Ethnic Differences in Presentation and Outcomes for Cardiovascular Disease in North America

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DISCLOSURE STATEMENT –Dr. Narendra Singh MD

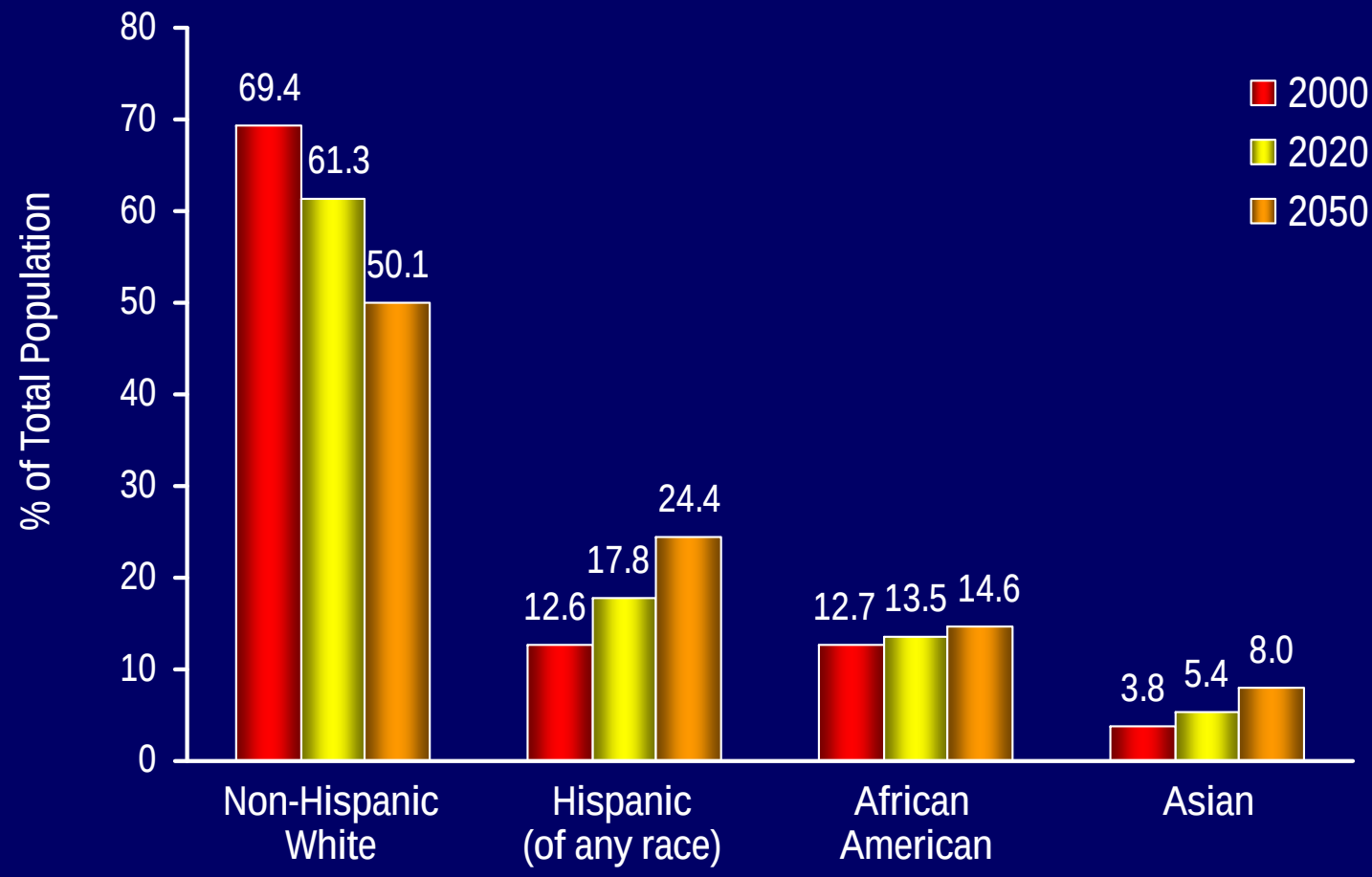
- **Research grants**
- Novartis, Gilead, Pfizer, Cardiomems, GSK, Sanofi, Takeda,
- Astra Zeneca, Medtronics, St Jude Medical, Biotronik, Sorin
- Merck/Schering, Boehringer Ingelheim, J and J, Roche, Eli Lily,
- Dalichi-Sankyo, Forrest Pharma, Amarin, Gilead, Astellas

- **Speakers Bureau, consultative, advisory board honoraria**
- Pfizer /BMS, Glaxo Smith Kline, Novartis, Sanofi, Boehringer Ingelheim, Astra Zeneca, Astellas ,Gilead
- ACC-GA Chapter, CCRN
- Northside Hospital, St Josephs Hospital, Dekalb Medical, Emory Johns Creek

- **Equity –stocks, options**
- none

This presentation; No conflicts

The Racial and Ethnic Diversity of the US Population Will Continue to Increase



US Census Bureau. US interim projections by age, sex, race, and Hispanic origin. 2004. Available at: http://www.census.gov/ipc/www/usinterimproj/. Accessed on December 21, 2005.

Ethnicity does not = Race

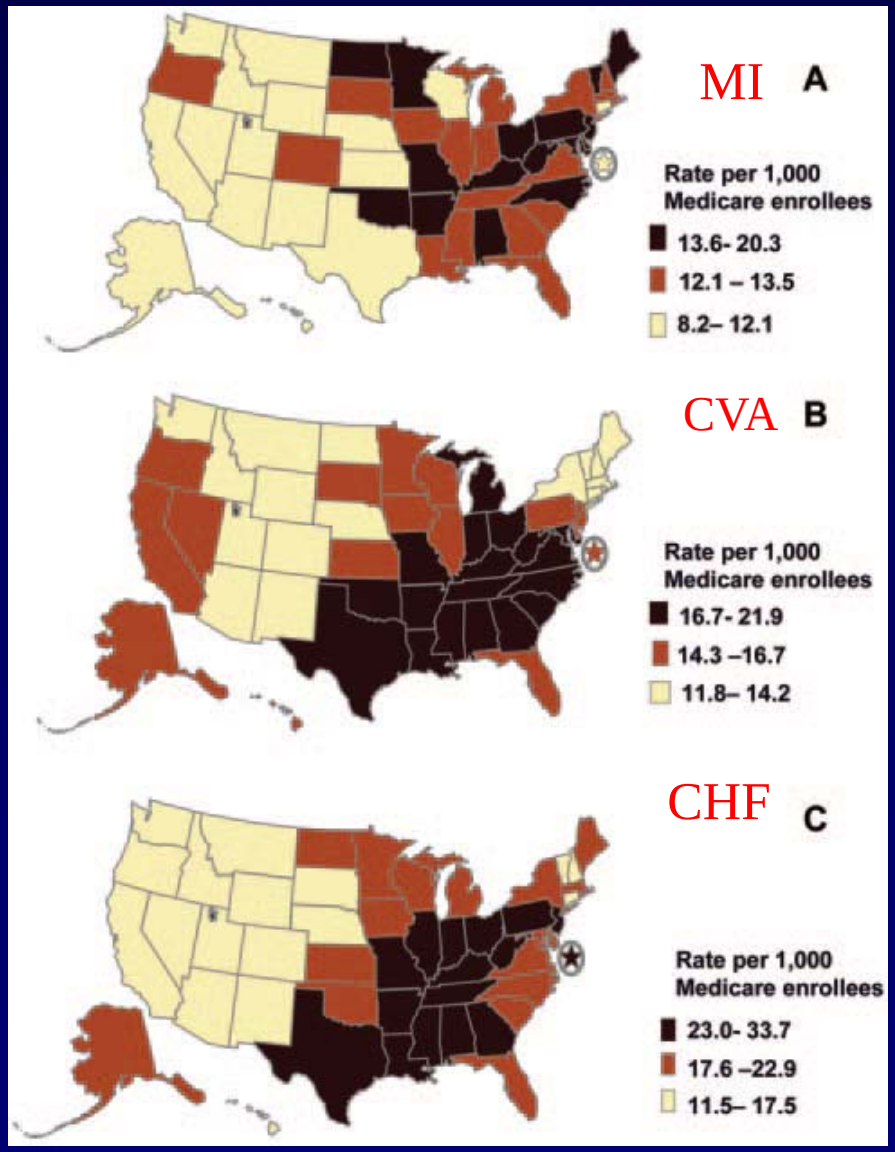
- Race – Dorland's dictionary;
  - An ethnic stock, or division of mankind. In genetics, races are considered as populations having different distributions of gene frequency.
- Ethnic – Dorland's dictionary;
  - Pertaining to a social group who share cultural bonds (religious,national,etc) or physical (racial) characteristics
- American Anthropological Association
  - "It has become clear that human populations are not unambiguous, clearly demarcated,biologically distinct groups….*Any attempt to establish lines of division among biological populations is both arbitrary and subjective."*

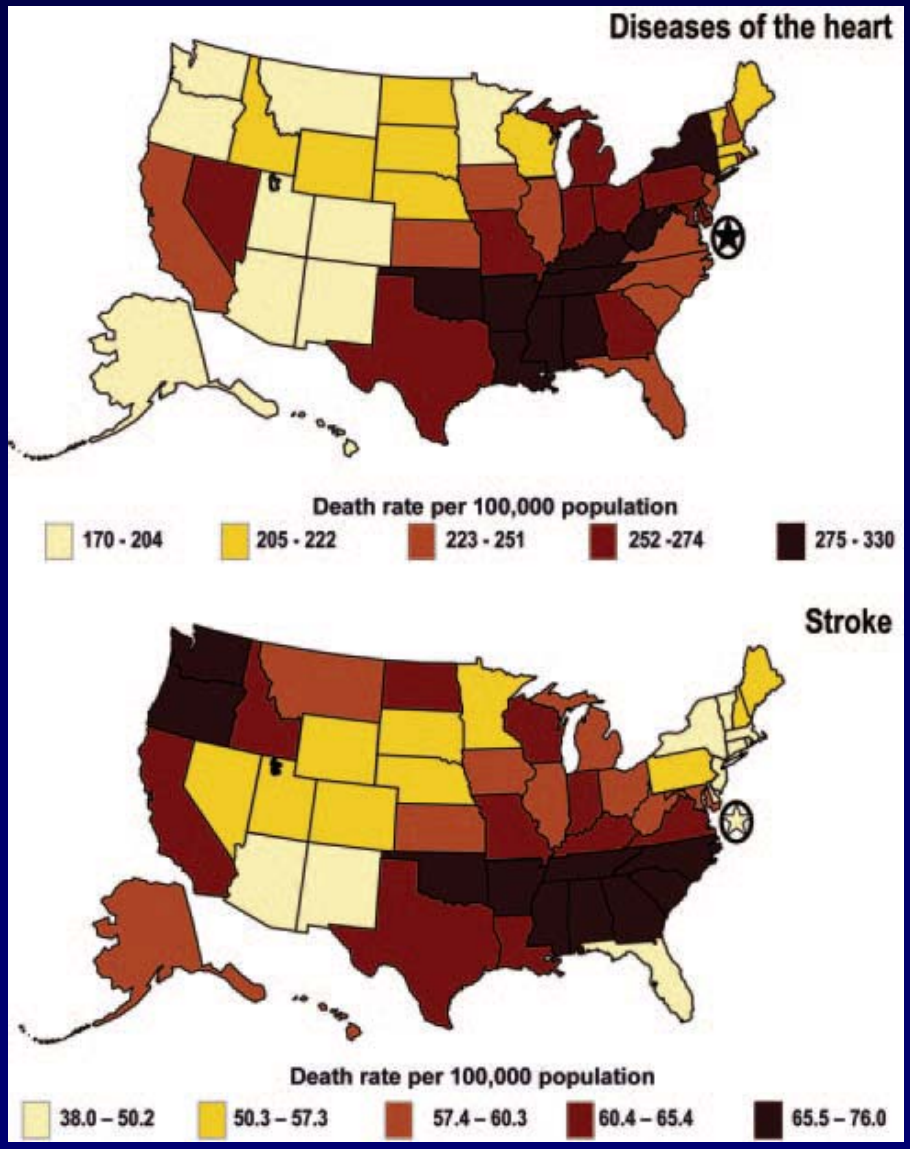
NEJM, 2001

RISKS OF ETHNICITY RESEARCH

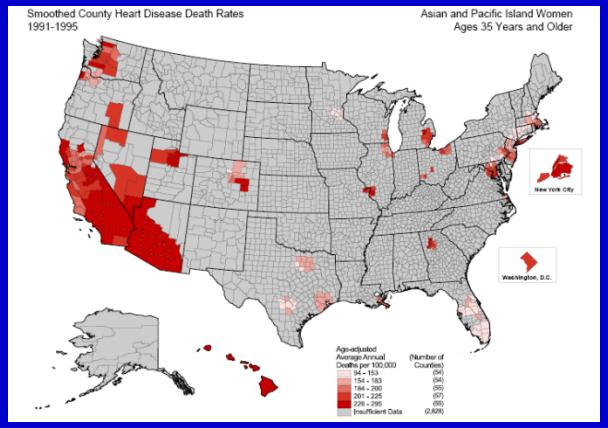
- Defining ethnic origin is not easy and likely to get more difficult in the future with increasing migration and inter-ethnic marriages
  - *This in turn can affect the validity and applicability of research conclusions*
- Ethnic labels could be used as a source of discrimination by health insurers and employers
  - *On the other hand identification of common high risk gene pools (alleles) may in the future allow us to tailor medical therapy to those in whom the cost-benefit ratio is most favorable*

GEOGRAPHIC CHD DIVERSITY

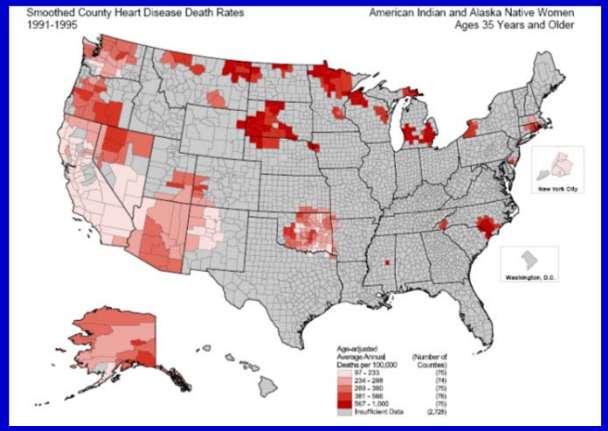




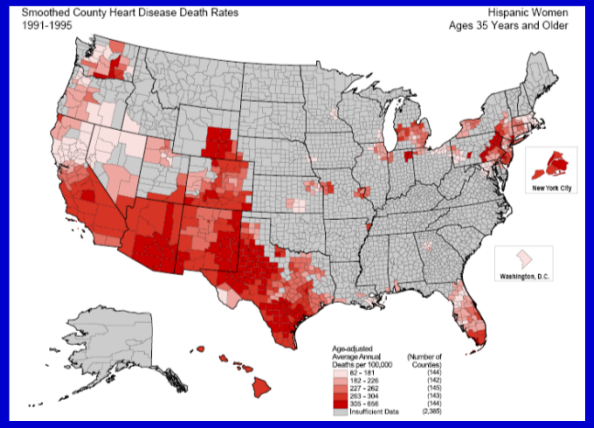
Geographic Diversity in CHD Deaths By Ethnicity



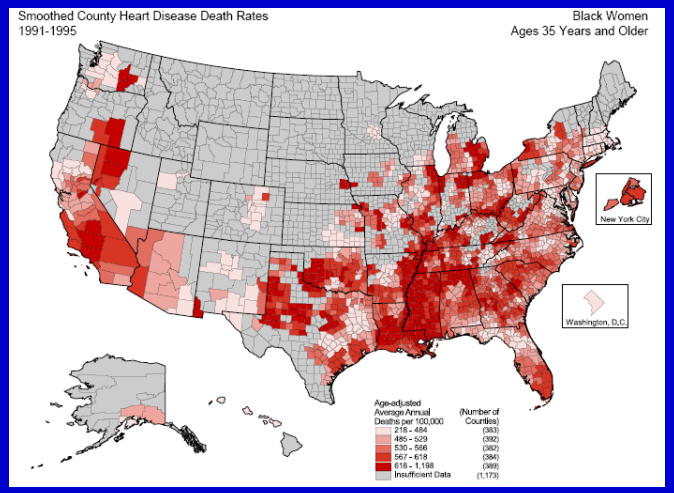
Asians



Native Indians

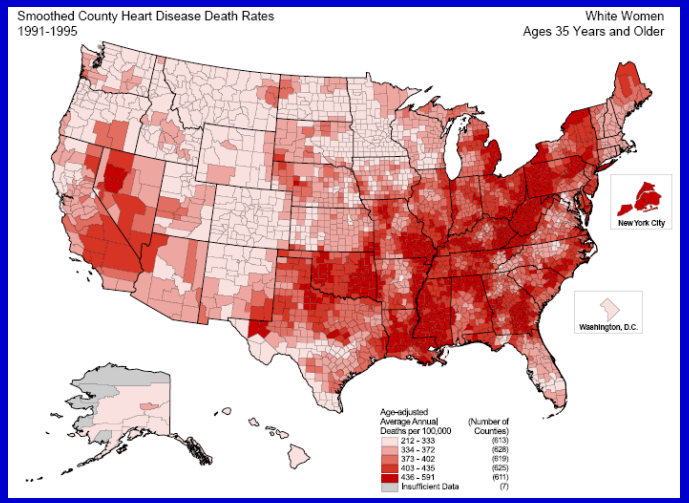


Hispanics



← Blacks

Whites →

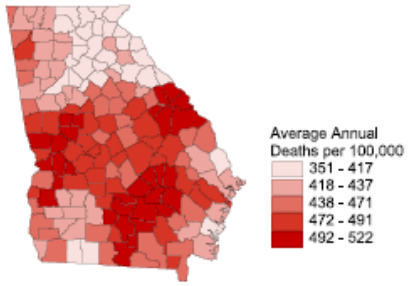


Geographic/Ethnic Disparity within Georgia

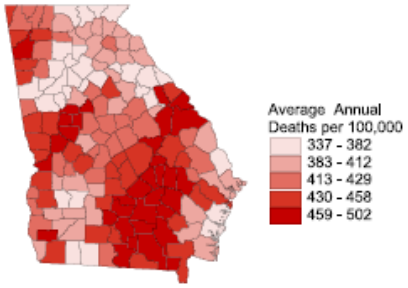
Georgia

Smoothed County Heart Disease Death Rates, 1991-1995

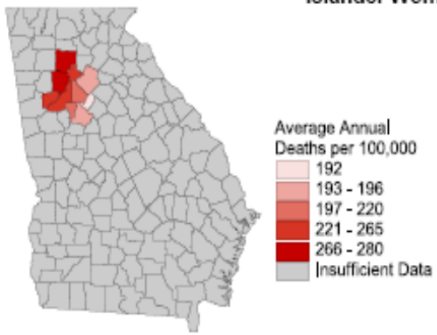
All Women



White Women



Asian and Pacific Islander Women

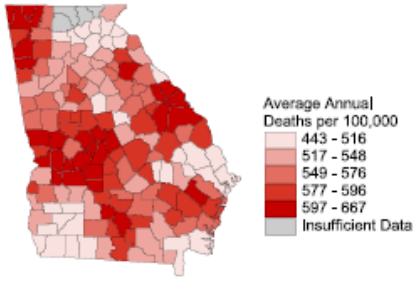


State Profile — Georgia

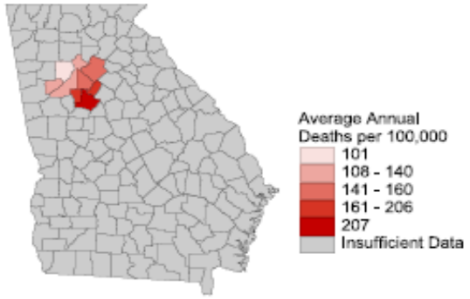
Race or Ethnicity	State Population 1995	State Heart Disease Death Rate, 1991-1995*
All Women	1,785,363	440
American Indian and Alaska Native Women	3,568	Insufficient Data
Asian and Pacific Islander Women	24,878	197
Black Women	436,167	564
Hispanic Women	24,059	132
White Women	1,320,750	408

* Average annual age-adjusted rate (deaths per 100,000) for women ages 35 years and older. Data for Hispanics are also included within each of the four categories of race.

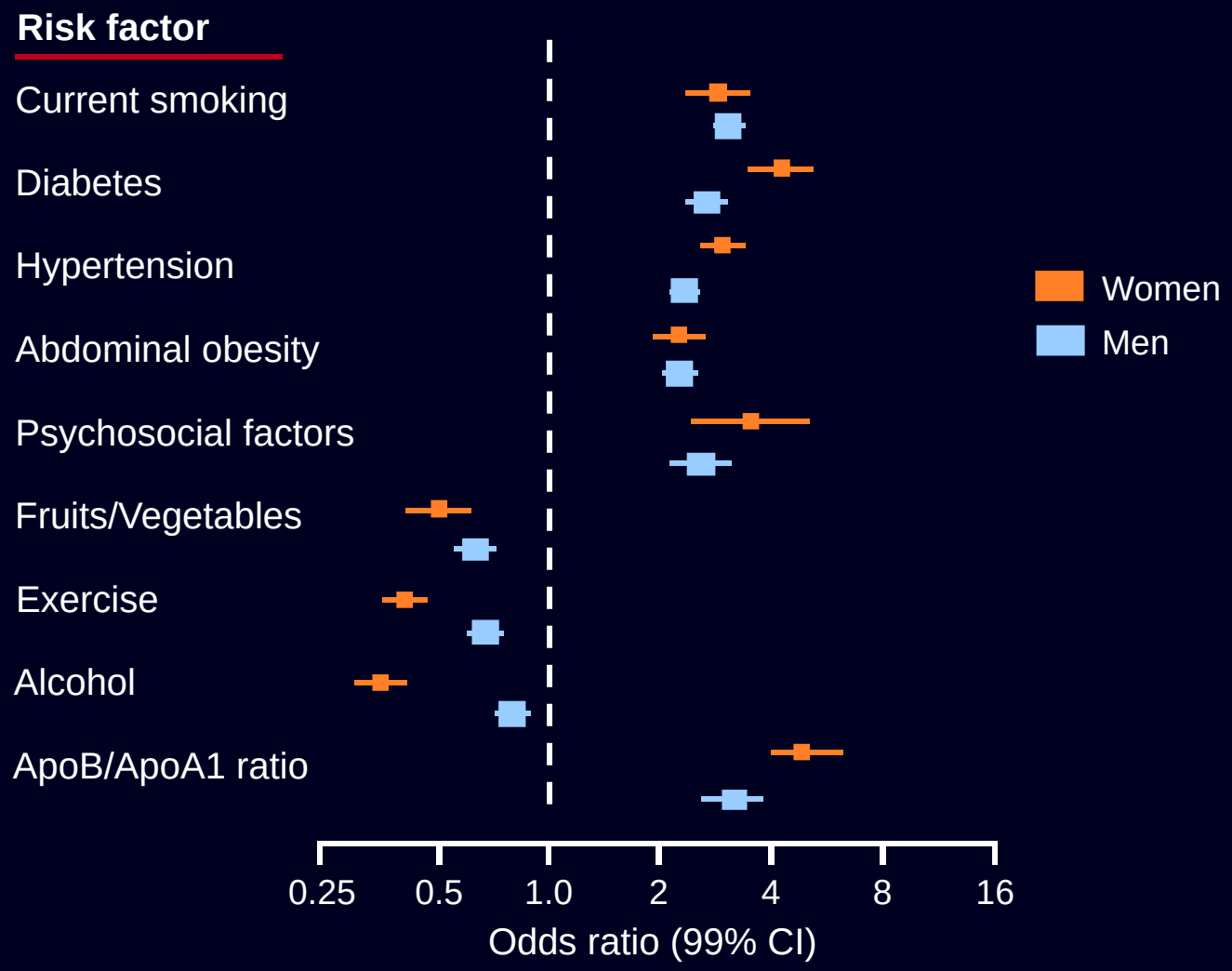
Black Women



Hispanic Women



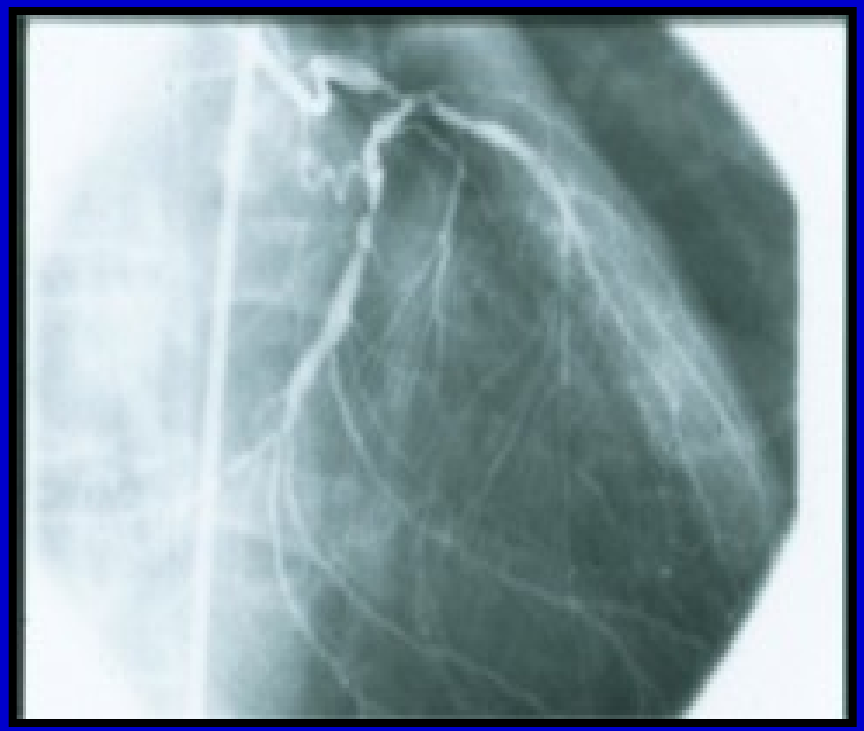
INTERHEART: Positive impact of lifestyle factors on acute MI for all ethnic groups

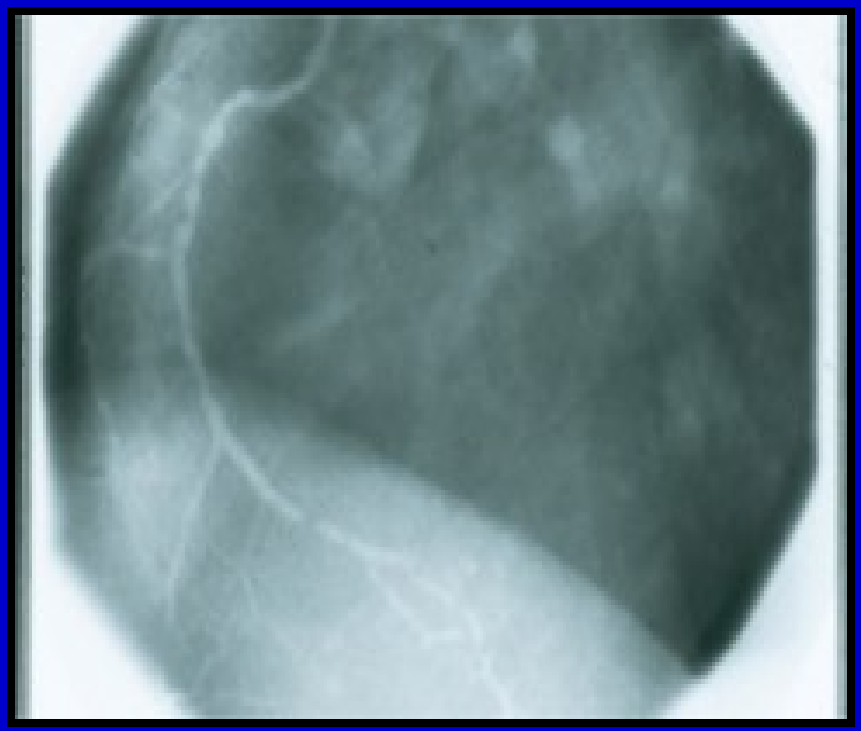


Yusuf S et al. *Lancet*. 2004;364:937-52.

Asian Indian (South Asian) Population

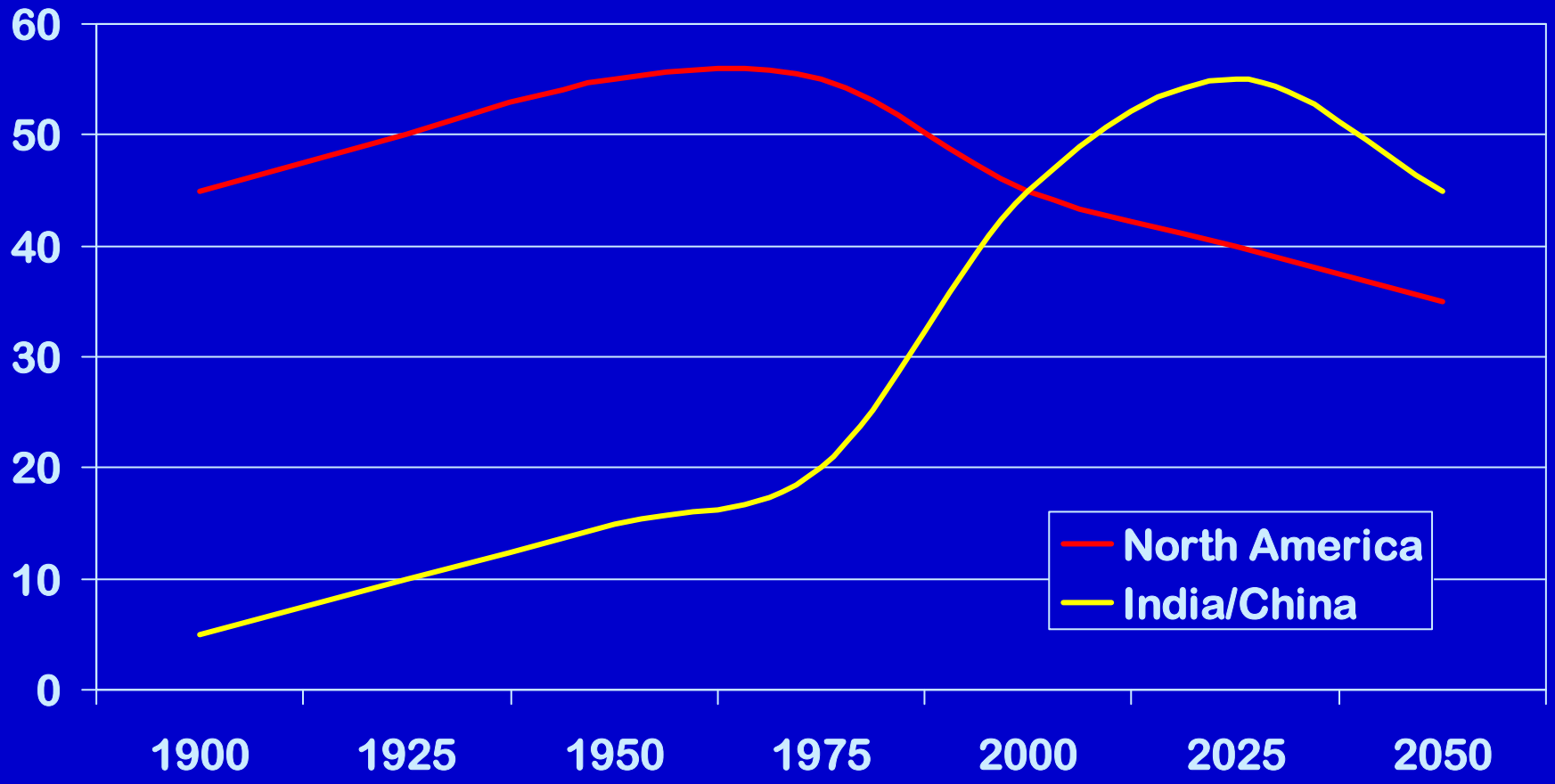
1994 - 38 yr old South Asian male- coronary anatomy at presentation





Who are "South Asians"

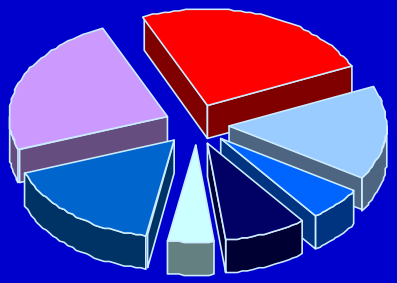
AGE-ADJUSTED CV deaths declining in N America but rising in INDIA/CHINA



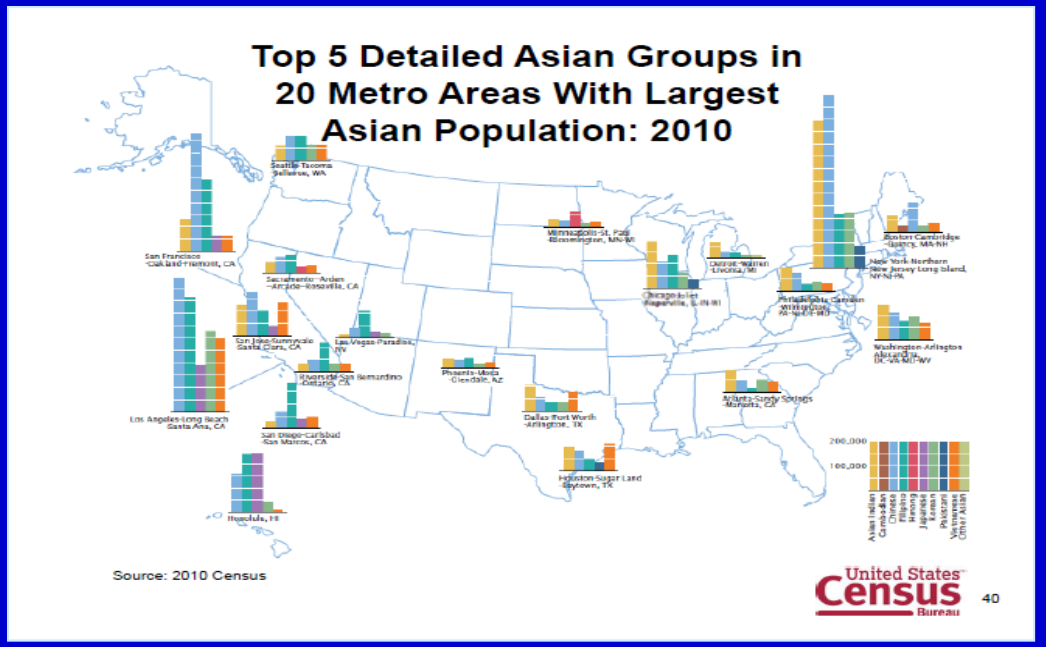
Visible Minorities in Canada and USA

CANADA Total = 1,262,865

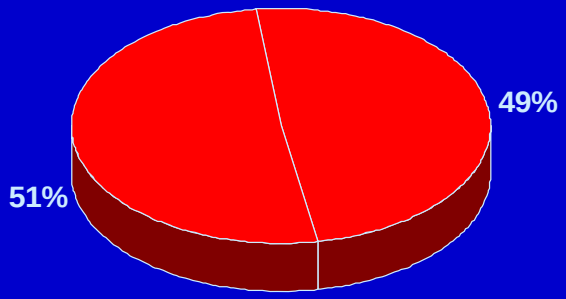
South Asians



Chinese | S Asian | Black
latin Am | Filipino | SE Asian
Other



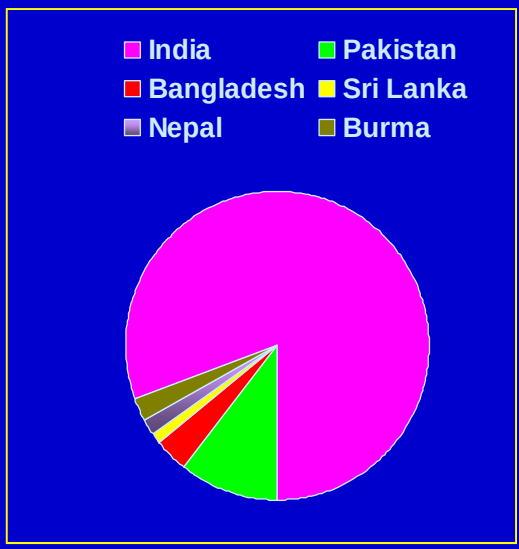
TORONTO



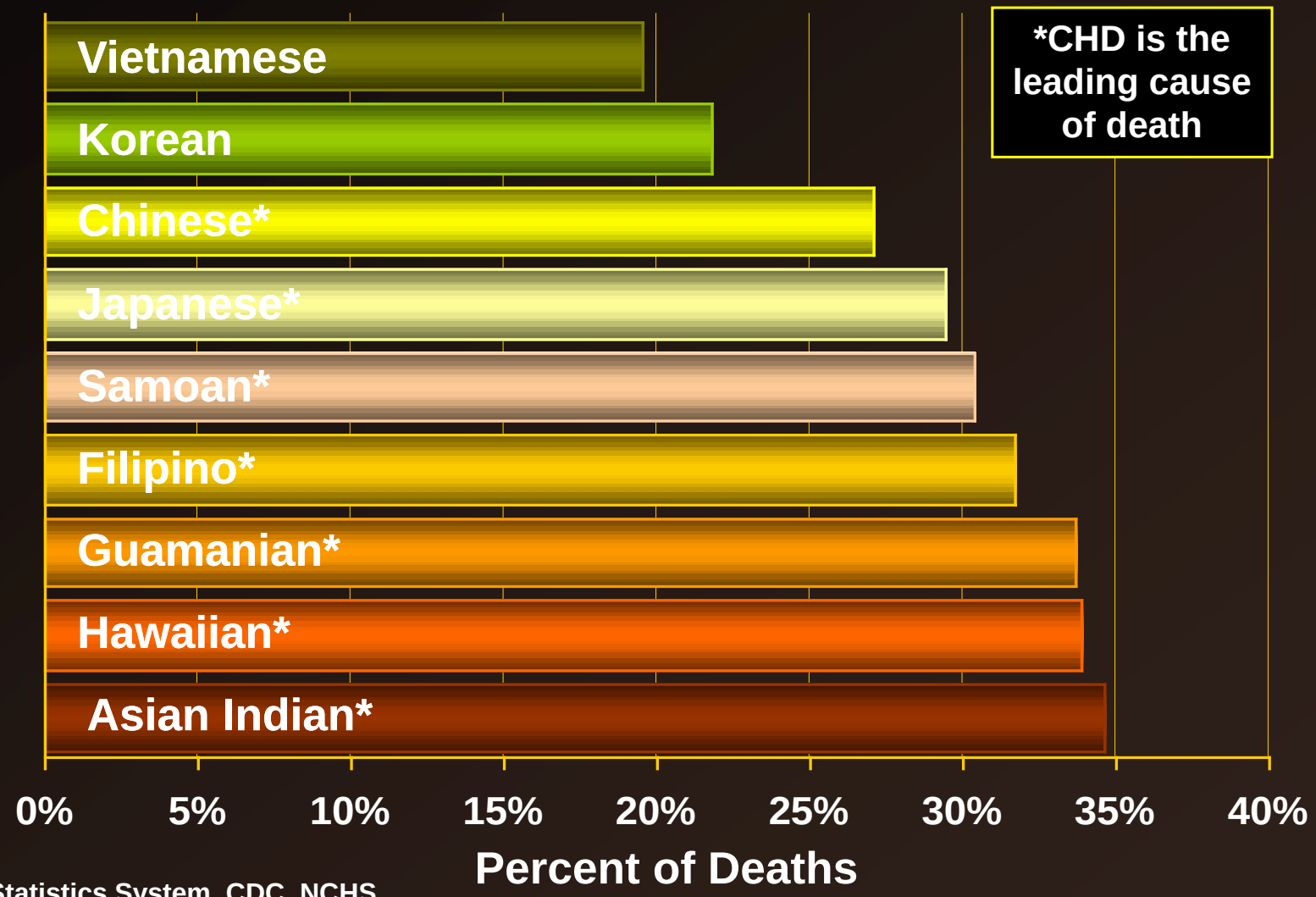
USA Census 2010, Stats Canada, 2006

Asian-Indians
Georgia – 96,116
USA- 3,183,063

Total SA-USA
3,795,562



CHD as Cause of Death in Asians



National Vital Statistics System, CDC, NCHS.

Don't Blame just the Diet!

Coronary Heart Disease in South Asians

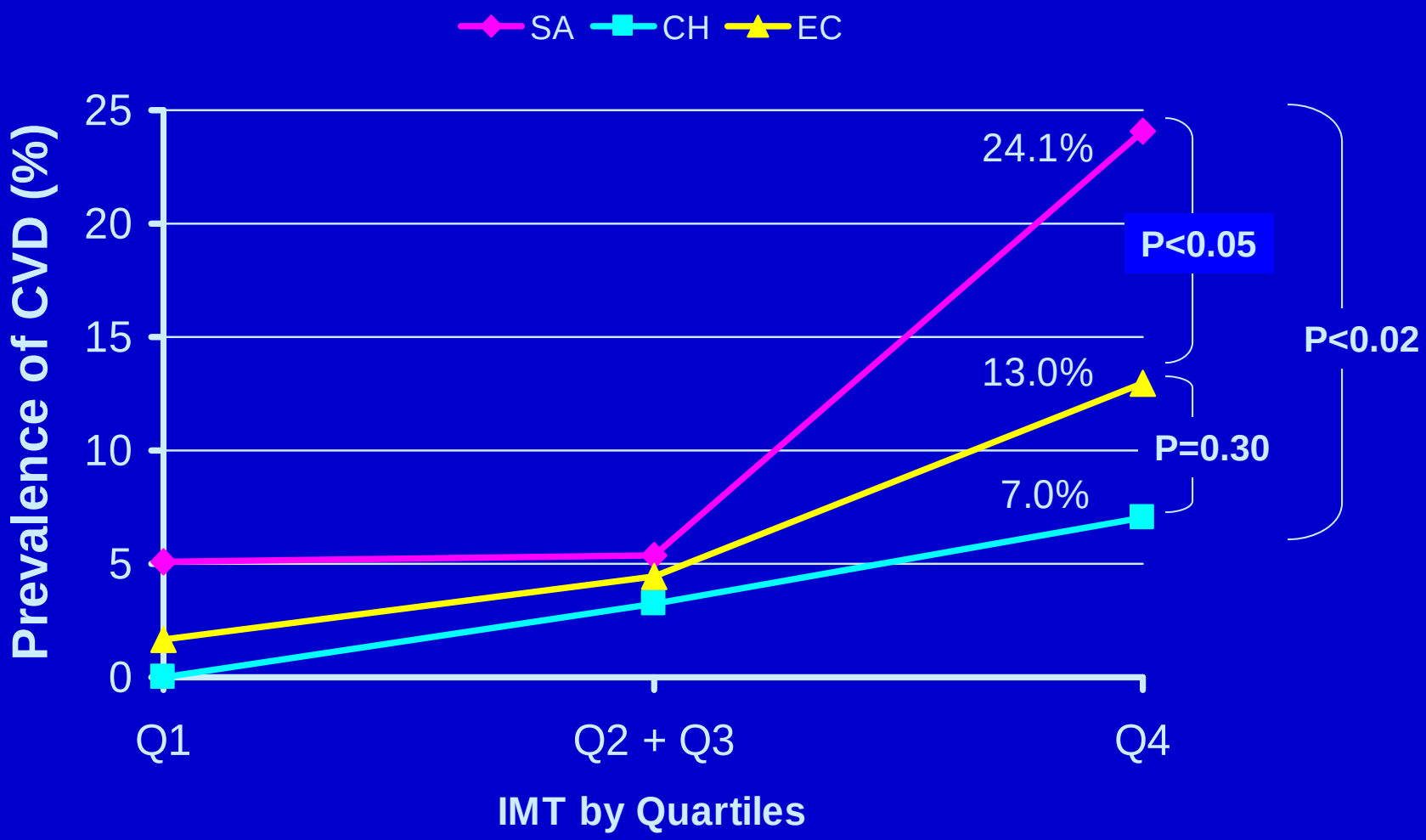
- **Two-fold increased risk of developing CHD for SA vs. Caucasians**
- **SA develop CHD and heart failure at younger ages**
- **More diffuse CAD at angiography, worse outcome following CABG**
- **Larger MI size, later presentation to hospital**
- **Approximately 50% higher CHD mortality**

- **Similar LDL levels, prevalence of HT , smoking similar or lower**
- **Lower HDL, higher prevalence of DM**
- **Conventional risk factors do not explain excess CHD**

Gupta M et al. CMAJ. 2002
Deedwania P et al. Indian Heart J. 2005:57;617-631.
Vallapuri S et al. Am J Cardiol. 2002;90:1147-50.
Hamdoolay Z et al. Circulation. 2004 (AHA)

Gupta M et al. Canadian Journal of Cardiology 2001;17(supp C):68C
Singh et al. Ethnicity and Disease. 2005:15(4):615-619
Gupta M et al. Circulation. 2006:113;924-929

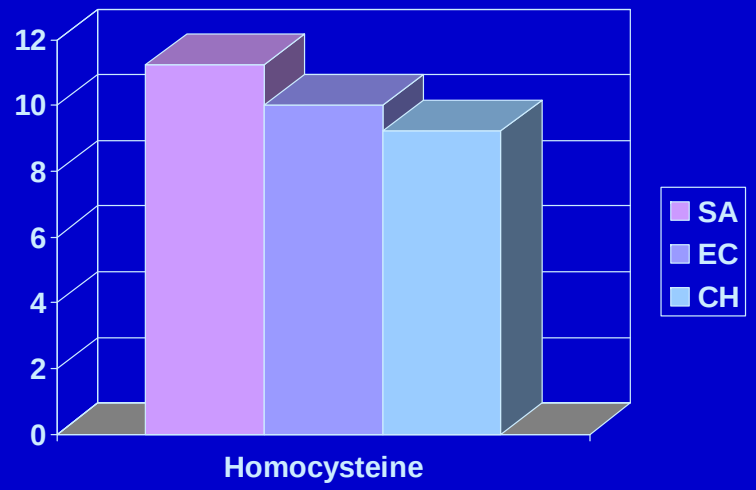
Prevalence of CVD for Given Levels of Carotid Atherosclerosis (IMT)

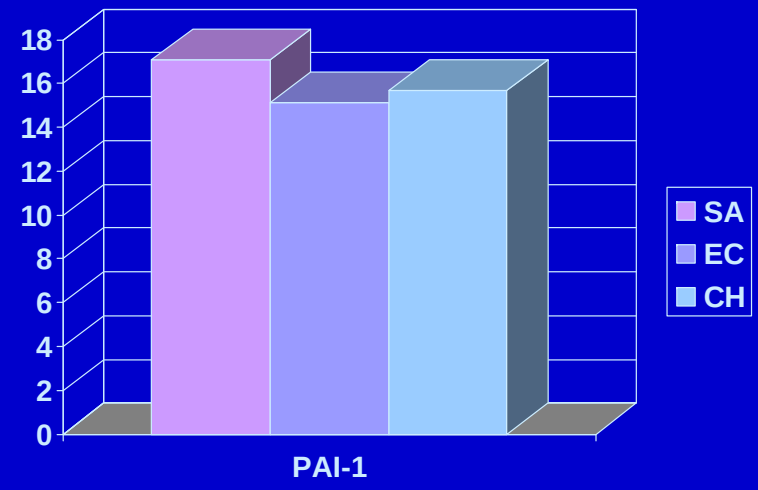


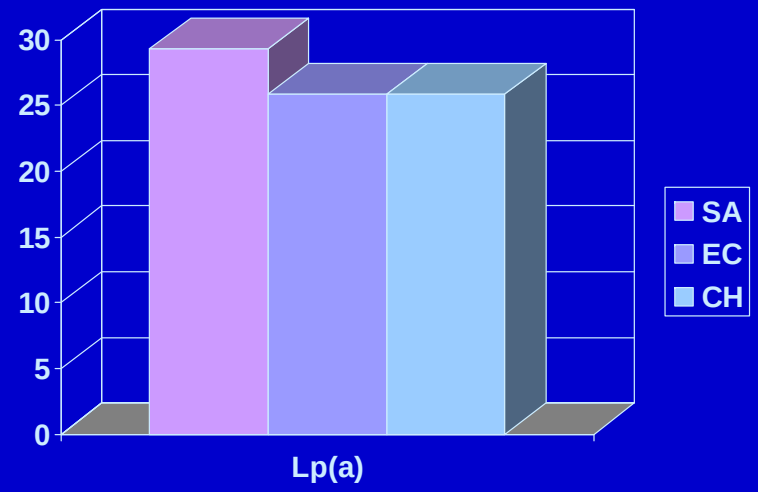
*Note: Overall P value <0.001, comparing SA, CH and EC

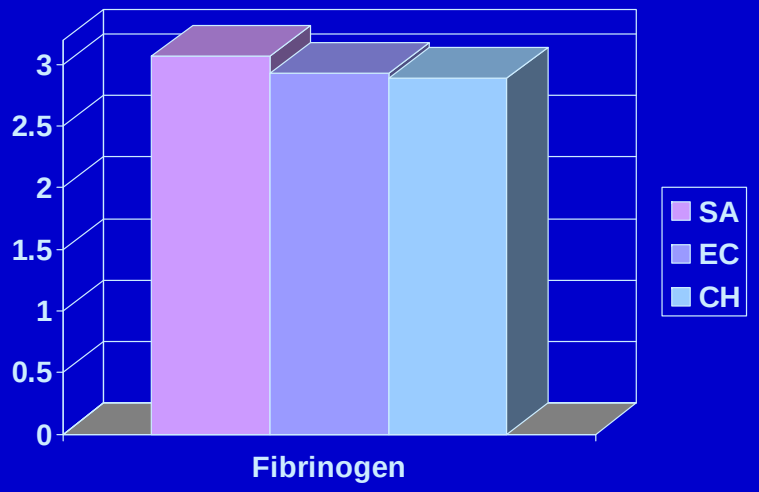
Non-Traditional Risk Factors

SHARE, Anand et al. Lancet 2000



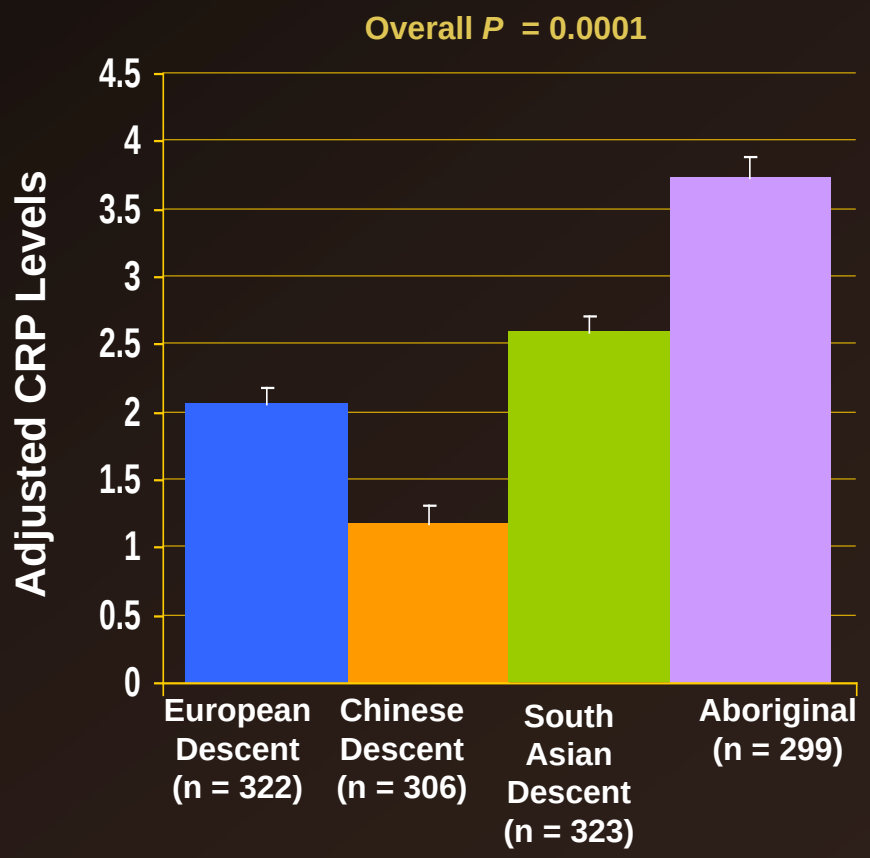






South Asians and CAD

- Rapidly growing segment of US population
- Elevated CAD incidence in young adults
- High CAD risk compared to whites, with equivalent risk factors
  - Higher prevalence rates of insulin resistance
  - Metabolic syndrome
  - Diabetes
  - Elevated CRP
  - Lipoprotein (a) levels

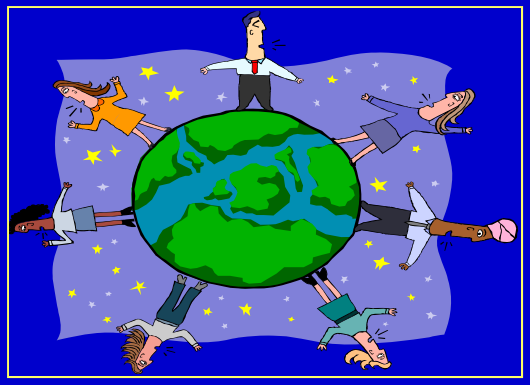


Anand SS, et al. *Arterioscler Thromb Vasc Biol*. 2004;24:1509-1515.

McKeigue & Sevak. *Coronary heart disease in South Asian communities.* London: Health Education Authority, 1994.
Anand SS, et al. *Lancet* 2000;356:279-284.

Environment, "Thrifty Genotype" and the Metabolic Syndrome

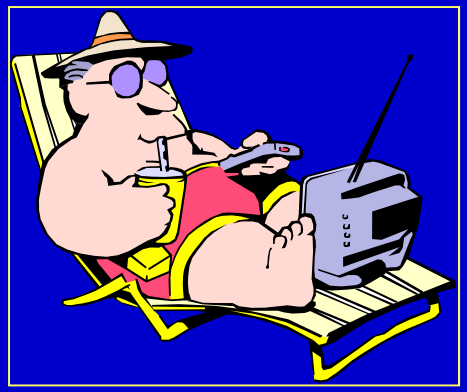
- Genes that convert and store simple sugars to abdominal fat
- Selective advantage in times of famine

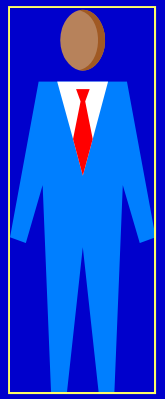


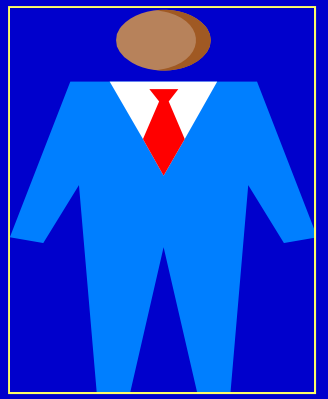
Low caloric intake
High energy expenditure
Low BMI and WHR

Urbanization

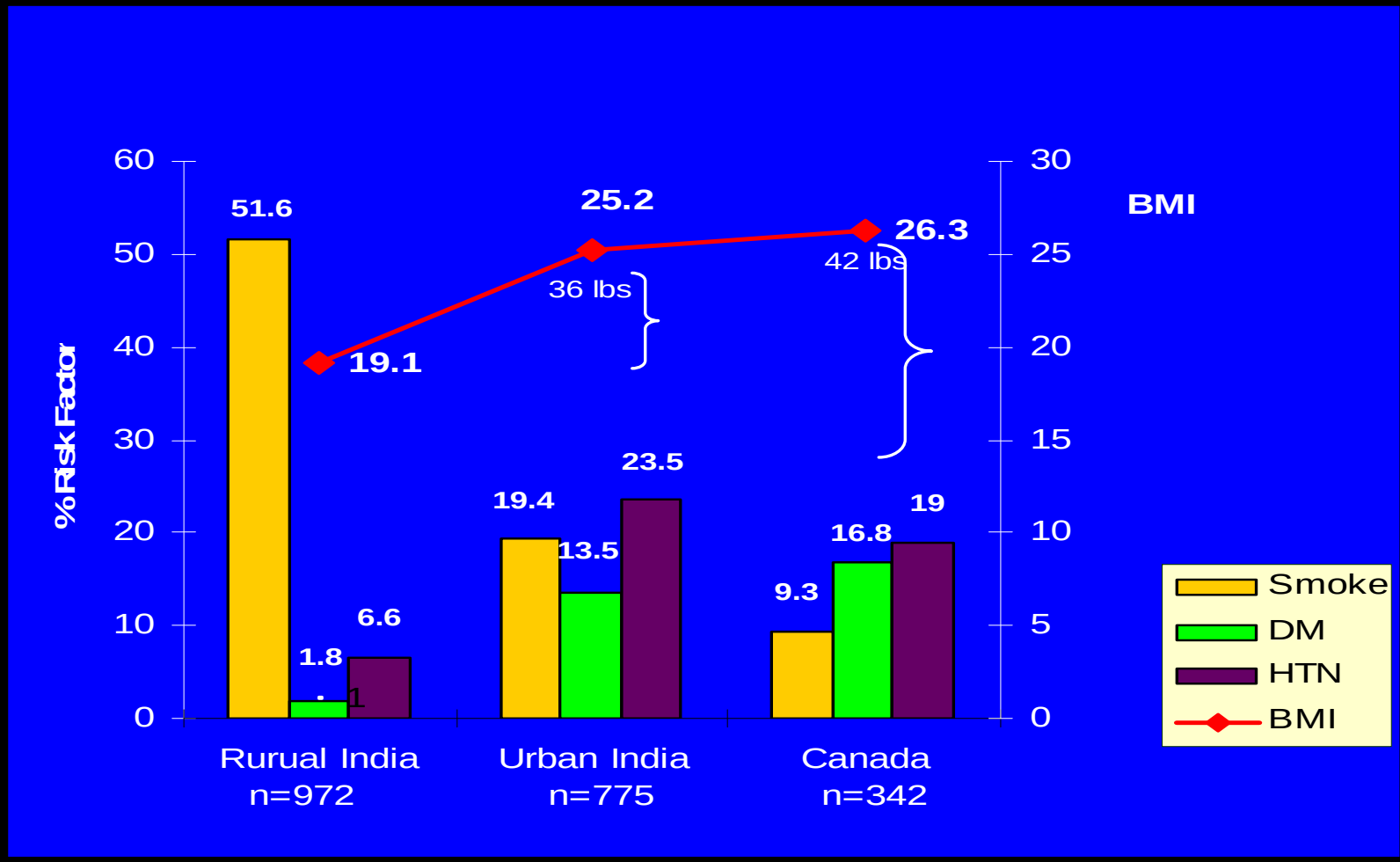
High caloric intake
Low energy expenditure
High BMI and WHR





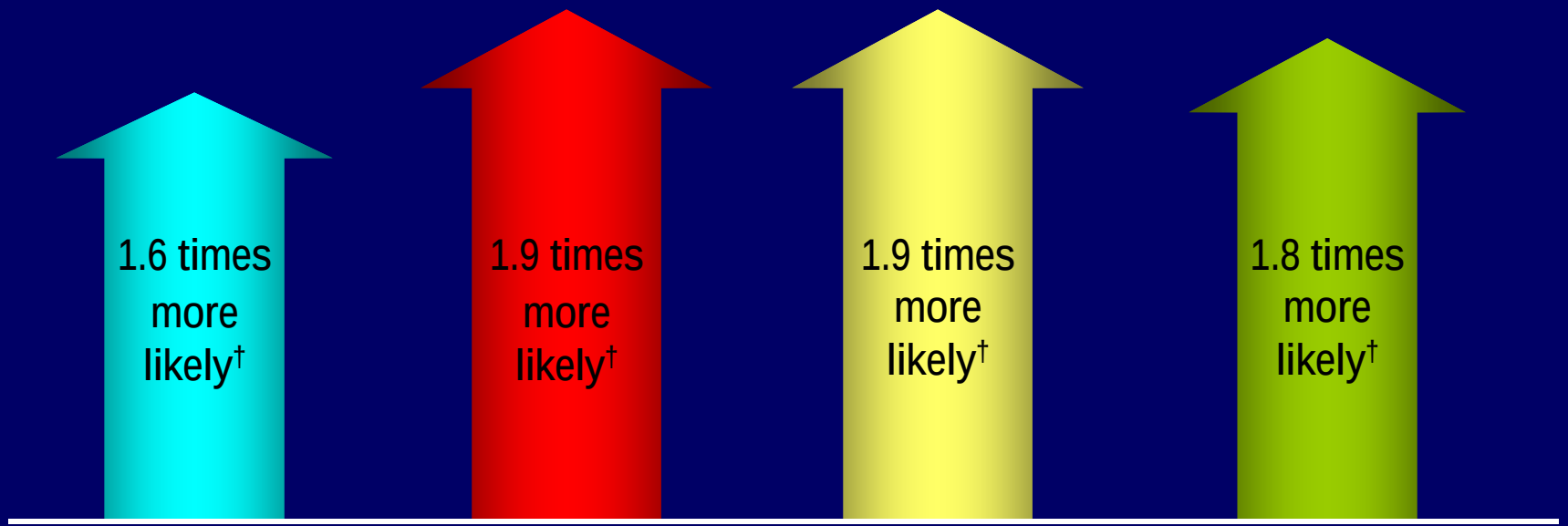


Changes in Risk Factors with Migration



Racial and Ethnic Minority Groups Are More Likely to Have Type 2 Diabetes

Adjusted* Odds of Type 2 Diabetes
Compared With Non-Hispanic Whites

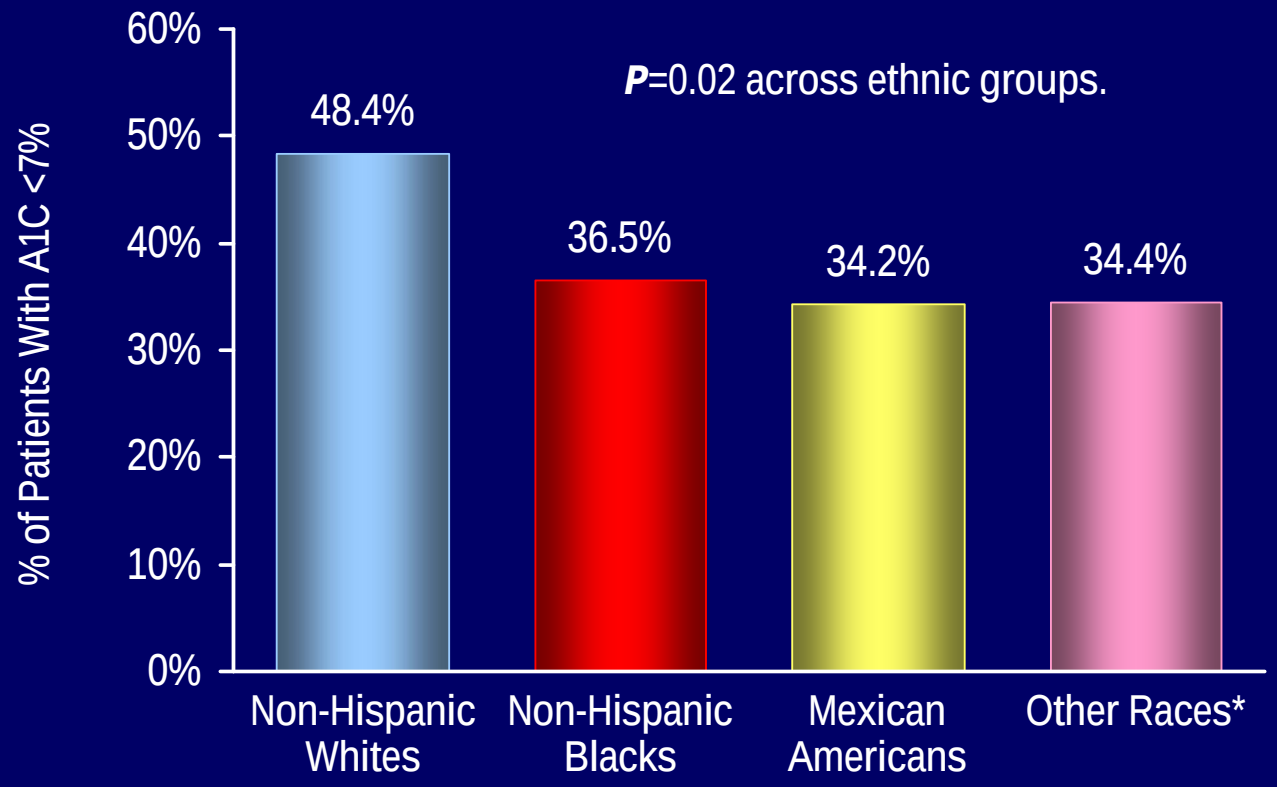


Asians	African Americans	Hispanics	Native Americans
Adjusted odds ratio: 1.6 (1.1-2.2)	Adjusted odds ratio: 1.9 (1.7-2.2)	Adjusted odds ratio: 1.9 (1.6-2.1)	Adjusted odds ratio: 1.8 (1.3-2.5)

* Adjusted for age, sex, and body mass index (BMI).
† *P*<0.01 vs non-Hispanic Whites.
Analysis of 163,584 subjects aged ≥30 years who participated in the 2001 Behavioral Risk Factor Surveillance System (BRFSS).

McNeely MJ, Boyko EJ. *Diabetes Care*. 2004;27:66-69.

Racial and Ethnic Minorities Tend to Have Worse Glycemic Control



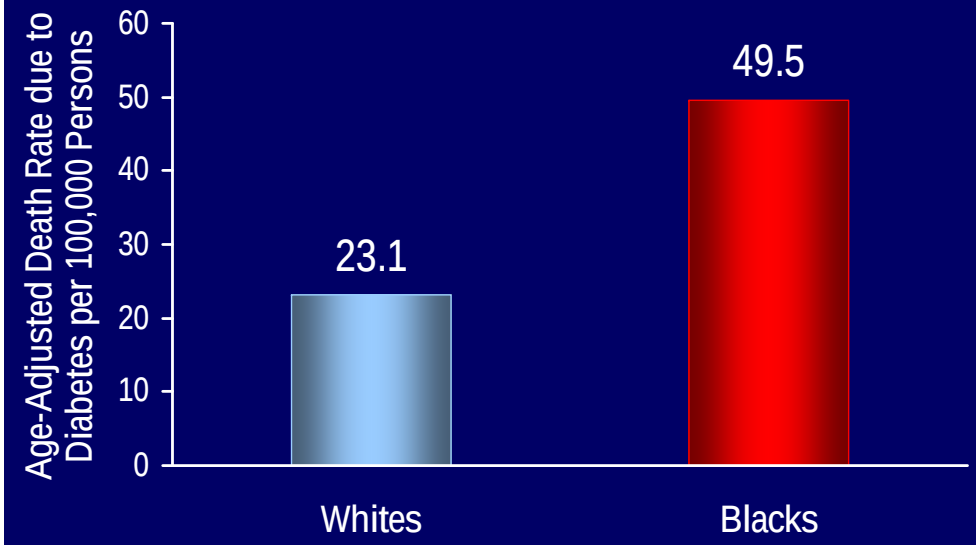
* Includes individuals who reported all remaining single-race responses, individuals who reported more than one race but did not identify a major race, individuals with multi-races, and people with missing values on race.

Based on data from 757 patients with type 2 diabetes who participated in the National Health and Nutrition Examination Survey (NHANES) 1999-2002.

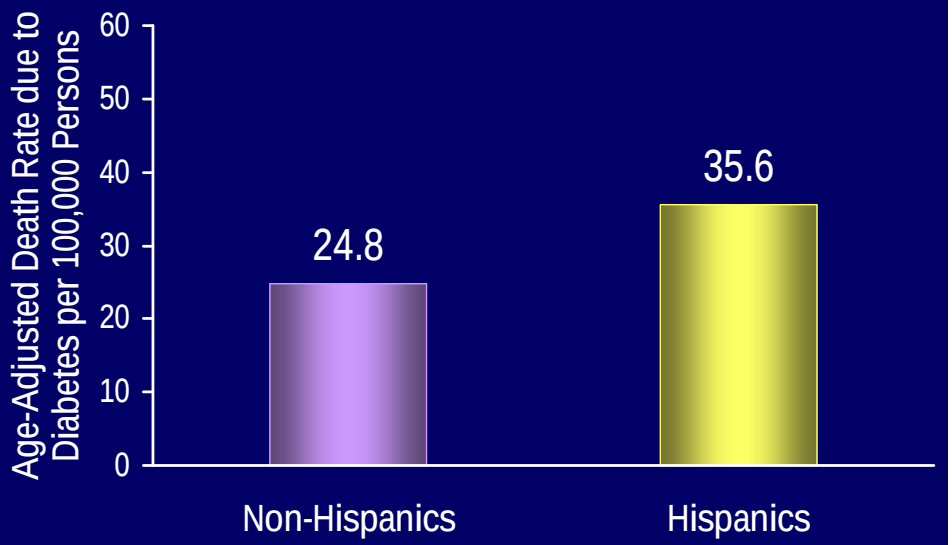
Fan T, et al. *Diabetes Care.* 2006. In press.

The Mortality Rate due to Diabetes Is Higher in Racial and Ethnic Minority Groups

Age-Adjusted Death Rate by Race in US, 2002



Age-Adjusted Death Rate by Ethnicity in US, 2002



Kochanek KD, et al. *Natl Vital Stat Rep.* 2004;53(5):1-115.

Summary of Our Research

- South Asians have an increased risk of cardiovascular disease and a presentation profile similar to diabetics
- Aggressive risk factor modification can reduce morbidity and possibly mortality
- Insulin resistance / diabetes is a key factor in the development of diffuse atherosclerosis
- Early identification and intervention with evidence-based therapy can reduce morbidity and possibly mortality
- **MY OPINION;***Consider SA ethnicity + 1 risk factor as a CAD equivalent*

ETHRISK CALCULATOR: www.epi.bris.ac.uk/CVDethrisk

10-year risk of CVD event (%) in 60-year-olds

Ethnic group	Male nonsmoker	Male smoker	Female nonsmoker	Female smoker
Indian	22.4	36.7	8.7	15.1
Pakistani	24.7	40.0	13.4	22.8
Bangladeshi	24.9	40.4	7.4	13.0
All South Asians	23.6	38.5	9.7	16.9
Chinese	11.1	19.1	2.5	4.4
Caribbean	13.3	22.7	9.7	16.9
Black African	20.1	33.3	10.8	18.7
Irish	16.0	27.0	9.1	15.8
Framingham score	14.1	22.3	8.7	14.7

Brindle P et al. *Heart* 2006;available at: http://heart.bmjjournals.com.

ASIAN BMI (Body Mass Index) Targets

- South Asians have a higher percentage of body fat and increased intra-abdominal fat compared to white Caucasians
- Insulin resistance is common in South Asians at BMI lower than 25
- South Asians develop type 2 diabetes at a younger age and at lower BMI compared to white Caucasians

Classification	Current BMI Target	Asian BMI Target	Risk of Co-Morbidity
Underweight	<18.5	<18.5	Low
Ideal Range	18.5-24.9	18.5-22.9	Average
Overweight	25 or more	23 or more	Increased
Obese I	30-34.9	25-29.9	Moderate
Obese II	35 or more	30 or more	Severe

IDF Diagnostic Criteria for Metabolic Syndrome

Central adiposity
(waist circumference in cm)

	Men	Women
• Europid	<94	<80
• South Asian	<90	<80
• Chinese	<90	<80
• Japanese	<85	<90

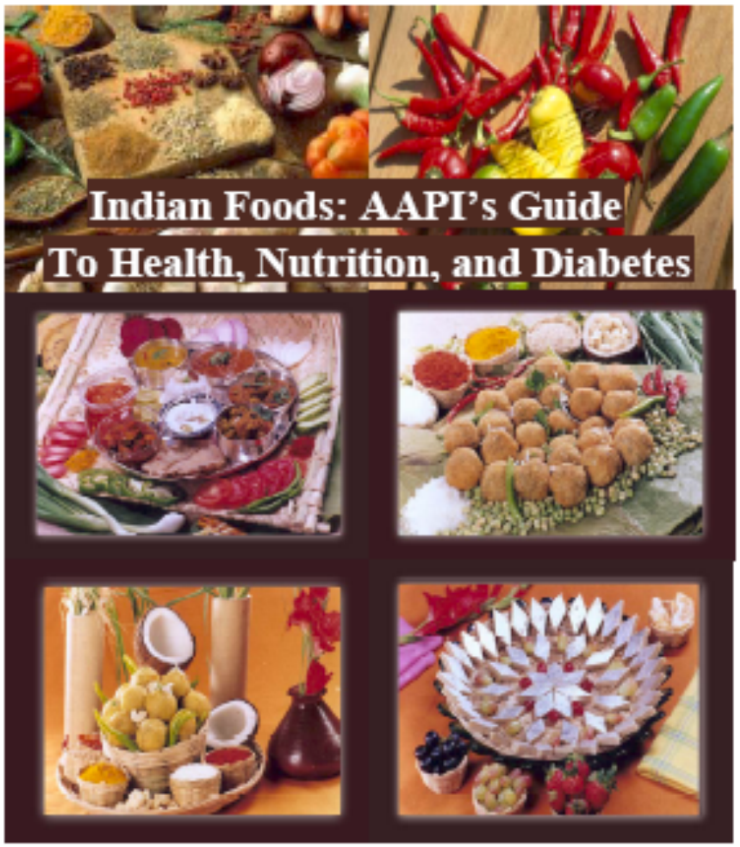
IDF 2004	
Central Adiposity (waist)	**Plus 2 or more of:**
Triglycerides	≥ 1.7 mmol/L
HDL cholesterol Men Women	 <0.9 mmol/L <1.1 mmol/L
Blood pressure	≥130 or ≥ 85 mmHg
Fasting glucose	≥ 5.6 mmol/L or DM or IGT

Challenges of Rx of risk factors in Ethnic populations

- Language barriers for information especially with 1st generation immigrants
- Lack of adequate insurance – many self-employed individuals
- Inappropriate dietary and lifestyle advice
- Reluctance to accept “Western medicine”
- Fatalistic attitude to life - “reincarnation”

South Asian Dietary Advice - RESOURCES

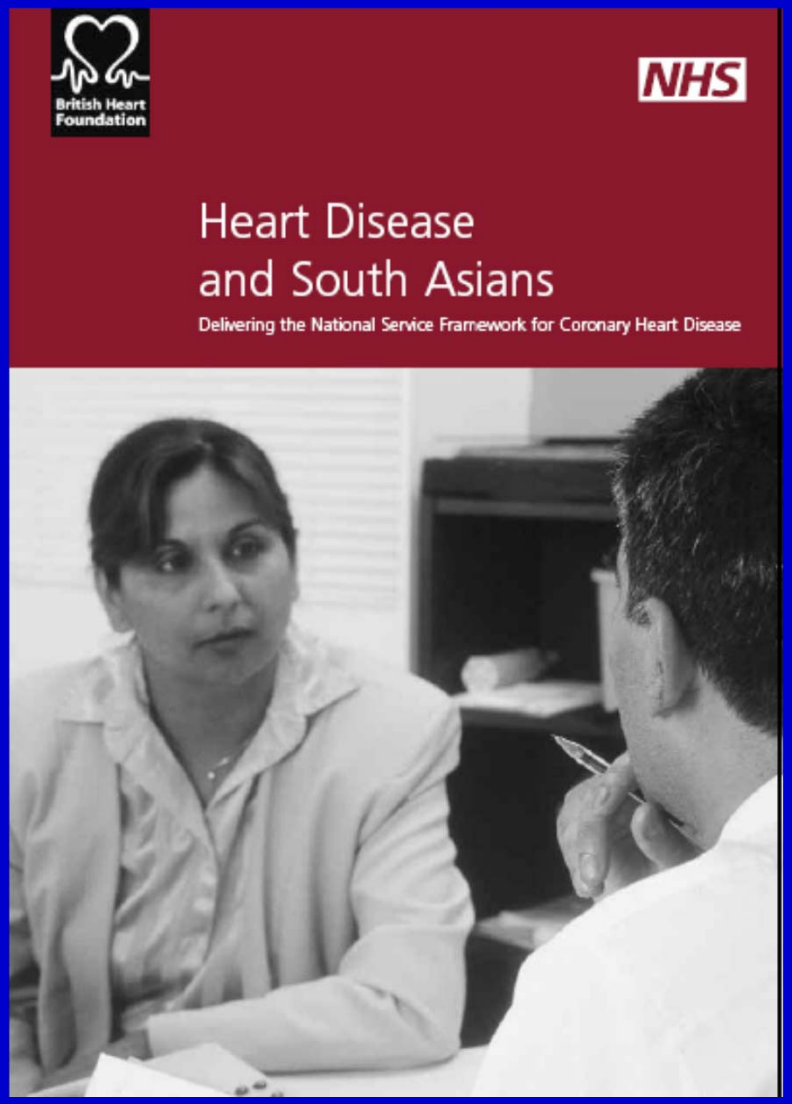
Stanford University
School of Medicine
General Clinical Research Center

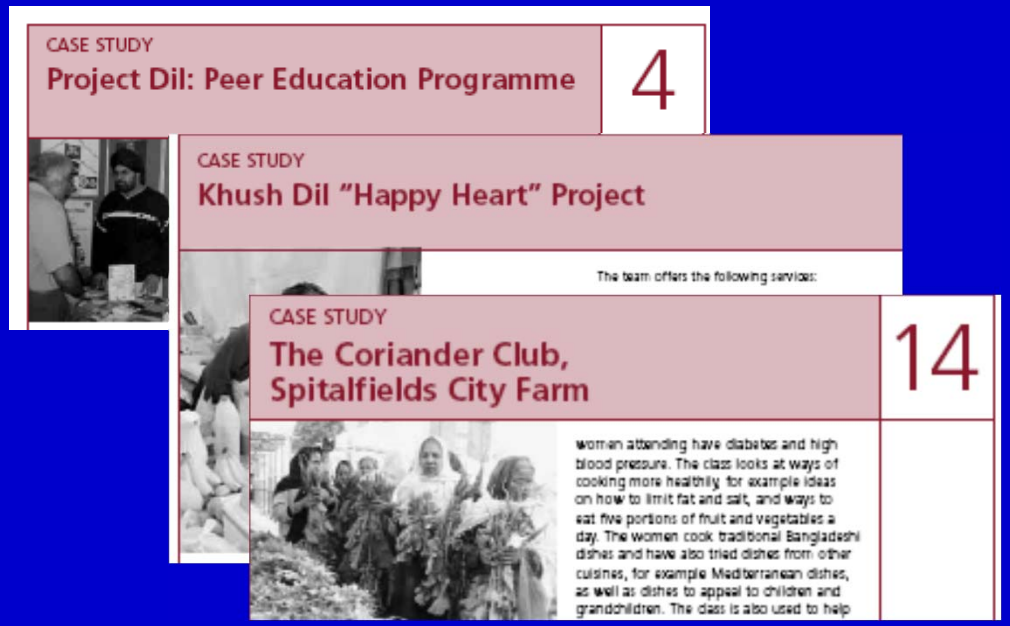


Various Recipes Available

Latha Palaniappan, MD, MS
Internal Medicine, Clinical Epidemiology
Stanford Center for Research in Disease Prevention
Phone: (650) 498-4427
E-mail: saiwwls@yahoo.com

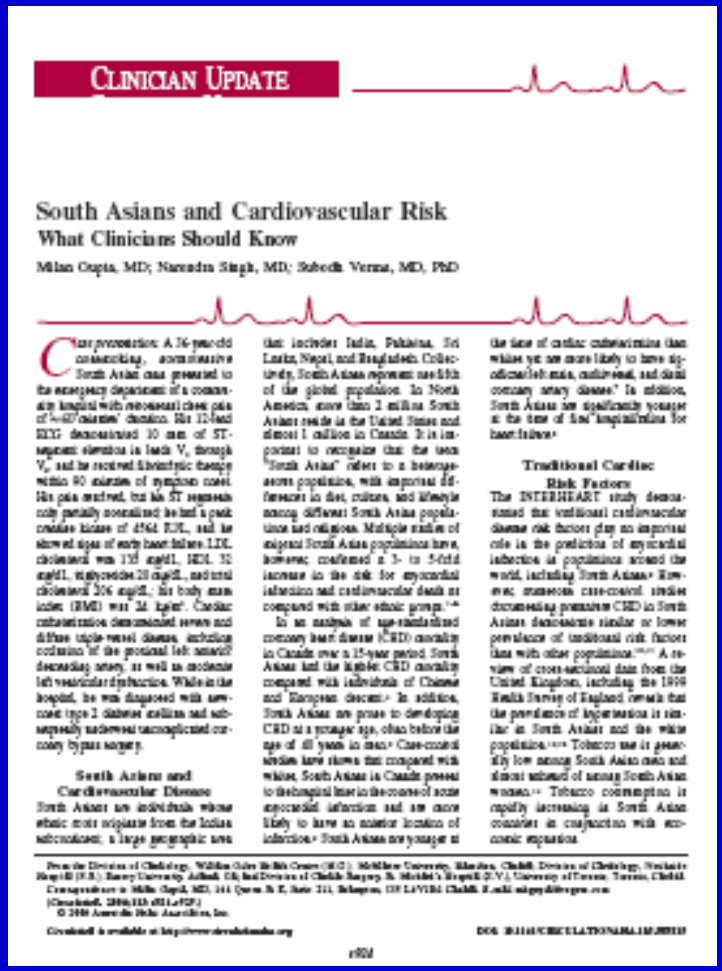
Resources- British Heart Foundation





RESOURCES – Clinician Update

- **Gupta M, Singh N, Verma S.**
- **South Asians and Cardiovascular Risk: What Clinicians Should Know**
- *Circulation* 2006;113 924-929



CLINICIAN UPDATE

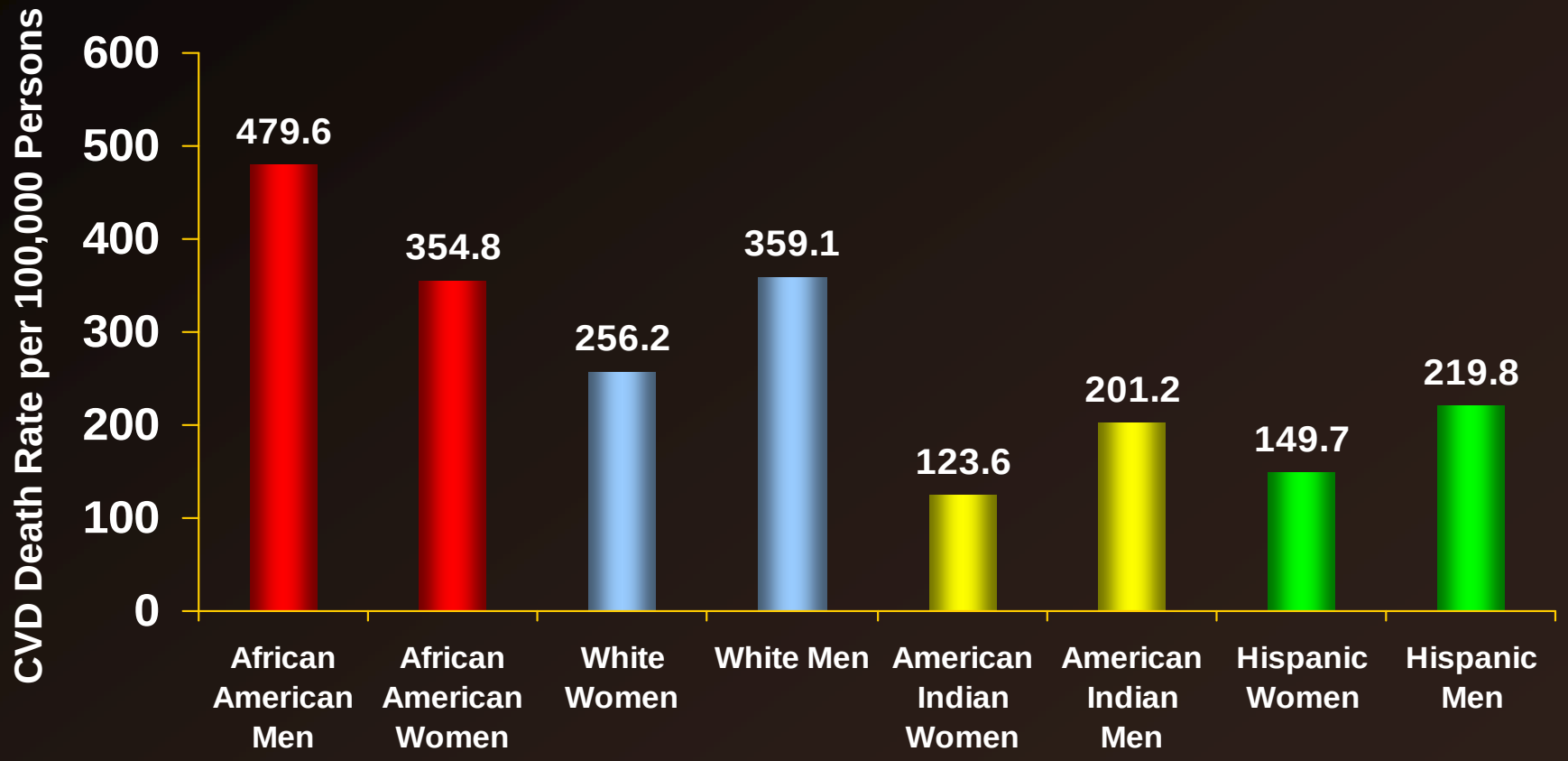
South Asians and Cardiovascular Risk
What Clinicians Should Know

Milan Gupta, MD; Narendra Singh, MD; Subodh Verma, MD, PhD

African American and Hispanic Populations

Risk of Cardiovascular Disease

Death Rates per 100,000 Persons Among US Ethnicities

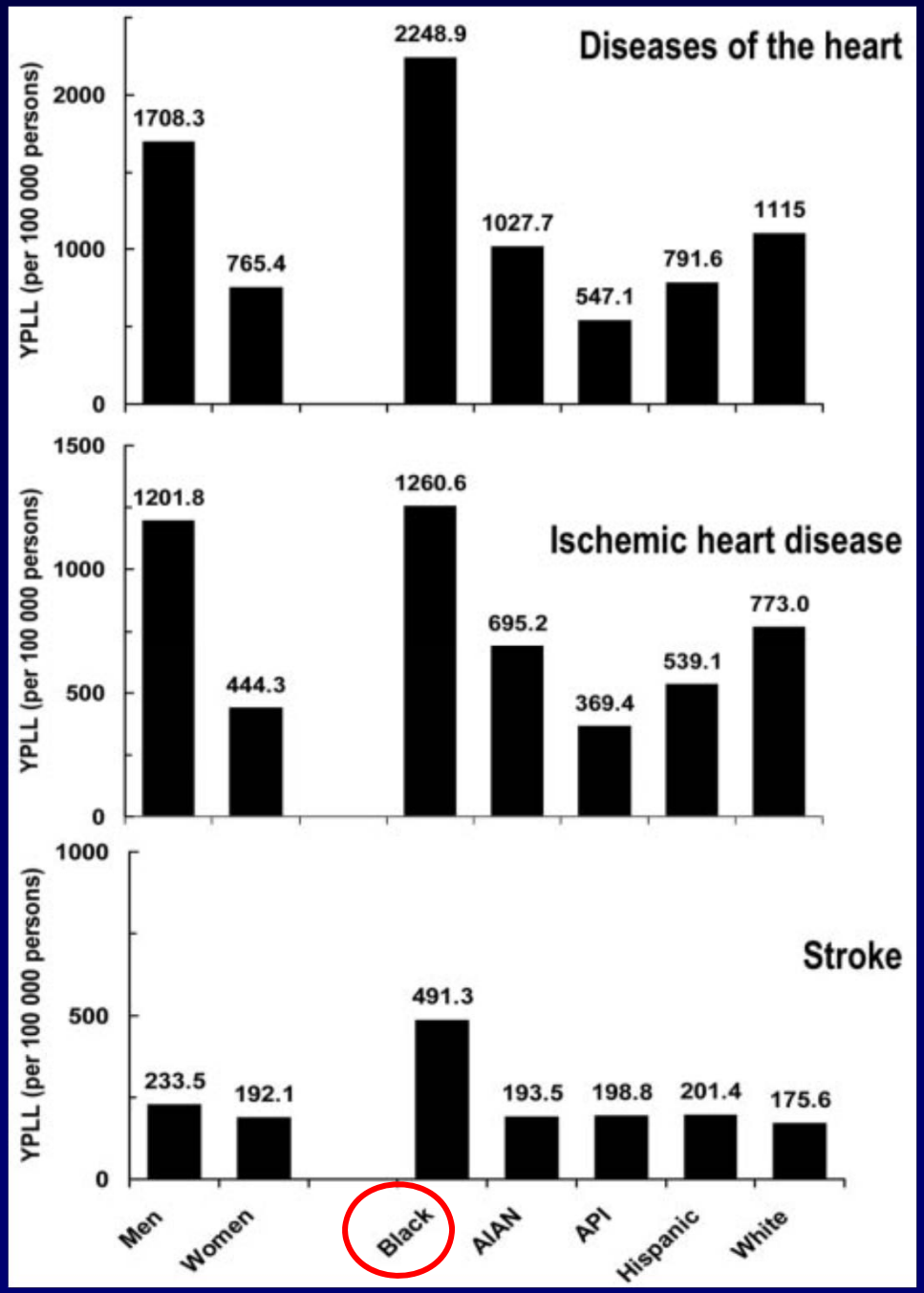


American Heart Association. 2006. *Heart Disease and Stroke Statistical Update.*

Yrs of potential life lost

Circulation
111: 2005

- **Figure 4.** Years of potential life lost (YPLL) before 75 years of
- age resulting from diseases of the heart, ischemic heart disease,
- and stroke, United States, 2001. API indicates Asian or Pacific
- Islander; AIAN, American Indian or Alaska Native. Source: CDC,
- Health United States, 2003.



Clinical Study Examples - LIPIDS

Study	Study Aim	Overall n	% Minority Subjects	Major Results	Subgroup Results
CARE, 1996 Cholesterol and Recurrent Events Trial	Effect of pravastatin on fatal/nonfatal coronary events; MI and 115<LDL-C<174mg/dL	4159	7-8% non-white participants	Fatal coronary event + nonfatal MI RRR=24% Need for CABG RRR=26% Stroke RRR=31%	
LIPID, 1998 Long-term Intervention with Pravastatin in Ischemic Disease	Effect of pravastatin on coronary/all cause mortality in CHD patients	9014		Coronary death RRR=24% Overall mortality RRR=22%	Women: Coronary mortality + non-fatal MI RRR=11% Age ≥ 70 yrs: Coronary mortality + non-fatal MI RRR=15%

Clinical Study Examples - HYPERTENSION

Study	Study Aim	Overall n	% Minority Subjects	Major Results	Subgroup Results
ALLHAT, 2002 Antihypertensive and Lipid Lowering Treatment to Prevent Heart Attack Trial	Effect of CCB or ACEi vs. diuretic CHD	33,357	W-47 B-32 Hispanic W-12.5 Hispanic B-3.3 Other-5	No difference in outcomes Thiazide type diuretics are superior in preventing CVD	Blacks: Heart Failure RR=1.47 (favors Cholthlidone)
MRFIT, 1985 Multiple Risk Factor Intervention Trial	Special intervention vs. Usual care	11,342	B-7.2	No favorable association between lowering BP and CHD rate	

Clinical Study Examples – CONGESTIVE HEART FAILURE

Study	Study Aim	Overall n	% Minority Subjects	Major Results	Subgroup Results
EPHEHSUS, 2005 Eplerenone Post Acute MI Heart Failure Efficacy and Survival Study	Impact of eplerenone on mortality (30 days post MI LVEF ≤40% and clinical signs of heart failure)	6632	1%	All cause mortality RRR= 31% CV mortality RRR=32% Sudden cardiac death RRR=37%	No sub-analysis of minority subjects Women: all cause mortality RR~ 0.5
HOPE, 2000 Heart Outcomes Prevention Evaluation	Role of ramipril (In patients at high risk for cardiovascular events, without LV Dysfunction or heart failure)	9297		CV death RR=0.74 MI RR=0.80 Stroke RR=0.68 All cause mortality RR=0.84 Heart failure RR=0.77	Women: MI + stroke + cardiovascular death RR ~ 0.8

Review of Studies Regarding Cardiovascular Disease That Include Racial/Ethnic Subgroups

The Jackson Heart Study (2000 – Present)

- Single site, prospective epidemiologic study of cardiovascular disease among African-Americans in Jackson, Mississippi
- 6500 African American subjects
- Largest investigation of CVD that has ever been undertaken in African Americans
- Questionnaires: lifestyle habits, medical history, medications, social/cultural factors
- Physical Assessment: weight, height, body size, BP, EKG echocardiogram
- Labs: lipids, glucose, hemostatic factors

Review of Studies Regarding Cardiovascular Disease That Include Racial/Ethnic Subgroups

The Strong Heart Study (1988-1992)

- Population based, epidemiologic, longitudinal study
- Studies CVD and pulmonary disease and their risk factors
- 4,549 Native Americans in Arizona, Oklahoma and North and South Dakota
- Included personal interview, physical exam, BP measurements and labs (OGTT)

Review of Studies Regarding Cardiovascular Disease That Include Racial/Ethnic Subgroups

The San Antonio Family Heart Study (1991- Present)

- Studies cardiovascular and diabetes and their risk factors
- 1,400 members of > 40 large Mexican American families
- Risk factor data collected by questionnaire plus physical exam and phlebotomy for genetic studies
- Two follow-up examinations through 2005

Review of Studies Regarding Cardiovascular Disease That Include Racial/Ethnic Subgroups

The Atherosclerosis Risk In Communities (ARIC) (1987-1998)

- Prospective population based, epidemiologic, study
- Studies CHD, atherosclerosis, stroke and risk factors
- 15,792 participants from 4 U.S. communities, including 12% Blacks in the Forsyth County, NC site
- Included personal interview, risk factor determination, physical exam, BP, BMI and waist circumference measurements, labs (HDL-C, TG, glucose levels)
- Echocardiographic studies were preformed in the Jackson site between 1993-1996

Review of Studies Regarding Cardiovascular Disease That Include Racial/Ethnic Subgroups

Multi-Ethnic Study of Atherosclerosis (MESA) (2000-2002)

- Studies prevalence, treatment and control of dyslipidemia
  - A multi-center cohort
  - 6814 participants, free of CVD at baseline, 28% black, 12% Chinese, 22% Hispanic
  - Participants were evaluated for CVD risk, CT (CAC) and fasting lipid profiles

Review of Studies Regarding Cardiovascular Disease That Include Racial/Ethnic Subgroups

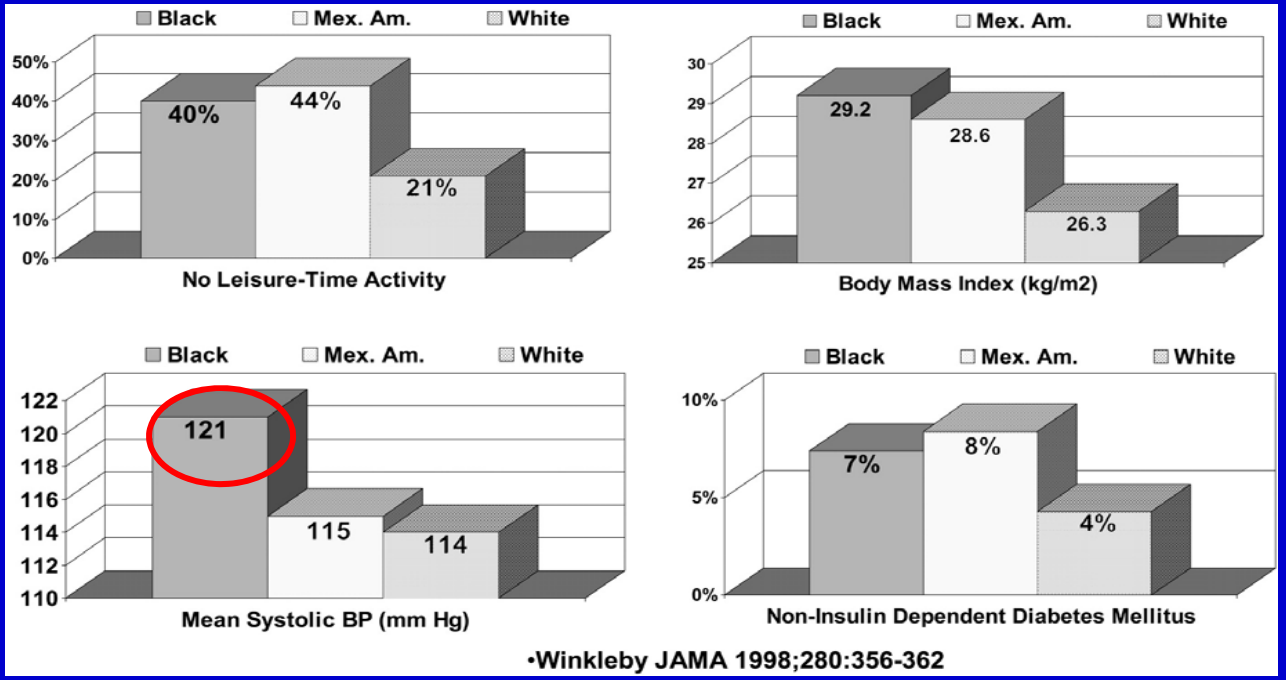
The Dallas Heart Study (2000-2002)

- Single-site population based probability sample of Dallas residents
- Aim: to evaluate ethnic differences in cardiovascular health
- Included survey questionnaires, labs and imaging studies
- 6101 subjects, 50% Black

Ethnic differences in risk factors in women 25-64 years old, NHANES 1988-1994

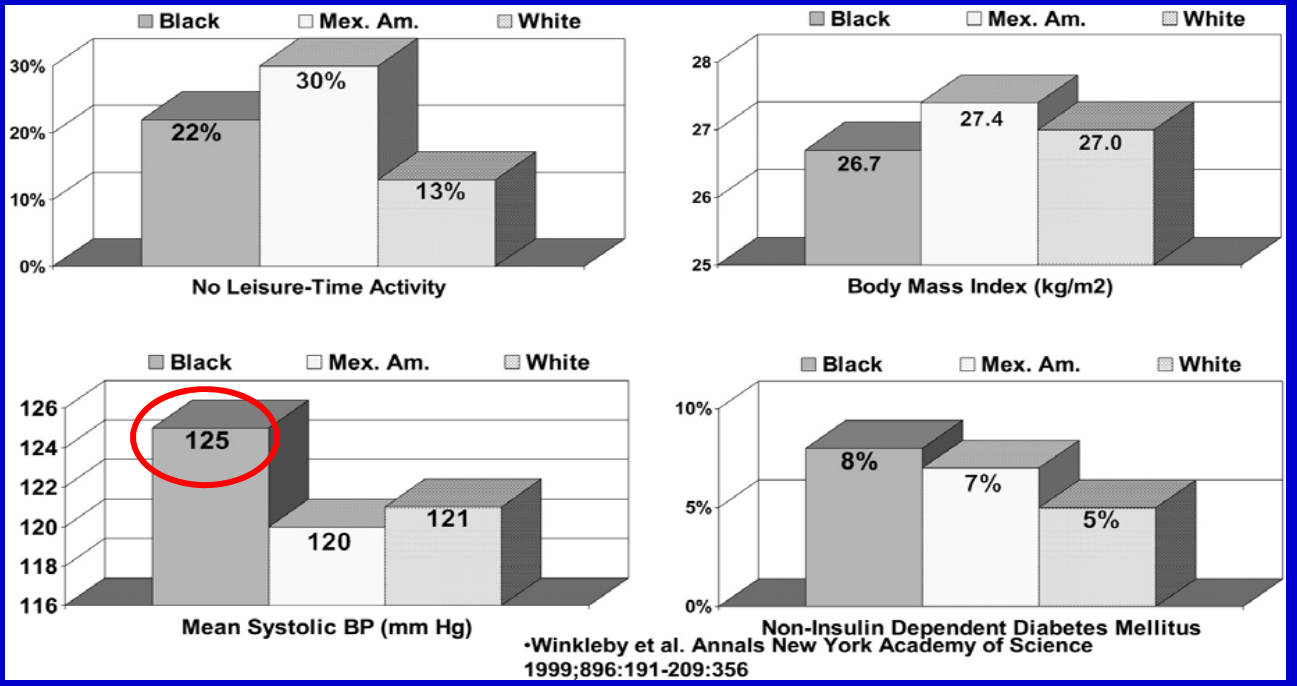
Benjamin, E. J. et al. Circulation 2005;111:e124-133e

Circulation



•Winkleby JAMA 1998;280:356-362

Ethnic differences in risk factors in men 25-64 years old, NHANES 1988-1994

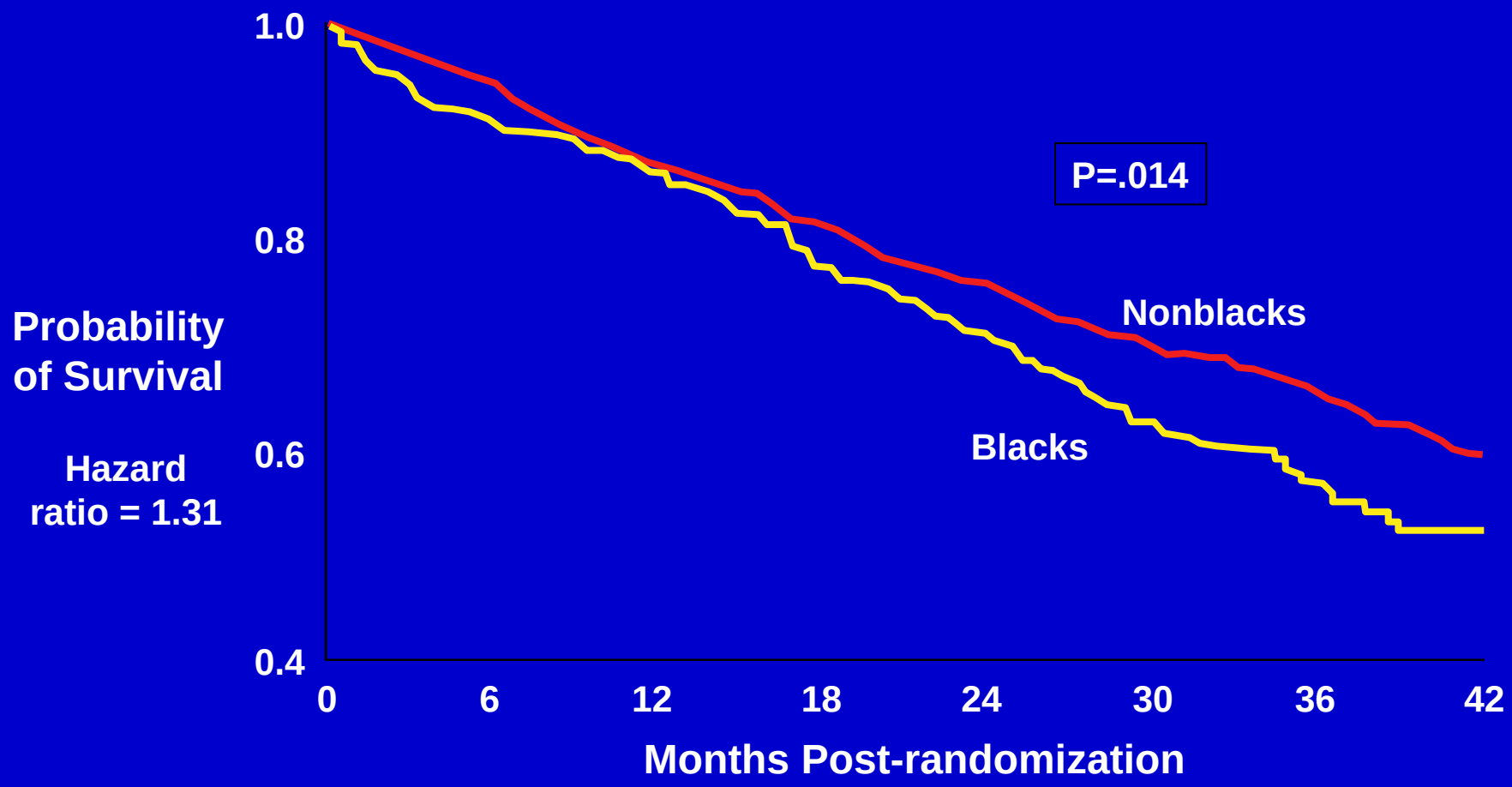


•Winkleby et al. Annals New York Academy of Science 1999;896:191-209:356

JNC 7- Minority Populations

- In general, treatment similar for all demographic groups.
- Socioeconomic factors and lifestyle important barriers to BP control.
- Prevalence, severity of HTN increased in African Americans.
- African Americans demonstrate somewhat reduced BP responses to monotherapy with BBs, ACEIs, or ARBs compared to diuretics or CCBs.
- These differences usually eliminated by adding adequate doses of a diuretic.

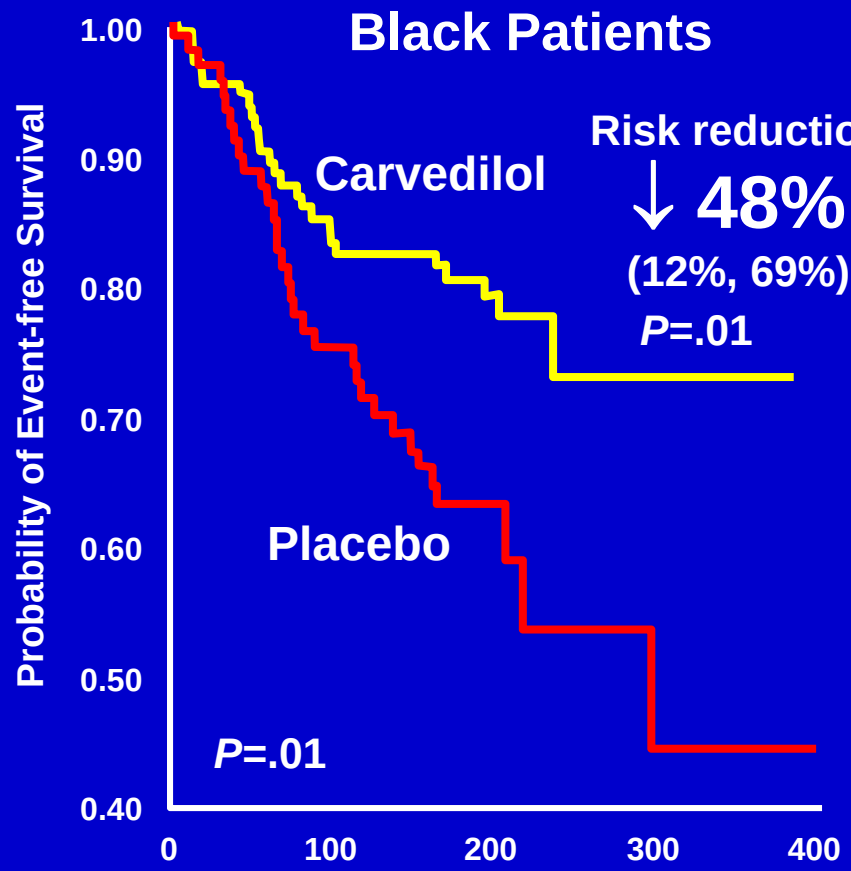
BEST Trial ; Effect of Bucindolol on Mortality by Race

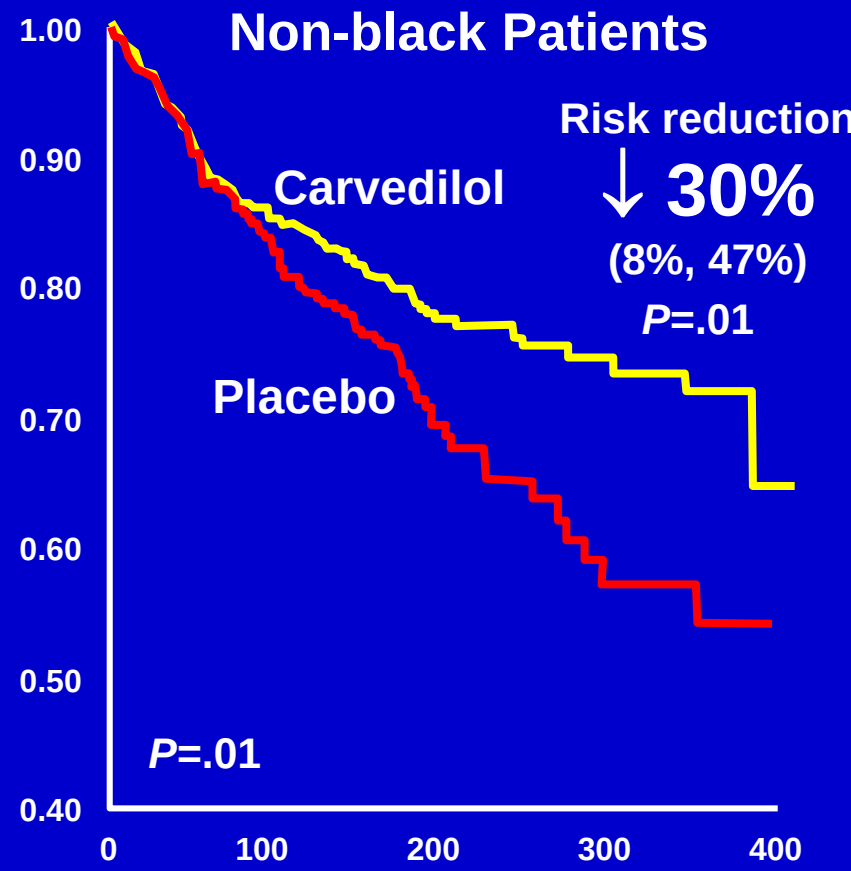


Eichhorn EJ et al. *Circulation.* 2000;102(Suppl):II-778. Abstract #3759.

HF NOT AN APPROVED INDICATION

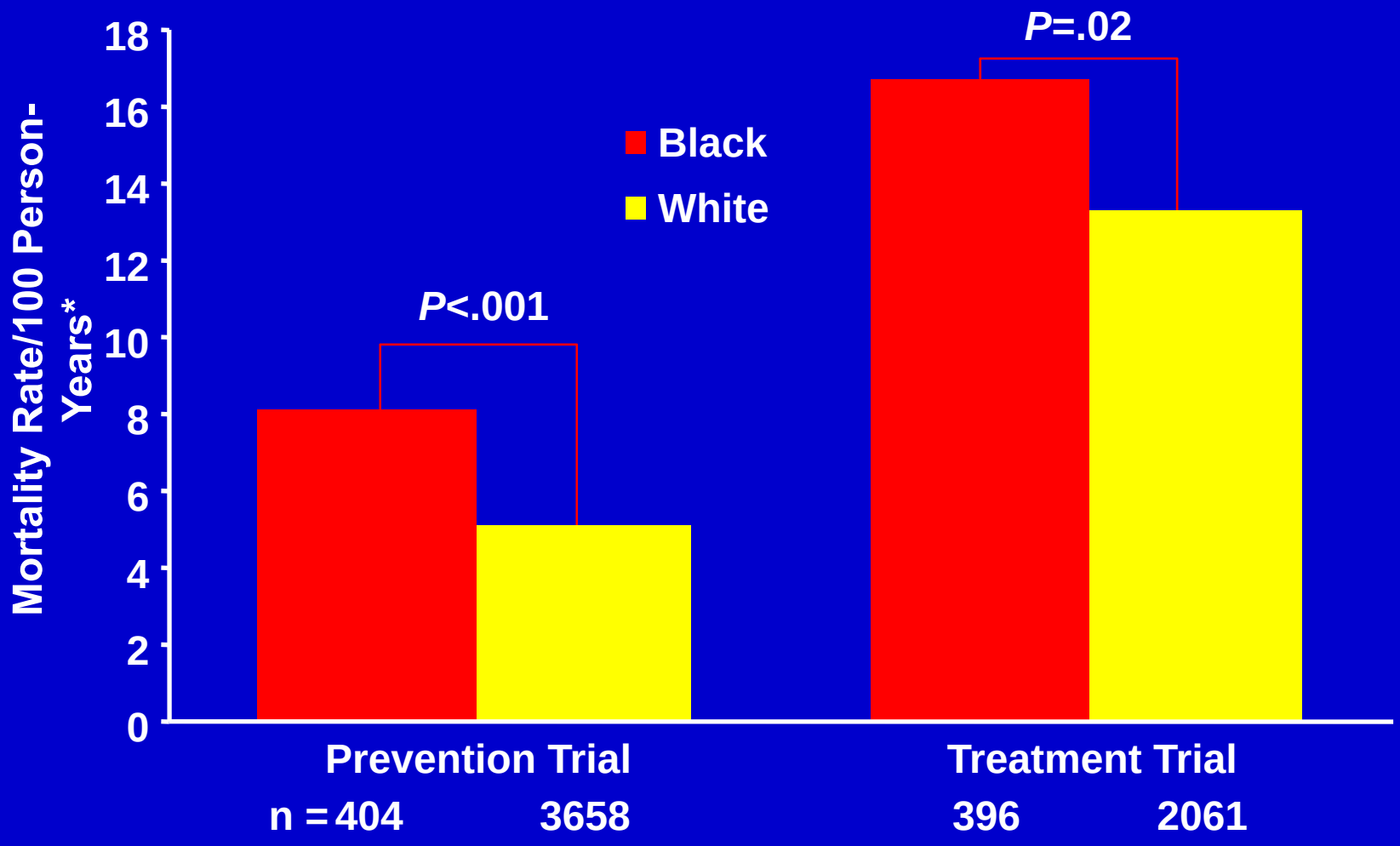
US Carvedilol Trials: Effect of Race on Death or Hospitalization for Any Cause





Yancy CW et al. *N Engl J Med.* 2001;344:1358–1365.

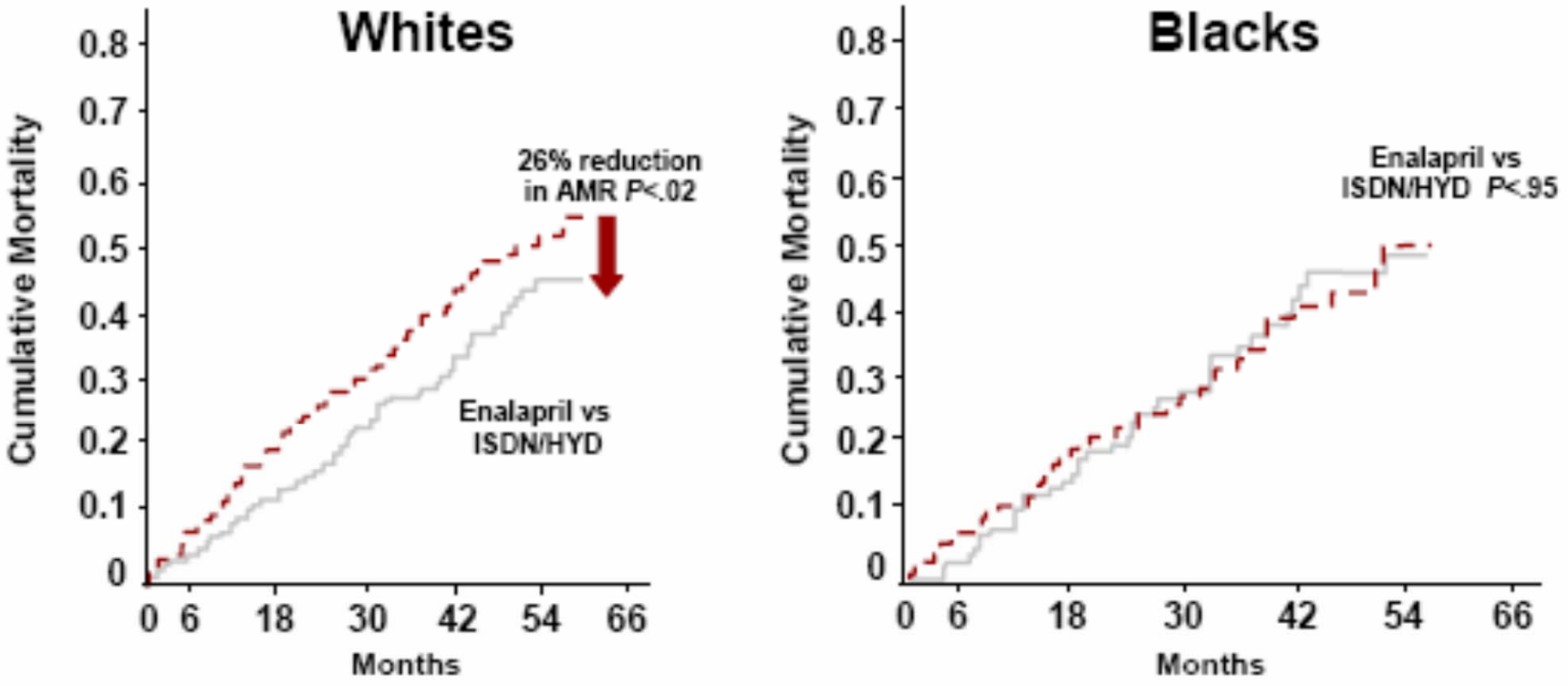
SOLVD Studies: Racial Differences in Mortality Rates



*Mortality rates include treatment and placebo arms. Adapted from Dries DL et al. *N Engl J Med*.1999;340:609–616.

V-HeFT II Retrospective Analysis: Effect on All-Cause Mortality in Black Patients

Retrospective analyses are hypothesis generating only

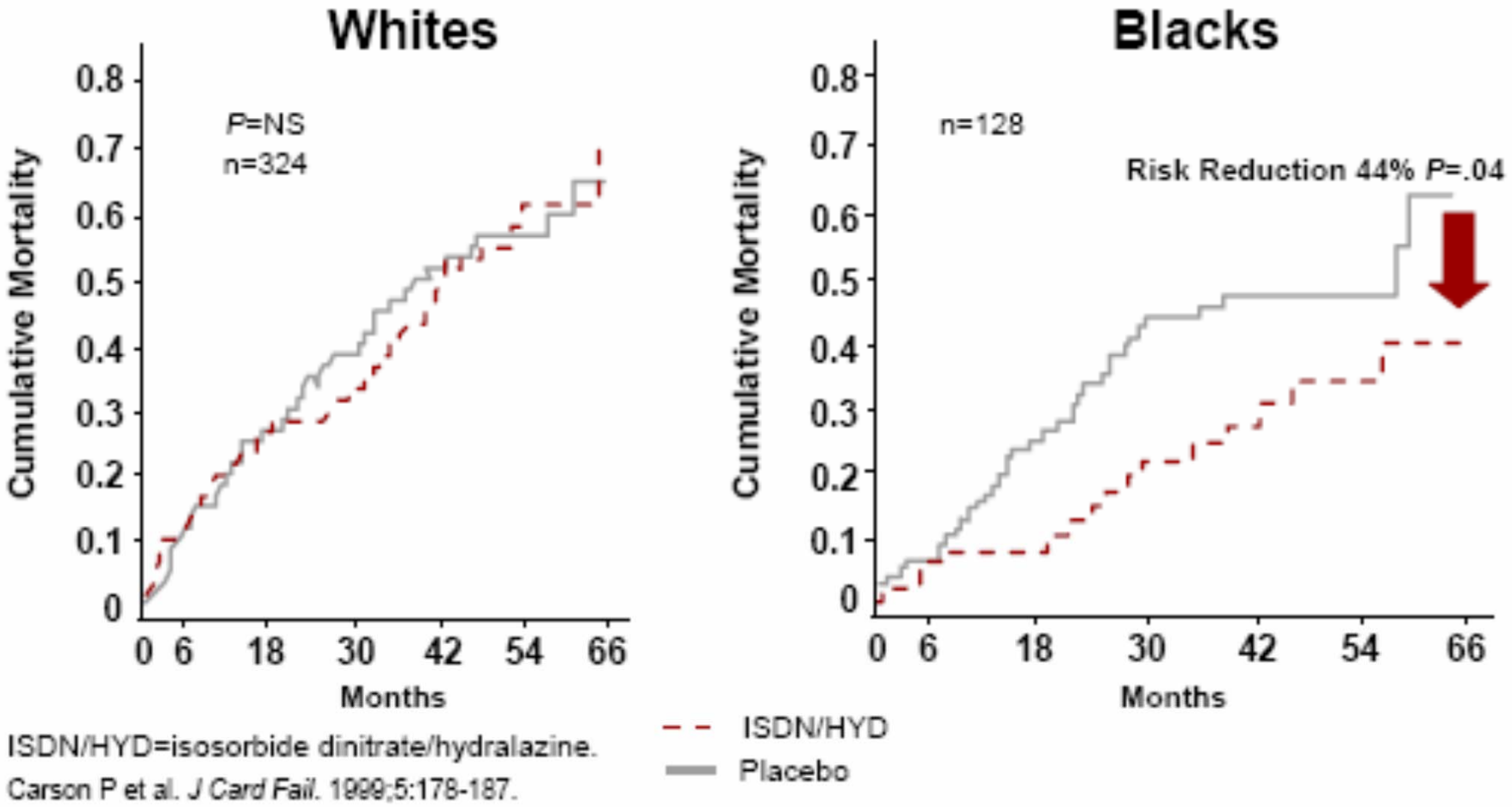


AMR=annual mortality rate; ISDN/HYD=isosorbide dinitrate/hydralazine.

Carson P et al. *J Card Fail.* 1999;5:178-187.

V-HeFT I Retrospective Analysis: Survival Benefit in Black Patients

Retrospective analyses are hypothesis generating only



ISDN/HYD=isosorbide dinitrate/hydralazine.

Carson P et al. *J Card Fail.* 1999;5:178-187.

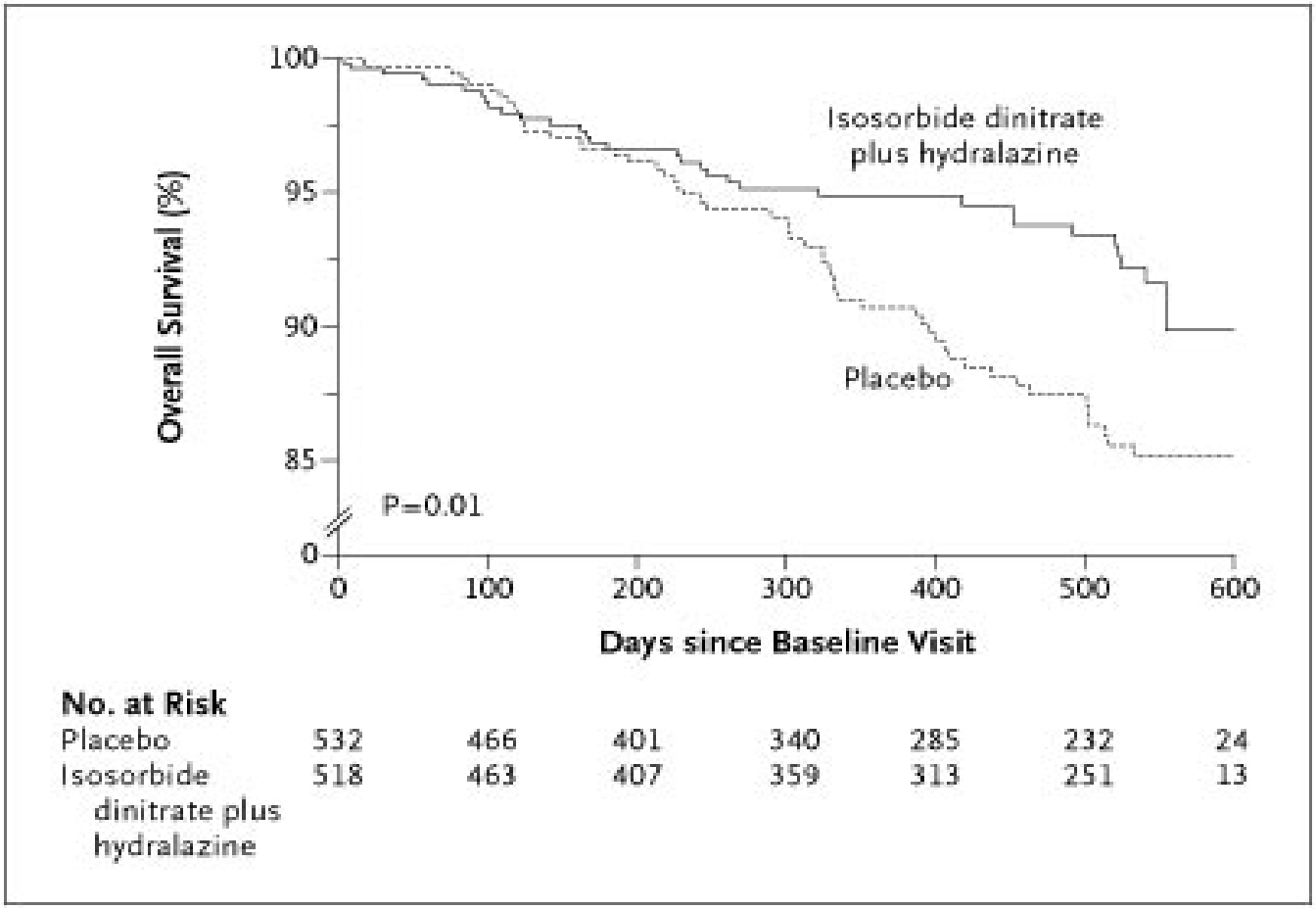
A-HeFT: Study Design

- African American Heart Failure Trial (A-HeFT)[1]
  - Hypothesis: Fixed-dose of ISDN/HYD will improve outcomes in black patients with moderate-to-severe symptomatic HF
- 169 sites[2]
- 1050 randomized patients (518 BiDil®, 532 placebo)[1,2]
- Up to 18 months of follow-up[1,2]
- No patient lost to follow-up for vital status[1]
- Study initiated 6/12/01, and terminated early due to significant survival benefit in the BiDil® group[1,2]

ISDN/HYD=isosorbide dinitrate/hydralazine.

1. Taylor AL et al. *N Engl J Med*. 2004;351:2049-2057.
2. BiDil® Prescribing Information.

A-HEFT Trial - Kaplan-Meier Estimates of Overall Survival



No. at Risk							
Placebo	532	466	401	340	285	232	24
Isosorbide dinitrate plus hydralazine	518	463	407	359	313	251	13

Taylor, A. L. et al. N Engl J Med 2004;351:2049-2057

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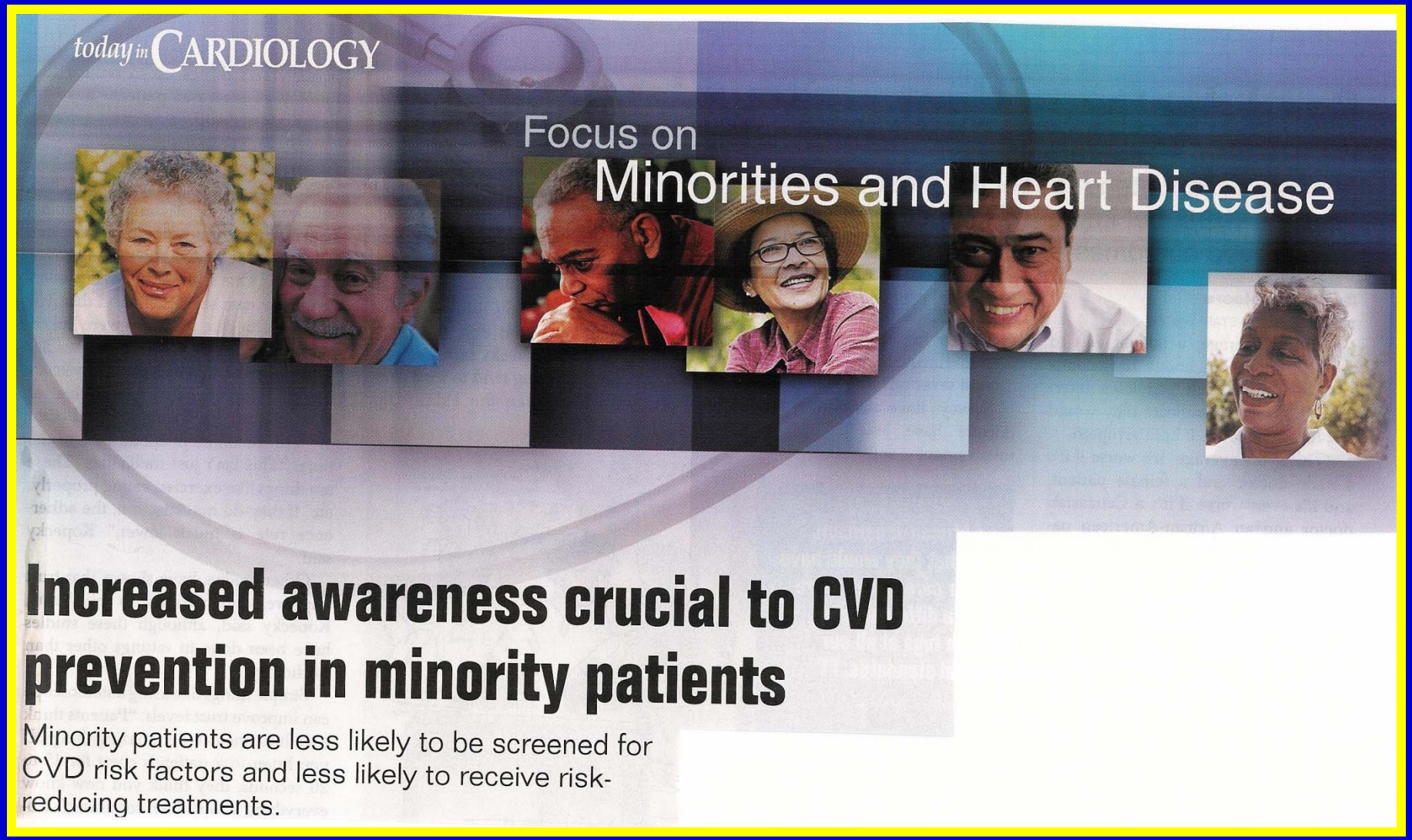
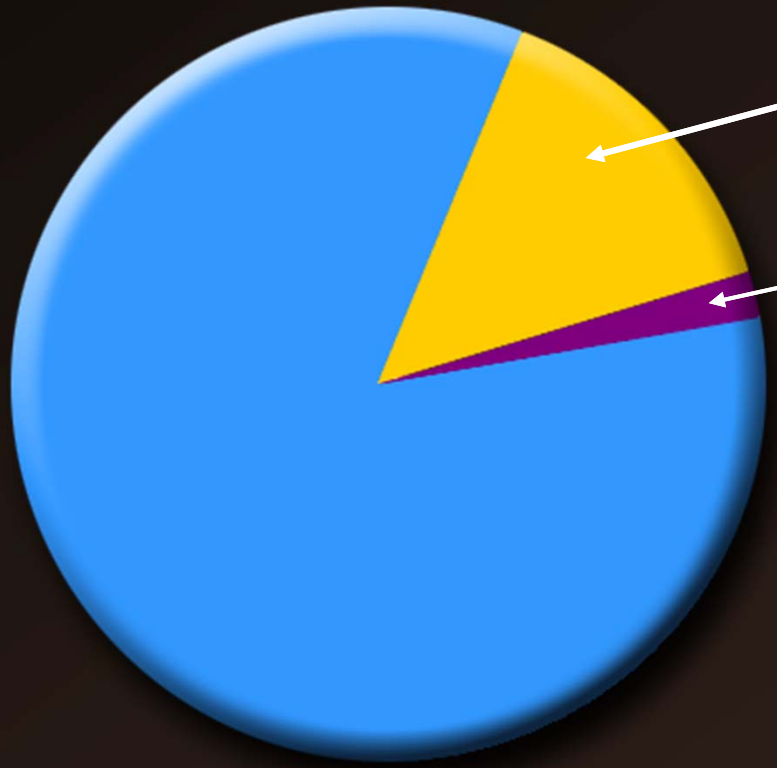
Disparities in Cardiovascular Care

Ethnic differences in Medicine



Evidence of Racial/Ethnic Differences in Cardiac Care, 1984-2001



11 studies find no racial/ethnic difference in care (14%)

2 studies find racial/ethnic minority group more likely than whites to receive appropriate care (2%)

68 studies find a racial/ethnic difference in care (84%)

Total = 81 studies

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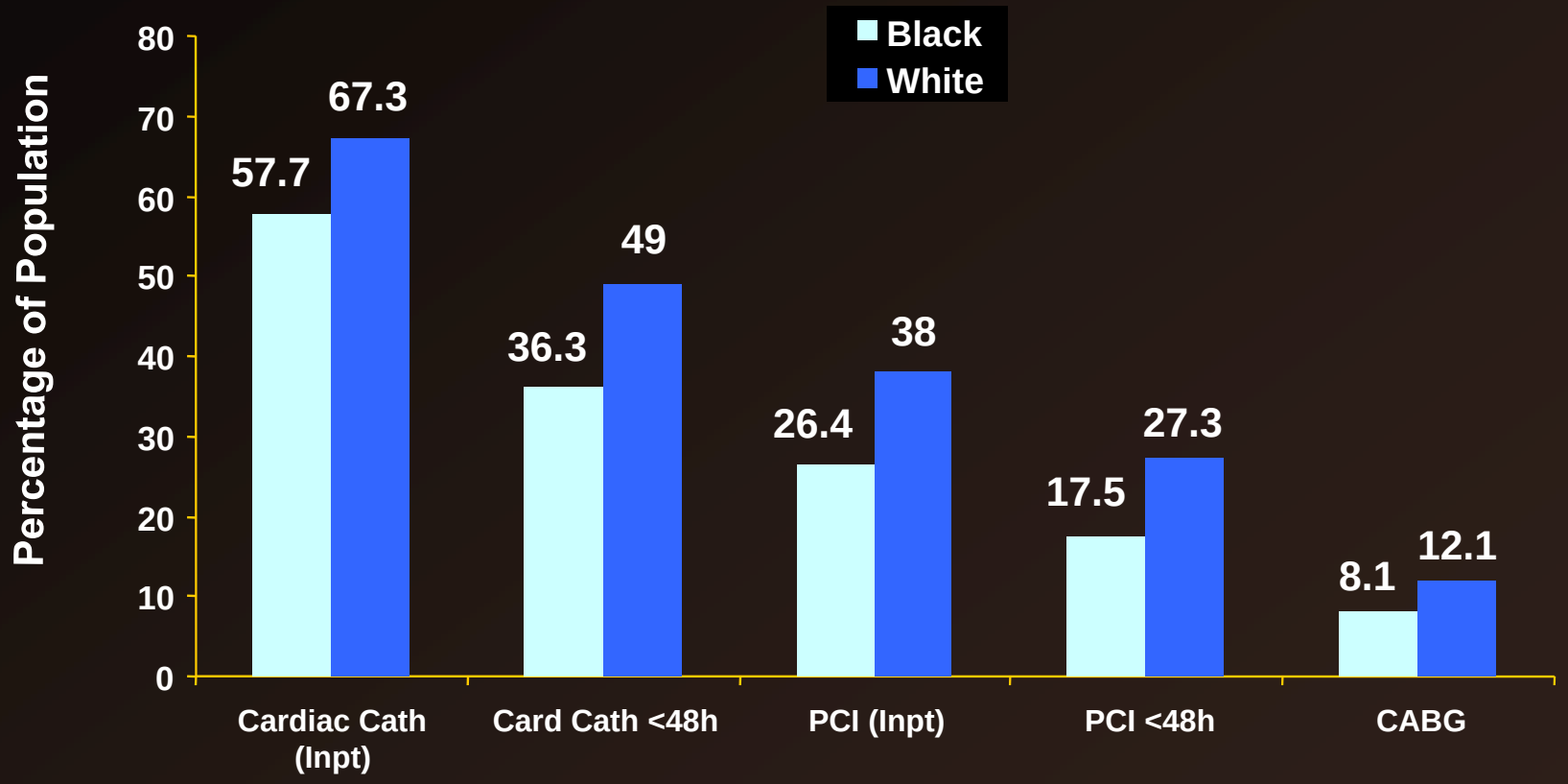
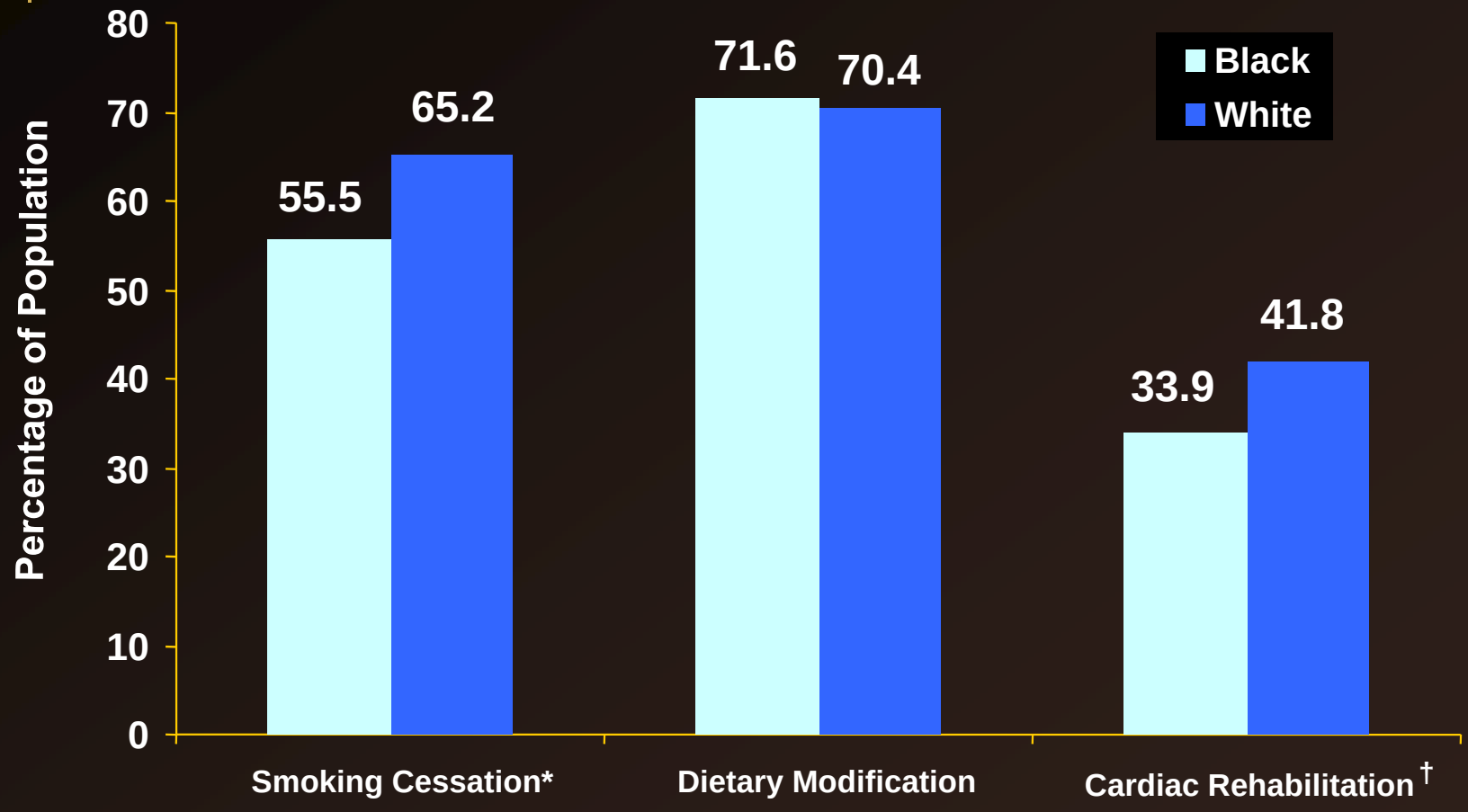
CRUSADE/NSTE ACS: In-Hospital Procedures



Sonel EF, et al. *Circulation.* 2005;111:1225-1232.

CRUSADE/NSTE ACS Recommendations at Discharge



* For current smokers.

† For patients with positive markers.

Sonel EF, et al. *Circulation.* 2005;111:1225-1232.

TACTICS-TIMI 18: Influence of Race in Non-ST Elevation ACS

Nonwhite patients vs. white patients

- Less likely to be
  - Taking aspirin
  - Taking beta-blockers
  - Taking statins
  - Referred for coronary angiography in the absence of clear-cut ischemia

Sabatine MS, et al. *Circulation*. 2005;111:1217-1224.

TACTICS-TIMI 18: Influence of Race in Non-ST Elevation ACS

Nonwhite patients vs. white patients

- Less likely to receive a stent when undergoing percutaneous coronary revascularization
- Less successful procedural outcomes
- Regardless, after adjustment for differences in rates and types of revascularization, nonwhite patients still had a worse prognosis

Sabatine MS, et al. *Circulation*. 2005;111:1217-1224.

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

	Mean Referral Rate %	Odds Ratio (95% CI)	P value
White	90.6	1.0	
Black	84.7	**0.6 (0.4-0.9)**	0.02

Schulman KA, et al. *NEJM* . 1999;340 (8):618-26.

Rate of Use of Cardiac Catheterization within 60 Days after Acute Myocardial Infarction among Black Patients and White Patients, According to the Race of Their Physicians

TABLE 2. RATE OF USE OF CARDIAC CATHETERIZATION WITHIN 60 DAYS AFTER ACUTE MYOCARDIAL INFARCTION AMONG BLACK PATIENTS AND WHITE PATIENTS, ACCORDING TO THE RACE OF THEIR PHYSICIANS.*

RATE	WHITE PHYSICIANS		BLACK PHYSICIANS	
	WHITE PATIENTS (N=35,176)	BLACK PATIENTS (N=3476)	WHITE PATIENTS (N=500)	BLACK PATIENTS (N=563)
	percent (95 percent confidence interval)			
Unadjusted	45.7	38.4†	49.6	38.2†
Adjusted	45.7‡	32.9 (30.1–36.1)§	53.4 (43.4–65.8)	36.5 (29.2–45.2)¶

*In the adjusted analyses, adjustments were made for the characteristics of the patients, the physicians, and the hospitals. There were no significant differences in the rates of cardiac catheterization among either the white patients or the black patients according to the race of their physicians.

†$P<0.001$ for the comparison between black patients and white patients, regardless of the race of their physician.

‡These patients served as the reference group.

§$P<0.001$ for the comparison between black patients treated by white physicians and white patients treated by white physicians.

¶$P=0.04$ for the comparison between black patients treated by black physicians and white patients treated by black physicians.

Chen, J. et al. N Engl J Med 2001;344:1443-1449

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LESS REVASCULARIZATION, MORE ANGINA

Circulation
111: 2005

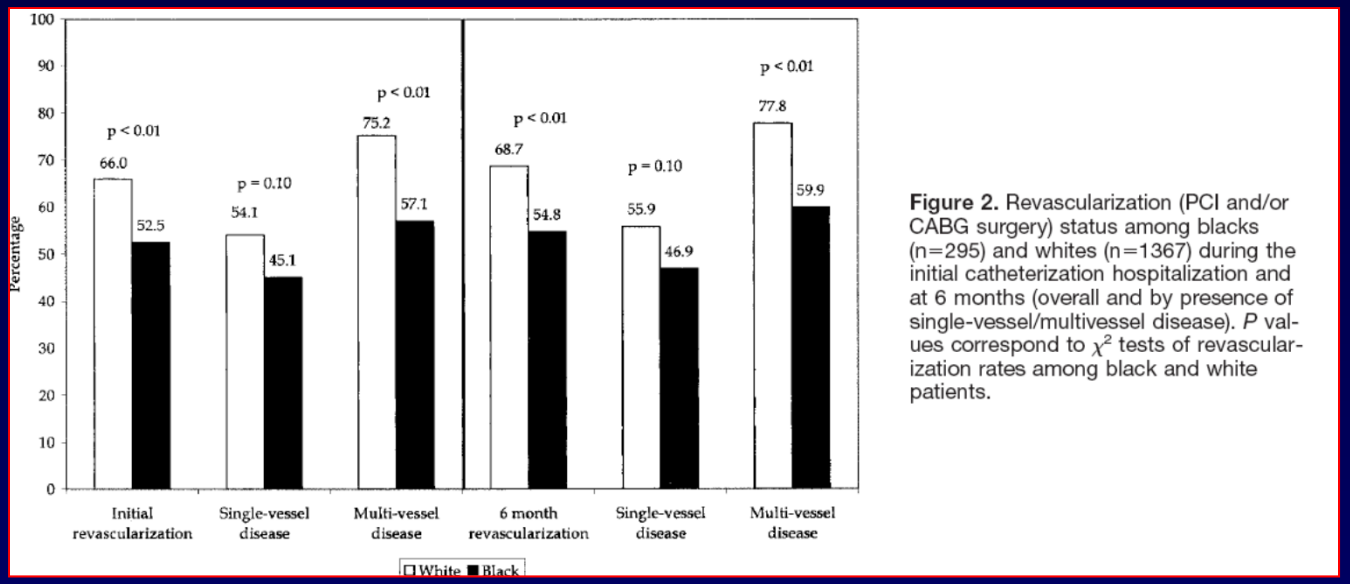


Figure 2. Revascularization (PCI and/or CABG surgery) status among blacks (n=295) and whites (n=1367) during the initial catheterization hospitalization and at 6 months (overall and by presence of single-vessel/multivessel disease). *P* values correspond to χ^2 tests of revascularization rates among black and white patients.

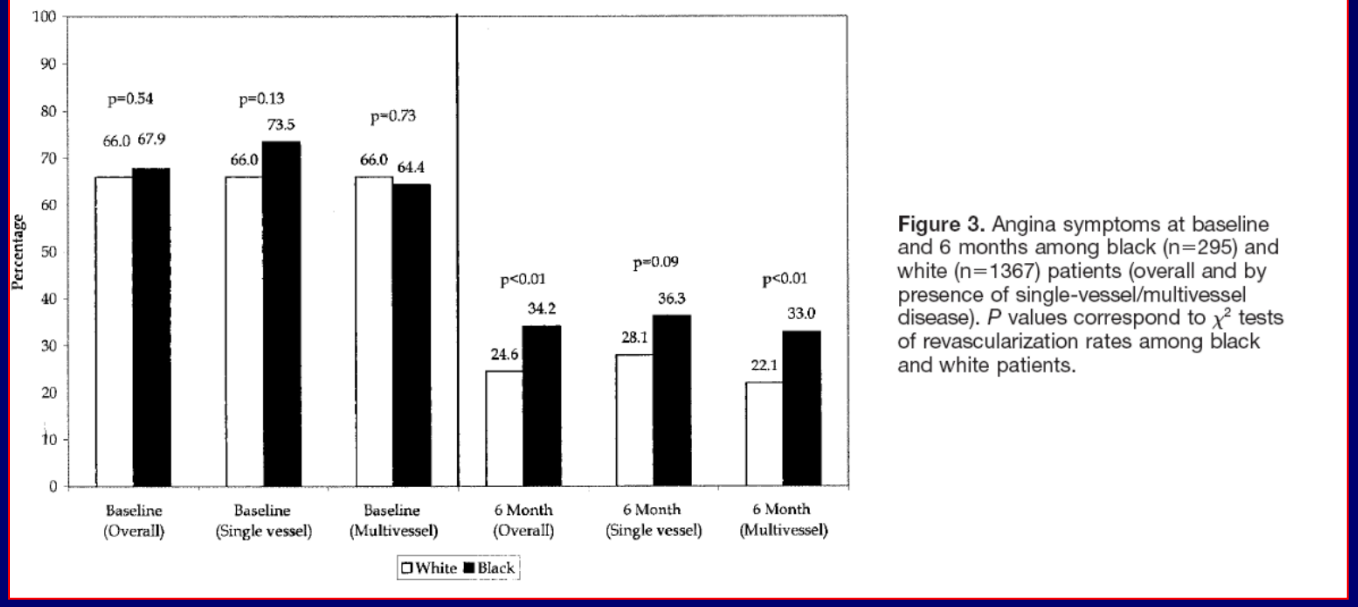


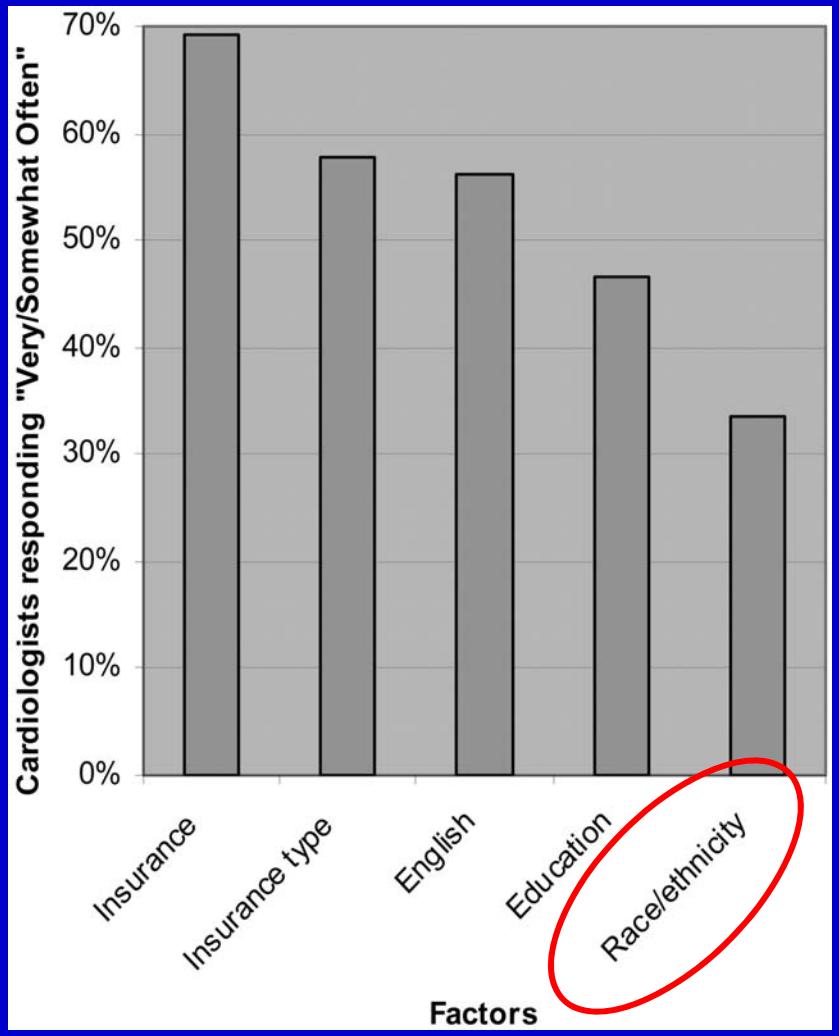
Figure 3. Angina symptoms at baseline and 6 months among black (n=295) and white (n=1367) patients (overall and by presence of single-vessel/multivessel disease). *P* values correspond to χ^2 tests of revascularization rates among black and white patients.

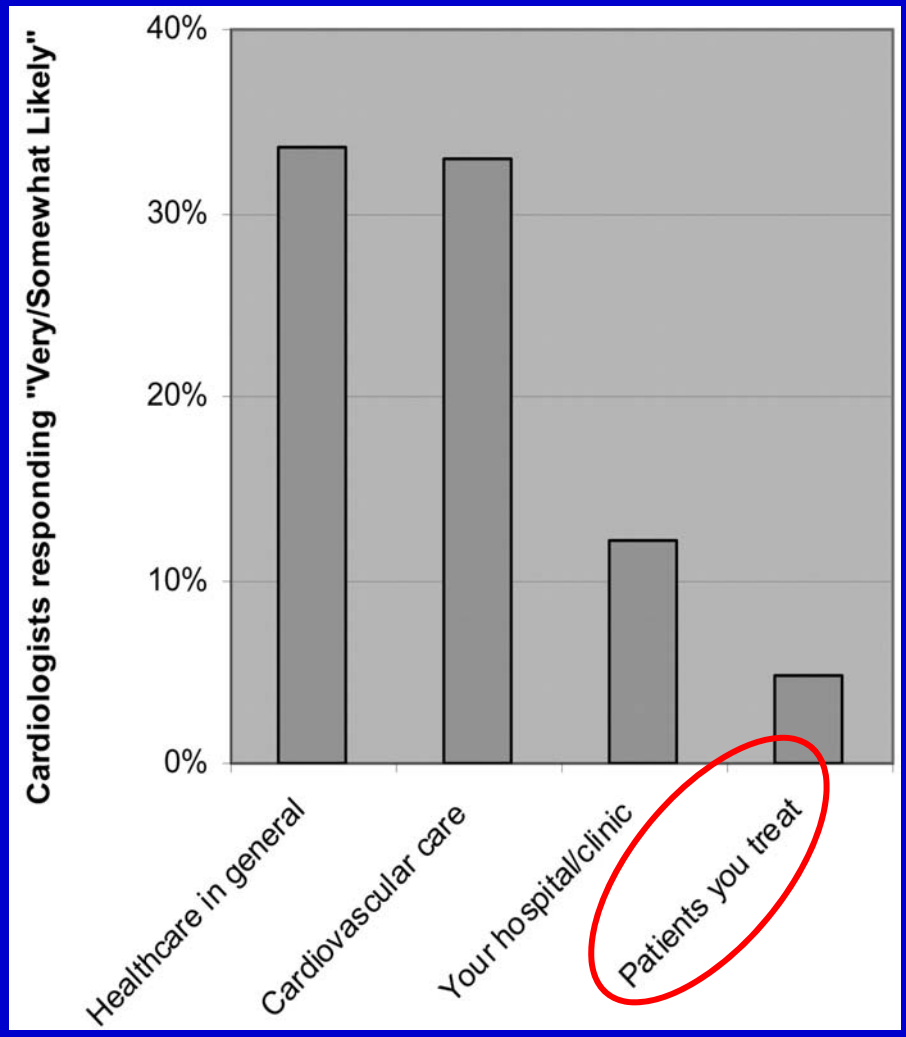
Weight of the Evidence

- African Americans less likely than whites to receive catheterization, angioplasty, bypass surgery and thrombolytic therapy
- Racial/ethnic differences in care remain after adjustment for clinical and socioeconomic factors
- Evidence of disparities in other procedures and treatments mixed
- Limited data on Latinos, Asians and Native Americans

Proportion responding that they believe that within the healthcare system in general, patients receive different care on the basis of the factors shown (n=344)

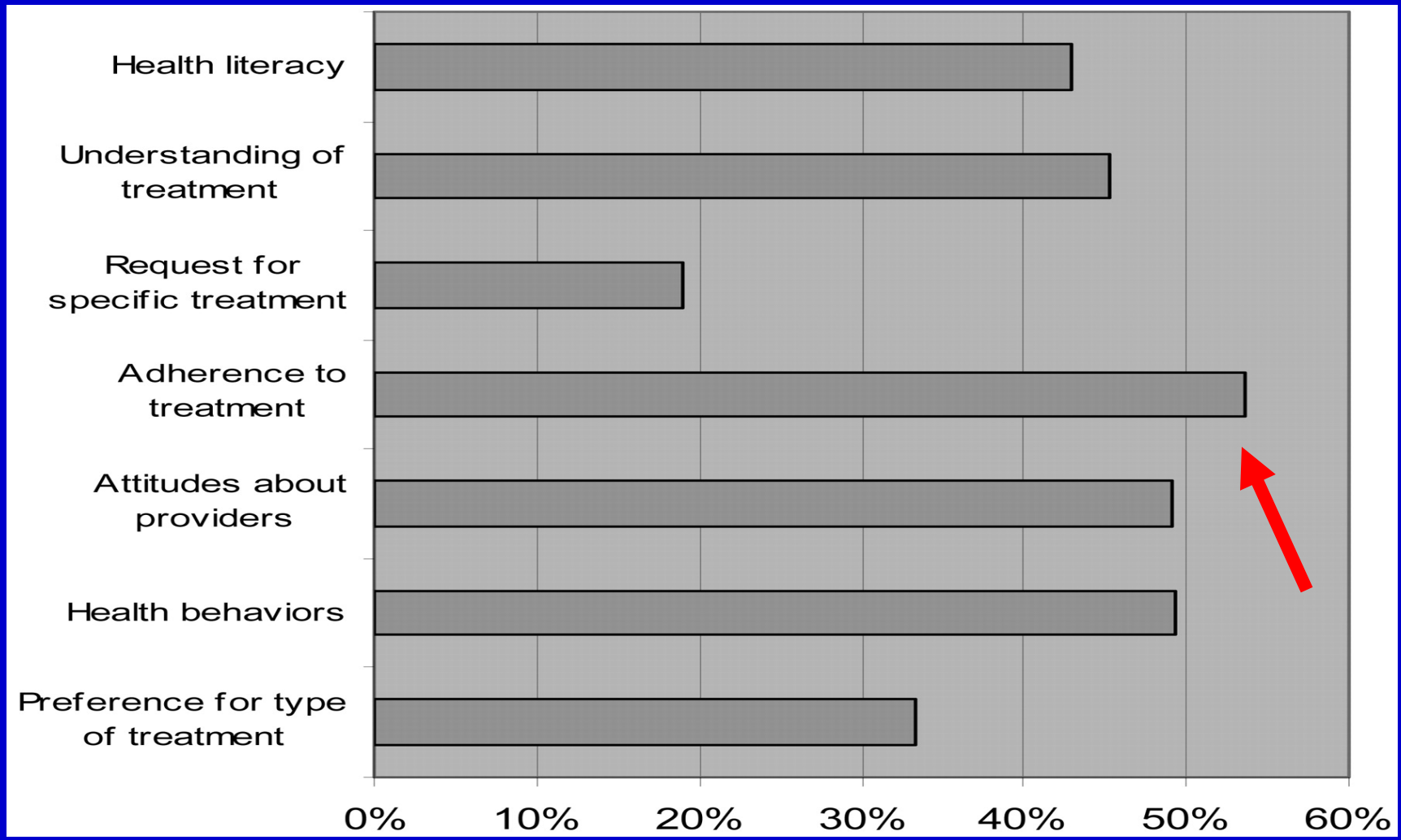
Proportion responding that they believe that clinically similar patients receive different care on the basis of race/ethnicity by proximity to practice (n=344)





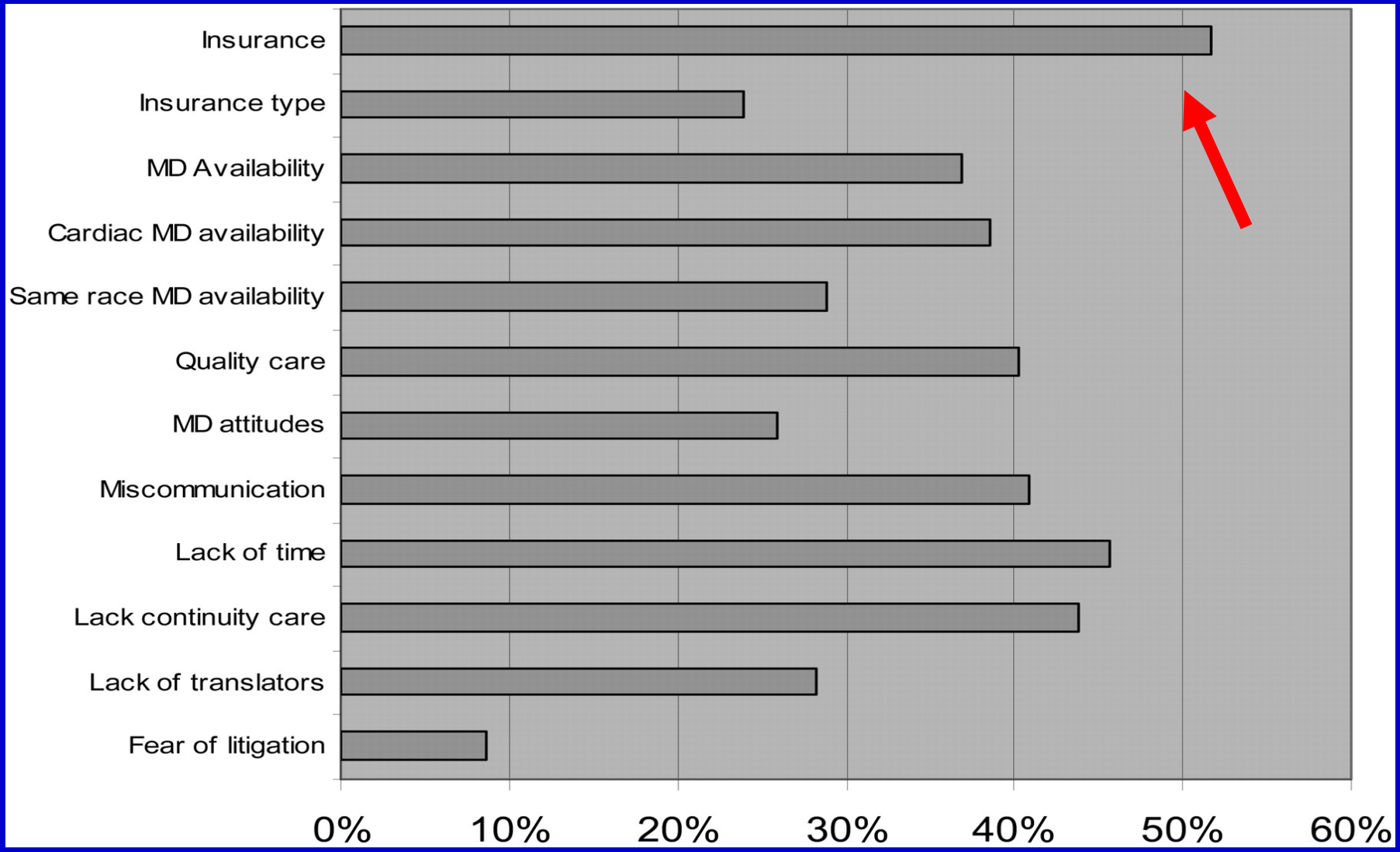
Lurie, N. et al. Circulation 2005;111:1264-1269

Percentage reporting that specific patient characteristics contribute a great deal to racial/ethnic disparities in cardiovascular care in the United States



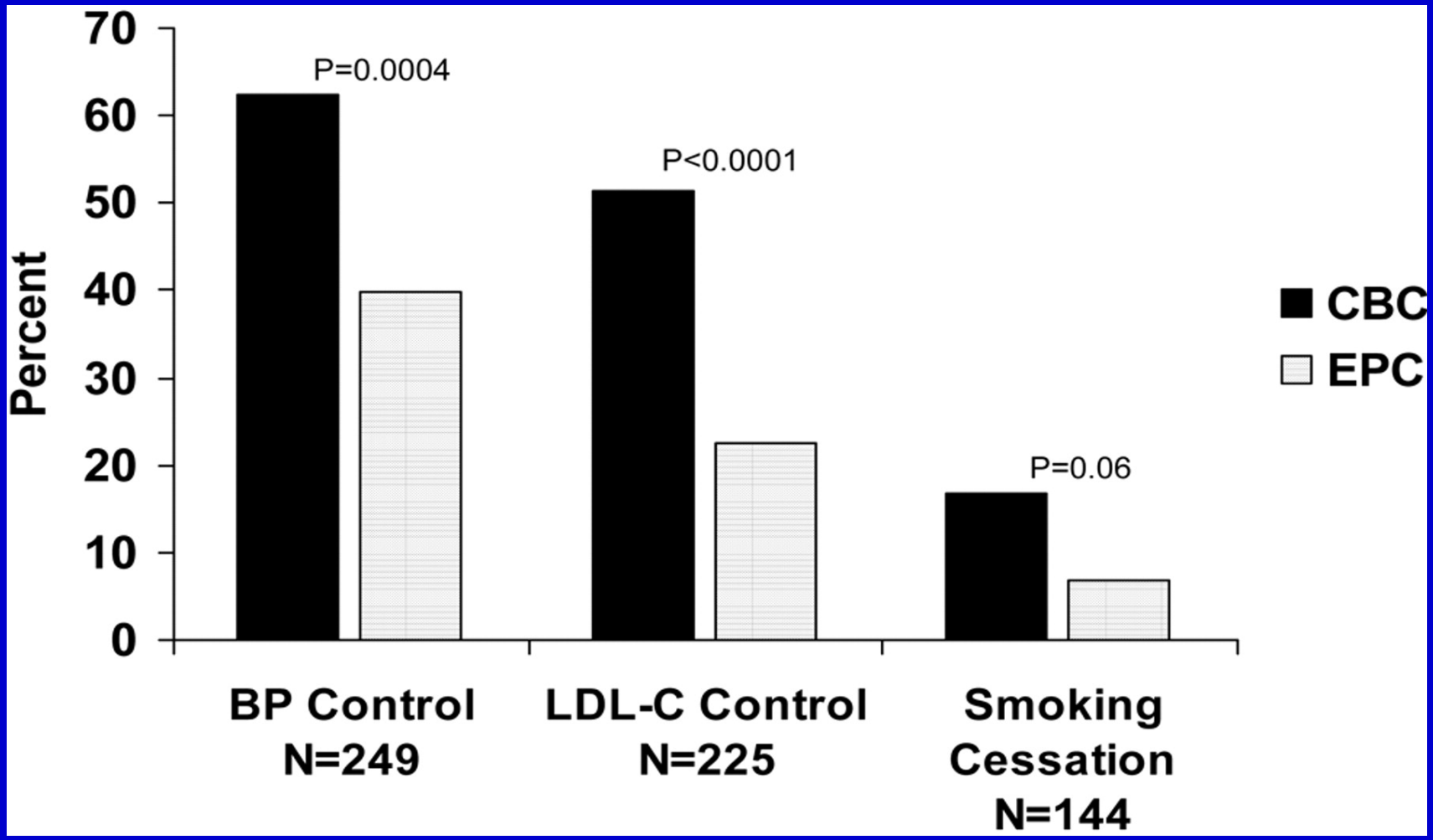
Lurie, N. et al. Circulation 2005;111:1264-1269

Percentage reporting that specific nonclinical factors contribute a great deal to racial/ethnic disparities in cardiovascular care in the United States



Lurie, N. et al. Circulation 2005;111:1264-1269

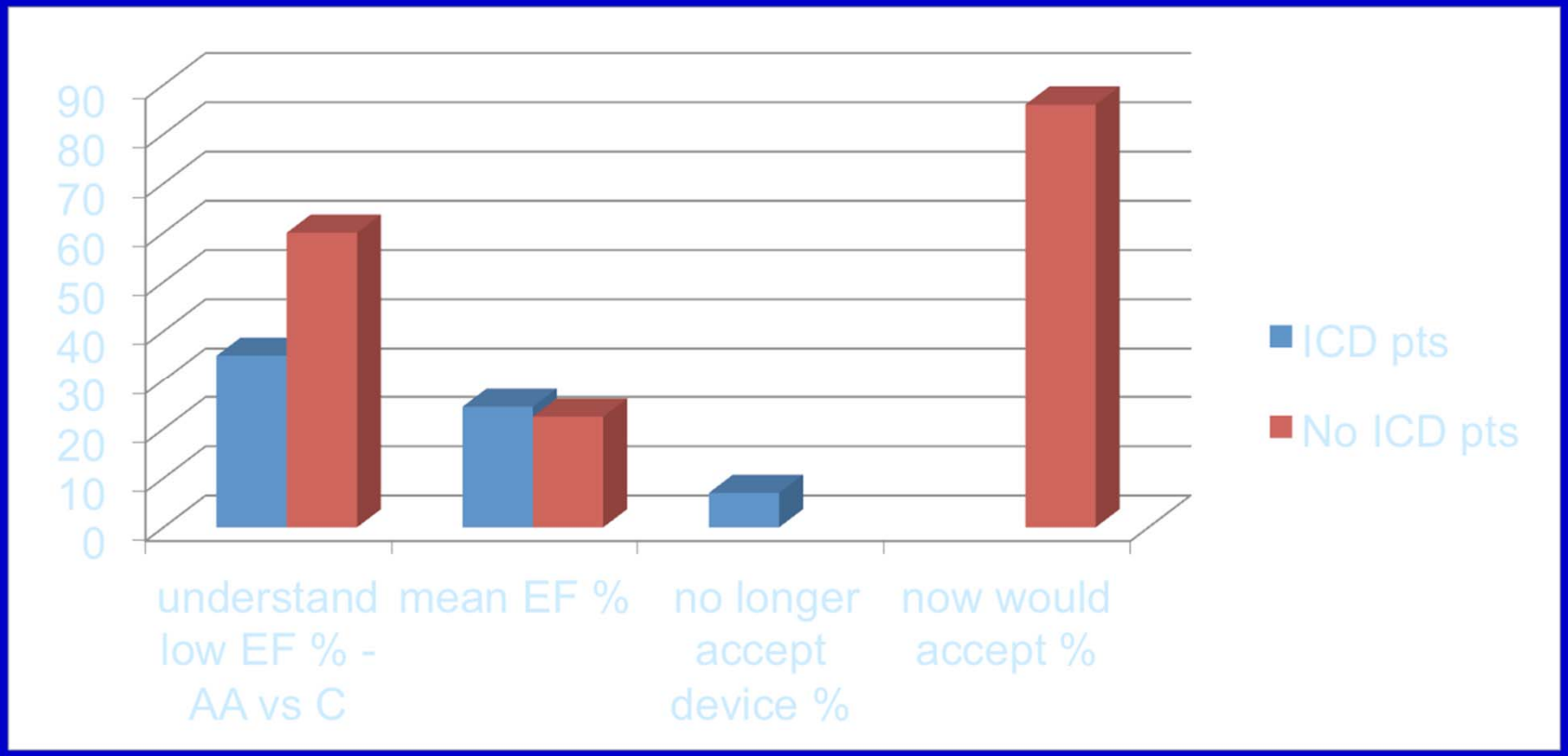
Percentage achieving goals at 1-year follow-up by intervention group (community based vs standard clinic)



Becker, D. M. et al. Circulation 2005;111:1298-1304

Potential Primary Prevention Implantable Cardioverter-Defibrillator (ICD) Patients Lack Understanding, Want More Information and are Willing to Reconsider Implant Refusal

N Singh, E Hall, E Lucas, S Chandra, D Song, L Yan, D Suh, A Dorsey, S Ramamurthy



Summary

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