Disclosures

Research grants/honoraria
- AstraZeneca, Merck, Nitromed, Novartis, Bristol-Myers Squibb, & Pfizer

- Stocks – none

- Patents – none

- Consultant
  - AstraZeneca, Nitromed, Novartis, Forest, Roche
Objectives

- Review epidemiology of CVD related to African Americans (AA) and other minorities
- Describe disparities of CVD in AA
- Detail the need for focused research and interventional tools for success
Concept of Race

- Over reliance may undervalue SES, geography, stress and lifestyle
- Skin color imperfect for genetics
- No active biologic or genetic category flawed idea
Guidance for Industry

Collection of Race and Ethnicity Data in Clinical Trials

U.S. Department of Health and Human Services
Food and Drug Administration
Center for Drug Evaluation and Research (CDER)
Center for Biologics Evaluation and Research (CBER)
Center for Devices and Radiologic Health (CDRH)
Office of the Commissioner (OC)

September 2005
Clinical Medical

http://www.fda.gov/cder/guidance/index.htm
Race & Ethnicity: Definitions

- **Race**
  - American Indian or Alaska Native
  - Asian
  - Black or African American
  - Native Hawaiian or Other Pacific Islander
  - White

- **Ethnicity**
  - Hispanic or Latino
  - Not Hispanic or Latino

CHD in Race & Ethnicity
Leading Causes of Death by Race

**White**
- CVD: 36.2%
- Other: 23.1%

**Black**
- CVD: 33.6%
- Other: 21.6%

**Hispanic**
- CVD: 29.6%
- Other: 19.7%

**Asian**
- CVD: 34.8%
- Other: 26.4%

Summary of Racial Disparities

Eliminating Racial and Ethnic Disparities in Cardiac Care
Eric Peterson, M.D., M.P.H., and Clyde W. Yancy, M.D.

Of all the forms of inequality, injustice in health care is the most shocking and inhumane.
— Martin Luther King, Jr.

The Institute of Medicine (IOM) includes “equity” as one of six key domains of health care quality, yet equal treatment for Americans of all races and ethnic groups remains an incompletely realized goal. It has been 25 years since significant unexplained racial variation in the use of coronary-artery bypass grafting (CABG) was noted in a single institution.1 noted that there may indeed be differences in care or outcome that are attributable to differences in underlying pathophysiology, patients’ expressed preferences regarding care, or the appropriateness of care for different patients. Health care disparities are those “unexplained” differences that persist after these factors have been accounted for; such disparities are most likely attributable to socioeconomic barriers, language differences, cultural insensitivity, bias, or frank racism.2

The magnitude and extent of racial or ethnic disparities in myocardial infarction, heart failure, or stroke, black patients are less likely than white patients to receive certain evidence-based medical treatments. Similarly, blacks and Hispanics are generally less likely than whites to be screened, receive treatment, or reach target therapeutic goals for hypertension, dyslipidemia, and obesity.2,4

Documenting racial or ethnic disparities is a start, but it’s more important to determine whether such unequal care is associated with adverse patient outcomes. To date, studies linking such differences in care to health outcomes
Higher Risk of Mortality from HF in African Americans

Mortality Ratios, by Age and Race/Ethnicity, 2000

Mortality ratios

Age in Years

NOTE: These data compare the mortality rate of each racial/ethnic group to that of Asian/Pacific Islanders, the group with the lowest mortality rates at each age.

Higher HF in African Americans

- Affects 3% of AAs, vs 2.3% of total population\(^1\)
- 2 times more likely in AA women vs non-AA women\(^1\)
- 2.5 times greater risk of HF-associated mortality in AAs aged 45-64\(^2\)

\(^1\)Statistical Fact Sheet—Populations. American Heart Association; 2006. \(^2\)National Minority Health Month Foundation; Centers for Disease Control (CDC).
Death from Stroke in US Among Persons <75 Years Varies Among Ethnicities

Rate per 100,000 population

Why is the management of hypertension so important?

HYPERTENSION → VASCULAR COMPLICATIONS

- Coronary Heart Disease
- Stroke
- Peripheral Vascular Disease
- Nephropathy/ESRD
Hypertension Control is More Challenging in African American Patients

**NHANES 2003-2004**

<table>
<thead>
<tr>
<th>Age adjusted.</th>
<th>African American</th>
<th>Caucasian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Awareness</td>
<td>66.4</td>
<td>66.9</td>
</tr>
<tr>
<td>Treatment</td>
<td>55.0</td>
<td>53.7</td>
</tr>
<tr>
<td>Control</td>
<td>28.9*</td>
<td>35.4</td>
</tr>
</tbody>
</table>

*P<0.05 for difference between NHANES 1999-2000

NHANES=National Health and Nutrition Examination Survey; Hypertension=average BP ≥140/90 mmHg or patient was taking antihypertensive medications.

Mortality From High Blood Pressure Higher in African Americans

Overall Mortality Rates From Causes Related to Hypertension, 2003*

In hypertensive African Americans, ≈30% and ≈20% of all deaths in men and women, respectively, may be due to high blood pressure.

*High blood pressure listed as a primary or contributing cause of death. High blood pressure=systolic ≥140 mmHg or diastolic ≥90 mmHg, taking antihypertensive medicine, being told ≥2 times by a physician that you have high blood pressure.

Adapted from Thom T et al. Circulation. 2006;113:e85–e151.
Greatest Impact of Diabetes Epidemic is in Blacks and Hispanics

Age-adjusted Prevalence of Diabetes per 100 Population, 1990–2002

Hypertension in African Americans

- 3-7× more prevalent in AA vs. non-AA
- Higher incidence of ESRD due to HTN; nearly 20× higher
- Higher risk of stroke
- Increased mortality due to stroke
- Higher incidence of LVH, 31% vs. 10%
- Perhaps a more malignant vascular response to HTN
Hypertension

- **Compared with whites, blacks are more likely to:**
  - Have hypertension
  - Be aware of having hypertension
  - Be pharmacologically treated for hypertension
  - Not reach BP goals

- **Between 1988-1994 and 1999-2002:**
  - Treatment effectiveness has increased for all
  - Effectiveness disparity between whites and blacks has increased

How important is socioeconomic status?

- AA more likely lower socioeconomic status, lower education

- Multiple CVD risks; multiple RF decrease as education increases

- 53% with income <10K vs. 29% > $50K

- Stress reduction (TM) can benefit AA
Association of education level to multiple risk

Behavioral Risk Factor Surveillance System, N = 103,191

Population with multiple CVD risk factors (%)

<table>
<thead>
<tr>
<th>Education Level</th>
<th>High School</th>
<th>College</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some</td>
<td>52.5</td>
<td>36.9</td>
</tr>
<tr>
<td>Graduate</td>
<td>43.8</td>
<td>25.9</td>
</tr>
</tbody>
</table>

Hayes DK et al. MMWR. 2005;54:113-7
Association of income level to multiple risk

Behavioral Risk Factor Surveillance System, N = 103,191

## Correlates of multiple CVD risk

<table>
<thead>
<tr>
<th>Established</th>
<th>Additional</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>Adiposity</td>
</tr>
<tr>
<td>LDL-C</td>
<td>Ethnicity</td>
</tr>
<tr>
<td>HDL-C</td>
<td>Socioeconomic status: income, health insurance, education</td>
</tr>
<tr>
<td>Age</td>
<td>Geographic region</td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Family history</td>
<td></td>
</tr>
<tr>
<td>Physical inactivity</td>
<td></td>
</tr>
</tbody>
</table>

---

So What Can We Do?
## Blood pressure response to Lifestyle Modifications

<table>
<thead>
<tr>
<th>Modification</th>
<th>Approximate SBP reduction (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight reduction</td>
<td>5–20 mm Hg/10 kg weight loss</td>
</tr>
<tr>
<td>Adopt DASH eating plan</td>
<td>8–14 mm Hg</td>
</tr>
<tr>
<td>Dietary sodium reduction</td>
<td>2–8 mm Hg</td>
</tr>
<tr>
<td>Physical activity</td>
<td>4–9 mm Hg</td>
</tr>
<tr>
<td>Moderation of alcohol consumption</td>
<td>2–4 mm Hg</td>
</tr>
</tbody>
</table>
BP can be significantly reduced with a diet abundant in fruits, vegetables, complex carbohydrates, and low-fat dairy products. Improves BP control with metabolic syndrome. More efficacy demonstrated in AA. The DASH diet includes these daily servings:

Sites of Action of Major Antihypertensive Drug Classes

Diuretics
- Kidney tubules

β-Blockers
- Heart

Calcium channel Blockers
- Vascular smooth muscle

AND

Alpha blockers

ACEI
- AT₁ receptors

ARB
- Renin-angiotensin system

BP Control Usually Requires Combination Therapy

Most patients require ≥2 antihypertensives to reach BP goal

<table>
<thead>
<tr>
<th>Trial/SPB Achieved</th>
<th>SBP (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UKPDS</td>
<td>144</td>
</tr>
<tr>
<td>RENAAL</td>
<td>141</td>
</tr>
<tr>
<td>ALLHAT</td>
<td>138</td>
</tr>
<tr>
<td>IDNT</td>
<td>138</td>
</tr>
<tr>
<td>HOT</td>
<td>138</td>
</tr>
<tr>
<td>INVEST</td>
<td>133</td>
</tr>
<tr>
<td>ABCD</td>
<td>132</td>
</tr>
<tr>
<td>MDRD</td>
<td>132</td>
</tr>
<tr>
<td>AASK</td>
<td>128</td>
</tr>
</tbody>
</table>

BP=blood pressure; SBP=systolic blood pressure.
Race in evaluating or treating patients?

- Not a primary factor in treatment plan
- African Americans heterogeneous
- Blunted response to monotherapy with ACEI, ARB and BP for BP lowering
- Equal or better to thiazide and CCBs
- ACEI with hypertensive nephropathy
- Fixed dose ISDN/HYD with symptomatic HF
Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare

- Racial and ethnic disparities in healthcare exist
  - May be associated with worse outcomes

- Bias, stereotyping, prejudice, and clinical uncertainty on the part of healthcare providers may contribute to racial/ethnic disparities in healthcare
  - More research is needed in this area

African Americans: Physician Related Barriers

- Lower outcome expectations

- Lack of specific clinical guidelines for treatment

- Failure to treat early and aggressively and to target BP/Lipids

- Increased prevalence of comorbid disease requiring complex medical interventions

Adapted from Douglas et al. Postgrad Med online. 2002;112.
Disparities in Healthcare

- AAs with CAD or AMI less likely to receive appropriate cardiac procedures or therapies
  - Less likely catheterized\(^1\)
  - 20\%-50\% less likely to undergo revascularization\(^2\)
  - Less likely to receive beta blockers, thrombolytic drugs, ASA\(^1\)

The Effect of Race and Sex on Physicians' Recommendations for Cardiac Catheterization

“Patients” experiencing symptoms of heart disease

Results: Referral for cardiac catheterization according to race

<table>
<thead>
<tr>
<th>Race</th>
<th>Mean Referral Rate %</th>
<th>Odds Ratio (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>90.6</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>84.7</td>
<td>0.6 (0.4-0.9)</td>
<td>0.02</td>
</tr>
</tbody>
</table>

CHD in African Americans

CHD death rates per 100,000 persons among African Americans and Whites

Source: NHANES 2000
Estimated Life Expectancy: 2003

U.S. Life Expectancy at birth 2003 (Updated March 2005) CDC.gov
Roles for Clinical Registries In Defining Racial/Ethnic Disparities

- Define the scope of racial/ethnic differences in health and healthcare in community practice
  - Risk factors
  - Treatment patterns
  - Disease presentation
  - Longitudinal care
  - Patient Outcomes

- Temporal trends in above
Using Registries to **Overcome Racial/Ethnic Disparities**

- **Support Provider-Driven QI**
  - Giving caregivers the data and feedback will lead to better outcomes

- **External Incentives**
  - Public Reporting,
  - Pay for Performance

- **Patient Incentives**
  - Direct feedback
  - Improving communication between patients and providers
Effect of Race on Outcomes

After adjustment, Nonwhite patients had worse composite outcomes

HR 1.54
95%CI 1.16, 2.05; P=0.003

Figure 1. Cumulative incidence of primary end point of death, MI, or rehospitalization for ACS in white (solid line) and nonwhite (dashed line) patients.

Circulation. 2005;111:1217-1224
Effect of Race on ACS Care

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>African-American</th>
<th>Adj. OR (95%CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clopidogrel</td>
<td>41</td>
<td>32</td>
<td>0.83 (0.76, 0.90)</td>
</tr>
<tr>
<td>Gp IIb-IIIa</td>
<td>36</td>
<td>29</td>
<td>0.80 (0.73, 0.87)</td>
</tr>
<tr>
<td>Statins</td>
<td>79</td>
<td>74</td>
<td>0.83 (0.75, 0.90)</td>
</tr>
<tr>
<td>Cath &lt; 48 h</td>
<td>47</td>
<td>36</td>
<td>0.73 (0.67, 0.79)</td>
</tr>
<tr>
<td>PCI &lt; 48 h</td>
<td>27</td>
<td>18</td>
<td>0.72 (0.66, 0.79)</td>
</tr>
<tr>
<td>CABG</td>
<td>12</td>
<td>8</td>
<td>0.74 (0.65, 0.83)</td>
</tr>
</tbody>
</table>

* Comparison adjusted for gender, race, comorbidity, cardiac markers, insurance status, hospital features, and clustering effects

Sonel AF *Circulation;*2005:111:1225
Only 35% of eligible HF patients receive an ICD.

OR for ICD (relative to White Males)
- Black Male: 0.73
- White Female: 0.62
- Black Female: 0.54

Hernandez AF et al. JAMA 2007;298:1525-1532
African Americans:
Patient-Related Barriers

- Lack of awareness of disease and consequences
- Lack of access to patient education
- Delayed diagnosis
- Living in disadvantaged community
- Inadequate resources to support healthful lifestyle
- Poor diet
- Overweight, obesity
- Distrust of medical professionals
- Adverse view of medications

Adapted from Douglas et al. Postgrad Med online. 2002;112.
Addressing Cultural Contexts in Health Care

Video/Education Area
Cardiovascular Disease
in Racial and Ethnic Minorities

Edited by
Keith C. Ferdinand, MD and Annemarie Armani, MD

Humana Press
“Simply identifying racial / ethnic health disparities will not eliminate them... life-saving, evidence-based medications should be afforded to all patients. No matter what scientific breakthroughs continue to be reported in evidenced-based literature, the complexities of living a healthy life and receiving the benefits of modern healthcare must be applied on a one-to-one basis.”
Cardiovascular Disease Disparities: Racial/Ethnic Factors and Potential Solutions

- Keith C. Ferdinand, MD, and Daphne P. Ferdinand, PhD, APRN
Broad policy areas for addressing racial and ethnic health care disparities

- Raising public and provider awareness of racial/ethnic disparities in care
- Expanding health insurance coverage
- Improving the capacity and number of providers in underserved communities
- Increasing the knowledge base on causes and interventions to reduce disparities

(Adapted from Agency for Healthcare Research and Quality.)
“There is a palpable sense of optimism that a more equitable American health care environment will develop in the near future. Measuring and monitoring disparities are essential in clinical and public health.”
THANK YOU!