Growing Class Gaps and Shrinking Race Gaps in Life Expectancy, 2001-2019

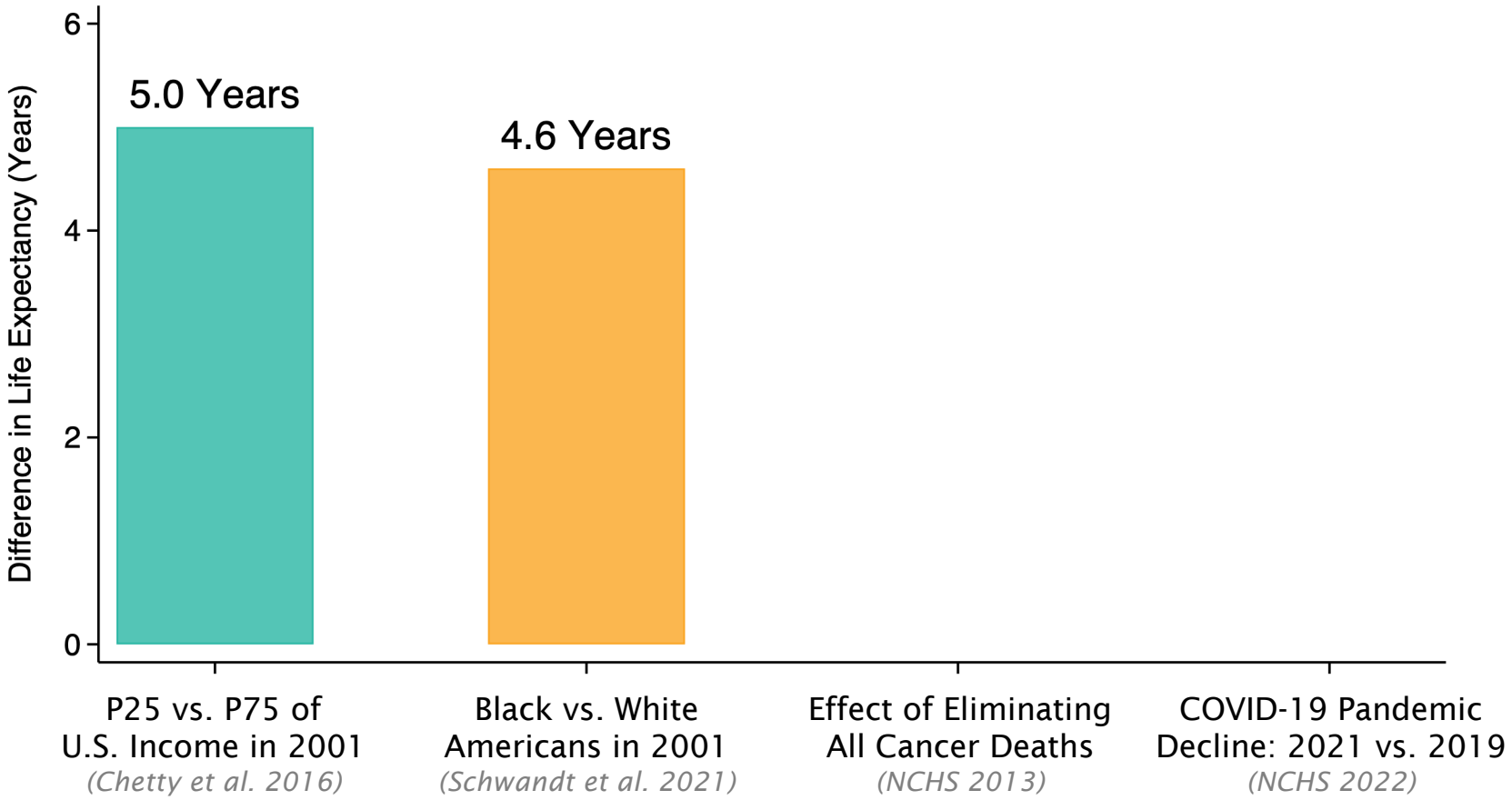
Raj Chetty, Janet Currie, John N. Friedman, Ines Guix, Nathaniel Hendren, Hannes Schwandt, Michael Stepner, Harvey Barnhard, Dhruv Gaur, Tyler Jacobson, Emma Lee, Ana Sanchez-Chico, Brad Foster, and Sonya Porter

PRELIMINARY RESULTS, PLEASE DO NOT CITE

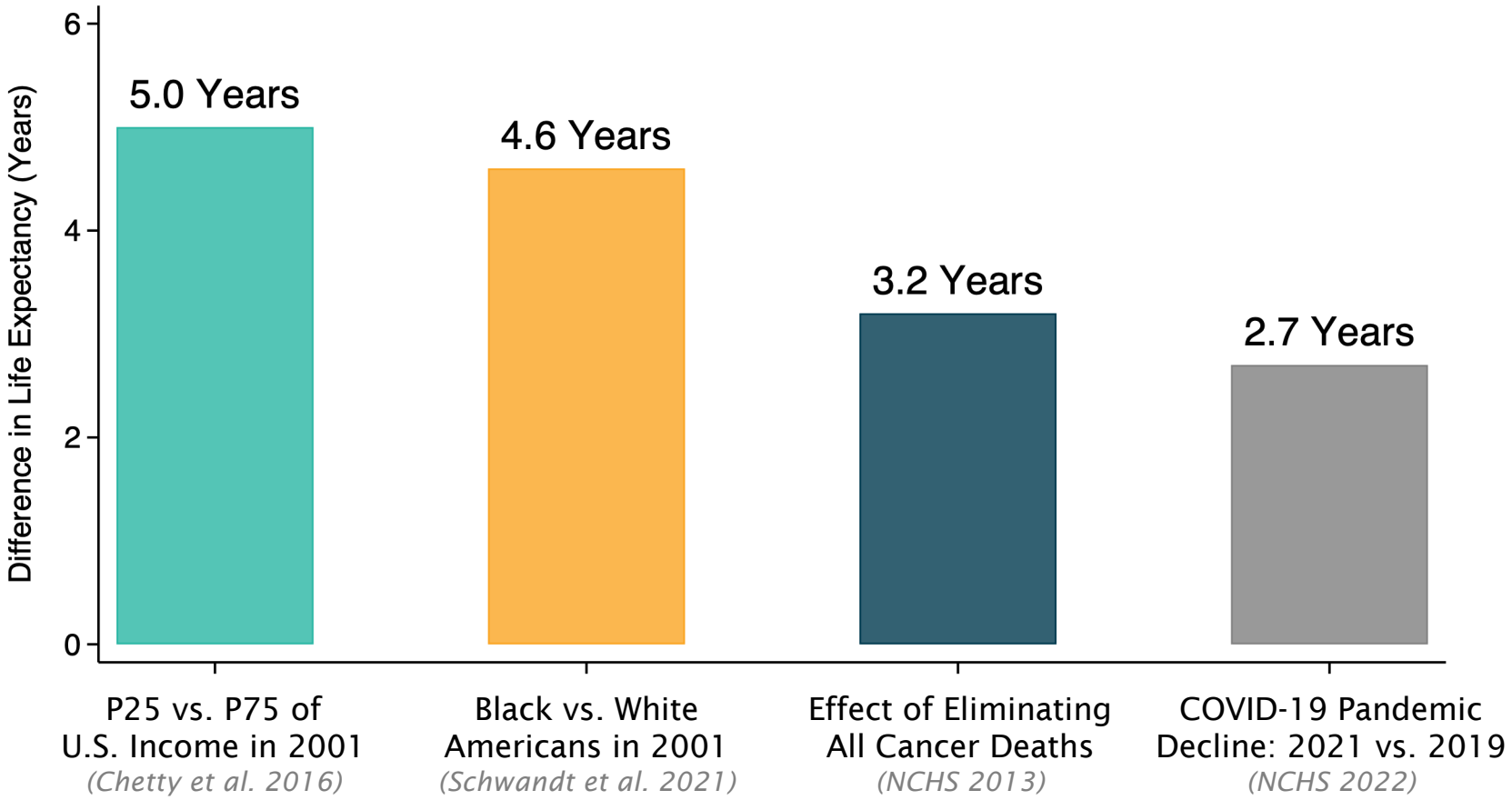
Any opinions and conclusions expressed herein are those of the authors and do not represent the views of the U.S. Census Bureau. The Census Bureau has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection (Project 7531153: CBDRB-FY22-CES014-024). The research reported herein was performed pursuant to grant RDR18000003 from the US Social Security Administration (SSA) funded as part of the Retirement and Disability Research Consortium.

OPPORTUNITY INSIGHTS

Gaps in Life Expectancy by Income and Race



Gaps in Life Expectancy by Income and Race vs. Other Causes of Death



This Talk

1. Present new evidence on how these disparities in health have changed in the past two decades

   - **Growing** class gaps

   - **Shrinking** Black–White race gap

2. Use these trends to study mechanisms that underlie changes in health disparities and identify ways to narrow disparities going forward



Data and Methods

Sample Definition

- Sample: 150 million individuals between ages 30-95 living in the United States according to 2000 decennial Census
  - Restrict to 88% who can be linked to tax data on incomes

- Linking tax and Census data permits two key advances over previous work (e.g. Chetty et al. 2016) analysis of life expectancy by income:
  1. Full population coverage, including U.S. residents with **zero incomes**
  2. Observe race and ethnicity as well as income



Definitions of Key Variables

- Income: pre-tax family income measured 2 years before mortality rates (as in Chetty et al. 2016)
  - Non-filers assigned W-2 income, or zero income if no W-2s
  - For individuals 63 years or older, measure income **at age 61** to obtain a measure of working-age income
  - Calculate percentiles by ranking individuals based on income relative to all other individuals of same age and gender in a given year



Definitions of Key Variables

- Income: pre-tax family income measured 2 years before mortality rates (as in Chetty et al. 2016)

- Race: self-reported race and ethnicity, broken into 5 categories:

  - Hispanic
  - non-Hispanic
    - White
    - Black
    - Asian
    - American Indian/Alaska Native

Target Parameter: Period Life Expectancy at Age 30

- Goal: summarize mortality rates in a given year for a population with a specific race, gender and income (ex: Black women at the 25th income percentile in 2019)

  → Aggregating mortality rates across ages in a single year.

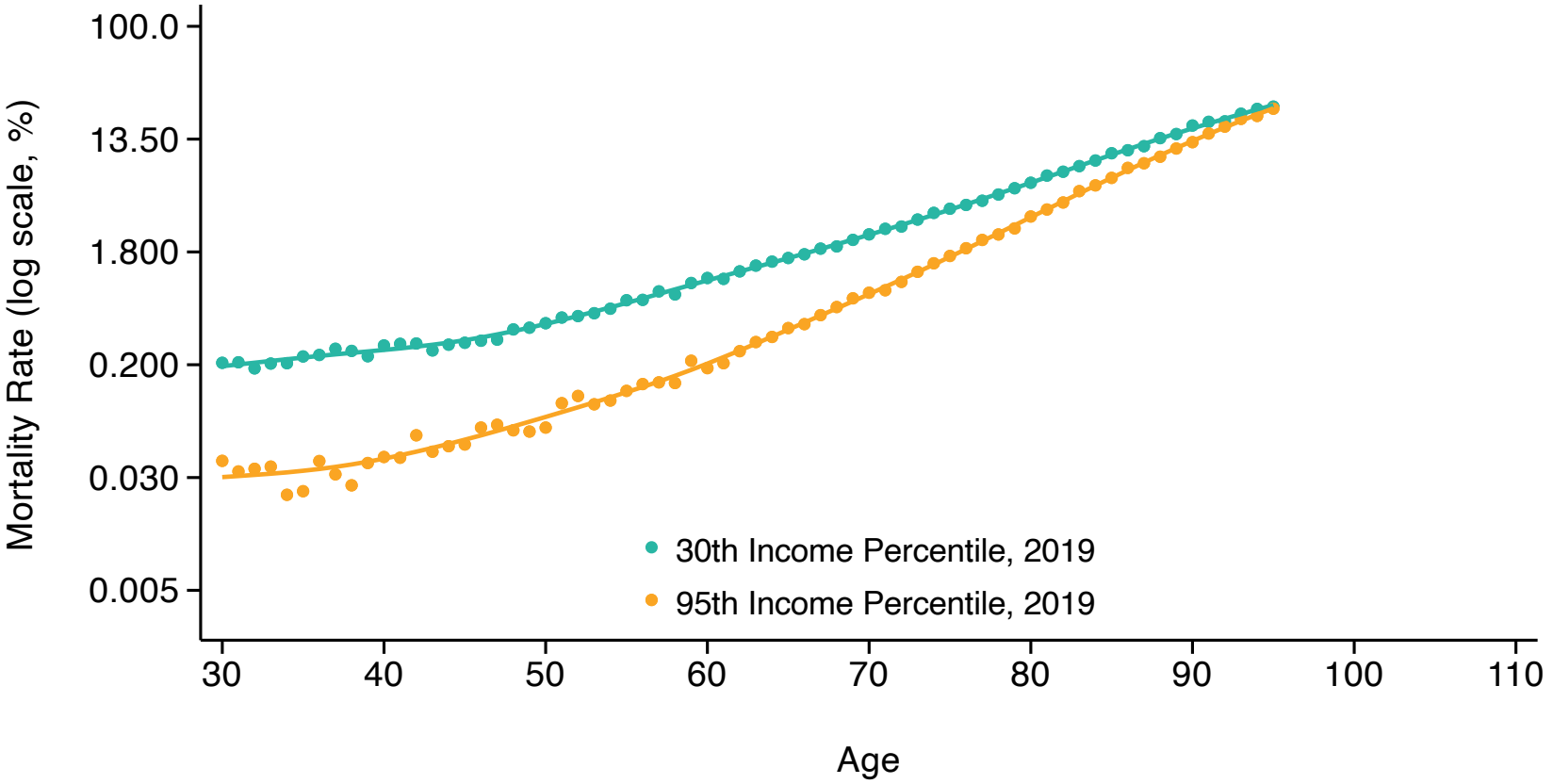
- We aggregate using **period life expectancy**

  - Life expectancy for a hypothetical person who experiences the observed cross-sectional mortality rates in year Y for group G at ages 30, 31, 32, …

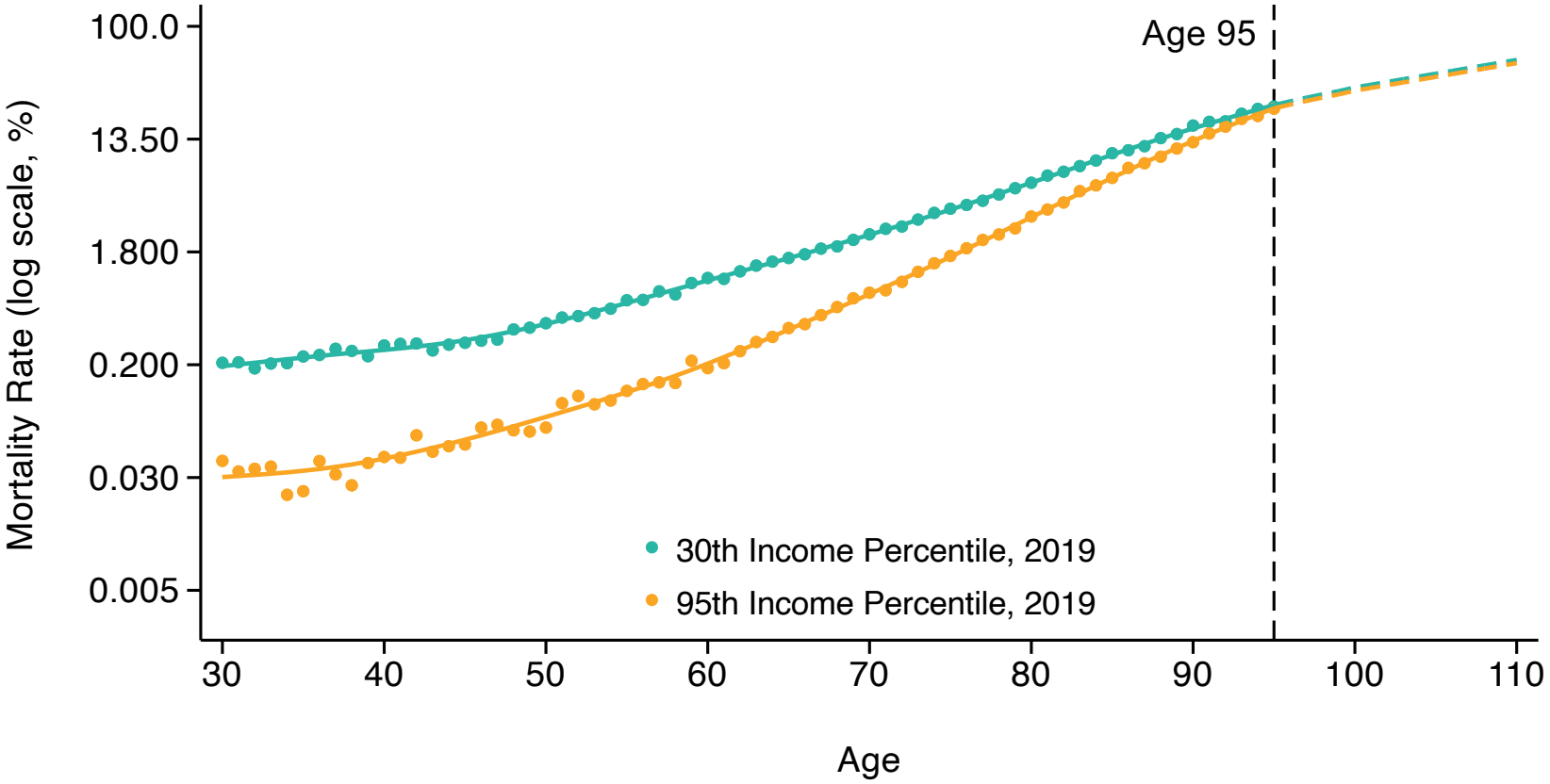
  - Pool by gender using the unweighted average life expectancy of men + women



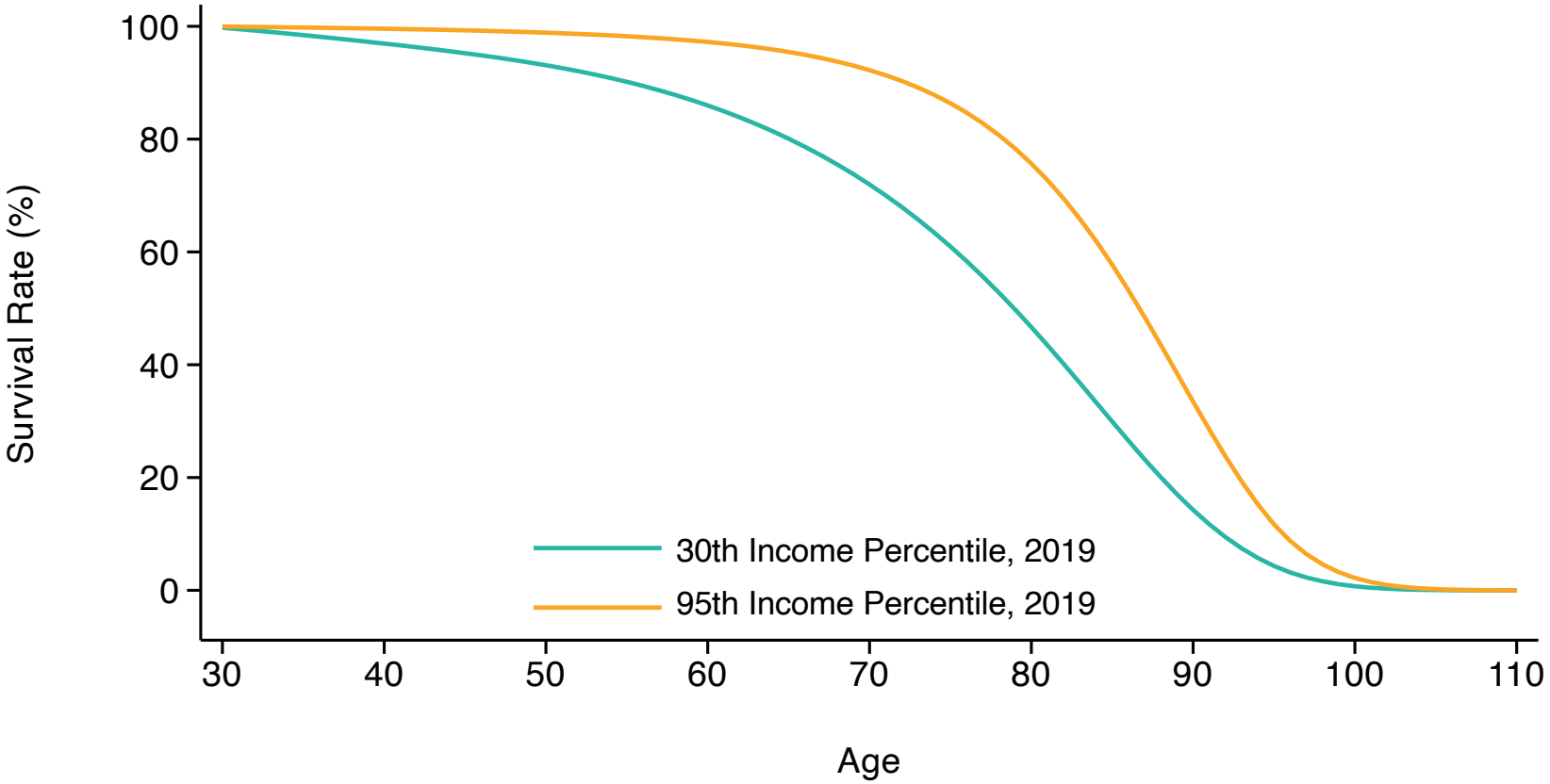
Step 1: Smooth age 30 to 95 mortality rates using a cubic spline



Step 2: Use uniform mortality rates after age 95 from SSA life tables

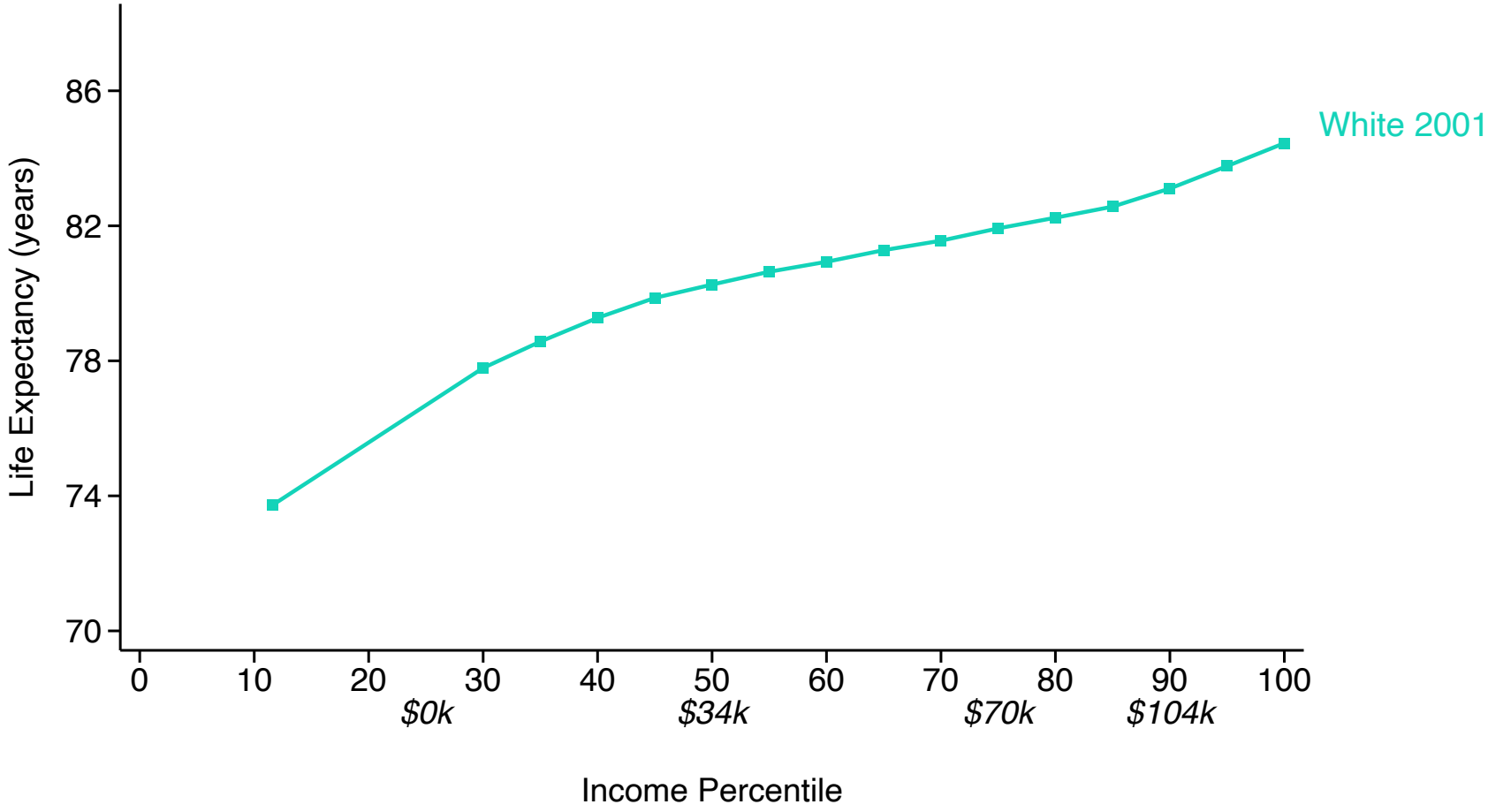


Step 3: Calculate life expectancy as the area under each survival curve

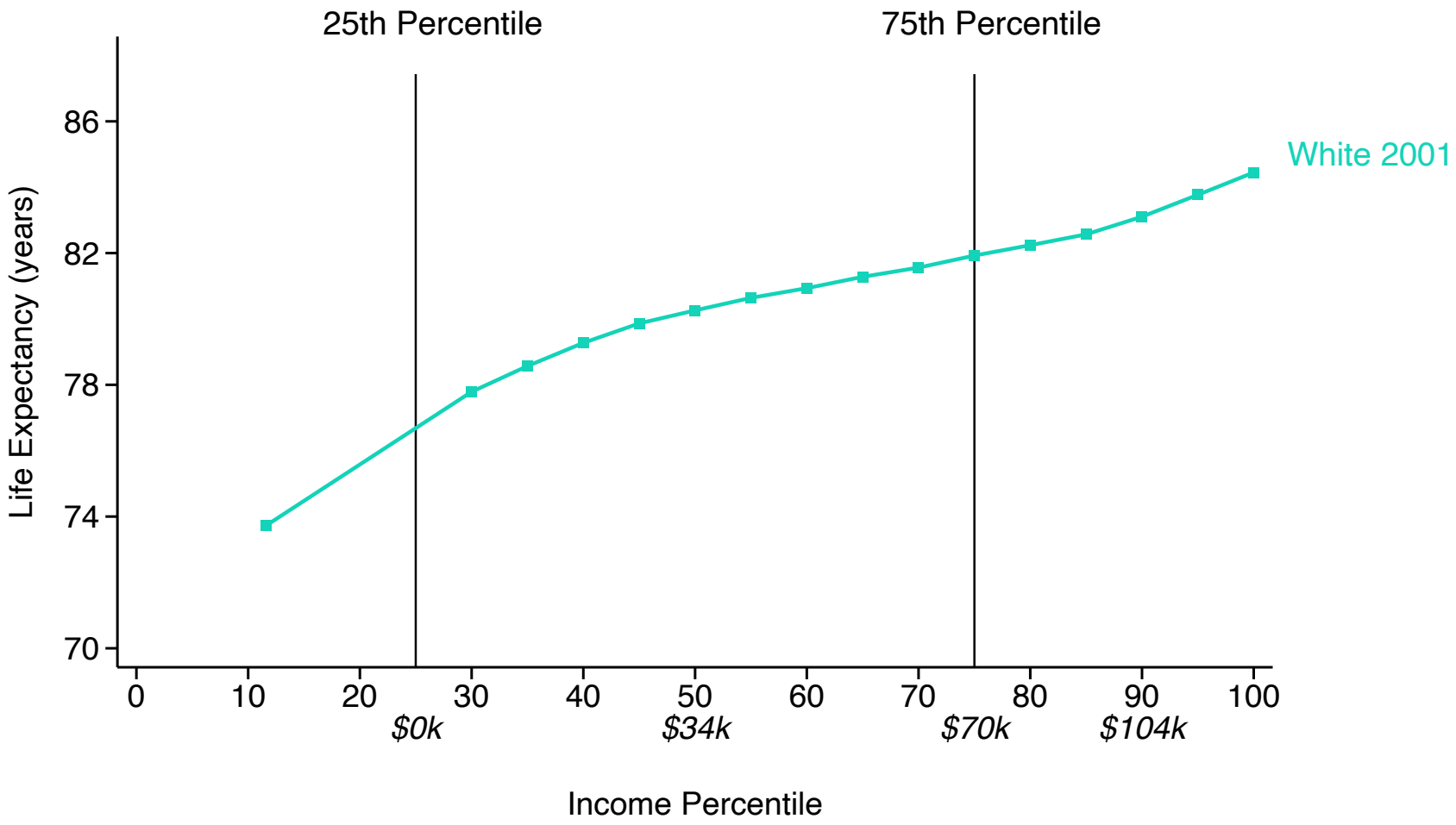


Trends in Life Expectancy by Race and Class

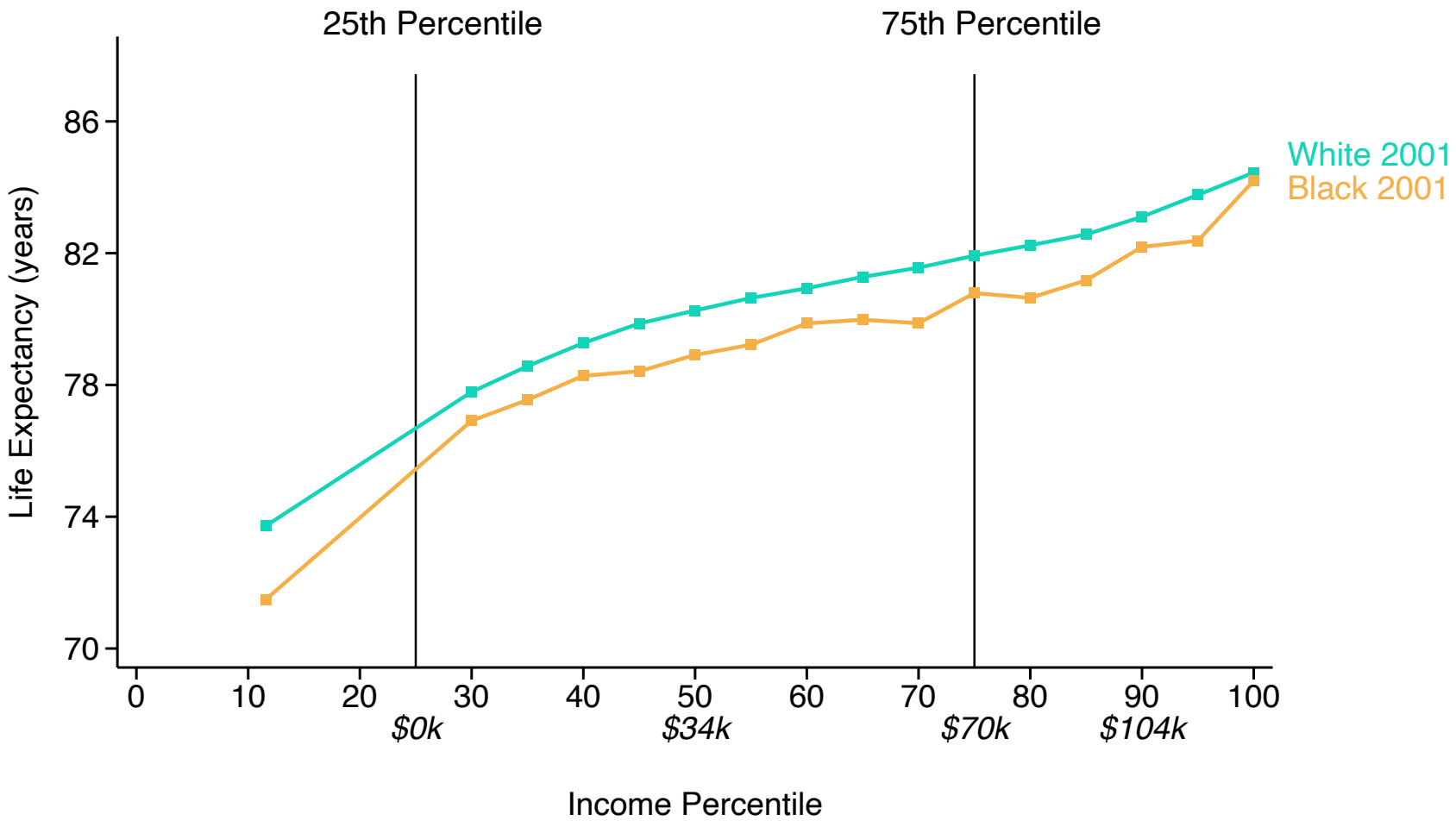
Life Expectancy at Age 30, by Race and Class



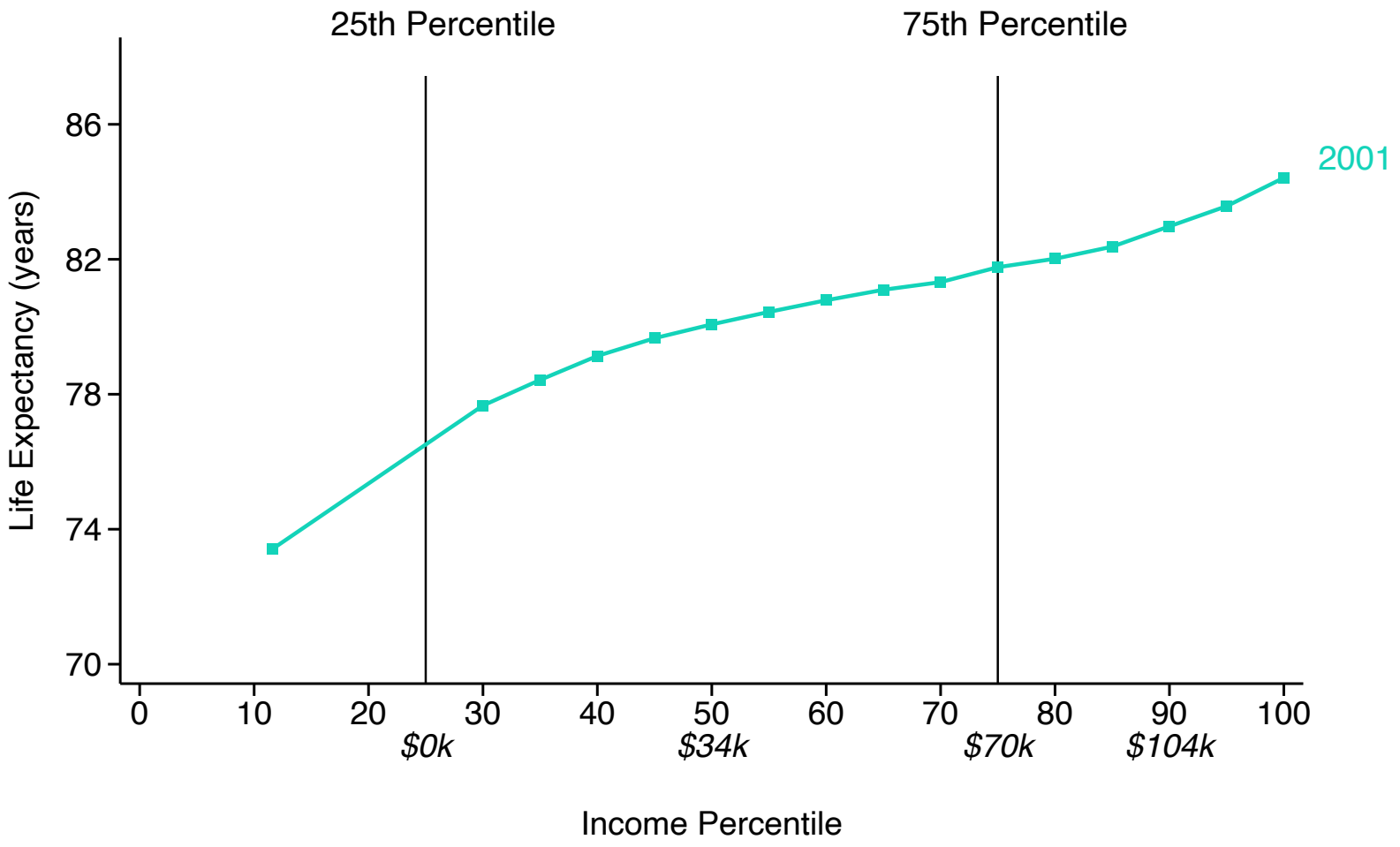
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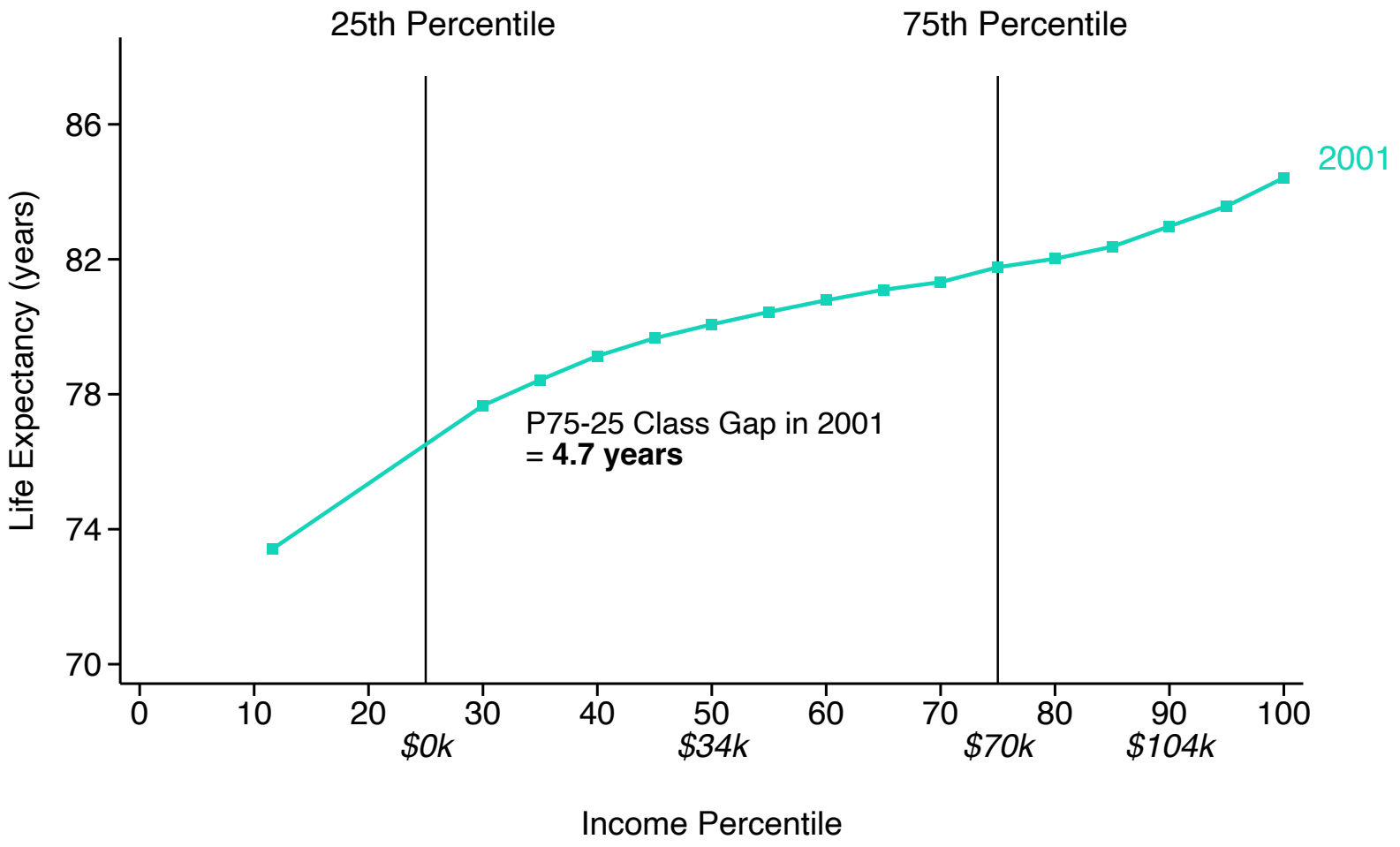
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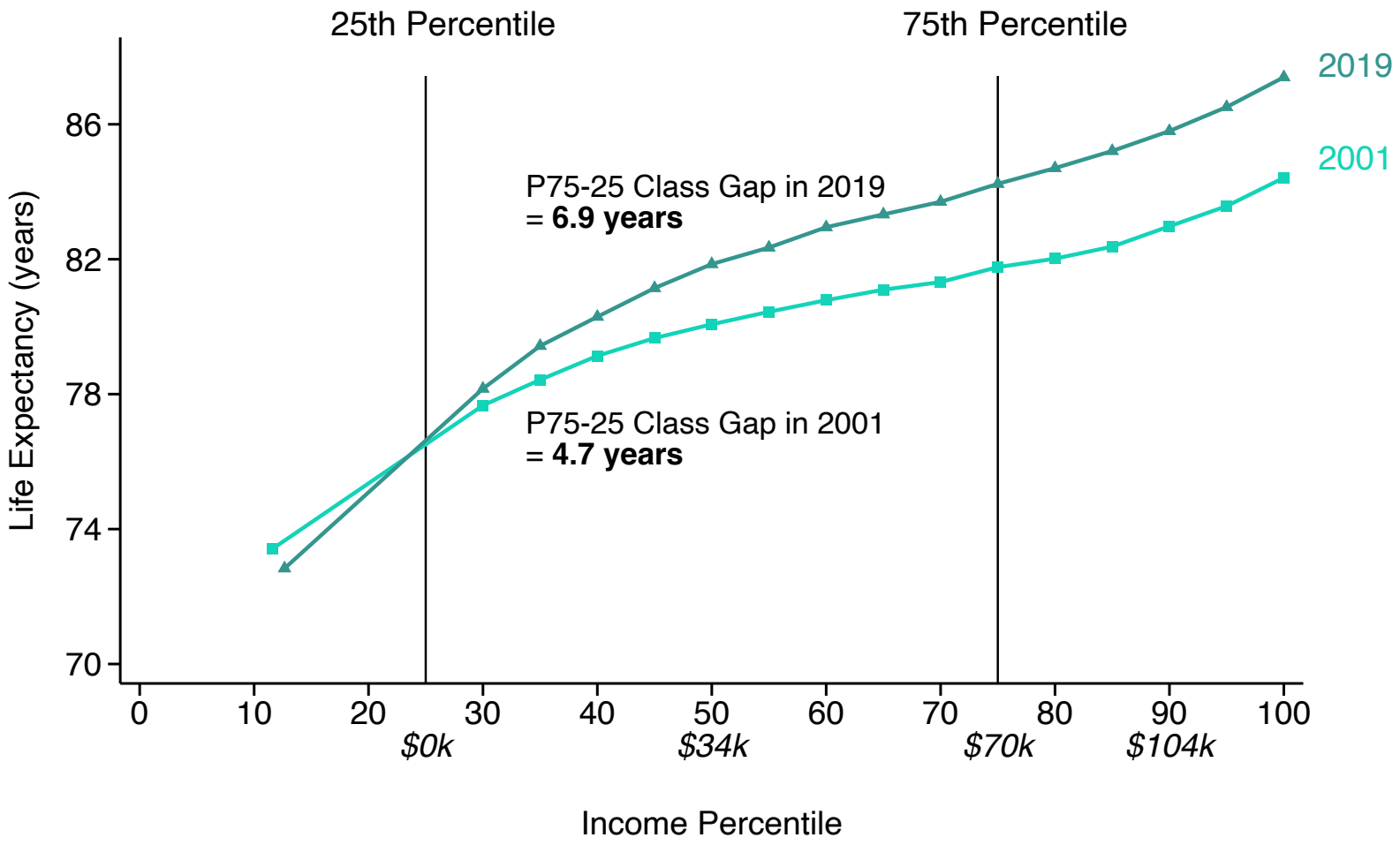
Life Expectancy at Age 30, by Class (Reweighting on Race)



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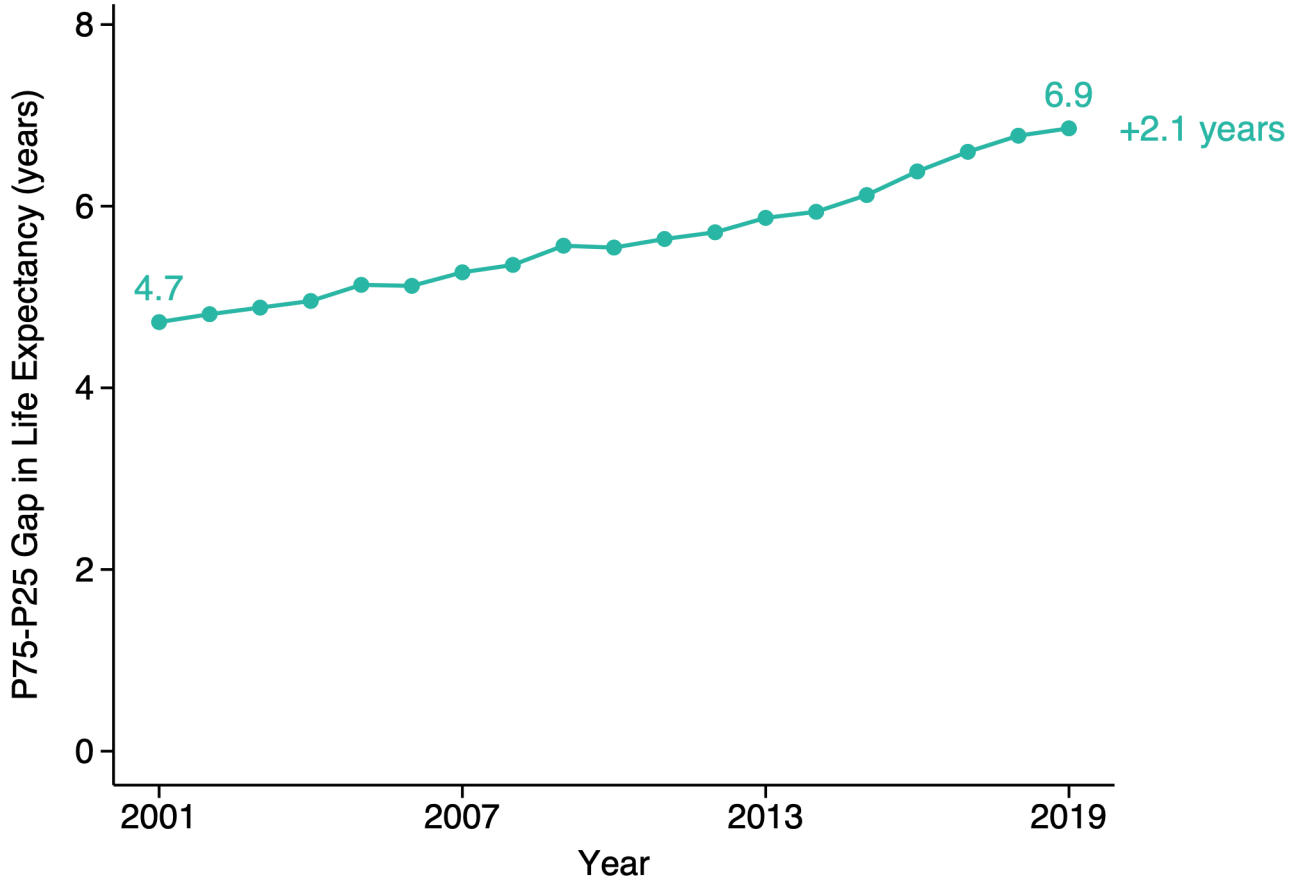


Life Expectancy at Age 30, by Class (Reweighting on Race)

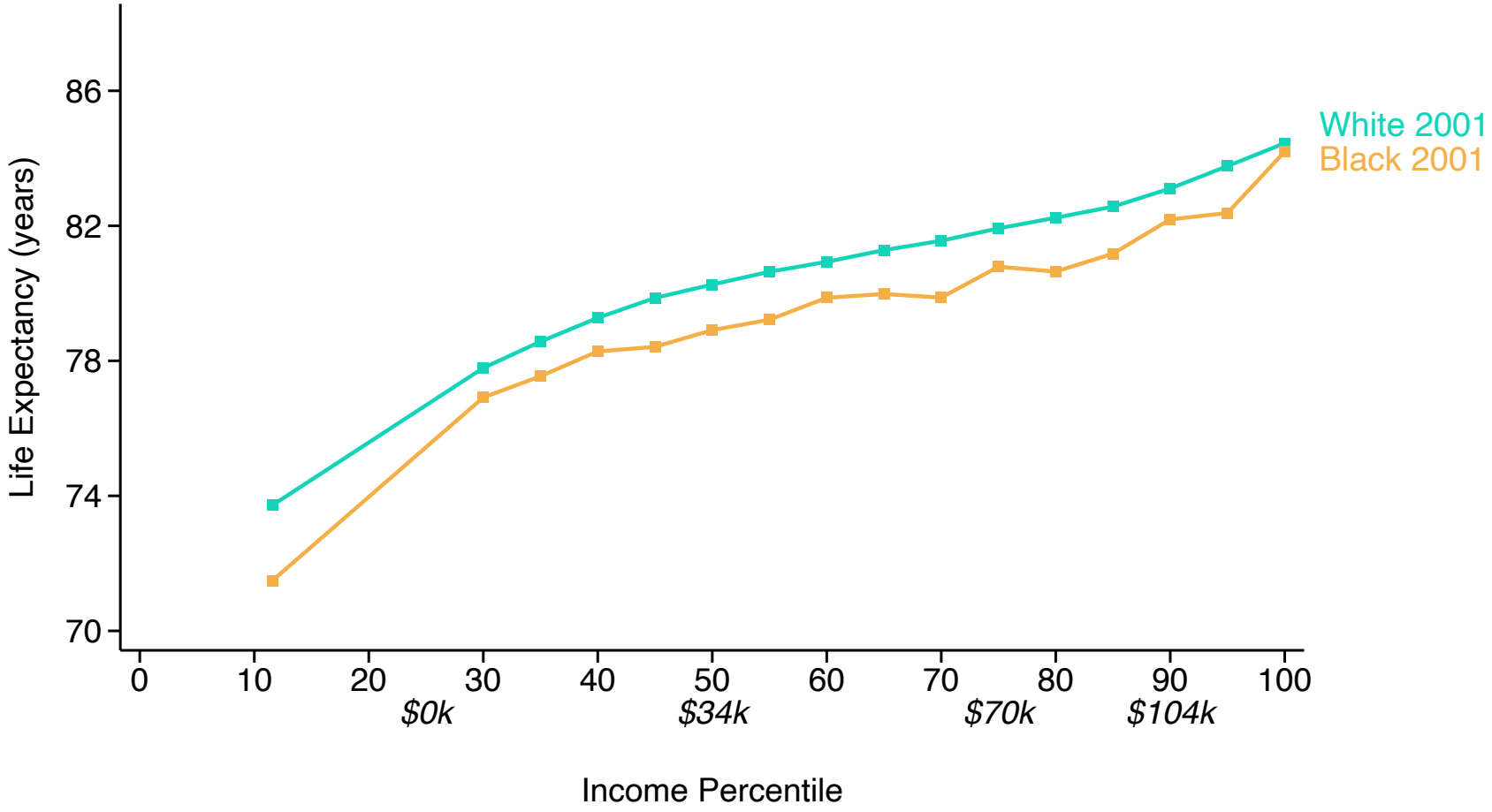


Evolution of Class Gap in Life Expectancy, 2001-2019

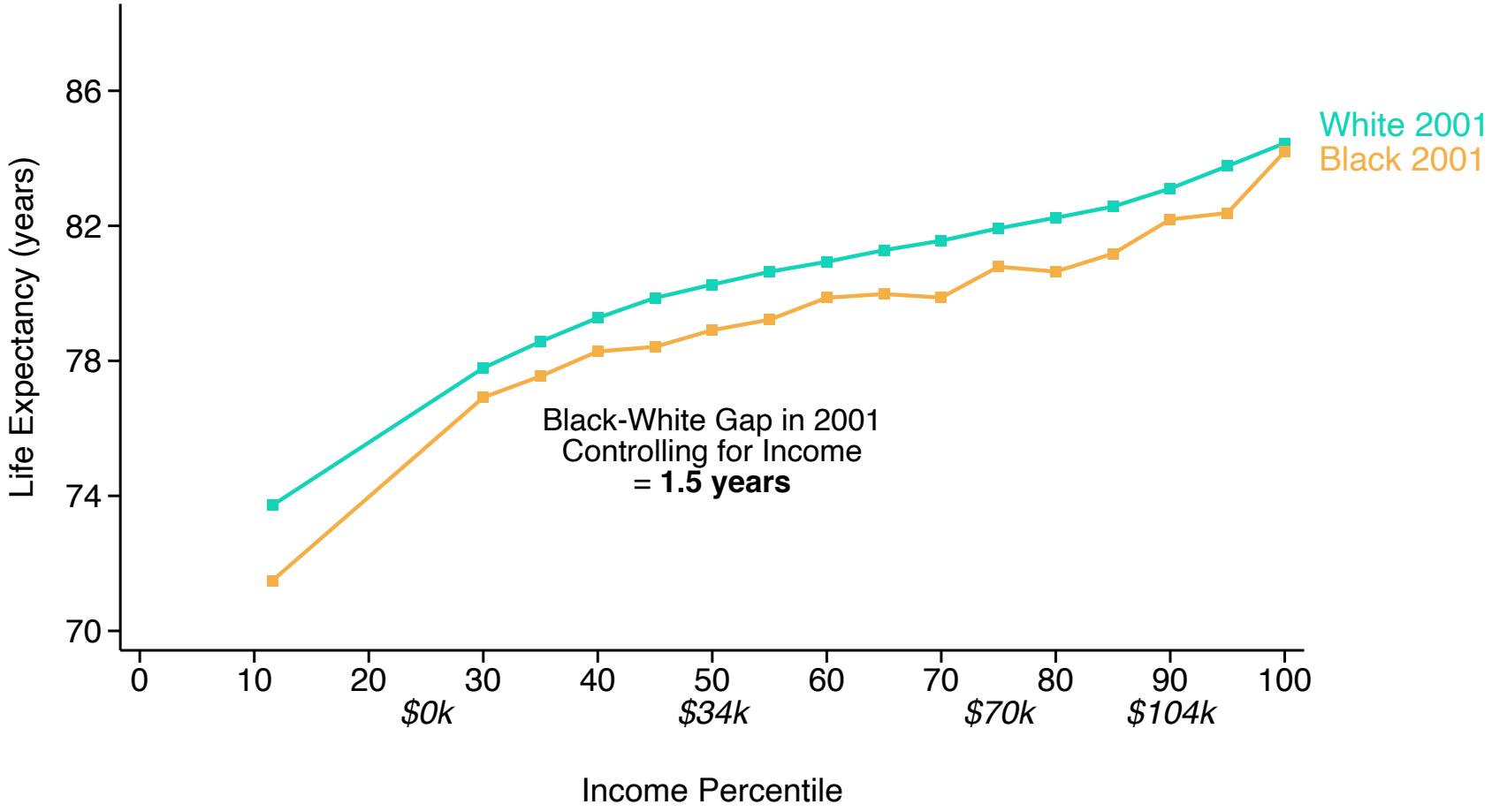
Race-Adjusted Gap in Life Expectancy: 25th vs. 75th Percentile of Household Income Distribution



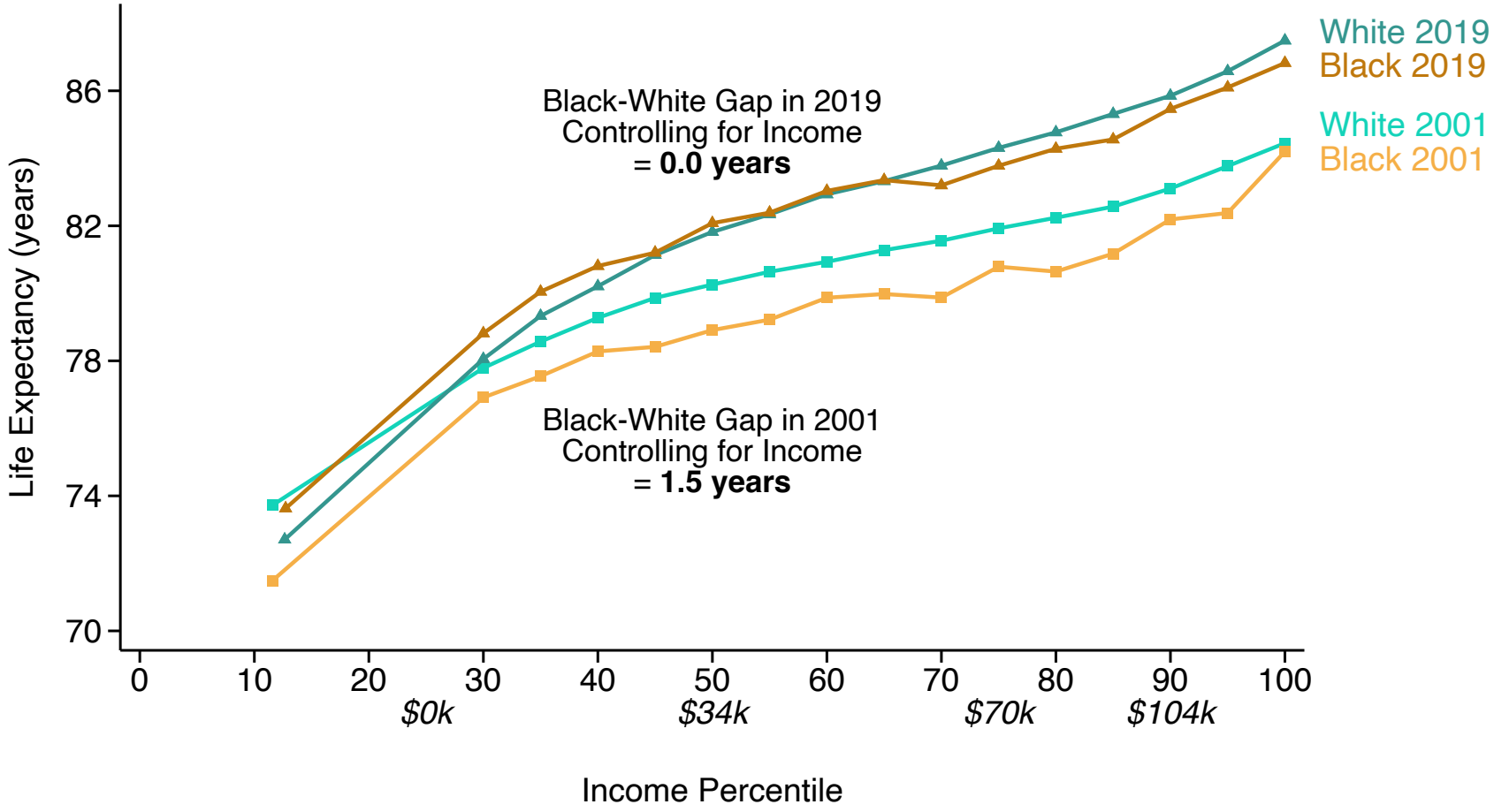
Life Expectancy at Age 30, by Race and Class



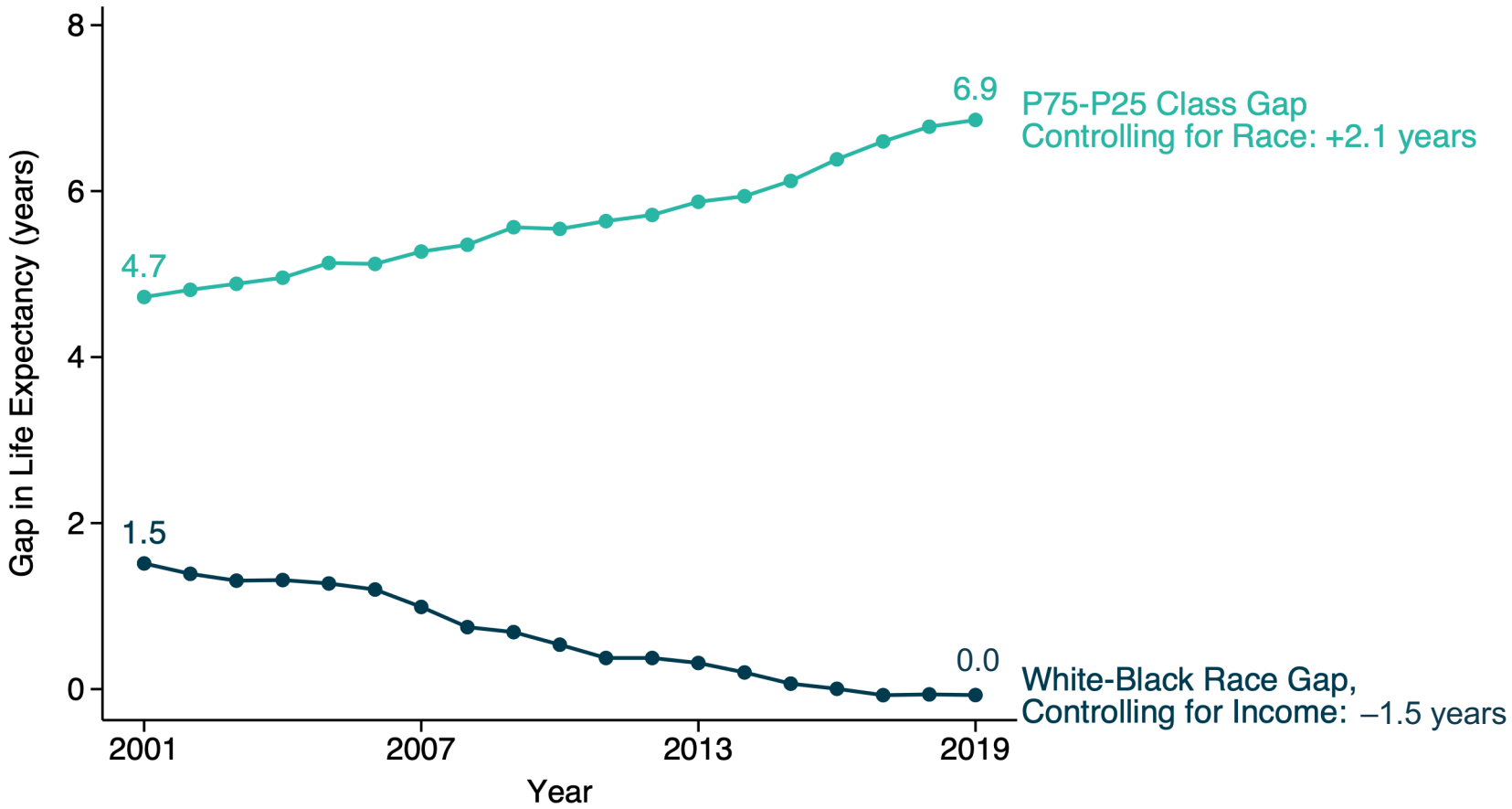
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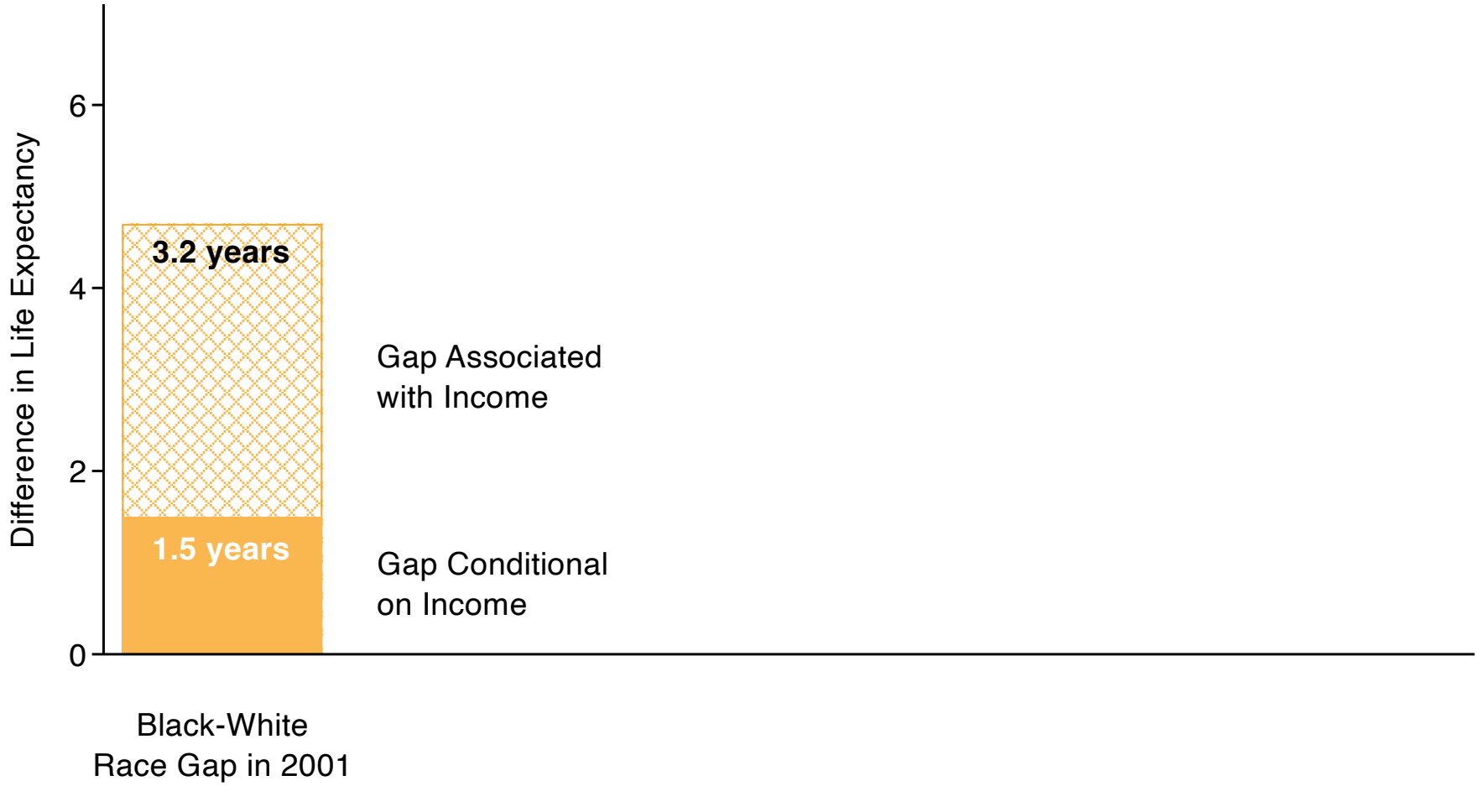
Growing Class Gaps, Shrinking Race Gaps in Life Expectancy, 2001-2019



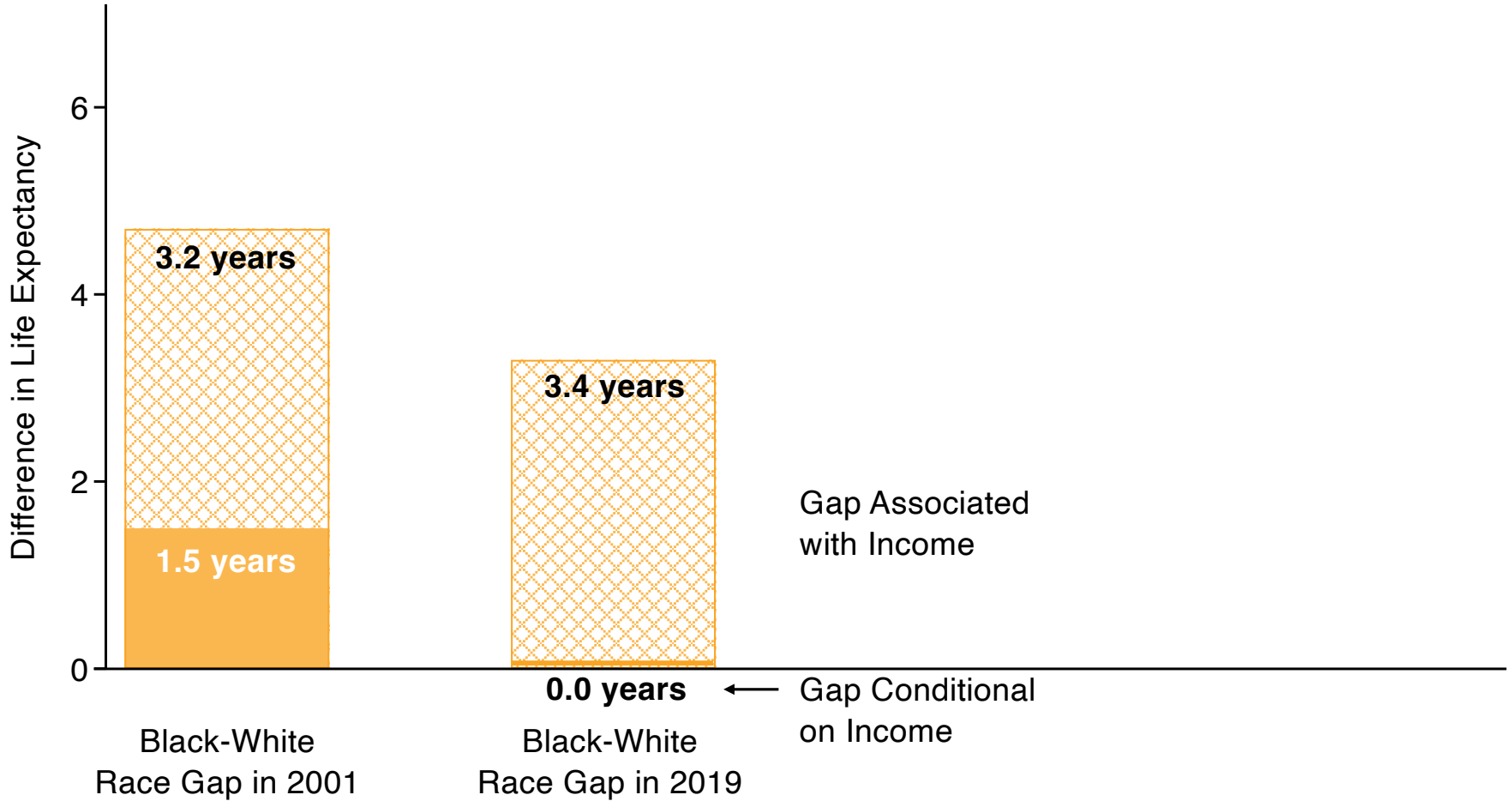
Summary: Shrinking Race Gaps, Growing Class Gaps from 2001-2019



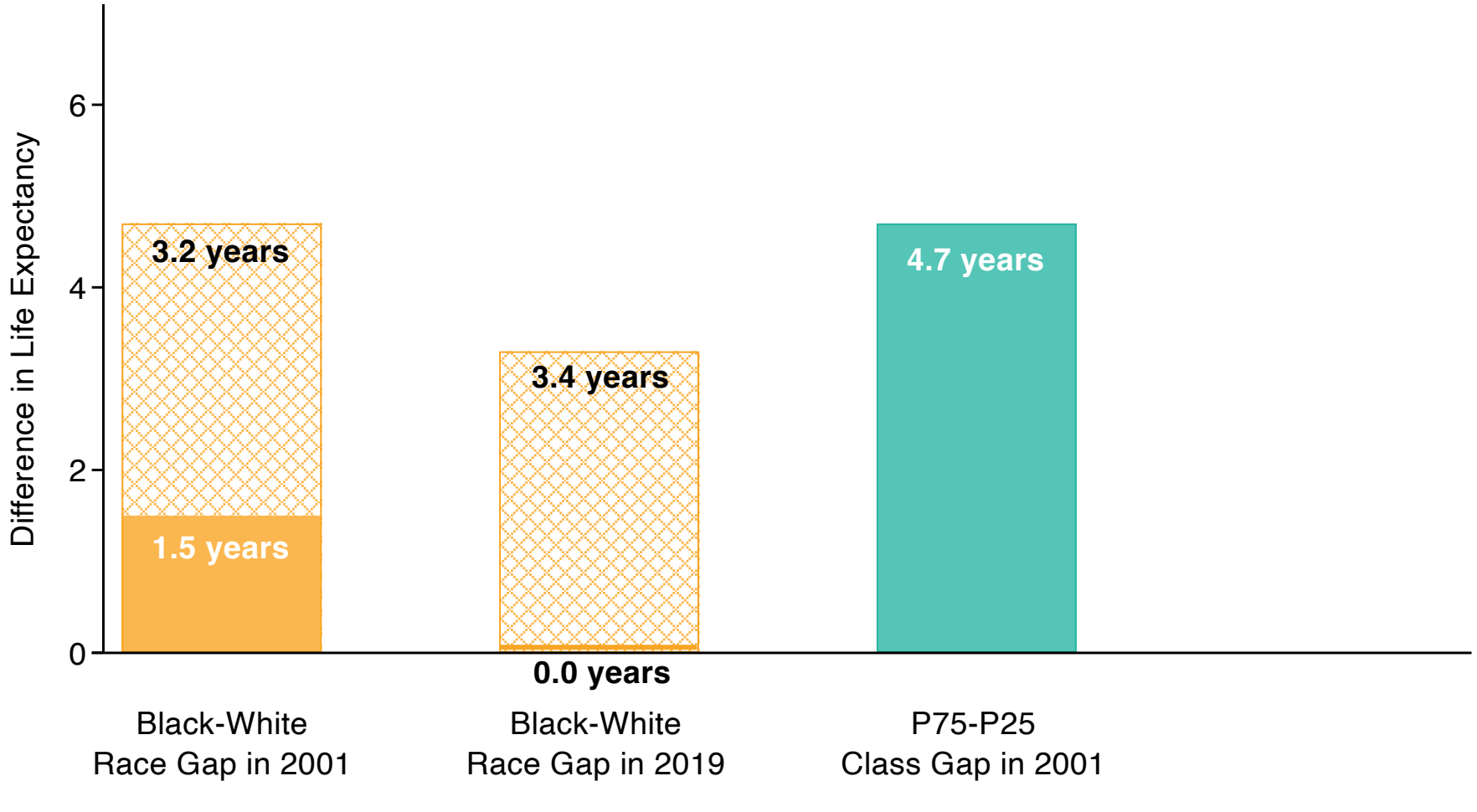
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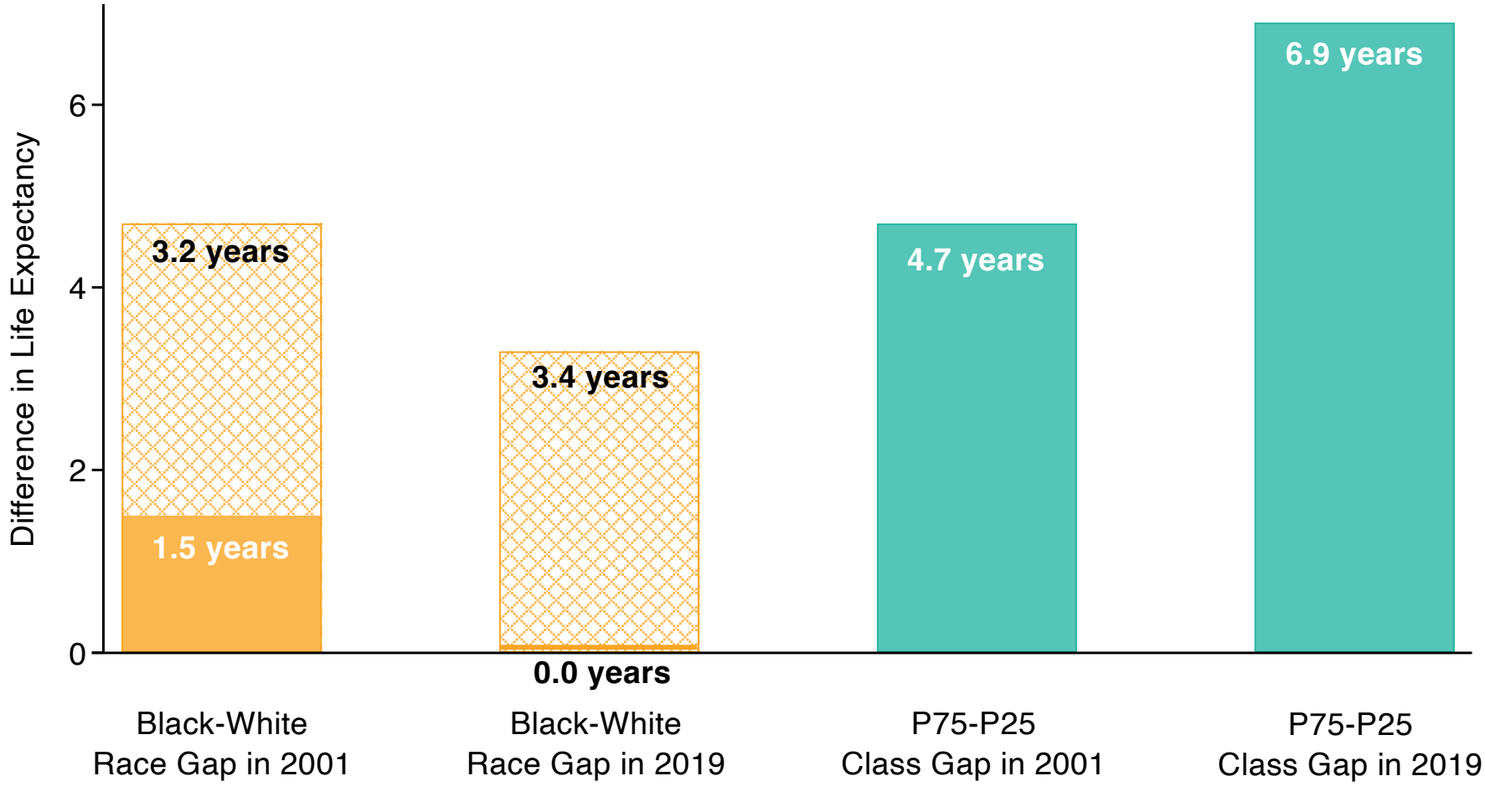
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Mechanisms

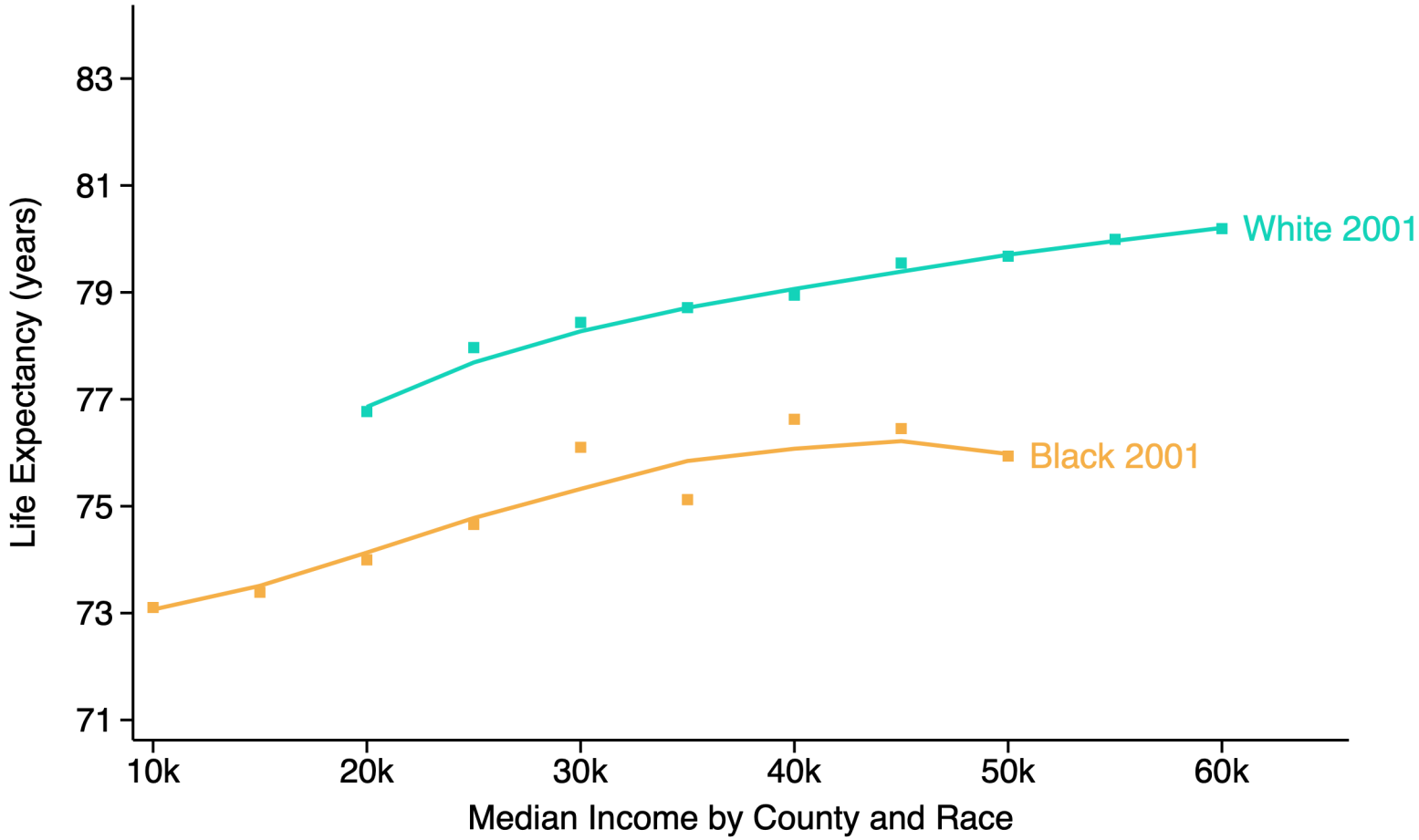
Replication in County-Level Data

County-Level Estimates of Trends by Race and Class

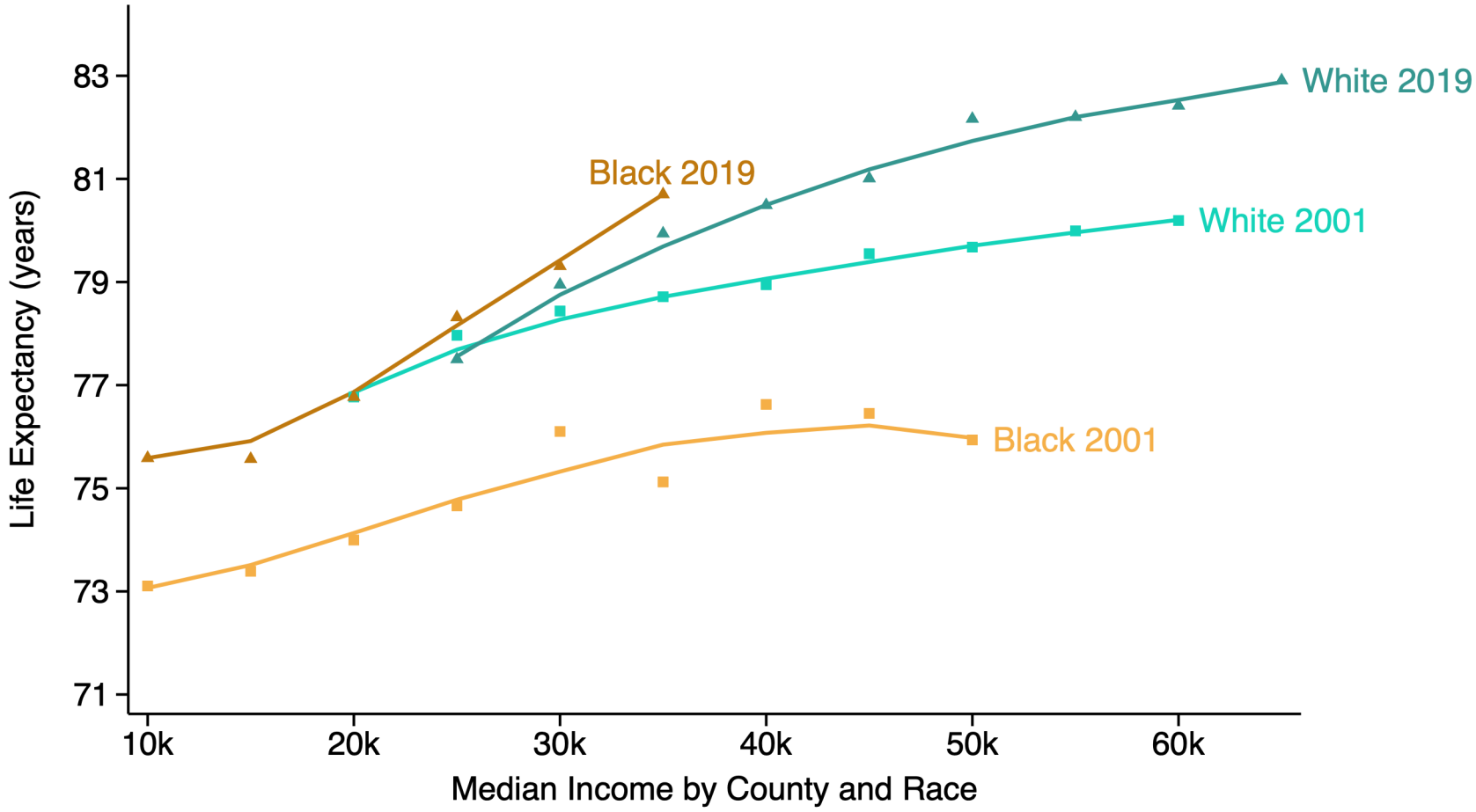
- Microdata lacks information to investigate mechanisms (e.g., causes of death, incidence vs. survival rates, etc.)
- Long tradition in epidemiology of using area-level data to study determinants population health
- Such an **ecological approach** allows us to analyze many factors, but does it accurately capture trends at individual level?
- Replicate preceding analysis using publicly accessible county-level data:
  - County-level life expectancy by race from CDC NCHS
  - County-level income by race from American Community Survey



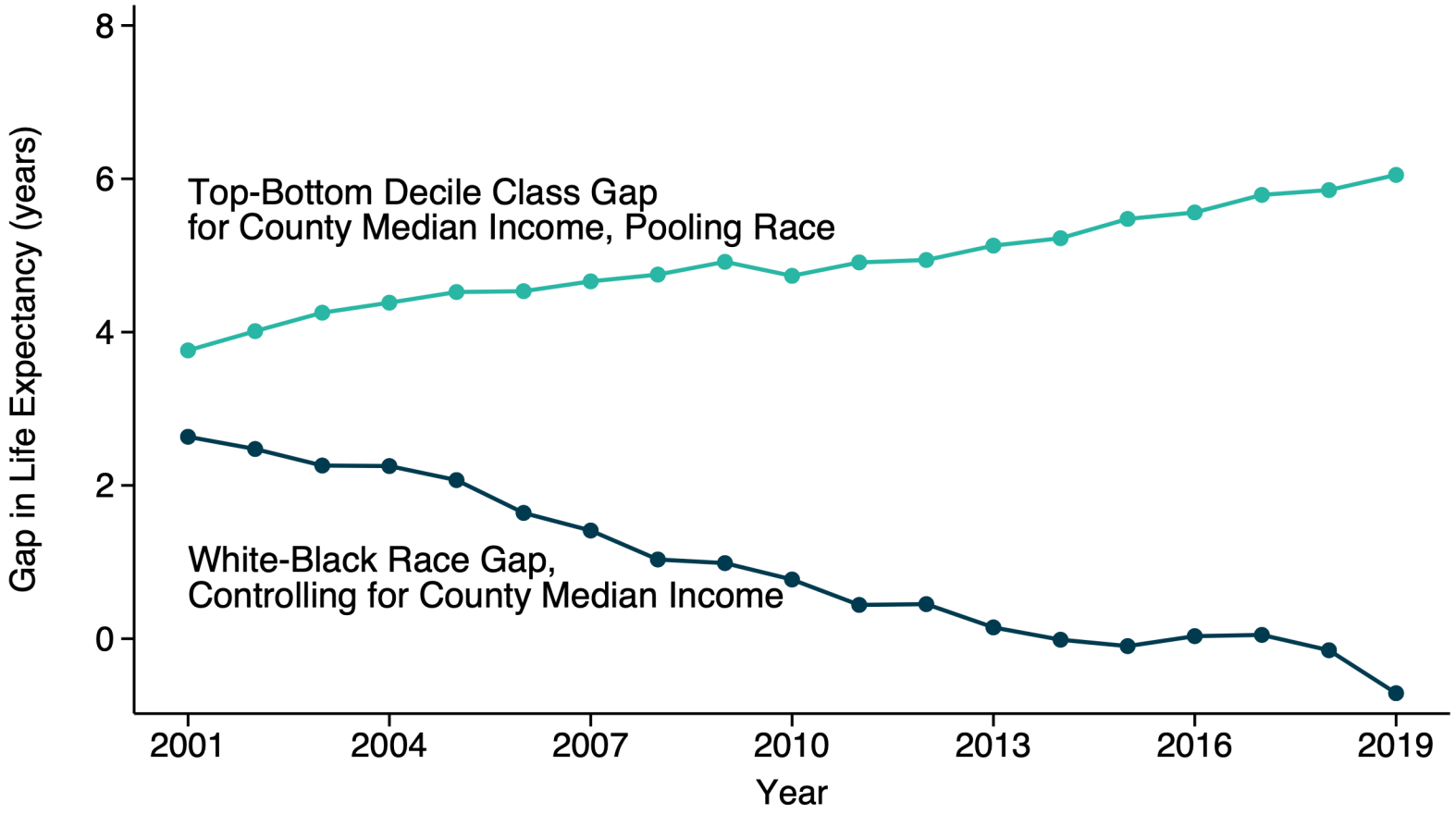
Life Expectancy by Race and Median County-Level Income, 2001



Life Expectancy by Race and Median County-Level Income, 2019



Trends in Race and County-Level Class Gaps in Life Expectancy



Mechanisms

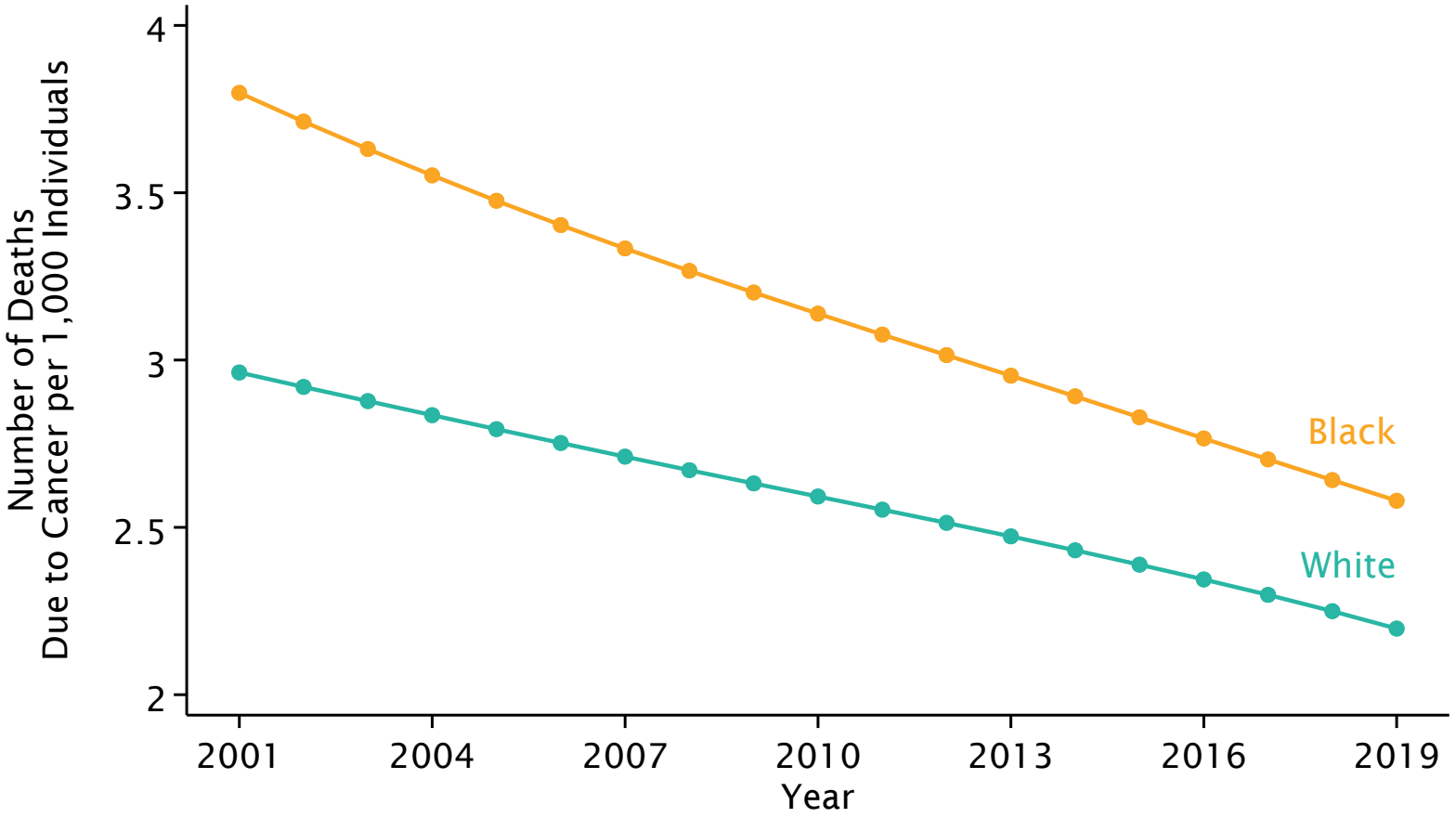
Causes of Death

Which causes of death drove these trends?

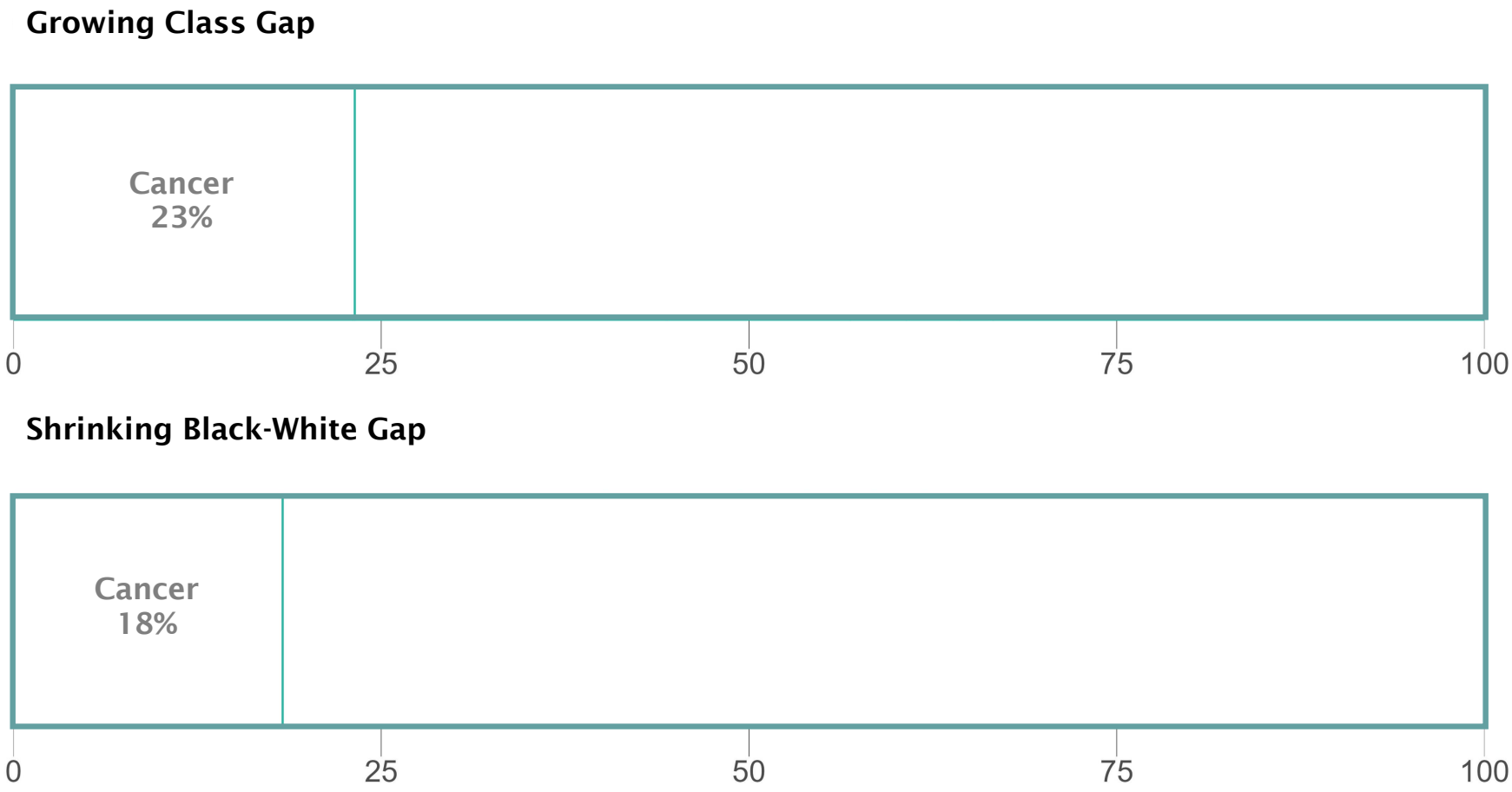
- As a first step toward understanding mechanisms, analyze which causes of death drove divergent trends

- Obtain county-level data on causes of death from the NCHS

Trend in Deaths Due to Cancer

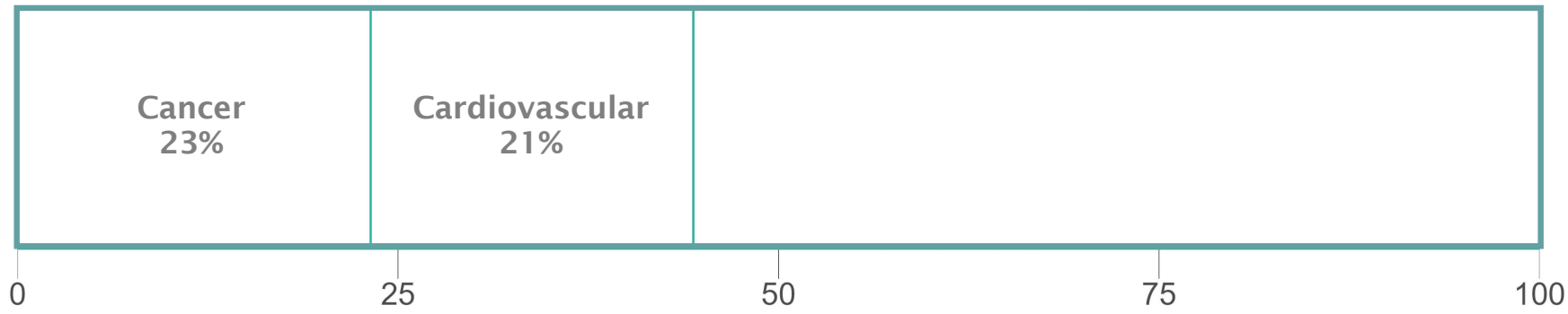


Causes of Death Underlying Growing Class Gaps and Shrinking Race Gaps

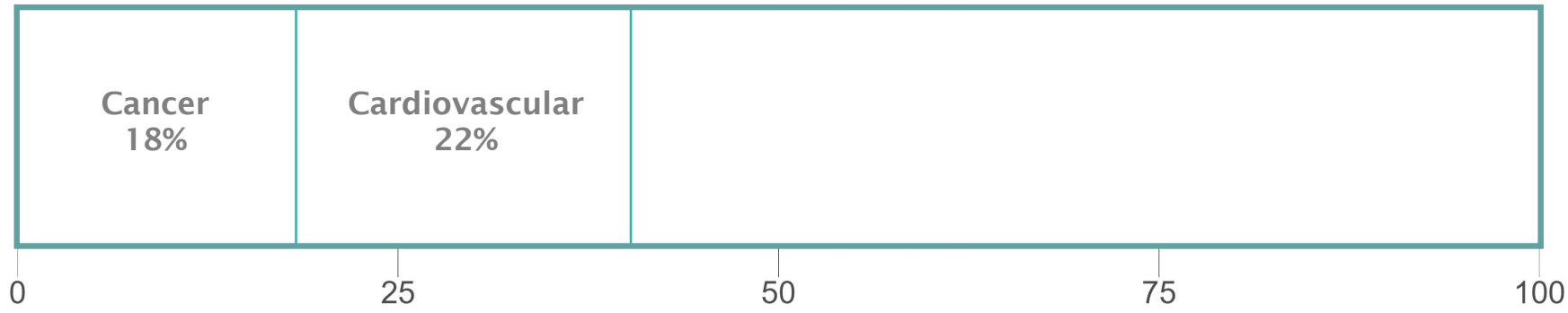


Causes of Death Underlying Growing Class Gaps and Shrinking Race Gaps

Growing Class Gap

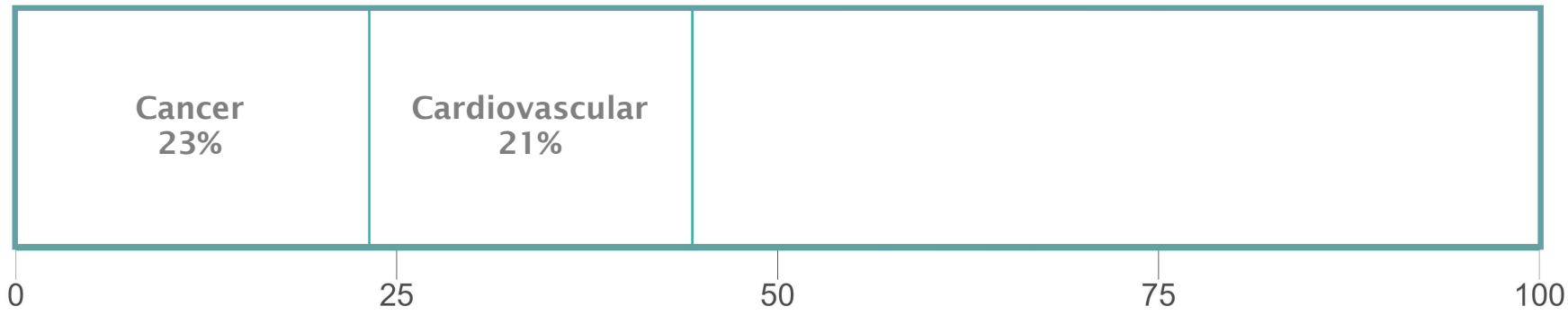


Shrinking Black-White Gap

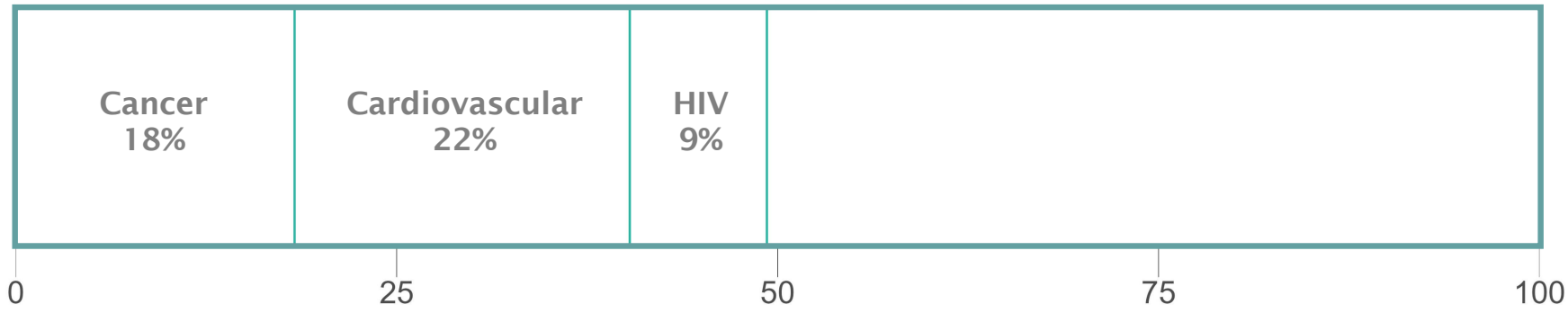


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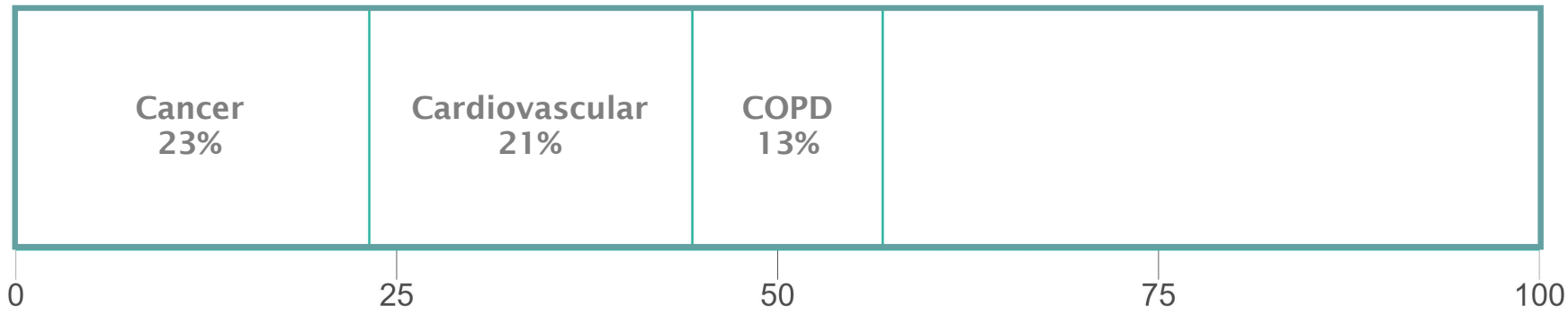


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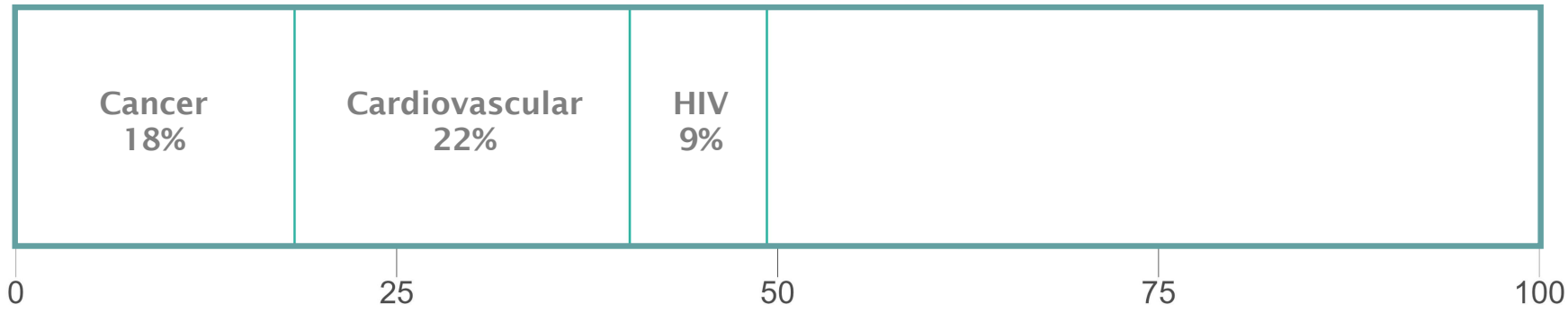


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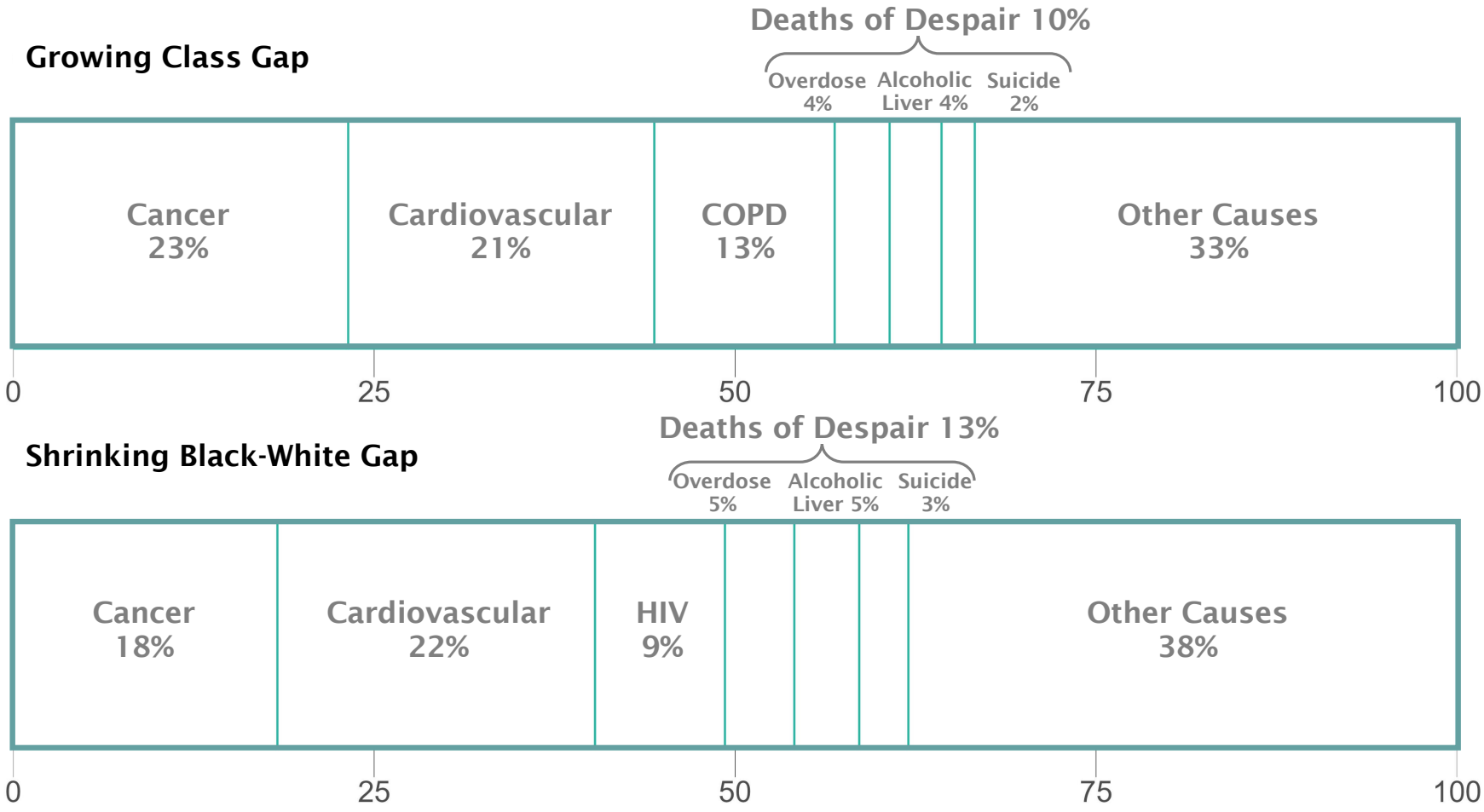
Growing Class Gap



Shrinking Black-White Gap



Causes of Death Underlying Growing Class Gaps and Shrinking Race Gaps



Mechanisms

Technology, Access, and Social Determinants

Potential Mechanisms for Divergent Trends in Life Expectancy

- Three classes of potential explanations for differential changes in life expectancy by race and class:

1. **Technology**: Shifts in technology (e.g., curing a disease) could benefit those with greatest disease burden the most, narrowing disparities

2. **Access**: Differential changes in access to medical treatment (e.g., access to drugs or high-quality hospitals, treatment by doctors)

3. **Social Determinants**: Differential changes in upstream risk factors (e.g., smoking, pollution, stress, vaccinations)



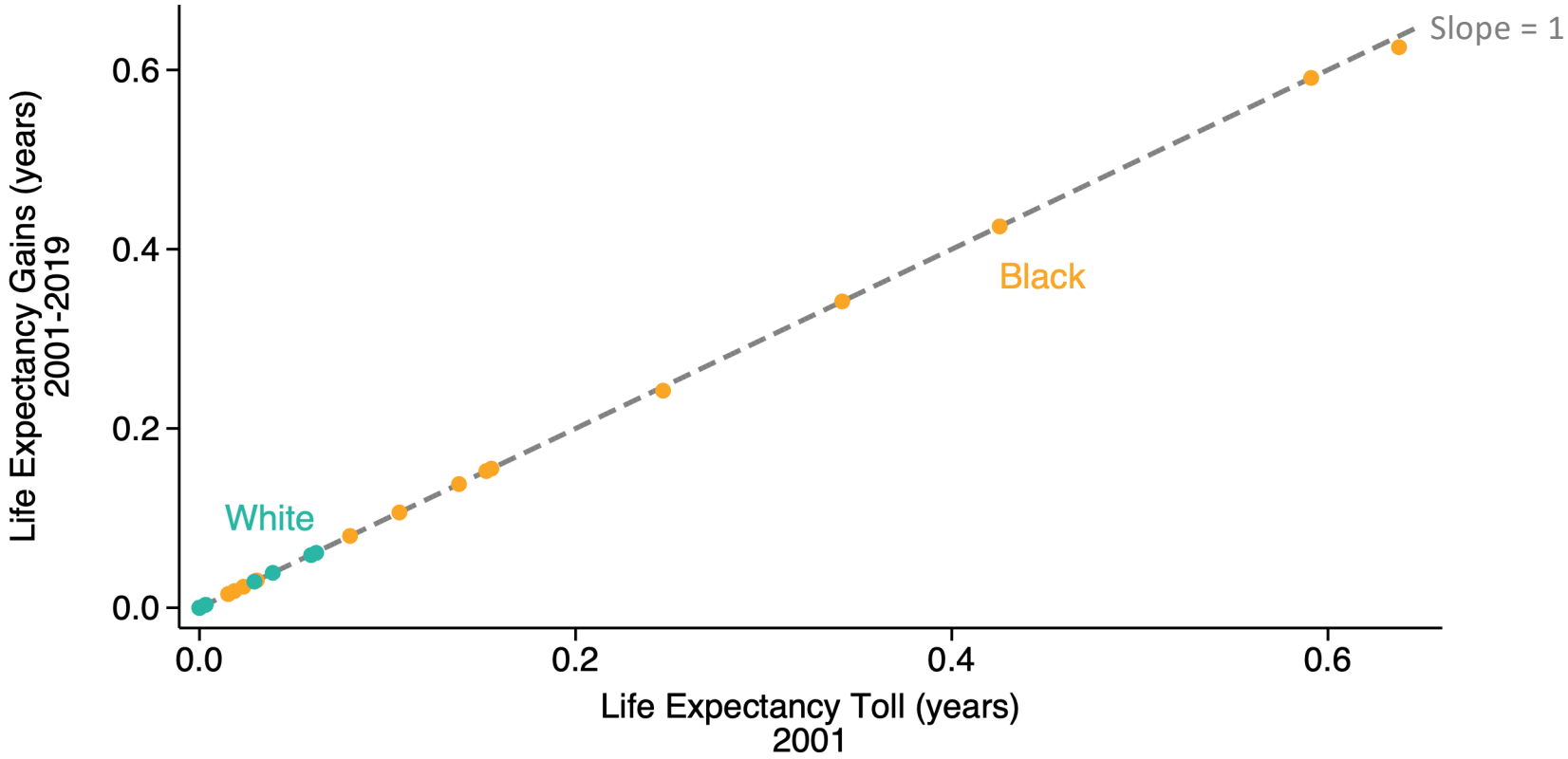
Potential Mechanisms for Divergent Trends in Life Expectancy

- Distinguish between these explanations using three approaches, focusing on most important causes of death identified earlier:

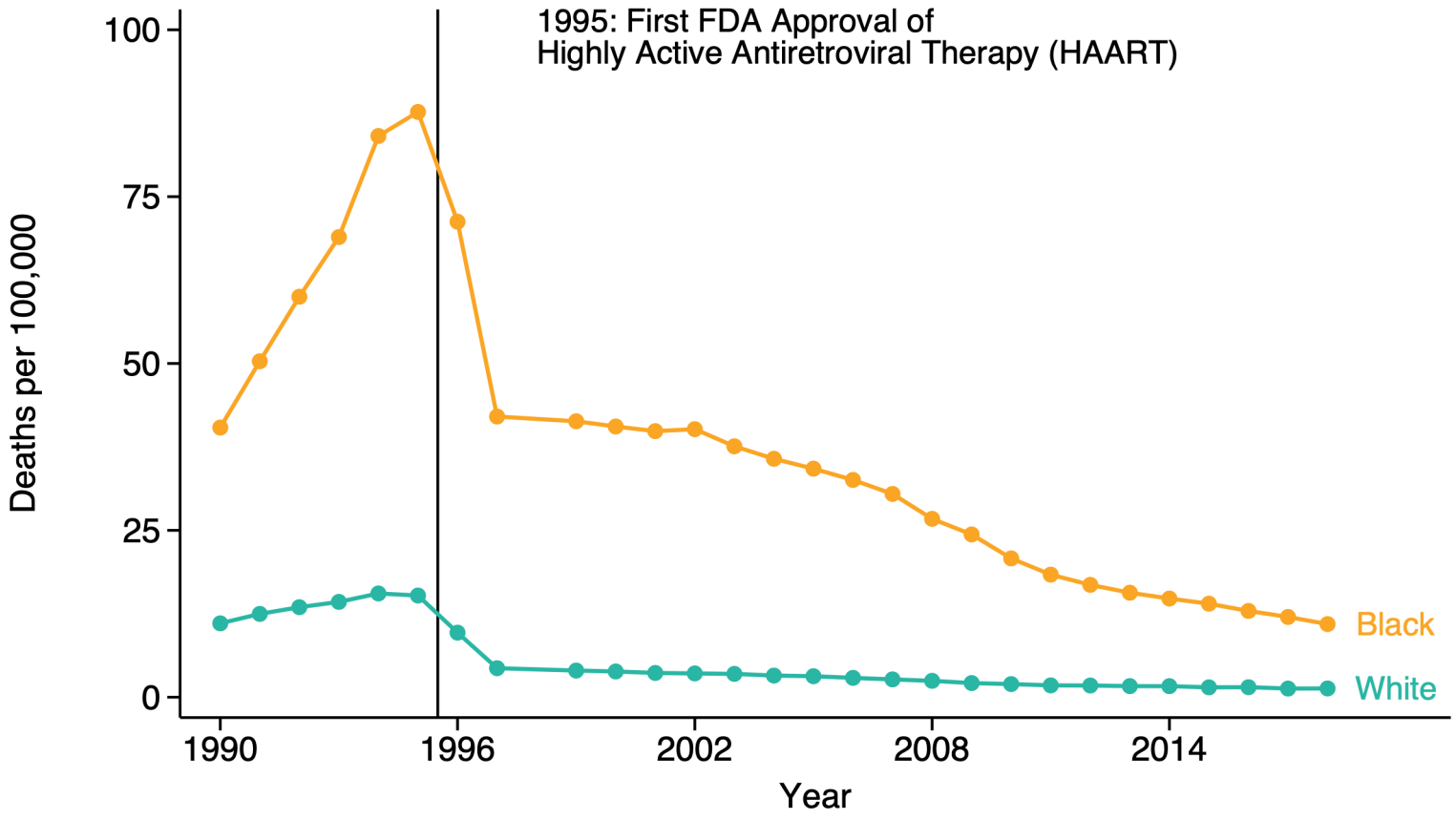
    1. Examine link between **baseline prevalence rates** and changes in life expectancy

Gains in Life Expectancy from Reduction in HIV Deaths vs. Initial Level

By Race and State

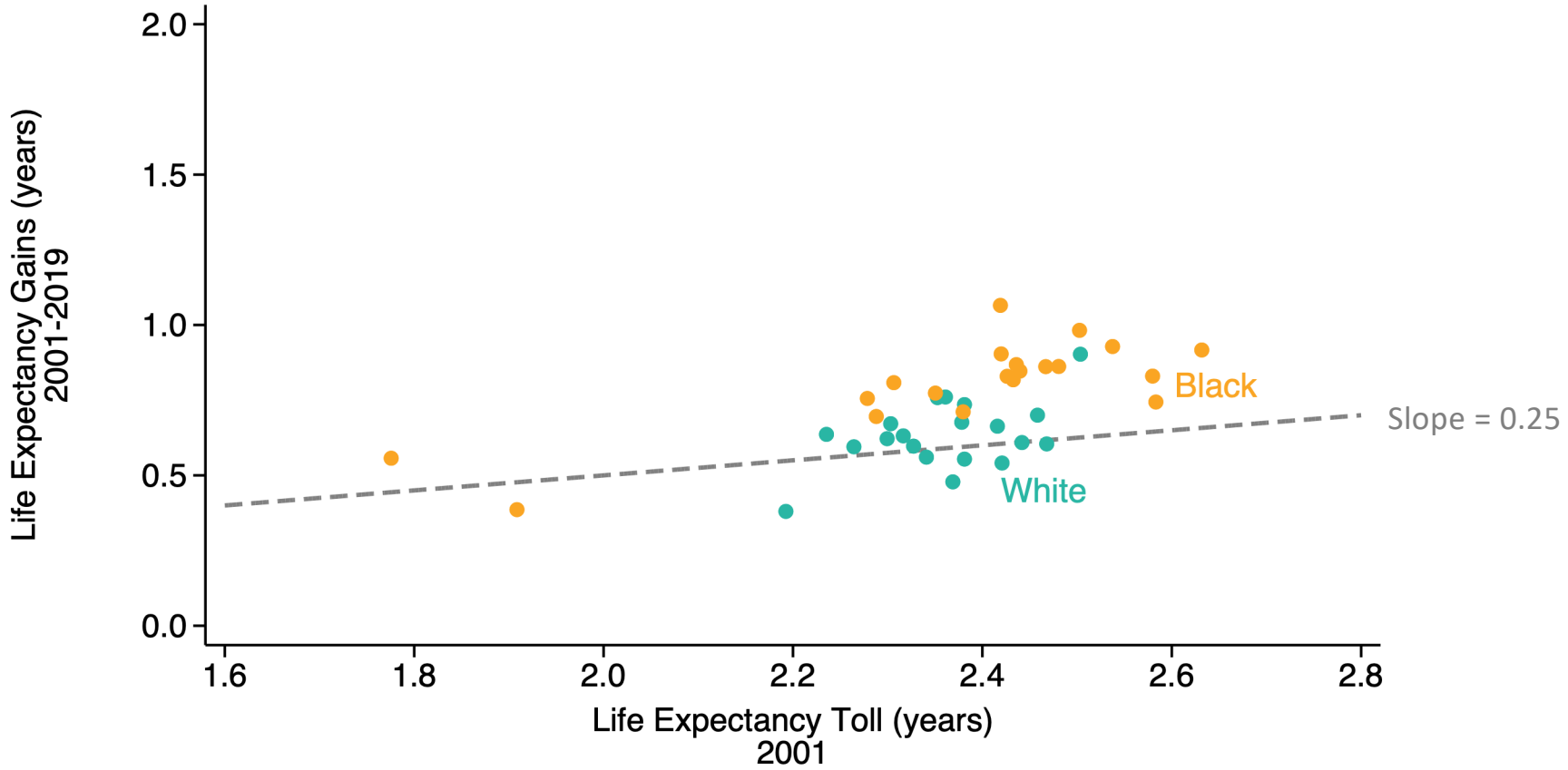


Deaths from HIV by Year for Black vs. White People



Gains in Life Expectancy vs. Initial Levels of Life Years Lost

Cancer



Potential Mechanisms for Divergent Trends in Life Expectancy

- Distinguish between these explanations using three approaches, focusing on most important causes of death identified earlier:

  1. Examine link between **baseline prevalence rates** and changes in life expectancy

  2. Distinguish between changes in **incidence** vs. **survival rates**

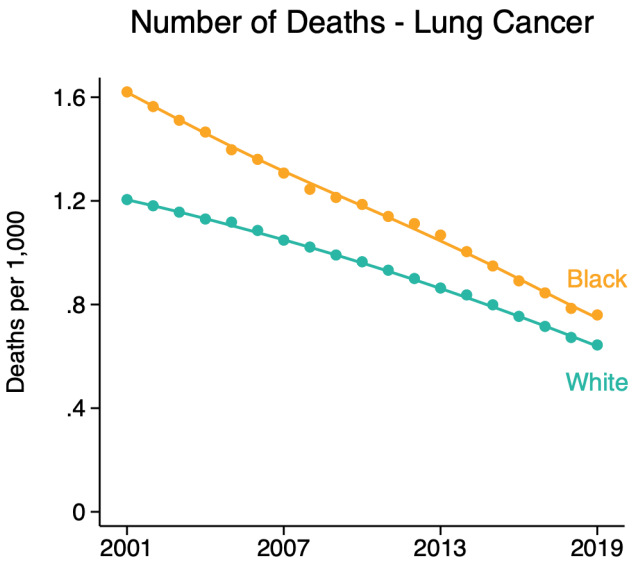
Changes in Incidence vs. Survival in Cancer

- Use data from National Cancer Institute's SEER program (Surveillance, Epidemiology, and End Results)
  - Cancer registry covering 48% of U.S. population, aggregating hospital records
- We compute statistics by year, race and county median income.
- For each cancer type, we decompose:
  - **Incidence:** rates of diagnosis and age at diagnosis
  - **Survival:** 5-year survival rates conditional on diagnosis



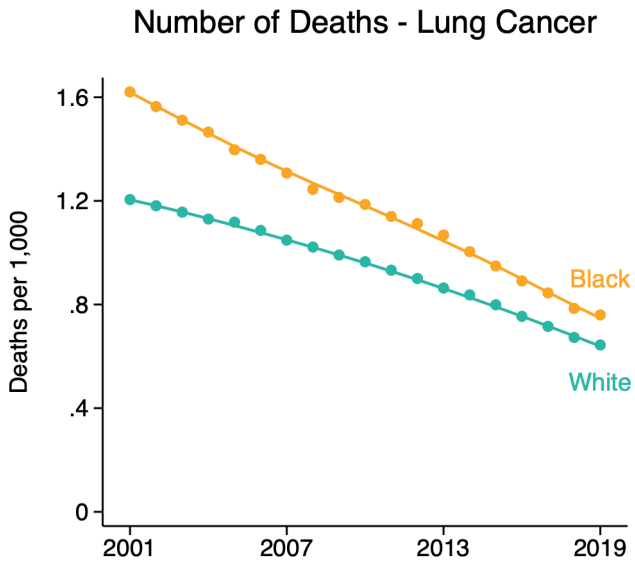
Trends in Incidence vs. Survival by Race for Lung Cancer

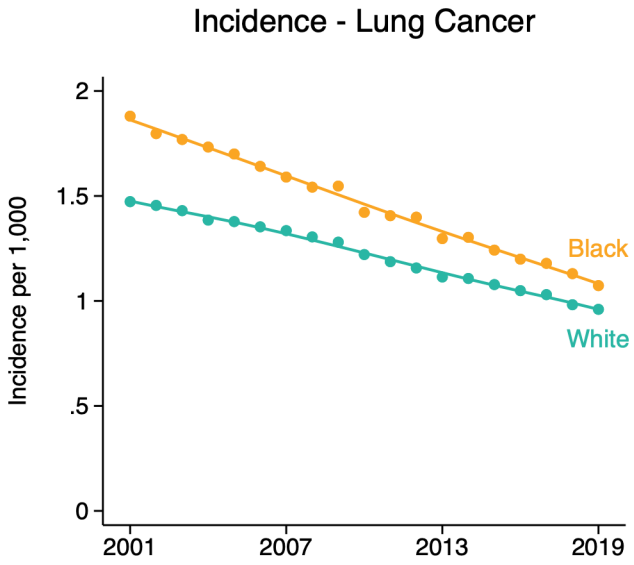
Men Aged 30-84



Trends in Incidence vs. Survival by Race for Lung Cancer

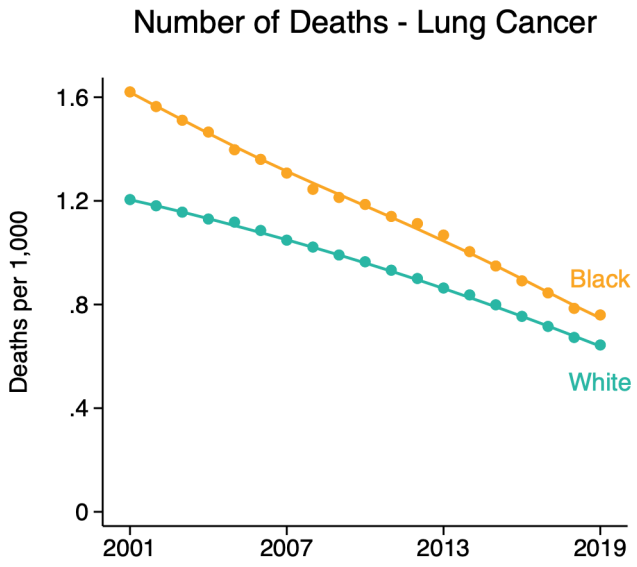
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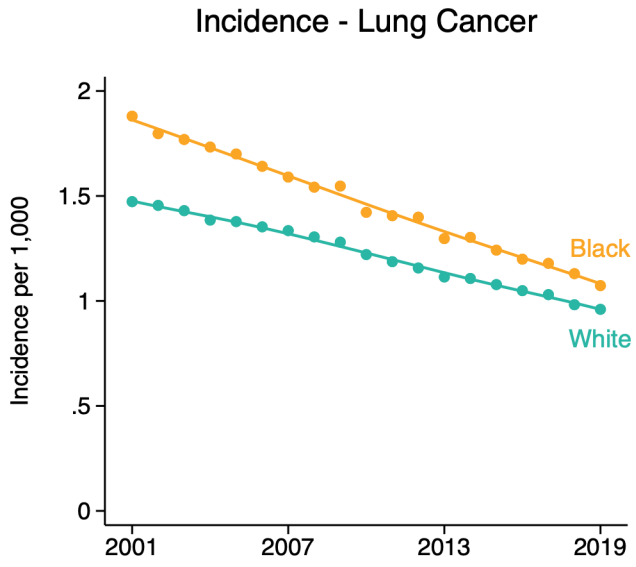


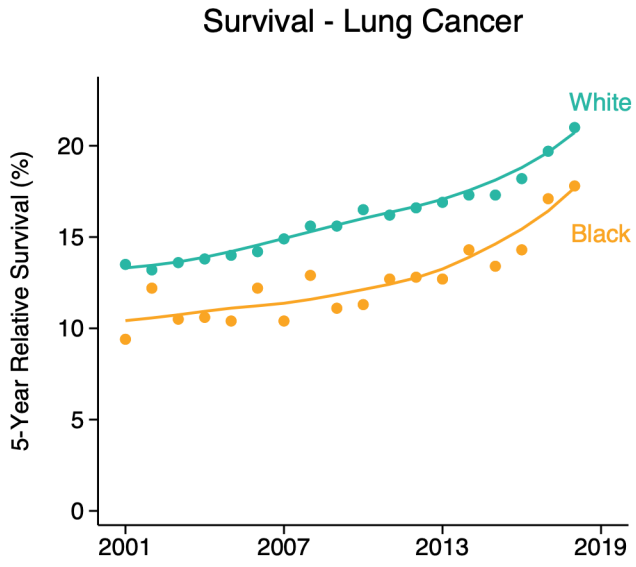


Trends in Incidence vs. Survival by Race for Lung Cancer

Men Aged 30-84

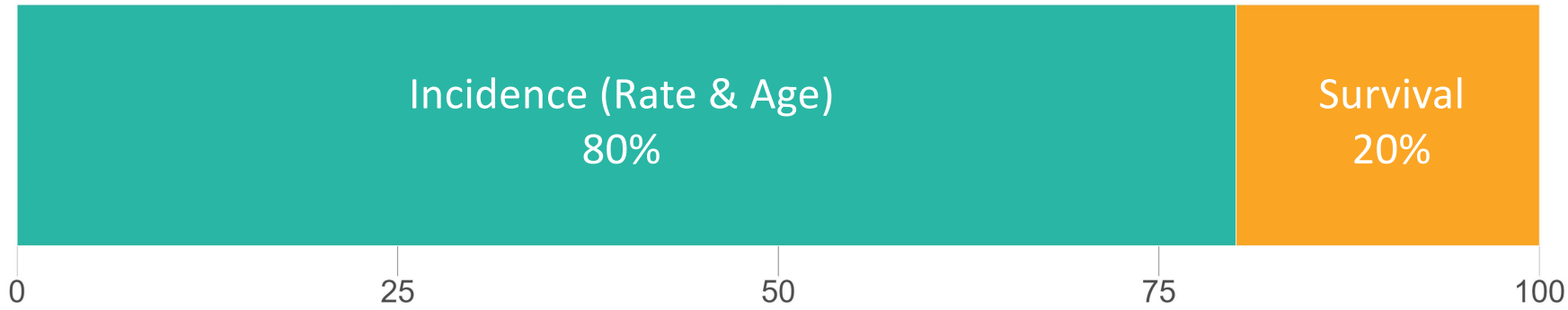




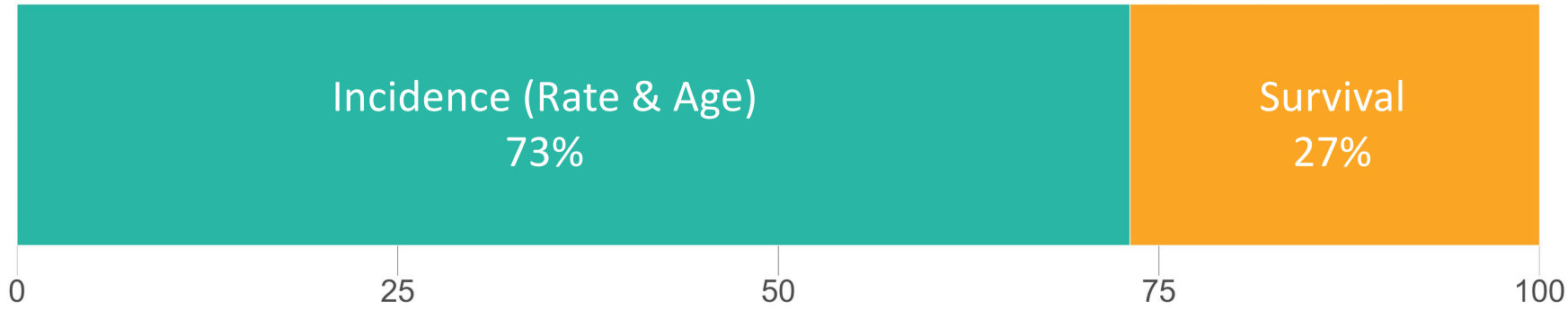


Differential Trends in Loss of Life from Cancer: Incidence vs. Survival

Growing Class Gap in Cancer Mortality



Shrinking Black-White Gap in Cancer Mortality



Potential Mechanisms for Divergent Trends in Life Expectancy

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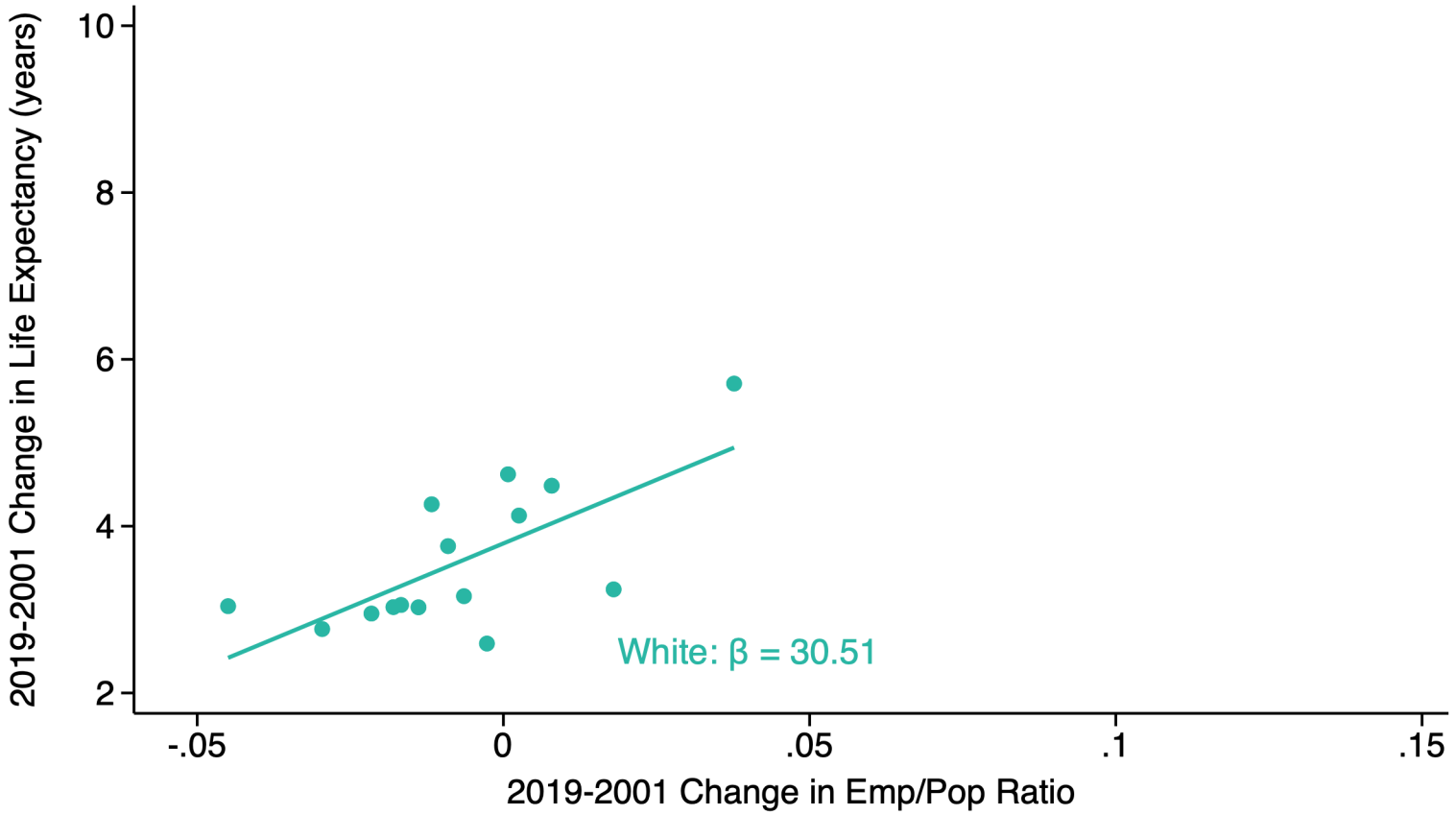
2. Distinguish between change in **incidence** of diseases vs. **survival rates**

3. Examine changes in risk factors and **social determinants of health**



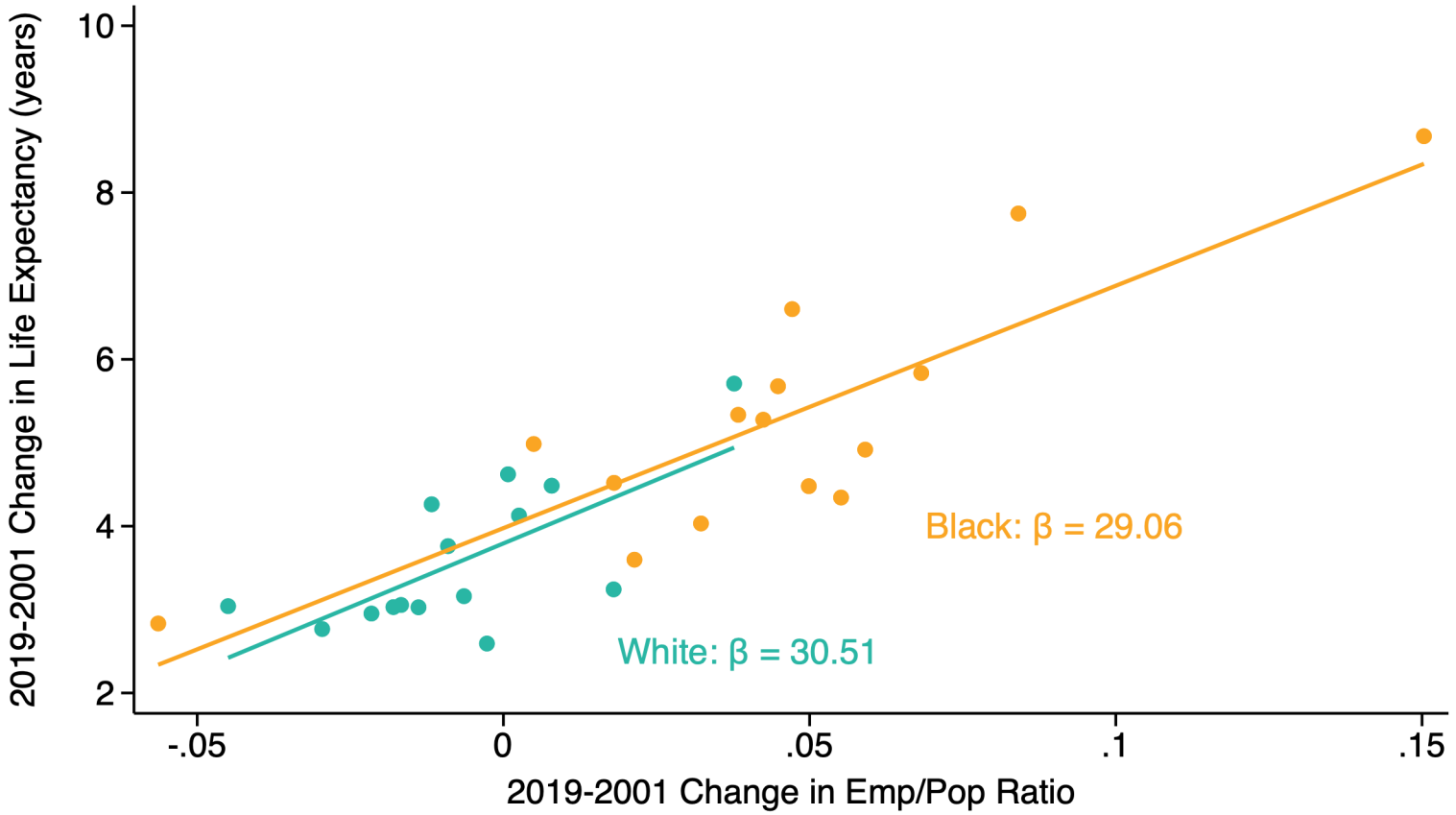
Changes in Life Expectancy vs. Changes in Employment Rates

By County and Race



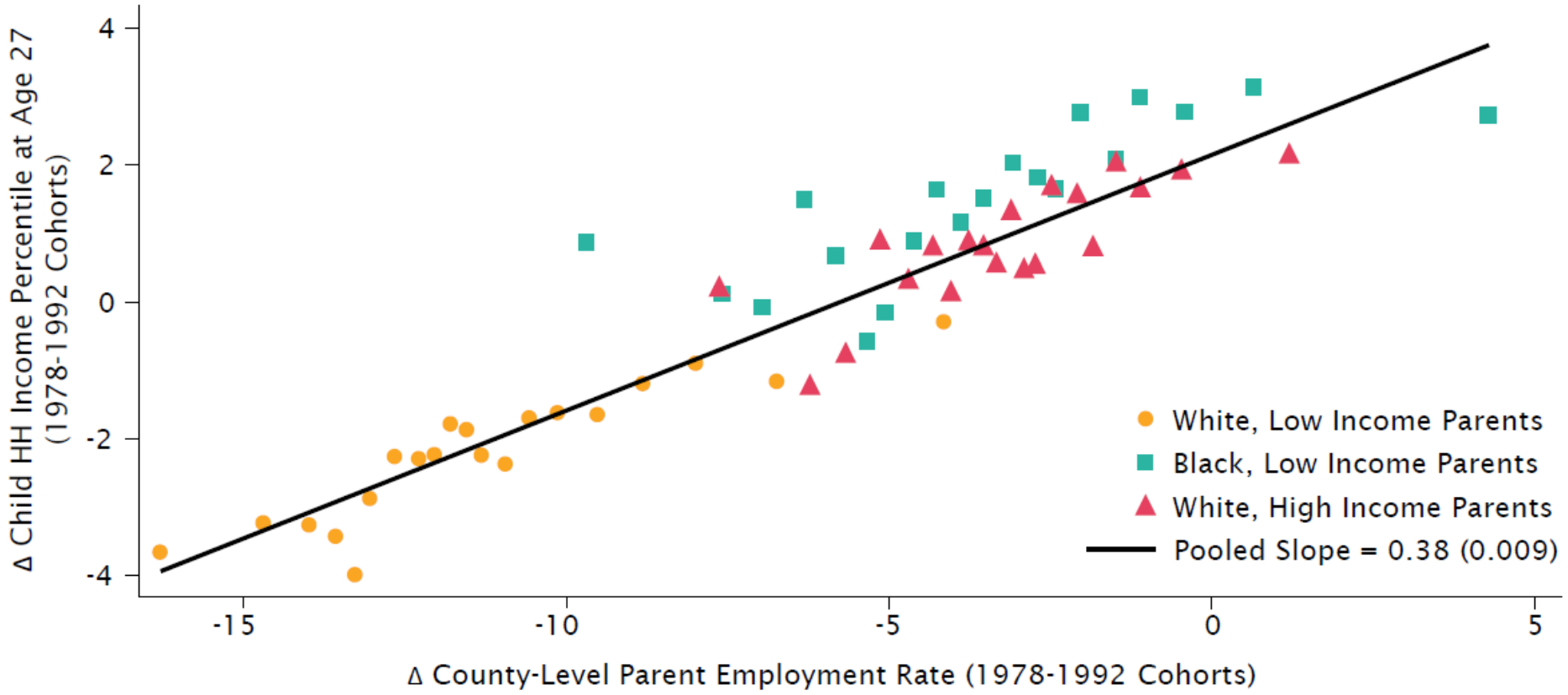
Changes in Life Expectancy vs. Changes in Employment Rates

By County and Race



Changes in Economic Mobility vs. Changes in Parent Employment Rates

By County, Race, and Class



Chetty et al. (2024)

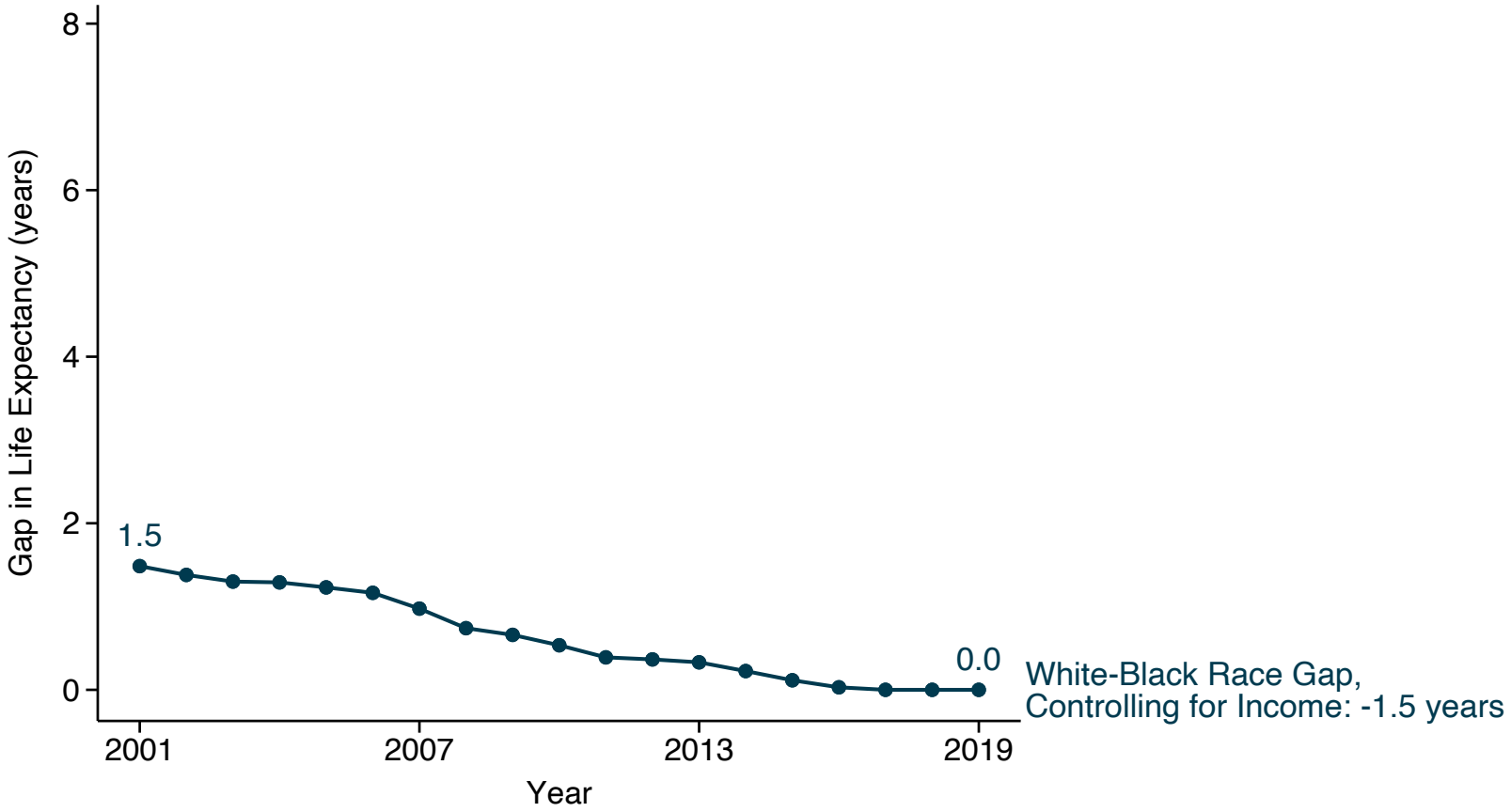
Summary: Mechanisms Underlying Divergent Trends in Longevity

- There is no monocausal story to explain divergence in life expectancies.
  - Growing class gaps and shrinking Black-white race gaps have been driven by a combination of factors that differ across diseases.
  - Technology, access and social determinants are all consequential.
- We observe that changes in incidence of disease and upstream risk factors, likely related to broader social determinants of health, played a significant role.

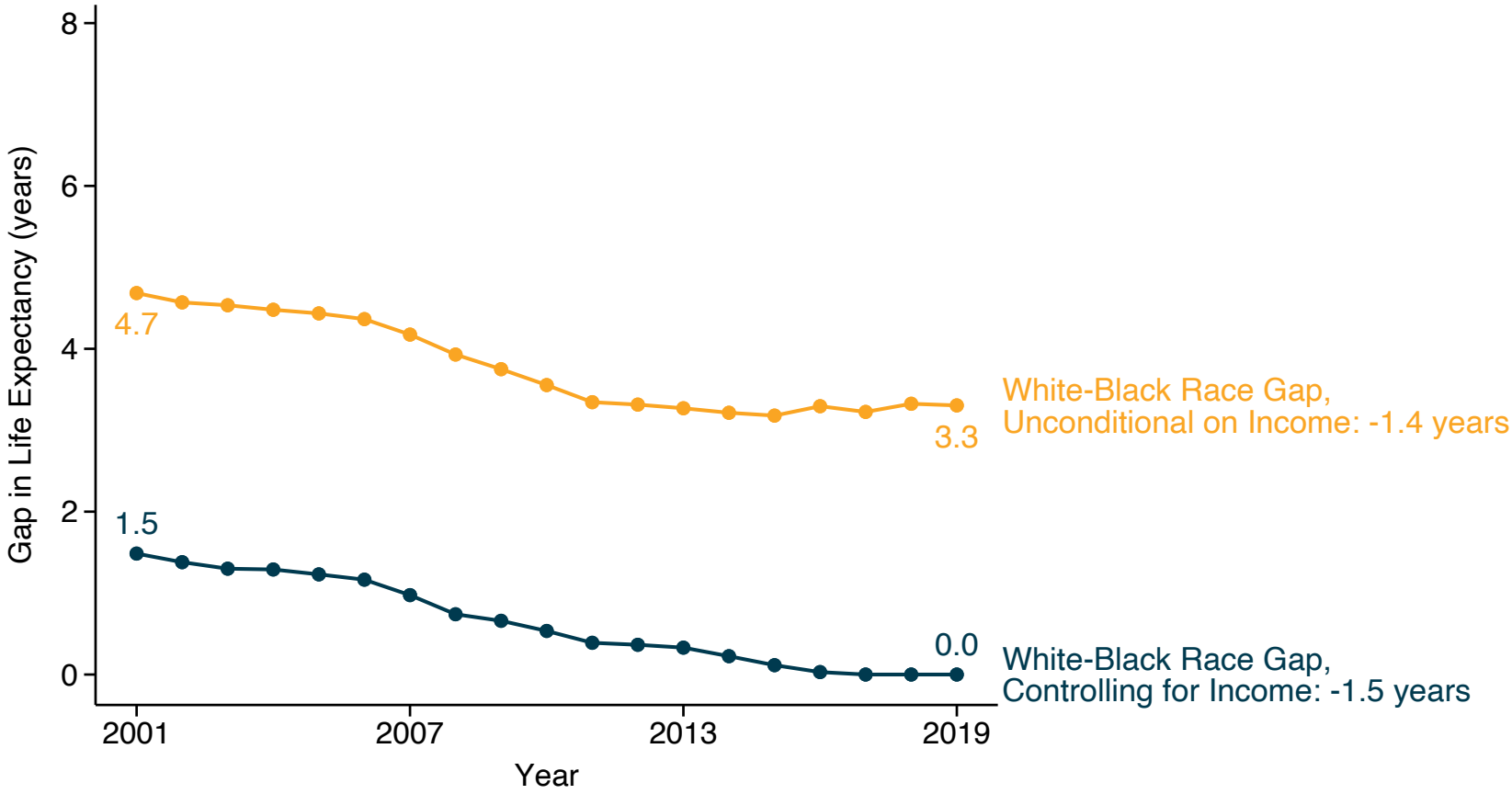


Implications for Narrowing Disparities

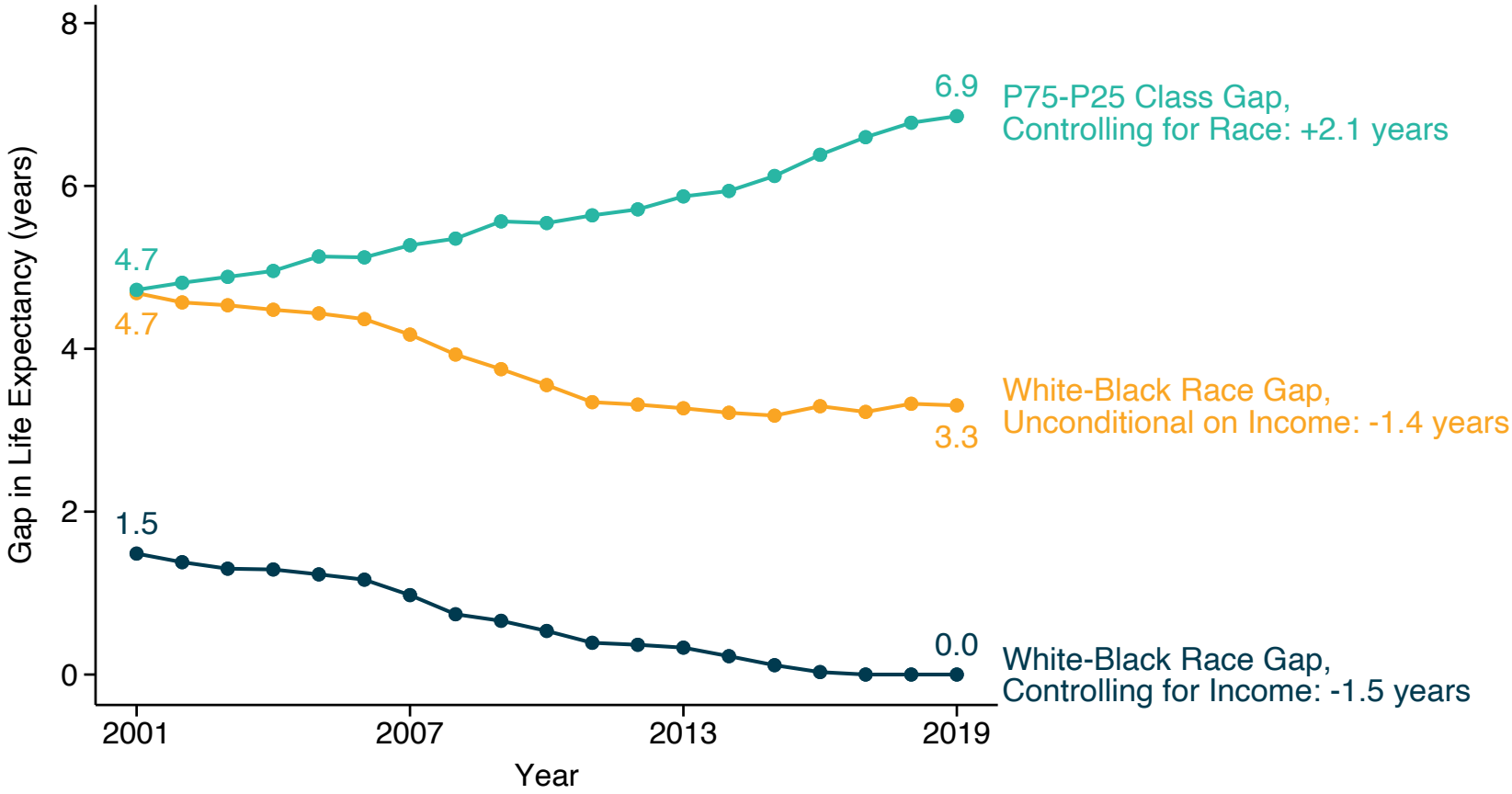
Shrinking Race Gaps, Growing Class Gaps in Life Expectancy, 2001-2019



Shrinking Race Gaps, Growing Class Gaps in Life Expectancy, 2001-2019



Shrinking Race Gaps, Growing Class Gaps in Life Expectancy, 2001-2019



Conclusion

- Closing racial gaps in life expectancy will likely require **narrowing socioeconomic disparities** on two dimensions:

  1. Reducing health disparities by income

  2. Reducing racial disparities in income
     [Chetty, Dobbie, Goldman, Porter, Yang 2024]

- Experience from 2001-2019 points to two ways to reduce health disparities:

  1. Technological progress and access to treatments reducing mortality from diseases (even with disparate prevalence, e.g. HIV)

  2. Addressing upstream risk factors, including social determinants of health



New Data to Support Further Progress

- Best approach likely to vary across areas and subgroups:
  - In some places, key issue may be a lack of access to care, in others may be upstream risk factors. Disease mix may also differ across places.

- We will release two new datasets to facilitate targeting of interventions and further research:
  - Data on mortality rates by race, income, county, and year
  - Statistics on causes of death and incidence vs. survival by area and subgroup



Growing Class Gaps and Shrinking Race Gaps in Life Expectancy, 2001-2019

Michael Stepner

joint with

Raj Chetty, Janet Currie, John N. Friedman, Ines Guix, Nathaniel Hendren, Hannes Schwandt, Harvey Barnhard, Dhruv Gaur, Tyler Jacobson, Emma Lee, Ana Sanchez-Chico, Brad Foster, and Sonya Porter

PRELIMINARY RESULTS, PLEASE DO NOT CITE

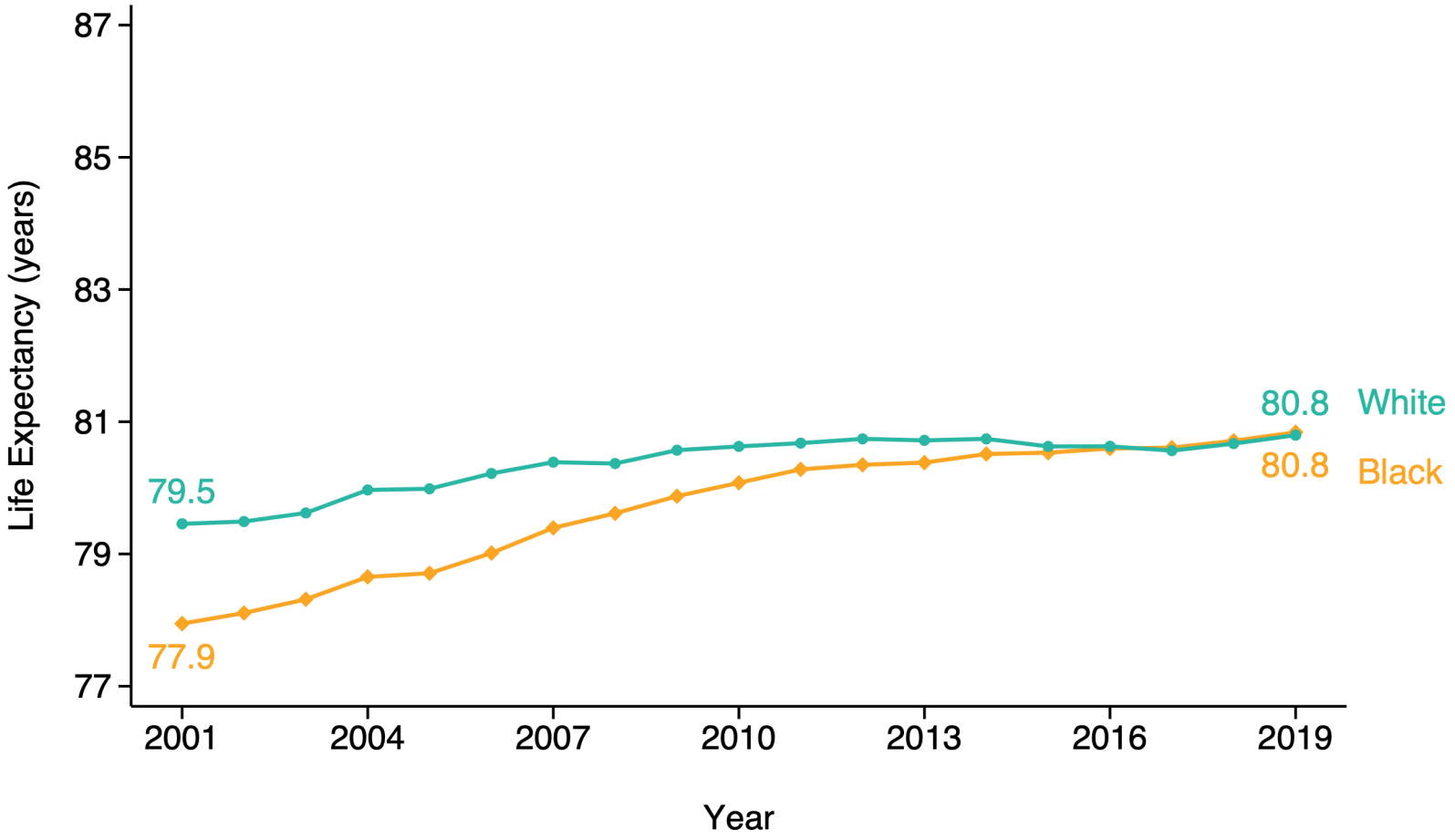
Any opinions and conclusions expressed herein are those of the authors and do not represent the views of the U.S. Census Bureau. The Census Bureau has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection (Project 7531153: CBDRB-FY22-CES014-024). The research reported herein was performed pursuant to grant RDR18000003 from the US Social Security Administration (SSA) funded as part of the Retirement and Disability Research Consortium.

OPPORTUNITY INSIGHTS

Appendix

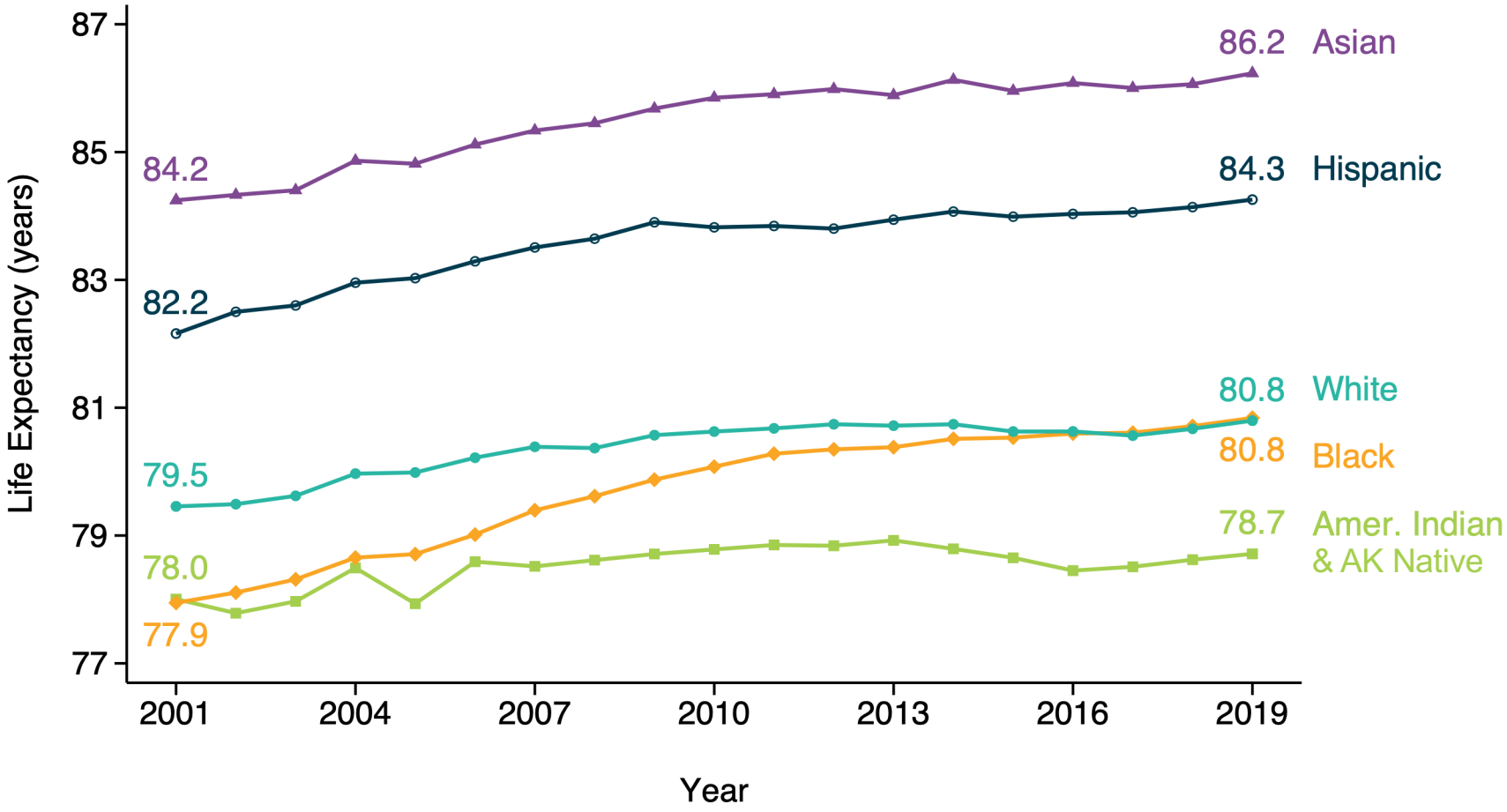
Trends in Life Expectancy by Race, Controlling for Income

Income Distributions Reweighted to Match National Income Distribution

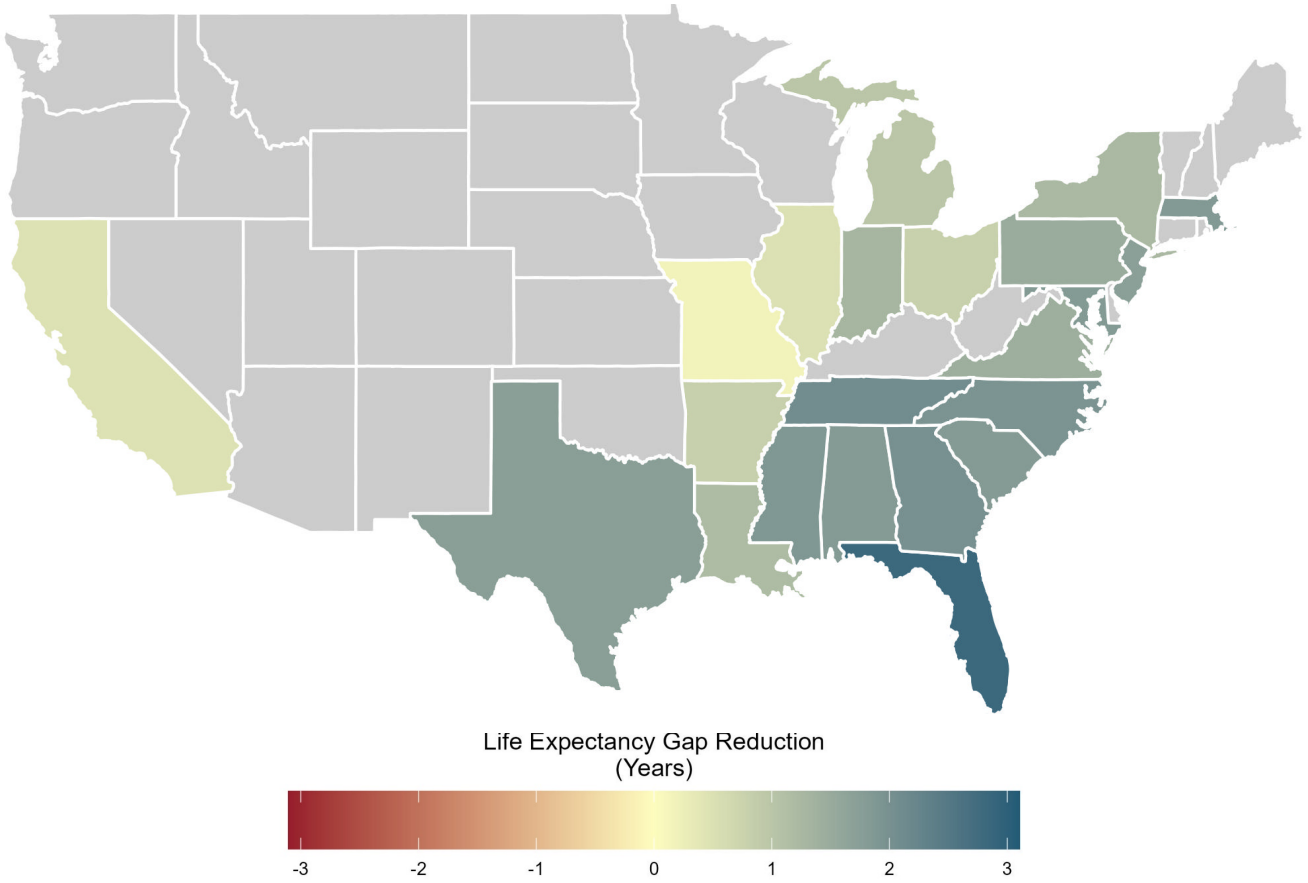


Trends in Life Expectancy by Race, Controlling for Income

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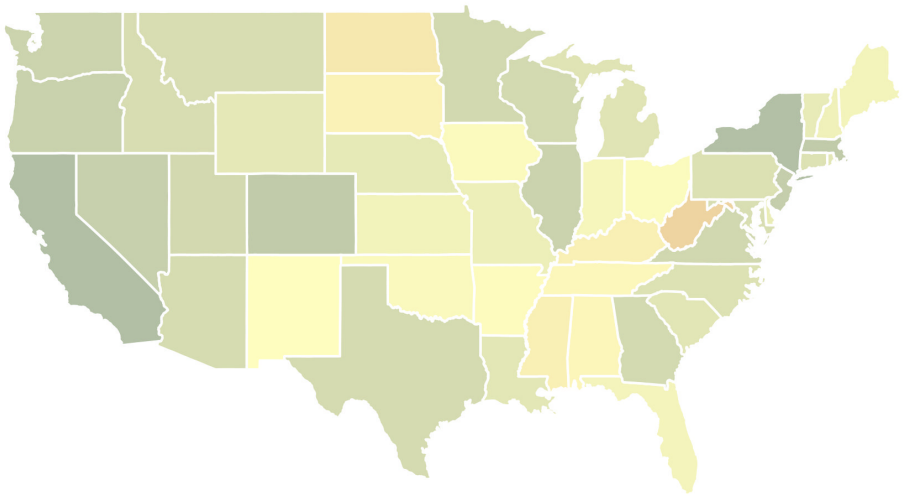


Black-White Life Expectancy Gap Reduction

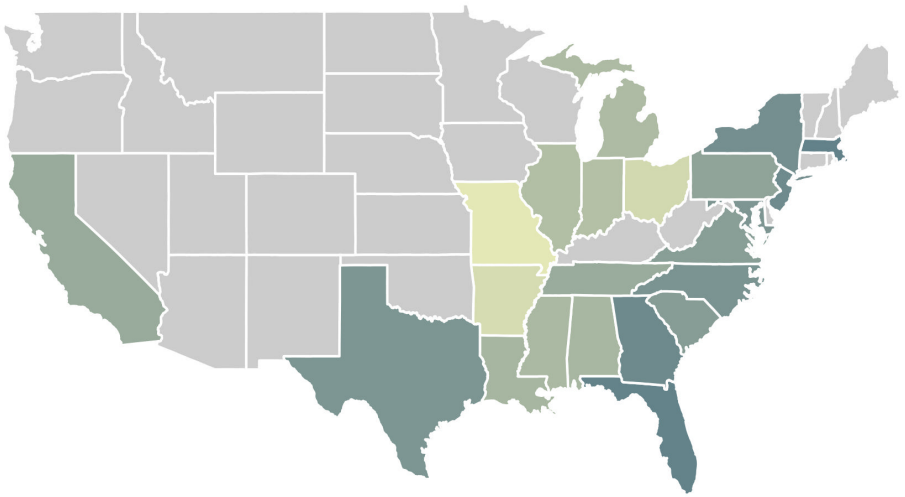


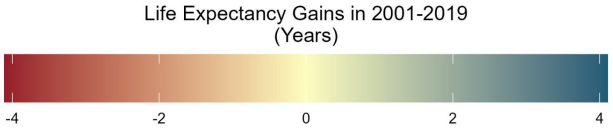
Life Expectancy Gains

White

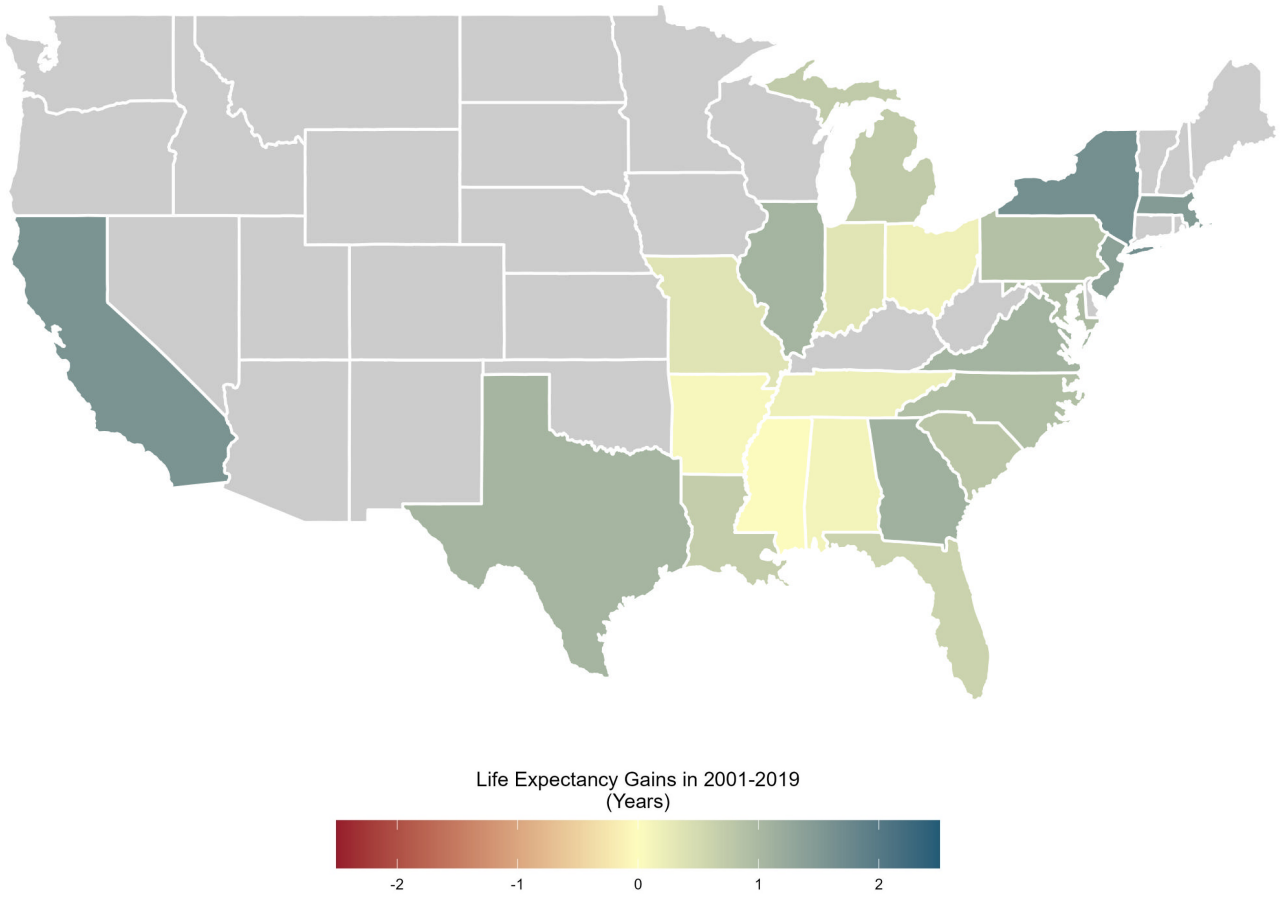


Black

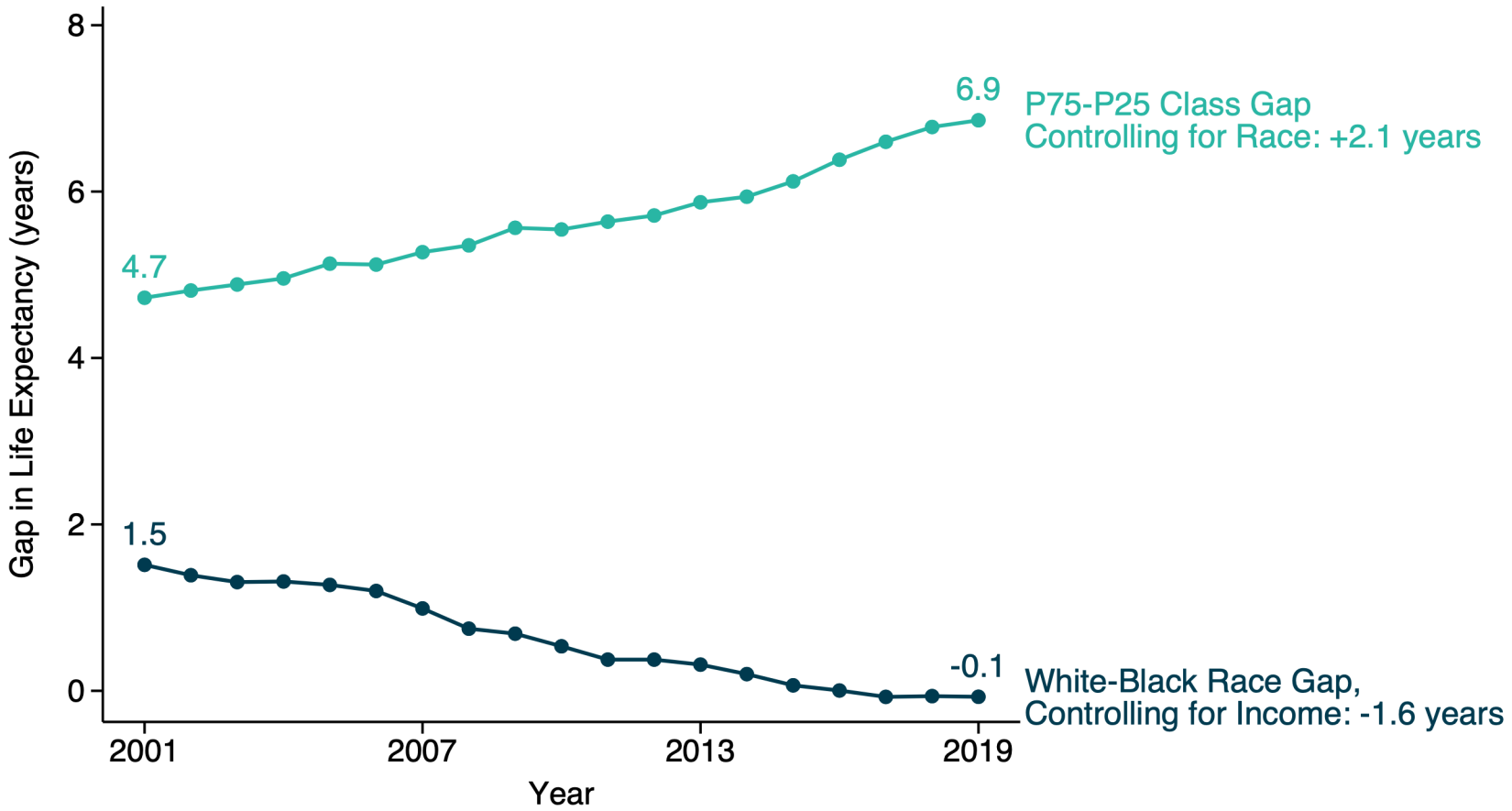




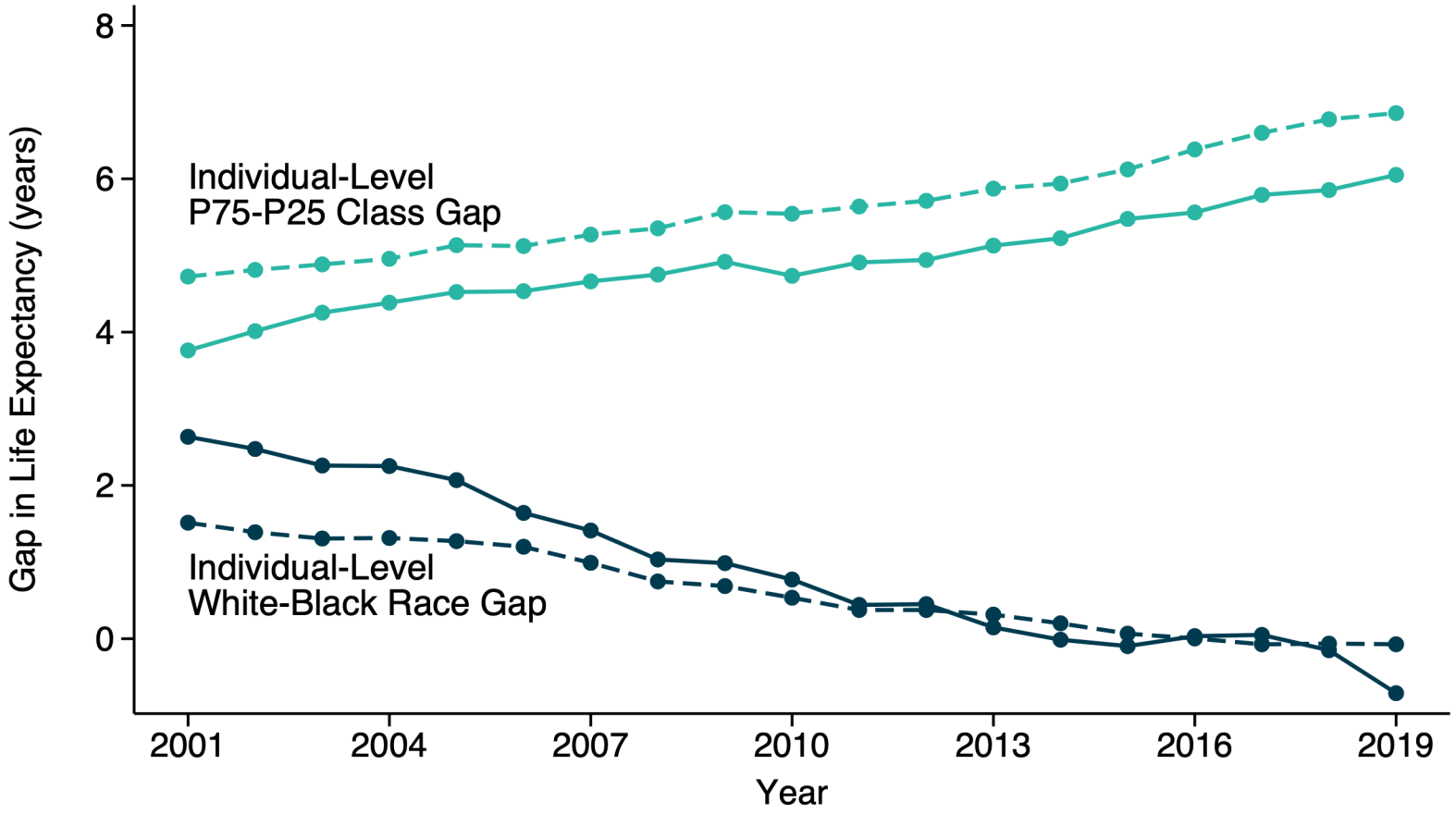
Life Expectancy Gains – Race Adjusted



Growing Class Gaps, Shrinking Race Gaps in Life Expectancy, 2001-2019

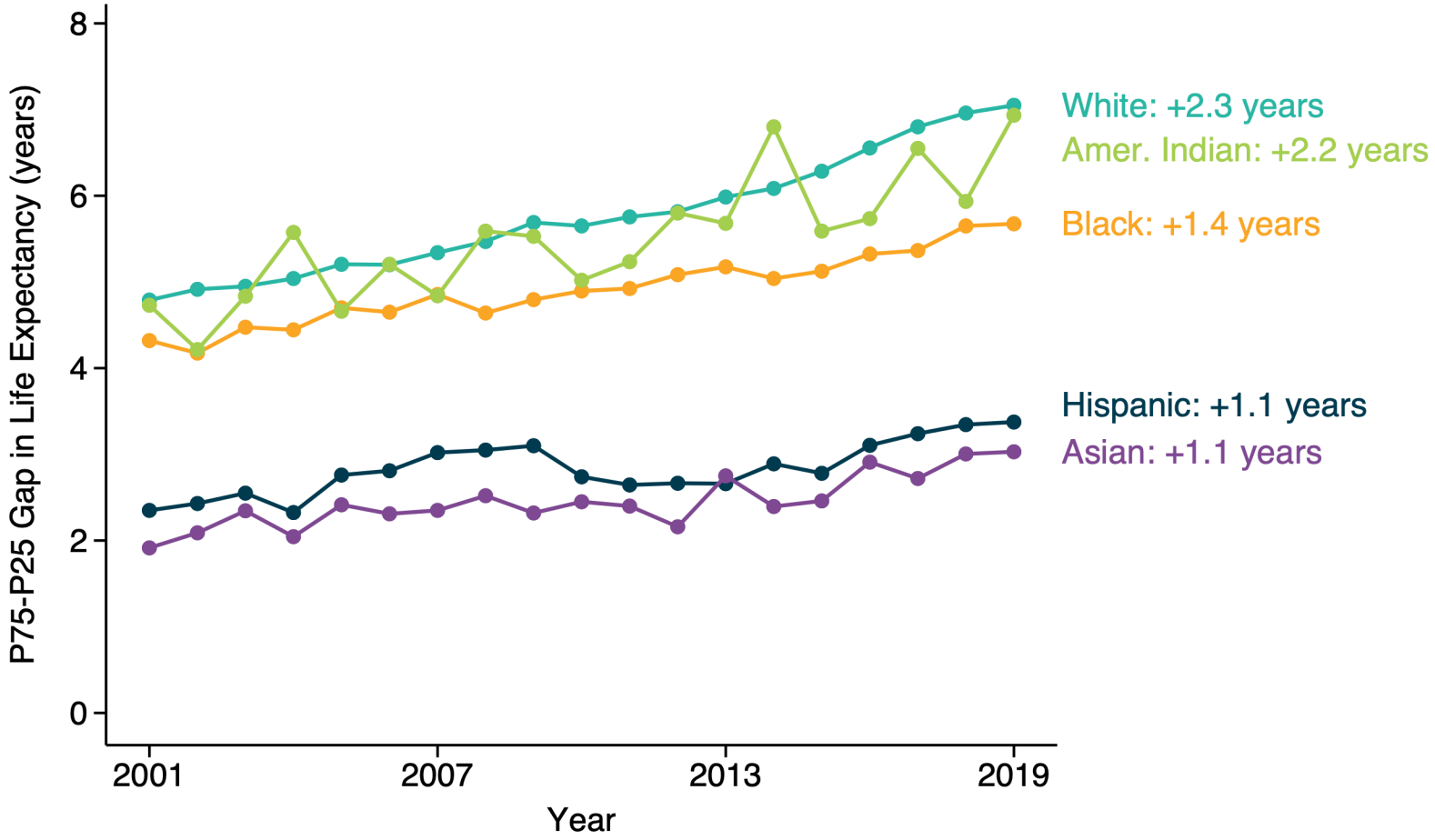


Trends in Race and County-Level Class Gaps in Life Expectancy



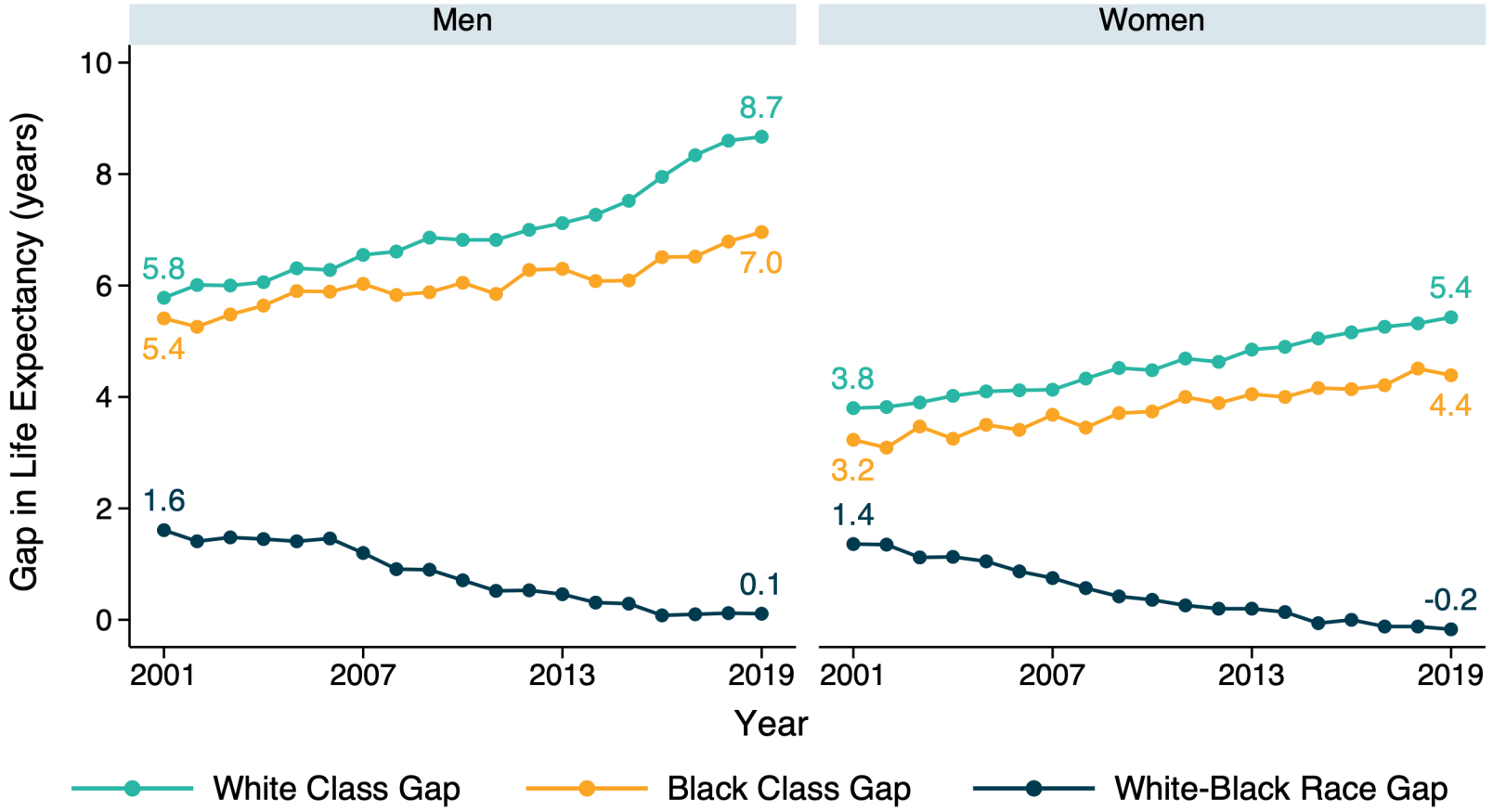
Evolution of Class Gaps in Life Expectancy, 2001-2019

Gap in Life Expectancy Between Individuals at 25th vs. 75th Percentile of Household Income Distribution



Growing Class Gap

Gap in Life Expectancy at Age 30 vs. Year

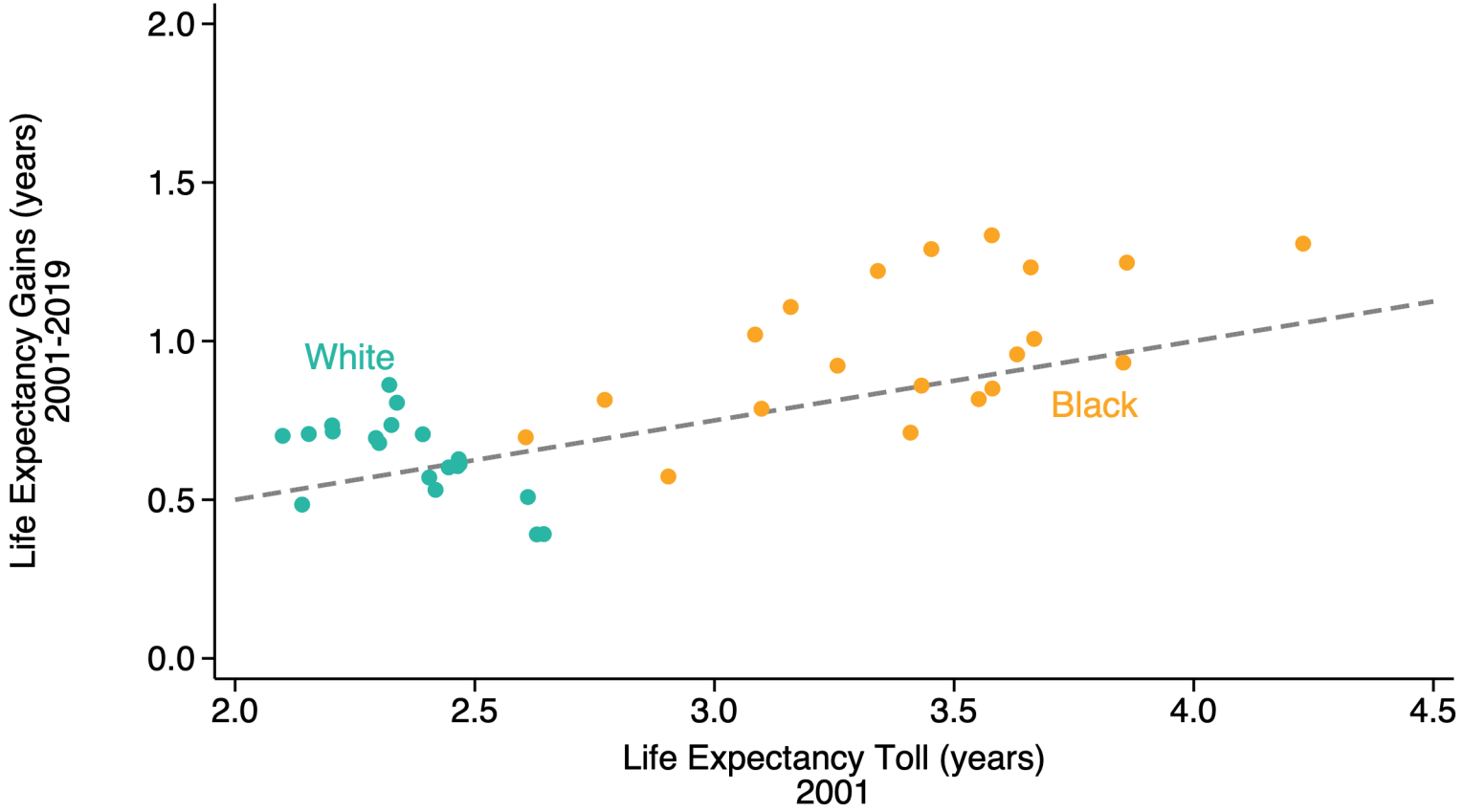


Causes of Death Underlying Growing Class Gaps and Shrinking Race Gaps

	Class Gap Expansion (top vs bottom county deciles)		Black-White Gap Reduction (adjusted by income)	
	Years	%	Years	%
Blood/immune	0.005	0.26	0.04	1.13
Cancer	**0.455**	**23.21**	**0.65**	**18.31**
Cardiovascular	**0.415**	**21.17**	**0.78**	**21.97**
Digestive, alcohol liver	0.07	3.57	0.16	4.51
Digestive, others	0.04	2.04	0.14	3.94
Endocrine	0.125	6.38	0.19	5.35
External, homicide	0.015	0.77	-0.01	-0.28
External, others	0.01	0.51	0.09	2.54
External, overdose	0.075	3.83	0.17	4.79
External, suicide	0.045	2.3	0.12	3.38
External, transport accidents	0.005	0.26	-0.01	-0.28
Genitourinary	0.07	3.57	0.12	3.38
Infectious, HIV	-0.075	-3.83	**0.32**	**9.01**
Infectious, others	0.065	3.32	0.15	4.22
Mental, others	0.02	1.02	0.03	0.84
Mental, substance abuse	0.015	0.76	0.1	2.82
Nervous	0.115	5.87	0.07	1.97
Obstetric	0.005	0.26	0.01	0.28
Respiratory, COPD	**0.245**	**12.5**	0.13	3.66
Respiratory, others	0.095	4.85	0.15	4.23
Others	0.145	7.4	0.15	4.23
Total	1.96	100	3.55	100

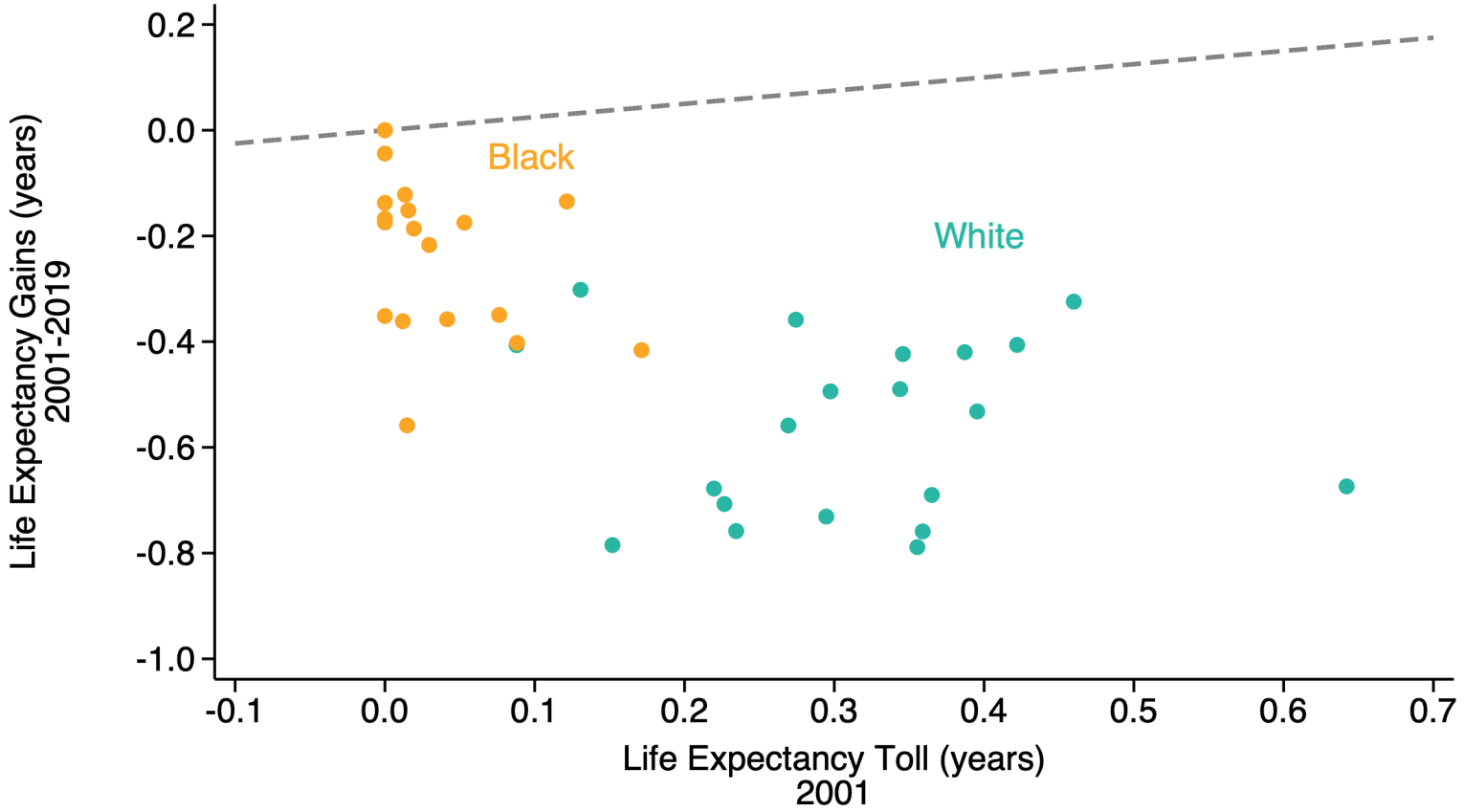
Gains in Life Expectancy vs. Initial Levels of Life Years Lost

Cardiovascular Disease



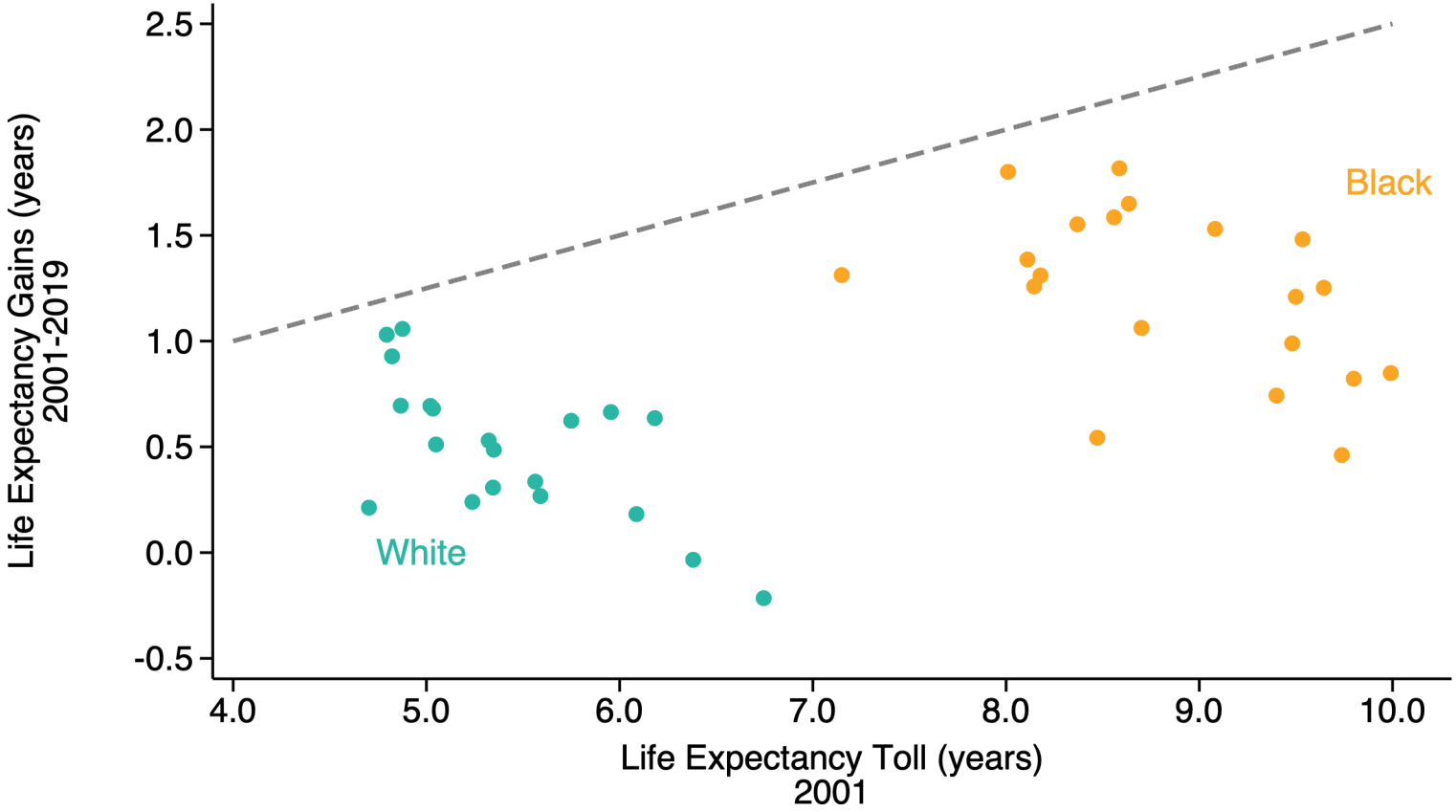
Gains in Life Expectancy vs. Initial Levels of Life Years Lost

Deaths of Despair

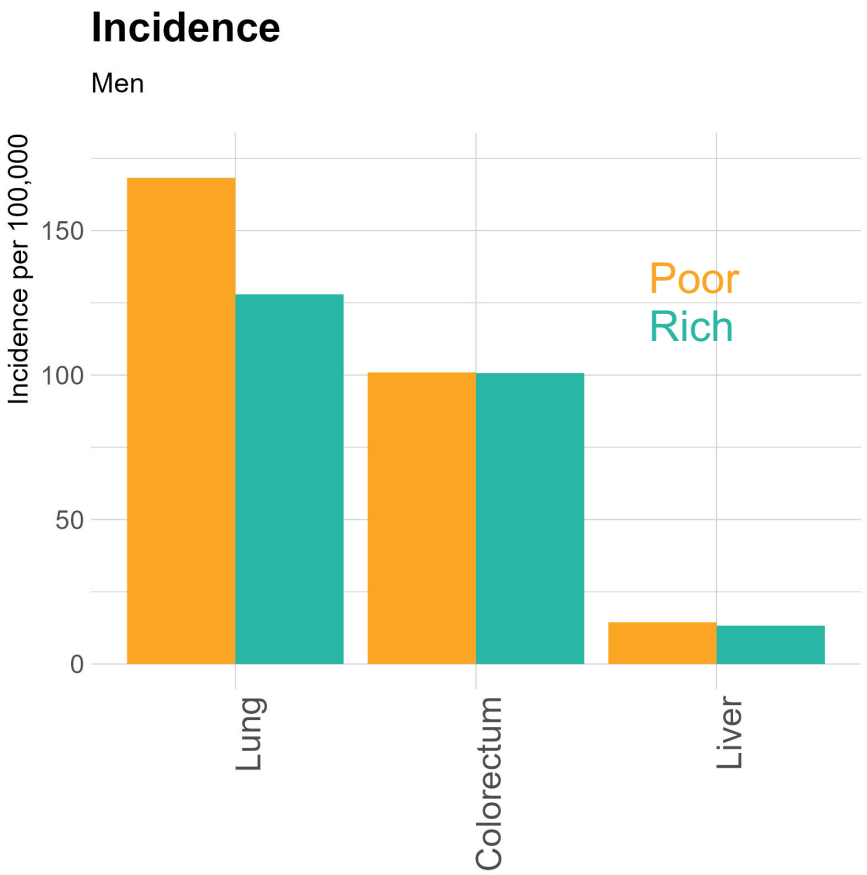


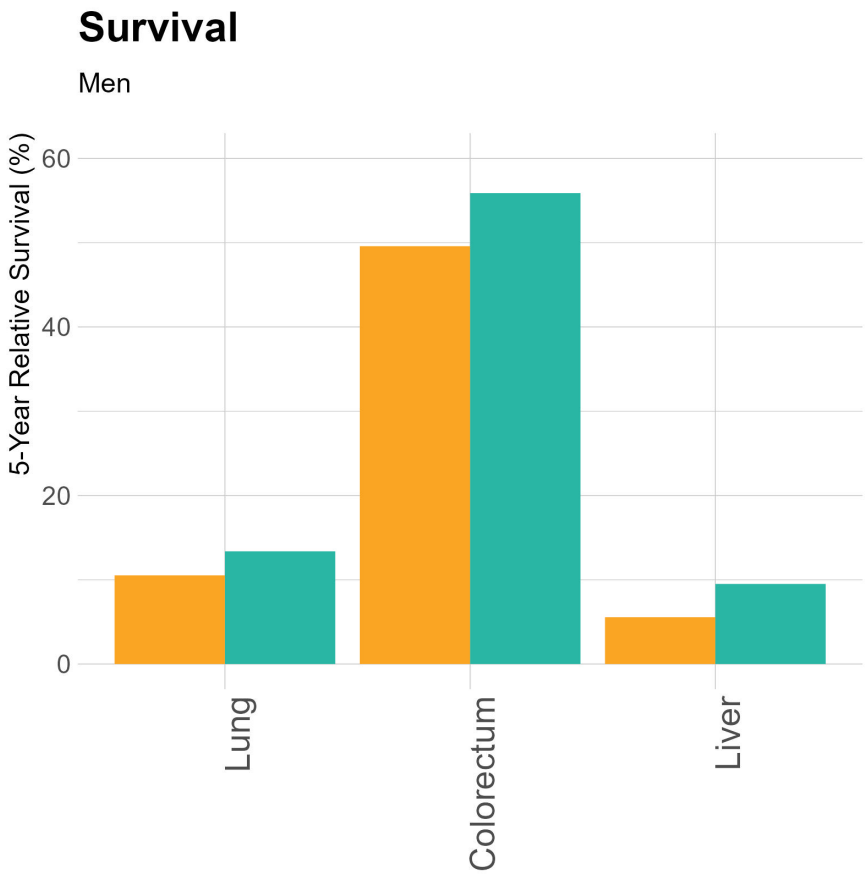
Gains in Life Expectancy vs. Initial Levels of Life Years Lost

Other Causes of Death

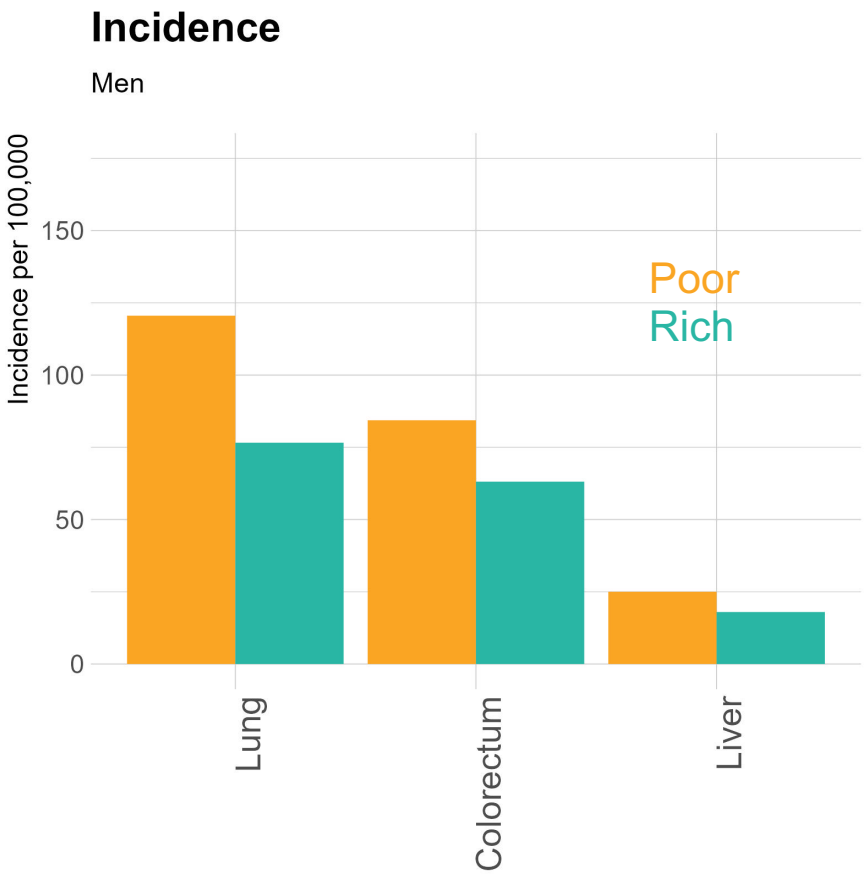


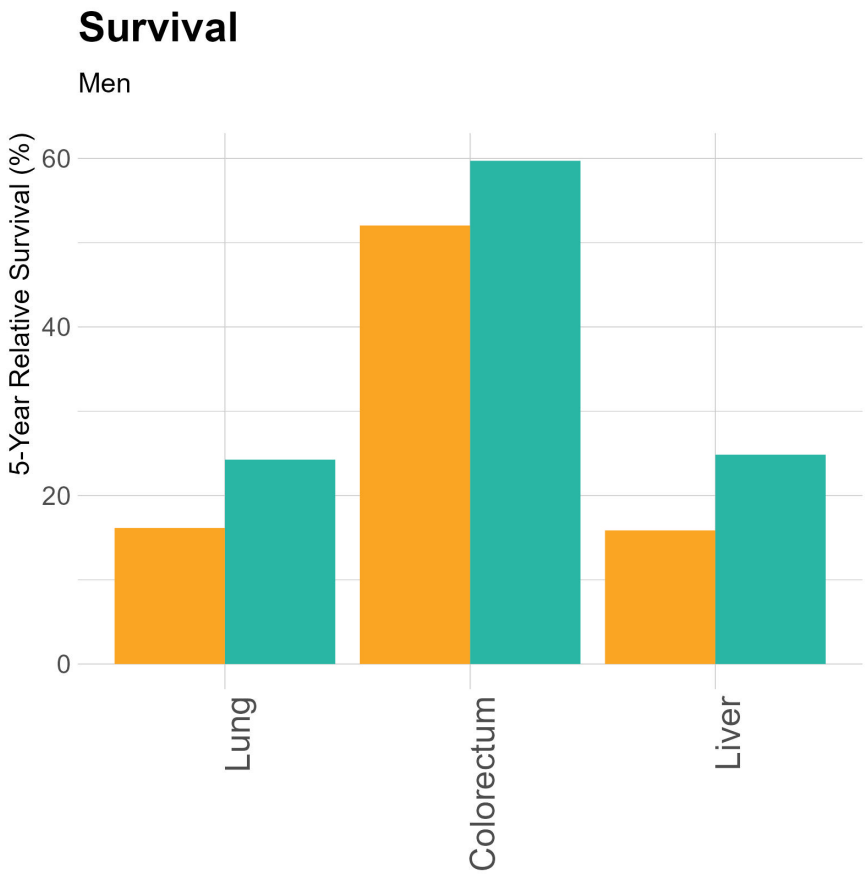
Class disparities in cancer mortality in 2001



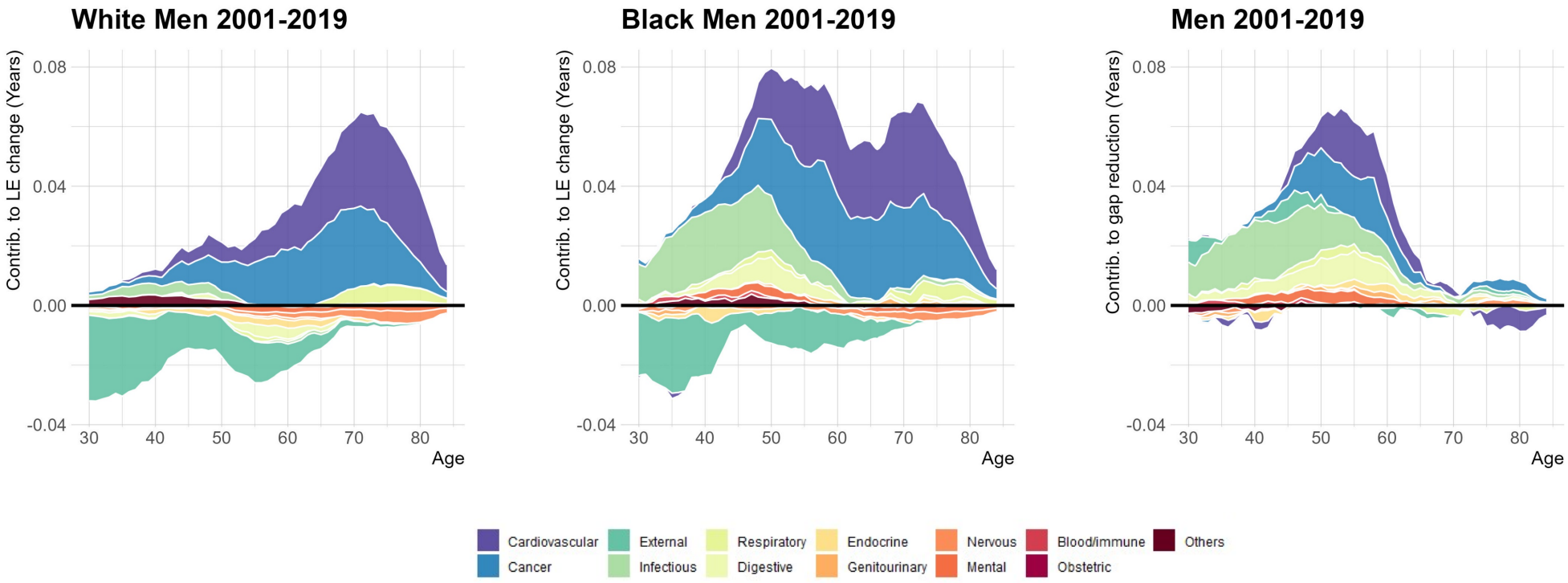


Class disparities in cancer mortality in 2019

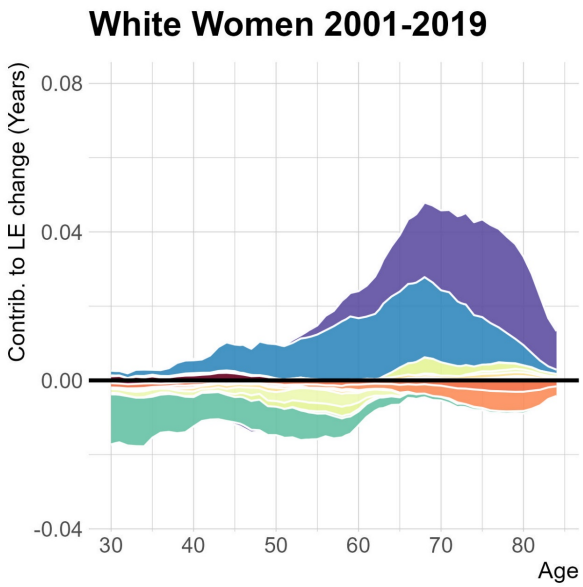


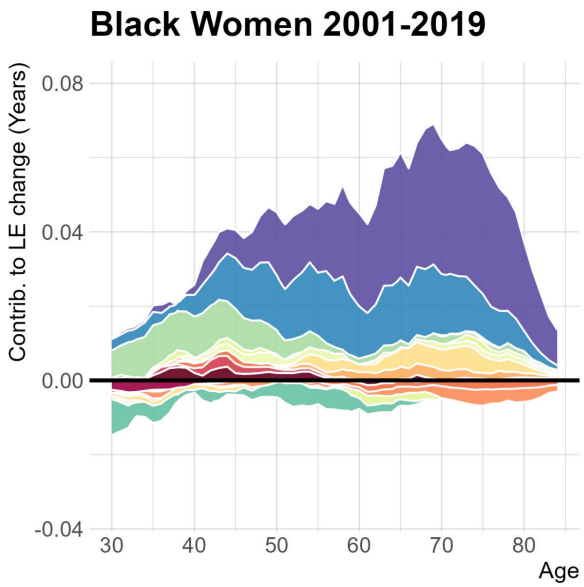


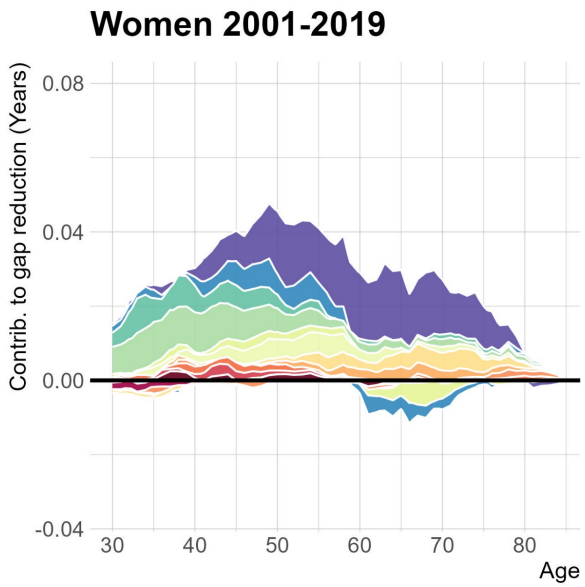
Contributions to the Black-White LE Gap Reduction



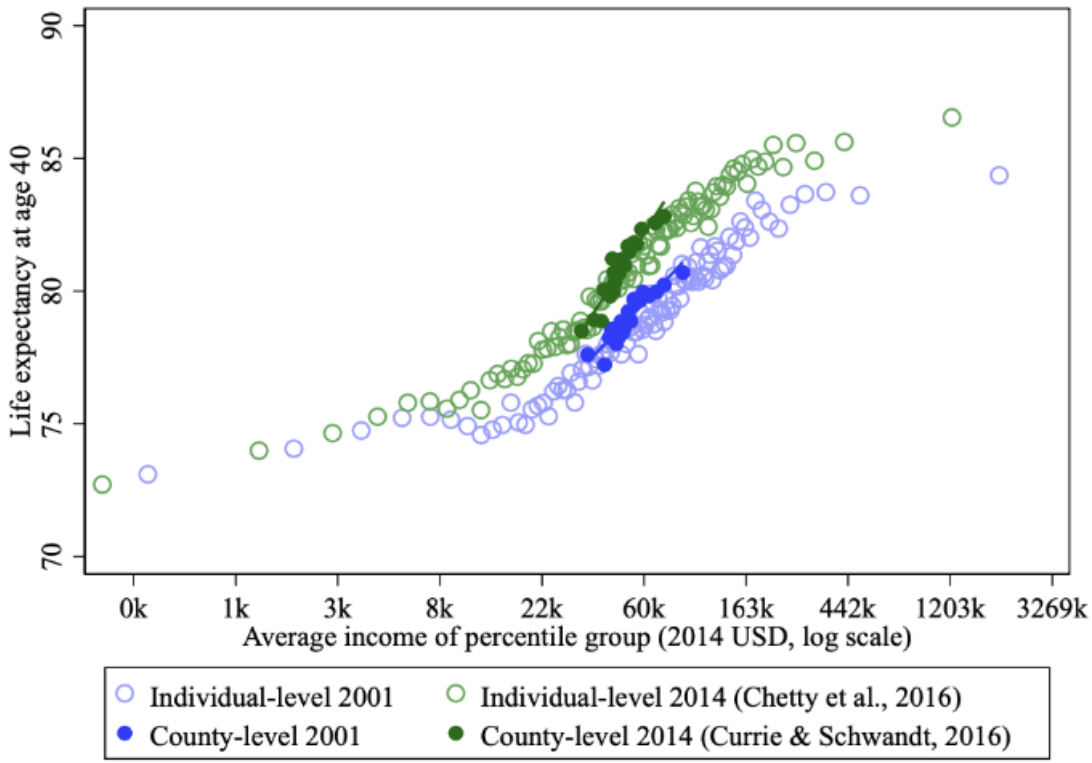
Contributions to the Black-White LE Gap Reduction



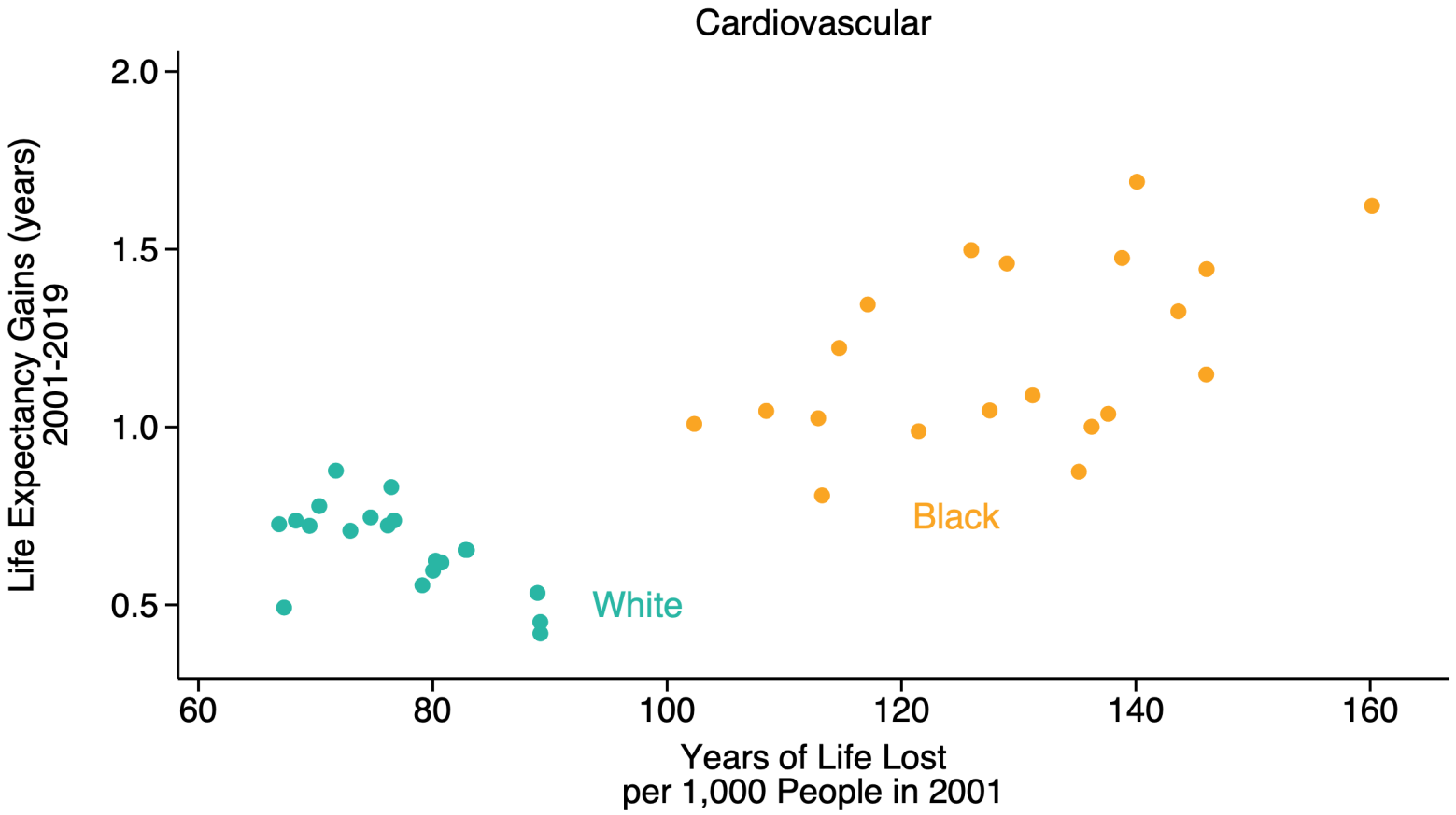




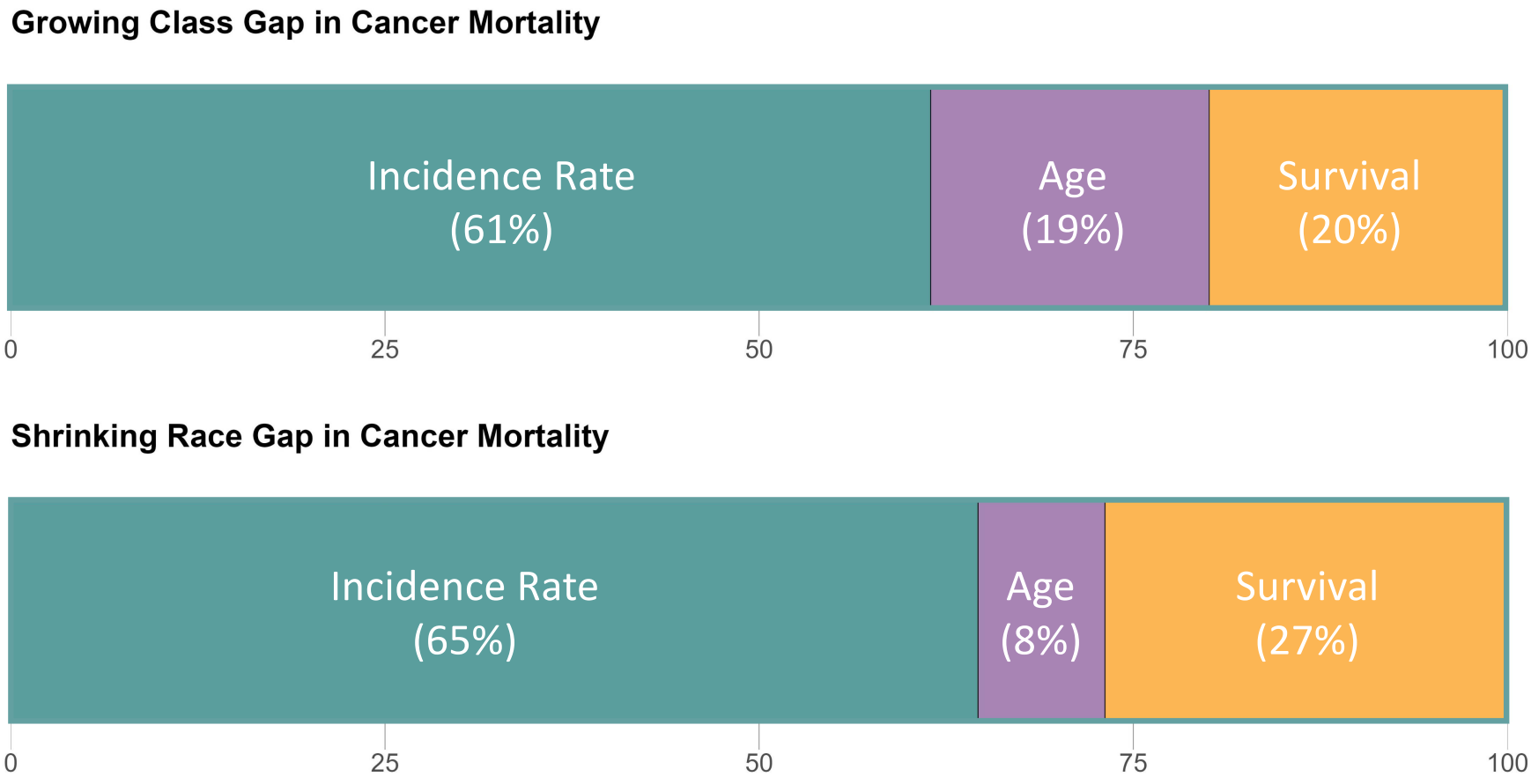
LE gradients based on individual- vs. county-level income percentiles



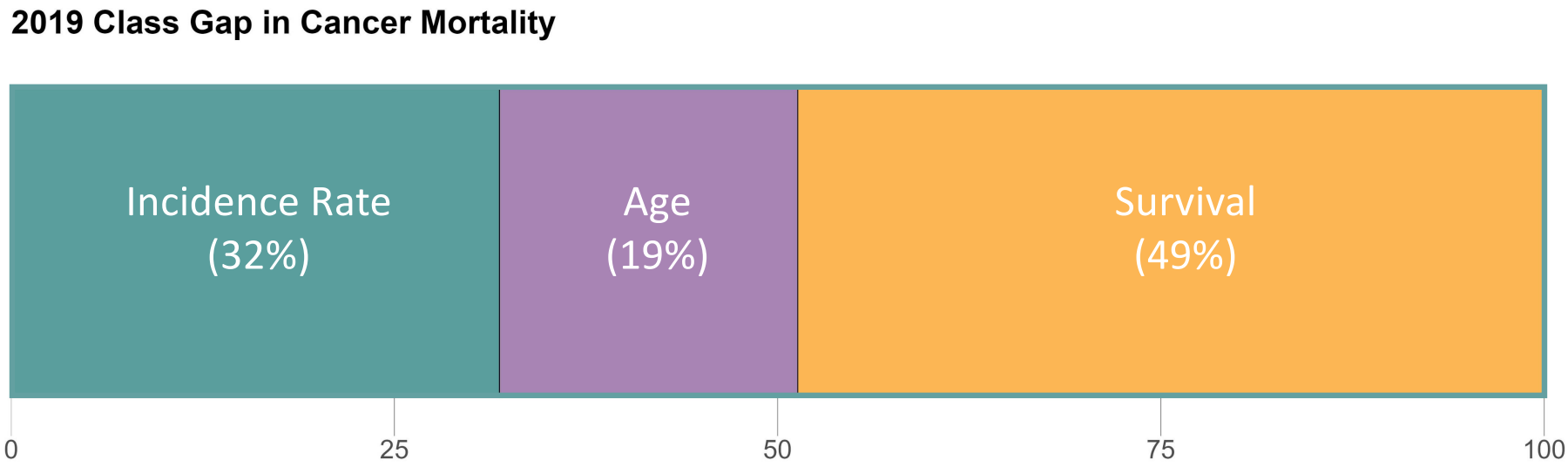
Improvements in cardiovascular mortality are not proportional to its initial toll



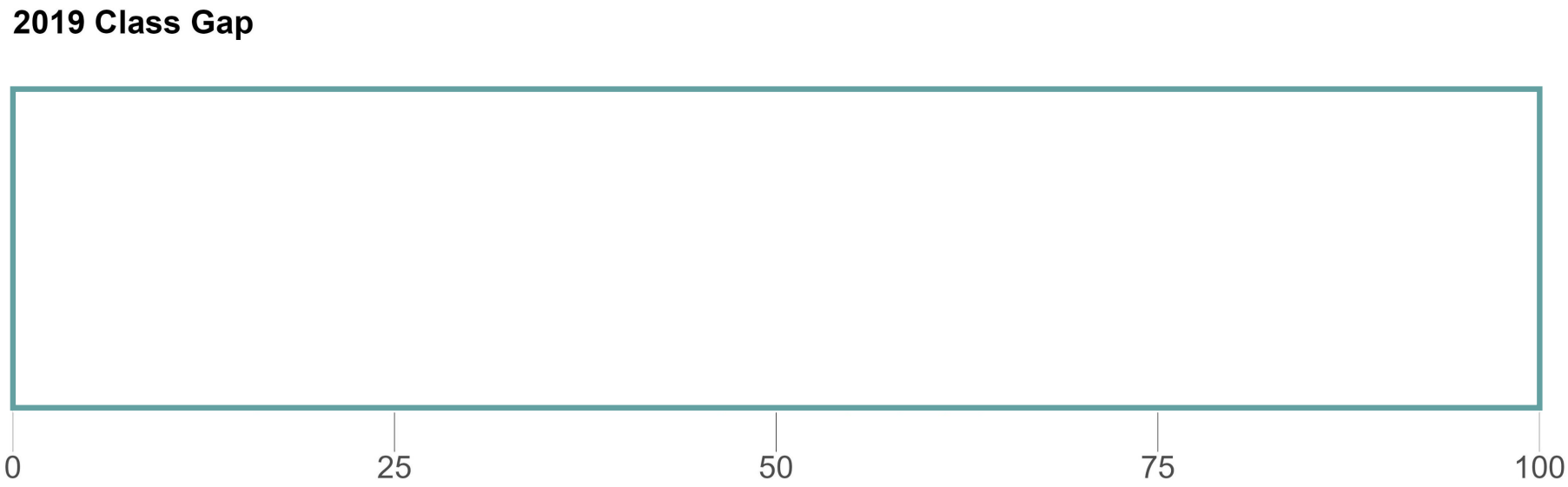
Gap changes in cancer mortality are driven by trends in incidence



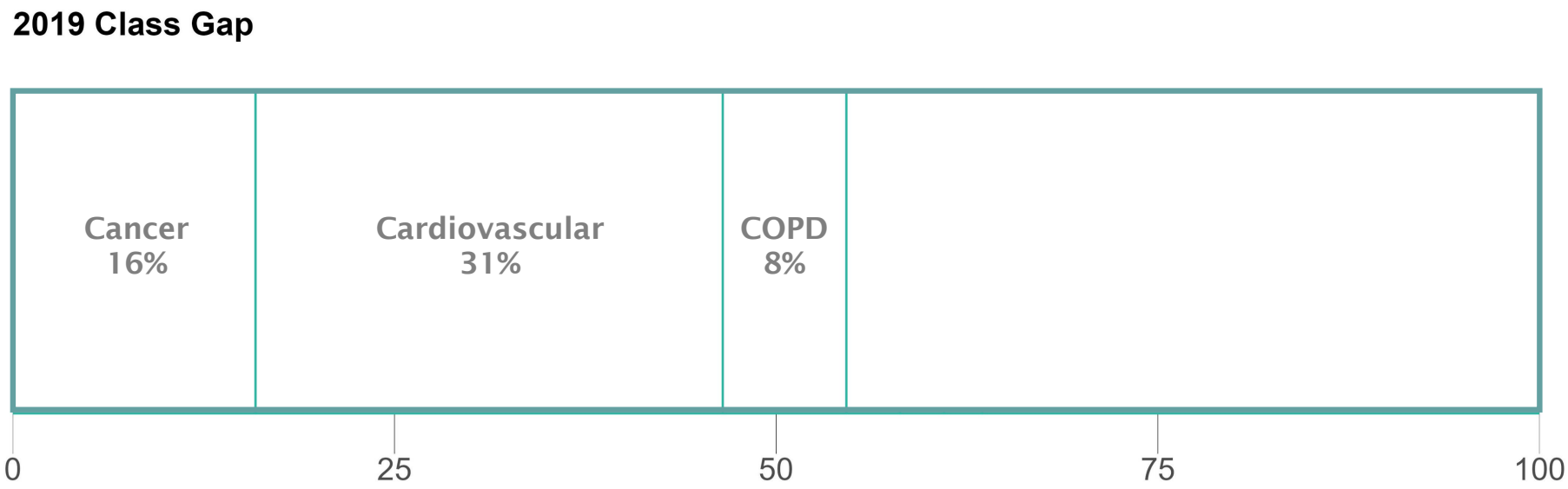
The remaining class gap in cancer mortality is driven by disparities in both incidence and survival



Causes of Death Underlying Class Gap in Life Expectancy in 2019



Causes of Death Underlying Class Gap in Life Expectancy in 2019



Causes of Death Underlying Class Gap in Life Expectancy in 2019

