AN OVERVIEW OF HEALTHCARE DISPARITIES IN THE AFRICAN AMERICAN COMMUNITY

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- Editor, Eliminating Healthcare Disparities in America
- Editor, Healthcare Disparities at the Crossroads with Healthcare Reform
- Author of five other books and 30 papers on healthcare
Presented to the
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Disclosure Statement

AstraZeneca: Grants, Speakers’ Bureau
Pfizer: Advisory Group, Speakers’ Bureau
Gilead Pharmaceuticals
Genentech
Forest Laboratories
Objectives

1. To provide the historical background of healthcare disparities
2. To create an awareness that the current health problems of minorities are rooted in slavery
3. To demonstrate evidence of healthcare disparities across multiple medical disciplines
4. To make recommendations for the elimination of healthcare disparities which all doctors can utilize
"Of all the forms of inequality, injustice in health is the most shocking and inhumane."

Dr. Martin Luther King, Jr.
By ten things is the world created,
By wisdom and by understanding,
And by reason and by strength,
By rebuke and by might,
By righteousness and by judgment,
By loving kindness and by compassion.

– Talmud Higaga 12A
Race And Ethnicity
Definitions:

- **Race**: Derived from the Latin (generatio, a beginning). A term of taxonomic or biological classification which subdivides the human species (homo sapiens sapiens) into groups based upon phenotypical or physical similarities such as hair, skin, and eye color, facial features, and body proportions.

Example: Black and white are racially relevant terms to describe people with darker or lighter skin color.
Race And Ethnicity Definitions:

- **Ethnic group/ Ethnicity:** Terms invented by Ashley Montagu (1964) to subdivide humans according to their membership in socially distinct groups rather than according to shared physical characteristics.

Example: African-American and Hispanic are ethnically relevant terms to describe population subgroups sharing certain sociological characteristics.
Race And Ethnicity Definitions:

- **Healthcare disparity**: A differential in outcomes of prevention and treatment of illness and disease which can be shown to vary according to the race, gender, and/or ethnic identity of patients. These differences may be ascribed to racism, denial of equal access to care, possession of different health-seeking behavior and idiosyncratic responses to treatment, or to poorly understood biological and genetic mechanisms.
AFRICAN AND

Humankind had its origin in Africa. So it seems reasonable that cultures originated there as well.

Not all if you believe some mainstream history books.

Many scientists and scholars have shown a need to acknowledge Africa's contributions to civilization—particularly to science and medicine—but the fact is that Egyptians and Ethiopians had advanced civilizations more than 8,000 years ago.

Hippocrates, the legendary "father of medicine," was influenced greatly by the works of Imhotep, an Egyptian who established his reputation and was credited for his medical contributions thousands of years before Hippocrates. New, safer, and more distinguishing practices in the sciences.

The Greeks, the Romans, and the Egyptians were influenced by the African civilizations. America, India, Egypt, Ethiopia, Sudan, and Tanzania are the sources of knowledge that Greeks and Romans used to dominate European society. And the notable achievements of ancient Africa were the precursor of modern medicine, Dr. Charles Fenchel, director of International Health at Morehouse School of Medicine and a noted historian on African influences on Western medicine, notes.

"There's absolutely no question about it," he says. "But you have to acknowledge that ancient African societies also contributed to the world's medical knowledge."

African-American CONTRIBUTIONS TO MEDICAL HISTORY

Afro-Centric has put together a timeline of African and African-American contributions to medical history nearly 4,000 B.C. to the present. From Imhotep to Dr. Mae Jemison, these black achievements have changed the face of science and medicine—"and" indeed of history.
Meharry Medical College and Howard University train most of the nation’s black dentists and doctors.

W. Montague Cobb has been cited for his studies in anatomy and physical anthropology. He is the major historian of the Negro in medicine.

Dr. H.E. Gaskin (right) conducts a class in orthodontics at the Howard University School of Dentistry.
Historical Examples In Science and Medicine of Racist Attitudes

- Taxonomy: Linnaeus, 1735
- Anthropology: Dr. Samuel George Morton (1848); Carlton Coon
- Medicine: Drs. Meigs, Warren, Agassiz
- Politics: Sen. J.C. Calhoun of South Carolina and the fraudulent Census of 1840
Examples of Bigoted Medical Concepts

- “...the Negro’s brain and nerves, the chyle and all the humora are tinctured with a shade of pervading darkness...”
  Dr. Samuel Cartwright, *New Orleans Medical and Surgical Journal*, 1851

- ...the Negro has less chest discomfort because “more than moronic intelligence” is necessary to perceive the sensation of pain
  Dr. MM Weiss, *American Heart Journal*, 1939

- Negros are a source of contagion and infection and they should be trained only as sanitarians to protect whites from their diseases
  Dr. Abraham Flexner, 1910
<table>
<thead>
<tr>
<th>Races</th>
<th>No. of Skulls</th>
<th>Mean Internal Capacity (cu. Inches)</th>
<th>Largest in Series</th>
<th>Smallest in Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>52</td>
<td>87</td>
<td>109</td>
<td>75</td>
</tr>
<tr>
<td>Mongolian</td>
<td>10</td>
<td>83</td>
<td>93</td>
<td>69</td>
</tr>
<tr>
<td>Malay</td>
<td>18</td>
<td>81</td>
<td>89</td>
<td>64</td>
</tr>
<tr>
<td>American</td>
<td>147</td>
<td>80</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>Ethiopian</td>
<td>29</td>
<td>78</td>
<td>94</td>
<td>65</td>
</tr>
<tr>
<td>Age</td>
<td>Slaves</td>
<td>Entire United States</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
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<td></td>
<td></td>
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<tr>
<td>0</td>
<td>350</td>
<td>179</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – 4</td>
<td>201</td>
<td>93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 – 9</td>
<td>54</td>
<td>28</td>
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<tr>
<td>10 – 14</td>
<td>37</td>
<td>19</td>
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<tr>
<td>15 – 19</td>
<td>35</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 24</td>
<td>40</td>
<td>39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A black surgical ward in Charleston’s segregated “Old Roper” Hospital, c. 1950. Although patients were all black, the professional staff here were all white. Courtesy of the Waring Historical Library. Medical University of South Carolina.
<table>
<thead>
<tr>
<th>Year</th>
<th>White</th>
<th>Nonwhite</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>1975</td>
<td>982</td>
<td>969</td>
</tr>
<tr>
<td>1984</td>
<td>977</td>
<td>961</td>
</tr>
<tr>
<td>2000</td>
<td>963</td>
<td>936</td>
</tr>
<tr>
<td>2039</td>
<td>738</td>
<td>581</td>
</tr>
<tr>
<td>2044</td>
<td>639</td>
<td>478</td>
</tr>
</tbody>
</table>

Those Who Fail To Heed
The Lessons Of History
Are Destined To Repeat Them.

-Santayana
THE EFFECT OF RACE AND SEX ON PHYSICIANS’ RECOMMENDATIONS FOR CARDIAC CATHETERIZATION

Kevin A. Schulman, M.D., Jesse A. Berlin, Sc.D., William Harless, Ph.D., Jon F. Kerner, Ph.D., Shyrl Sistrunk, M.D., Bernard J. Gersh, M.B., Ch.B., D.Phil., Ross Dubé, Christopher K. Taleghani, M.D., Jennifer E. Burke, M.A., M.S., Sankey Williams, M.D., John M. Eisenberg, M.D., and José J. Escarce, M.D., Ph.D.
“Patients” experiencing symptoms of heart disease, from Schulman et al. (1999)
<table>
<thead>
<tr>
<th></th>
<th>Evidence of Racial and Gender Bias in Medical Procedures and Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Treatment of cardiac arrest</td>
</tr>
<tr>
<td>2.</td>
<td>Selection of patients for cardiac catheterization</td>
</tr>
<tr>
<td>3.</td>
<td>Coronary artery bypass graft surgery (CABG)</td>
</tr>
<tr>
<td>4.</td>
<td>Thrombolytic therapy</td>
</tr>
<tr>
<td>5.</td>
<td>Percutaneous transluminal coronary angioplasty (PTCA)</td>
</tr>
<tr>
<td>6.</td>
<td>Selection of patients for treatment to prevent stroke</td>
</tr>
</tbody>
</table>
Give it to me straight, Doc... I can take it... what's wrong with me?

You're not a white male.
Doctor, studies show that if I were a white male, you'd be rushing me to a cardiac catheterization procedure.

No kidding? I thought a Rolaid's would do the trick for you.
<table>
<thead>
<tr>
<th>Expression</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Sedimentary Life</td>
<td>Sedentary</td>
</tr>
<tr>
<td>Emancipated</td>
<td>Emaciated</td>
</tr>
<tr>
<td>Genetic Drugs</td>
<td>Generic Drugs</td>
</tr>
<tr>
<td>Old-Timers’ Disease</td>
<td>Alzheimer’s Disease</td>
</tr>
<tr>
<td>Premarital Stress</td>
<td>Premenstrual Stress</td>
</tr>
<tr>
<td>Valium Stress Test</td>
<td>Thallium Stress Test</td>
</tr>
<tr>
<td>Public Hair</td>
<td>Pubic Hair</td>
</tr>
<tr>
<td>I had an Autopsy</td>
<td>Biopsy</td>
</tr>
<tr>
<td>Pep Smear</td>
<td>Pap Smear</td>
</tr>
<tr>
<td>Prostrate</td>
<td>Prostate</td>
</tr>
<tr>
<td>Tubal Litigation</td>
<td>Ligation</td>
</tr>
<tr>
<td>Cologne Trouble</td>
<td>Colon</td>
</tr>
<tr>
<td>Cardiac Coagulation</td>
<td>Catheterization</td>
</tr>
<tr>
<td>I was Castrated</td>
<td>Catheterized</td>
</tr>
</tbody>
</table>
Percentage of the Population by Race/Ethnicity: 2000 and 2025

- **White**: 71.4% in 2000, 61.9% in 2025
- **AA**: 12.2% in 2000, 12.9% in 2025
- **American Indian, Eskimo, Aleut**: 0.7% in 2000, 0.8% in 2025
- **Asian and Pacific Islander**: 3.9% in 2000, 6.2% in 2025
- **Hispanic Origin (of any race)**: 11.8% in 2000, 18.2% in 2025

*Indicates non-Hispanic.
AA=African American.
Estimated Life Expectancy: 2001

- AA Males: 68.6
- White Males: 75.0
- AA Females: 75.5
- White Females: 80.2

Leading Causes of Death for African American Males and Females

United States: 2001

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>33.5</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>22.4</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>4.6</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>40.1</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>20.8</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>2.8</td>
<td></td>
</tr>
</tbody>
</table>

CVD=cardiovascular disease.

Defining Health STATUS Disparities

- “...differences that occur by gender, race or ethnicity, education or income, disability, living in rural localities or sexual orientation.” US Department of Health and Human Services, Healthy People 2010

- “...a population-specific difference in the presence of disease, health outcomes, or access to care.” US Health Resources and Services Administration (2000)

- “...differences in the incidence, prevalence, mortality and burden of diseases and other adverse health conditions that exist among specific population groups in the United States. Research on health disparities related to socioeconomic status is also encompassed in the definition.” National Institutes of Health (2000).
Defining Health CARE Disparities

“...racial or ethnic differences in the quality of healthcare that are not due to access-related factors or clinical needs, preferences and appropriateness of interventions.”

Institute of Medicine (2002)
The Minority-Majority and the Future of Healthcare

Can a healthcare system created in segregation adjust to the minority-majority?
Risk Factors for Disparate Healthcare

- Poverty
- Racism
- Discrimination
- Bias
- Language barriers
- Geographical barriers
- Socioeconomic status
- Immigrant status
- TRUST (or lack thereof)

Healthcare Disparity

A race disparity in coronary revascularization was found among patients in the Veteran Affairs health system, where there are no race differences in ability to pay and providers are paid a salary.

Healthcare Disparity

Studies of patients who were appropriate candidates for coronary angiography have found race differences in obtaining a referral for this diagnostic procedure.

African American Medicare patients are more likely than white Medicare patients to have a lower limb amputation as a result of poor management of diabetes.

Physician-patient Race Concordance in the 1994 Commonwealth Minority Health Survey

<table>
<thead>
<tr>
<th>Patient’s Race</th>
<th>White (n = 910)</th>
<th>Black (n = 745)</th>
<th>Hispanic (n = 676)</th>
<th>Asian American (n = 389)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician’s Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td></td>
<td>58.5%</td>
<td>60.1%</td>
<td>45.0%</td>
</tr>
<tr>
<td>Black</td>
<td>1.5%</td>
<td></td>
<td>2.2%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2.1%</td>
<td>2.3%</td>
<td></td>
<td>5.5%</td>
</tr>
<tr>
<td>API</td>
<td>7.5%</td>
<td>10.1%</td>
<td>10.5%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3.3%</td>
<td>7.4%</td>
<td>8.3%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

Life Expectancy at birth by race and gender, U.S. 1900-2000

Source: U.S. National Center for Health Statistics, “Health, United States, 2003”, Table 27
Age-adjusted mortality rates by race/ethnicity, 1940-2000


1 Data for Hispanics is based on estimates

Source: National Center for Health Statistics (2002)
Projected Percentage Resident Population by race/ethnicity, U.S. 2010-2070

Source: U.S. Bureau of the Census (NP-T5) Projections of the Resident Population by Race, Hispanic Origin, and Nativity: Middle Series, 1999 to 2100
Region of birth for foreign-born U.S. population, 1990-1997
Fertility Rates by race/ethnicity, 1980-2000

Source: National Center for Health Statistics, 2002
Table 1. Definition and basic characteristics of the eight Americas

<table>
<thead>
<tr>
<th>America</th>
<th>General description</th>
<th>2000 Census population (millions)</th>
<th>2000 Census income per capita</th>
<th>2000 Census completion school</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asians</td>
<td>10.1</td>
<td>$21,675</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>White low-income rural Northland</td>
<td>3.6</td>
<td>$17,758</td>
<td>83</td>
</tr>
<tr>
<td>3</td>
<td>Middle America</td>
<td>219.0</td>
<td>$24,463</td>
<td>84</td>
</tr>
<tr>
<td>4</td>
<td>White poor</td>
<td>11.0</td>
<td>$15,451</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Appalachia/Mississippi Valley</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Western Native Americans</td>
<td>1.0</td>
<td>$10,008</td>
<td>69</td>
</tr>
<tr>
<td>6</td>
<td>Black middle America</td>
<td>23.4</td>
<td>$15,407</td>
<td>75</td>
</tr>
<tr>
<td>7</td>
<td>Black poor rural South</td>
<td>5.8</td>
<td>$10,432</td>
<td>61</td>
</tr>
<tr>
<td>8</td>
<td>Black high-risk urban</td>
<td>7.5</td>
<td>$14,798</td>
<td>71</td>
</tr>
</tbody>
</table>

Individual characteristics, community attributes, and access to and interaction with the healthcare system interact to determine health outcomes.

Critical to the formulation of effective policies to improve health outcomes is (2) having a population large enough to facilitate analysis of causes of death, risk factors, access to care services and other factors over time. Each race/ethnicity subgroup would require a more targeted approach to identify and address specific health disparities.
The Mortality Crossover

Expected Years of Life Remaining

White

Black

Crossover

Table 2. Male and female life expectancy at birth for 2001 in eight Americas

<table>
<thead>
<tr>
<th>America</th>
<th>General description</th>
<th>Male life expectancy at birth</th>
<th>Female life expectancy at birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asians</td>
<td>82.8</td>
<td>87.7</td>
</tr>
<tr>
<td>2</td>
<td>White low-income rural Northland</td>
<td>76.2</td>
<td>81.8</td>
</tr>
<tr>
<td>3</td>
<td>Middle America</td>
<td>75.2</td>
<td>80.2</td>
</tr>
<tr>
<td>4</td>
<td>White poor Appalachia/Mississippi Valley</td>
<td>71.8</td>
<td>77.8</td>
</tr>
<tr>
<td>5</td>
<td>Western Native Americans</td>
<td>69.4</td>
<td>75.9</td>
</tr>
<tr>
<td>6</td>
<td>Black middle America</td>
<td>69.6</td>
<td>75.9</td>
</tr>
<tr>
<td>7</td>
<td>Black poor rural South</td>
<td>67.7</td>
<td>74.6</td>
</tr>
<tr>
<td>8</td>
<td>Black high-risk urban</td>
<td>66.7</td>
<td>74.9</td>
</tr>
</tbody>
</table>

the other seven Americas. America 4 is made up of poor white populations in Appalachia and the Mississippi Valley. Thirty percent of these populations have not

In other words, millions of Americans in health-disadvantaged groups have life expectancies similar to some poor developing countries.
SUMMARY OF FINDINGS
From IOM Report

Racial and ethnic disparities in health care exist and, because they are associated with worse outcomes in many cases, are unacceptable.

Racial and ethnic disparities in health care occur in the context of broader historic and contemporary social and economic inequality, and evidence of persistent racial and ethnic discrimination in many sectors of American life.

Many sources – including health systems, health care providers, patients, and utilization managers – contribute to racial and ethnic disparities in health care.
Bias, stereotyping, prejudice, and clinical uncertainty on the part of healthcare providers may contribute to racial and ethnic disparities in healthcare.

Racial and ethnic minority patients are more likely than white patients to refuse treatment, but differences in refusal rates are generally small, and minority patient refusal does not fully explain healthcare disparities.
If we cannot end our differences, at least we can make the world safe for diversity, for in the final analysis, our most basic link is that we all inhabit this small planet. We all breathe the same air, we all cherish our children's future, and we are all mortal.
“WE MAY HAVE COME HERE ON DIFFERENT SHIPS, BUT WE’RE IN THE SAME BOAT NOW.”
“Insanity is when people continue to repeat the same mistakes over and over with the same bad results”

- Albert Einstein
Where There Is No Vision, The People Perish.

Proverbs 29:18
Cardiovascular Disease Statistics in African Americans

- African Americans (AA) are about 2.5 times as likely as the general US population to die from complications of hypertension.
- Approximately one third of AA adults have hypertension (age-adjusted), among the world’s highest rates.
- The prevalence of MI in AA women is 3.3% compared with 2.0% in white women.
- AA have a 1.3 and 1.8-fold increased risk of suffering a nonfatal or fatal stroke, respectively, compared with whites.
- AA are about twice as likely as Americans in general to die from diabetes. Diabetes is the third leading cause of death in AA women.

Hypertension

- The African American prevalence of hypertension is highest in the World
- Stage 3 hypertension is more common among African Americans than Whites
- AA have a higher incidence of LVH
- AA have a 4 fold greater incidence of end stage renal disease than other Americans
- 75% of AA women are overweight or obese
Heart Failure

- HT is the leading cause of HF in AA
- HF affects 3.5% of AA men and 3.1% of AA female over 20 years, and 5% of over 65 years
- HF outcome is poorer in AA patients with 45% higher rate of functional decline or death in 6 months c/w white
Multivariate analysis

- HT was a particularly strong risk factor in AA women
- Diabetes was somewhat more predictive in white women
- LDL was similarly predictive in all race-sex groups
- HDL was somewhat more protective in white

(2298 black women, 5686 white women, 1096 black men, 4682 white men)
“Under-use” in African Americans or “Over-use” in Whites?

- Do those with ‘most to gain’ (ie sickest) get procedures?
  - Patients with baseline symptoms (angina)
  - Estimated incremental survival benefit

- Are there measurable differences in Long-term patient outcomes?
  - Actual Survival Rates
  - Functional Outcomes
# Impact of Racial Differences on Downstream Functional Status and Angina

## Model Components

<table>
<thead>
<tr>
<th>Model Components</th>
<th>Estimated Coefficient (P value)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SF -36 Physical Function</strong></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td>-2.3 (&lt;0.01)</td>
</tr>
<tr>
<td>Race + Clinical</td>
<td>-1.5 (0.03)</td>
</tr>
<tr>
<td>Race + Clinical + Treatment</td>
<td>-1.3 (0.69)</td>
</tr>
<tr>
<td><strong>Angina Frequency Score</strong></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td>-3.9 (&lt;0.01)</td>
</tr>
<tr>
<td>Race + Clinical</td>
<td>-2.7 (0.03)</td>
</tr>
<tr>
<td>Race + Clinical + Treatment</td>
<td>-2.3 (0.07)</td>
</tr>
</tbody>
</table>

Source: Kaul P. Circulation 2005;111:1184-90
Conclusions

- AA with CVD are less likely to receive revascularization than whites after adjusting for clinical factors, etc.
- Differences most marked among those who stood the most to gain from the procedure.
- These differences in care appear to have resulted in worse long-term survival for blacks.
- These difference in care were also associated with more downstream angina and worse functional status.
Perceived Factors Influencing Health Care

Does Race Impact Care Decisions?

What Factors Cause Racial Disparities in CV Procedures?

“Disparities in the health care delivered to racial and ethnic minorities are real and are associated with worse outcomes in many cases, which is unacceptable.”

-- Alan Nelson, retired physician, former president of the American Medical Association and chair of the committee that wrote the Institute of Medicine report, *Unequal Treatment: Confronting Racial and Disparities in Health Care*
Conclusions
After 20 years of research...

- Racial differences in use of CV care persist..
  - Most marked in interventional procedures (e.g., CABG) and newer, high cost drugs (GP, Clop, statins)
- These differences in care NOT explained fully by clinical or other patient factors
- Differences appear to impact on patient outcomes
- Answers to overcoming disparities remain unclear,
  - Patient involvement in decision-making
  - Efforts to measure and promote ‘evidenced-based care’ for all!
CDC Eliminate CVD disparities by 2010

- Reduce deaths from heart disease among AA by 30%
- Reduce deaths from stroke among AA by 47%
Means of Reducing Disparities GAP

- Better patient education about disease and treatment options. Patient activism
  - Shared Decision Project
- Physician education
  - Rand/ACC/AHA/STS Study
- Performance measurement
Kaiser Family Foundation Ad Campaign

Ad appeared in leading medical publications:

*Journal of the American Medical Association*

*Today in Cardiology*

*Journal of the American College of Cardiology*

*Circulation – The Journal of the American Heart Association*
Treatment Pearls: Management of High Blood Pressure in African Americans

- Obtain BP and assess risk of CVD at regular intervals
- Increase awareness of links between lifestyle choices and CV outcomes
- Increase dietary potassium while moderating sodium intake
- Increase awareness of obesity and inactivity as major risk factors
- Provide DASH diet information to patients
- Provide intensive intervention to lower LDL of those with type 2 diabetes
- Eliminate misperception that it is more difficult to lower blood pressure in African Americans
- Combination therapy may be required to achieve and maintain target blood pressure
- As monotherapy, beta blockers and ACE inhibitors may produce less blood pressure-lowering effects in AA than whites
- Diuretics and calcium channel blockers may have greater blood pressure lowering efficacy than other classes
- Where compelling indications have been identified for prescribing specific classes of agents, indications should be equally applied to AAs
- AA appear to be at increased risk for ACE inhibitor associated angioedema, cough or both. Patients should be instructed to report symptoms

### Table 2. Causes of Death in the Prevention Trial.

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Blacks (N=404)</th>
<th></th>
<th></th>
<th>Whites (N=3658)</th>
<th></th>
<th>P Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Deaths (%)</td>
<td>Incidence/100 Person-Yr†</td>
<td></td>
<td>No. of Deaths (%)</td>
<td>Incidence/100 Person-Yr†</td>
<td></td>
</tr>
<tr>
<td>All causes</td>
<td>89 (22.0)</td>
<td>8.1</td>
<td></td>
<td>532 (14.5)</td>
<td>5.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pump failure</td>
<td>29 (7.2)</td>
<td>2.6</td>
<td></td>
<td>157 (4.3)</td>
<td>1.5</td>
<td>0.003</td>
</tr>
<tr>
<td>Arrhythmia</td>
<td>22 (5.4)</td>
<td>2.0</td>
<td></td>
<td>176 (4.8)</td>
<td>1.7</td>
<td>0.40</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>13 (3.2)</td>
<td>1.2</td>
<td></td>
<td>84 (2.3)</td>
<td>0.8</td>
<td>0.20</td>
</tr>
<tr>
<td>Stroke or pulmonary</td>
<td>10 (2.5)</td>
<td>0.9</td>
<td></td>
<td>25 (0.7)</td>
<td>0.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>embolism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>15 (3.7)</td>
<td>1.5</td>
<td></td>
<td>90 (2.5)</td>
<td>0.9</td>
<td>0.08</td>
</tr>
</tbody>
</table>

*Two-sided P values for the comparison between blacks and whites were derived with the log-rank statistic.

† The unadjusted incidence is expressed as the rate per 100 person-years of follow-up.

AHeFT

- 1050 patients with Class III or IV HF
- Primary endpoint:
  Composite score of all cause mortality, hospitalizations for HF & change in QOL
- Study terminated early:
  10.2% mortality in placebo vs 6.2% in BiDil group (p=0.02)
  43% reduction in all cause mortality (p=0.01)
  33% reduction in hospitalization for HF (p=0.0001)
  Significant improvement in QOL (p=0.02)
At least 29 medicines have been claimed to work differently among racial/ethnic groups.

While it is not clear how many of these differences are real, this suggests a potentially important issue in the use of prescription medicines.
<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Examples</th>
<th>Difference in Drug Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE inhibitor</td>
<td>Enalapril, Lisinopril, Trandolapril</td>
<td>Lesser / no response in AAs compared with CAs</td>
</tr>
<tr>
<td>A combination of two vasodilators (the antihypertensive hydralazine and isosorbide dinitrate)</td>
<td>BilDil</td>
<td>Greater efficacy in AAs than CAs with CHF</td>
</tr>
<tr>
<td>Vasodilator antihypertensive</td>
<td>Sodium nitroprusside</td>
<td>Attenuated response in normotensive AAs compared to CAs</td>
</tr>
<tr>
<td>Beta-adrenoceptor blocker</td>
<td>Propranolol, Nadolol, Atenolol, Oxprenolol</td>
<td>More effective in CAs than AAs</td>
</tr>
<tr>
<td>Vasopeptidase inhibitor</td>
<td>Omapatrilat</td>
<td>Increased risk of angioedemas in AAs than CAs</td>
</tr>
<tr>
<td>Anticoagulant</td>
<td>Danaparoid</td>
<td>Significantly more CAs had favourable outcome than AAs</td>
</tr>
<tr>
<td>Alpha-adrenoceptor blocker</td>
<td>Prazosin</td>
<td>More effective in CAs than AAs</td>
</tr>
<tr>
<td>Thiazide (diuretic)</td>
<td>Hydrochlorothiazide</td>
<td>Greater response in AAs than CAs</td>
</tr>
<tr>
<td>Calcium channel blocker</td>
<td>Diltiazem</td>
<td>More effective in AAs than CAs</td>
</tr>
</tbody>
</table>
# Race and Drug Response - Others

<table>
<thead>
<tr>
<th>Class</th>
<th>Name</th>
<th>Difference in Drug Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha(1)-adrenoceptor agonist</td>
<td>Phenylephrine</td>
<td>Increased response in AAs compared to CAs</td>
</tr>
<tr>
<td>Alpha(2)-adrenoceptor agonist</td>
<td>Clonidine</td>
<td>AAs have reduced hypotensive response compared to CAs</td>
</tr>
<tr>
<td>Beta-adrenoceptor agonist</td>
<td>Isoproterenol</td>
<td>Attenuated vasodilation and heart-rate increase, in normotensive AAs compared to CAs.</td>
</tr>
<tr>
<td>Immunosuppressant</td>
<td>Tacrolimus, Cyclosporine</td>
<td>AAs require higher dose than CAs, and have poorer response, resp.</td>
</tr>
<tr>
<td>Glucocorticoid</td>
<td>Methylprednisolone</td>
<td>Adverse effects more common in AAs than CAs</td>
</tr>
<tr>
<td>HepC Antiviral treatment</td>
<td>Ribavirin, Interferon</td>
<td>Poorer response in AAs than CAs</td>
</tr>
<tr>
<td>Prostaglandin analogue</td>
<td>Travoprost</td>
<td>Response greater in AAs than CAs</td>
</tr>
<tr>
<td>Cytotoxic agents</td>
<td>1. 6-MP and methotrexate 2. Docetaxol and Carboplatin</td>
<td>1. Significant difference in response by ethnicity for childhood ALL, with Asians &gt; CAs &gt; Hispanics &gt; AAs. 2. Greater response in Asians than CAs with advanced NSCLC</td>
</tr>
<tr>
<td>Insulin</td>
<td>Insulin</td>
<td>AAs and Hispanic children more resistant than CAs</td>
</tr>
<tr>
<td>Antipsychotic</td>
<td>1. Haloperidol 2. Clozapine</td>
<td>1. Hispanics require greater mean dose than CAs or AAs 2. AAs require greater mean dose than CAs</td>
</tr>
</tbody>
</table>
Could average genetic differences among racial or ethnic groups contribute to differences in drug response?

Consider 42 gene variants that have been implicated in drug responses. How many have important differences in frequency between African Americans and Americans of European ancestry?
Should race, ethnicity, or some other measure of group membership be used to guide treatment regimes?
Population Structure

• *Ethnic or racial labeling* uses racial labels to describe the structure of human genetic variation. Risch and colleagues (2002) propose five major racial groups based on continental ancestry. Whilst this method is easy to implement, it assumes a rather simplistic view of human genetic history.

• *Explicit genetic inference* ignores geographic, racial or ethnic labels and instead groups individuals using genetic data (e.g. Wilson et al 2001). However, such a scheme misses genetic variation *within* a group.
Current NIH Guidelines on Race
Current NIH Guidelines on Race

5 categories of race based on continental ancestry:

- African
- Caucasian (Europe and Middle East)
- Asian
- Pacific Islander
- Native American
Current NIH Guidelines on Race
Guidelines Ignore Variation Within Groups

e.g. African Bantu and San
What is wrong with using the five “races”? 

- The scheme cannot represent the diversity within groups 
- The scheme is unlikely to reflect the real pattern of global human diversity 
  - The sample used that have been used to date are far from comprehensive and incomplete sampling may generate a false impression of discrete groups
The BEST Population

- 833 Caucasians and 207 African-Americans who entered a clinical trial for the non-selective beta-blocker bucindolol, for congestive heart failure
- Overall, only survival benefit for Caucasians
- Ask whether drug response is associated with the genetic ancestry of the individuals and if so, can this be explained by frequency differences of haplotypes or SNPs in the drug targets
ADRB2 Genetic Variation and Response to Bucindolol

<table>
<thead>
<tr>
<th>ADRB2 SNP</th>
<th>Associated Phenotype</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream -1023</td>
<td>Treatment success for G/A patients</td>
<td>0.00034</td>
</tr>
<tr>
<td></td>
<td>Change in LVEF by genotype (A allele better response) for African-Americans</td>
<td>0.00723</td>
</tr>
<tr>
<td>Arg16Gly</td>
<td>Baseline LVEF by genotype for African-Americans (Gly higher),</td>
<td>0.00595</td>
</tr>
<tr>
<td>Gln27Glu</td>
<td>Treatment success for Gln/Glu patients</td>
<td>0.00046</td>
</tr>
</tbody>
</table>

Chr5
KB

-1023 Arg16Gly Gln27Glu

2015 bp
This figure shows that the African-Americans have a broad range of ancestry proportions indicating substantial genetic structure. This may be relevant to drug response.
This figure demonstrates that there is little internal structure within the Caucasians.
PONDERING THE PROBLEM OF PONDEROUS PEOPLE

Richard Allen Williams, M.D.
Clinical Professor of Medicine
UCLA School of Medicine
Vice Chair

Institute for the Advancement of Multicultural and Minority Medicine (IAMMM)
OBESITY FACTS

- 65% of U.S. adults over age 20 are overweight or obese.
- 30% (60 million) are obese.
- Black female girls have highest prevalence: 37.6% overweight, 22.2% obese. Black adolescent girls 12-19 are 45.5% overweight, 26.6% obese.
- Mexican American boys 6-11: 43% overweight, 27.3% obese; adolescents 44.2% overweight, 27.5% obese.
- Californians have gained 360 million pounds in the last decade.
GENDER, RACE, AND OBESITY

- Black women 40-59: 58% obese.
- White women: 38% obese.
- Adult men: Whites and Blacks equally obese.
Other Effects of Adiposity

- Insulin resistance
- Dyslipidemia
- Low-grade inflammation
- Increased growth factor and hormone levels
- ACCELERATED AGING
- 30% caloric restriction prevents or retards chronic diseases and PROLONGS MAXIMAL LIFE SPAN (In lab animals)
Diseases Associated With Obesity

- Hypertension
- Dyslipidemia
- Diabetes
- Coronary heart disease
- Stroke
- Gallbladder disease
- Sleep apnea
- Cancer (endometrial, breast, colon)
The Weapons of Mass Destruction
Conclusions

1. Although Risch et al propose that racial groupings based on continental ancestry be used to represent population structure, real data from the BEST population, as seen in Fig 1., demonstrates that this classification is insufficient for African-Americans. African Americans are highly heterogeneous.

2. The ADRB2 upstream –1023 SNP is associated with change in left ventricular ejection fraction in the BEST African-Americans.
Implications

- Racial / ethnic groups are not homogeneous entities
- If there is association between drug response and race or ethnicity this is a pointer that individual (environmental or genetic) variables are important to drug response
- Identifying the individual determinants will also provide better diagnostic information than the group designation
Social Causes of Disparity

- Socioeconomics
- Limited access especially in rural areas
- Culture and trust
- Lack of diversity of healthcare providers
- Shortage of training of minority providers
Steps to be taken by Medical Institutions:

- Clear mission statement that recognizes the value of diversity
- Appoint URM to leadership position to influence change
- Articulate the vision for diversity to all levels
- Hold leaders accountable
- Institutional objectives must be consistent with the goal to increase diversity including efforts to ease financial and nonfinancial obstacles
Summary

- Biologic & Genetic factors
- Environmental factors
- Socioeconomic factors
- Access & Cost
- Practice Bias
- Lack of Diversity in Providers
- Need for Leadership and commitment