

Lifespan inequalities and mortality risk across social determinants of health

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Exploring population heterogeneities, 07/12/2023

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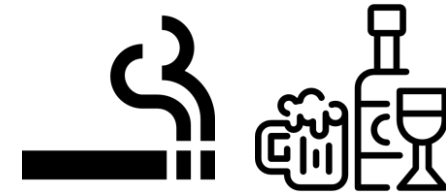
BACKGROUND

Who is at high risk of mortality?

Genetic factors

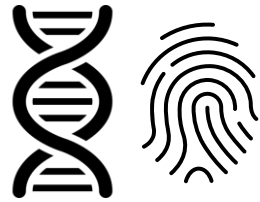


Individual risks

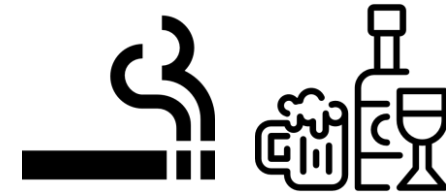


Who is at high risk of mortality?

Genetic factors



Individual risks



Social factors



Social factors associated with mortality

Social determinants of health are “*conditions in which people are born, grow, live, work, and age.*” (WHO)

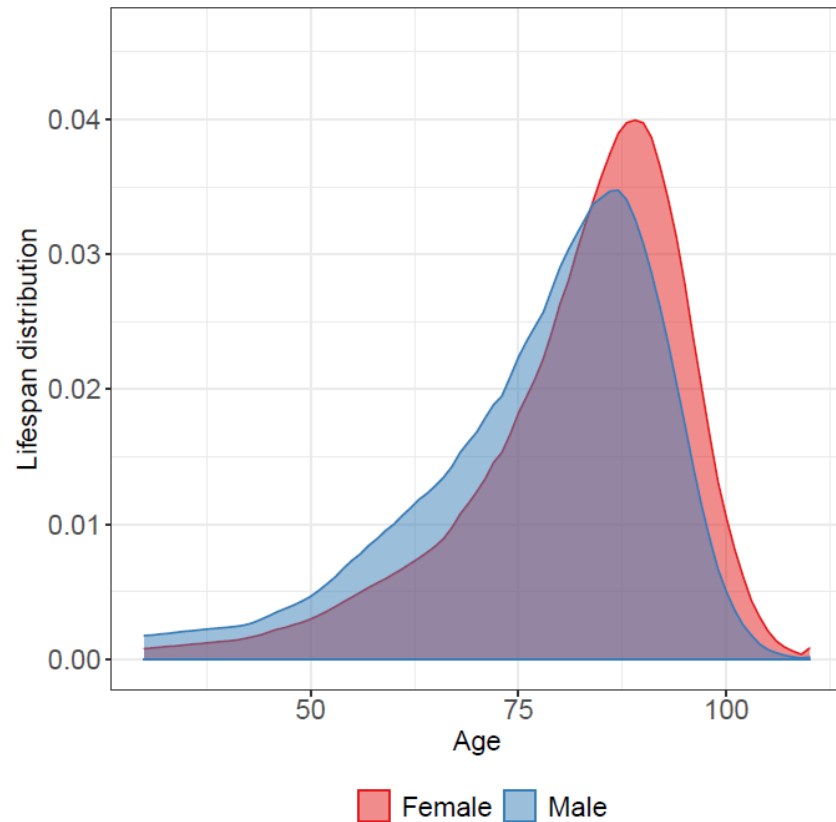
- Sex
- Race
- Socioeconomic status: education, income, employment
- Neighborhood
- Social support networks
- Etc.

Social gradient in mortality

- Inequalities in life expectancy between low and high educated/income individuals are consistent across countries and have widened over the last years (Marmot 2002, Brønnum-Hansen et al. 2012, Chetty et al. 2016, van Raalte et al. 2018)
- Blacks have lower life expectancy than Whites in the US (Dwyer-Lindgren et al. 2022)
- Unmarried individuals have lower life expectancy than married ones (Murphy et al. 2007)

Lifespan distributions largely overlap

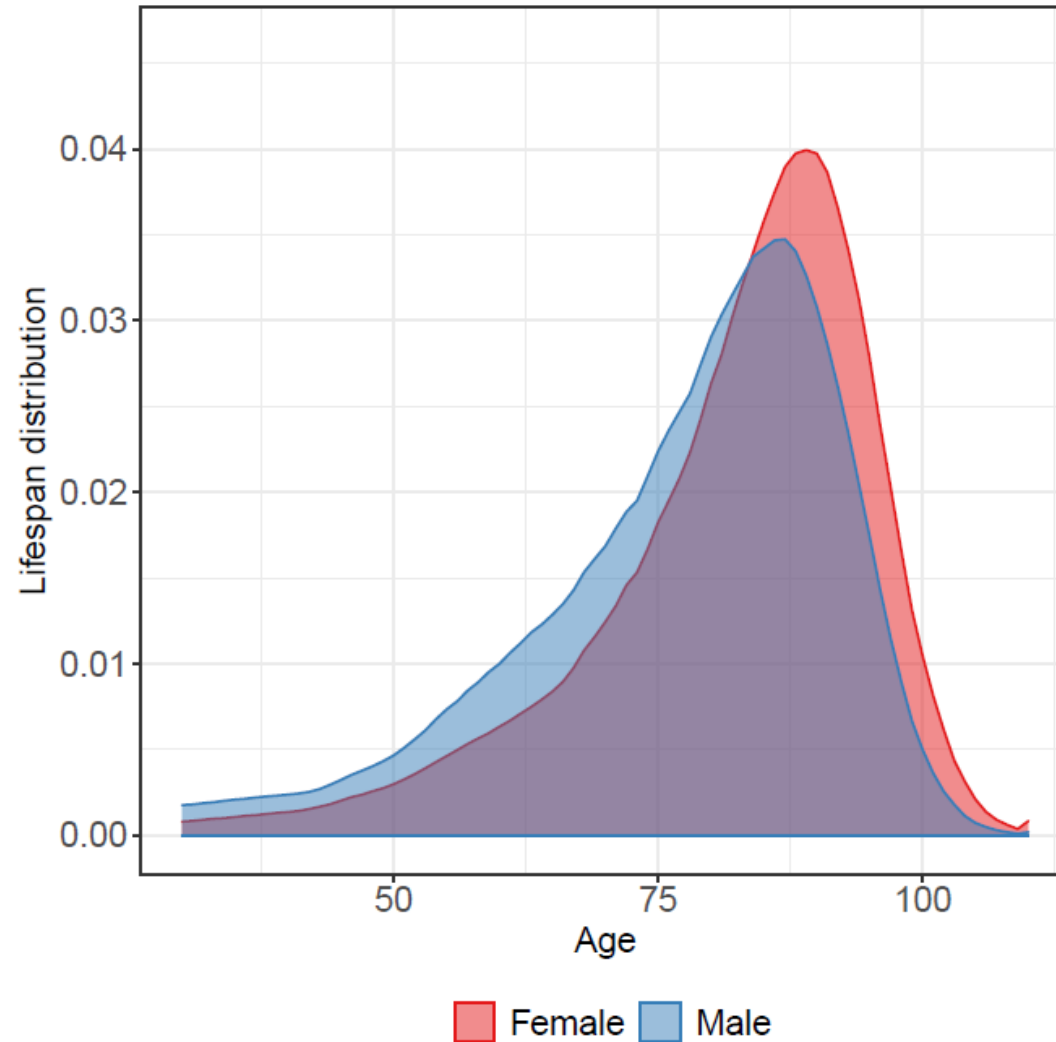
Lifespan distribution by sex, US
2015-2019



→ Shi et al. 2022. "*A distributional approach to measuring lifespan stratification.*"

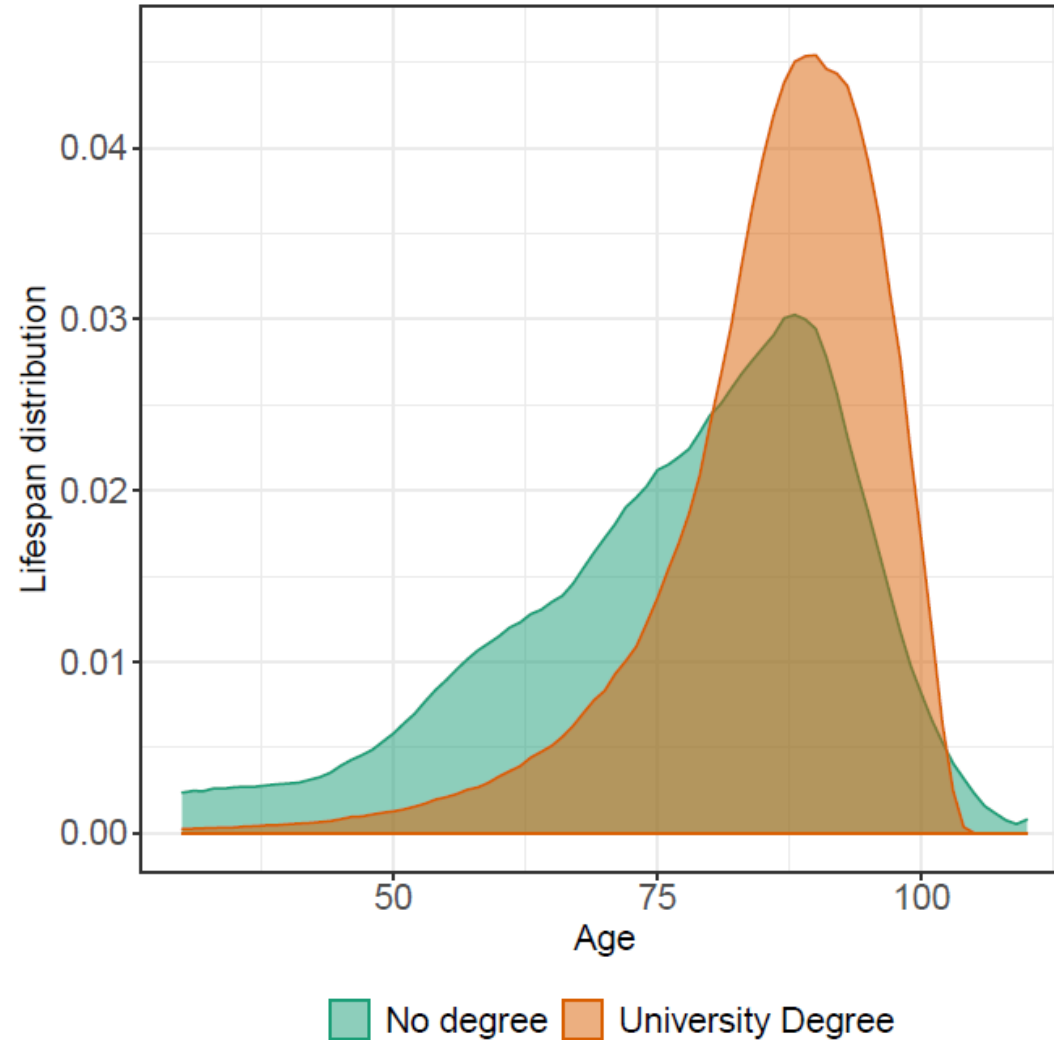
→ Vaupel et al. 2021. "*Outsurvival as a measure of the inequality of lifespans between two populations.*"

Lifespan distribution by sex, US 2015-19



$$\Delta e_{30} = 4.4y$$
$$\phi = 0.40$$
$$S = 0.76$$

Lifespan distribution by educ., US 2015-19



$$\Delta e_{30} = 6.3y$$
$$\phi = 0.33$$
$$S = 0.56$$

OBJECTIVE

Objective

To better understand the whys of lifespan inequalities, we investigate lifespan differences for subpopulations based on multiple determinants of health: sex, race, marital status and education

DATA & METHODS

Data

- United States 2015-2019
- Death counts from Multiple Cause of Death dataset (NCHS)
- Population counts from the American Community Survey (US Census Bureau)
- Age range 30 to 90

Variables

→ Sex

- Female (F)
- Male (M)

→ Marital Status

- Married (Ma)
- Previously married (Pm)
- Never married (Nm)

→ Education

- High school diploma or less (Hd)
- Some college or similar (Sc)
- University degree (Ud)

→ Race

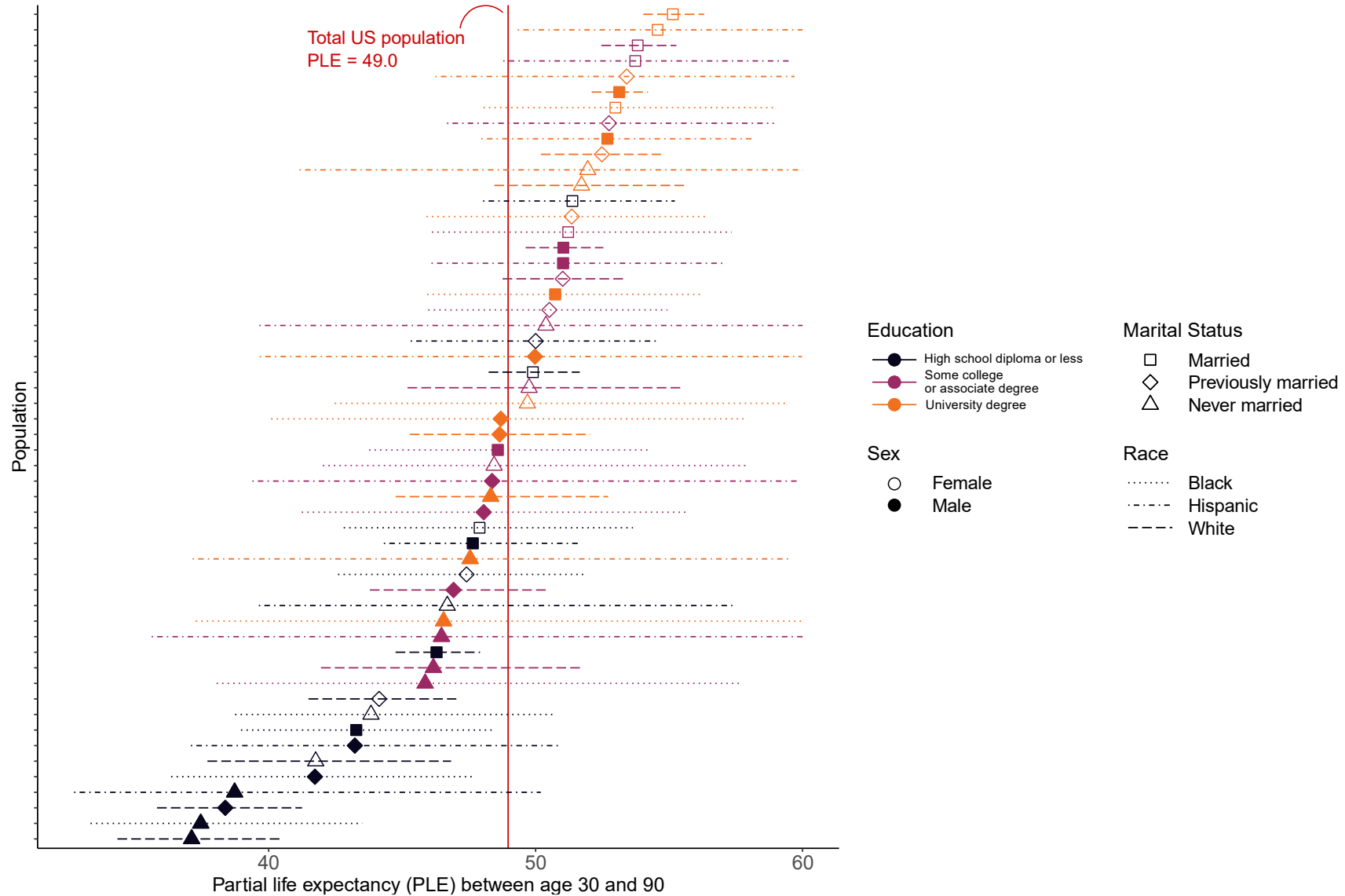
- Black (B)
- Hispanic-white (H)
- Non-Hispanic white (W)

Methods

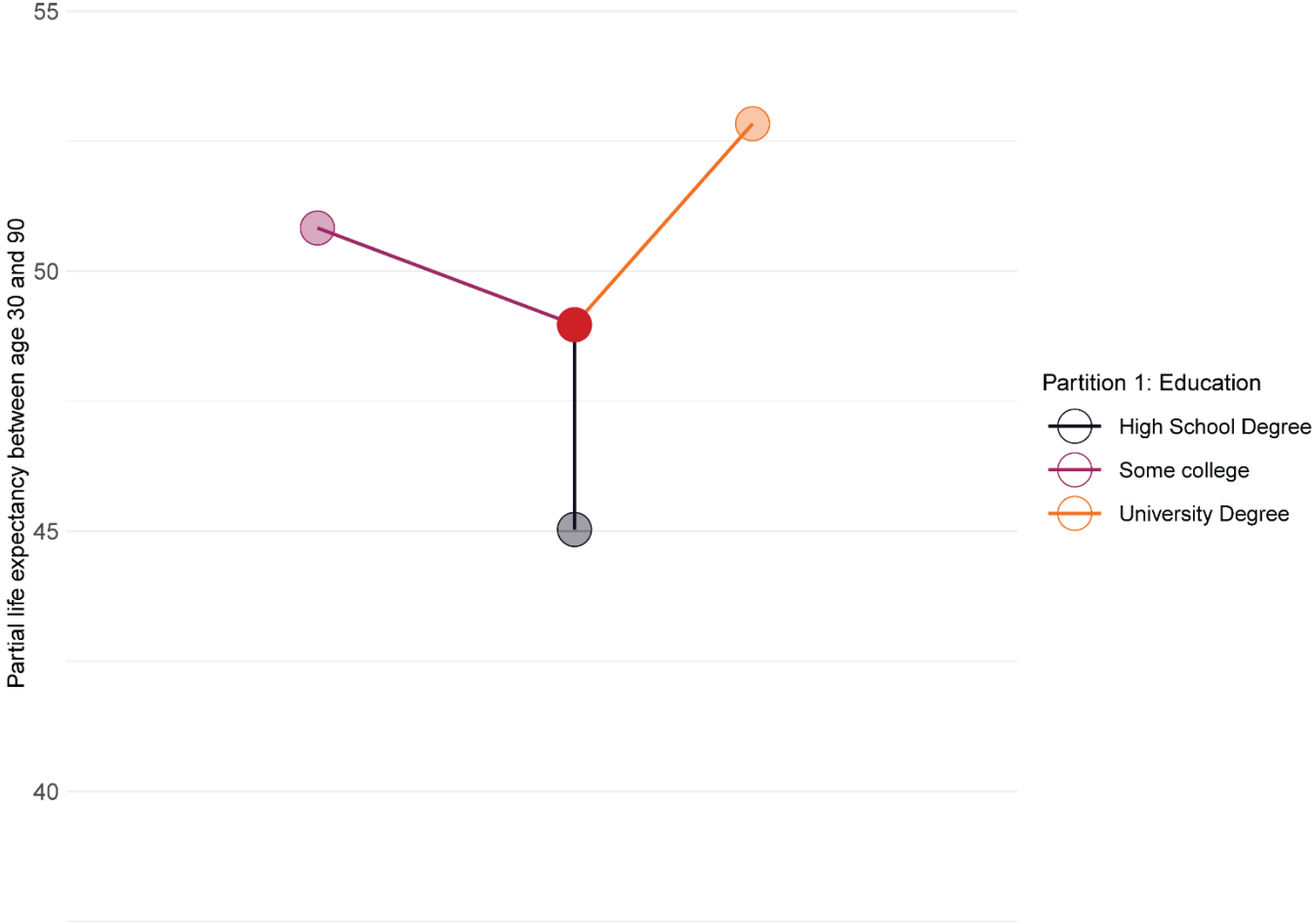
- Life tables by sex, education, marital status, and race
 - Partial life expectancy (30-90)
 - Confidence intervals (Chiang, 1984)
- Arriaga decomposition to assess age and cause of death contributions to inequalities
- Outsurvival statistics (Vaupel et al. 2021)

RESULTS

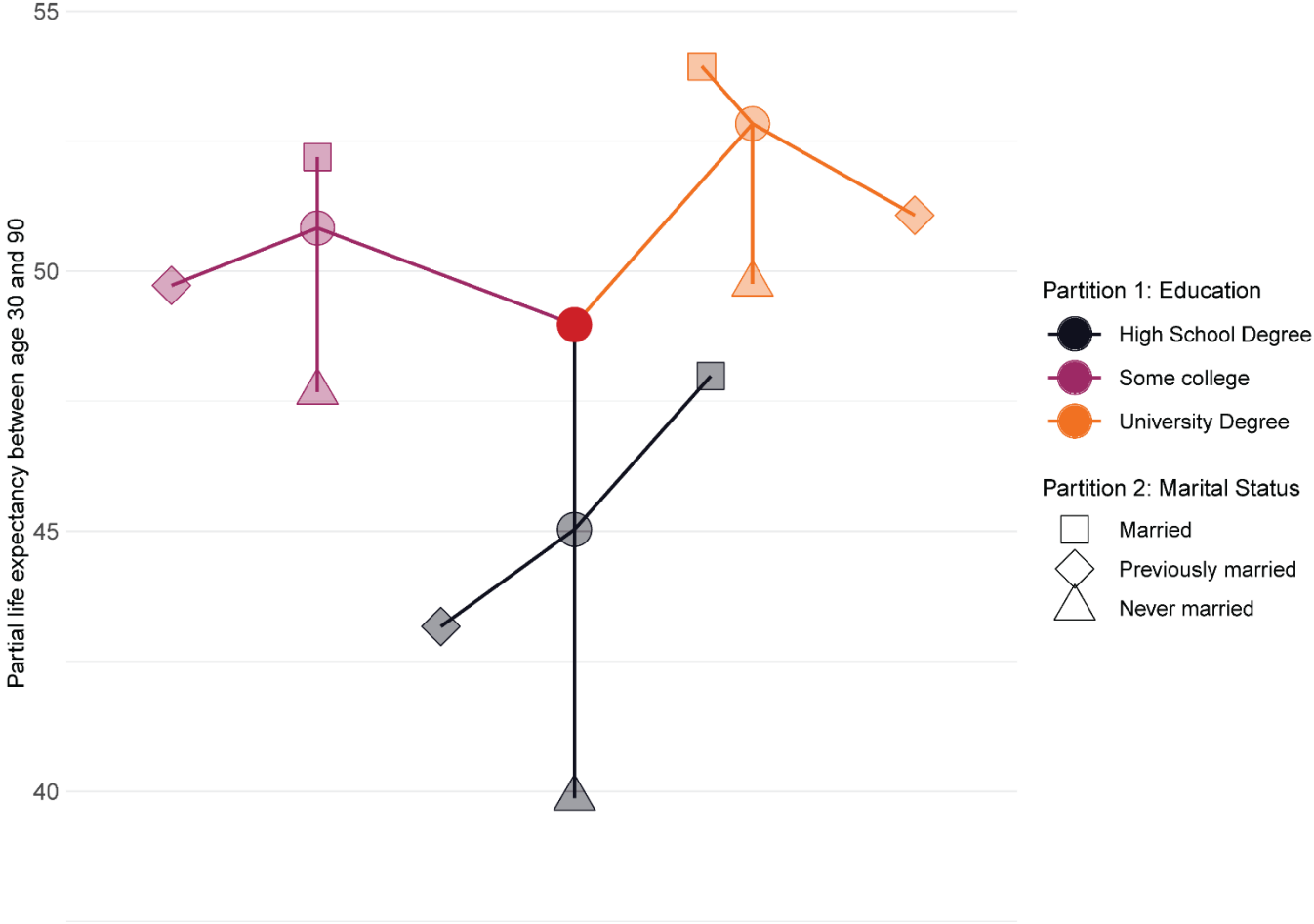
Multiple social determinants, US 2015-19



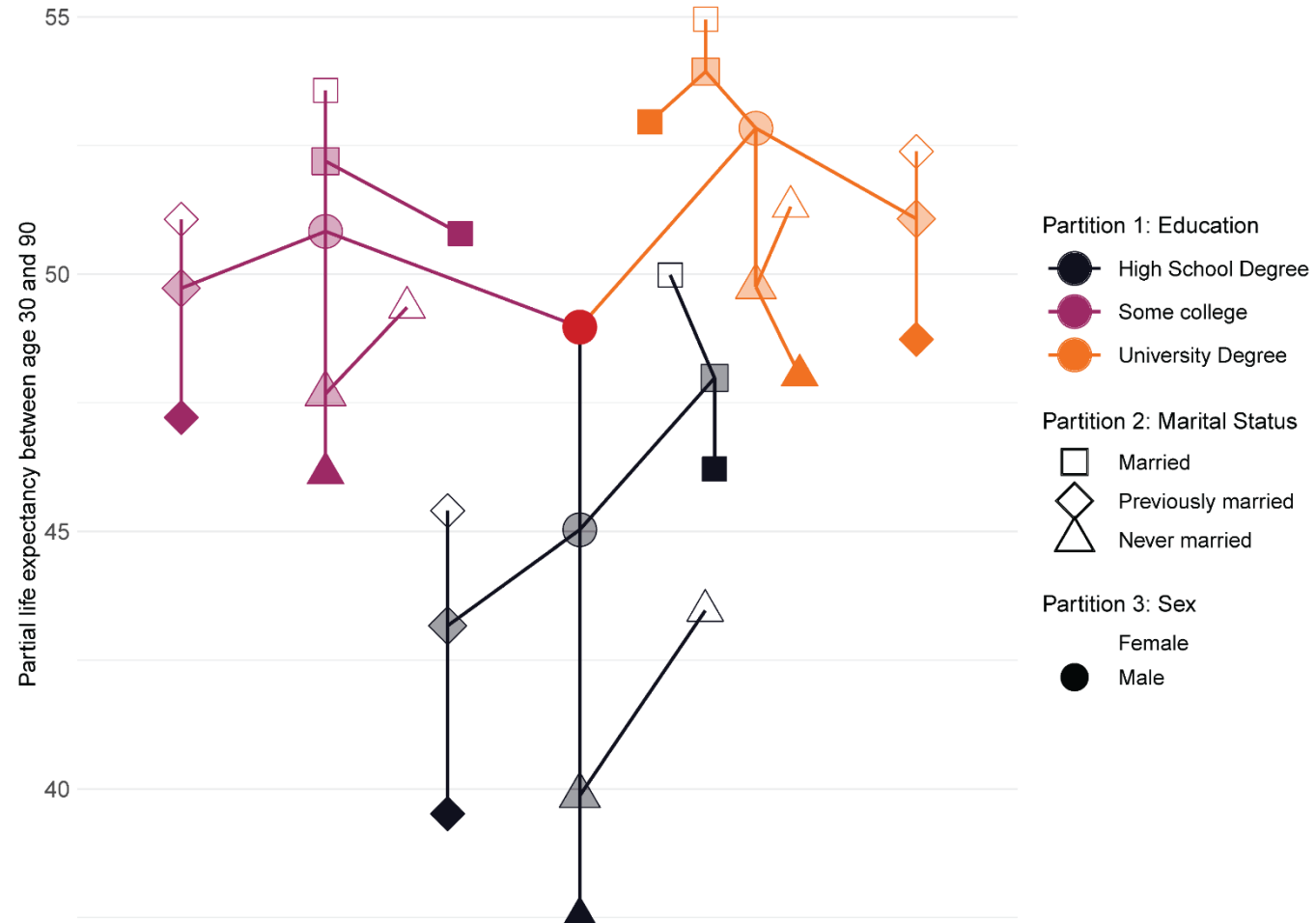
Multiple social determinants, US 2015-19



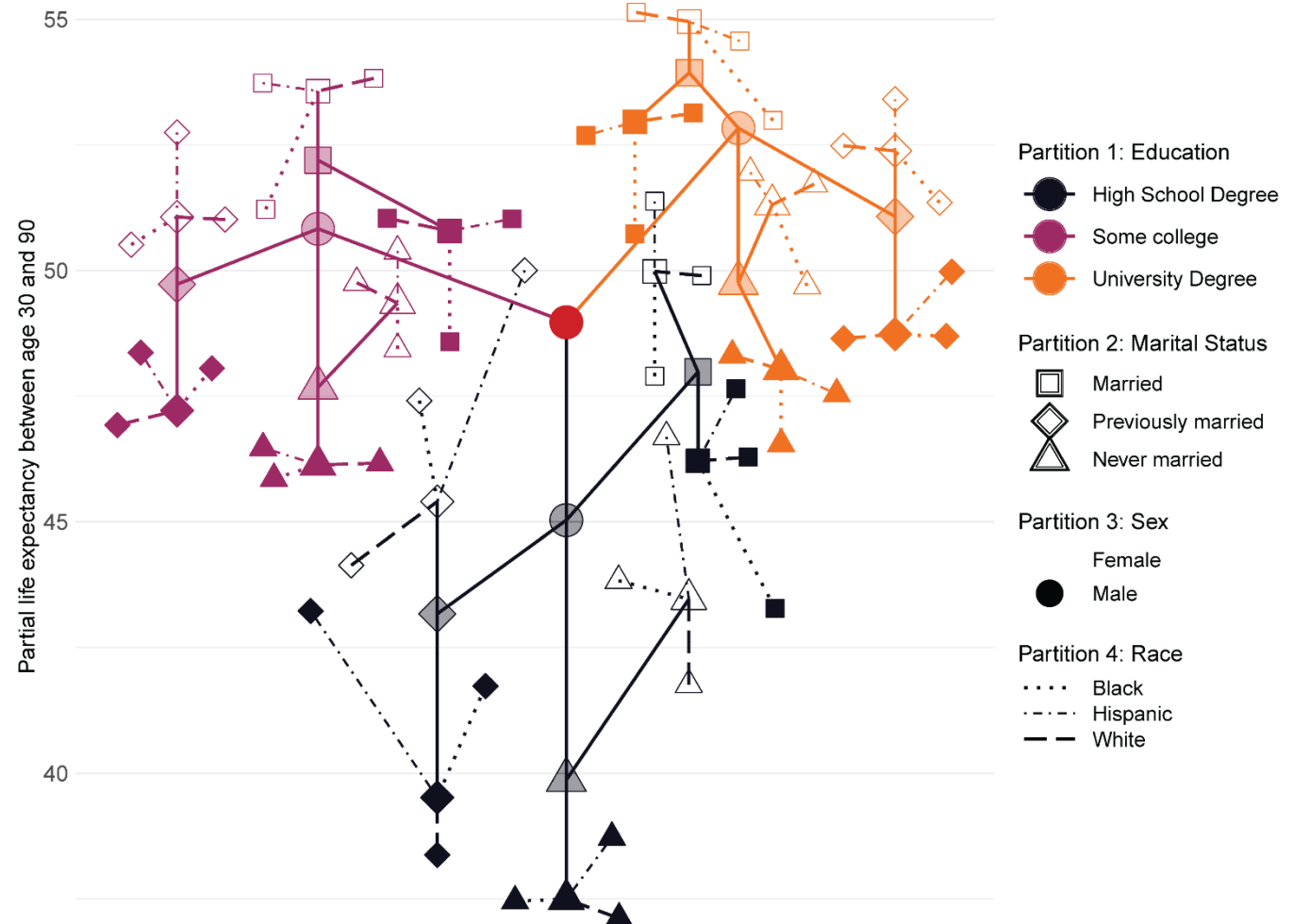
Multiple social determinants, US 2015-19



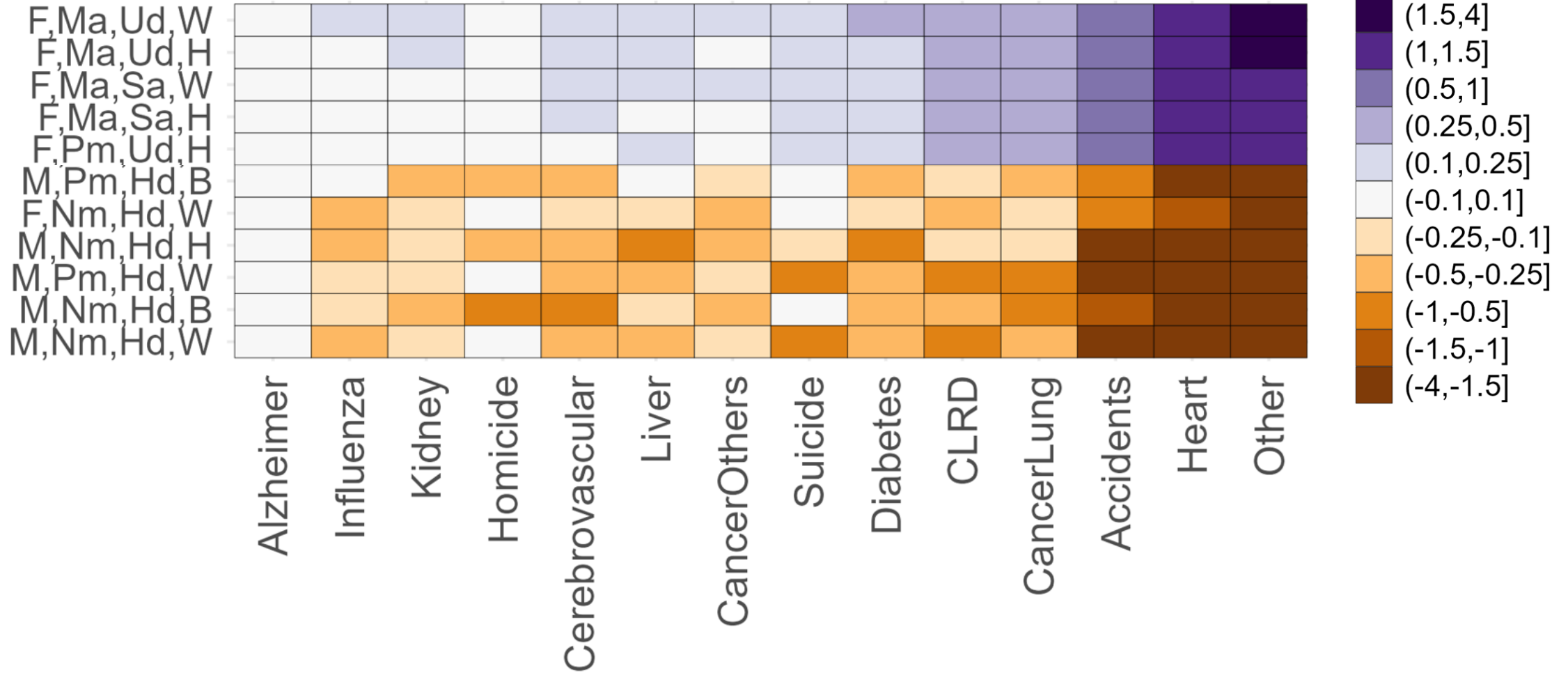
Multiple social determinants, US 2015-19



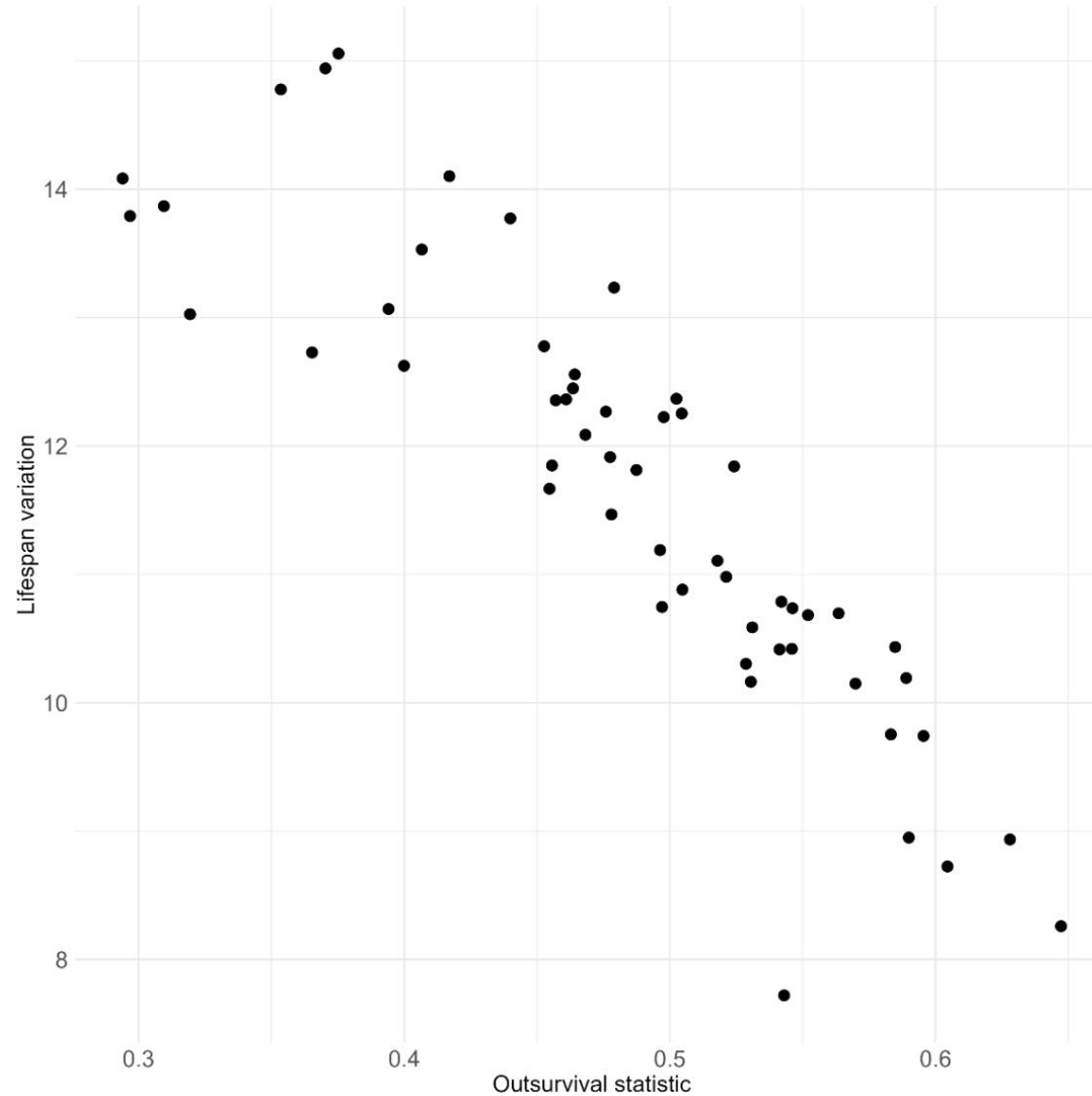
Multiple social determinants, US 2015-19



Cause of death decomposition, US 2015-19



Lifespan variation and outsurvival statistic, US 2015-19



DISCUSSION

Limitations

→ Period calculations:

- Age-specific mortality rates observed in 2015-2019 will characterize the life of a 30-year-old until age 90 from those years
- Marital status is prone to change, and in this study, we only accounted for marital status at a single point in time
- We do not account for educational and marital status differences across cohorts

Conclusions

- There is a complex interaction between social factors and length of lifespans
- Considering multiple social factors provides lots of insights but is not exhaustive
- Identifying individuals at higher risk of mortality is key to reduce inequalities: modern societies major concern

Thank you for attention!



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