Relationship Between Oral Health and Cardiovascular Disease in Communities of Color

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Objectives

- To describe the relationship of periodontitis to cardiovascular disease
- To discuss the inflammatory and microbiology of periodontitis in relationship to cardiovascular
- To discuss the potential relationship between periodontal disease and cardiovascular health in racial/ethnic minorities

Causes of Oral Health Diseases

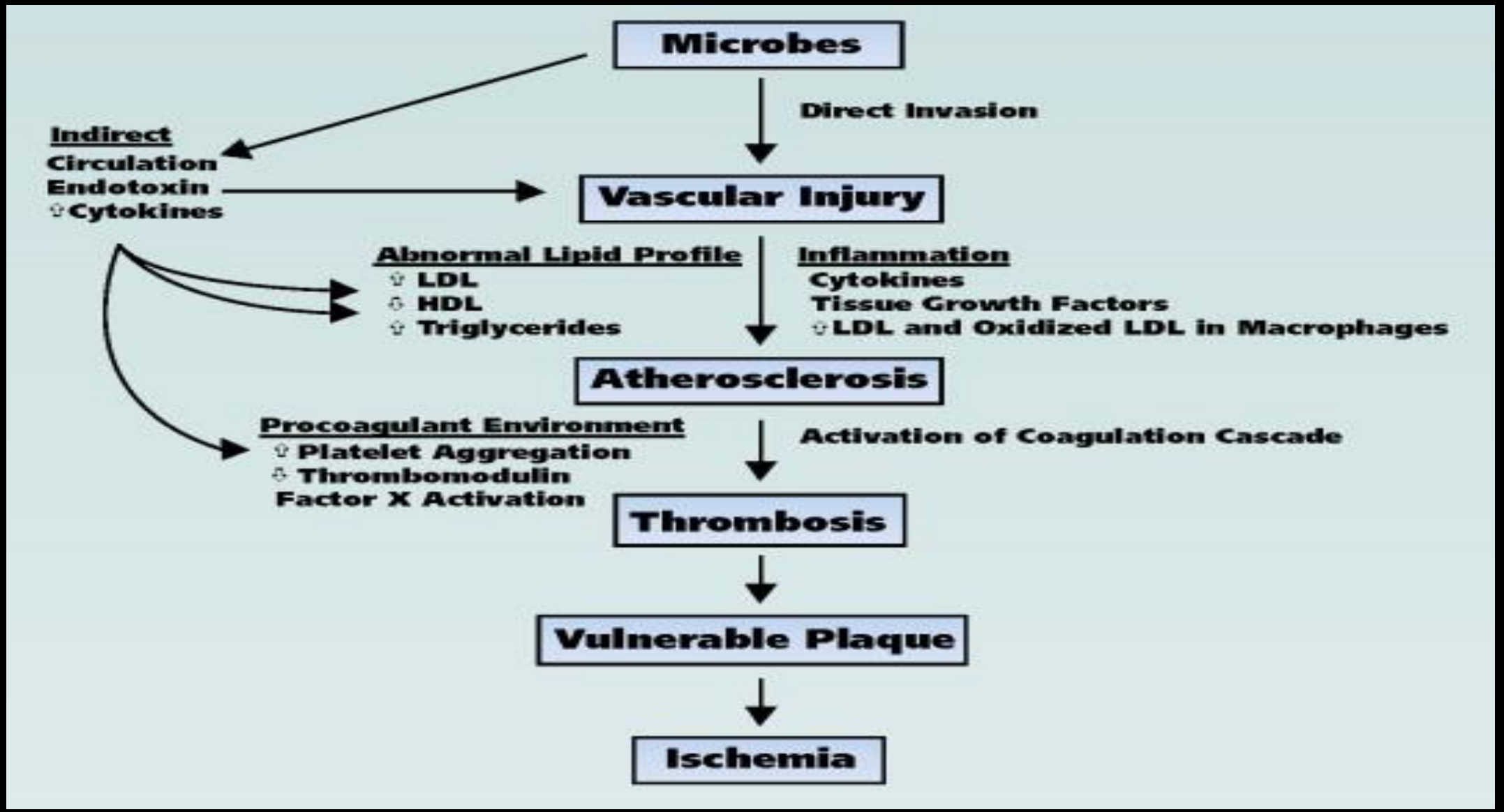
- Diets of Sugary snacks or beverages
- **Plaque Accumulation**
- Tartar
- Smoking or Chewing tobacco
- Irregular visits to a dentist or oral health professional

Effects of Oral Health Diseases

- Cavities
- **Gingivitis**
- **Periodontitis**
- Bad breath/ Halitosis
- Abscesses and pus build up
- Non-Oral issues such as Preterm Labor or Heart Disease

Serves as source of bacteremia and indolent systemic infection

Potential Mechanism of Infection and CVDze



Dysfunction AND Disease in the Mouth

- Has an impact on overall health and social functioning
- Especially important for people who are frail or nutritionally at risk
- Findings prevalent in older patients:
  - Decayed or missing teeth
  - Periodontal disease
  - Salivary hypofunction
- Not normal—patients should be urged to seek preventive and therapeutic care

Oral Health Disparity within the African American and Hispanic Community

Dental caries is the most common childhood chronic disease. It is 5x more common than asthma.

Hispanics have a higher incidence of dental caries than non-Hispanics.

40.9% Hispanic kindergarten children have been affected by dental caries

49.2% of Hispanics adolescents have been affected by dental caries

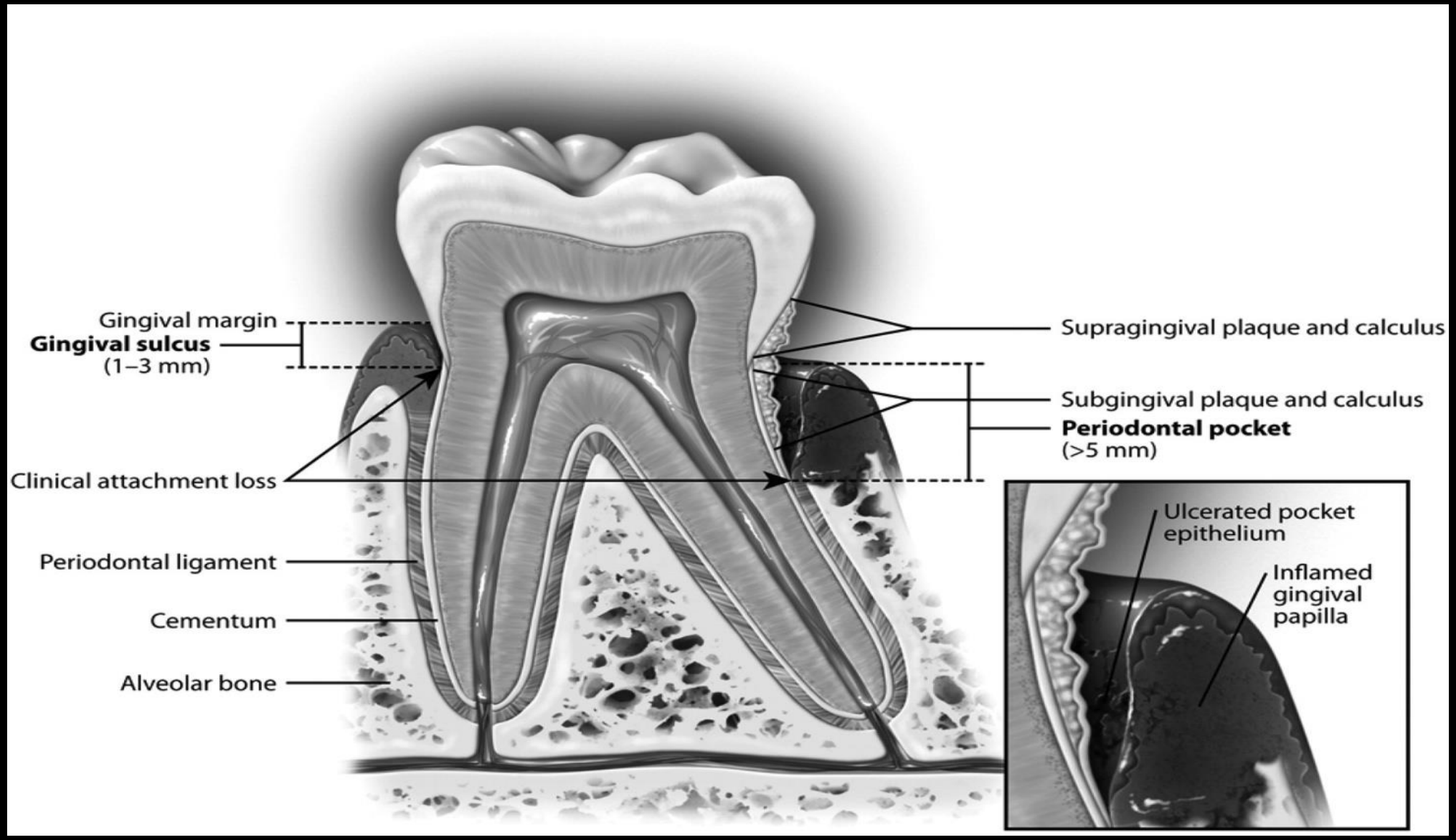
Periodontal Disease (1 of 4)

- The periodontium consists of:
  - The gingiva
  - The alveolar bone
  - The periodontal ligament—a collagenous sleeve between the tooth root and surrounding bone
- Periodontal disease occurs when microorganic colonies (plaque) form:
  - On the teeth near the gingiva (causing gingivitis) and predisposing to plaque growth
  - Between the gingiva and the root surface within the gingival sulcus (predisposing to periodontitis)

Periodontal Disease (2 of 4)

- Gingivitis—the inflammatory reaction to plaque is limited to the gingiva
  - Rapidly reversible following removal of plaque
- Periodontitis—inflammatory process extends to the periodontal ligament and alveolar bone
  - Irreversible; destroys hard and soft tissues of the periodontium

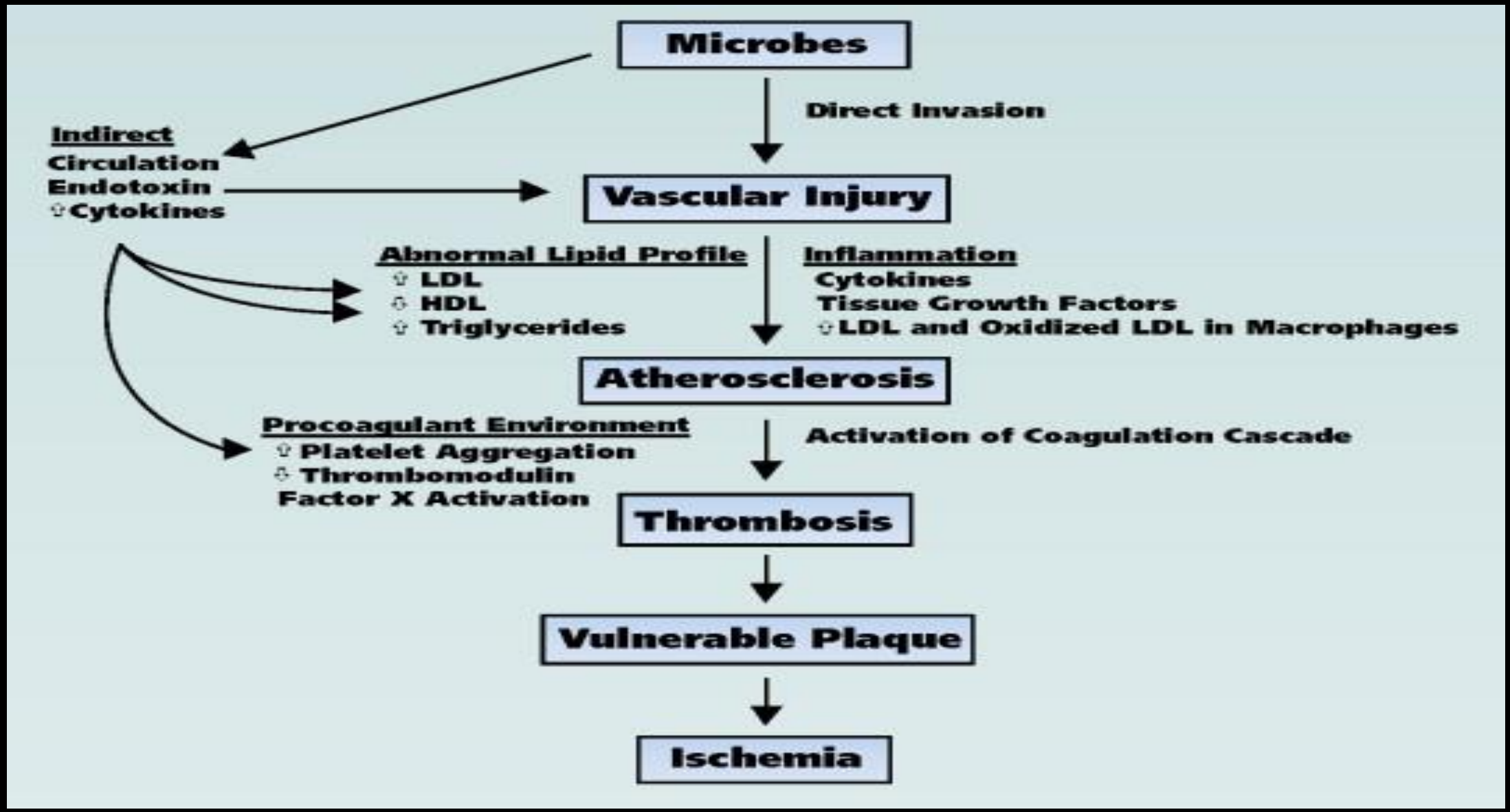
Periodontal Anatomy and Disease



Periodontal Disease (3 of 4)

- Risk factors for periodontitis:
  - Advancing age
  - Smoking
  - Poor oral hygiene
- Black and Hispanic Americans have a significantly higher prevalence of advanced periodontitis than do white Americans
- Periodontitis has been linked to the pathogenesis of diabetes, peripheral vascular disease, cerebrovascular disease, coronary artery disease and atherosclerosis, and nosocomial pneumonia

Potential Mechanism of Infection and CVDze



Bacteriology of Dental Plaque

	Facultative	**Anaerobic**
Gram-positive cocci	*Streptococcus sanguis* *Streptococcus oralis* *Streptococcus mutans*	
Gram-positive bacilli		*Actinomyces naeslundii* *Actinomyces odontolyticus* *Actinomyces viscosus*
Gram-negative cocci	*Neisseria* species	*Veillonella* species
Gram-negative bacilli	*Aggregatibacter* (formerly *Actinobacillus*) *Actinomycetemcomitans* *Capnocytophaga* species *Elkenella corrodens* *Helicobacter pylori* *Chlamydophila pneumonia*	*Porphyromonas gingivalis* *Fusobacterium nucleatum* *Prevotella intermedia* *Tenneralla forsythia* *Selenomonas noxia* *Campylobacter rectus*
Spirochetes		*Treponema denticola* Other *Treponema* species
Methanogenic archaea		*Methanobrevibacter oralis*-like
Sulfate-reducing bacteria and archaea		*Desulfomicrobium orale* *Desulfovibrio*

Periodontal Disease (4 of 4)

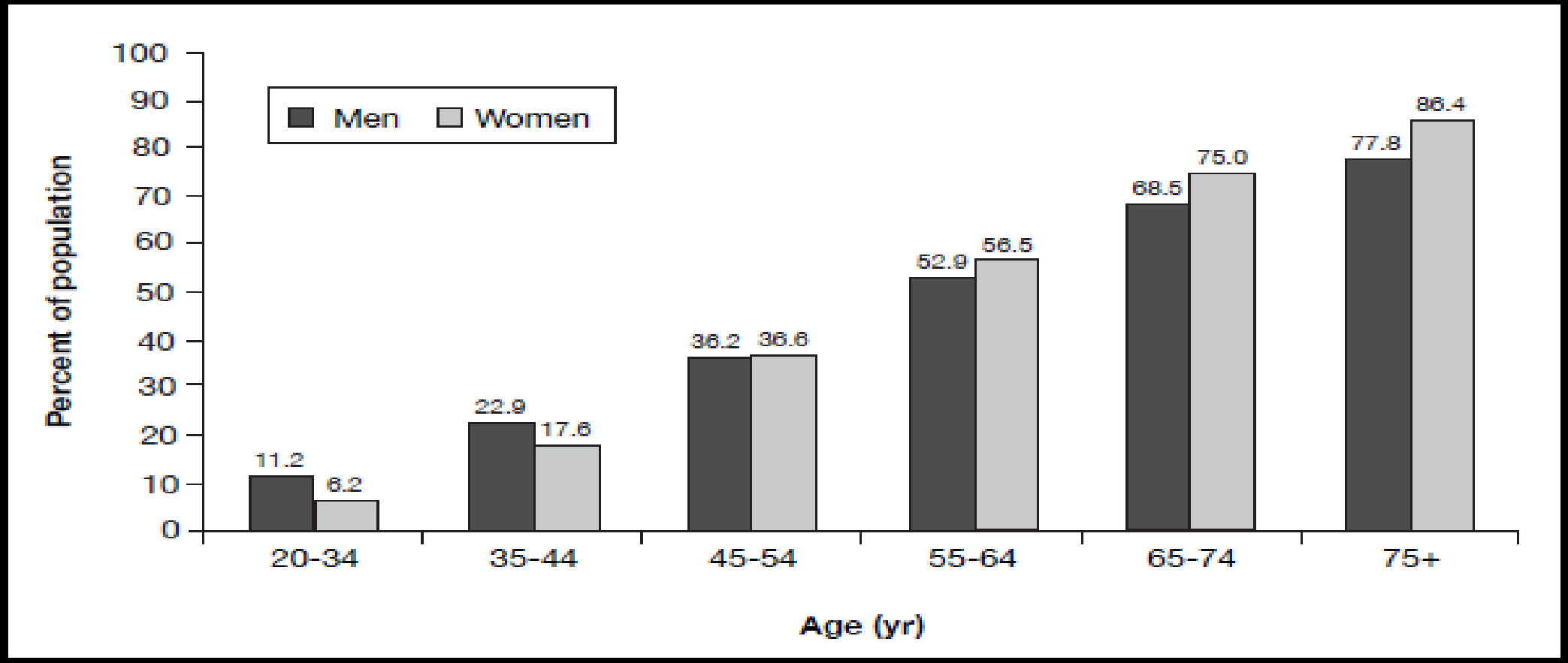
- Managing periodontal disease involves debriding the roots below the gingiva, which may require surgical access
- Topical antibiotics (chlorhexidine, oral rinse) and systemic antibiotics (minocycline, metronidazole, doxycycline) are increasingly used as adjuncts to other periodontal therapy

WHY IS CARDIOVASCULAR DISEASE IMPORTANT

Epidemiology OF CVDze (1 of 2)

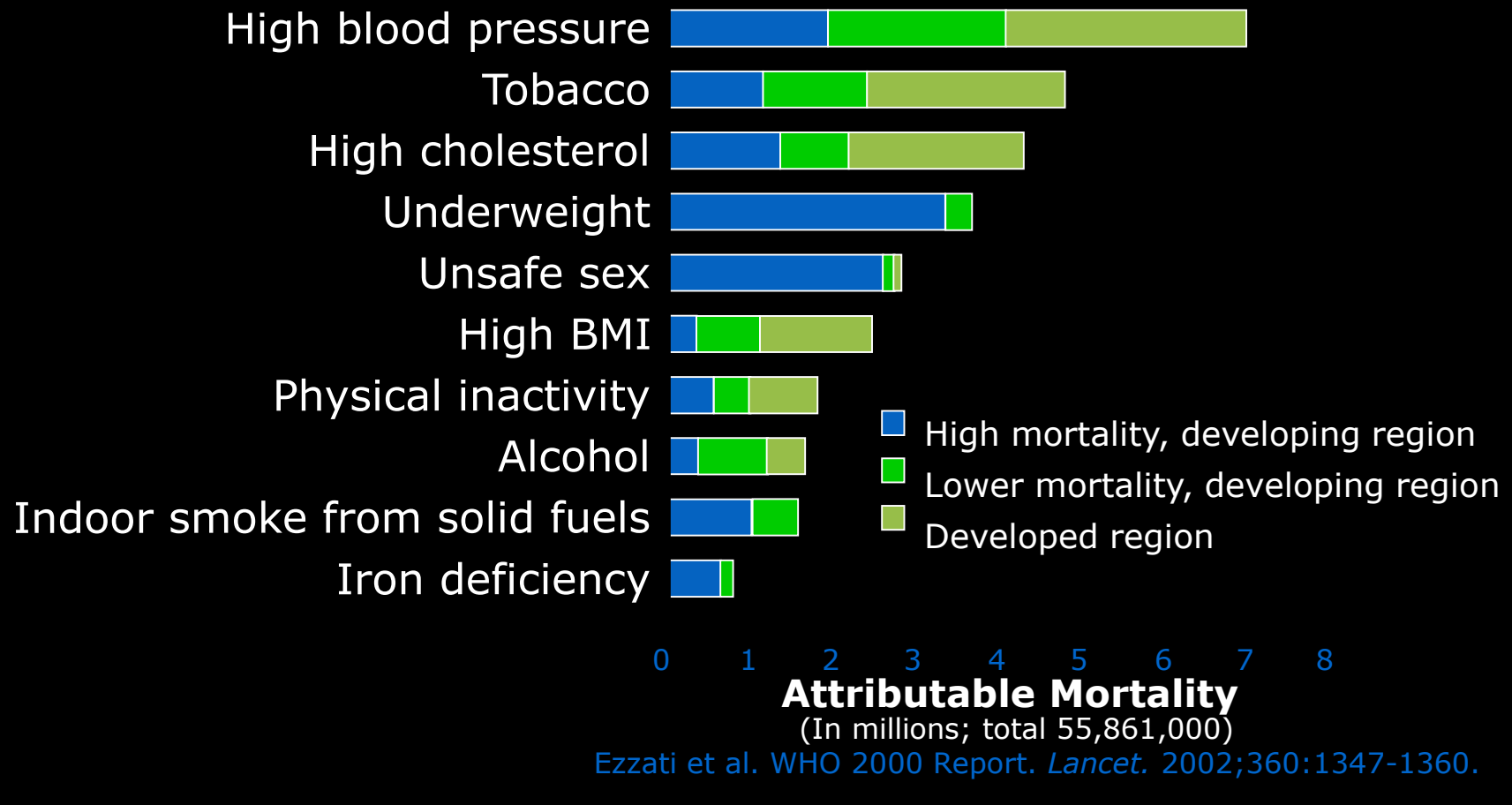
- Among ~ 870,000 deaths in the US from cardiac and cerebrovascular diseases in 2004
- 84% occurred in adults ≥65 yr old and 68% occurred in the 6.1% of the population ≥75 yr old
- With the aging of the population, the absolute number of cardiovascular deaths in older adults is expected to increase markedly over the next several decades

Epidemiology OF CVDze (2 of 2)



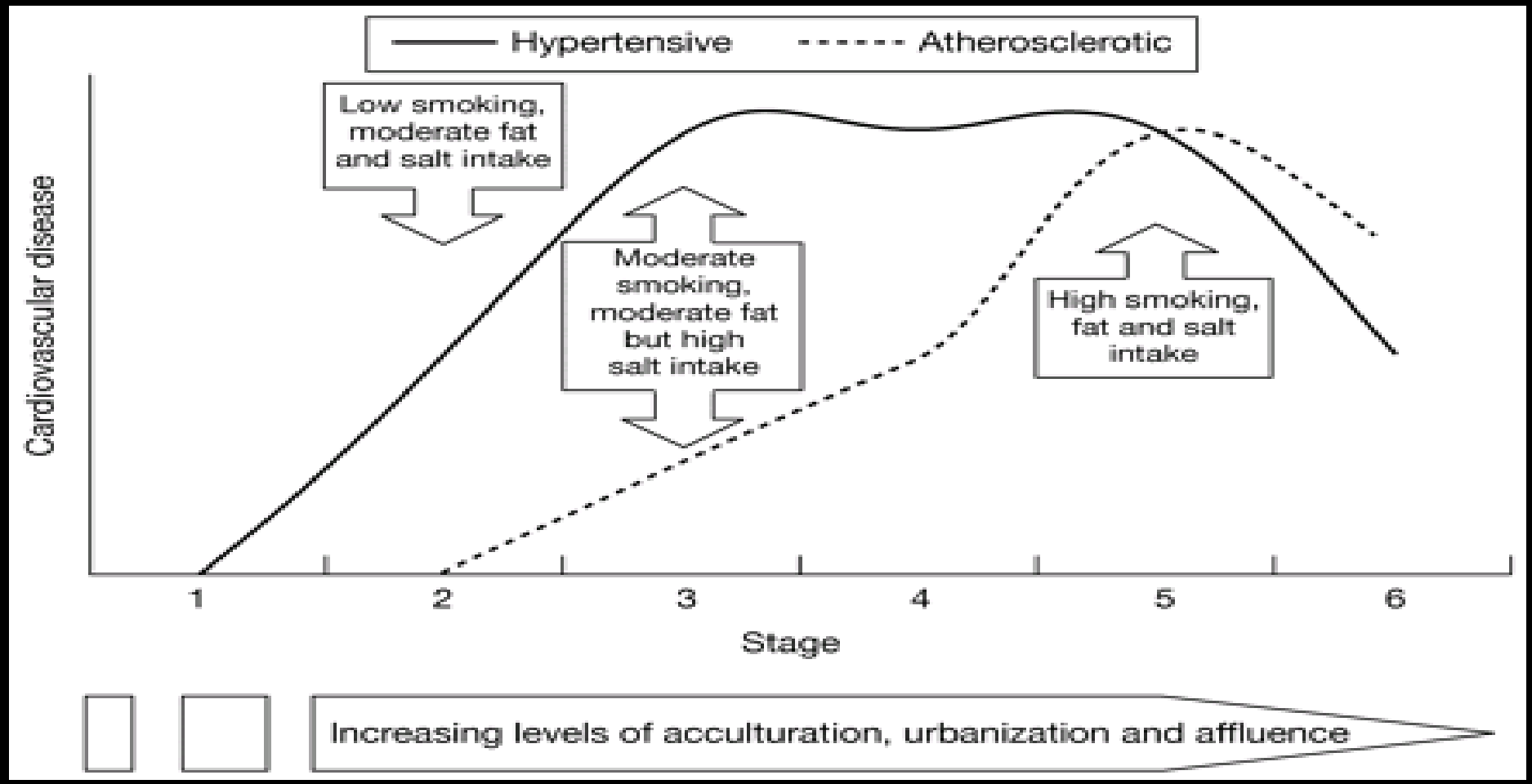
The prevalence of CVD increases progressively with age, exceeding 80% in men and 90% in women >80 years old

Proportion of deaths attributable to leading risk factors worldwide (2000)



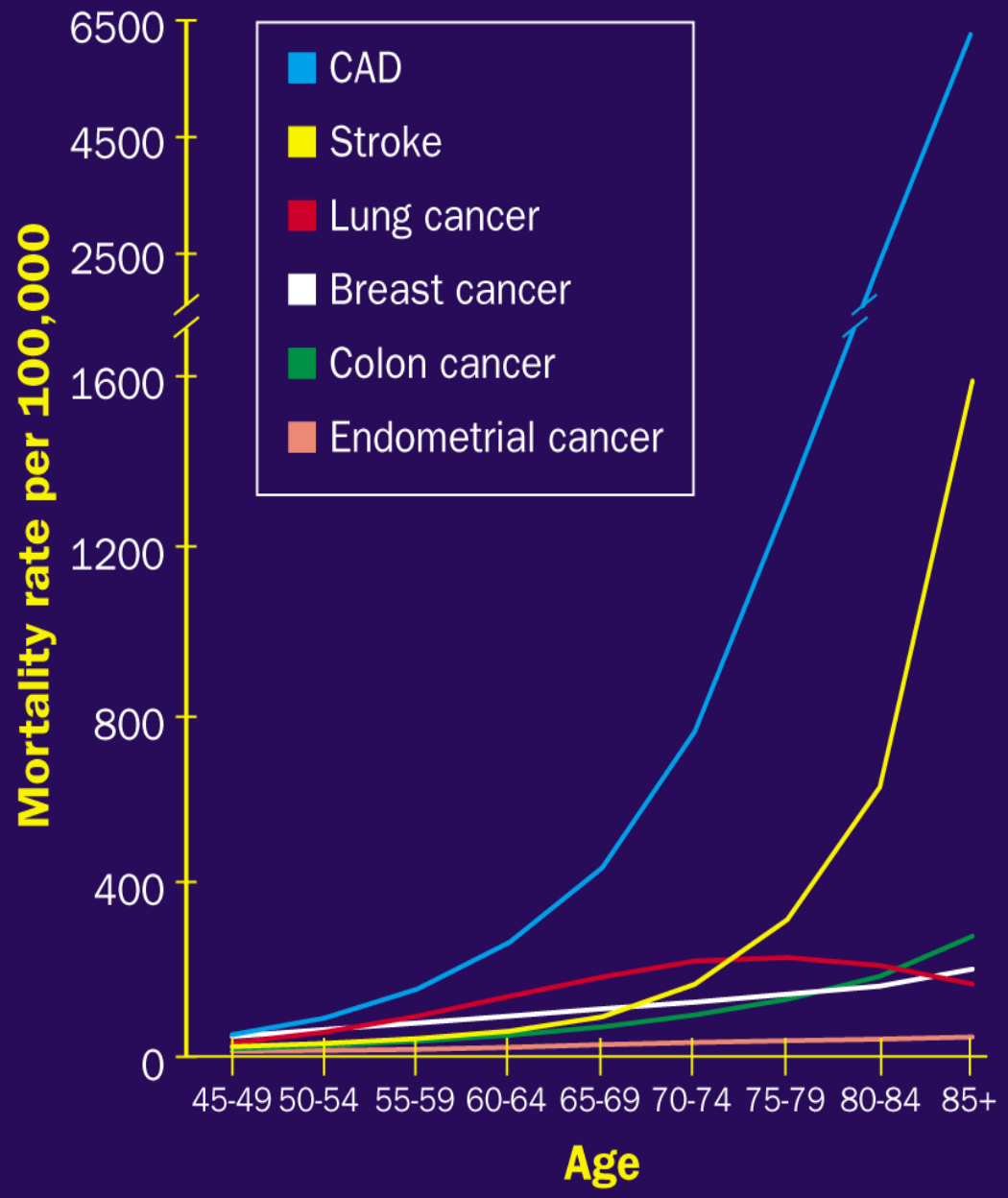
Ezzati et al. WHO 2000 Report. *Lancet.* 2002;360:1347-1360.

Gillum's stages in the epidemiological evolution of cardiovascular disease patterns among people of sub-Saharan African origin



Cappucio F 2004;33:387-388 Gillum 1996; 335(21):1597-1599

Mortality Rates in Women

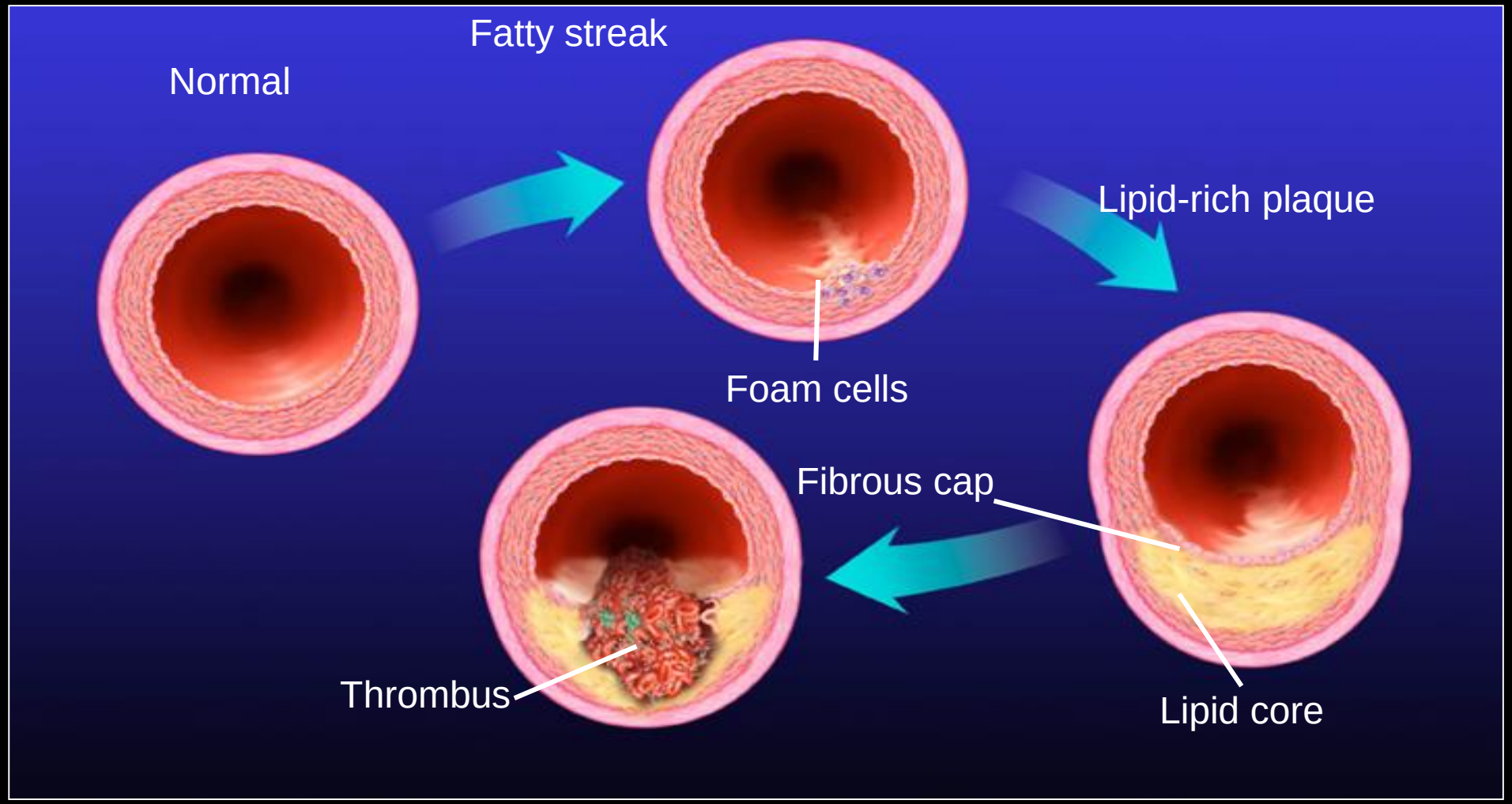


Cardiovascular Disease (CVD):
African American compared to White, non-Hispanic

- 1.5 x more deaths due to heart disease
  - screening for hyperlipidemia at 40
- Black mortality rates are elevated for heart & cerebrovascular disease (they exceed those for Whites at any age above 44 years)
  - 1.3 x nonfatal CVA
  - 1.8 x fatal CVA
- 5 x End Stage Renal Disease

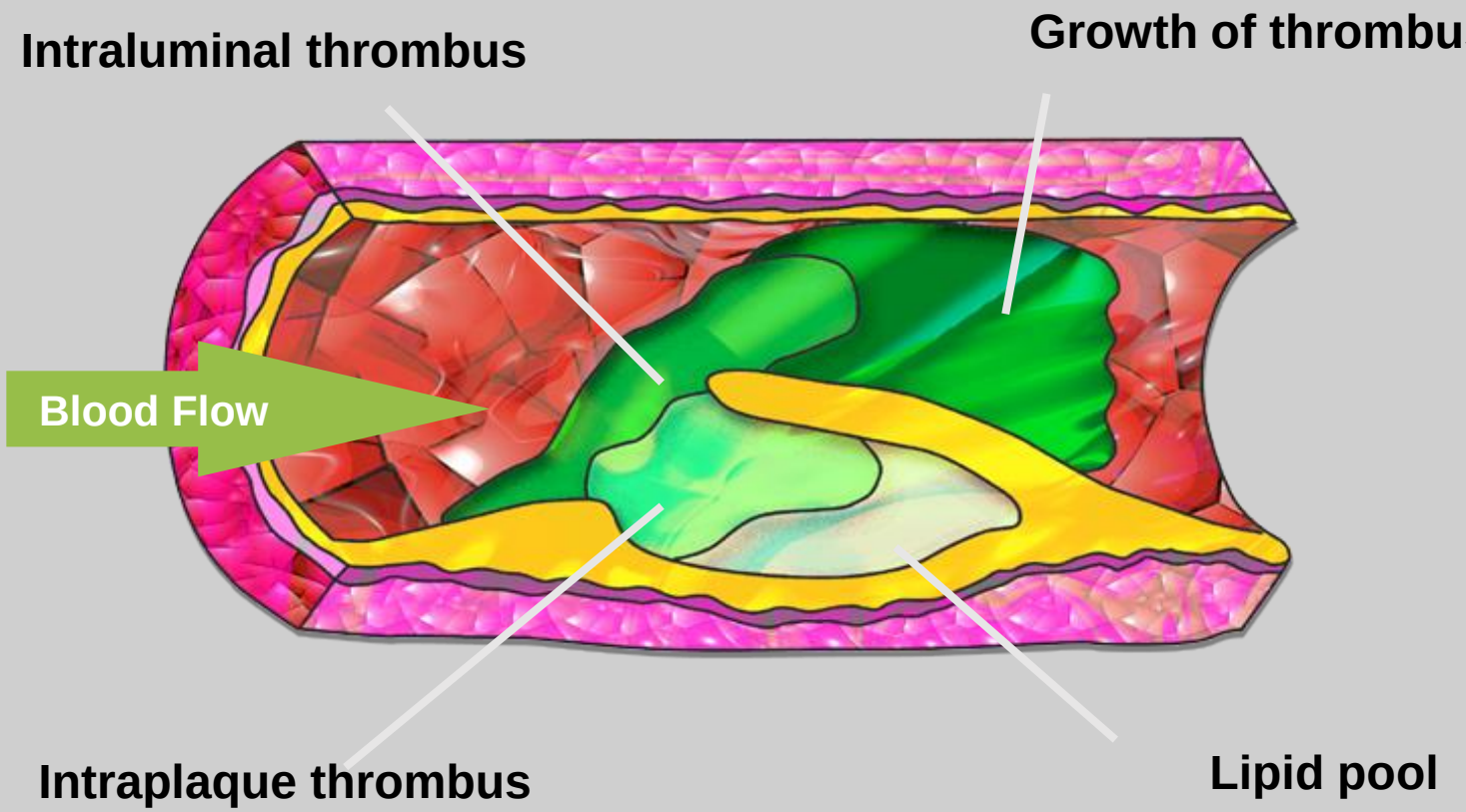
HOW DOES CARDIOVASCULAR DISEASE DEVELOP

Development of Atherosclerotic Plaques



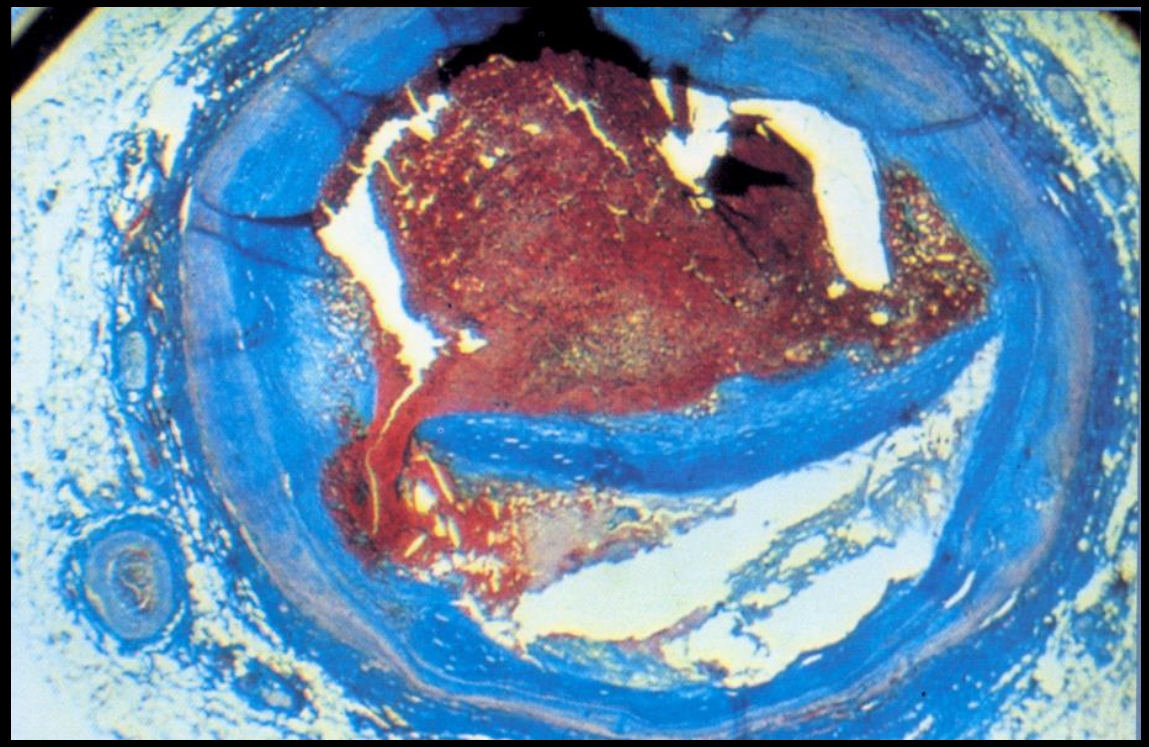
Ross R. *Nature.* 1993;362:801-809.

Atherosclerotic Plaque Rupture & Thrombus Formation



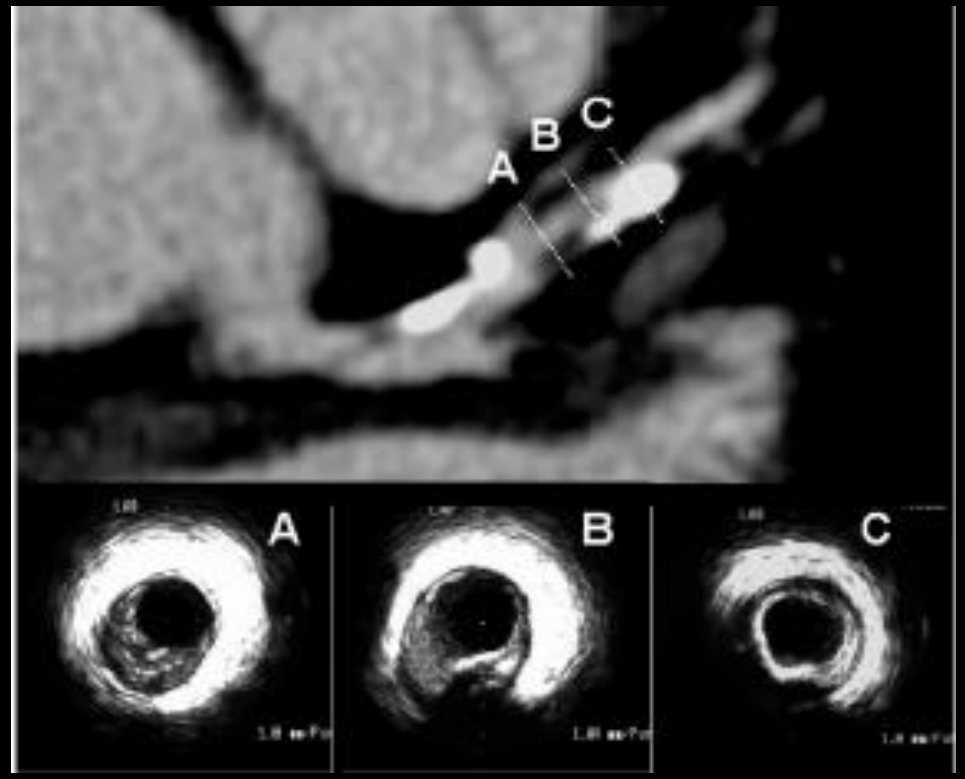
Adapted from Weissberg PL. *Eur Heart J Supplements* 1999:1:T13–18

Features of a Ruptured Atherosclerotic Plaque



- Eccentric, lipid-rich
- Fragile fibrous cap
- Prior luminal obstruction < 50%
- Visible rupture and thrombus

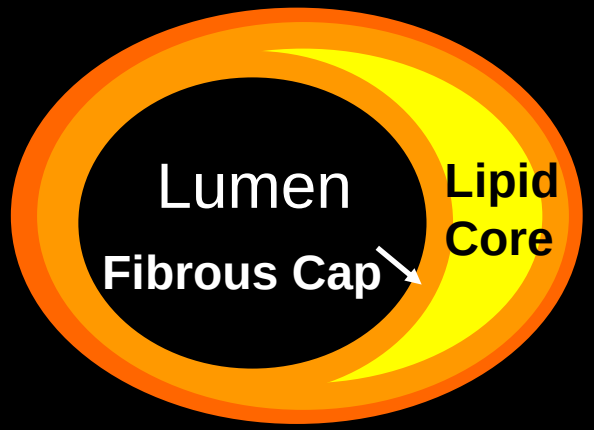
Constantinides P. *Am J Cardiol.* 1990;66:37G-40G.



Correlation of CT angiography of the coronary arteries with intravascular ultrasound illustrates the ability of MDCT to demonstrate calcified and non-calcified coronary plaques (Becker et al., Eur J Radiol 2000)

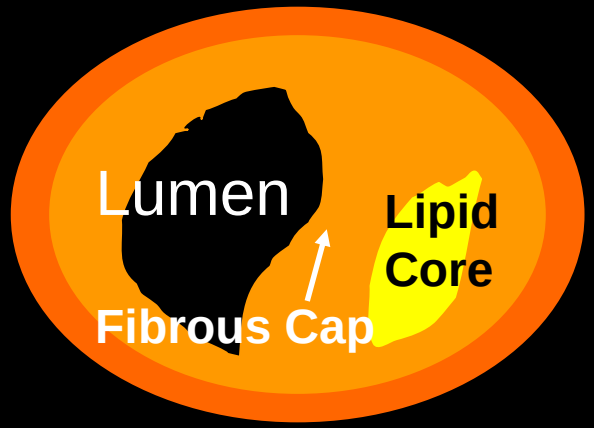
Non-calcified, soft, lipid-rich plaque in left anterior descending artery (arrow) (Somatom Sensation 4, 120 ml Imeron 400). The plaque was confirmed by intravascular ultrasound (Kopp et al., Radiology 2004)

Vulnerable Versus Stable Atherosclerotic Plaques



Vulnerable Plaque

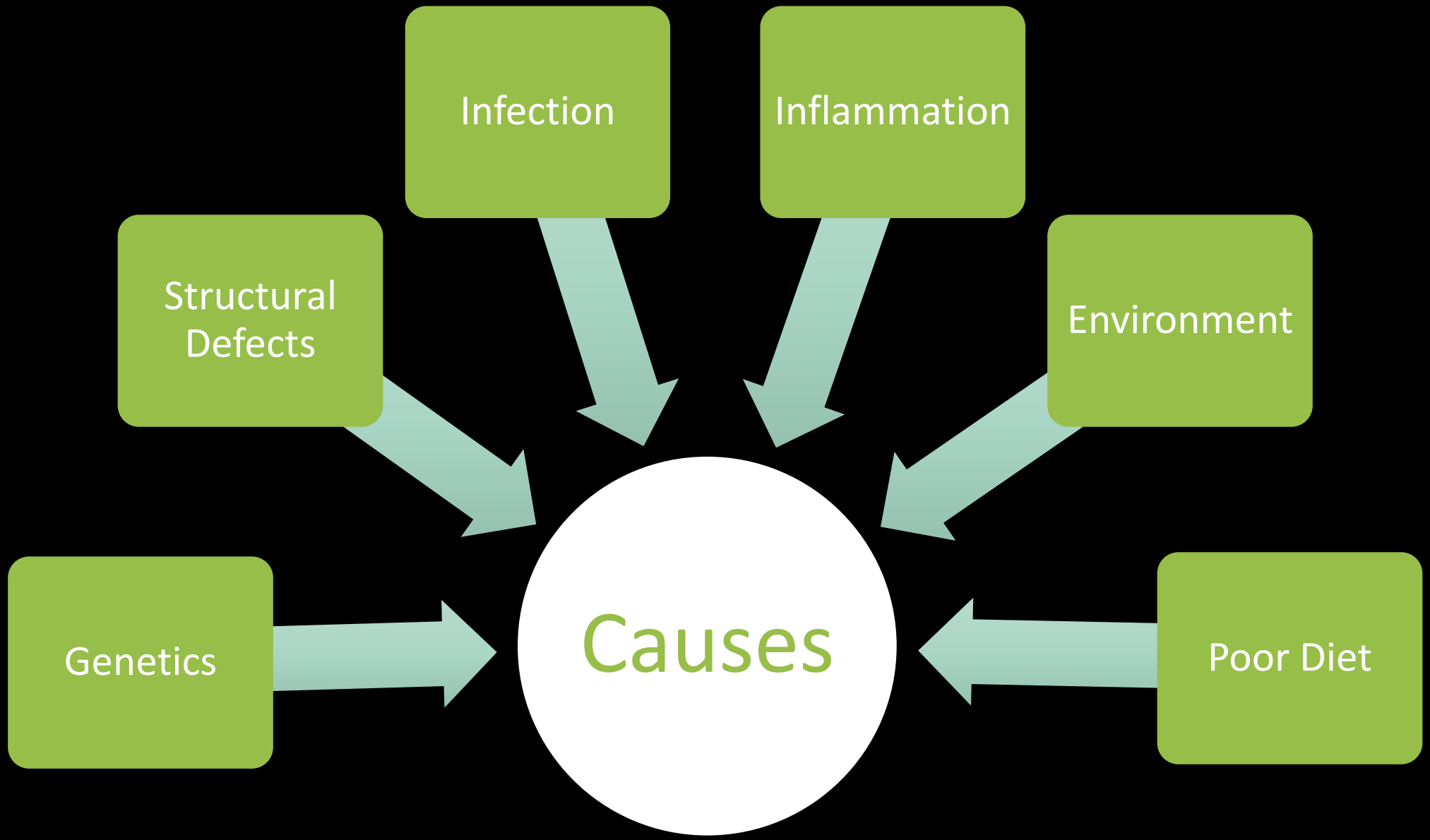
- Thin fibrous cap
- Inflammatory cell infiltrates: proteolytic activity
- Lipid-rich plaque



Stable Plaque

- Thick fibrous cap
- Smooth muscle cells: more extracellular matrix
- Lipid-poor plaque

Libby P. *Circulation.* 1995;91:2844-2850.


Infection
Inflammation
Structural Defects
Environment
Genetics
Causes
Poor Diet

Obesity
High Cholesterol
Physical Inactivity
Risk Factors
High Blood Pressure
Diabetes

Cardiovascular Risk Factors

- Four major risk factors for cardiovascular disease:
  - Hypertension
  - Diabetes mellitus
  - Dyslipidemia
  - Smoking
- Higher rates of CV disease in older people: absolute number of cases per risk factor tends to increase with age
- Multiple risk factors act in concert with age-related CV changes to promote the development and progression of heart and vascular disorders

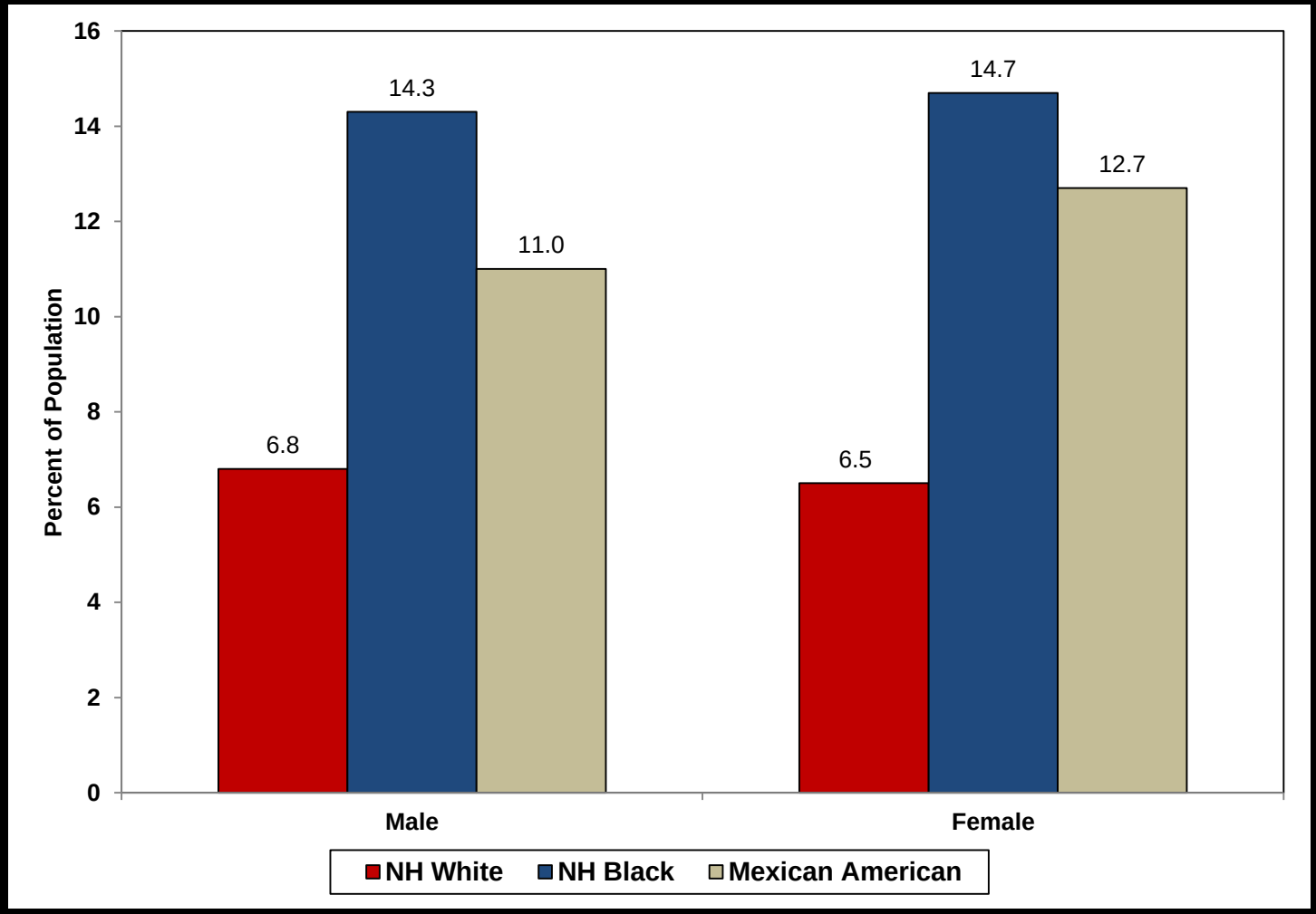
Hypertension

- Systolic BP tends to increase gradually with age, while diastolic BP peaks and plateaus in late middle age and declines thereafter
  - Pulse pressure (the difference between systolic and diastolic BP) increases with age, and isolated systolic hypertension becomes the dominant form of hypertension in older adults, especially women
- Although the prevalence of diastolic hypertension declines with age, the presence of increased diastolic BP raises CVD risk independent of systolic BP, particularly in men

Diabetese Mellitus

- Prevalence increases with age at least up to age 80
  - Approx. 50% of patients with diabetes in the US are ≥65 yr old
- As in younger patients, the impact of diabetes on CVD risk is greater in older women than in older men
- In the Framingham Heart Study, for example:
  - The adjusted risk for incident coronary heart disease for older patients with diabetes was 2.1 in women and 1.4 in men
  - The excess risk associated with diabetes was greater in both men and women >65 yr old than in younger individuals

Age-adjusted prevalence of physician-diagnosed diabetes in adults ≥20 years of age by race/ethnicity and sex (NHANES: 2005–2008).



Source: NCHS and NHLBI. NH indicates non-Hispanic.

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Roger VL et al. Published online in *Circulation* Dec. 15, 2010

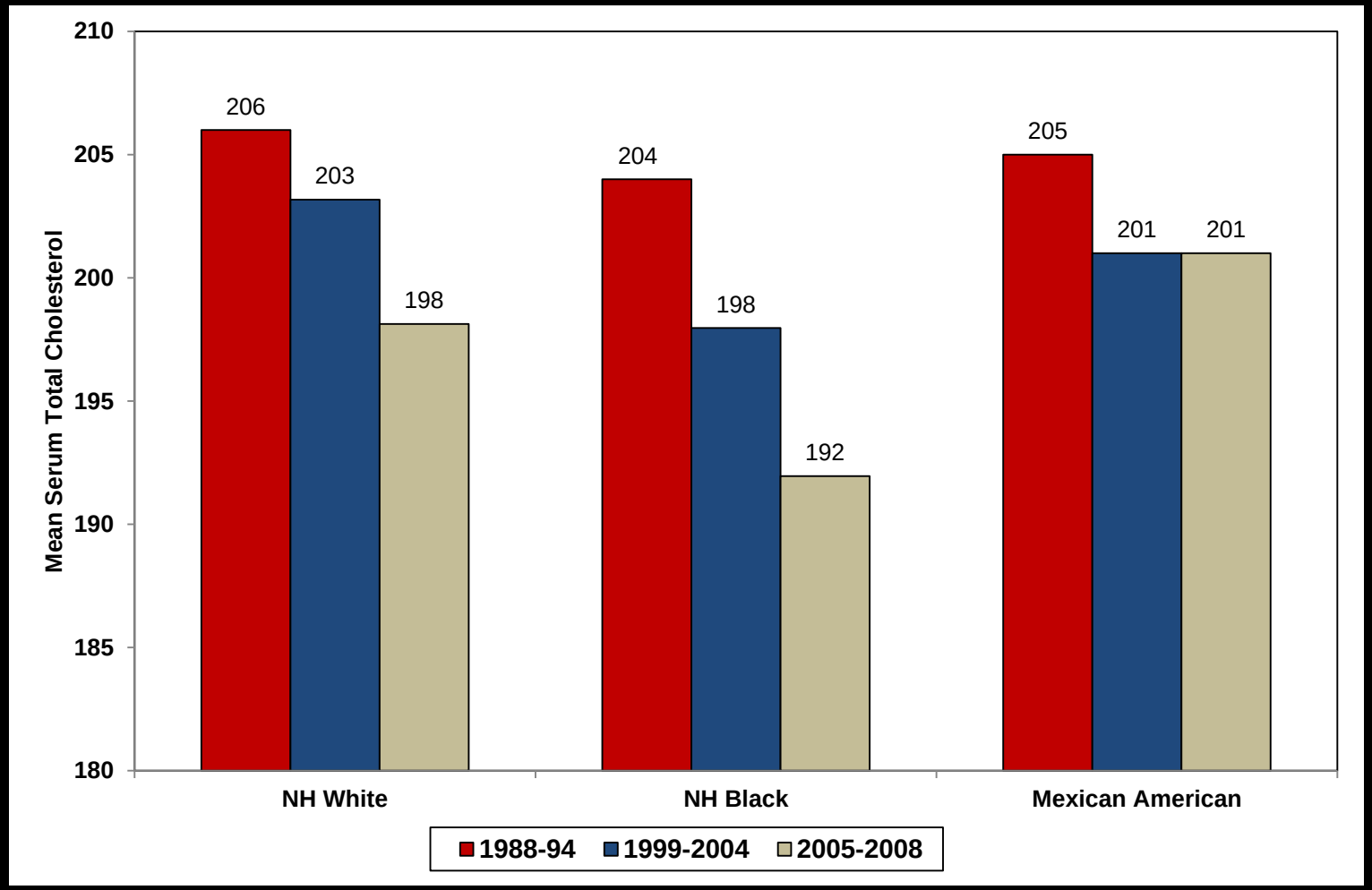
Dyslipidemia

- The strength of the association between total cholesterol and LDL cholesterol levels and incident CAD ↓ with age, especially after age 80

- But low HDL cholesterol levels (<40 mg/dL in men, <50 mg/dL in women) and high ratios of total cholesterol to HDL cholesterol (≥5.5 in men, ≥5 in women) remain independently associated with coronary events even among people >80 yr old

- Clinical trials have demonstrated benefits of statin therapy in moderate-risk and high-risk patients up to 85 yr of age

Trends in mean total serum cholesterol among adults ages ≥20 by race and survey year, (NHANES: 1988–1994, 1999–2004 and 2005–2008).



Source: NCHS and NHLBI. NH indicates non-Hispanic.

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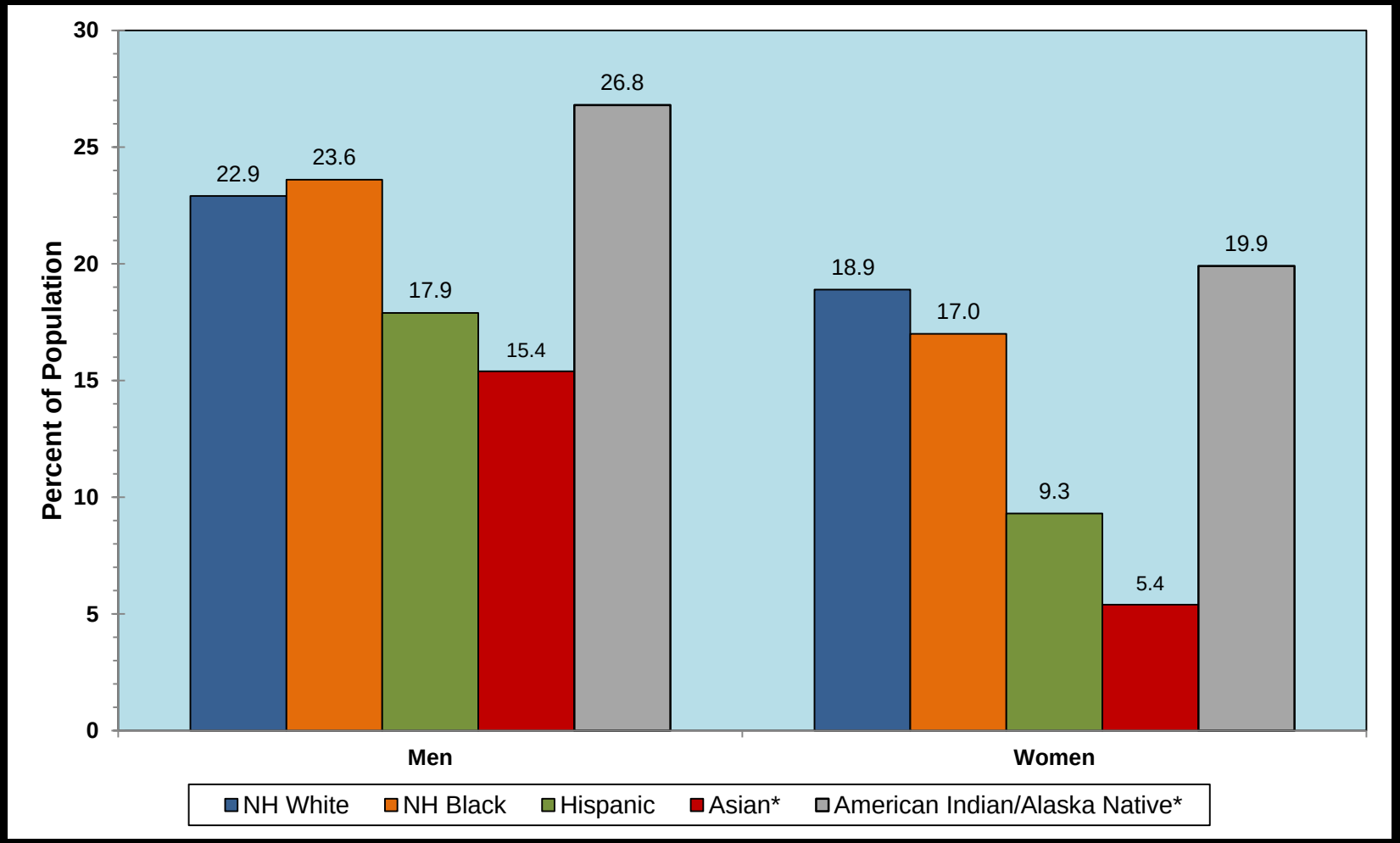
Smoking

- Prevalence of smoking declines with age, partly due to successful smoking cessation, partly due to premature deaths in smokers
  - ➢ Among older smokers, smoking cessation is associated with substantial reductions in CVD risk within 2–6 years relative to continued smoking
- In most studies, smoking remains a strong and independent risk factor for fatal and nonfatal CV events among older adults

Prevalence of current smoking for adults ≥ 18 years of age by race/ethnicity and sex (NHIS: 2007-2009)



All percentages are age-adjusted. NH indicates non-Hispanic. *Includes both Hispanics and non-Hispanics. Data derived from Centers for Disease Control and Prevention/National Center for Health Statistics, Health Data Interactive.

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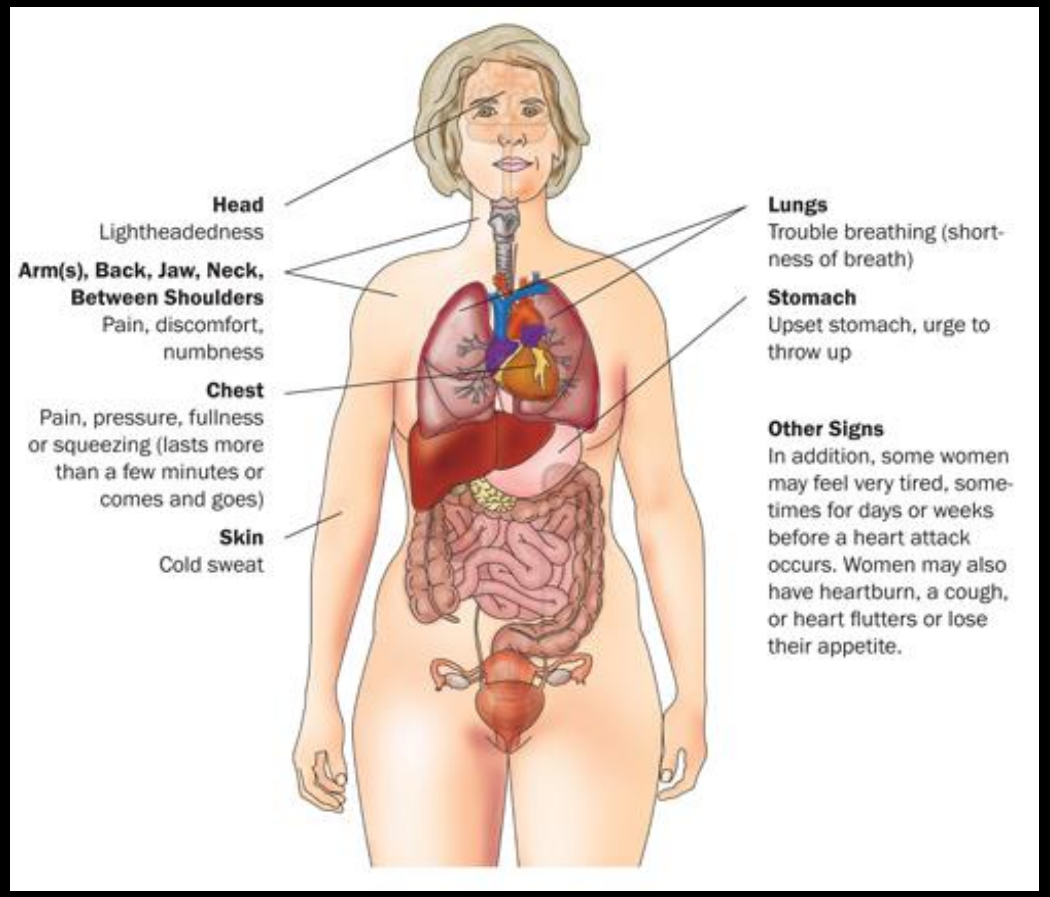
Roger VL et al. Published online in *Circulation* Dec. 15, 2011

Additional Risk Factors?

Whether the following are important risk factors for CVD among older adults is unclear:

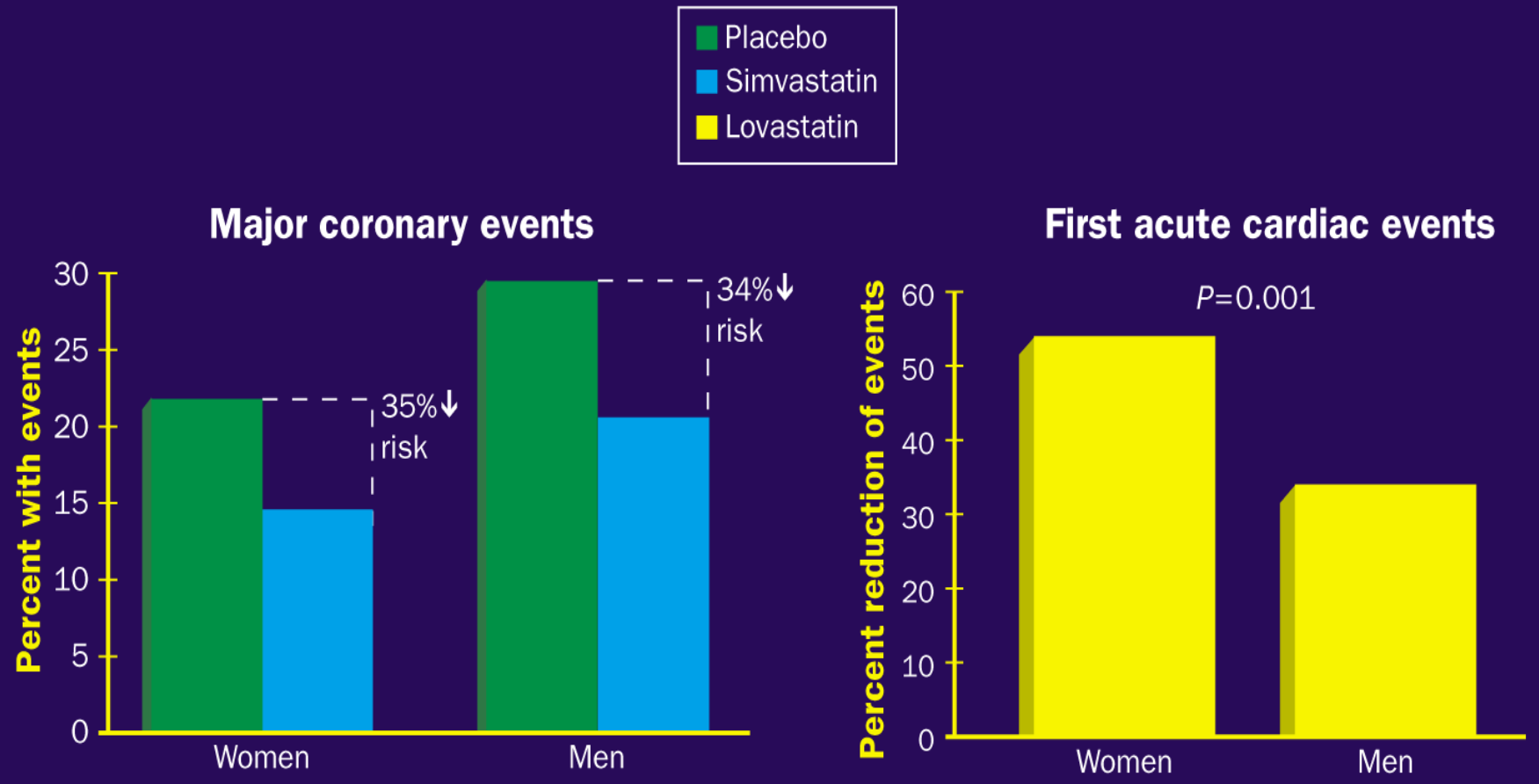
- Obesity
- Increased levels of C-reactive protein, fibrinogen, D-dimer, and plasmin-antiplasmin complex
- Coronary artery calcium content on CT

Symptoms of CVD



- Chest Pain/ Chest Discomfort
- Pain in one or both arms, left shoulder, neck jaw, or back.
- Shortness of breath
- Dizziness
- Faster heart beats
- Nausea
- Abnormal heart beats
- Fatigue

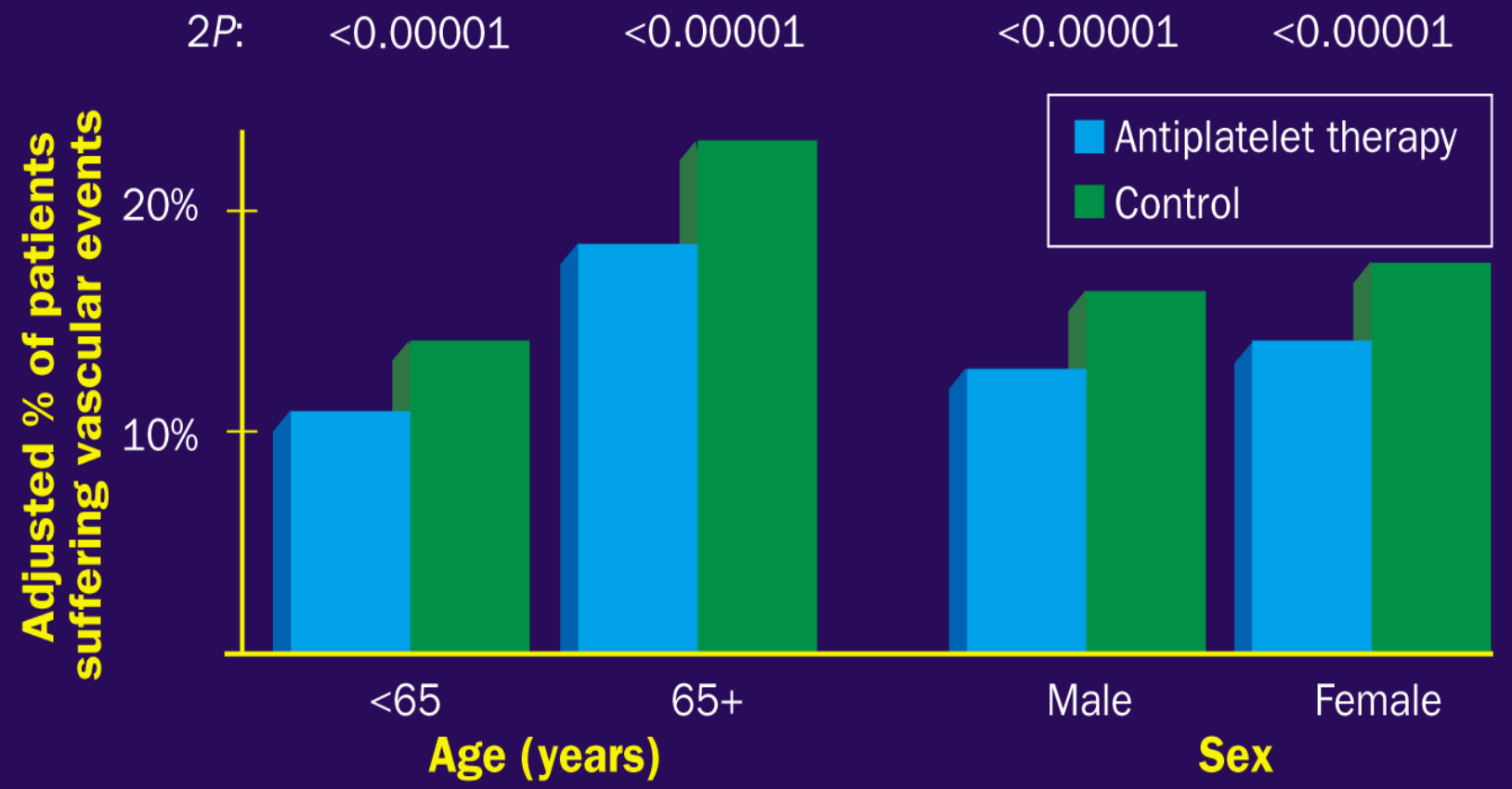
Statin Survival Studies



Lancet. 1994;344:1383.
Gotto et al. American Heart Association annual meeting. Orlando. 1997.

Effect of Aspirin on CVD

Among high-risk cardiovascular patients



Antiplatelet Trialists' Collaboration. *Br Med J.* 1994;308:71.

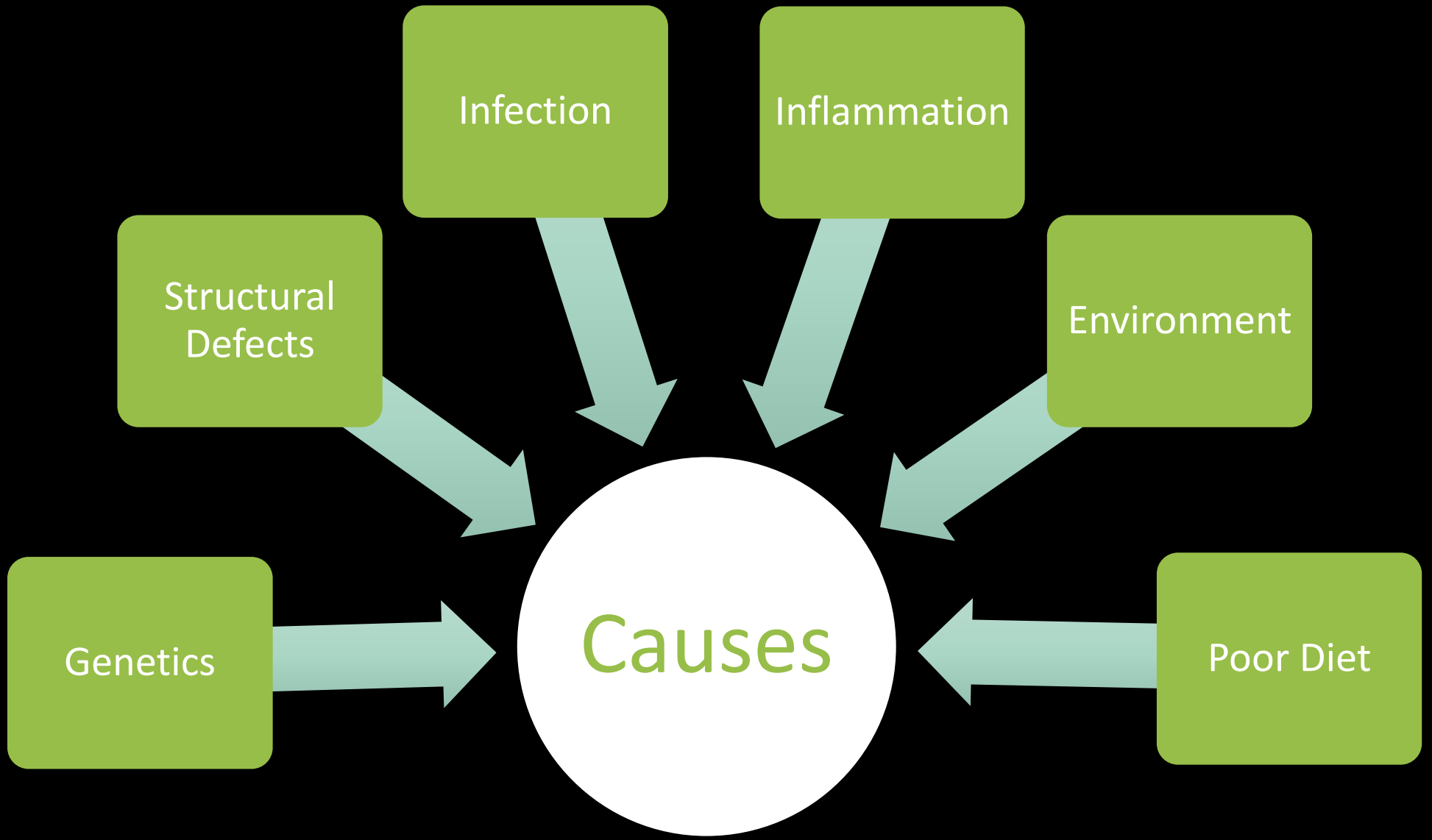
Women's Health Initiative Results for African American Women: Why Examine Racial Differences?

- Black women are at greater risk for: obesity, diabetes, stroke, and deaths due to heart disease and breast cancer compared to white women[1-5].
- Despite widespread use, menopausal hormone therapy influence on health outcomes among black women has received extremely limited attention.
- Among studies of CHD and HT conducted between 1966-1996, only 173 of 148,437 (0.1%) study participants were black[6].

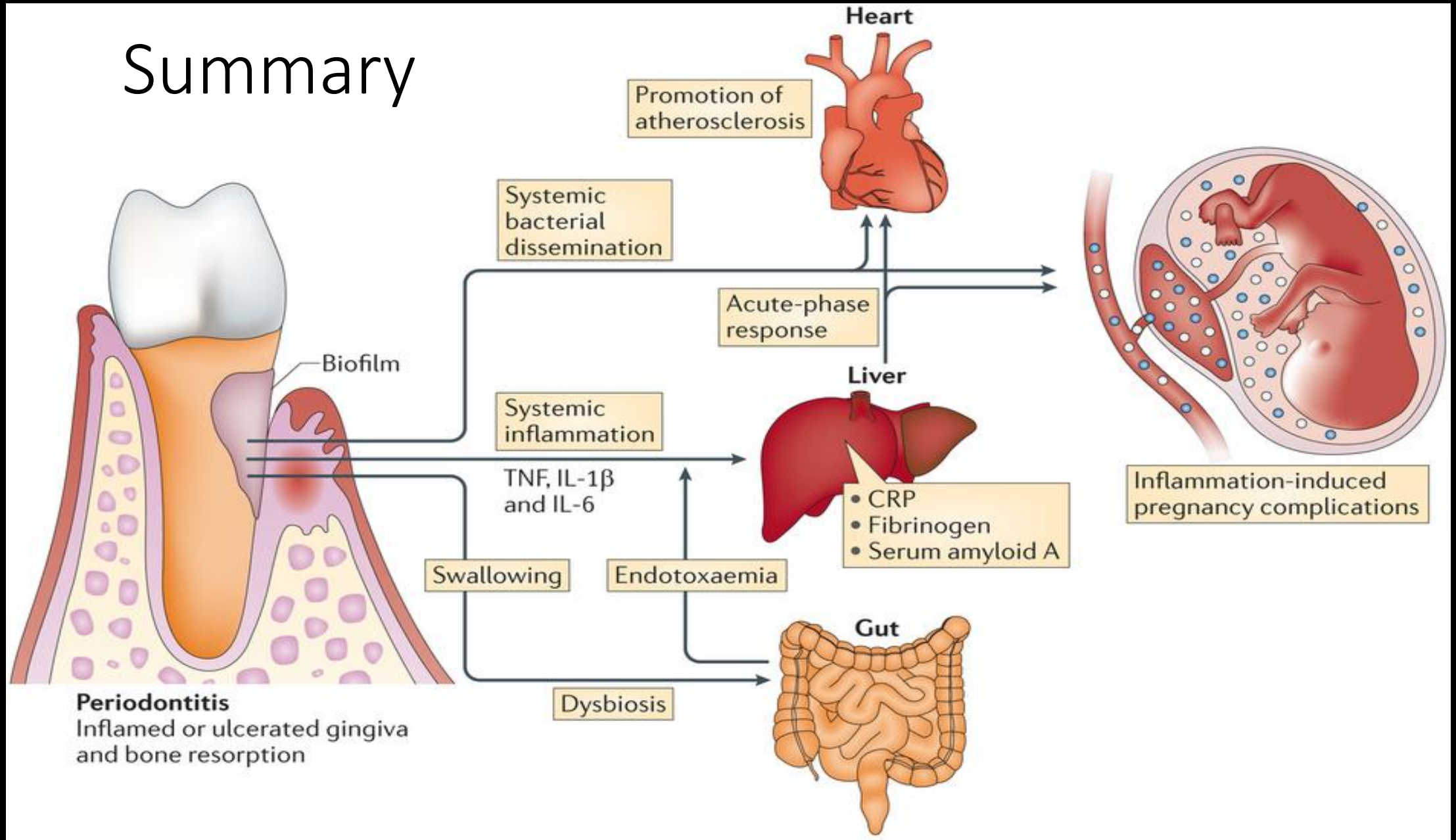
[1]Ma et al Am J Epidemiol 2013;178:1533; [2]Jha et al Circulation 2006;108:1089; [3]Chlebowski et al J Natl Cancer Inst 2005;97:939;
[4]Carey et al JAMA 2006;295:2492 ; [5]Igbal et al JAMA 2015;13:725 ; [6]Nicholson et al Menopause 1999;6:147

Estrogen Alone Influence on Clinical Outcomes in Black Women by Randomization Group

Clincal outcome	n(annualized %) Active	Placebo	HR (95%CI)
Primary endpoints			
Coronary heart disease	48(0.55)	52(0.55)	1.03 (0.69,1.53)
Invasive breast cancer	17(0.20)	40(0.43)	0.47 (0.26,0.82)
Other endpoints in global index			
Stroke	48(0.56)	49(0.52)	1.04 (0.70,1.56)
Venous Thromboembolism	23(0.26)	40(0.42)	0.63 (0.38,1.06)
Colorectal cancer	10(0.11)	9(0.09)	1.21 (0.49,2.98)
Hip fracture	4(0.05)	4(0.04)	0.94 (0.23,3.80)
All−cause mortality	98(1.11)	99(1.03)	1.04 (0.79,1.38)
Global index	172(2.06)	195(2.18)	0.95 (0.77,1.17)

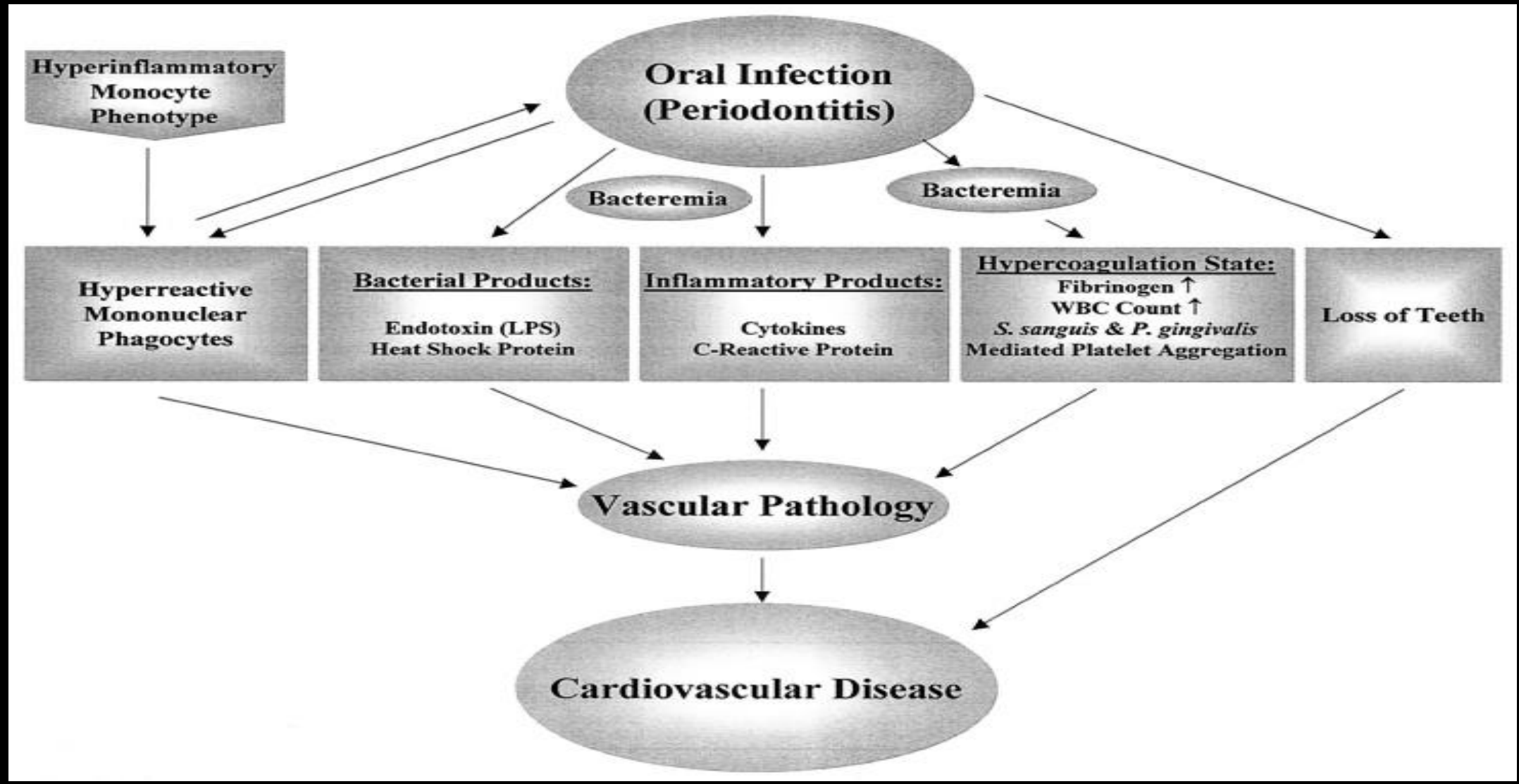

Infection
Inflammation
Structural Defects
Environment
Genetics
Causes
Poor Diet

Summary



Nature Reviews | Immunology

Conclusion

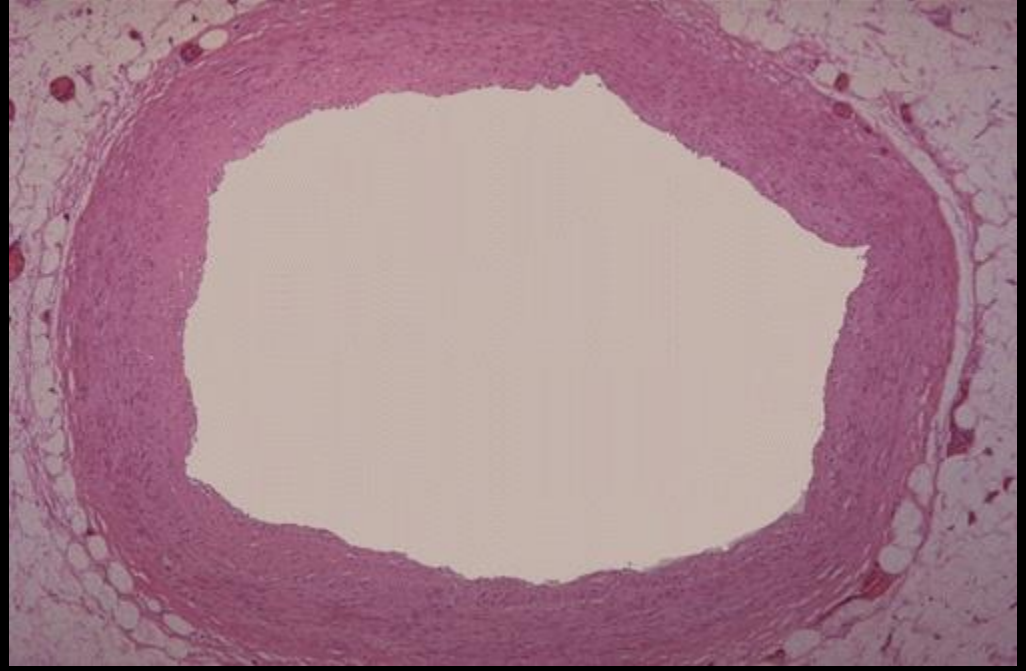

Hyperinflammatory Monocyte Phenotype
Oral Infection (Periodontitis)
Bacteremia
Bacteremia
Hyperreactive Mononuclear Phagocytes
Bacterial Products:
Endotoxin (LPS)
Heat Shock Protein
Inflammatory Products:
Cytokines
C-Reactive Protein
Hypercoagulation State:
Fibrinogen ↑
WBC Count ↑
S. sanguis & P. gingivalis
Mediated Platelet Aggregation
Loss of Teeth
Vascular Pathology
Cardiovascular Disease

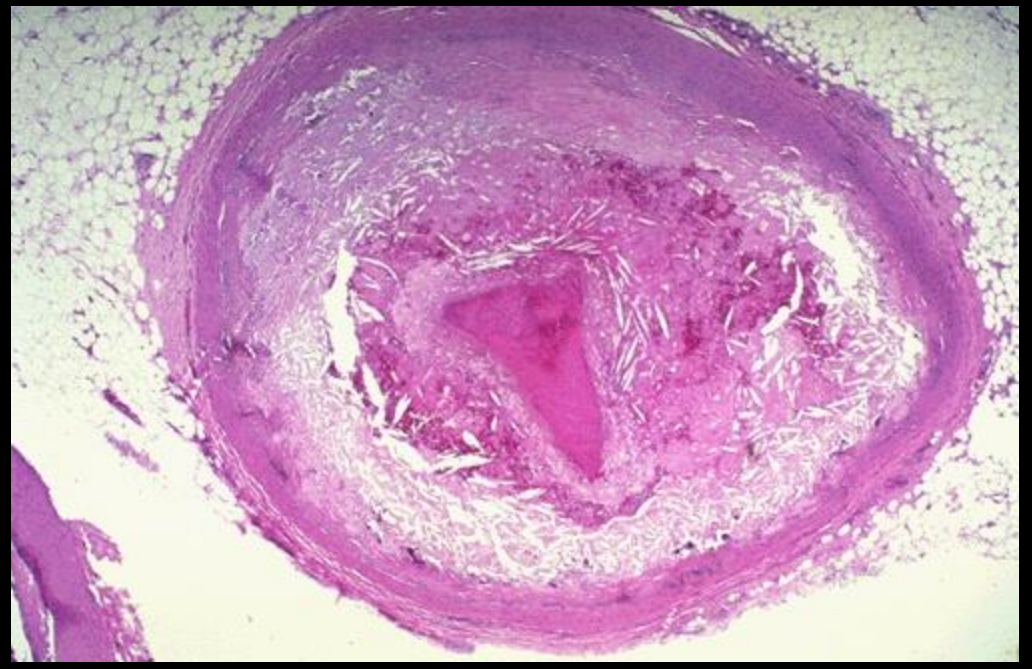
Questions

Hypertension

- 20261 deaths in 2002; 7/100,000 population
- 20.1% of adults over 20 years old

Cardiovascular disease





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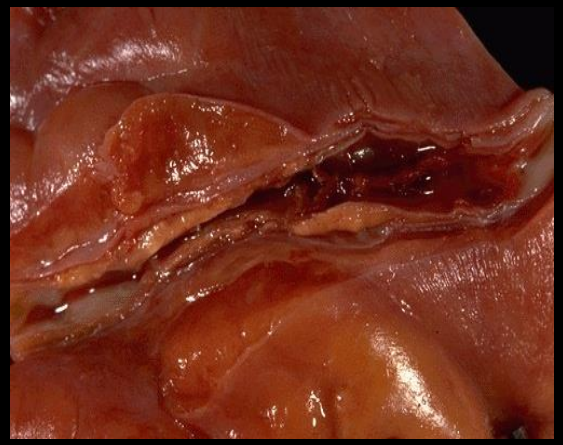
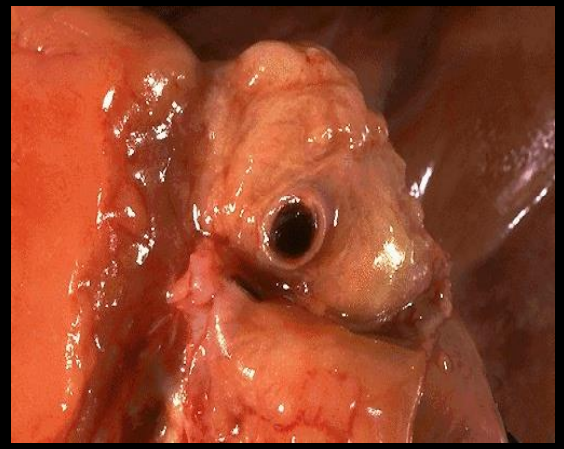




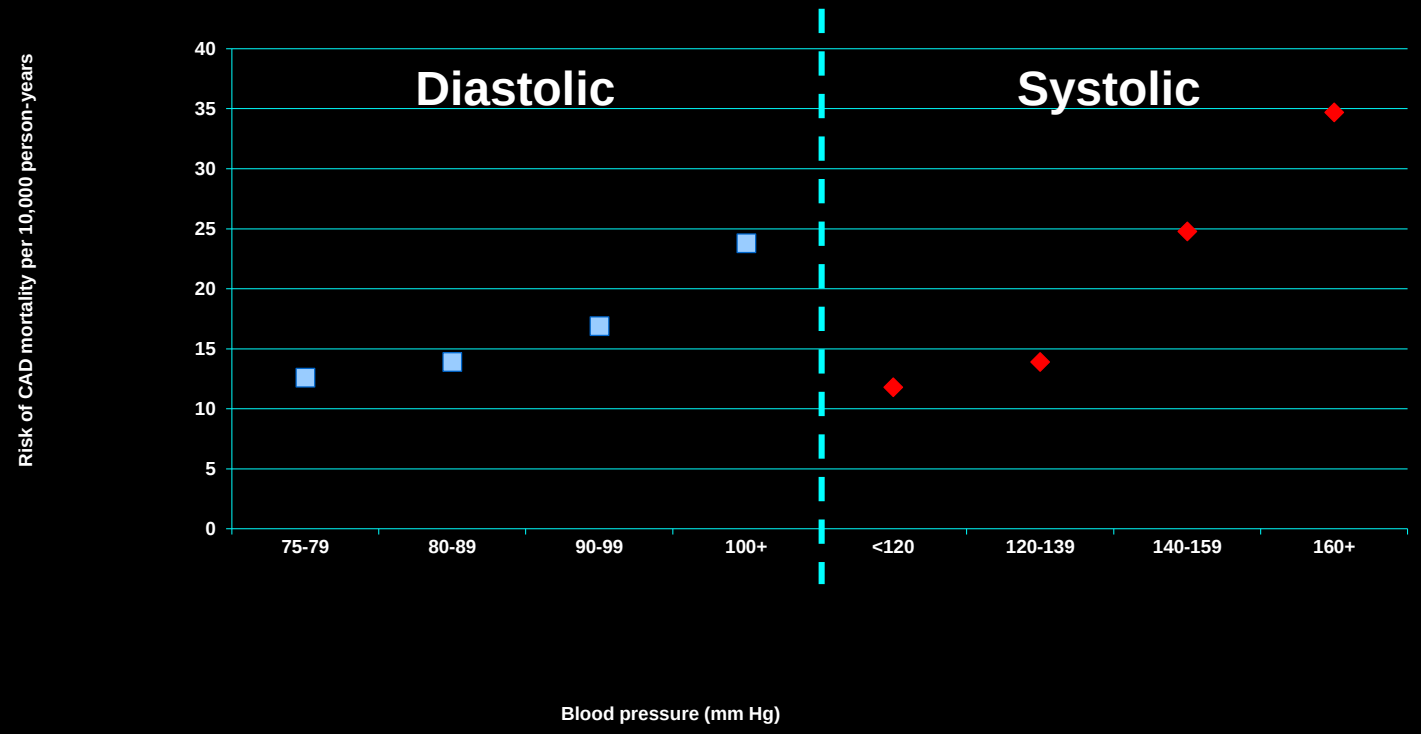
2004 ADR

Hypertension as a Risk Factor

Hypertension is a significant risk factor for:

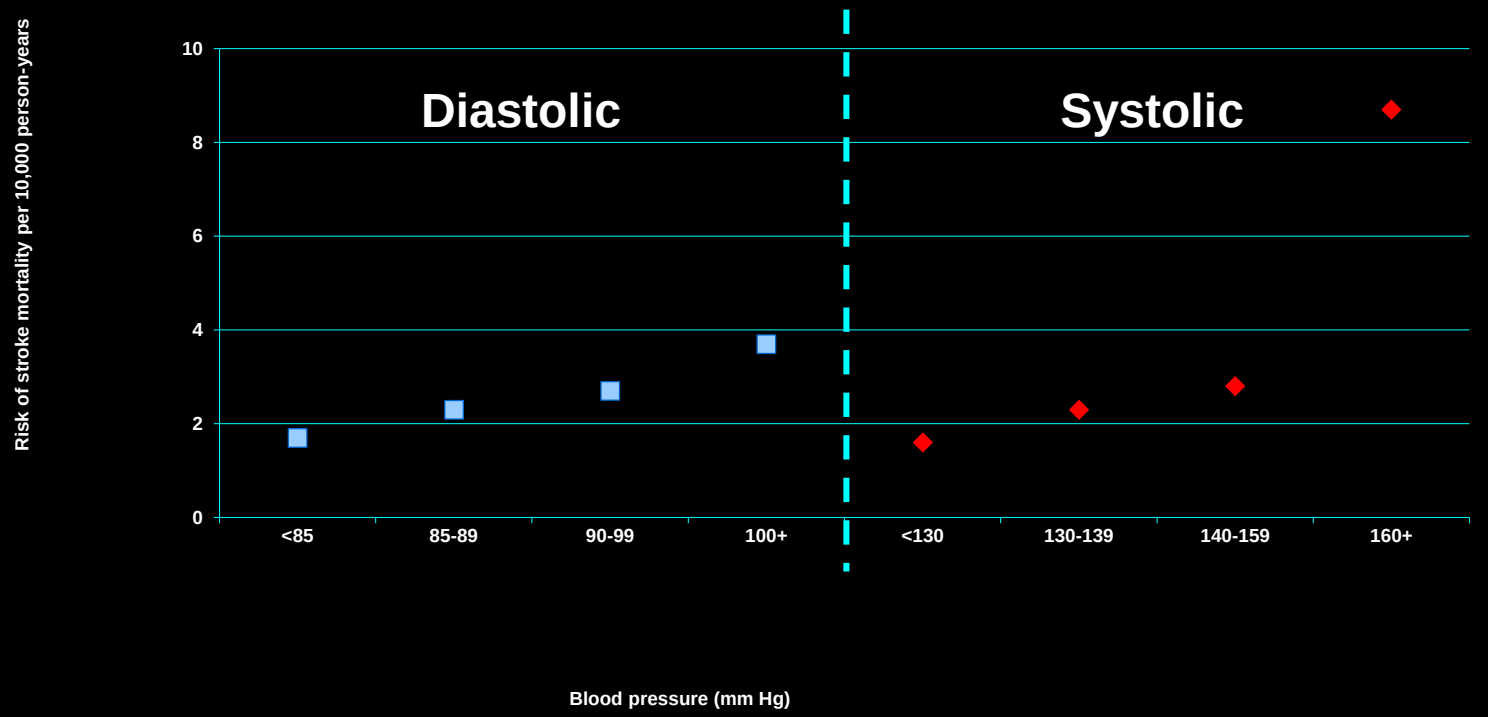
- cerebrovascular disease
- coronary artery disease
- congestive heart failure
- renal failure
- peripheral vascular disease
- dementia
- atrial fibrillation

Blood Pressure and Risk of CAD Mortality



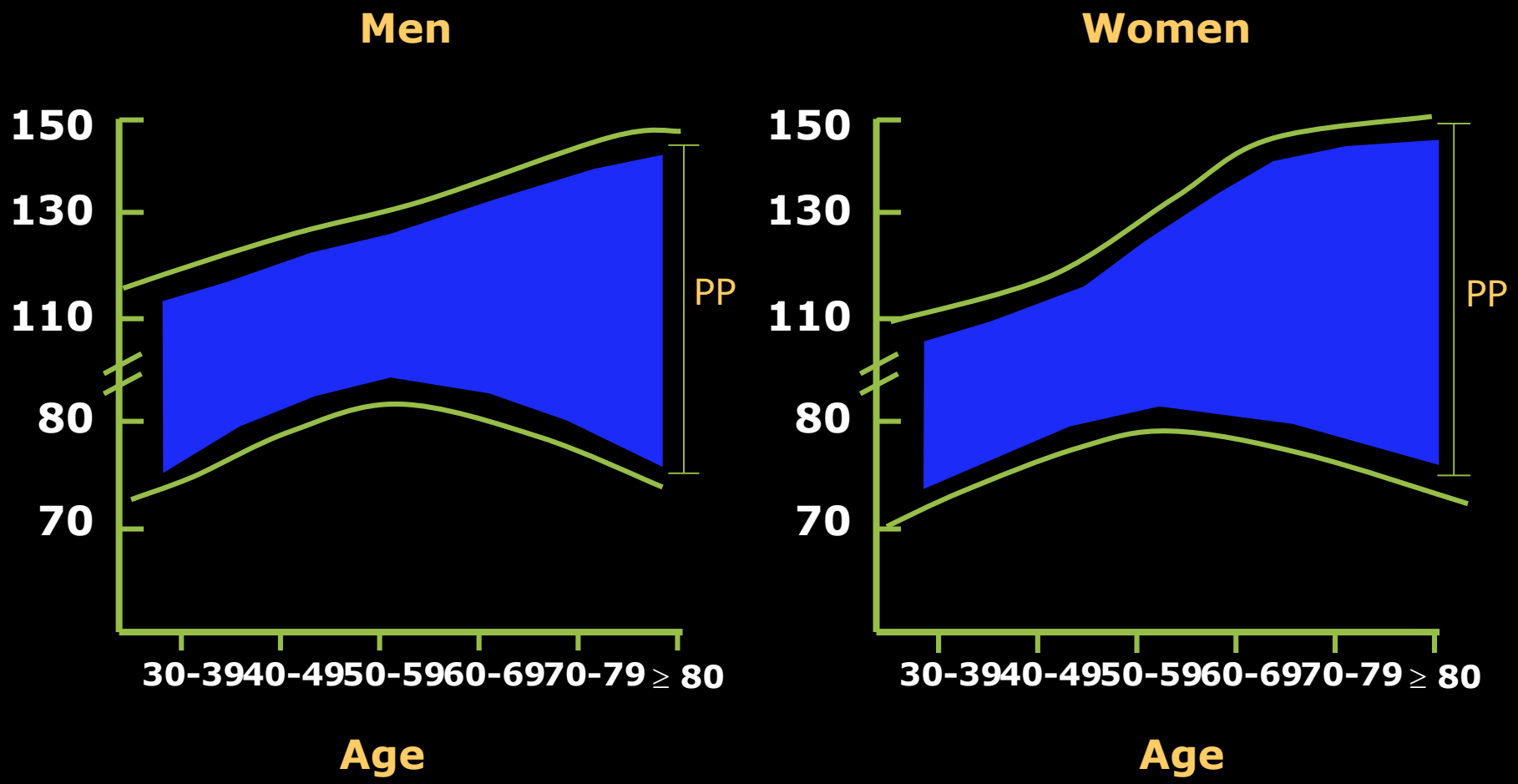
Multiple Risk Factor Intervention Trial (MRFIT); n=347,978 men.
Neaton et al. Arch Intern Med 1992;152:56-64

Blood Pressure and Risk of Stroke Mortality



Multiple Risk Factor Intervention Trial (MRFIT); n=347,978 men.
Neaton et al. In: Laragh et al (eds)
Hypertension: Pathophysiology, Diagnosis, and Management.2 ed. NY: Raven, 1995:127

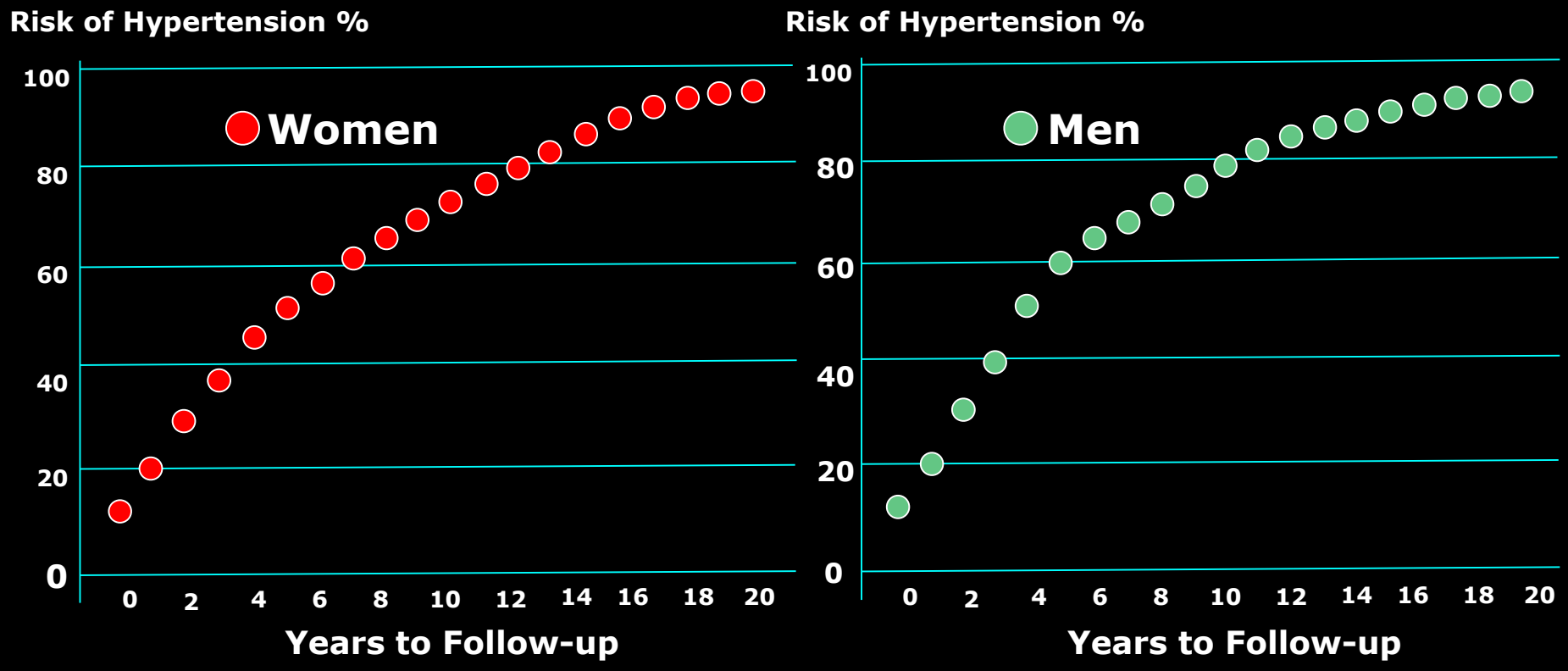
Blood Pressure Distribution According to Age



PP=Pulse Pressure.

Adapted from : Third National Health and Nutrition. Examination Survey, *Hypertension* 1995;25:305-13

Cumulative Incidence of Hypertension in Women and Men aged 65 years



JAMA 2002: Framingham data.

Classification of Hypertension

(Pre Hypertension) 120-139 -- 80-89

Category	Systolic		Diastolic
Optimal / Normal	<120	and / or	<80
Pre hypertension	120-139	and / or	80-89
Hypertension	≥ 140	and / or	≥ 90
Grade 1	140-159	and / or	90-99
Grade 2	160-179	and / or	100-109
Grade 3	≥ 180	and / or	≥ 110
Isolated Systolic Hypertension (ISH)	≥140	and / or	<90

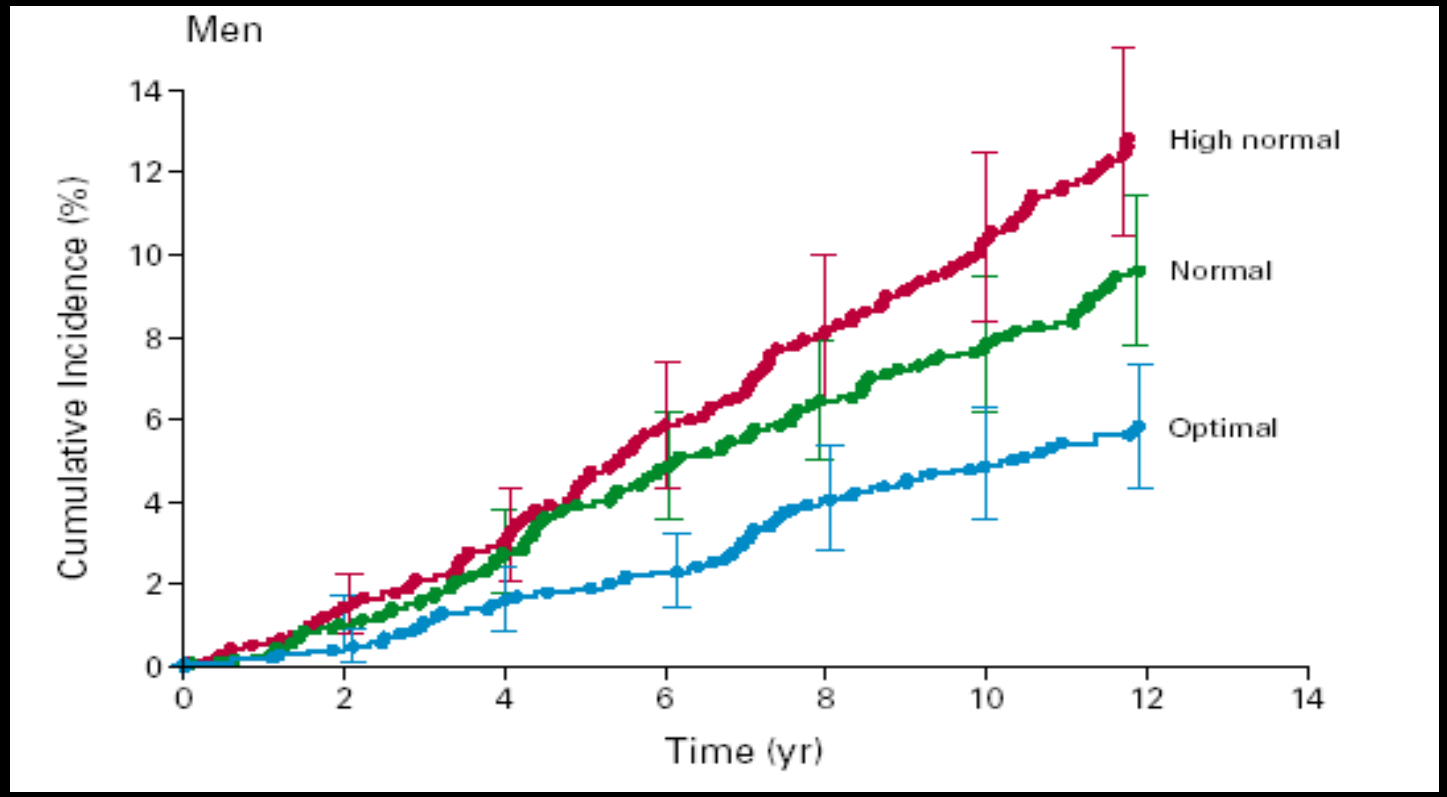
The category pertains to the highest risk blood pressure

*ISH=International Society of Hypertension.

Chalmers J et al. *J Hypertens* 1999;17:151-85 and JNC-7 JAMA 2003, 288, 2560-72.

Impact of High-Normal Blood Pressure on the Risk of Cardiovascular Disease

CUMULATIVE INCIDENCE OF CV EVENTS IN MEN *WITHOUT* HYPERTENSION ACCORDING TO BASELINE BLOOD PRESSURE



mmHg

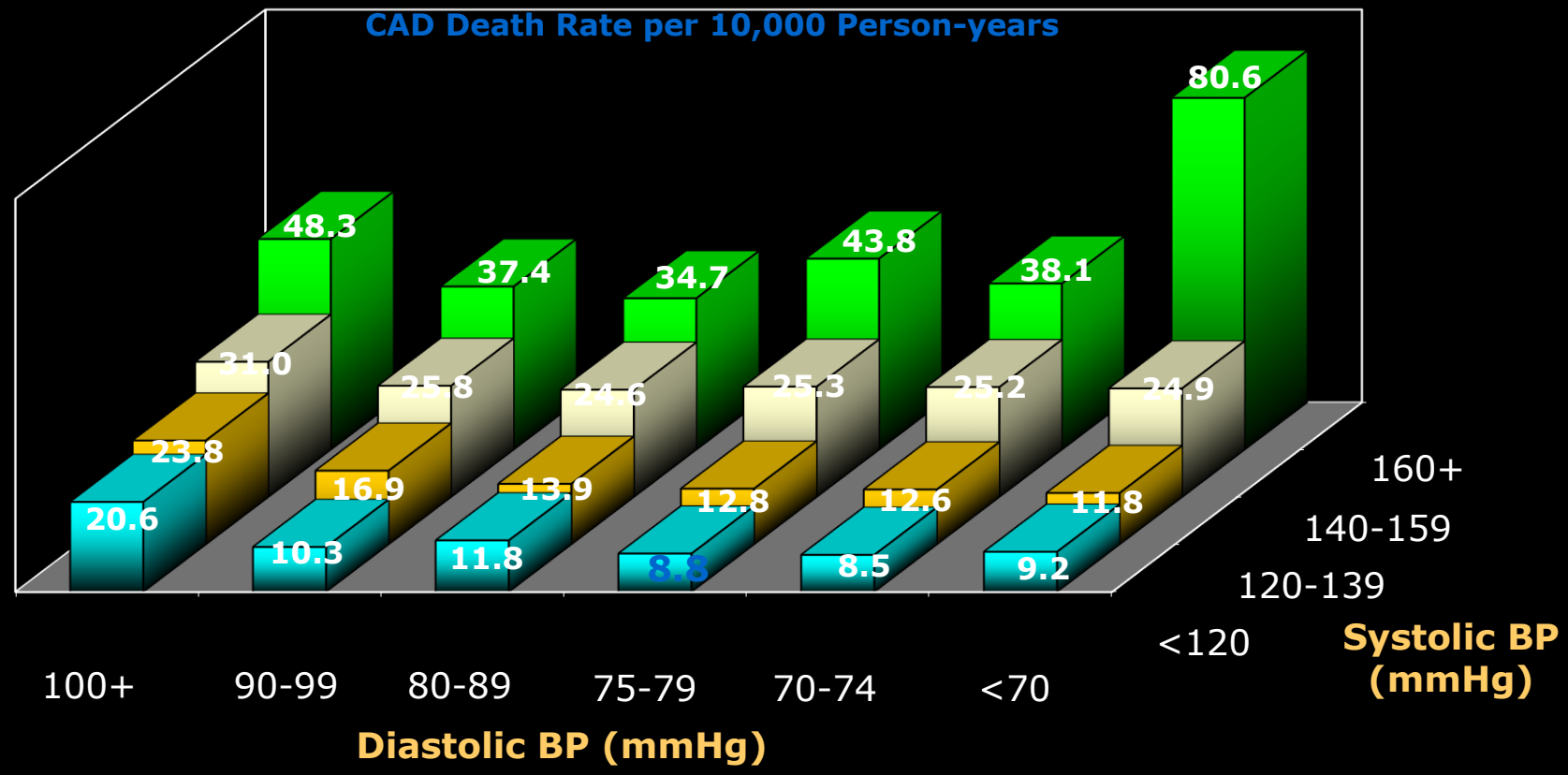
(130-139)

(121-129)

(< 120)

N Engl J Med 2001;345:1291-7

Effect of SBP and DBP on Age-Adjusted CAD Mortality: MRFIT



Neaton et al. *Arch Intern Med* 1992; 152:56-64.

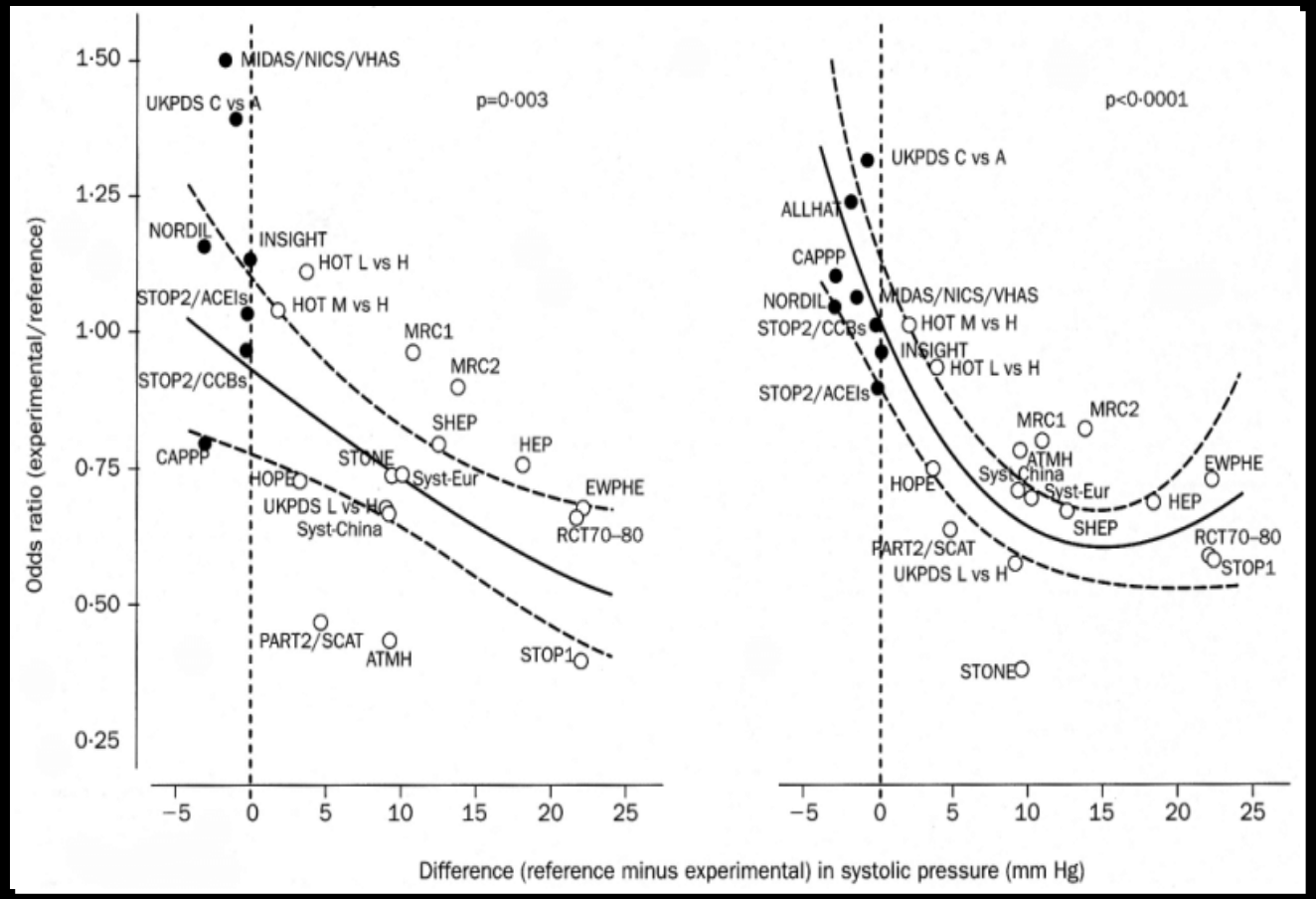
Benefits of Treating Hypertension

- Younger than 60
  - reduces the risk of stroke by **42%**
  - reduces the risk of coronary event by **14%**

- Older than 60
  - reduces overall mortality by **20%**
  - reduces cardiovascular mortality by **33%**
  - reduces incidence of stroke by **40%**
  - reduces coronary artery disease by **15%**

Correlation Between Reduction in SBP and Cardiovascular Mortality or Events

Cardiovascular mortality **Cardiovascular events**



Staessen et al. Lancet 2001;358:1305-15.

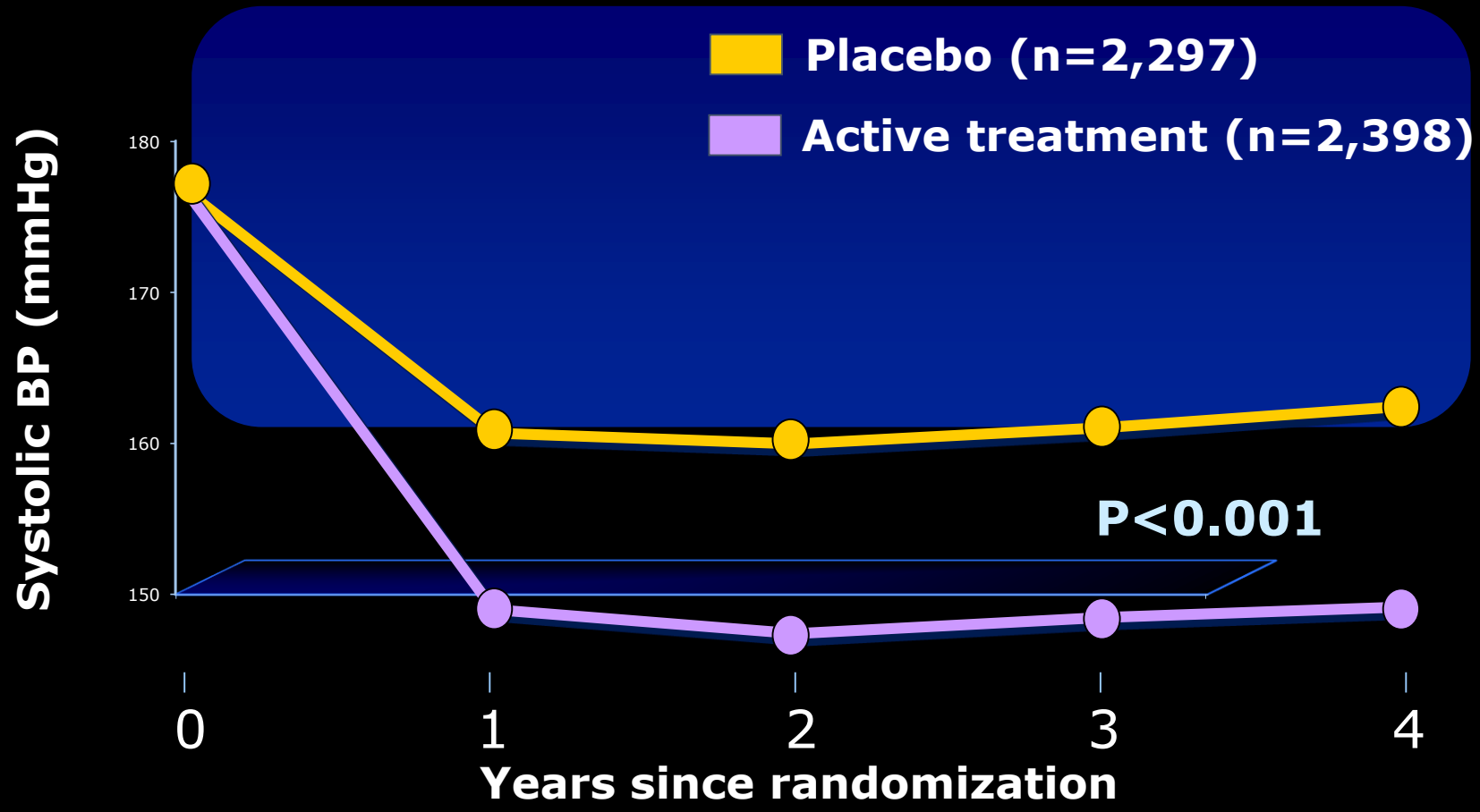
Benefits of Treating to Target

- Older than 60 with isolated systolic hypertension
  (SBP ≥160 mm Hg and DBP <90 mm Hg)
  - 36% reduction in the risk of stroke
  - 25% reduction in the risk of coronary events

LIFESTYLE MODIFICATIONS FOR HYPERTENSION

- Reduce dietary sodium
  - 2gm Na diet leads to 2-8 mmHg (SBP)
- Weight loss
  - 10 kg leads to 5-20 mmHg
- Increasing Physical Activity
  - 30 min 5X per week leads to 4-9 mmHg
- Moderate alcohol consumption
  - 1 drink wine q day leads to 2-4 mmHg

Syst-Eur Mean Sitting Systolic Blood Pressure



Syst-Eur=Systolic Hypertension in Europe Trial

Staessen JA, et al. Lancet. 1997;350:757-764.
Reprinted with permission from Elsevier Science.

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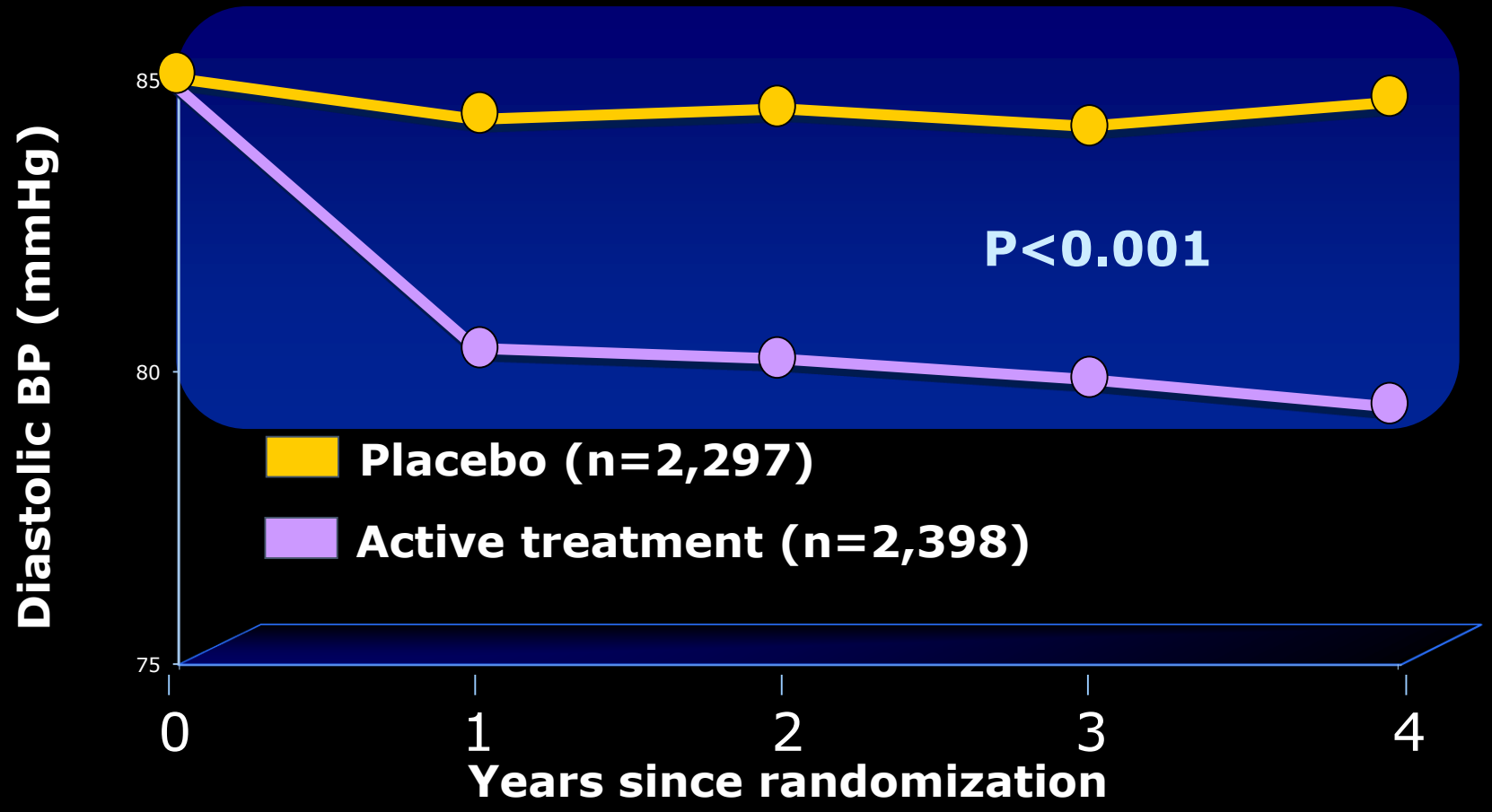
Syst-Eur Mean Sitting Diastolic Blood Pressure



Syst-Eur=Systolic Hypertension in Europe Trial

Staessen JA, et al. Lancet. 1997;350:757-764.
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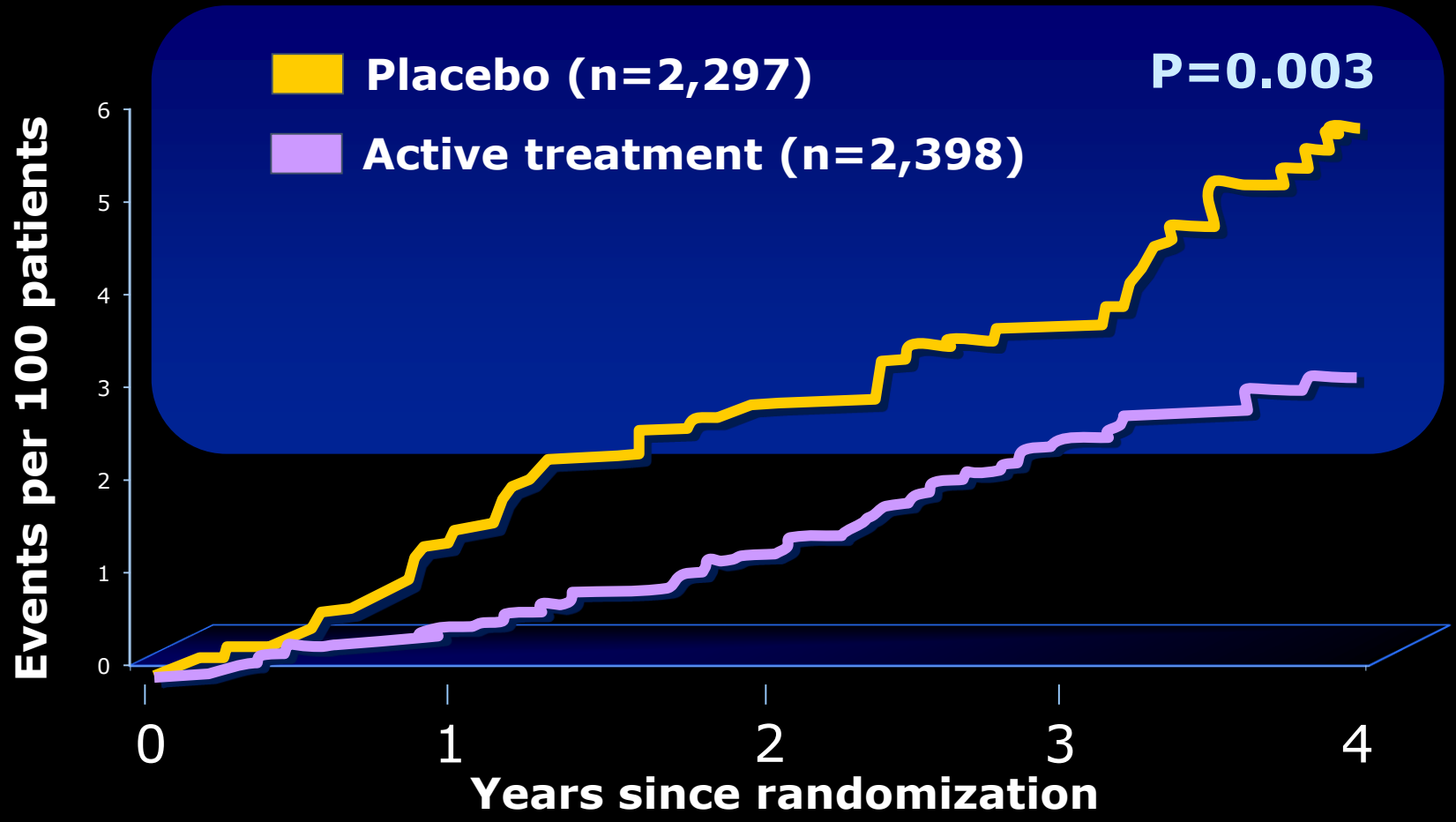
Syst-Eur Primary Endpoint
Fatal and Nonfatal Stroke



Syst-Eur=Systolic Hypertension in Europe Trial

Staessen JA, et al. Lancet. 1997;350:757-764.
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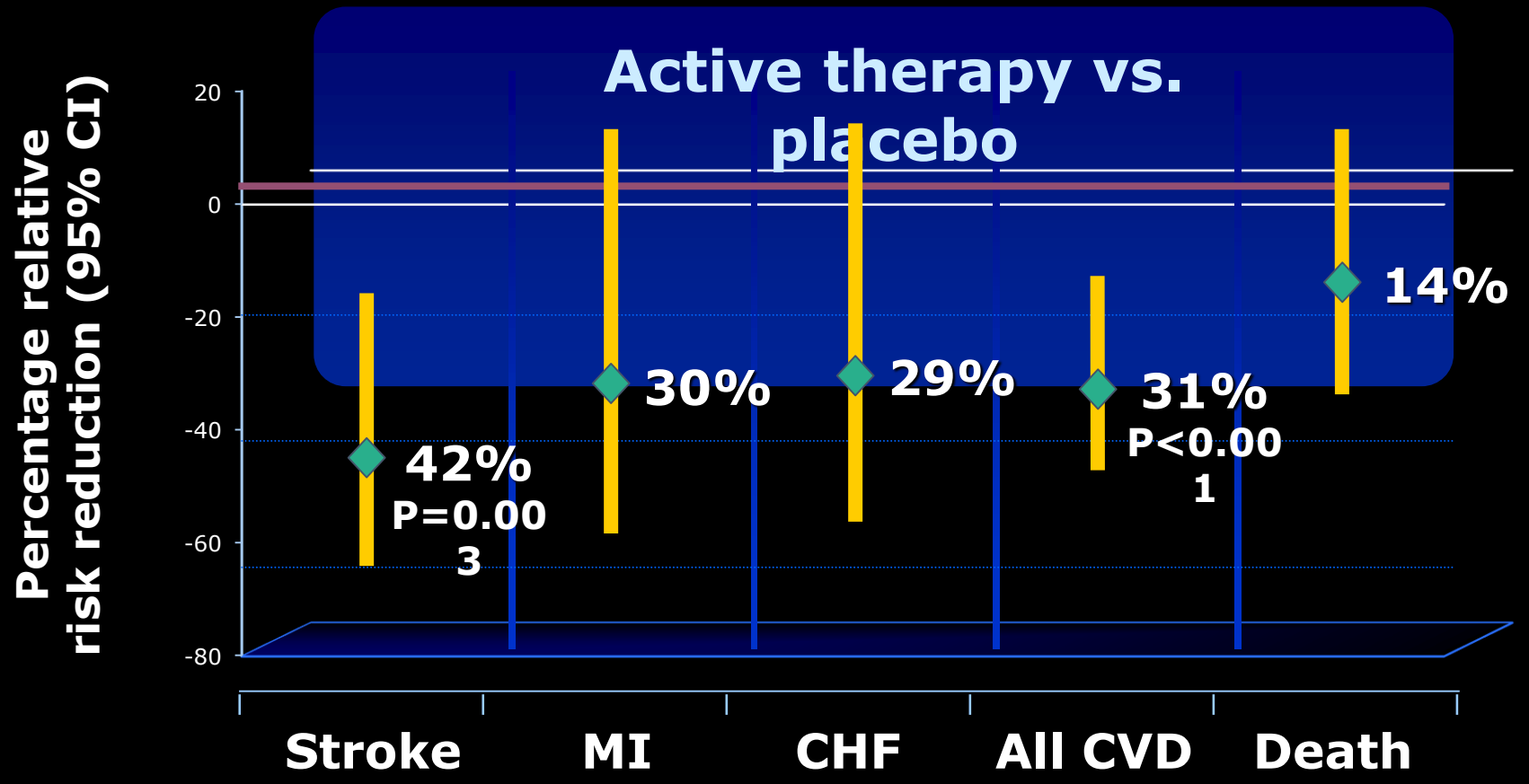
Syst-Eur
Cardiovascular Disease Endpoints



MI=myocardial infarction; CHF=congestive heart failure; CVD=cardiovascular disease

Syst-Eur=Systolic Hypertension in Europe Trial

Staessen JA, et al. Lancet. 1997;350:757-764.

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Risk Stratification: JNC-VI

BP Stages	Systolic BP (mmHg)	Diastolic BP (mmHg)	Risk Group A ▪No risk factors ▪No TOD ▪No CCD	Risk Group B ▪≥1 risk factors…but no diabetes ▪No TOD ▪No CCD	Risk Group C ▪Diabetes and/or ▪TOD & CCD ▪± Other risk factors
High Normal	130-139	85-89	Lifestyle modification	Lifestyle modification	Drug therapy§
Stage 1	140-159	90-99	Lifestyle modification (up to 12 mos)	Lifestyle modification (up to 6 mos)	Drug therapy
Stage 2 & 3	≥ 160	≥ 100	Drug therapy	Drug therapy	Drug therapy

JNC-VI. Arch Intern Med. 1997;157(21):2413-2446.

JNC-VI Tx: Recommendations for High Risk Hypertensives

BP Stage	Systolic BP (mmHg)	Diastolic BP (mmHg)	Risk Group C ▪Diabetes…and/or ▪TOD & CCD ▪± Other risk factors
High Normal	130-139	85-89	Drug therapy§
Stage 1	140-159	90-99	Drug therapy

TOD = Target Organ Damage; CCD = Clinical Cardiovascular Disease
§For those patients with heart failure, renal insufficiency, and diabetes mellitus

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JNC-VI. Arch Intern Med. 1997;157(21):2413-2446.

WHO-ISH 1999 Guidelines for Management of HTN: CV Risk and Prognosis

Risk strata	Other risk factors & disease history	Systolic and Diastolic BP (mmHg)		
		Grade 1 Mild HTN SBP 140-159 or DBP 90-99	Grade 2 Moderate HTN SBP 160-179 or DBP 100-109	Grade 3 Severe HTN SBP ≥180 or DBP ≥100
I	No other risk factors	Low risk	Medium risk	High risk
II	1-2 risk factors	Medium risk	Medium risk	Very high risk
III	> 3 risk factors or TOD or DM	High risk	High risk	Very high risk
IV	Associated clinical conditions	Very high risk	Very high risk	Very high risk

TOD=Target Organ Damage/Associated Clinical Conditions include clinical cardiovasular disease or renal disease

WHO-ISH Guidelines. J Hypertens. 1999;17(2):151-183.

Tight BP Control and Intensive Gluc. Control

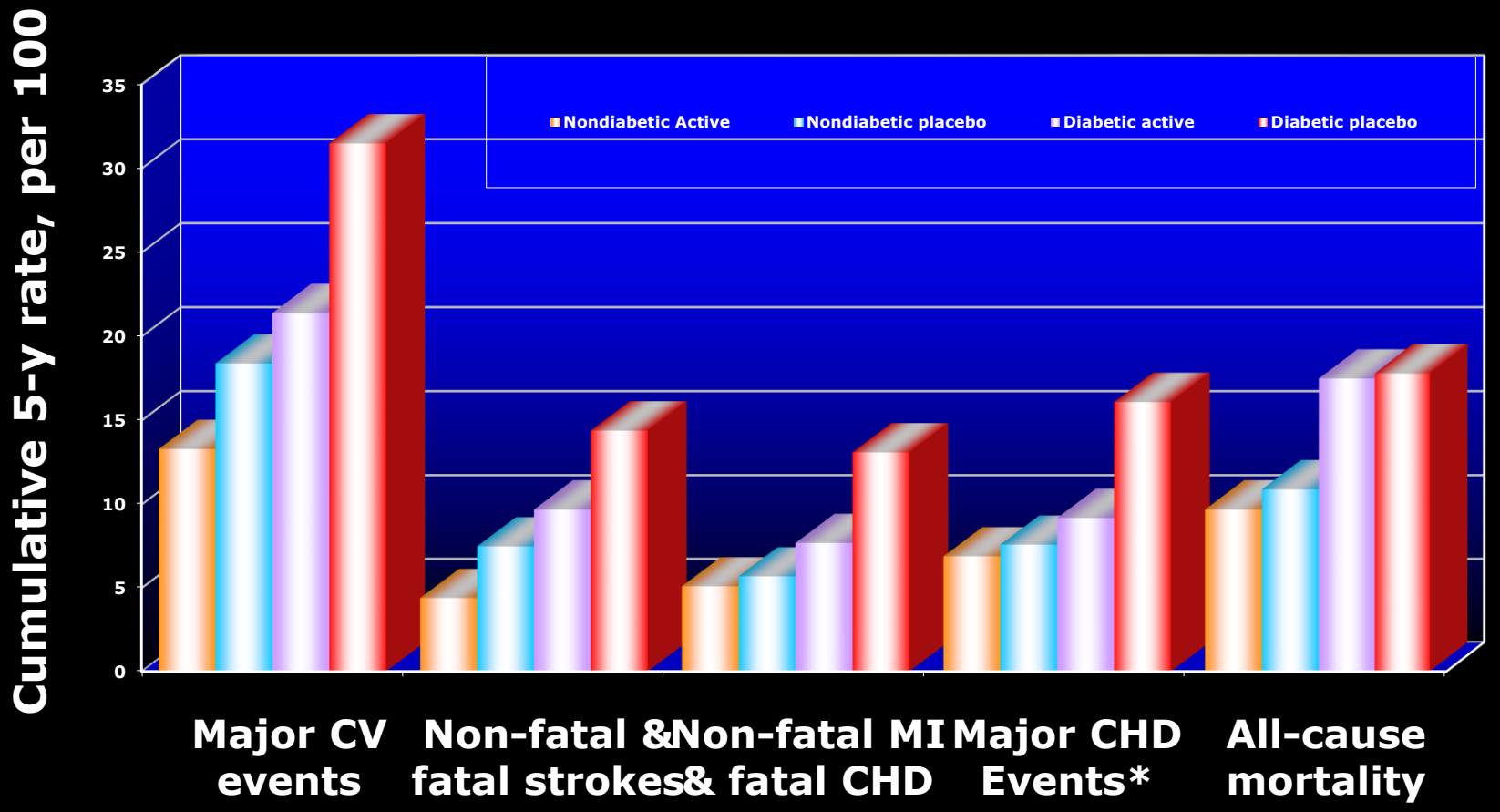
- **Tight vs less tight blood pressure control reduces risk of**
  - **Any diabetes-related endpoint 24% P=0.005**
  - **Microvascular complications 37% P=0.009**
  - **Stroke 44% P=0.01**
- **An intensive compared to conventional glucose control policy reduces risk of**
  - **Any diabetes-related endpoint 12%; P=0.03**
  - **Microvascular complications 25%; P<0.01**
  - **Myocardial infarction 16%; P=0.05**

Tight control (using captopril or atenolol) mean achieved BP 144/82 mmHg (n=758)
Less tight control (avoiding ACEIs and ß-blockers) mean achieved BP 154/87 mmHg (n=390)

Over 10 years, HbA_{1c} was 7.0% (6.2-8.2) in the intensive group treated with sulfonylurea or insulin (n=2,729) compared with 7.9% (6.9-8.8) in the conventional group (n=1,138) with diet modifications

UKPDS Group. BMJ. 1998;317:703–712. UKPDS Group. Lancet. 1998;352:837-853.

SHEP Morbidity and Mortality for Diabetics and Nondiabetics



*P<0.05 for treatment effect in diabetics compared to nondiabetics
CV=cardiovascular, MI=myocardial infarction, CHD=coronary heart disease

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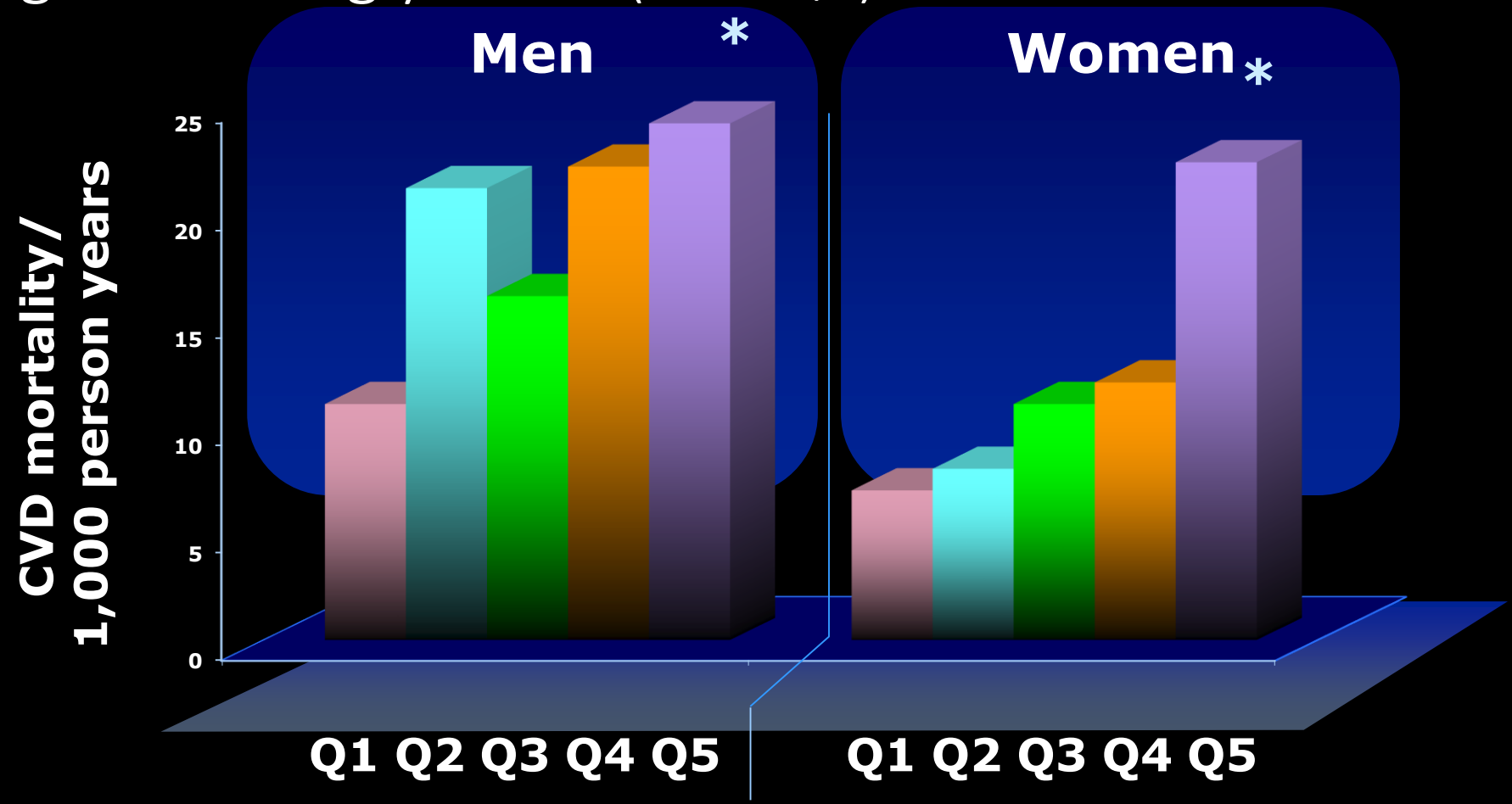
Curb DJ, et al. JAMA. 1996;276(23):1886-1892.

Age-Adjusted CVD Mortality by Quintile* of Fasting Serum Triglyceride (mmol/l)



CVD=cardiovascular disease *P<0.01 compared to Q1
Q1<1.10; Q2=1.11-1.50; Q3=1.51-2.02; Q4=2.03-2.93; Q5>2.94.
Fuller JH, et al. Diabetologia. 2001;44[suppl2]:S54-S64.
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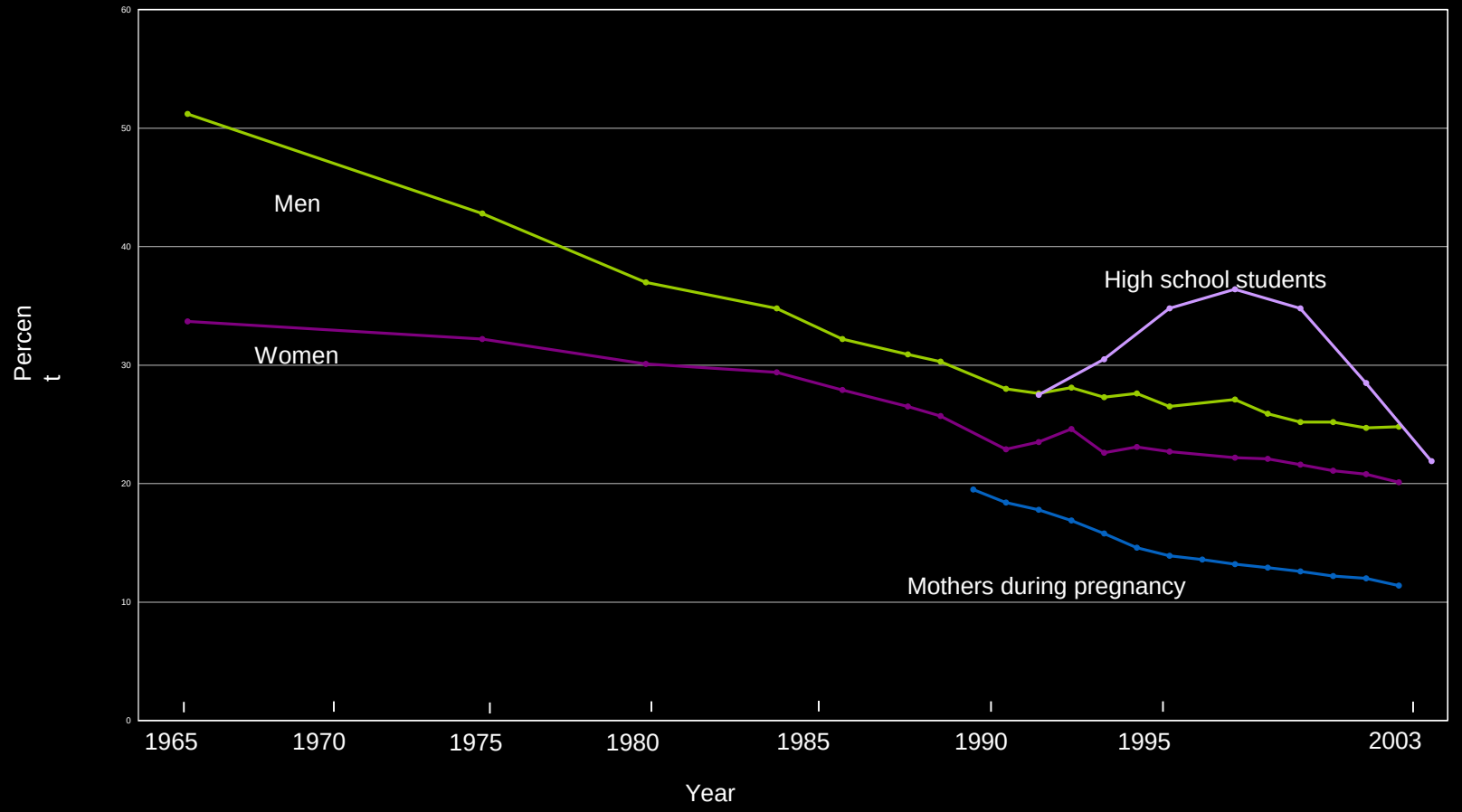
Figure 12. Cigarette smoking among men, women, high school students, and mothers during pregnancy: United States, 1965-2003

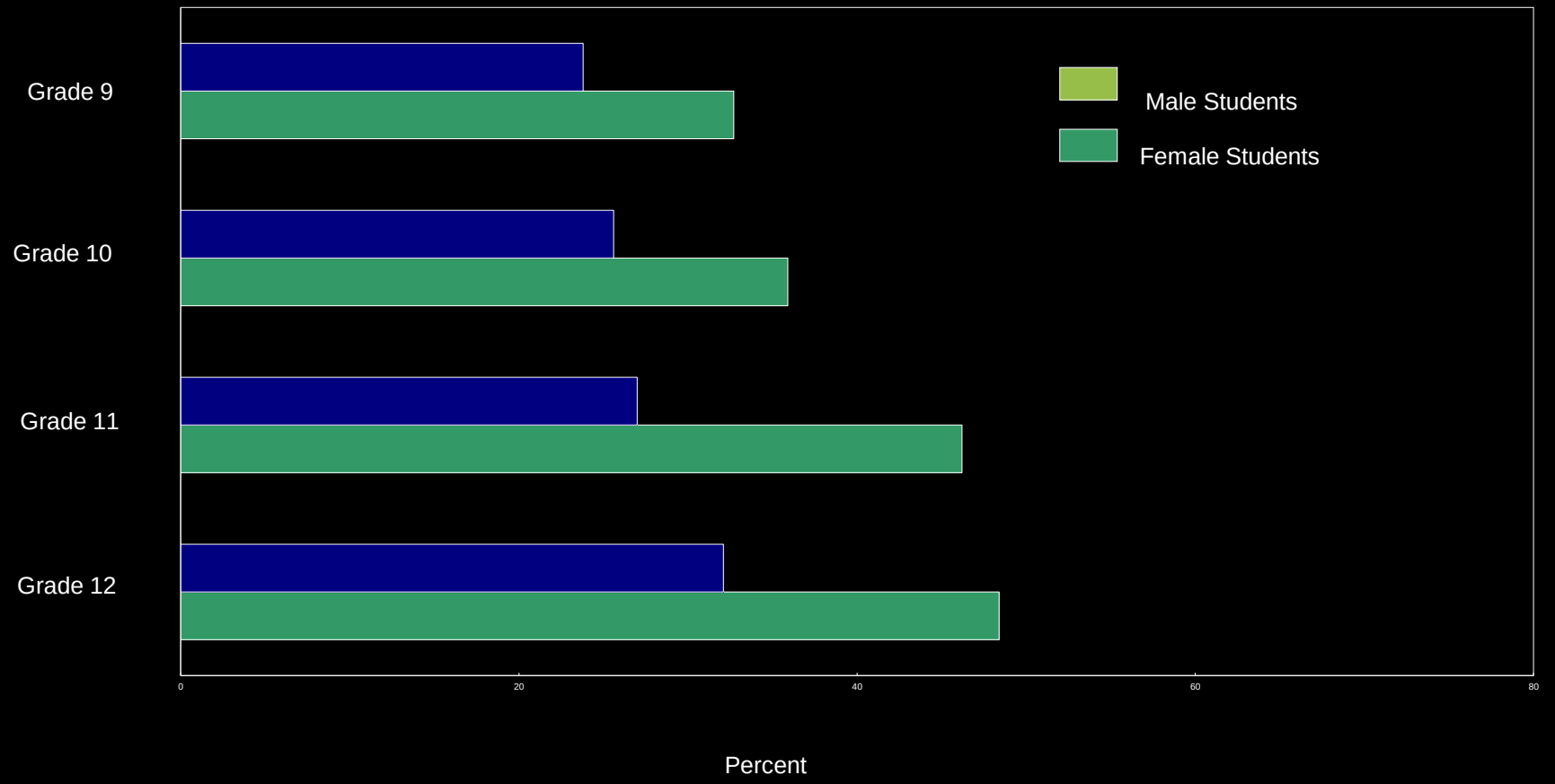


NOTES: Percents for men and women are age adjusted. See Data Table for data points graphed, standard errors, and additional notes. Cigarette smoking is defined as: (for men and women 18 years of age and older) at least 100 cigarettes in lifetime and now smoke every day or some days; (for students in grades 9-12) 1 or more cigarettes in the 30 days preceding the survey; and (for mothers with a live birth) during pregnancy.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey (data for men and women); National Vital Statistics System (data for mothers during pregnancy); National Center for Chronic Disease Prevention and Health Promotion, Youth Risk Behavior Survey (data for high school students).

Centers for Disease Control and Prevention, National Center for Health Statistics. Health, United States, 2004

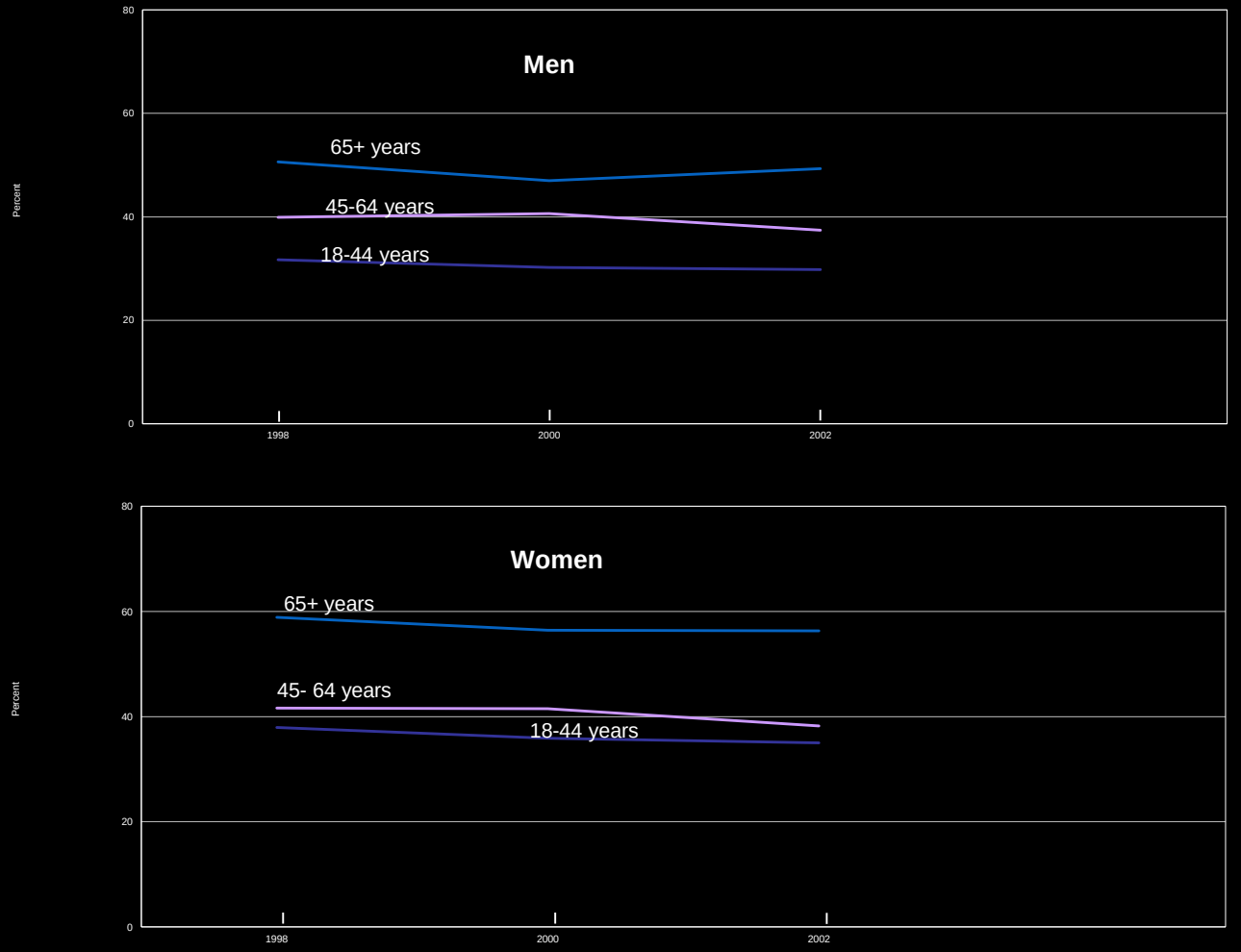
Figure 14. High school students not engaging in recommended amounts of physical activity (neither moderate nor vigorous) by grade and sex: United States, 2003



NOTE: See Data Table for data points graphed, standard errors, and additional notes defining moderate and vigorous activity.

SOURCE: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Youth Risk Behavior Survey.

Adults not engaging in leisure-time physical activity by age and sex: United States, 1998-2002

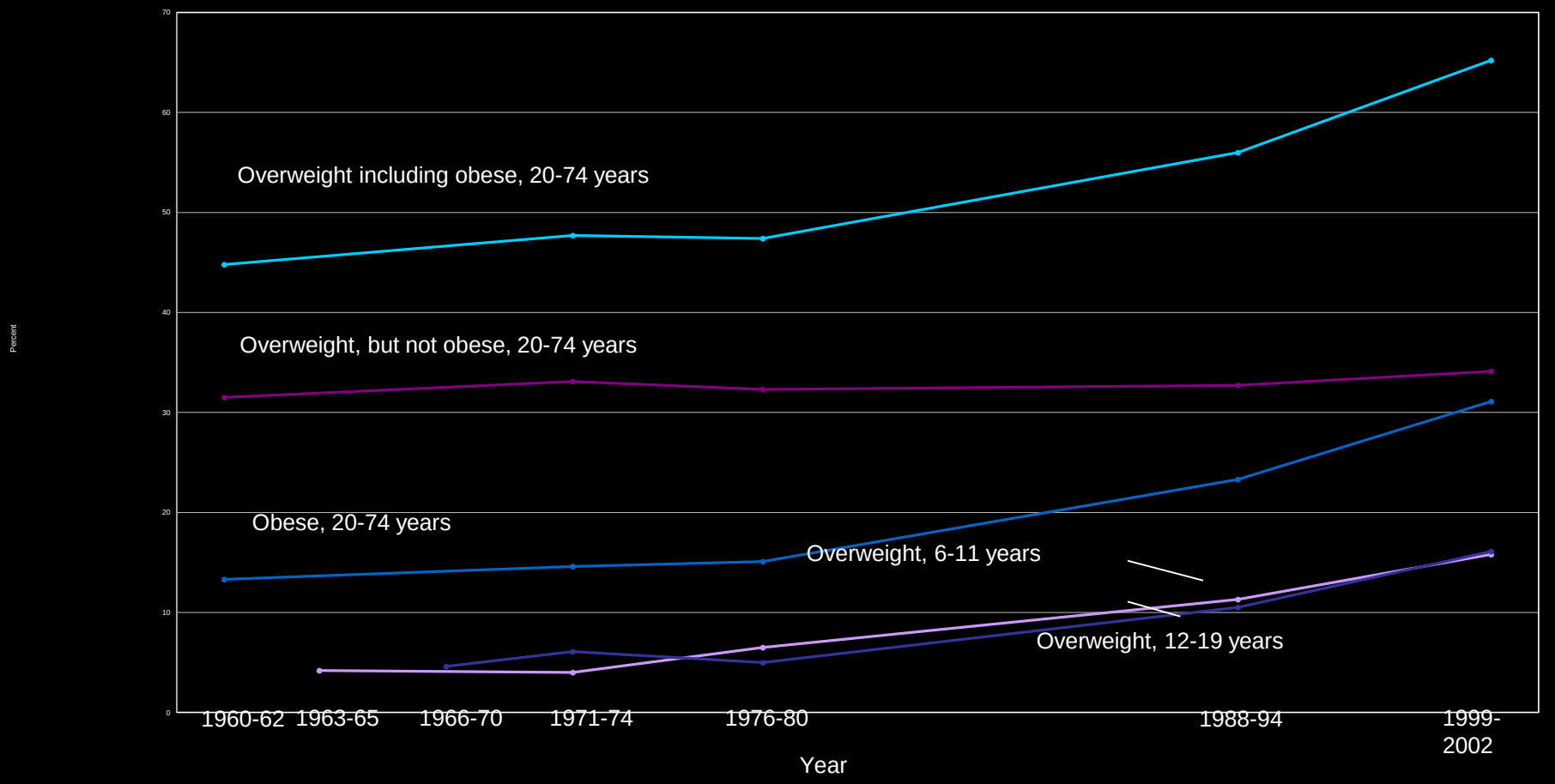


NOTE: See Data Table for data points graphed, standard errors, and additional notes defining leisure-time physical activity.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.

Centers for Disease Control and Prevention, National Center for Health Statistics. Health, United States, 2004

Overweight and obesity by age: United States, 1960-2002

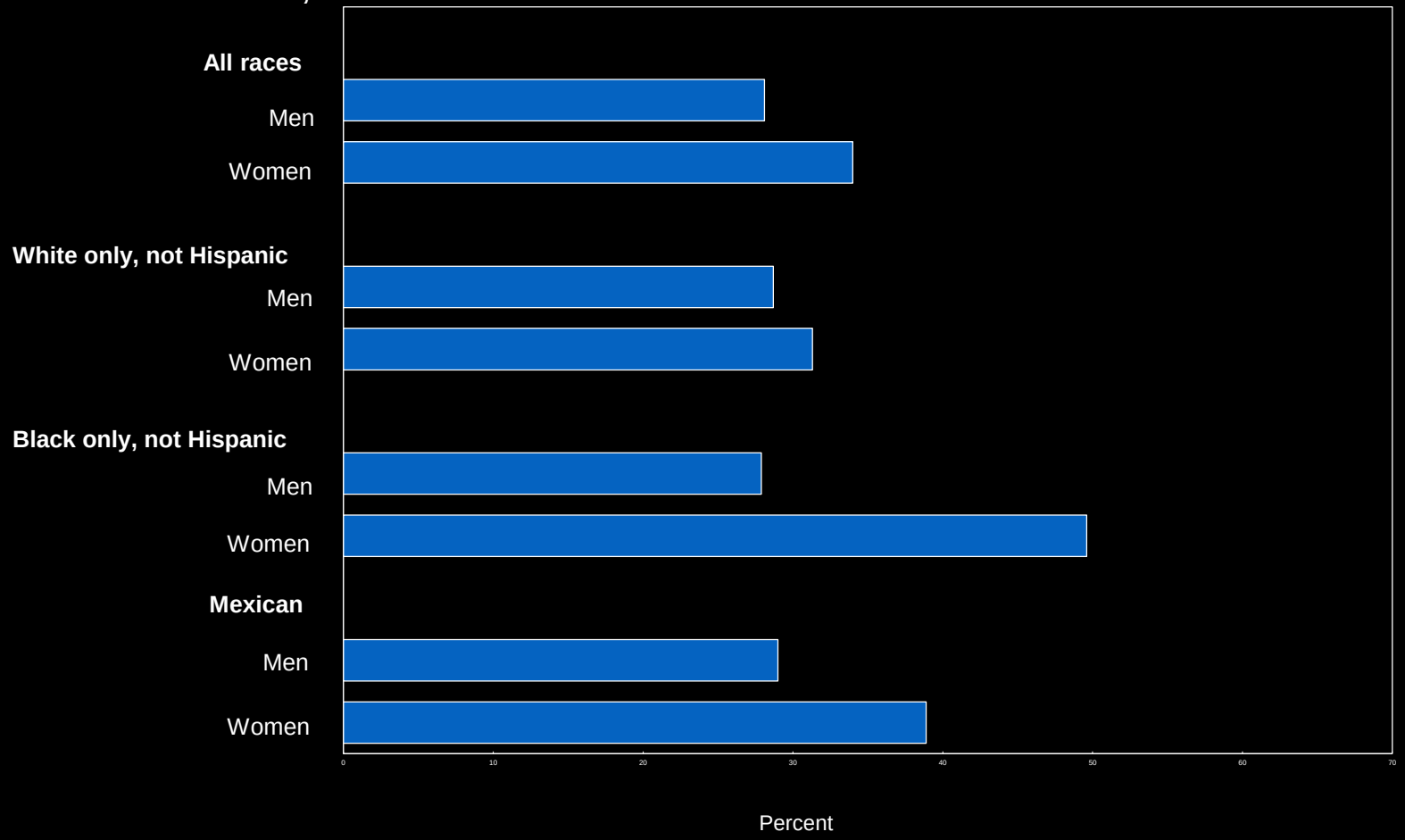


NOTES: Percents for adults are age adjusted. For adults: "overweight including obese" is defined as a body mass index (BMI) greater than or equal to 25, "overweight but not obese" as a BMI greater than 25 but less than 30, and "obese" as a BMI greater than or equal to 30. For children: "overweight" is defined as a BMI at or above the sex- and age-specific 95th percentile BMI cut points from the 2000 CDC Growth Charts: United States. "Obese" is not defined for children. See Data Table for data points graphed, standard errors, and additional notes. Data are for the civilian noninstitutionalized population and are age adjusted. See Data Table for data points graphed and additional notes.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Examination Survey and National Health and Nutrition Examination Survey.

Centers for Disease Control and Prevention, National Center for Health Statistics. Health, United States, 2004

Obesity among adults 20-74 years of age by sex, race, and Hispanic origin: United States, 1999-2002

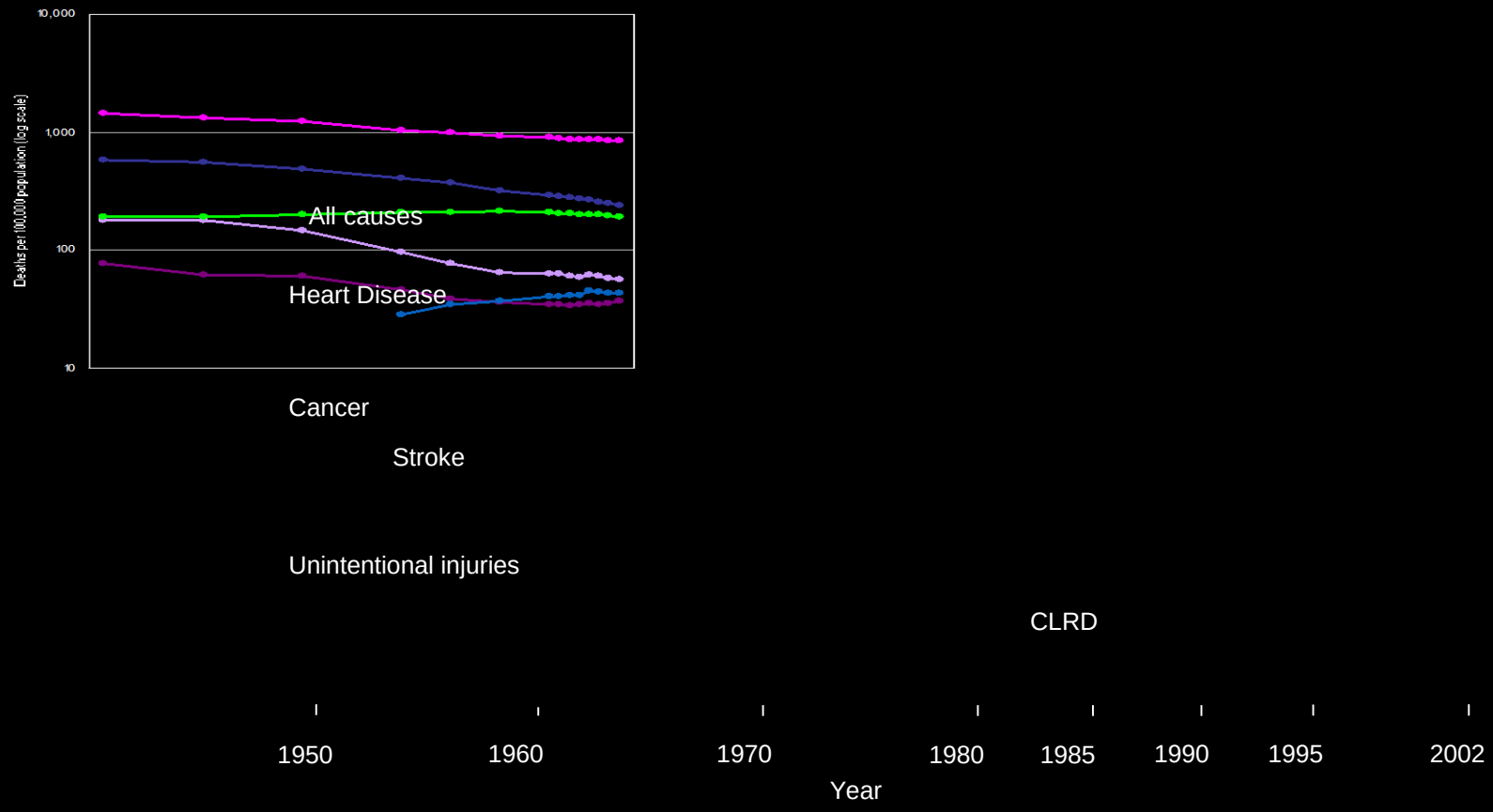


NOTES: Percents are age-adjusted. Obese is defined as a body mass index (BMI) greater than or equal to 30. Persons of Mexican origin may be of any race. See Data Table for data points graphed, standard errors, and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey.

Centers for Disease Control and Prevention, National Center for Health Statistics. Health, United States, 2004

Death rates for leading causes of death for all ages: United States, 1950-2002

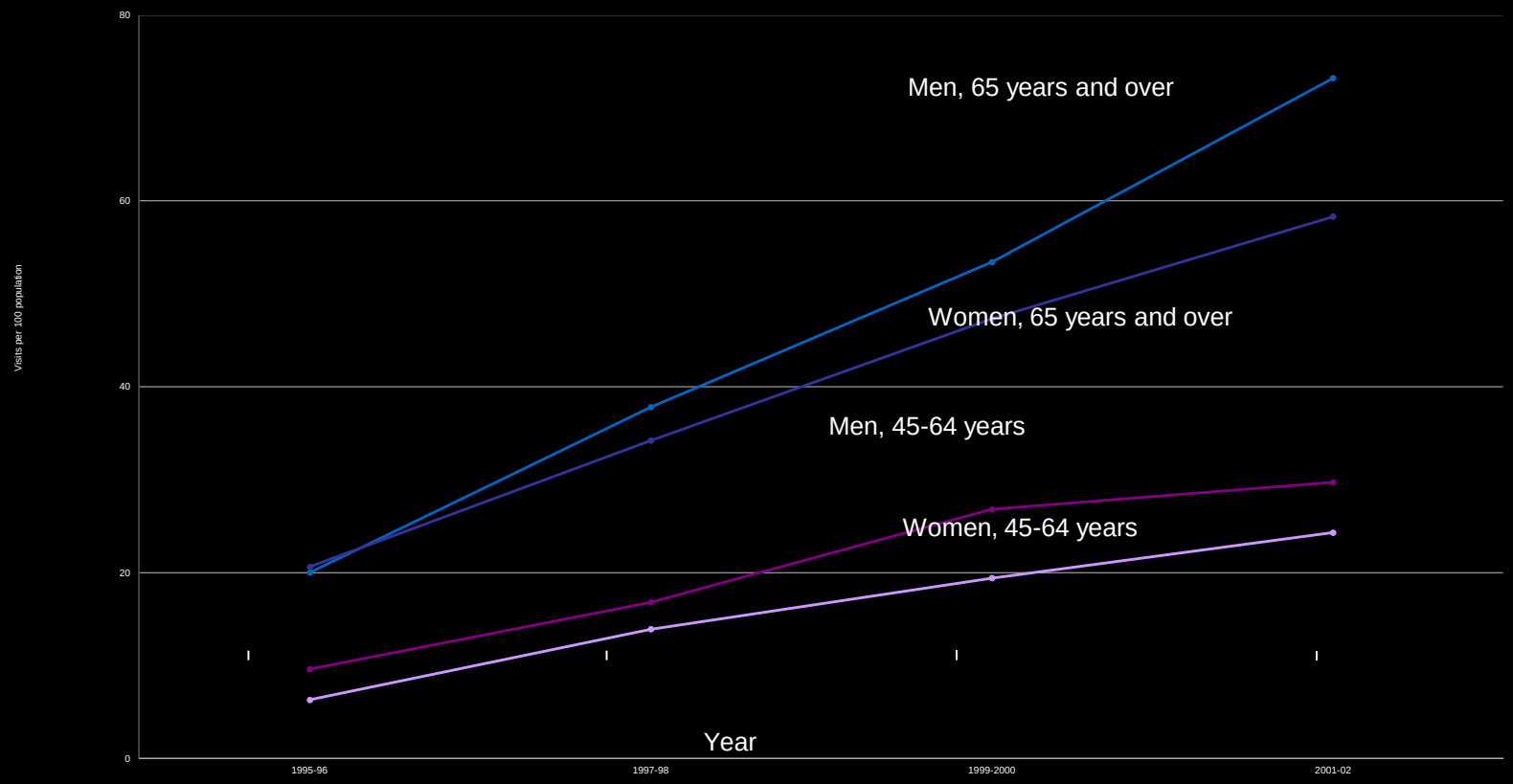


NOTES: Rates are age adjusted. Causes of death shown are the five leading causes of death for all ages in 2002. CLRD is chronic lower respiratory diseases. Starting in 1999, data were coded according to ICD-10. See Data Table for data points graphed and additional notes.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.

Centers for Disease Control and Prevention, National Center for Health Statistics. Health, United States, 2004

Cholesterol-lowering statin drug visits among adults 45 years of age and over by sex: United States, 1995-2002



NOTES: Cholesterol-lowering statin drug visits are physician office and hospital outpatient department visits with cholesterol-lowering statin drugs prescribed, ordered, or provided. See Data Table for data points graphed, specific drugs included, standard errors, and additional notes.

SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, National Ambulatory Medical Survey and National Hospital Ambulatory Medical Care Survey.

Centers for Disease Control and Prevention, National Center for Health Statistics. Health, United States, 2004

Exercise Recommendations

- ACSM & the CDC recommend that all Americans should perform 30” or more of moderate-intensity LTPA on most, preferably all days of week[2]
- U.S. Surgeon General’s Report (1996) = significant health benefits can be obtained by including a moderate amount of LTPA on most, if not all, days of the week
- Healthy People 2010 (2000) = 2 objectives:
  - Reduce the proportion of adults who engage in no LTPA
  - Increase the proportion of adults who engage regularly, preferably daily, in moderate LTPA for @ least 30”/day

What amount of activity?

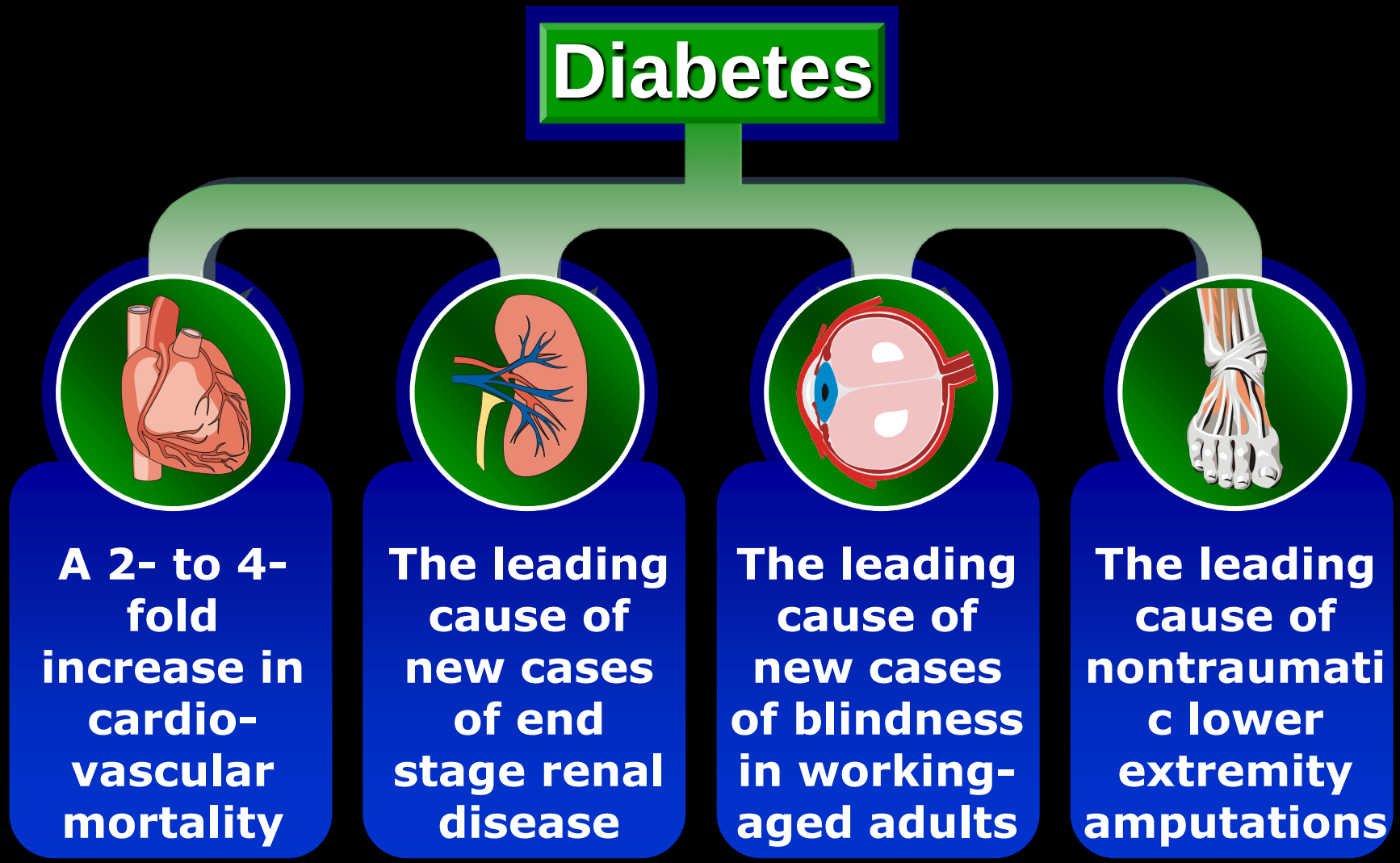
- Moderate activity = expenditure of ~150-200 kcal/day over 30-45” on @ least 5 days/week
  - Example = 30-45” of a brisk walk (3-4 mph) expending 4-7 kcal/minute
- Achieving all possible health benefits requires higher amounts of activity
- Important to perform a mix of activities including:
  - Endurance
  - Strength
  - Balance
  - Flexibility

Cardiovascular disease

- Hypertension (BP measurement at each office visit)
  - Txment decrease mortality (12%RR), stroke (36%RR),CAD (25%RR)in older adults
  - NNT 18 to prevent event in 5 yrs
- Dyslipidemia
  - Screening recommended if LE > 5 years
  - Lipid lowering efficacy controversial but 26%-30% decrease in mortality in high risk elders (after age 70 NNT<40 to prevent 1 event in 5 yrs)
- Coronary artery disease
  - No efficacy in routine screening for asymptomatic disease
  - ASA +/-

LIFESTYLE MODIFICATIONS FOR CARDIOVASCULAR DISEASE

Clinical Impact of Diabetes Mellitus



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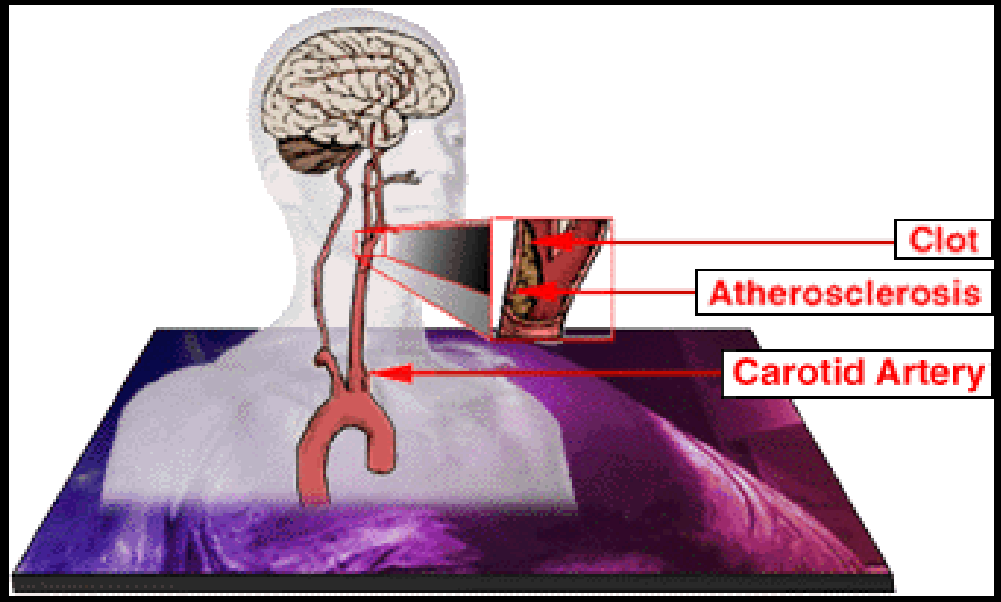
What is Cardiovascular Disease (CVD)?

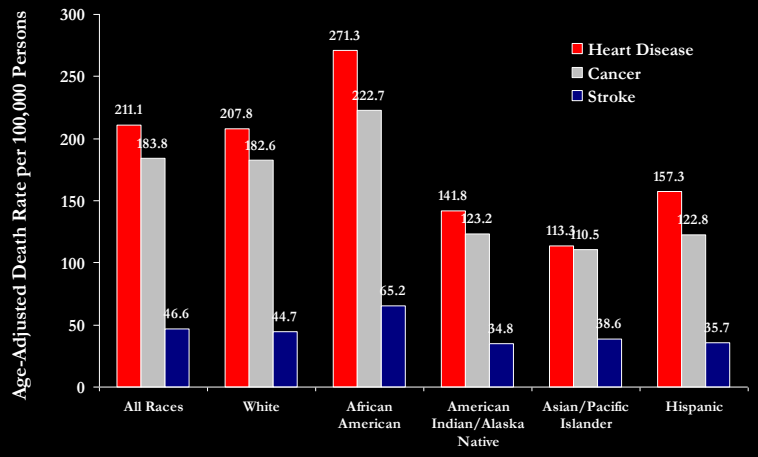
“ Cardiovascular Disease is an abnormal function of the heart involving the narrowing or blocking of blood vessels.”

- Cardiovascular Disease Foundation



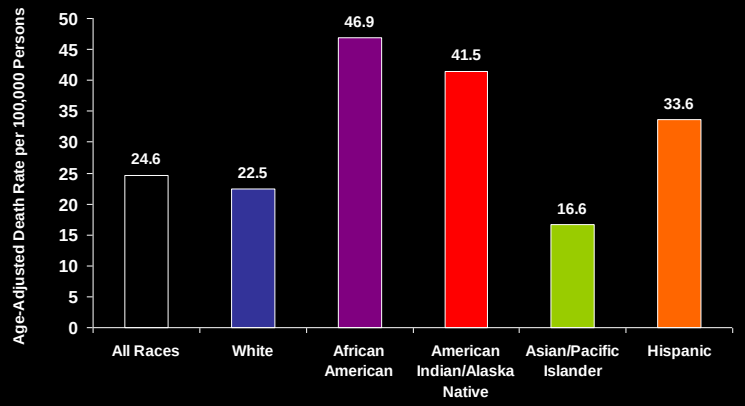
Heart Disease, Cancer, & Stroke

Age-Adjusted Death Rates per 100,000 Persons by Race & Hispanic Origin: U.S., 2005



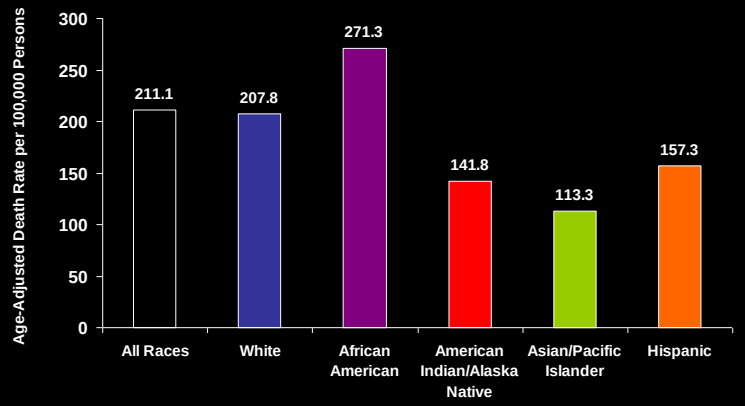
Diabetes

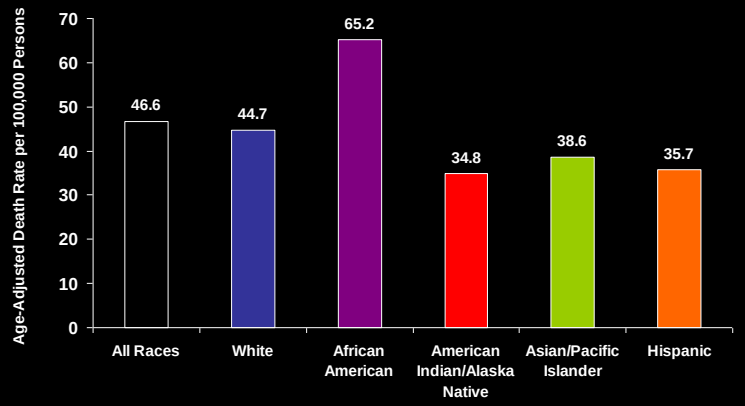
Age-Adjusted Death Rates per 100,000 Persons by Race & Hispanic Origin: U.S., 2005



Heart Disease

Age-Adjusted Death Rates per 100,000 Persons by Race & Hispanic Origin: U.S., 2005



Stroke

Age-Adjusted Death Rates per 100,000 Persons by Race & Hispanic Origin: U.S., 2005