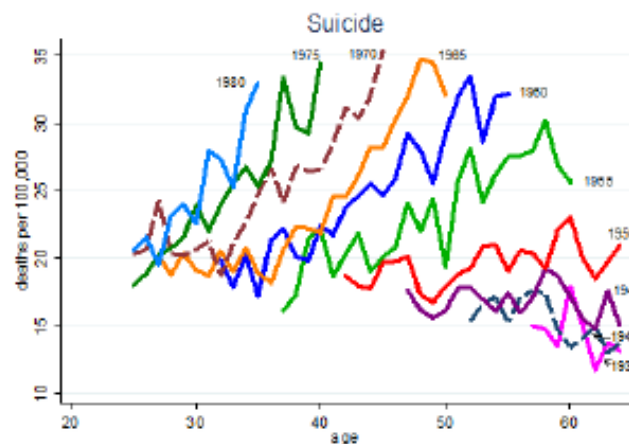
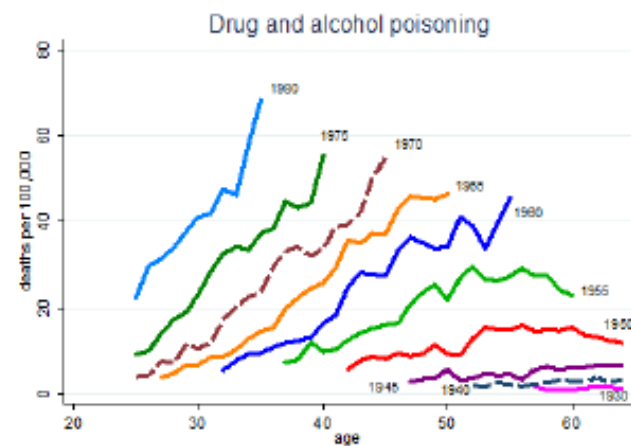
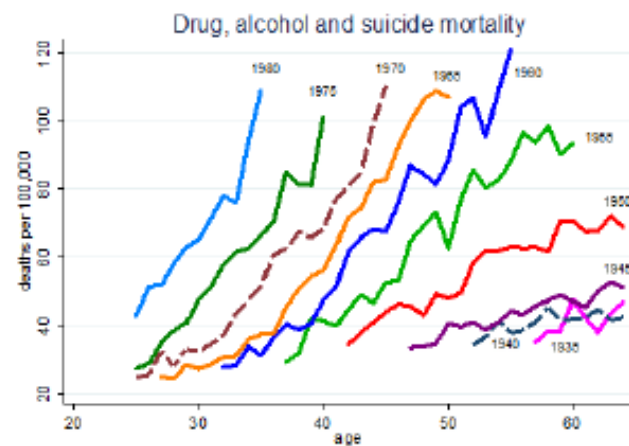


Figure 1.9 All-cause mortality, white non-Hispanics, ages 45-54

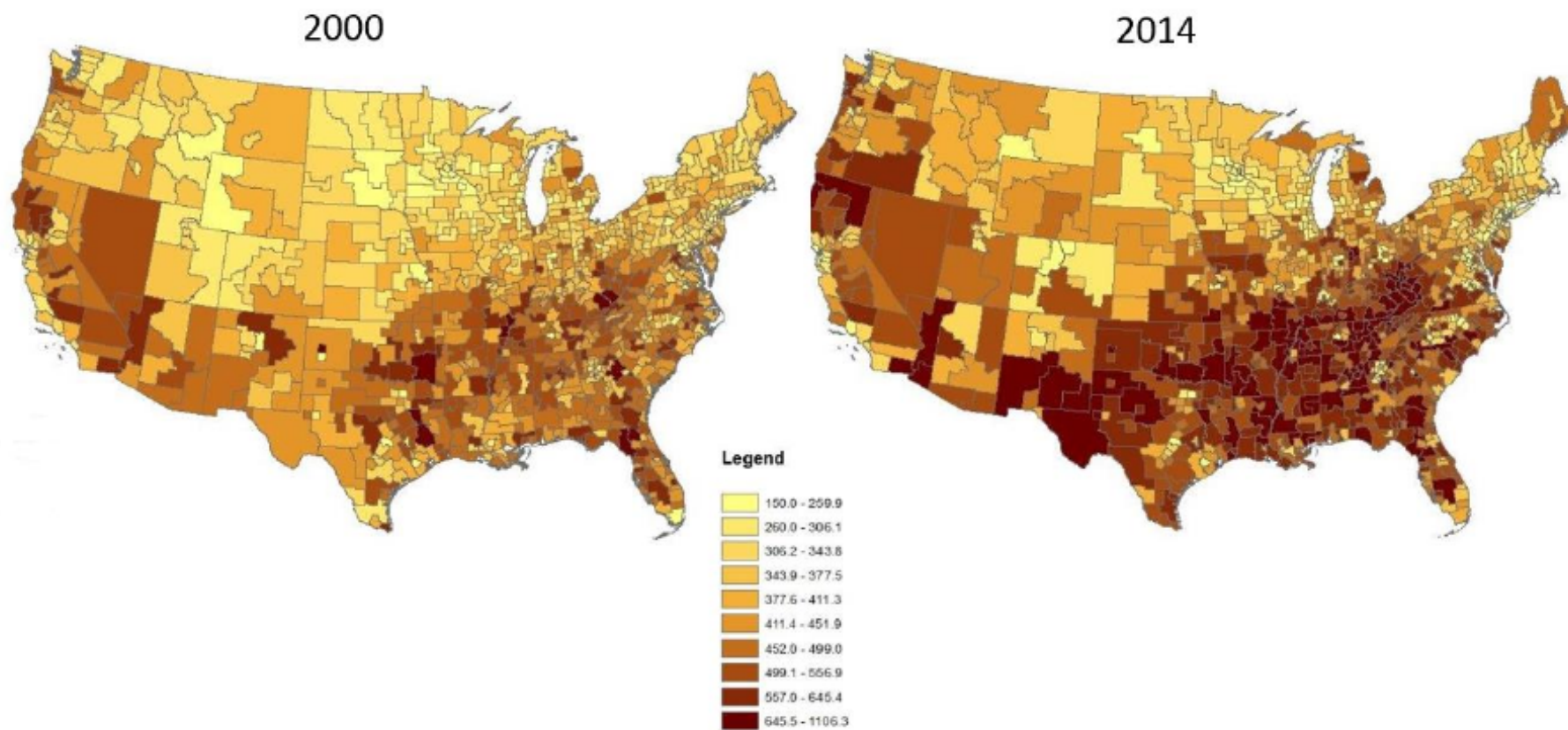


Figure 1.10 Change in mortality rates, white non-Hispanics 1998-2015

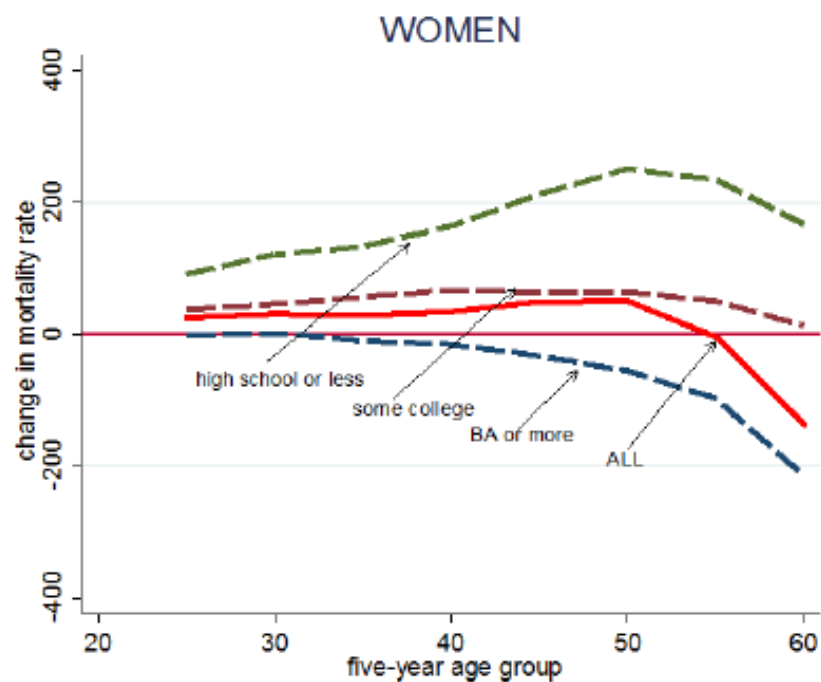
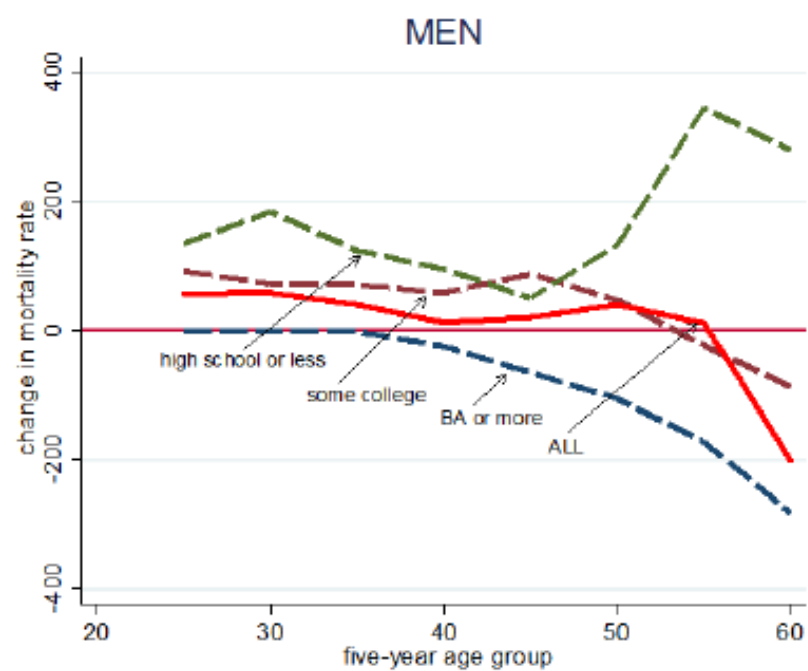
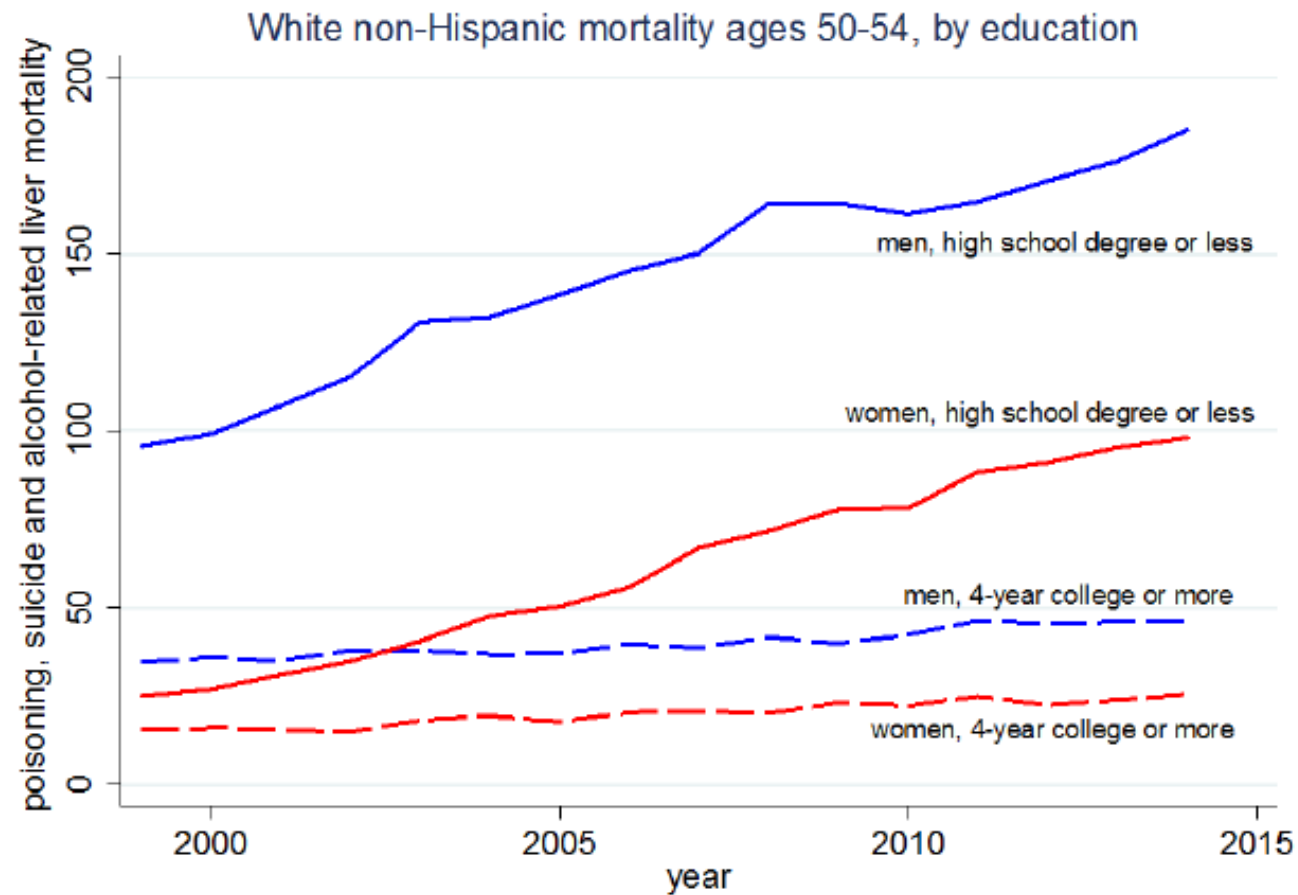


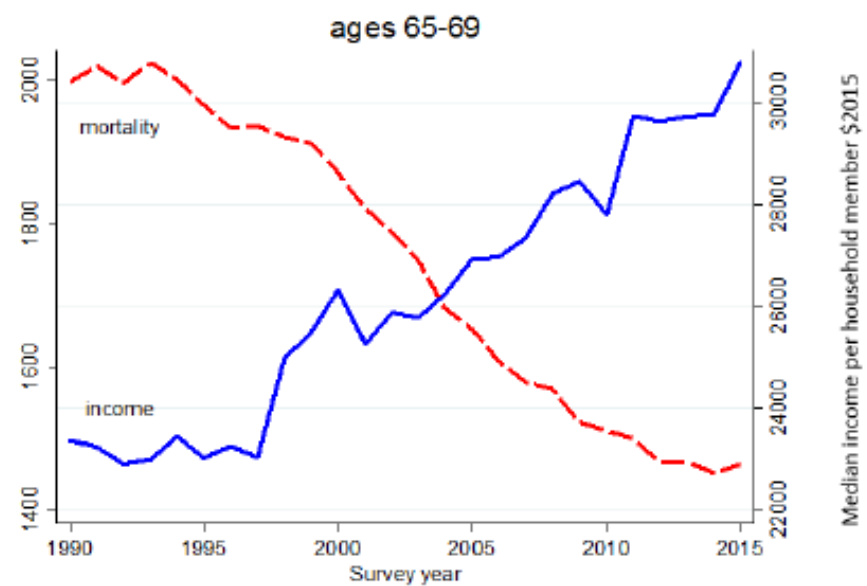
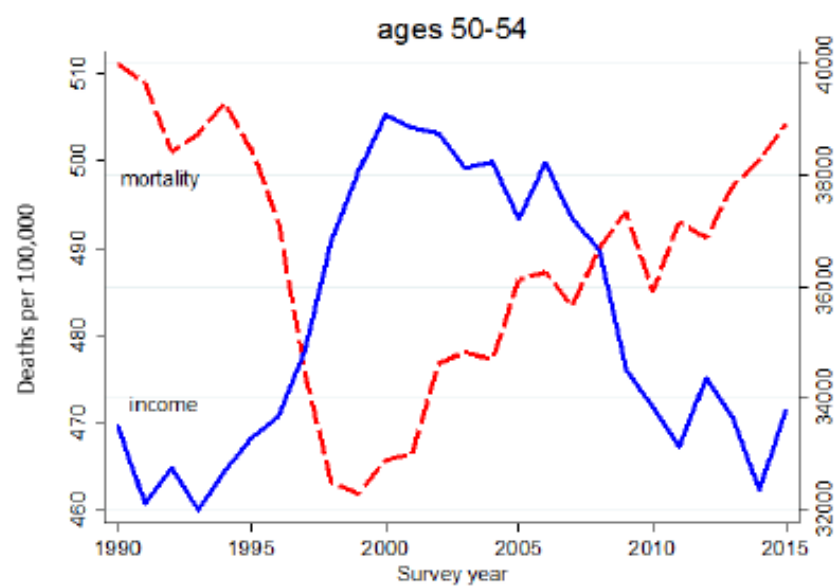
Figure 1.11 Drug, alcohol and suicide mortality

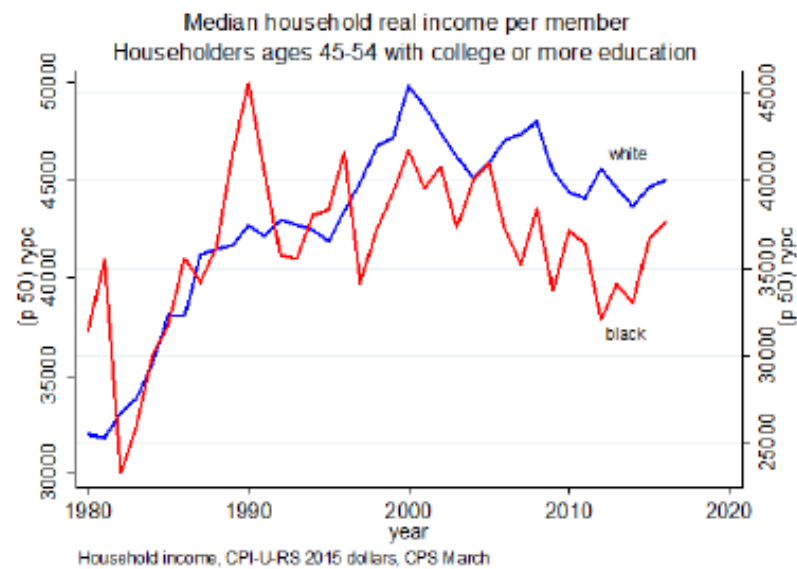
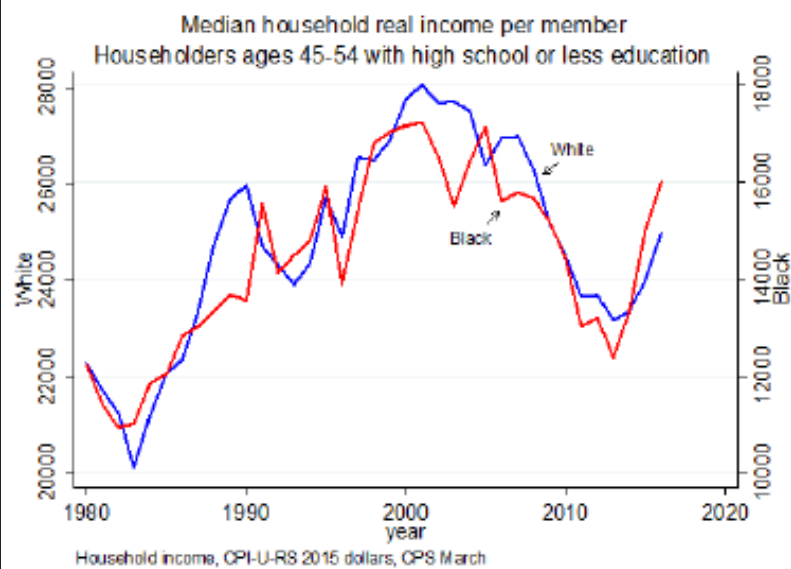


## Causes

- Income highly correlated with mortality
- Cannot explain everything, income for whites shows similar patterns as other groups
- Case and Deaton suggest "cumulative deprivation" (fewer prospects in life)

## Median household income per member and all-cause mortality, white non-Hispanics by age group







## Summary

- Income is highly correlated with life expectancy
- Increasing inequality increases the gap in mortality between rich and poor
- For some groups (non-Hispanic white men) life expectancy is decreasing
- The same people who are losing jobs to trade and automation?
- How do these people vote?

**Hillary Clinton**  
DEMOCRAT

**Donald J. Trump**  
REPUBLICAN

Sex

Male

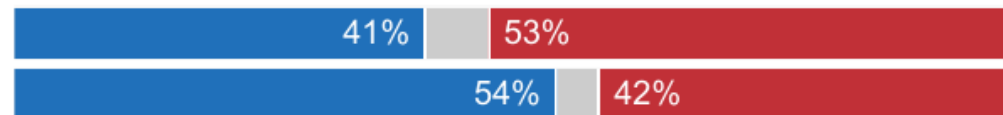
41%

53%

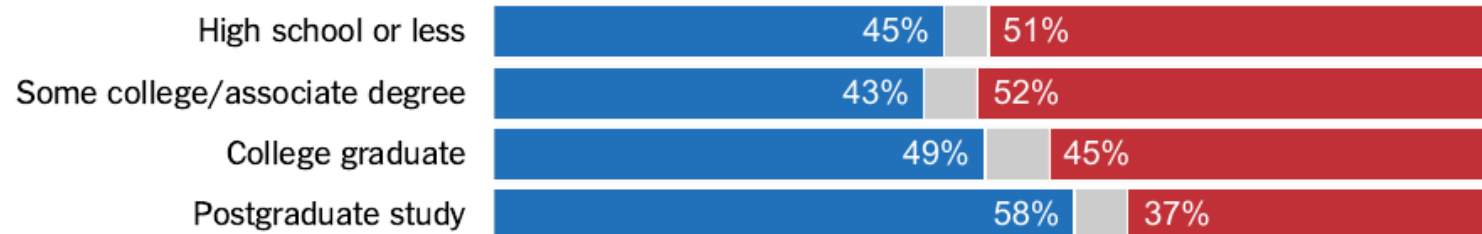
Female

54%

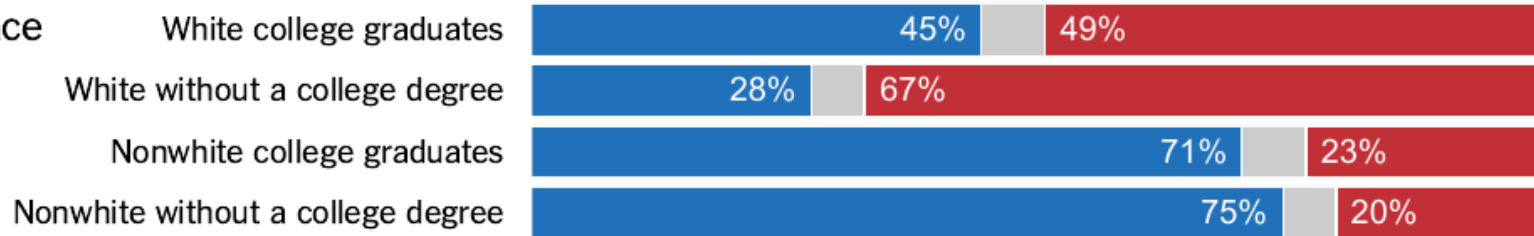
42%



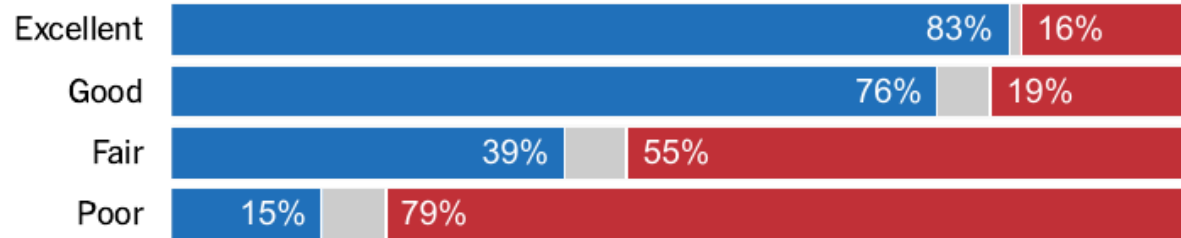
## Education



## Education by race



Condition of the nation's  
economy



Effect of trade with  
other countries on U.S.  
jobs

Creates more jobs



Takes away jobs



Has no effect

