Addressing Cardiac Health Disparities for Better Patient Outcomes
Learning objectives

• Provide examples of how health disparities in cardiac care can adversely impact health outcomes and quality of care.

• Identify the role of implicit bias in contributing to health disparities.

• Evaluate strategies for reducing the occurrence of health disparities in your cardiac care practice.

This presentation and a link to the recording will be emailed to you within five (5) business days.
Why we are here today

• While management of cardiovascular disease has led to improved mortality over the years, disparities in outcomes have continued to increase among racial and ethnic groups.

• Disparities manifest by race and ethnicity, socioeconomic status, gender and geography.

• In this webinar, Dr. Batiste will address key health disparities in cardiac care and the principles and practices cardiac providers can use to recognize and reduce their occurrence.
Columbus D. Batiste II, MD FACC FSCAI

- Board-certified Interventional Cardiologist
- Regional Chief of Cardiology, Southern California Permanente Medical Group
- Assistant Clinical Professor, University of California Riverside School of Medicine.
- Co-founder, Healthy Heart Nation
Bridging the Gap: Addressing Cardiac Health Disparities for Better Patient Outcomes

Columbus Batiste, MD, FACC, FSCAI
Black people face increased health risks from COVID-19.

2.5x  Black people are 2.5 times as likely as White people to be hospitalized after infection.

1.7x  Black people are 1.7 times as likely as White people to die.

Despite increased health risks, Black people are also less likely than White people to have received a COVID-19 vaccine.

Percent of Population That Has Received at Least One Vaccine Dose

- Orange: White
- Blue: Black
- Brown: Hispanic
- Light blue: Asian
"One thing we must of course expect to find, and that is a much higher death rate at present among Negroes than among whites...They have in the past lived under very different conditions and they still live under different conditions..." 1899 The Philadelphia Negro, Chapter X page 148
HYPERTENSION DISPARITIES

African American adults are 40 percent more likely to have high blood pressure, and they are less likely than non-Hispanic whites to have their blood pressure under control.

African American women are nearly 60 percent more likely to have high blood pressure, as compared to non-Hispanic white women.
STROKE DISPARITIES

African Americans are 50 percent more likely to have a stroke (cerebrovascular disease), as compared to their white adult counterparts.

Black men are 70 percent more likely to die from a stroke as compared to non-Hispanic whites.

African American women are twice as likely to have a stroke as compared to non-Hispanic white women.
Cardiovascular Disparities
Coronary Artery Disease

Prevalence, death rate vary by race
Difference exists in rates of angiogram, timeliness of angiograms, and treatment given post-MI
Treatment includes PCI, CABG, medications, and lifestyle referrals/counseling such as cardiac rehab

https://www.cdc.gov/nchs/hus/spotlight/HeartDiseaseSpotlight_2019_0404.pdf
Racial disparities in PCI utilization still exist with lower PCI rates in most races compared to White patients with AMI.
Cardiovascular Disparities
Heart Failure

- Black persons diagnosed with heart failure at younger age
- Death rate for heart failure is highest in Black men
- Rate of hospitalization is 2.5x higher than that compared to White patients with longer length of stay as well as higher readmission rate

J Am Coll Cardiol. 2022 Mar, 79 (9_Supplement) 610.
Larger Shares of Black and Hispanic Medicare Beneficiaries Are Under Age 65 and Living With a Long-Term Disability Compared to White Beneficiaries

<table>
<thead>
<tr>
<th></th>
<th>Under 65</th>
<th>65-74</th>
<th>75-84</th>
<th>85 and over</th>
<th>Number of beneficiaries</th>
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<tbody>
<tr>
<td>Overall</td>
<td>14%</td>
<td>49%</td>
<td>26%</td>
<td>11%</td>
<td>60.9 million</td>
</tr>
<tr>
<td>White</td>
<td>12%</td>
<td>49%</td>
<td>27%</td>
<td>12%</td>
<td>45.7 million</td>
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“Among White individuals, the prevalence of CV risk factors and disease is projected to decrease whereas significant increases are projected in racial and ethnic minorities”
What do Racial Disparities in Health Really Mean?
Massive Unnecessary Loss of Lives

265 Deaths Every Day

Levine et al., 2001
Racial health disparities are associated with substantial annual economic losses nationally, including an estimated $35 billion in excess health care expenditures, $10 billion in illness-related lost productivity, and nearly $200 billion in premature deaths. Concerted efforts to reduce health disparities could thus have immense economic and social value.
Why Do Black People *Die Sicker* and *Sooner* Than Other People?
IT’S NOT GENETIC
STRESS
Defining Stress

Stress is a condition or feeling experienced when a person perceives that demands exceed the personal and social resources the individual is able to mobilize.
The amygdala notes the emotion and feelings caused by the stimuli, and the unthinkable response that resulted from them. In the future, if similar emotion and feelings are evoked, the amygdala hijacks the rational brain, producing the noted unthinkable response.
Fight or Flight
Hidden Effects

Cortisol released increasing blood pressure and blood sugar while depressing the immune system.

Adrenaline released To Increase strength for fight or flight

Brain gets body ready for action which in turn prevents sleep.

Liver releases glucose for muscle fuel

Digestion slows or stops

Urine production slows or stops

Oxygen, nutrients and blood flow shunted to muscles.
“Too much of a good thing can be a bad thing”
The Stress Factor

Chronic exposure to stress, poor social supports and limited social networks have been shown to increase disease risk

Institute of Medicine, 2001.
Perceived Stress & Heart Disease

Meta-analysis suggests that high perceived stress is associated with a moderately increased risk of incident CHD.
The Interheart study showed that psychological stress is an independent risk factor for heart attacks, similar in heart-damaging effects to the more commonly measured cardiovascular risks.
STRESSORS

EMPLOYMENT AS A STRESSOR

WEALTH AS A STRESSOR

EDUCATION AS A STRESSOR

HOUSING AS A STRESSOR

AIR QUALITY IS A STRESSOR

NOISE IS A STRESSOR
14 studies were included in a meta-analysis indicating that perceived psychosocial stress is independently associated with increased risk of stroke.
Flow-mediated Dilatation
Endothelial Dysfunction

Dilatation
Growth inhibition
Antithrombosis
Anti-inflammation

Constriction
Growth promotion
Prothrombosis
Pro-inflammation
Chronic Stress

HPA - axis activation
- ↑ Glucocorticoids

LC - NE system activation
- ↑ Catecholamines

↓ NO synthesis
- ↓ cAMP
- ↑ ET-1

↑ Proinflammatory cytokines
- ↑ Adhesion molecules
- ↑ NF-κβ activation
- ↑ VCAM; ICAM; E-selectin

Vasoconstriction

Uncoupled eNOS

↑ ROS
- ↓ Anti-oxidant enzymes
- ↑ Lipid peroxidation

↑ RAAS and ANGII

↑ oxLDL

↑ eNOS activity
- ↑ Inflammatory response

Endothelial Dysfunction and Atherosclerosis

↓ eNOS and NO

Raphaely et al. IGI Global 2016.
Mental Stress Induces Transient Endothelial Dysfunction in Humans

Chronic Stress and Endothelial Dysfunction: MESA STUDY
Vascular Dysfunction is the precursor of:

- Stroke
- Dementia
- Alzheimer’s Disease
- Macular Degeneration
- Heart Attack
- Heart Failure
- Angina
- Pulmonary Hypertension
- Erectile Dysfunction
- Peripheral Arterial Disease

Sleep Apnea
Hypertension
Portal Hypertension
Raynaud’s Disease
Diabetes
Renal Failure
Diabetic Foot
Unique Stressor

Is a thread that connects all other stressors and disproportionately impacts a segment of the population
RACISM
Racism is a statement about a person’s value ......Resources most often go where value is perceived.
More than 60 years after redlining was banned, the historical discriminatory housing practice was still associated with cardiovascular disease and its risk factors in a cross-sectional study.
What is caste? According to Wilkerson, "caste is the granting or withholding of respect, status, honor, attention, privileges, resources, benefit of the doubt, and human kindness to someone on the basis of their perceived rank or standing in the hierarchy."
Everyday discrimination scale

- Frequently treated with less courtesy than others
- Frequently treated with less respect than others
- Frequently received poorer service than others
- Frequently people think you’re not smart
- Frequently people are afraid of you
- Frequently people act like you are dishonest
- Frequently people act better than you
Racism as Stress

A study of African-American women found that those who reported chronic emotional stress due to their experience of racism had more severely blocked carotid arteries.
When considering underrepresented groups defined by factors other than race and ethnicity, persons with income <35k dollars were more likely to both have CAS and undergo revascularization.
THE ROLE OF RACISM AS STRESS IN HEALTHCARE
Compared with White patients, *Black patients had 2.54 times the odds of having at least one negative descriptor in the history and physical notes*......potential to exacerbate racial and ethnic health care disparities.
Etiology of Racial Disparities
Implicit Bias

Logistic-regression analysis indicated that women (odds ratio, 0.60; 95 percent confidence interval, 0.4 to 0.9; P=0.02) and blacks (odds ratio, 0.60; 95 percent confidence interval, 0.4 to 0.9; P=0.02) were less likely to be referred for cardiac catheterization than men and whites, respectively.
Biological Proof of Racism as Stress
Collectively, our findings provide the first evidence that social discrimination is independently associated with elevations in intrinsic amygdala activity and functional connectivity, thus revealing clear parallels between the Neural substrates of discrimination and psychological stressors of other origins.
High levels of interpersonal *racial discrimination* determine low-grade *inflammation* levels that have been found to forecast chronic diseases of aging, such as coronary disease and stroke.
Lower Socioeconomic Status:

Associated with higher Amygdalar activity

Independently predicts MACE

These findings illuminate a stress-associated neurobiological mechanism by which SES disparities may potentiate adverse health outcomes.
Endothelial Function: The Impact of Objective and Subjective Socioeconomic Status on Flow-Mediated Dilation

Lower subjective social status in one's community may be linked to CVD via impaired vasodilation.
Acute mental stress drives vascular inflammation and promotes plaque destabilization in mouse atherosclerosis

Our data show that acute mental stress rapidly amplifies inflammatory leucocyte expansion inside mouse atherosclerotic lesions and promotes plaque vulnerability.
In communities with a high level of frisking, Sewell et al found increased levels of PTSD, nervousness, and mental stress not only by those touched directly by the law system but also others within the community.
Racism as a leading cause of death in the United States

Harlan M. Krumholz,1,2,3 Daisy S. Massey,1 Karen B. Dorsey1,4

During the past year, the dual crises of the covid-19 pandemic and police violence have opened many people’s eyes to the ways in which the political construct of race—and anti-Black racism in particular—continue to determine who lives and who dies in the United States. Moreover, research is showing how little progress we are making in eliminating inequalities.1 Within medicine, physicians and other healthcare professionals are reckoning with the ways in which research has falsely looked at race as a biological attribute rather than a social construct over centuries, contributing to systems of racism in healthcare delivery. At long last, medical science is declaring that race is not biological, but that racism has profound consequences for health.2

To address racism, understand its impact on health, and identify and assess potential remedies, a national set of metrics is needed to galvanize action and promote accountability. During the pandemic, excess potential pathways. This reality derives from the historical and present manifestation of racial politics in the United States, such as laws and policies that curtail individual freedoms, obstruct access to economic opportunities, and limit social mobility. For many racial and ethnic minority groups, and particularly for the descendants of enslaved Africans, equality in health and longevity remain beyond reach. Excess deaths among Black people represent the difference over a discrete time between the number of deaths that occurred and the number of deaths that would have occurred had the mortality rate been the same as that among White people. The excess deaths associated with race can be understood as a toll that is in large part a result of racism in the United States. There is no biological reason, independent of social context, that Black people should die younger than White people. The excess premature deaths are the cumulative difference in death between Black and White people across every specific cause of death.
Stress = Demands - Resources

The higher our *stress* the poorer our health
When you get stressed what do you turn to?
Turn to fake resources
The Motivational Triad

Exert the least amount of effort

Avoid pain

Seek pleasure
BAD HABITS
STRESSED
SPELLED BACKWARDS IS
DESSERTS
Study found that the consumption of fast food and levels of stress were directly proportional to each other.

‘I Just Need the Comfort’: Processed Foods Make a Pandemic Comeback

Shoppers, moved by nostalgia and hunting for longer shelf lives, are returning to old standbys like Chef Boyardee and Campbell’s soup.
Food Deserts

According to a survey done in 2016 by McKinsey & Company, “one out of every five African American households is situated in a food desert. Researchers have revealed that for every 1% increase in the percentage of the white population, there was a 17% decrease in the density of fast-food outlets in low-income neighborhoods.
Nutritional stress
Eating the *disease-forming* foods
not eating the health-promoting foods
The Behavioral Risk Factor Surveillance Survey, only 21.3% of African Americans consume fruits and vegetables ≥5 times per day, the lowest of any U.S. racial or ethnic group
Food we eat *creates stress* in our bodies.
Nutritional stress damages our endothelium
Plant-based diets

- e.g., Mediterranean diet/ DASH diet
  - Fruits, vegetables, whole grains, legumes, nuts, fish, olive oil

Western diet

- e.g., Fast-food diet
  - Red and processed meat, high-energy foods, refined carbohydrates, etc.

**Oxidative stress**

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<tr>
<th>Plant-based diets</th>
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<tr>
<td><strong>Lipid peroxidation</strong></td>
</tr>
<tr>
<td>↓ F2-isoprostanе; ↓ ox-LDL; ↓ MDA; ↓ TBARS</td>
</tr>
<tr>
<td><strong>Oxidative DNA damage</strong></td>
</tr>
<tr>
<td>↓ 8-OH-dG</td>
</tr>
<tr>
<td><strong>Antioxidant defense</strong></td>
</tr>
<tr>
<td>↑ SOD activity; ↑ SOD protein level; ↑ catalase activity</td>
</tr>
<tr>
<td><strong>Inflammation</strong></td>
</tr>
<tr>
<td>↓ hs-CRP; ↓ IL-6; ↓ TNF-α</td>
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<th>Western diet</th>
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<tr>
<td><strong>Lipid peroxidation</strong></td>
</tr>
<tr>
<td>↑ MDA; ↑ Lipoprotein-associated phospholipid</td>
</tr>
<tr>
<td><strong>Antioxidant defense</strong></td>
</tr>
<tr>
<td>↓ MPO protein level; ↓ TAC; ↓ Ceruloplasmin</td>
</tr>
<tr>
<td><strong>Inflammation</strong></td>
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| ↑ IL1RT1; ↑ IL2RA; ↑ TRAIL-
ADVANCED GLYLATED END PRODUCTS
Effects of low- and high-AGE meals on macro- and microvascular endothelial function and oxidative stress in patients with type 2 diabetes mellitus
Salt, Sugar, & Fat
Endothelial function is impaired after a high-salt meal in healthy subjects.
Effects of Sugar-Sweetened Beverage Consumption on Microvascular and Macrovascular Function in a Healthy Population

Flow-Mediated Dilatation Is Impaired by a High–Saturated Fat Diet but Not by a High-Carbohydrate Diet

Figure A: FMD<sub>BA</sub> (%Δ) for Young, Lower TMAO, and Higher TMAO groups with Saline and Ascorbic Acid treatments.

Figure B: Change in FMD<sub>BA</sub> (%Δ) from saline to AA for Young, Lower TMAO, and Higher TMAO groups.
Researchers defined ultra-processed foods as highly processed industrial formulations made with no or minimal whole foods that include flavorings or preservatives.

Each additional daily serving of ultra-processed foods conferred:

- **7%** increased risk for hard CVD
- **5%** increased risk for overall CVD
- **9%** increased risk for CVD mortality
Dutch study that found that adults living within a half-mile of fast-food outlets were more likely to develop heart disease than those living further away.
It’s never too late to change the direction that your life is going in.

- Dr. Wayne Dyer
Health=Resiliency/Stress
In MESA (Multi-Ethnic Study of Atherosclerosis), HRs for the Black–White difference in CVD mortality decreased from 1.72 to 0.95 after adjustment for socioeconomic status (neighborhood socioeconomic status, education, income, and health insurance), lifestyle and psychosocial factors, and clinical risk factors.
Nutrition for Resilience
Instead of For Stress
A computer simulation model, projected that a national policy combining a 30% fruit and vegetable subsidy targeted to low-income Supplemental Nutrition Assistance Program recipients and a population-wide 10% price reduction in fruits and vegetables in the remaining population could prevent ≈230 000 deaths by 2030 and reduce the socioeconomic disparity in CVD mortality by 6%.

Effect of Intensive Lifestyle Changes on Endothelial Function

Consumption of a defined, plant-based diet reduces lipoprotein(a), inflammation, and other atherogenic lipoproteins and particles within 4 weeks

Rami S. Najjar\textsuperscript{1} | Carolyn E. Moore\textsuperscript{2} | Baxter D. Montgomery\textsuperscript{3,4}
Diets higher in plant foods and lower in animal foods were associated with a lower risk of cardiovascular morbidity and mortality in a general population.
Dietary patterns and risk for sudden cardiac death

- High Mediterranean diet score trended toward reduced 10-year risk for SCD
- High Southern diet score trended toward increased 10-year risk for SCD
- There was no relationship between other dietary patterns and SCD risk

Southern diet pattern and risk of sudden cardiac death
Southern diet pattern associated with acute heart disease.
Plant-based diet and mortality

Participants free from major chronic diseases

Participants with cardiovascular disease

Hazard ratio of total mortality

$P_{\text{linear}} < 0.001$

$P_{\text{linear}} < 0.001$

$P_{\text{linear}} < 0.001$

$P_{\text{nonlinear}} = 0.02$

$P_{\text{linear}} < 0.001$

$P_{\text{linear}} < 0.001$
Health Disparities are Driven by Social and Economic Inequities

- Economic Stability
- Neighborhood and Physical Environment
- Education

Racism and Discrimination

- Food
- Food security
- Access to healthy options

- Community, Safety, & Social Context
- Health Care System

- Employment
- Income
- Expenses
- Debt
- Medical bills
- Support

- Housing
- Transportation
- Parks
- Playgrounds
- Walkability
- Zip code/ geography

- Literacy
- Language
- Early childhood education
- Vocational training
- Higher education

- Social integration
- Support systems
- Community engagement
- Stress
- Exposure to violence/trauma
- Policing/justice policy

- Health coverage
- Provider & pharmacy availability
- Access to linguistically and culturally appropriate & respectful care
- Quality of care

Health and Well-Being:
Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations
The Solution: Disruptive Approach to Driving Equitable Care for the Vulnerable Populations

LAYING THE CULTURAL FOUNDATION
Purposeful approach to cultural awareness, education, competency, and hiring including addressing language gaps and seeking to mirror the population

EMBRACING DIGITAL HEALTH INNOVATIONS
Expanding reach of technology, including telemedicine and remote across the care continuum, encompassing ambulatory and post acute care settings

IMPROVING CARE DELIVERY
Becoming the “provider of choice” marked by world class service, eradicating care variation and disparities and delivering high quality outcomes (convenient, accessible, affordable, equitable, effective, efficient).

DRIVING “CARE ANYWHERE”
Shifting care from traditional hospital centered care to the “right care, right place, right time, right purpose”, including Hospital at Home and Mobile Health

WIDENING THE FRONT DOOR
Addressing barriers to care access by expanding needed services/centers of excellence and making care more accessible/convenient, including transportation and central access

ADDRESSING THE SOCIAL DETERMINANTS
Healing the wounds that you don’t see by addressing food insecurity, housing insecurity, poverty, violence and leveraging community health workers to serve as the bridge to connect all the resources.
From Health Disparities to Health Equity

Health Disparities:
“...preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are experienced by socially disadvantaged populations”¹

Health Equity:
“When every person has the opportunity to ‘attain his or her full health potential’ and no one is ‘disadvantaged from achieving this potential because of social position or other socially determined circumstances”²

Resources to help you

For more about this topic, consider viewing:

- [Racism in American Medicine](#) (recorded webinar – 54 mins)
- [Implicit Bias in Healthcare and What You Can Do About It](#) (online course – 10 mins)