# Biological Aging of Sexual and Gender Minorities:
A Comparison with a Cisgender, Heterosexual Population

KJ Davidson-Turner, Tara McKay, Audrey Kelly, and Lauren Gaydosh

VANDERBILT UNIVERSITY

TEXAS
The University of Texas at Austin

Sexual and gender minority (SGM) adults are at high risk for age-related health problems compared to non-SGM adults though mixed findings exist
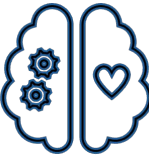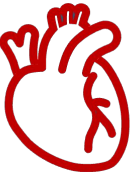
What are possible reasons for these mixed findings in SGM health?

1. SGM adults are often categorized into one group despite differences in life experiences

2. Limitations of self-reported measures of health that are commonly used in SGM data collection

Biological aging refers to the gradual decline in systems within the body that occurs as chronological age increases and is an important risk factor for early mortality and age-related diseases and morbidities

Biological aging among SGM populations may be useful:

1. Measures are objective

2. Risk can reflect social factors and life experiences

3. Important indicator for future health outcomes
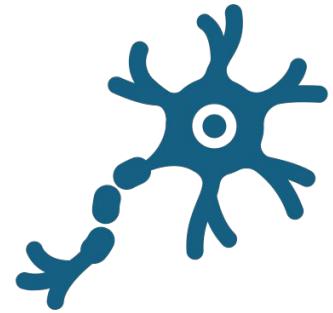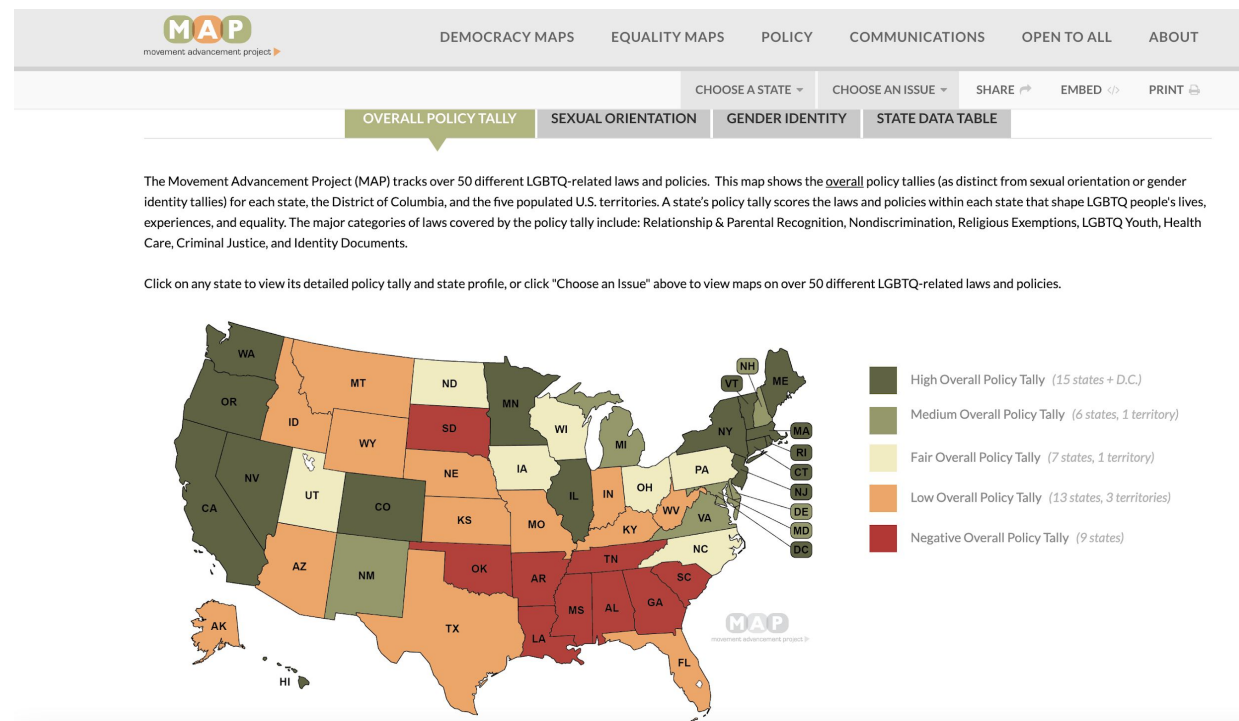
Research Questions

1. Do sexual and gender minority older adults have delayed or accelerated biological aging?

2. Are there differences in biological aging within sexual orientations and gender identities among older adults?

3. How does biological aging of sexual and gender minority older adults compare to the biological aging of straight, cis-gender older adults?

Vanderbilt University Social Networks, Aging, and Policy Study (VUSNAPS)
(2020 – 2021 Data)

The goal of the VUSNAPS study is to <u>understand health, aging, and the social relationships</u> that older LGBTQ, nonbinary, and gender non-conforming adults draw on for support.

Focus on those living in the US South (Georgia, North Carolina, Tennessee, or Alabama). Ages were between 50 and 76 years-old.
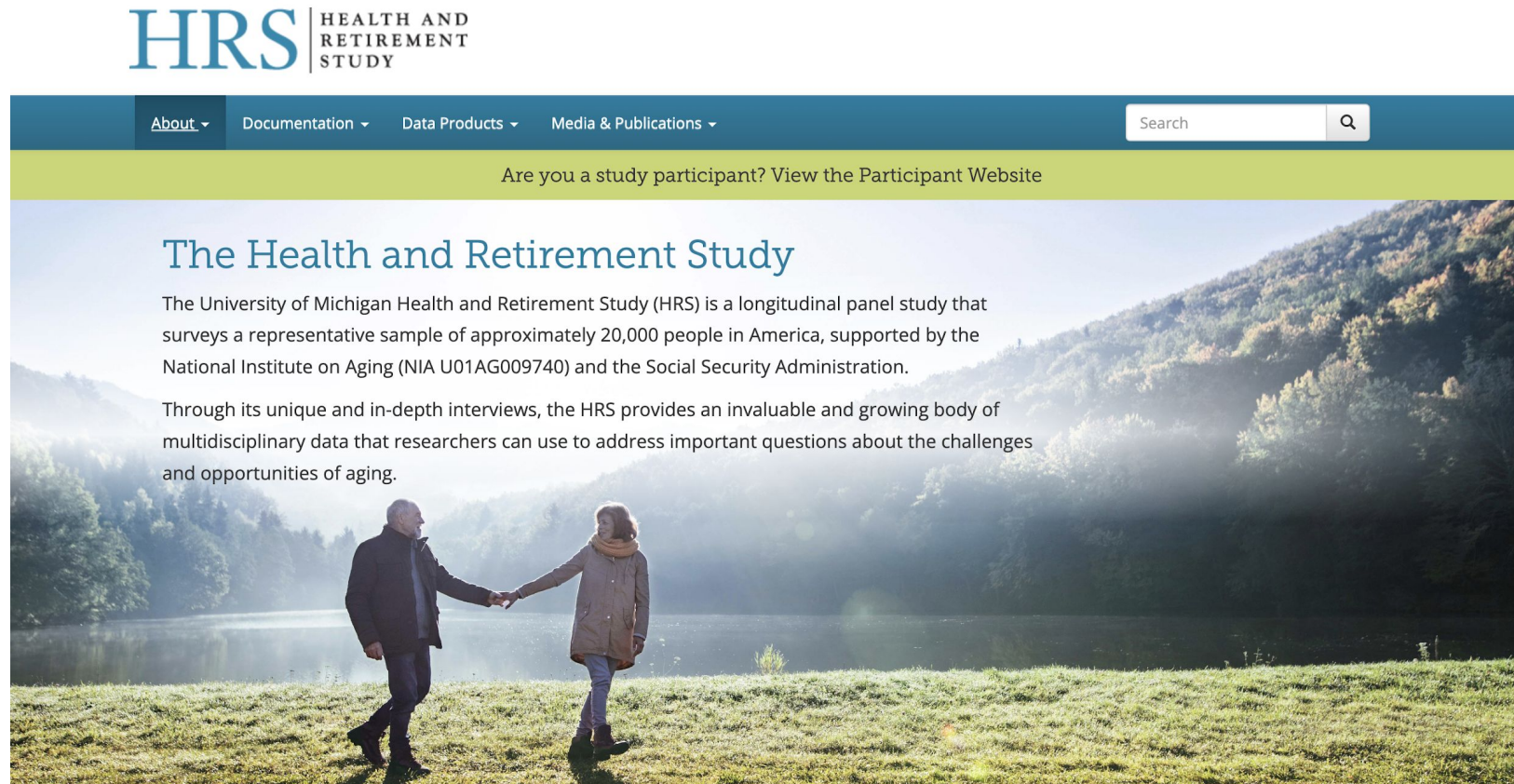
BioAge Pilot Study
(May – October 2022)

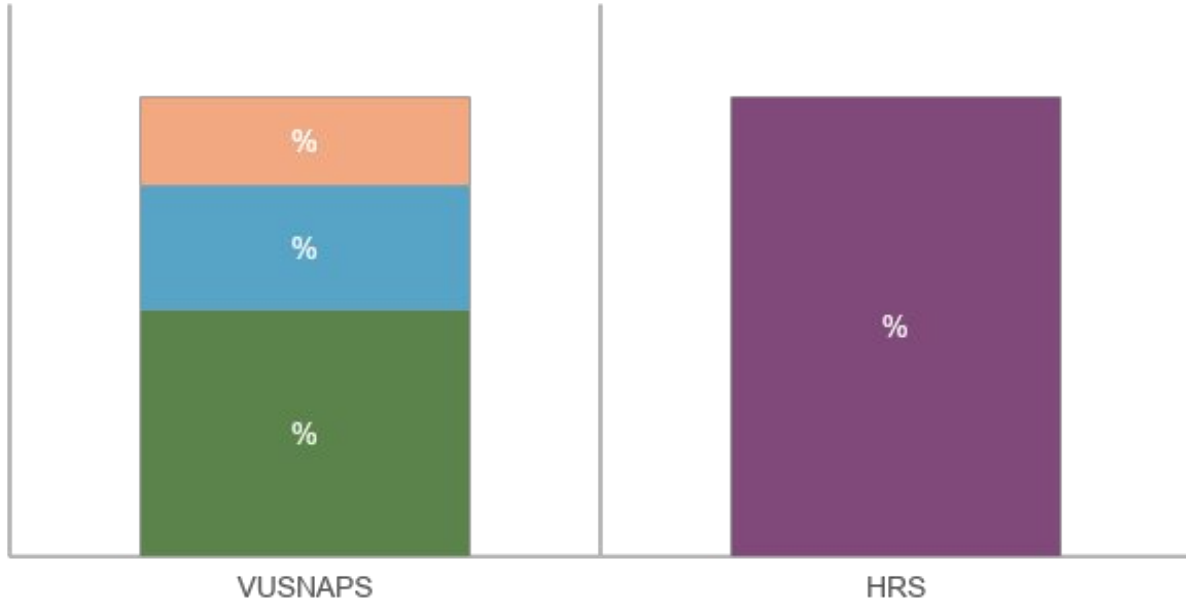# Health and Retirement Study (HRS)

- Venous Blood Study (2016)

VUSNAPS & HRS

Table 1. Demographic characteristics of VUSNAPS and HRS samples		
	VUSNAPS (n=140)	**HRS (n=2,073)**
	%	**%**
Sexual Orientation		
Straight	0.00%	100.00%
Gay	53.57%	0.00%
Lesbian	27.14%	0.00%
Bisexual	19.29%	0.00%
Gender Orientation		
Cis-man	52.14%	42.40%
Cis-woman	35.71%	57.60%
Transgender	12.14%	0.00%
Age	61.57	65.40
	(6.75)	(6.73)
Marital Status		
Married	50.71%	79.11%
Separated/Divorced	15.00%	7.81%
Widowed	3.57%	12.35%
Never Married	30.71%	0.72%
Household Total Income		
< $45,000	21.43%	43.66%
$45,000 - $75,000	25.00%	20.98%
$75,000 - $125,000	32.14%	17.90%
$125,000 +	21.43%	17.46%
Race/Ethnicity		
Non-Hispanic White	75.00%	64.16%
Non-Hispanic Black	5.71%	26.10%
Hispanic/Latino	5.71%	7.24%
Other	13.57%	2.51%
Educational Attainment		
Less than high school/ged & high school	7.14%	48.19%
Some College/Professional Degree	16.43%	26.87%
College or more	76.43%	24.94%

Klemera-Doubal Method (KDM)
(Klemera & Doubal, 2006)
Multi-system measure looking at physiological aging of a sample population in which the algorithm is trained on a healthy external sample
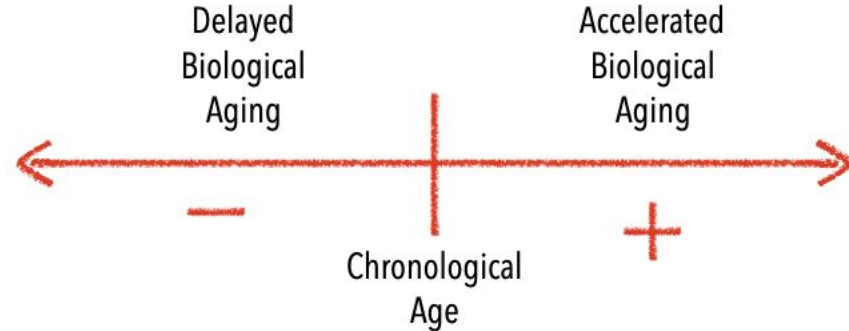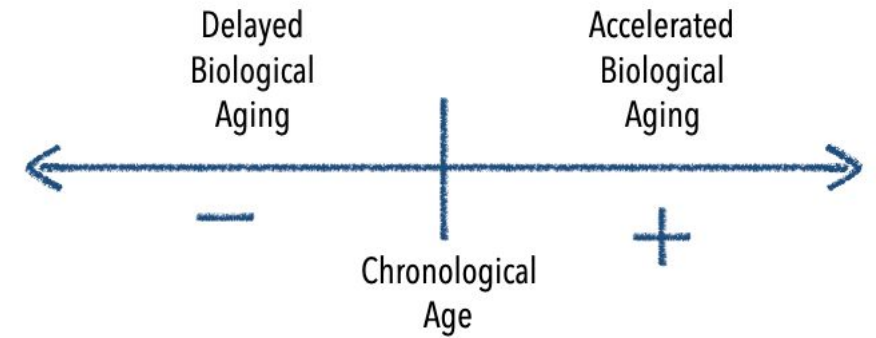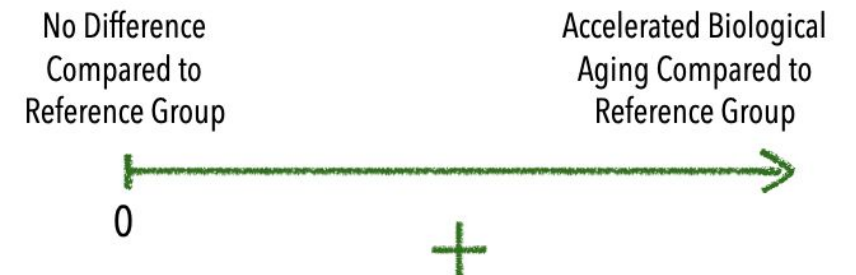

PhenoAge
(Levine 2013; Levine et al. 2018)
Multi-system measure associated with the chronological age at which mortality risk would be approximately normal in a reference population

Homeostatic Dysregulation (HD)
(Cohen 2016)
Compares how different an individual's physiology is from the physiology of a healthy and young reference population

| BIOMARKERS	
VUSNAPS	**HRS**
C-reactive Protein (CRP) (*inflammation*)	**C-reactive Protein (CRP)**
Cystatin C (*Kidney function*)	**Cystatin C**
Glycosylated Hemoglobin (*metabolism*)	Albumin
Insulin (*metabolism*)	Alkaline Phosphatase
	Blood Urea Nitrogen
	Creatinine
	Total Cholesterol
	White Blood Cells
	Lymphocytes
	Mean Cell Volume
	Red Cell Distribution Width

Analysis:
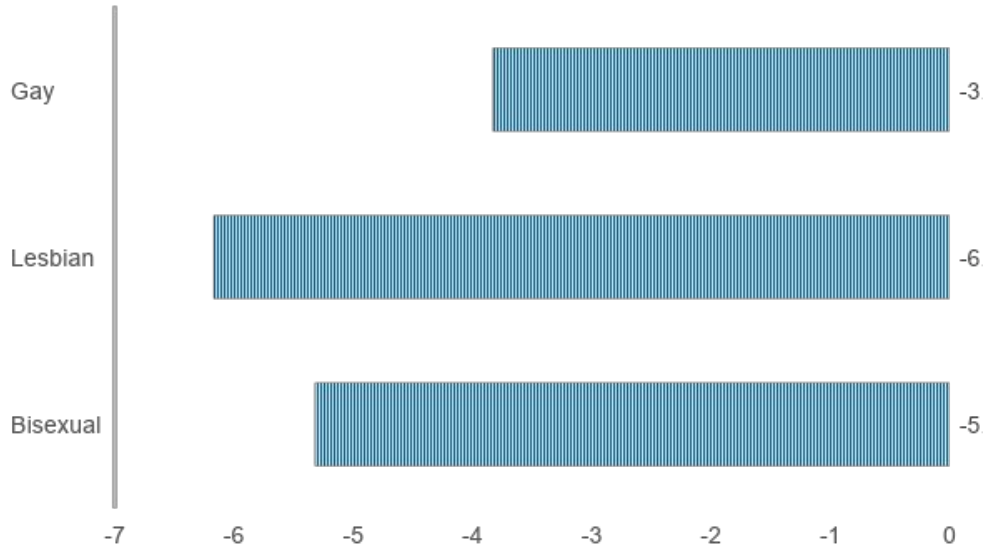Ordinary Least Squares (OLS) regressions
Predicted Probabilities

1. Do sexual and gender minority older adults have delayed or accelerated biological aging?
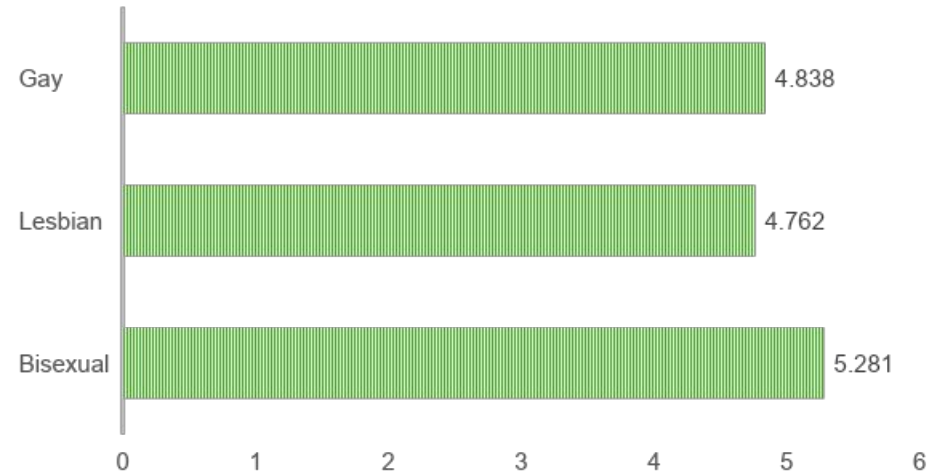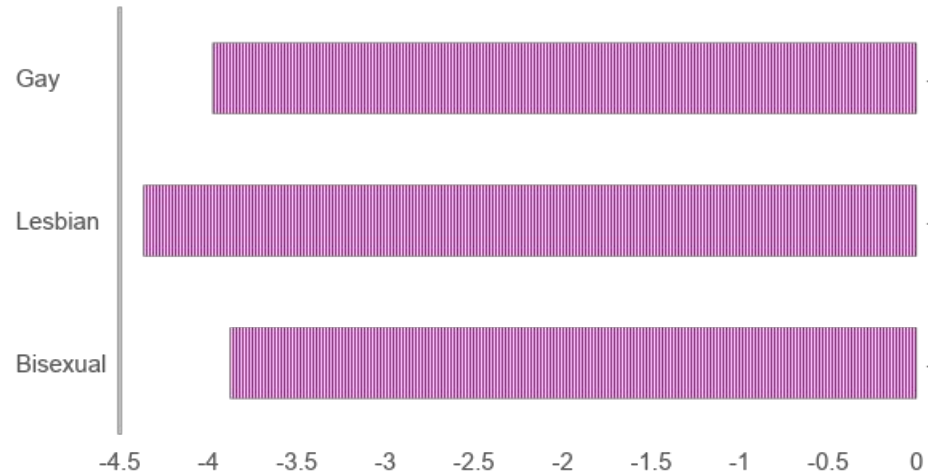
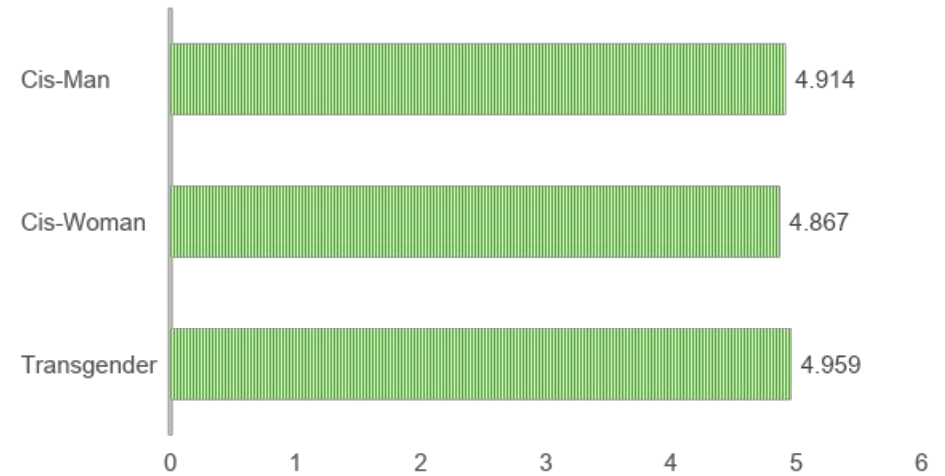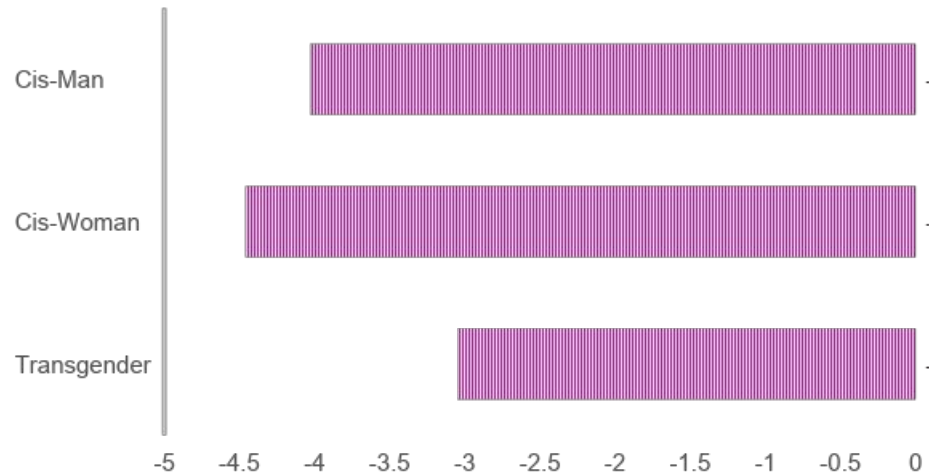Average Biological Aging Values for Respondents in VUSNAPS trained in NHANES (N=140)
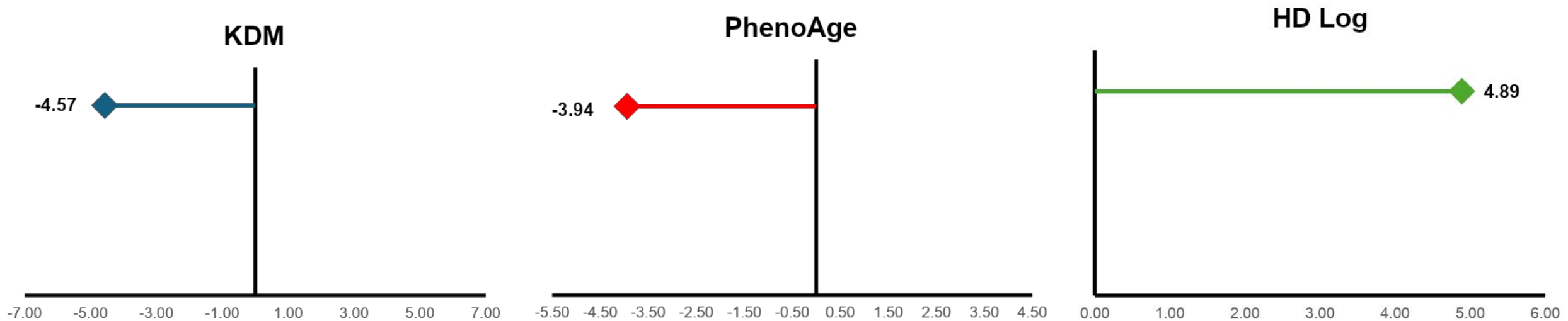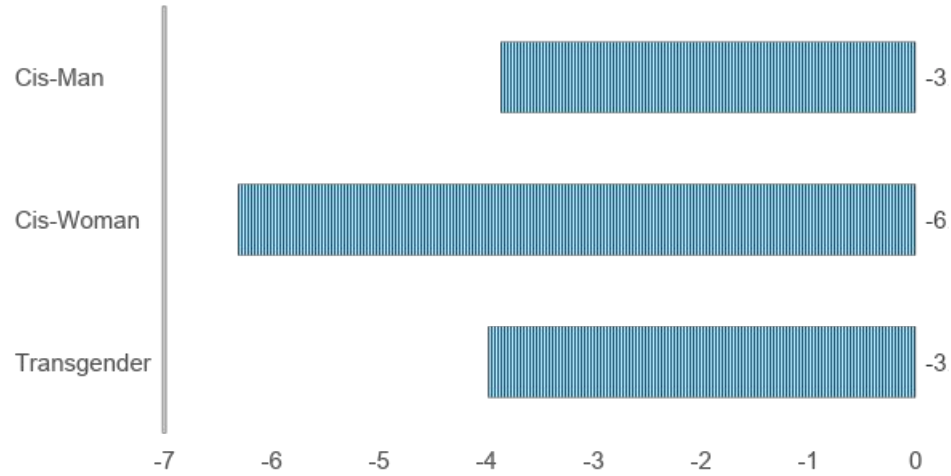
KDM

2. Are there differences in biological aging within sexual orientations and gender identities among older adults?

SEXUAL ORIENTATION

2. Are there differences in biological aging within sexual orientations and gender identities among older adults?
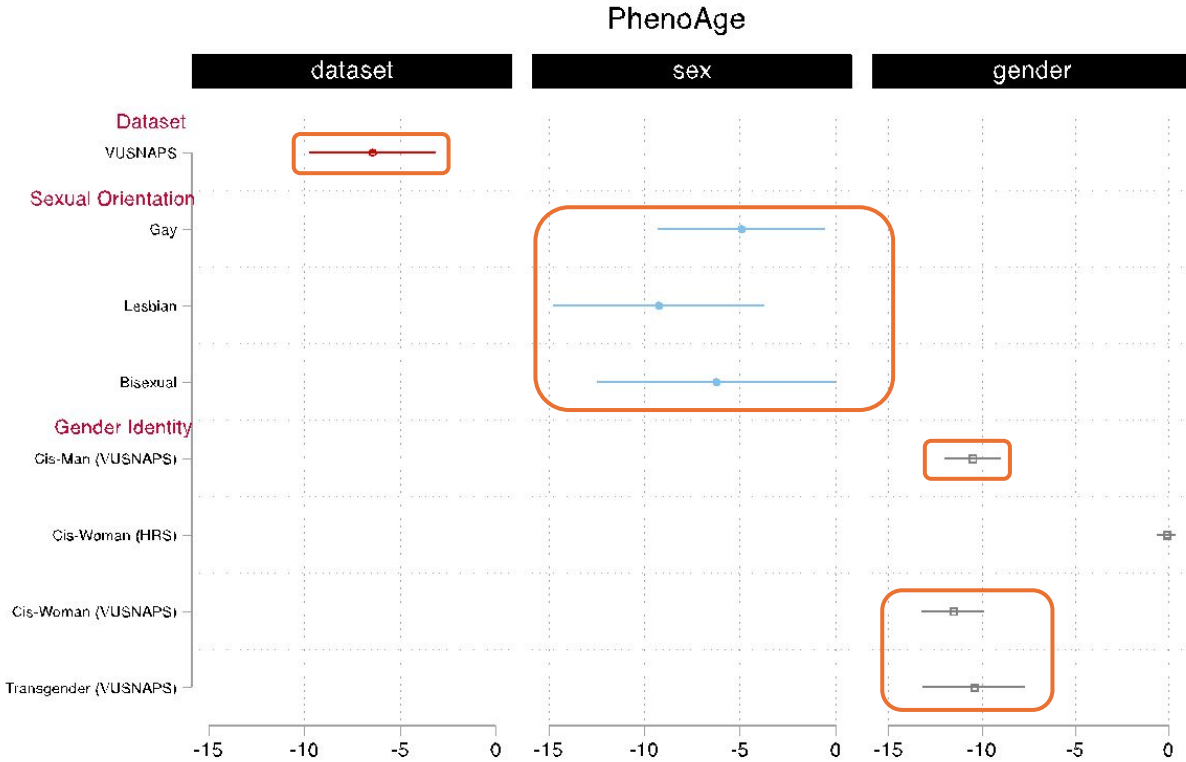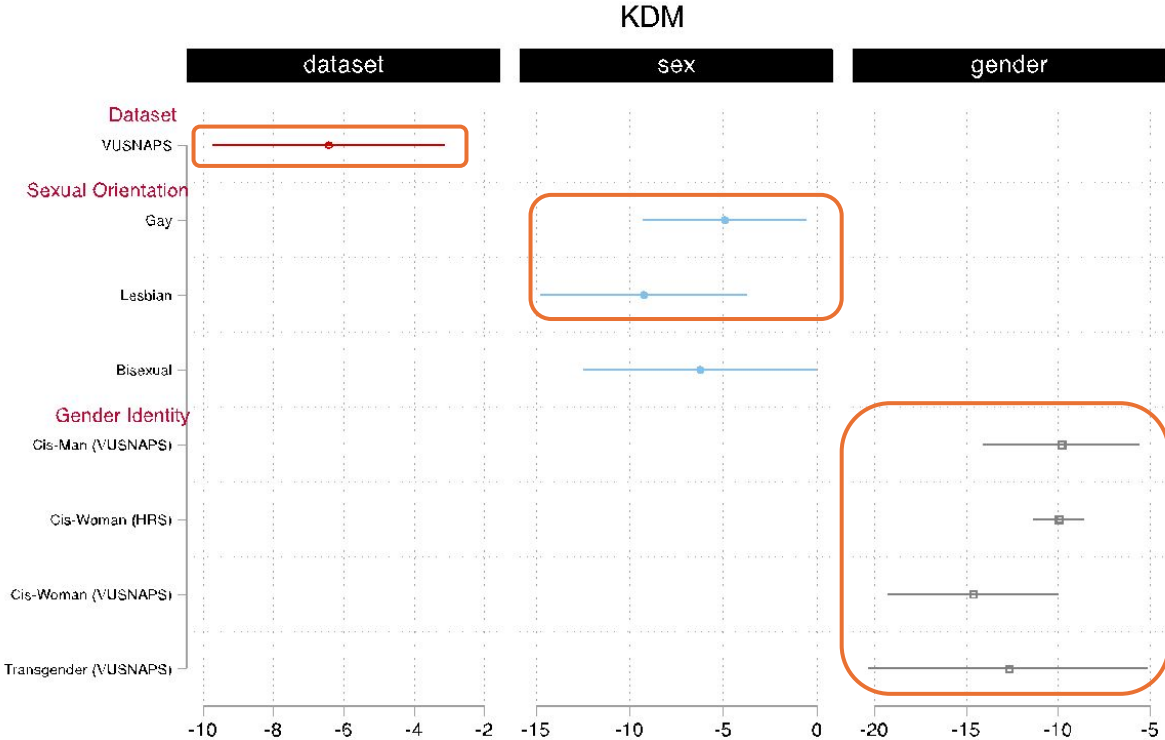
GENDER IDENTITY

3. How does biological aging of sexual and gender minority older adults compare to the biological aging of straight, cis-gender older adults?

Dataset reference: HRS

Sexual Orientation reference: Straight

Gender Identity reference: Cis-Man (HRS)

1. SGM adults had KDM and PhenoAge values indicative of delayed biological aging

2. While not statistically significant, we observed different biological aging patterns for SGM adults (worse biological aging among gay, bisexual, and transgender adults)

3. SGM older adults had more delayed biological aging compared to cis-gender, straight older adults living in the US South
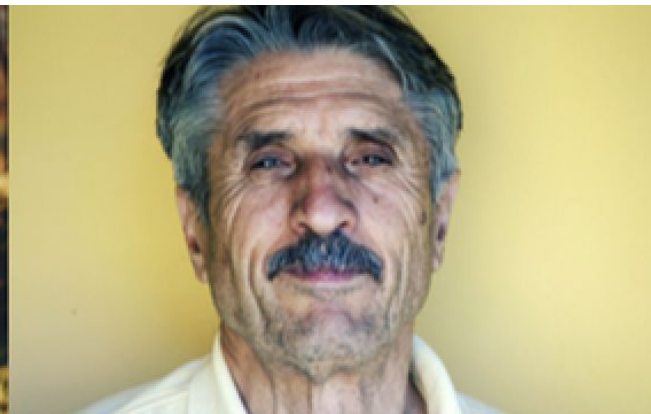
Thank you to Dr. Audrey Kelly, Dr. Tara McKay, and Dr. Lauren Gaydosh.

kjdavidsonturner@utexas.edu

Limitations

- Pilot Study – small sample sizes for groups
  - Could not separate bisexual and transgender adults by gender

- VUSNAPS sample not nationally representative

BioAge Pilot Study

- 9 markers identified as important for evaluating age-related health problems (Justice et al. 2018)

Biomarkers of Physiological Dysregulation	
C-reactive Protein (CRP)	Inflammation
Cystatin C (CYSC)	Kidney function
Glycosylated Hemoglobin (GLYHB)	Blood glucose level (2-3 months prior to the test)
Interleukin-6 (IL6)	Inflammation
N-terminal brain natriuretic peptide (NTBNP)	Cardiac disease
Insulin (INS)	Metabolism
Insulin-Like Growth Factor (IGF1)	Metabolism
Growth Differentiation Factor (GDF)	Inflammation, cardiovascular disease
Tumor Necrosis Factor (TNF)	Inflammation