

Health Disparities in CNS System Disorders: The Role of Weathering, Biological Aging and Intersectionality

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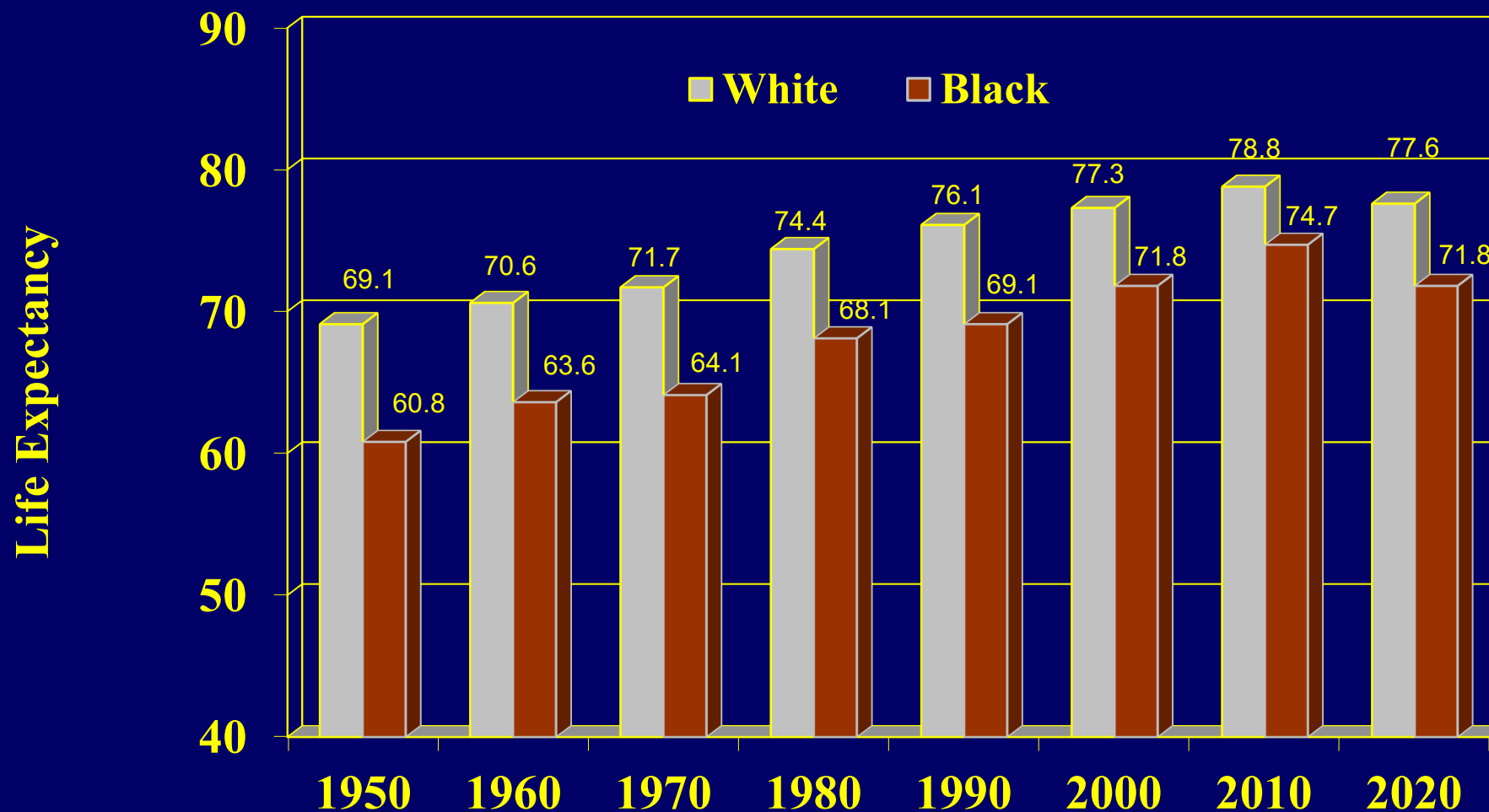
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I have no conflicts to disclose

Racial Inequities in Health Have
Existed for a Long Time

Life Expectancy by Race, 1950-2020



What Drives these Large Racial Inequities
in Health?

Socioeconomic Status

Socioeconomic Status (SES), (whether measured by income, education, occupation, poverty or wealth) is a central determinant of the distribution of valuable resources in society



Race/Ethnicity is strongly related to SES

Median Household Income and Race, 2018

Racial Differences in Income are Substantial:

1 dollar



Whites

1.23 dollar



Asians

73 cents



Hispanics

59 cents



Am Indians*

59 cents



Blacks

Reducing Racial Inequity in Income is on a Treadmill: A Lot of Talk: Little Progress

- In 1978, Black households earned 59 cents for every dollar of income that White households earned
- In 2018, the gap is still 59 cents to the dollar



Large racial gaps in income markedly
understate the racial gap in economic status

Median Wealth and Race, 2016

For every dollar of wealth that Whites have,



Blacks have 10 cents



Latinos have 12 cents



Other Races have 38 cents



What Low Economic Status Means

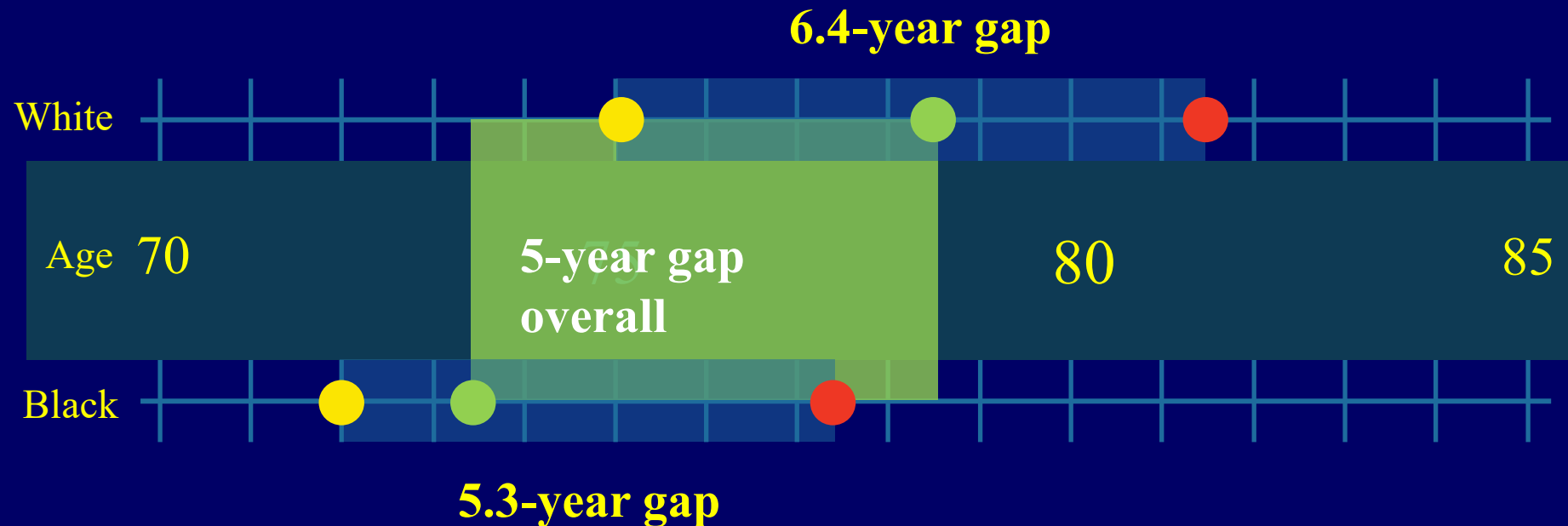
We are in the same storm but in different Boats



The Added Burden of Race

The Intersectionality of Race and SES

Life Expectancy at Age 25 Based on Level of Education

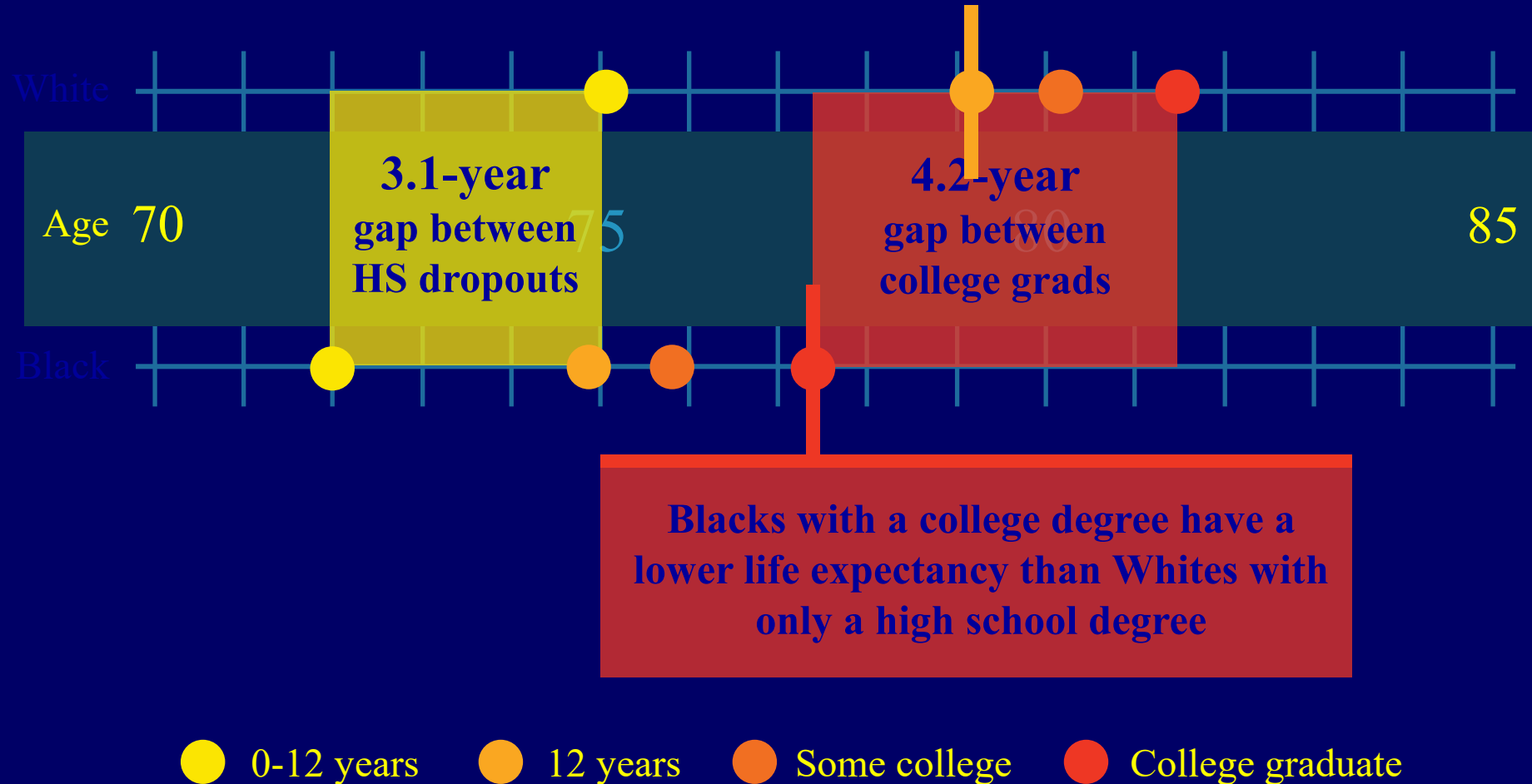


● Overall ● 0-12 years ● College graduate

Murphy, NVSS 2000; Braveman, Cubbin, Egerter, Williams, Pamuk, *AJPH*, 2010; NLMS 1988-1998

Life Expectancy at Age 25

Race Still Matters



Why Does Race Still Matter?

What does Scientific Research Clearly Say?

*Racism and Racial
Discrimination are alive, well,
pervasive and thriving in
America*

*And Racism has Dramatic
Negative effects on Mental
Health*



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The House that Racism Built

Racism as a
societal system



Social Forces

- Political
- Legal
- Economic
- Religious
- Cultural
- Historical Events

Structural or
Institutional
Racism (e.g.
Segregation)

US: Centrality of Segregation in Creating Racial Inequities

VIEWPOINT

Racial Residential Segregation: A Fundamental Cause of Racial Disparities in Health

DAVID R. WILLIAMS, PhD, MPH^a
CHIQUITA COLLINS, PhD^b

SYNOPSIS

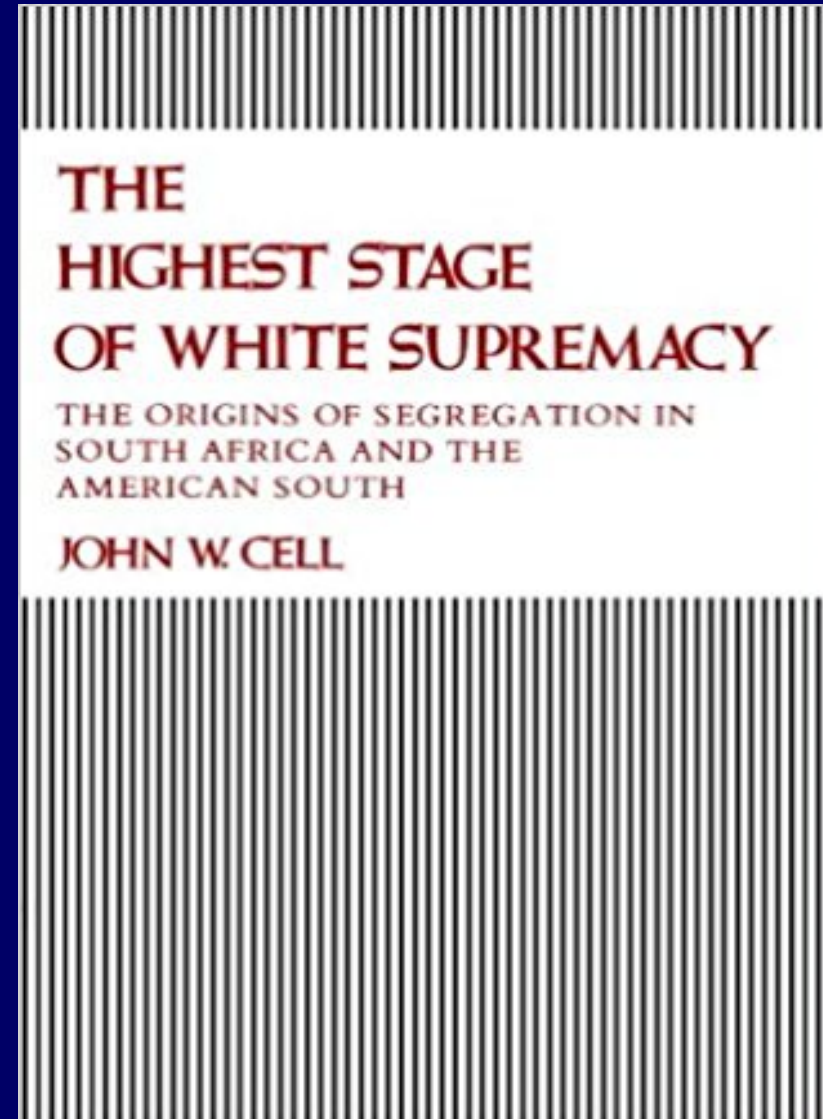
Racial residential segregation is a fundamental cause of racial disparities in health. The physical separation of the races by enforced residence in certain areas is an institutional mechanism of racism that was designed to protect whites from social interaction with blacks. Despite the absence of supportive legal statutes, the degree of residential segregation remains extremely high for most African Americans in the United States.



- Segregation refers to restricted residence to particular areas based on race
- It includes the forced removal and relocation of indigenous peoples
- Reflects institutionalized isolation & marginalization of racial populations

Racial Segregation Is ...

- One of the most successful domestic policies of the 20th century
- "the dominant system of racial regulation and control" in the U.S



John Cell, 1982

How Segregation Works

Segregation is like a burglar at mid-night. It slips into the community, awakens no one, but once it shows up, valuables disappear:

- Quality Schools
- Safe playgrounds
- Good jobs
- Healthy environment
- Safe housing
- Transportation
- Healthcare



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Racial Differences in Residential Environment

In the 171 largest cities in the U.S.,
there is not even one city where
whites live in equal conditions to
those of blacks



“The worst urban context in which
whites reside is considerably better
than the average context of black
communities.”



*Segregation is the central driver of the
Large Racial/Ethnic Differences in SES*

Residential Segregation and SES

A study of the effects of segregation on young African American adults found that the elimination of segregation would erase black-white differences in:

- Earnings
- High School Graduation Rate
- Unemployment

And reduce racial differences in single motherhood by two-thirds



*Segregation and its Consequences for
exposure to Risk Factors for health*

Segregation and Medical Care

HSR

Health Services Research

© Health Research and Educational Trust

DOI: 10.1111/j.1475-6773.2012.01410.x

SPECIAL ISSUE: MEASURING AND ANALYZING HEALTH CARE DISPARITIES

Elucidating the Role of Place in Health Care Disparities: The Example of Racial/Ethnic Residential Segregation

Kellee White, Jennifer S. Haas, and David R. Williams

Objective. To develop a conceptual framework for investigating the role of racial/ethnic residential segregation on health care disparities.

Data Sources and Settings. Review of the MEDLINE and the Web of Science databases for articles published from 1998 to 2011.

Study Design. The extant research was evaluated to describe mechanisms that shape health care access, utilization, and quality of preventive, diagnostic, therapeutic, and end-of-life services across the life course.

Principal Findings. The framework describes the influence of racial/ethnic segregation operating through neighborhood-, health care system-, provider-, and individual-level factors. Conceptual and methodological issues arising from limitations of the research and complex relationships between various levels were identified.

Conclusions. Increasing evidence indicates that racial/ethnic residential segregation is a key factor driving place-based health care inequalities. Closer attention to address research gaps has implications for advancing and strengthening the literature to better inform effective interventions and policy-based solutions.

Key Words. Racial/ethnic residential segregation, health care disparities, health care access, social determinants of health

- Historic and ongoing underfunding of care in poor communities of color
- Low levels of health insurance
- Providers with reduced ability to refer patients to specialty care
- Fewer Pharmacies, less medication
- Hospitals more likely to close
- Lifelong reduced access and quality of care contributes to poorer management of disease and worse outcomes

Segregation, SES, Stress and Health

Lower economic status, living in disadvantaged, segregated, neighborhoods leads to higher levels of exposure and greater clustering of:

1. Economic Stressors
2. Psychosocial Stressors
3. Physical & Chemical Stressors



Blacks & US Born Latinos Have Higher Levels of:

- ...Major Life Events (eg, death of loved one, unemployment, Life-threatening illness/accident)
- ...Financial Stressors (eg, unable to pay bills, borrowed money from friends or relatives)
- ...Work Stressors (eg, job leaves me tired/stressed)
- ...Relationship Stressors (eg, others make too many demands on you, your children have problems with finance, health, relationships)
- ...Neighborhood Stress (eg, home broken into; robbery, you or family victim of violence)



Research Priority

- We need to routinely capture data on geographic location (census tract, or census block group) of study participants
 - We need to link neighborhood context (through resources such as Diversity Data Kids.org) to biomarker and other health outcomes
 - We need to better understand how racism (structural/institutional) in longitudinal studies, with repeated measures, is linked to changes in health, biomarkers, risks and resilience factors over the life course
-



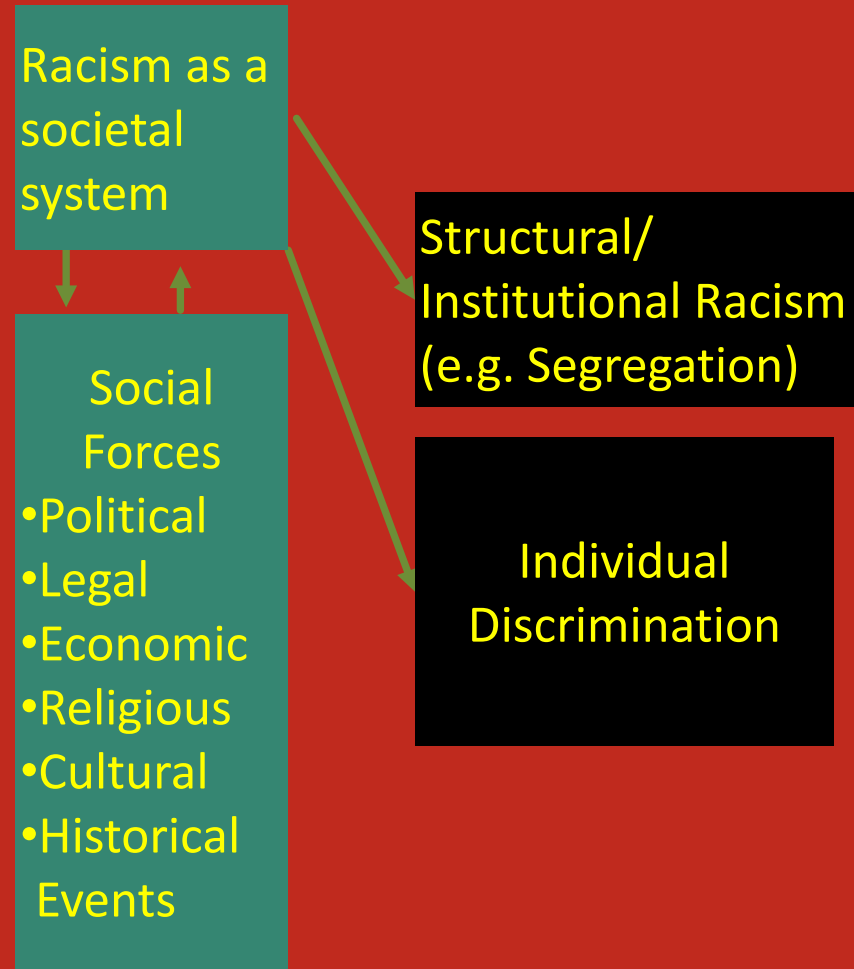
Diversitydata kids.org

Other Aspects of Systemic Racism

A Systematic Review Identified:

- Structural Racism in social institutions
- Immigration & Border Enforcement Policies
- Political Participation
- Criminal Justice System & Policies
- Workplace Policies
- Home Mortgage Discrimination

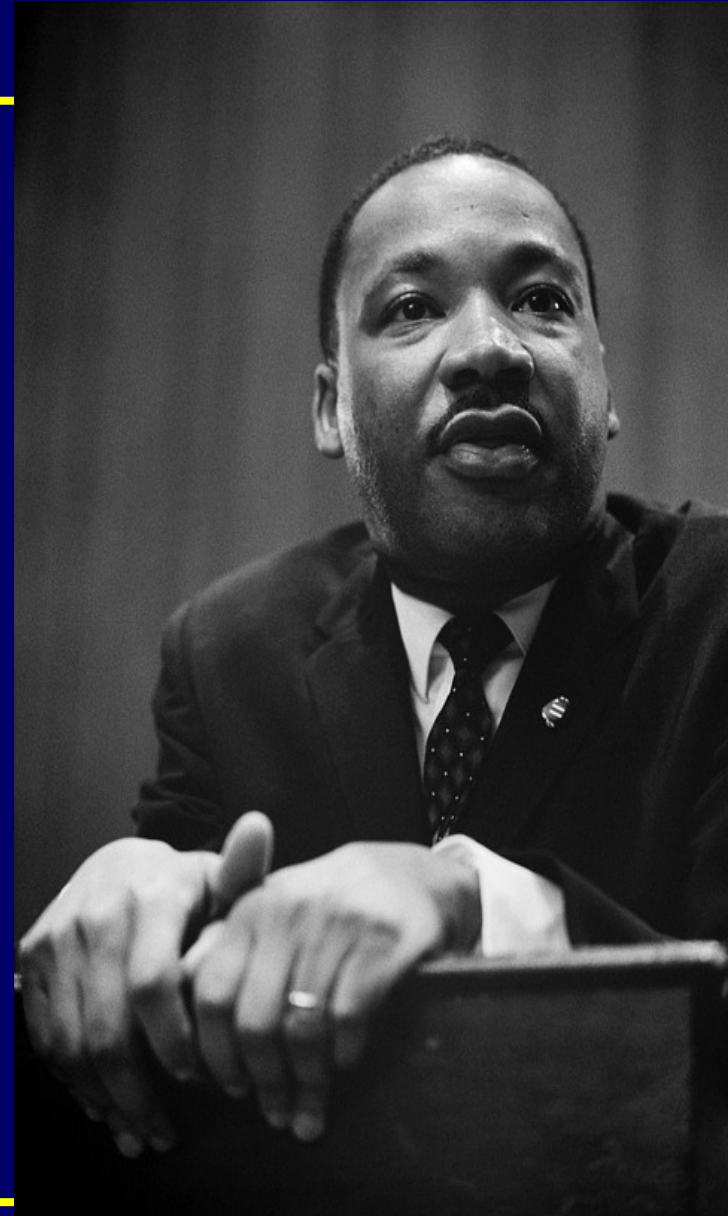
The House that Racism Built



MLK Quote

“... Discrimination is a hellhound that gnaws at Negroes in every waking moment of their lives declaring that the lie of their inferiority is accepted as the truth in the society dominating them.”

Martin Luther King, Jr. [1967]



Every Day Discrimination

In your day-to-day life how often do these happen to you?

- You are treated with less courtesy than other people.
- You are treated with less respect than other people.
- You receive poorer service than other people at restaurants or stores.
- People act as if they think you are not smart.
- People act as if they are afraid of you.
- People act as if they think you are dishonest.
- People act as if they're better than you are.
- You are called names or insulted.
- You are threatened or harassed.



What do you think was the main reason for these experiences?

Everyday Discrimination is Associated With:

- coronary artery calcification
- inflammation (C-reactive protein)
- inflammation (IL-6)
- blood pressure
- lower birth weight
- cognitive impairment
- poor sleep
- mortality
- visceral fat
- shorter telomere length
- arterial stiffness
- incident CVD events



Tene Lewis

Sources: Lewis et al., Psy Med, 2006; Lewis et al., Brain Beh Immunity, 2010; Lewis et al., J Gerontology: Bio Sci & Med Sci 2009; Earnshaw et al., Ann Beh Med, 2013; Barnes et al., 2012; Lewis et al, Hlth Psy, 2012; Barnes et al., J Gerontology: Bio Sci & Med Sci, 2008; Lewis et al., Am J Epidemiology, 2011; Hailu et al, Ann Epi, 2020; Bromfield et al, Hlth Psych, 2020; Everson-Rose et al, AJE, 2015; Kershaw et al, Hlth Psych, 2016

Hidden Ways in which Stressors linked to
Race and Racism Adversely affect Health

Exposure to Traumatic Videos

- Study of black and Latinx adolescents (11-19 years old)
- Assessed viewing race-related, traumatic images or videos online: seeing persons from own ethnic group 1) beaten, 2) arrested or detained, or 3) being shot by the police
- Exposure to online traumas in prior year linked to higher PTSD and depressive symptoms
- Need to assess and facilitate coping with race-related materials



Worry About Safety of Children

- Study of black women found that most live with a heavy burden of stress due to concern about the racism their children might experience
- Over 70% were very concerned:
 - that their children might be harmed by the police
 - that their children might get stopped in a predominantly white neighborhood



Police Stops and Mother's Health

- A study of over 3,000 mothers in 20 cities (Fragile Families Study)
- 23% of urban youth are stopped by the police by the age of 15
- Mothers of youth who were stopped by the police are more than twice as likely to report both depression- and anxiety-related sleep difficulties.



Unsplash.com

Police Violence and Mental Health

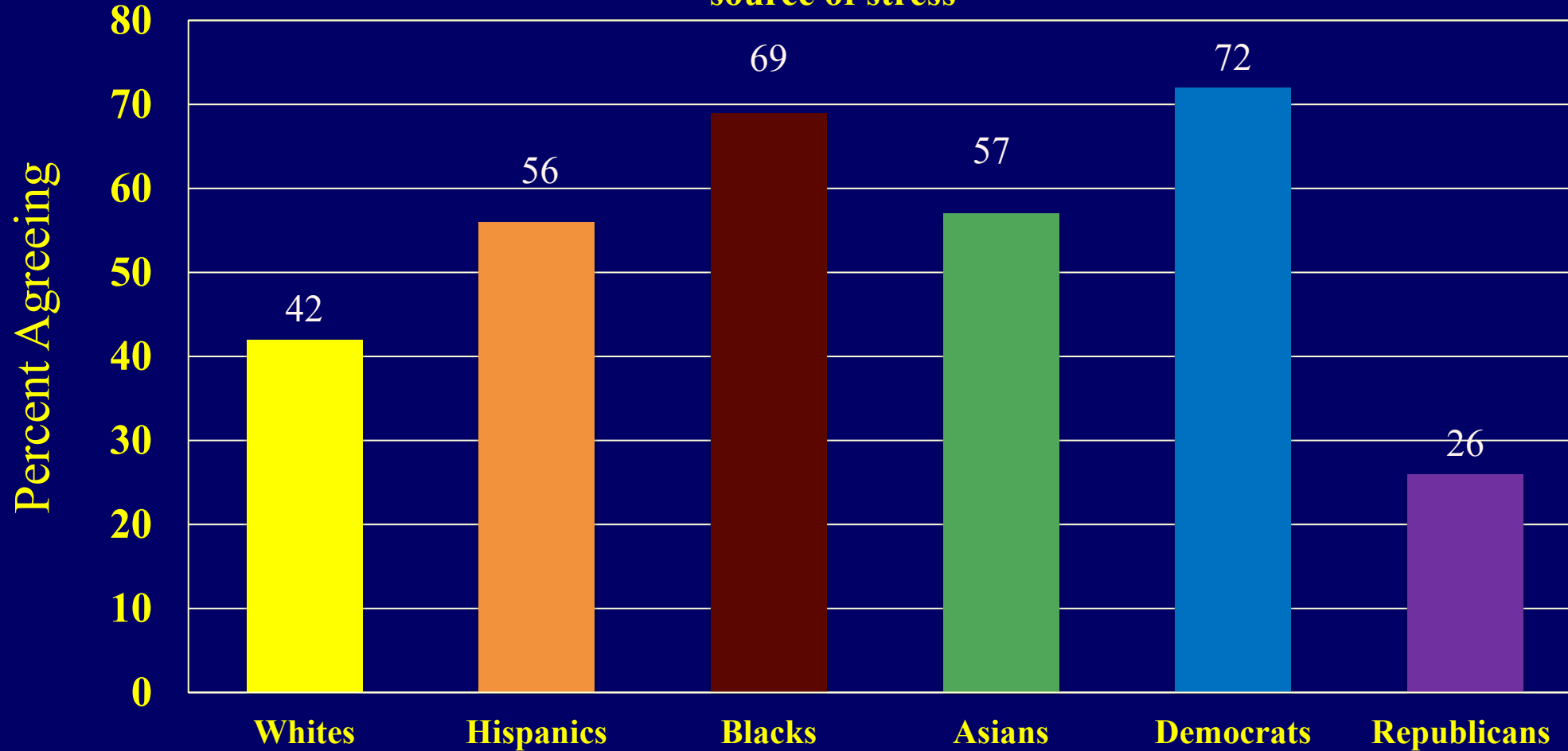
- Frequent media reports of incidents of police violence directed to black, Latino, and Native American communities
- These are stressors that negatively affect health of larger community
- Recent national, quasi-experimental study:
- Police killings of unarmed blacks lead to declines in mental health among blacks in general population for 3 months after event
- No effect on whites



Stress linked to political events can also
have Negative Effects on Health

Election Outcome as a Source of Stress

Percent saying it was a 'very significant' or 'somewhat significant' source of stress



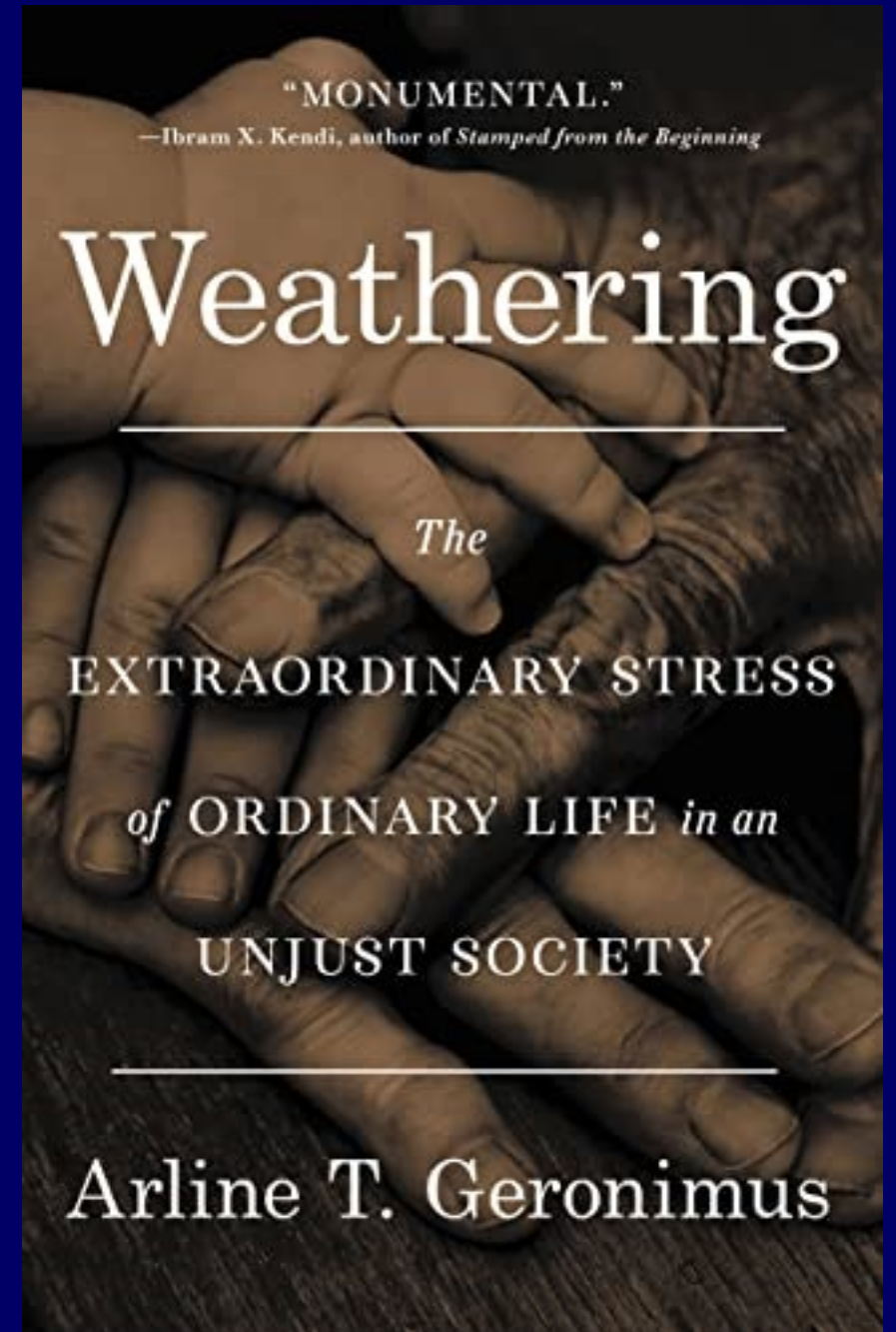
2016 Election Led to Heart Attacks & Strokes

- Study in Southern California
- Hospitalization rate for heart attacks and strokes was 1.62 times higher in the two days after the 2016 presidential election, compared with the same two days in the prior week
- Stress linked to
 - political campaigns
 - political rhetoric, and
 - election outcomes can directly harm health



Consequences of the
cumulative exposure to
discrimination and other
stressors:

“Accelerated Aging”
“Premature Aging”
Biological “Weathering”
Earlier Onset of Chronic
Disease



Biological Weathering

- Chronological age captures duration of exposure to risks for groups living in adverse living conditions
- U.S. blacks are experiencing greater physiological wear and tear, and are aging, biologically, more rapidly than whites
- It is driven by the cumulative impact of repeated exposures to psychological, social, physical and chemical stressors in their residential, occupational and other environments, and coping with these stressors
- Compared to whites, blacks experience higher levels of stressors, greater clustering of stressors, and probably greater duration and intensity of stressors



pixabay

Allostatic Load

10 biomarkers

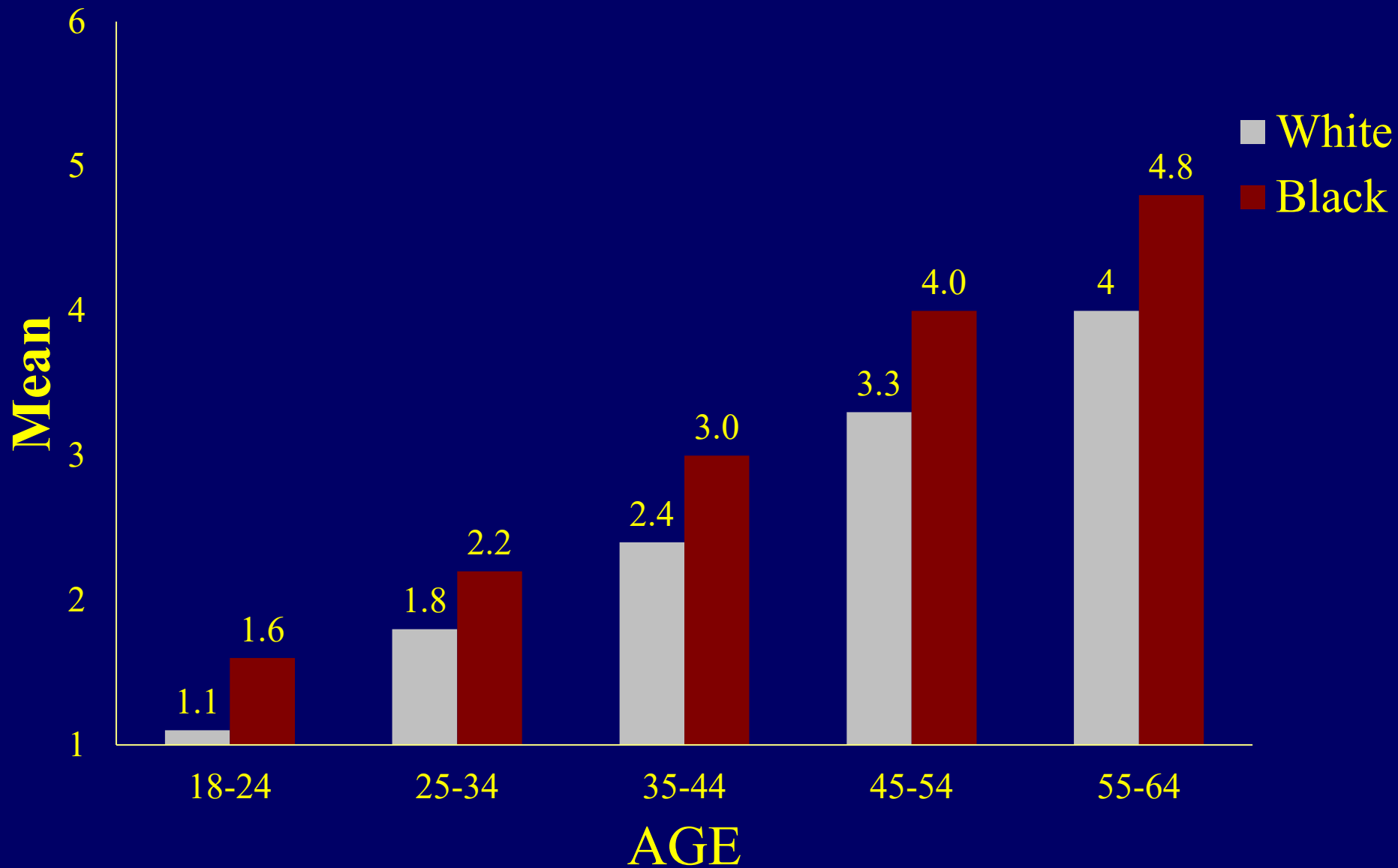
1. Systolic blood pressure
2. Diastolic blood pressure
3. Body Mass Index
4. Glycated hemoglobin
5. Albumin
6. Creatinine clearance
7. Triglycerides
8. C-reactive protein
9. Homocysteine
10. Total cholesterol

High-risk thresholds *

127 mm HG
80 mm HG
30.9
5.4%
4.2 g/dL
66 mg/dL
168 mg/dL
0.41 mg/dL
9 μ mol/L
225

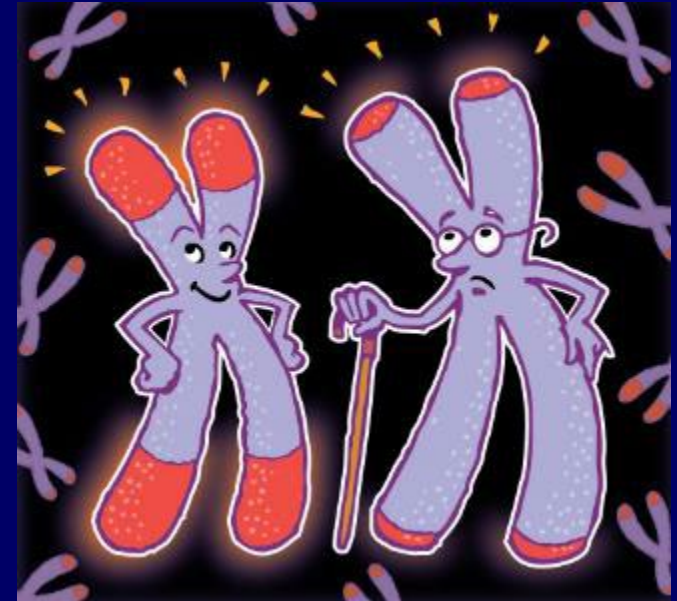
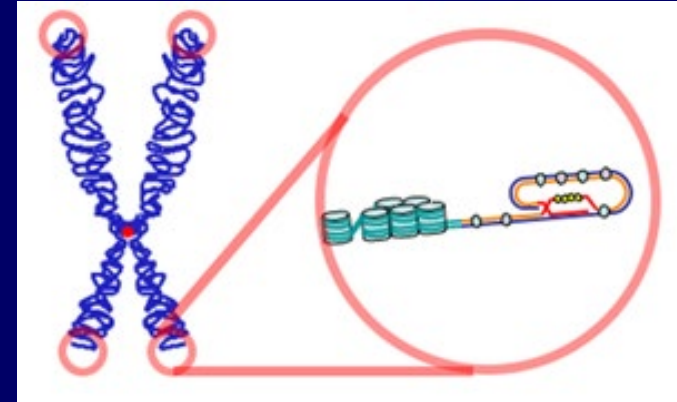
* = < 25th percentile for creatinine clearance; >75th percentile for others

Mean Score on Allostatic Load by Age

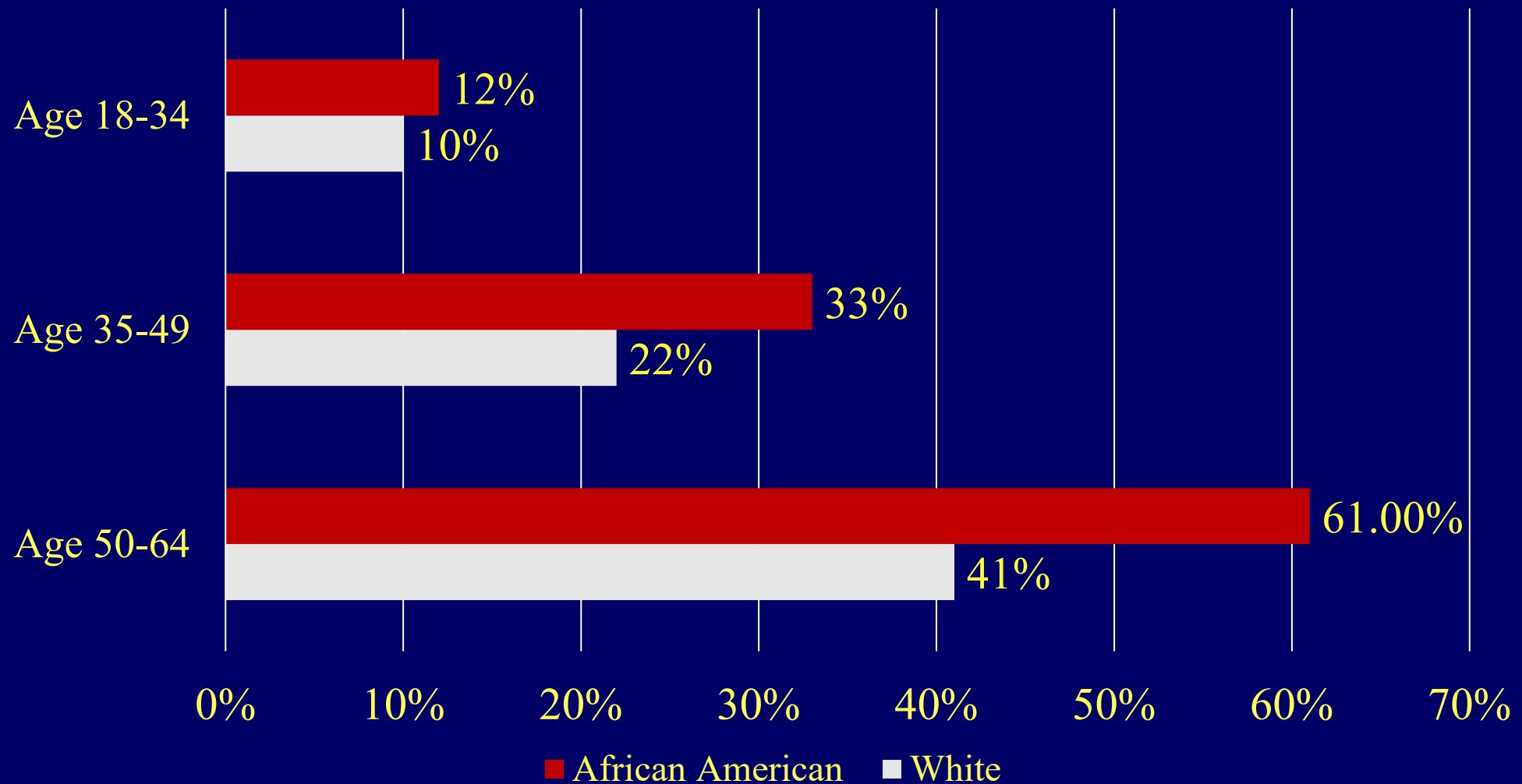


Racial Differences in Telomere Length

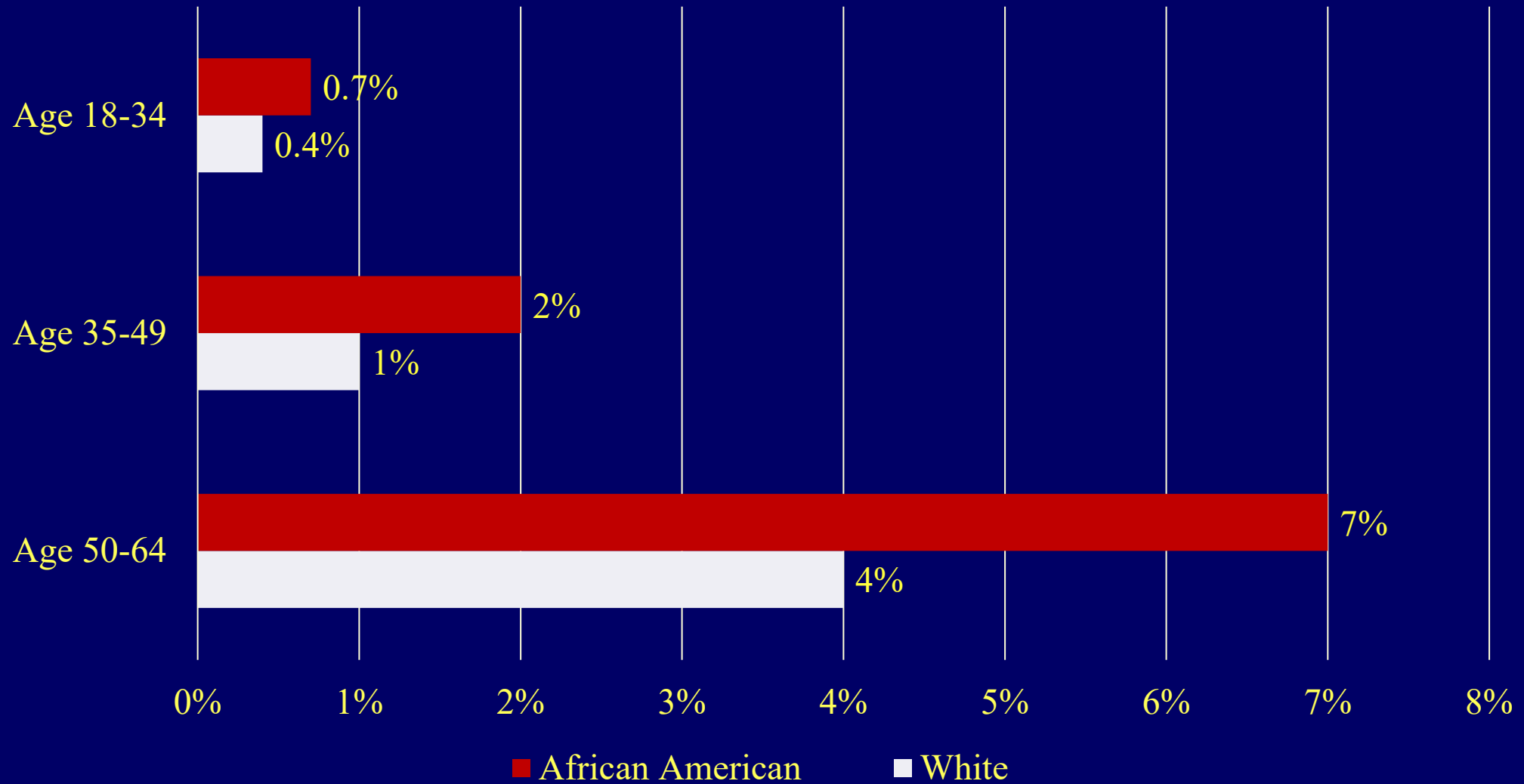
- Telomeres are sequences of DNA at end of chromosome. Telomere length is viewed as an overall marker of biological aging
- Study found that Black women had shorter telomeres than White women
- At same chronological age, black women had accelerated biological aging of about 7.5 years



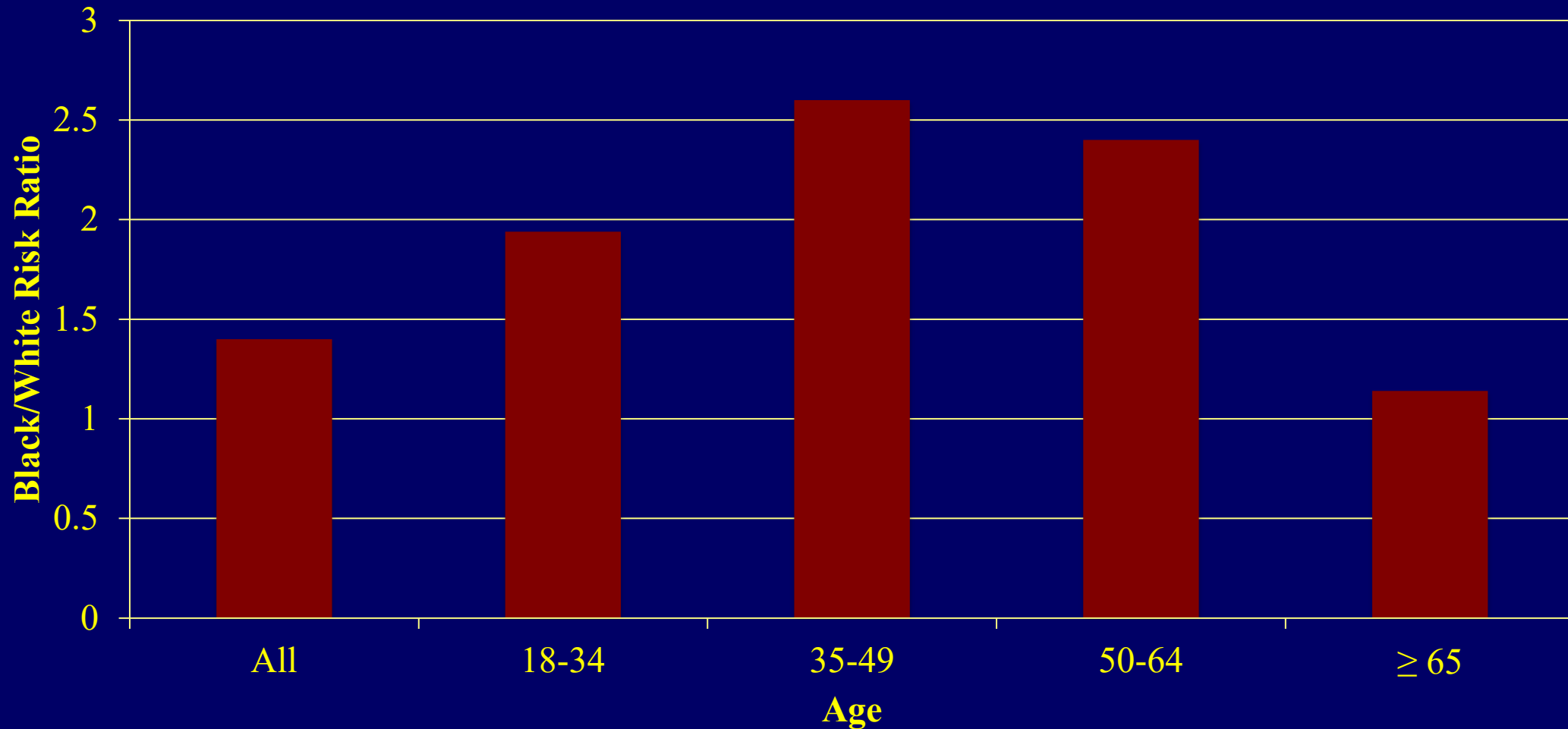
Earlier Onset of High Blood Pressure



Earlier Onset of Stroke



Age-Adjusted and Age-Specific Mortality Stroke (Cerebrovascular Disease)



Distinctive Social Contexts: Research Implications

- Race/ethnicity captures the clustering of stressors over time and the occupancy of distinctive residential and occupational environments
 - How are normal adaptive and regulatory systems affected by the accumulation of adversity?
 - To what extent does biological adaptation to their residential environments lead persons of color to have some biological profiles that are different from other groups and some distinctive patterns of interactions (between biological and psychosocial factors)?
-



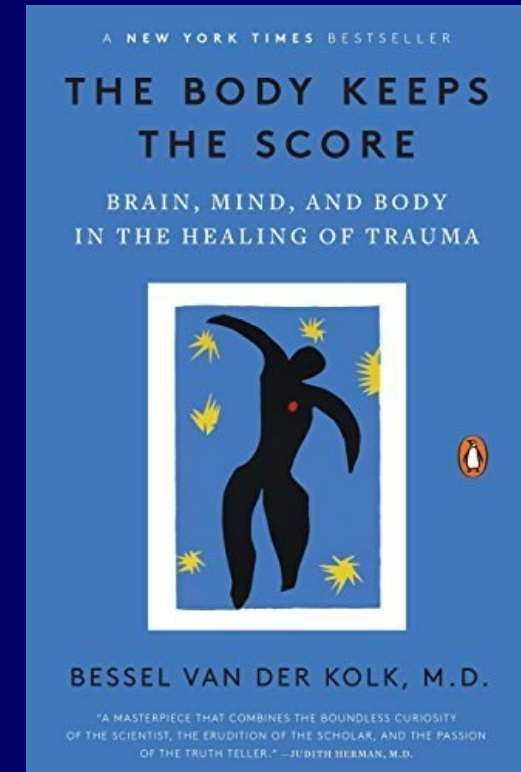
CDC



CDC

Research Priorities – Understanding Stress & Racism

- We need to better understand how the distinctive accumulation of stressors, in early life and adulthood, among racial/ethnic minorities may lead to epigenetic changes that can affect health across the lifecourse and across generations
- Are there long-term, even intergenerational, epigenetic changes that predict risk of disease linked to
 - exposure to segregated conditions?
 - Historical trauma?
 - Slavery and its sequelae?
 - Colonial traumas/abuses experienced by Indigenous people
 - Present-day discrimination and Systemic Racism?



Stress and Epigenetic Changes

- Study of Dutch Famine in 1940s showed reduced birth length and poor health in later life of the children and grandchildren of pregnant women during famine
- Persons prenatally exposed to famine have epigenetic changes that are still evident 6 decades later
- Exposure to prenatal maternal stress (1998 Quebec ice storm) was associated with genome wide changes in offspring (methylation in 957 genes linked to immune function)

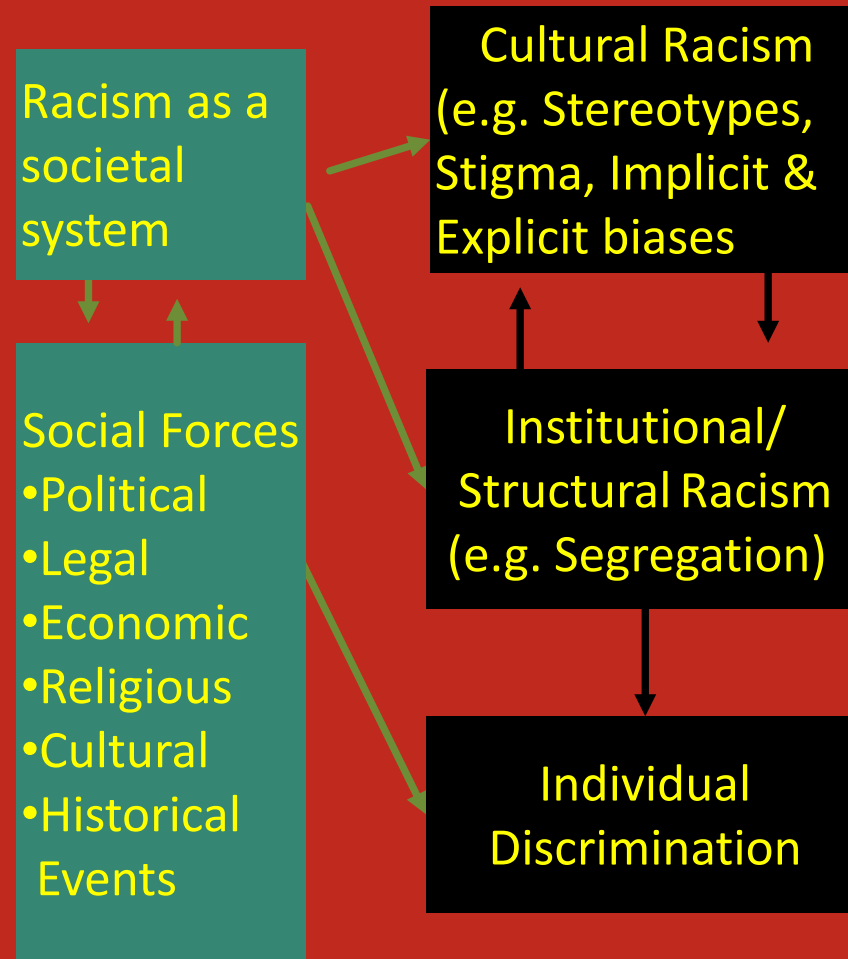


Intergenerational Epigenetic Mechanisms

- Holocaust exposure was associated with epigenetic alterations that were evident both in the exposed parent and offspring (compared to demographically comparable controls)
- This intergenerational epigenetic priming of the physiological response to stress may contribute to the increased risk of poor health in the next generation

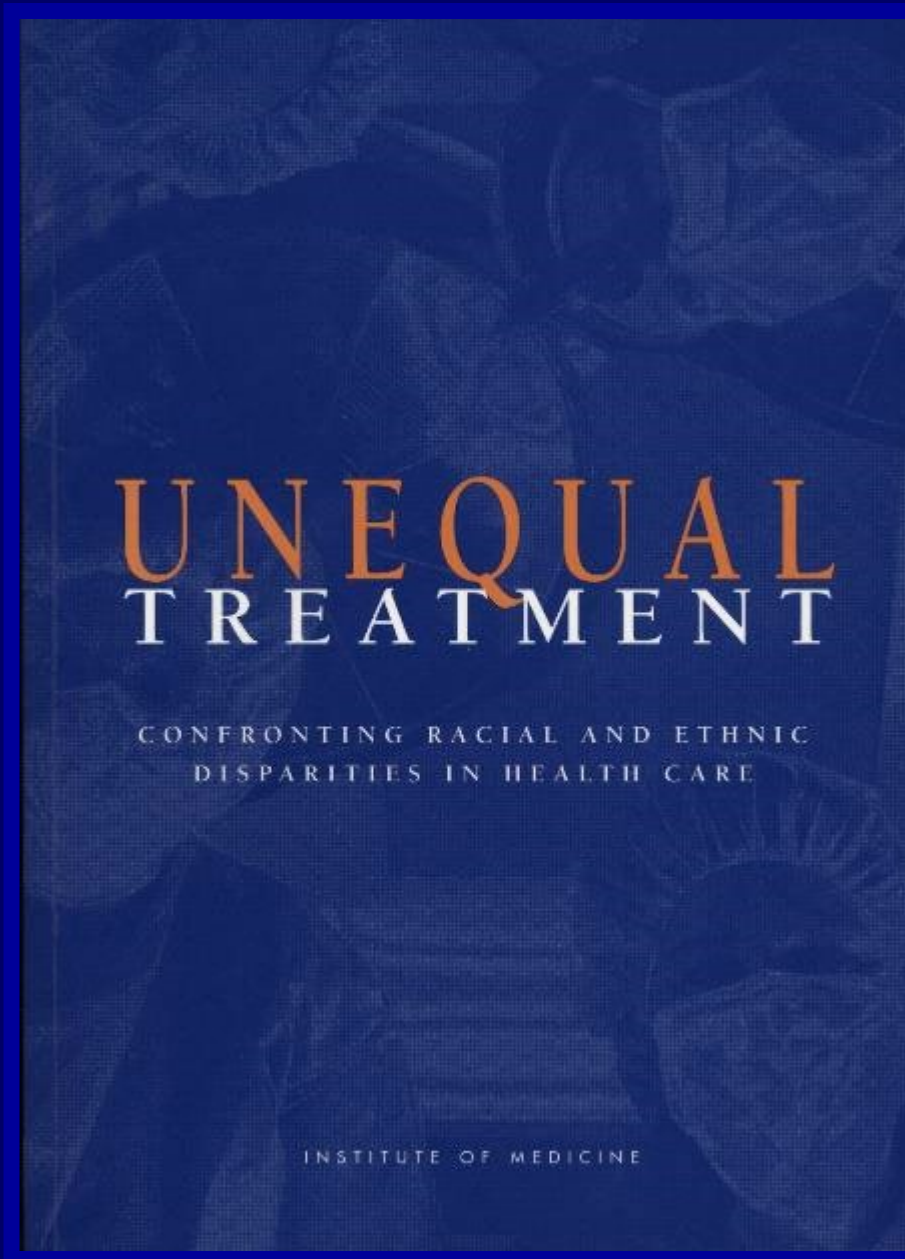


The House that Racism Built



Implicit Bias Exists in Medical Care





Populations of
color receive
poorer quality
medical Care

Race and Access to Specialty Care

- Analysis of 10 years of data (2008 to 2017) of all patients admitted for heart failure (HF) at BWH
- Compared to Whites, Blacks and Latinos were less likely to be admitted to cardiology and more likely admitted to general medicine service (GMS)
- Admission to GMS linked to higher 30-day readmission rates
- On cardiology service, patients have better outcomes and better amenities (private rooms, etc)
- Women and older age (>75) were also less likely to be admitted to cardiology
- Results adjusted for covariates (eg, neighborhood SES, comorbidity, insurance, and having seen a cardiologist or PCP)



Research Questions: What are the Determinants?

- Racial differences in care provided?
 - Racial differences in the quality of patient provider interactions that adversely affects care – not just communication but trust and adherence?
 - Implicit bias that leads to differential treatment?
 - Are there characteristics of the health care system and context that facilitates these inequities?
 - Are these patterns more likely for some health outcomes versus others? Are they evident for other health care professionals?
-

Research Priority

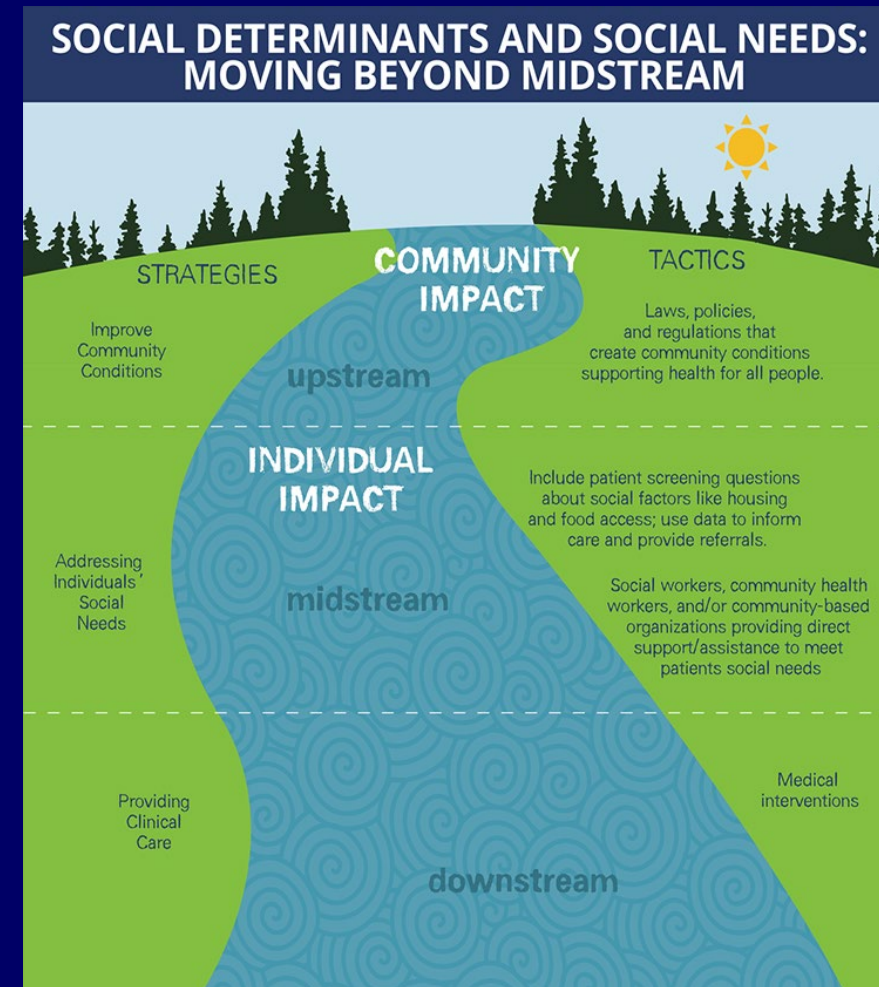
Identifying Protective factors and Resilience Resources

We need to better understand how to mitigate the negative effects of racism on individuals and population subgroups, and to reduce, at multiple levels, the persistence of racism in society



Our Greatest Need? Renewed Focus on Upstream Interventions

- We need to better identify how to develop interventions that improve the health of the disadvantaged more rapidly than the rest of the population
- We need to more actively pursue assessing the health impact of potential natural experiments and other interventions on the upstream social determinants on health that could potentially reduce racial disparities in health



Long Term Solution: Upstream Interventions

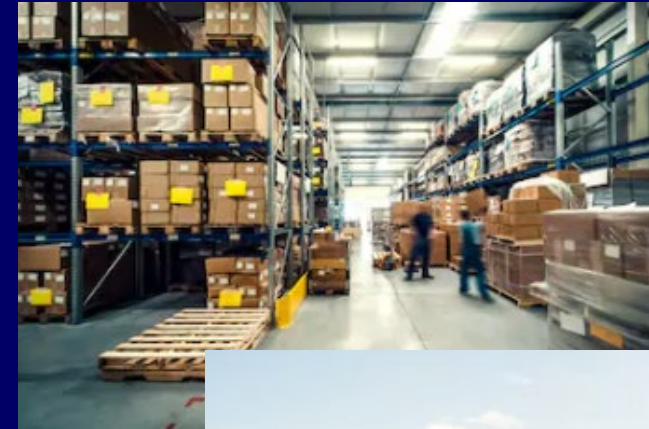
Create Communities of Opportunity to minimize, neutralize and dismantle the systems of racism that create inequities in health



Reducing Inequalities

Address Place-Linked Determinants of Health

- Enrich the quality of neighborhood environments and increase economic development in poor areas
- Improve housing quality and the safety of neighborhood environments



"True compassion is more than flinging a coin to a beggar; it understands that an edifice which produces beggars needs restructuring."

