بسم الله الرحمن الرحيم

Prevention of CAD: update

By

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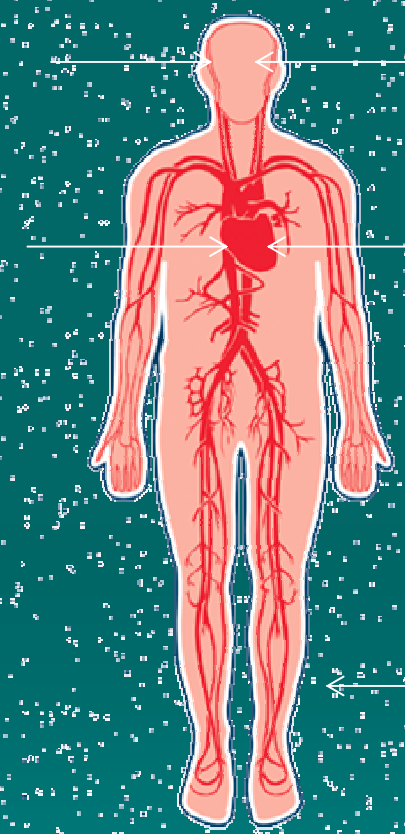
Overview

- Introduction
- Burden of CVD
- Atherosclerosis risk factors
- Global risk assessment
- Preventive strategies
- Conclusions

Introduction

Historical medical recordings as early as 2500 BC referred to the practice of Prevention. References to the importance of prevention are found in the writings of Hippocrates and Osler, thus rendering the prevention concept important and certainly “not new” in the practice of medicine.

Major Clinical Manifestations of Atherothrombosis



Ischemic stroke

Transient ischemic attack

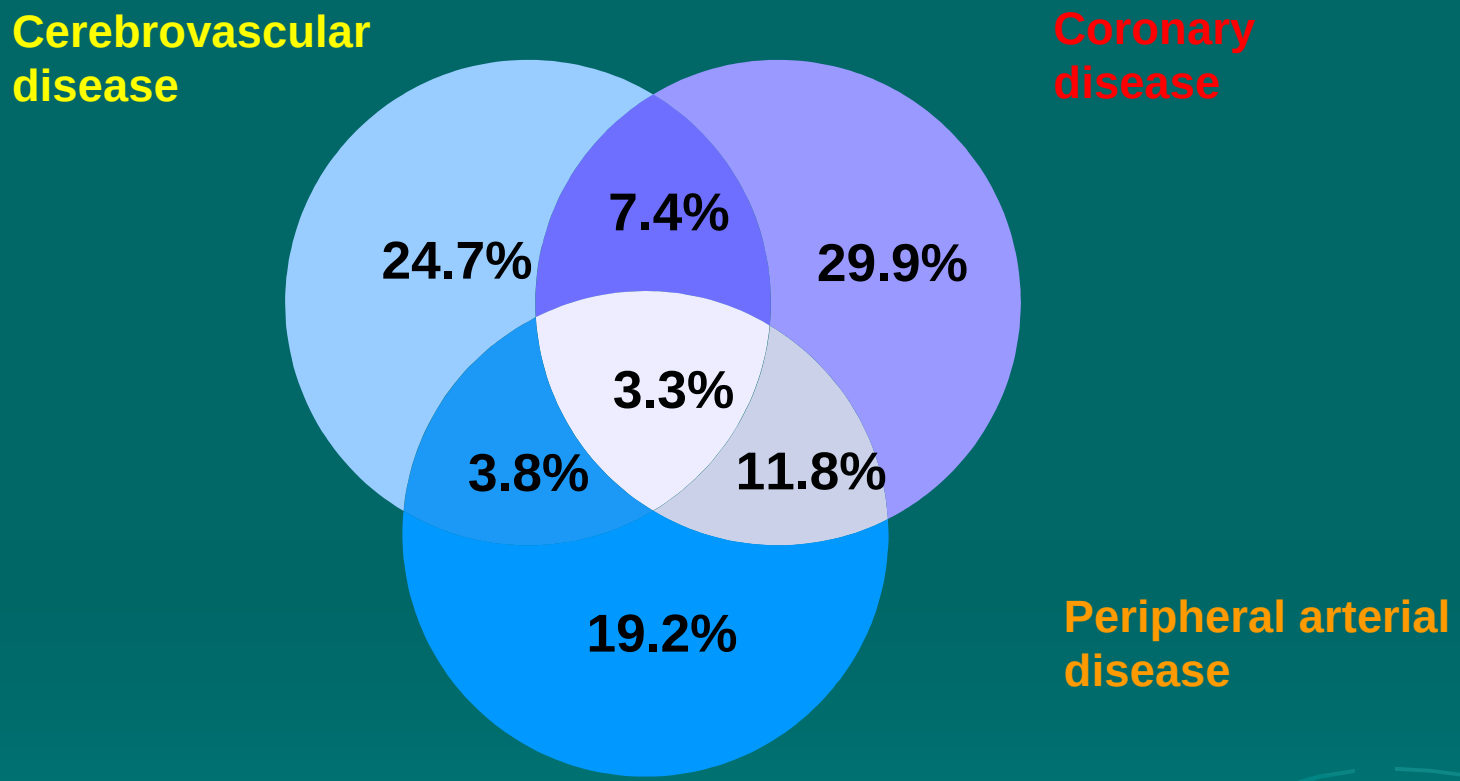
Myocardial infarction

Angina:
- Stable
- Unstable

Peripheral arterial disease:
- Intermittent claudication
- Rest Pain
- Gangrene
- Necrosis

Adapted from: Drouet L. *Cerebrovasc Dis* 2002; 13(suppl 1): 1–6.

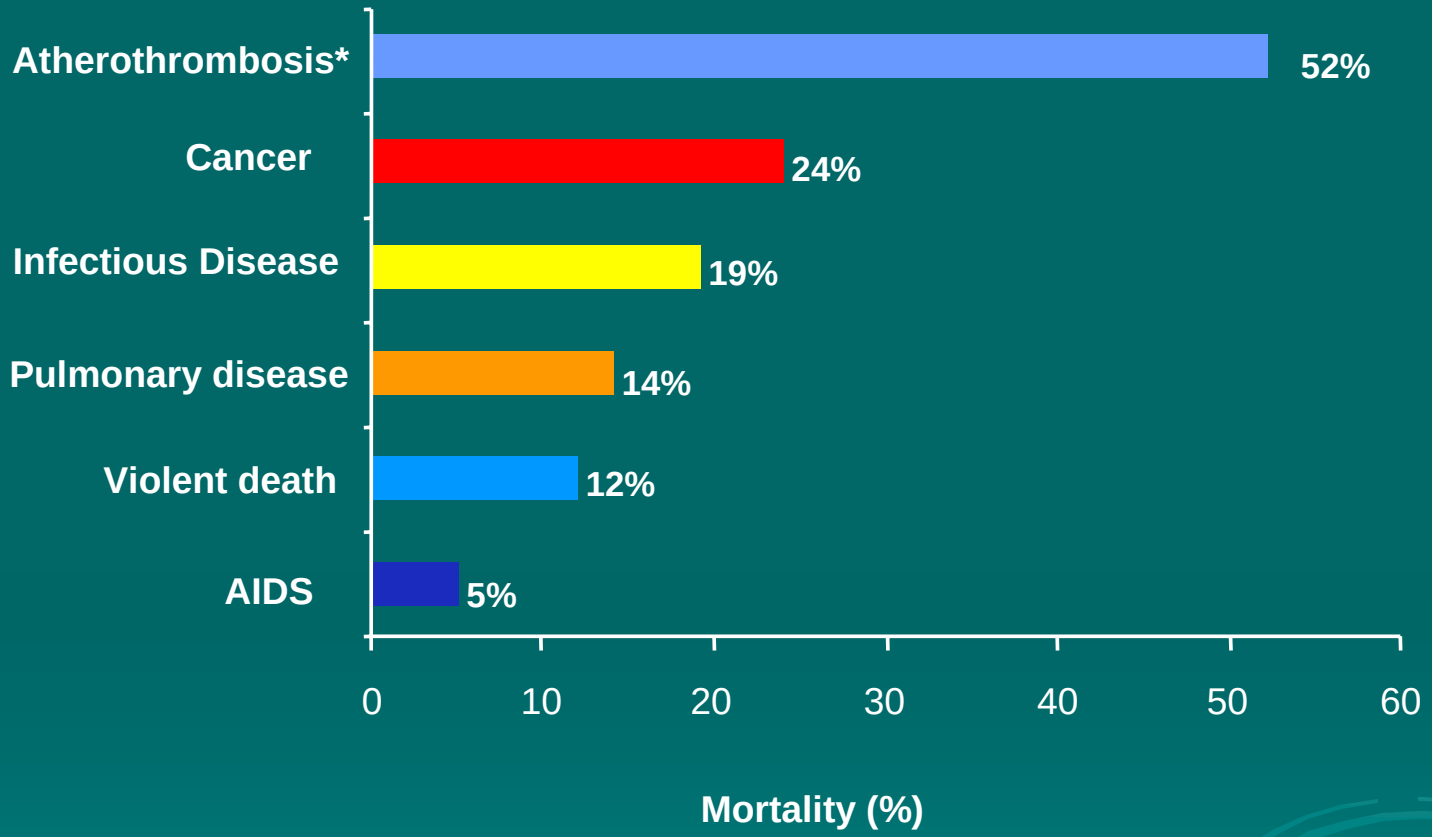
Atherothrombosis is Commonly Found in More Than One Arterial Bed*[1]



*Data from CAPRIE study (n=19,185)

1. Coccheri S. *Eur Heart J* 1998; 19(suppl): P1268.

Atherothrombosis* is the Leading Cause of Death Worldwide†1



*Cardiovascular disease, ischemic heart disease and cerebrovascular disease

†Worldwide defined as Member States by WHO Region (African, Americas, Eastern Mediterranean, European, South-East Asia and Western Pacific).

1. World Health Organization. The World Health Report 2001. Geneva: WHO; 2001.

Atherothrombosis Will Remain the Leading Cause of Disease Burden

The ten leading causes of disease burden in developed countries 1990–2020

1990 disease or injury[1]	Rank order	2020 disease or injury[2]
Ischemic heart disease	1	Ischemic heart disease
Cerebrovascular disease	2	Cerebrovascular disease
Road traffic accidents	3	Unipolar major depression
Bronchus and lung cancers	4	Bronchus & lung cancers
Self-inflicted injuries	5	Road traffic accidents
Conditions arising during perinatal period	6	Alcohol use
Lower respiratory infections	7	Osteoarthritis
Congenital anomalies	8	Dementia and other CNS disorders
Colon and rectal cancers	9	Chronic obstructive pulmonary disease
Stomach cancer	10	Self-inflicted Injuries

Note: Disease burden is measured in disability adjusted life years (DALYs), a measure that combines the impact on health of years lost due to premature death and years lived with a disability. One DALY is equivalent to one lost year of healthy life

1. Murray and Lopez. *Global Burden of Disease Study*. 1996
2. Murray and Lopez. *Global Burden of Disease Study*. 1997

Atherothrombosis Significantly Reduces Life Expectancy

Analysis of data from the Framingham Heart Study

- More than 60% of patients aged >40 develop cardiovascular disease
- Cardiovascular disease reduces life expectancy by 11–12 years for patients aged >50

Average Life Expectancy at Age 60 (Men)	
Healthy	**20.0 years**
History of CVD	**12.3 years**
History of AMI	**10.8 years**
History of stroke	**7.98 years**

CVD = cardiovascular disease
AMI = acute myocardial infarction

Source: Peeters *et al. Eur Heart J* 2002; 23: 458–466

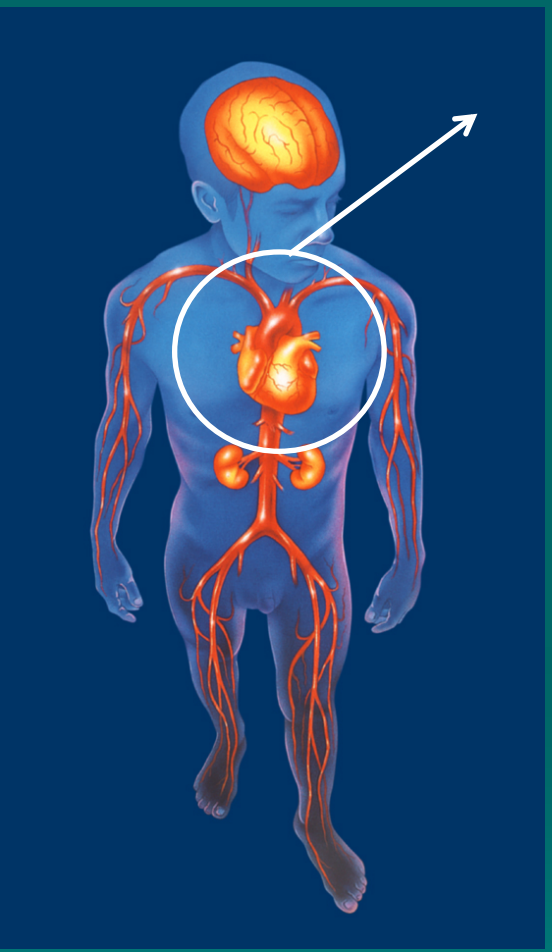
Risk of Myocardial Infarction and Stroke Greatly Increases With Atherothrombotic Disease

	Increased risk of MI	Increased risk of stroke[3]
Patient with myocardial infarction	**5–7 X** greater risk[1]	**3–4 X** greater risk (includes TIA)
Patient with ischemic stroke	**2–3 X** greater risk[2] (includes angina and CHD death)	**9 X** greater risk (major stroke)
Patient with peripheral arterial disease (PAD)	**4 X** greater risk[4] (includes fatal MI and other CHD death)	**2–3 X** greater risk (includes TIA)

***Data are versus the general population and measure the associated risk increase in events taken from different sources. The increase in risk of events was based on ten year follow up, except for risk of stroke following stroke, which measures subsequent annual risk. CHD = coronary heart disease. TIA = transient ischemic attack**

1. Rossouw JE *et al. N Eng J Med* 1990; 323: 1112–1119
2. Kannel WB. *J Cardiovasc Risk* 1994; 1: 333–339
3. Wilterdink JL, Easton JD. *Arch Neurol* 1992; 49: 857–863
4. Criqui MH *et al. N Eng J Med*. 1992; 326: 381–386

Coronary Heart Disease is a Major Health Burden



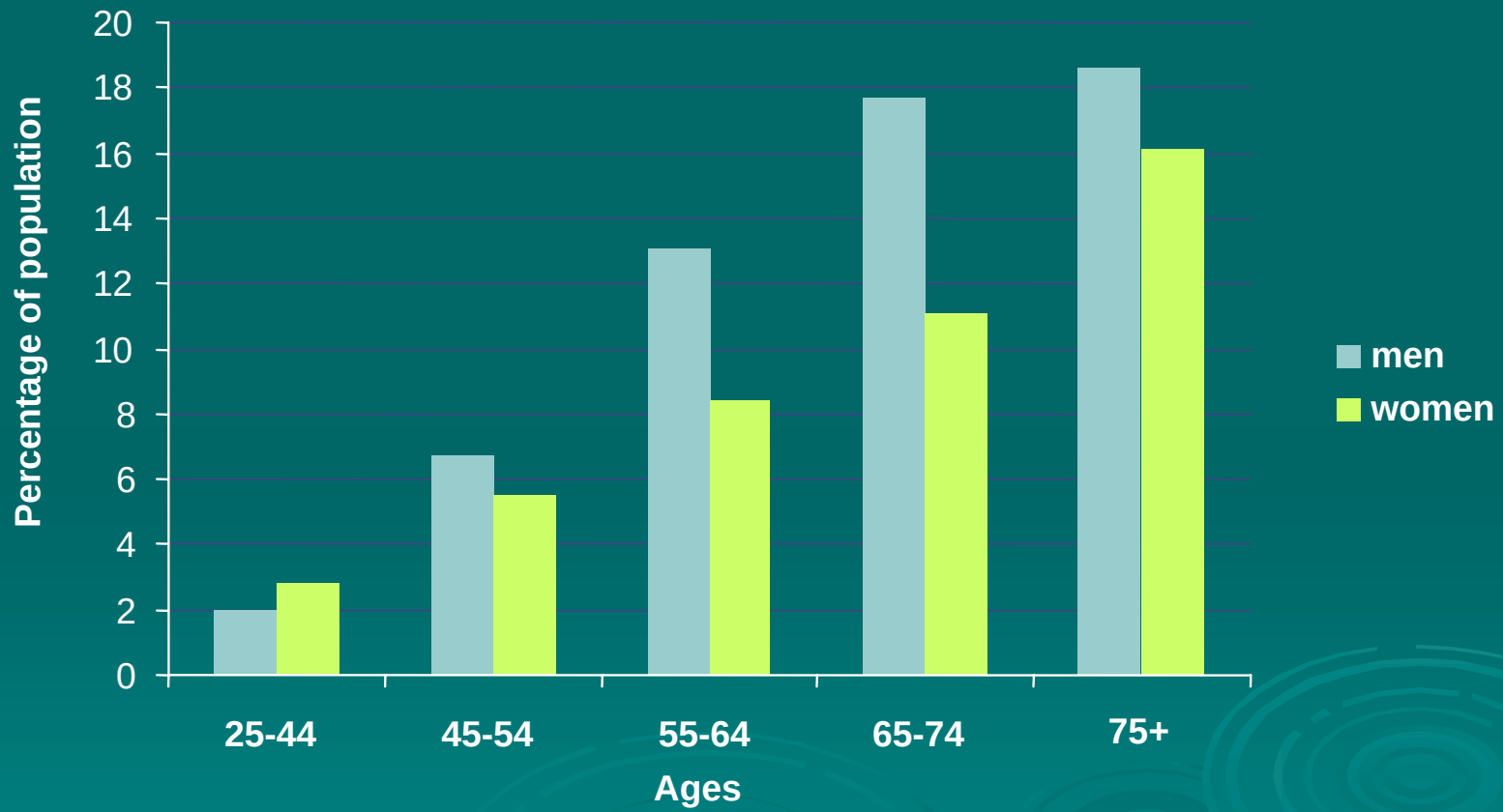
Myocardial infarction (MI) and unstable angina

- A major health burden
  - Coronary heart disease is the leading cause of death in developed countries[1]
  - Patients with cardiovascular disease consistently report worse quality of life than age- and sex-matched controls[2]
- Key facts
  - In the USA: about 250.000 people a year die of CHD without being hospitalised[3]
  - About every 29 seconds someone will suffer a coronary event in the USA[3]
- Epidemiology:
  - Worldwide MI prevalence of 9.1 million in 2000 and rising[4]
  - Prevalence of angina estimated to be 3.2% in men and 2.5% in women[5]

1. Murray CJL, Lopez AD. In: Murray CJL, Lopez AD, eds. *Global Burden of Disease*. Vol 1. 1996
2. Brown N *et al. Heart* 1999; 81: 352–358
3. American Heart Association. *2002 Heart and Stroke Statistical Update.* AHA, 2002
4. Guillot F, Moulard O. *Circulation* 1998: 98(abstr suppl 1): 1421
5. Department of Health. *Health Survey for England: cardiovascular disease*. London: DoH, 1999

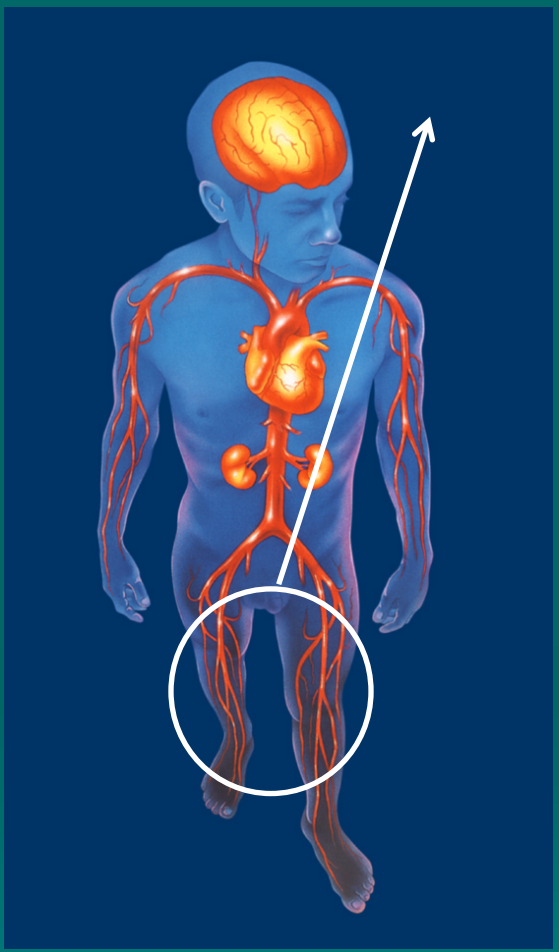
Coronary Heart Disease is Highly Prevalent

Prevalence of coronary heart disease by age and sex[1]



1. American Heart Association. *2002 Heart and Stroke Statistical Update.* AHA, 2002

Peripheral Arterial Disease is a Major Health Burden

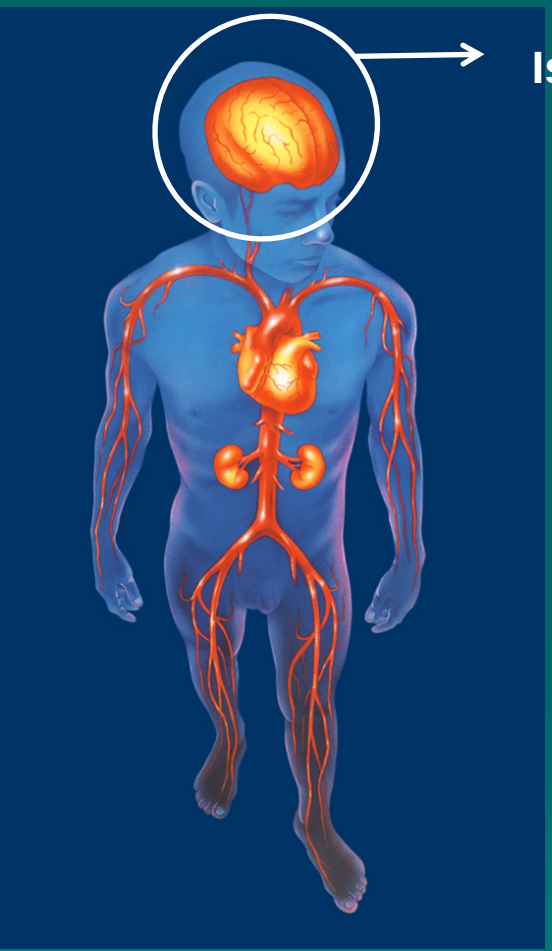


Peripheral arterial disease (PAD)

- **A major health burden:**
  - Patients with PAD are six times more likely to die within ten years than those without PAD[1]
  - Patients with PAD often have decreased quality of life because of pain during walking and limitations of mobility[2]
- **Key facts:**
  - Survival rates are worse than for breast cancer or Hodgkin's disease: patients with PAD have a five-year mortality rate of 28% compared with 15% for breast cancer and 18% for Hodgkin's disease[1]
- **Epidemiology:**
  - The prevalence of PAD is estimated at 27 million in Europe and North America[3]

1. Criqui MH *et al. N Eng J Med* 1992; 326: 381–386
2. Belch JJF *et al. Arch Int Med* 2002. In press
3. Weitz JI *et al. Circulation* 1996; 94: 3026–3049

Ischemic Stroke is a Major Health Burden



Ischemic stroke

- A major health burden in Western countries:
  - Stroke is the third most common cause of death[1]
  - Stroke is the leading cause of disability in adults[1]
  - Stroke is the second most important cause of dementia[1]
- Key facts:
  - In the USA: every 53 seconds, someone suffers a stroke[2]
  - In the UK: more than 47,000 working lives are lost (deaths before age of 65) each year and 8 million working days are lost[3]
- Epidemiology:
  - Worldwide stroke prevalence of 7.1 million in 2000 and rising[4]

1. Leys D. *Cerebrovascular Disease* 2001: 11(suppl 2): 1–4
2. American Heart Association. *2002 Heart and Stroke Statistical Update.* AHA, 2002
3. NHS Executive. *Burdens of Disease: a discussion document.* London: Department of Health, 1996
4. Guillot F, Moulard O. *Circulation* 1998: 98(abstr suppl 1): 1421

The Burden of Stroke Continues After the Acute Event

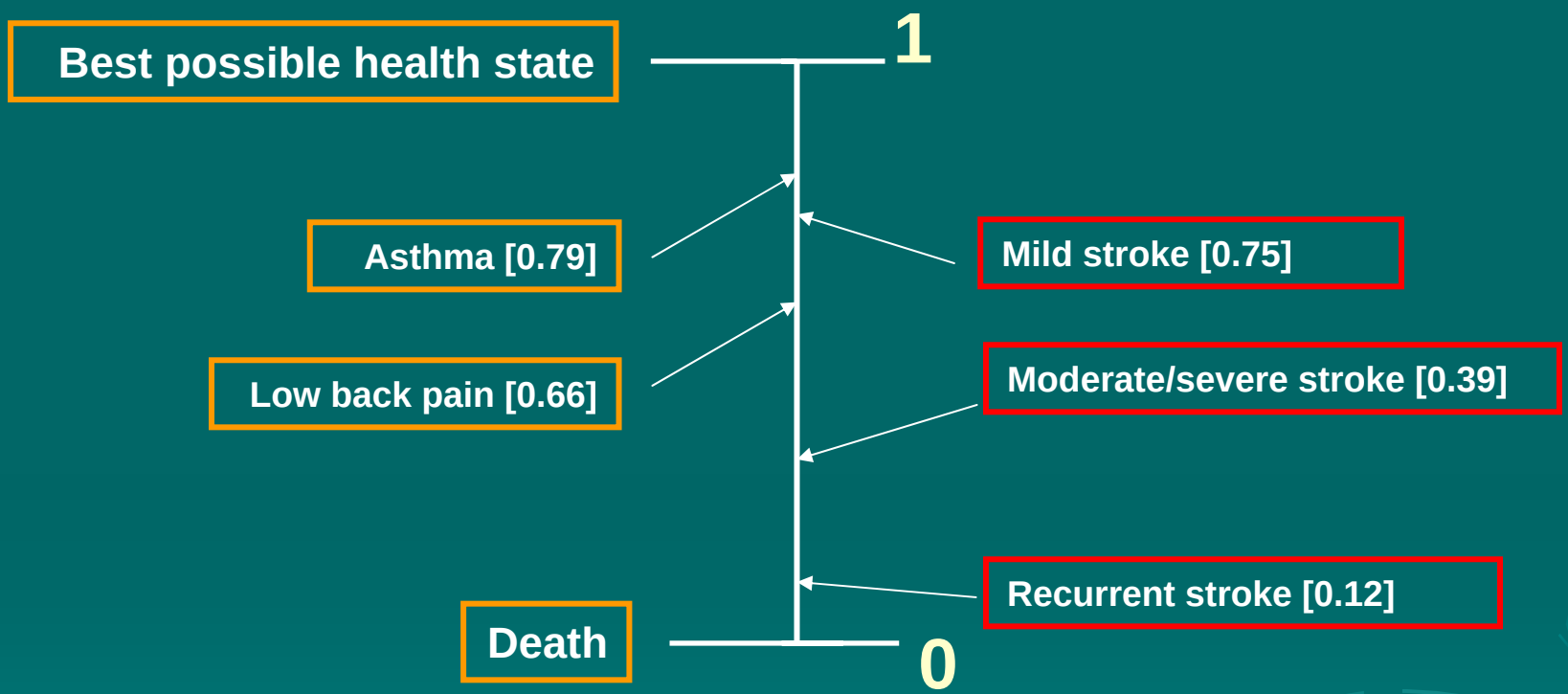
- Stroke progression during hospitalization
  24%
- Mortality

30 days	8–20%
1 year	15–25%
5 years	40–60%

- Complete or partial dependence
  27–53%
- Dementia persisting at 1 year
  34%

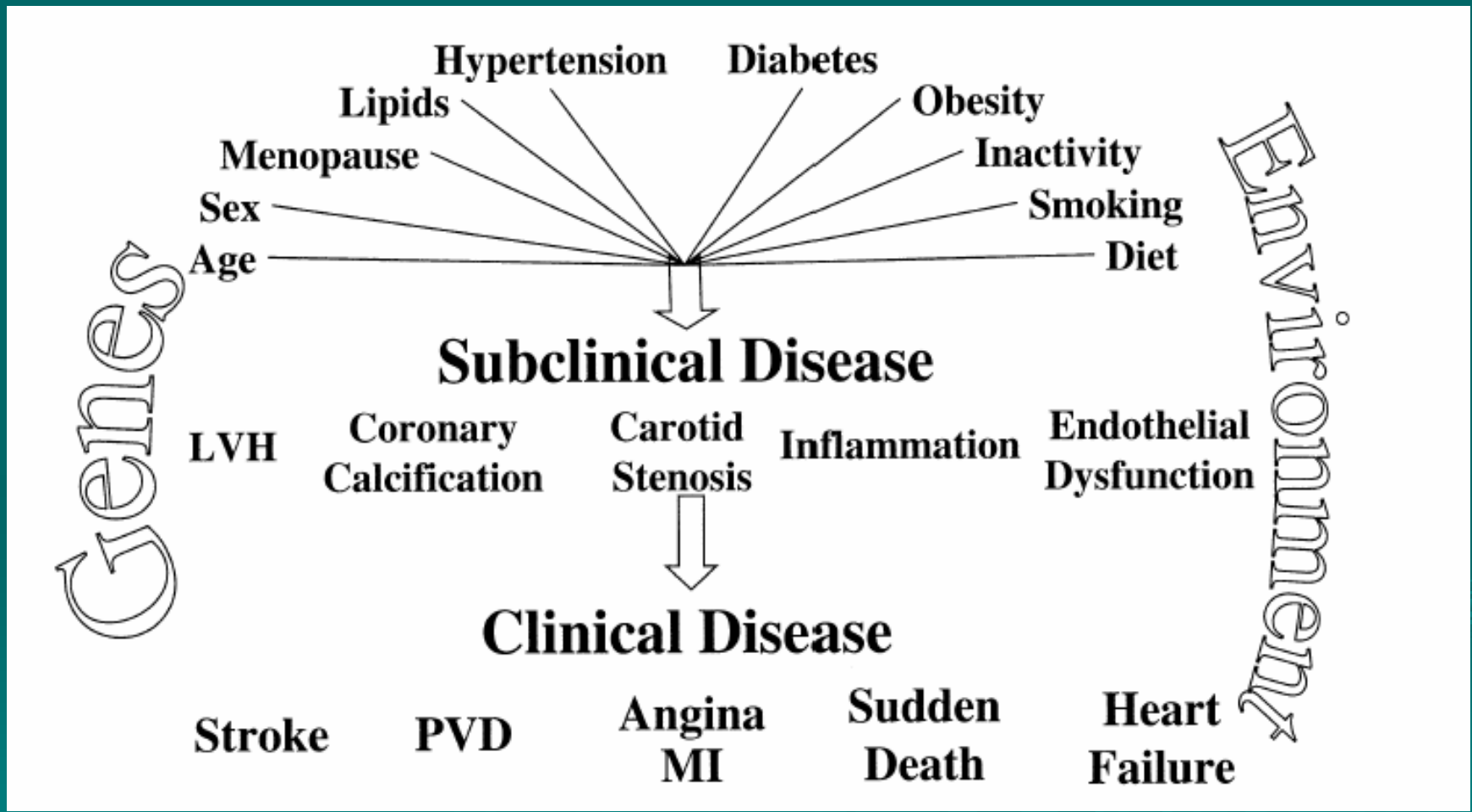
Source: Sacco. *Neurology*. 1997; 49 (Suppl 4): S39–S44

Stroke Has a Major Impact on Quality of Life



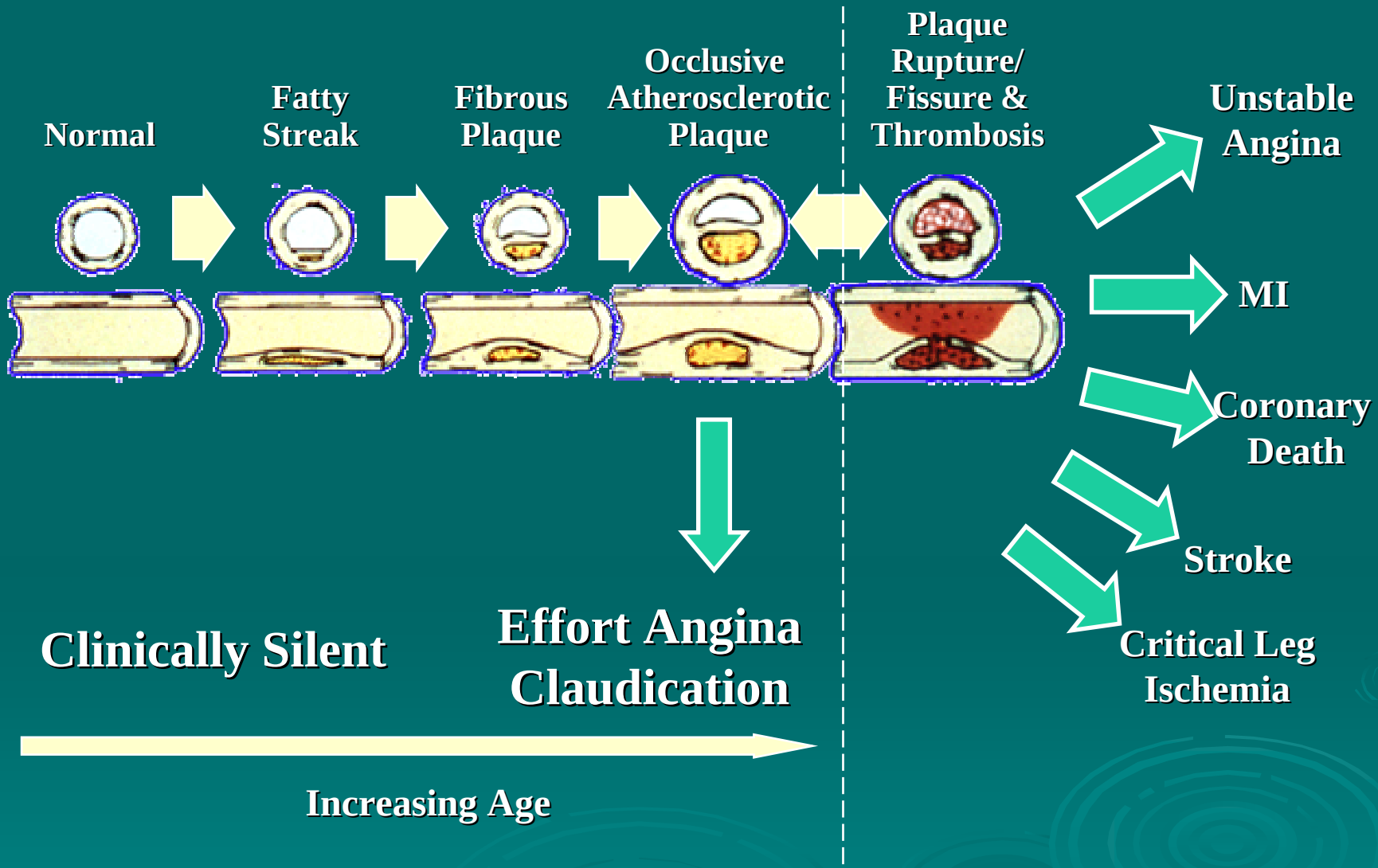
1. Gage BF *et al*. *JAMA* 1995; 274: 1839–1845
2. Burstrom K *et al*. *Qual Lif Res* 2001; 10: 621–635

CVD: From Risk Factors to Clinical Presentation



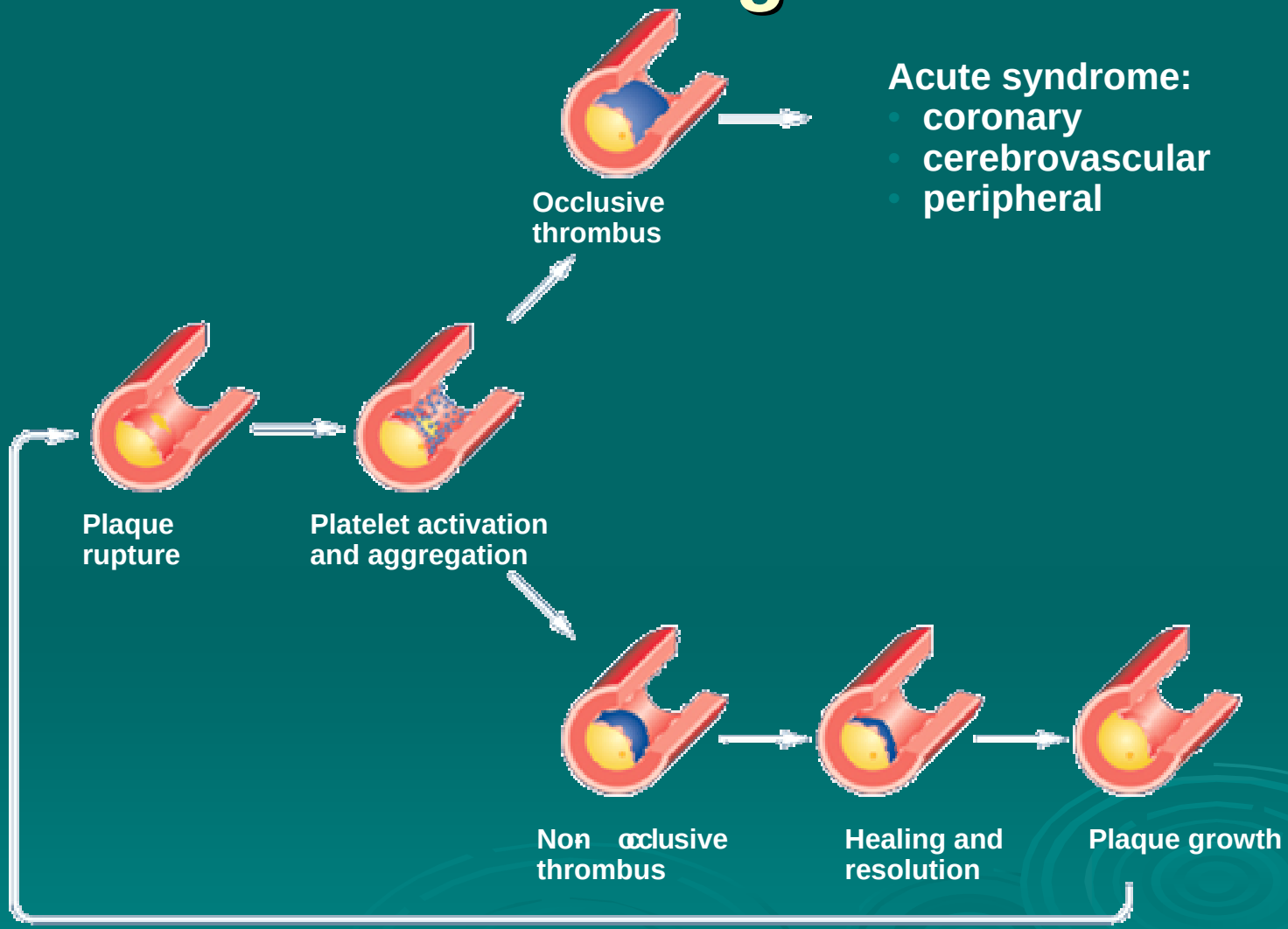
JACC Vol. 40, No. 4, 2002:579–651

Atherosclerosis: A Progressive Process



Courtesy of P Ganz.

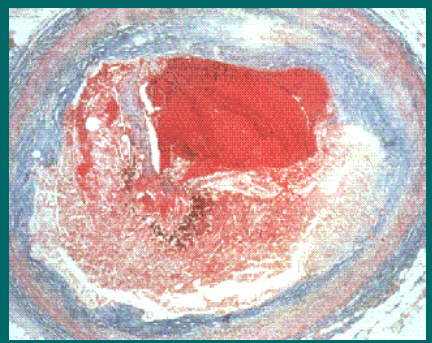
The Development of Atherothrombosis–a Generalized and Progressive Process



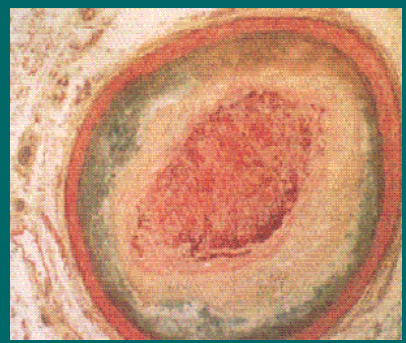
Adapted from: Drouet L. *Cerebrovasc Dis* 2002; 13(suppl 1): 1–6.

Atherothrombosis: Main Cause of Major Ischemic (Vascular) Events

- Atherothrombosis is characterized by a sudden (unpredictable) atherosclerotic plaque disruption (rupture or erosion) leading to platelet activation and thrombus formation



Plaque rupture[1]

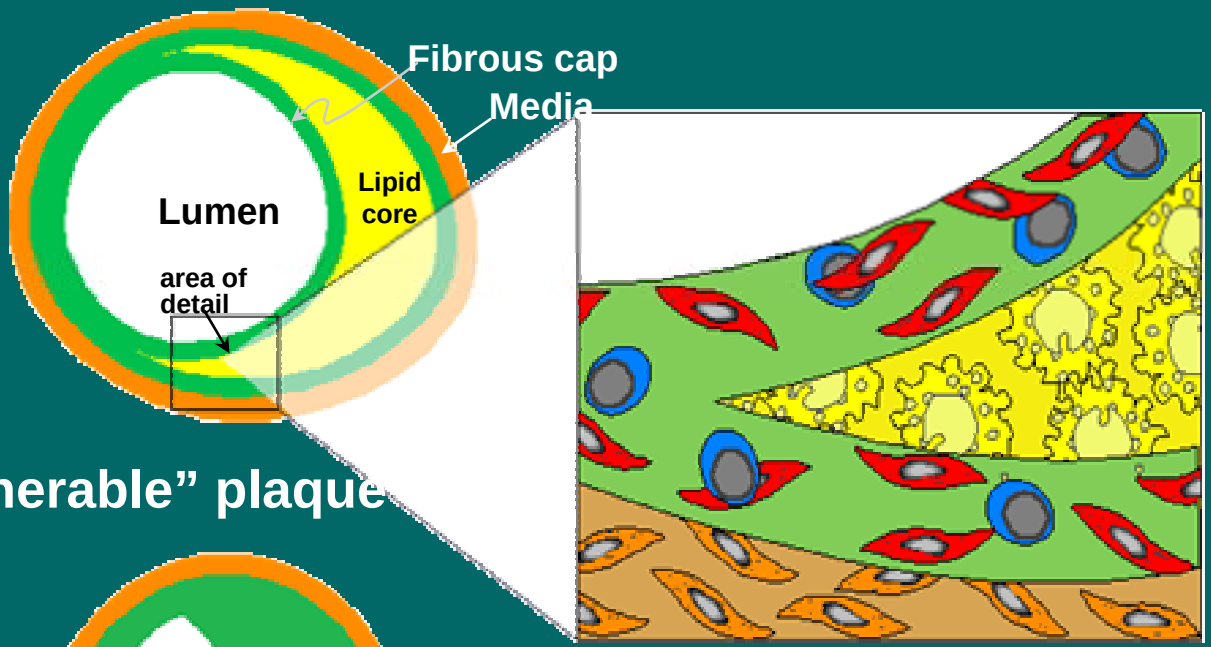


Plaque erosion[2]

- Atherothrombosis is the underlying condition that results in events leading to myocardial infarction, ischemic stroke, and vascular death

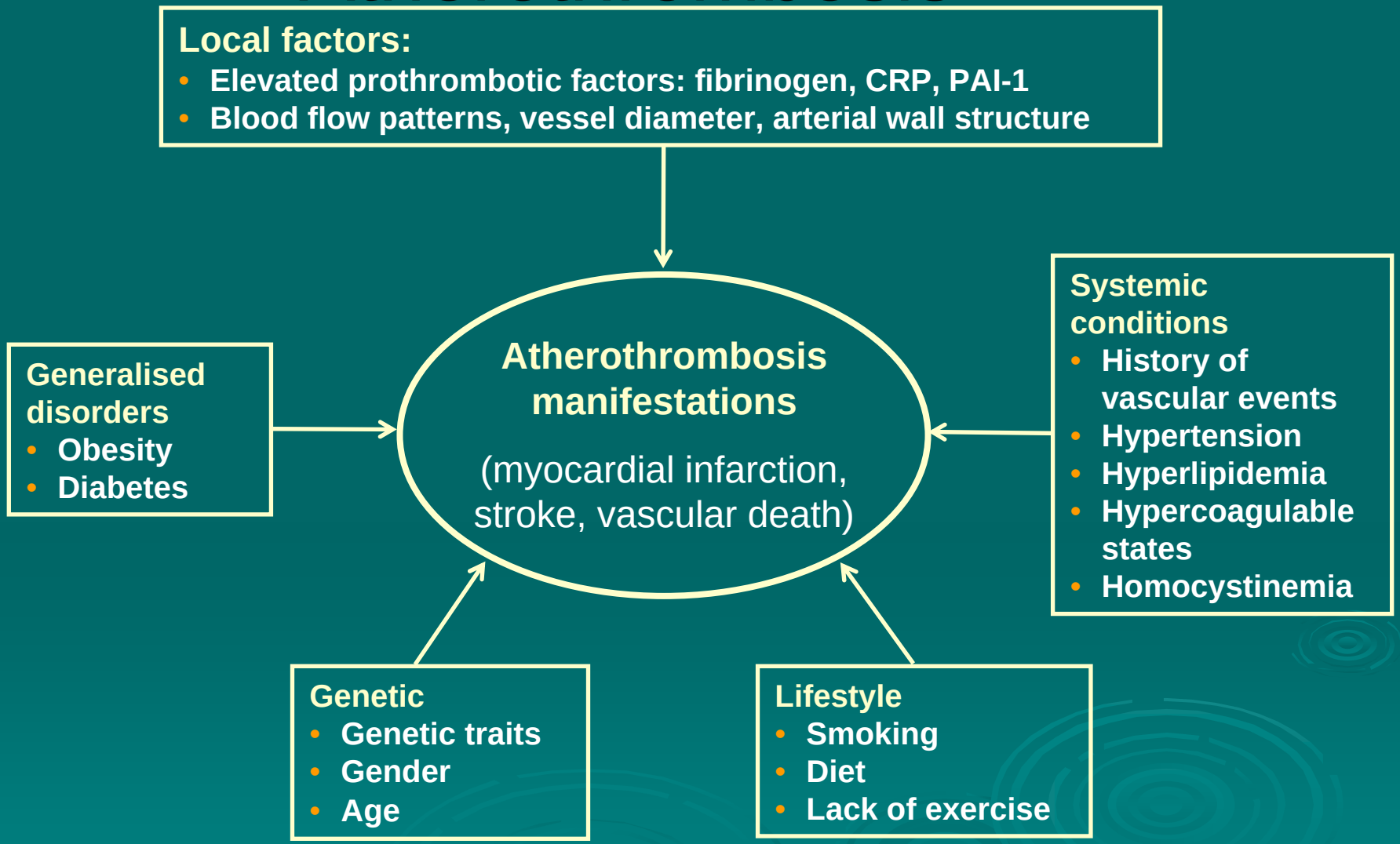
1. Falk E *et al. Circulation* 1995; 92: 657–71. 2. Arbustini E *et al. Heart* 1999; 82: 269–272

Characteristics of Plaques Prone to Rupture



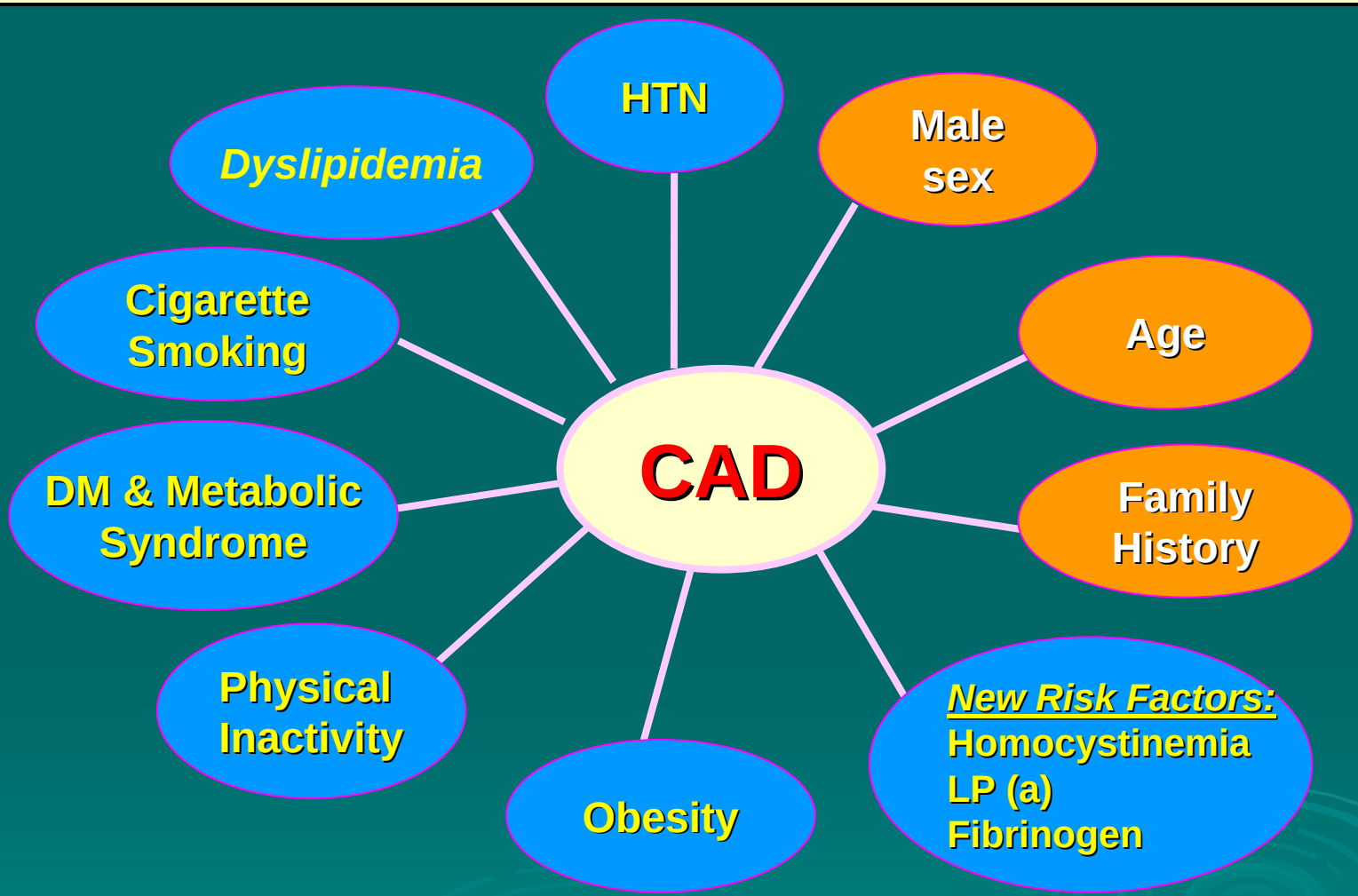
Libby P. *Circulation.* 1995;91:2844-2850.

Identifying Those at Risk of Atherothrombosis[1,2]



1. Yusuf S *et al*. *Circulation* 2001; 104: 2746–53.
2. 2. Drouet L. *Cerebrovasc Dis* 2002;

Established Risk Factors of CAD



ATP III JAMA, 2001

Homocysteine:

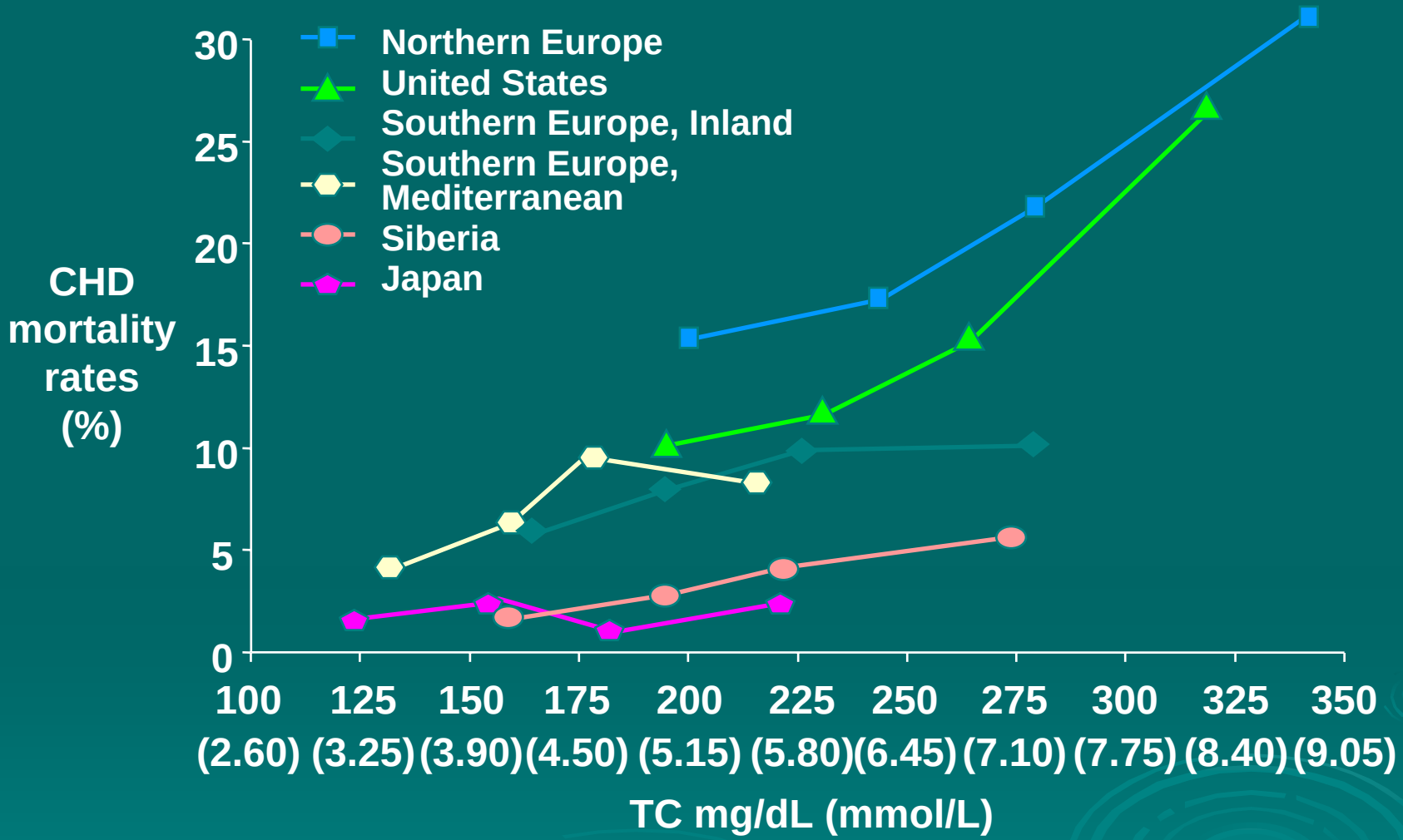
Role in Atherogenesis

- Linked to pathophysiology of arteriosclerosis in 1969
- CVD patients have elevated levels of plasma homocysteine
- May cause vascular damage to intimal cells
- Elevated levels linked to:
  - genetic defects
  - exposure to toxins
  - diet
- Increased dietary intake of folate and vitamin B6 may reduce CVD morbidity and mortality

McCully KS. *Am J Pathol*. 1969;56:111-128.
McCully KS. *JAMA*. 1998;279:392-393.
Rimm EB et al. *JAMA*. 1998;279:359-364.

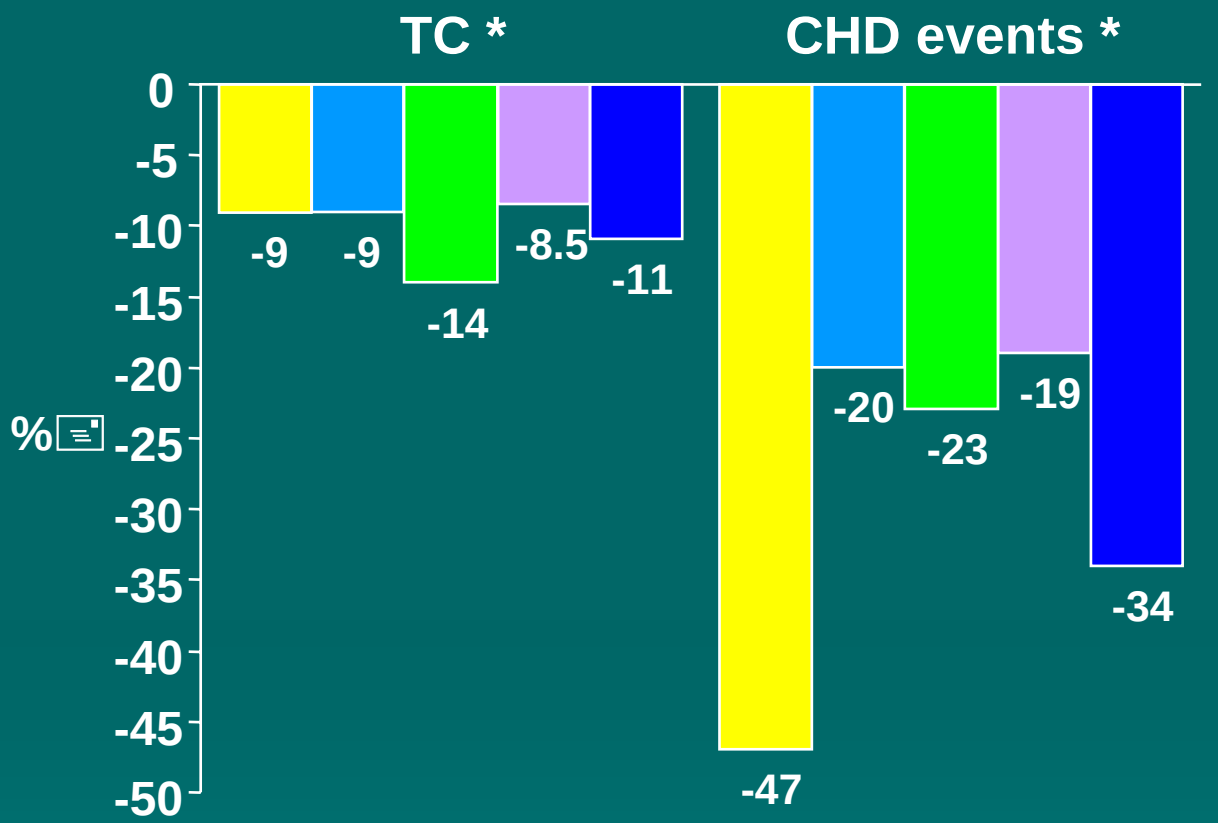
Dyslipidemia

Cholesterol and CHD: Seven Countries Study



Verschuren WMM et al. *JAMA*. 1995;274:131-136.

Early Primary-Prevention Trials: Overview



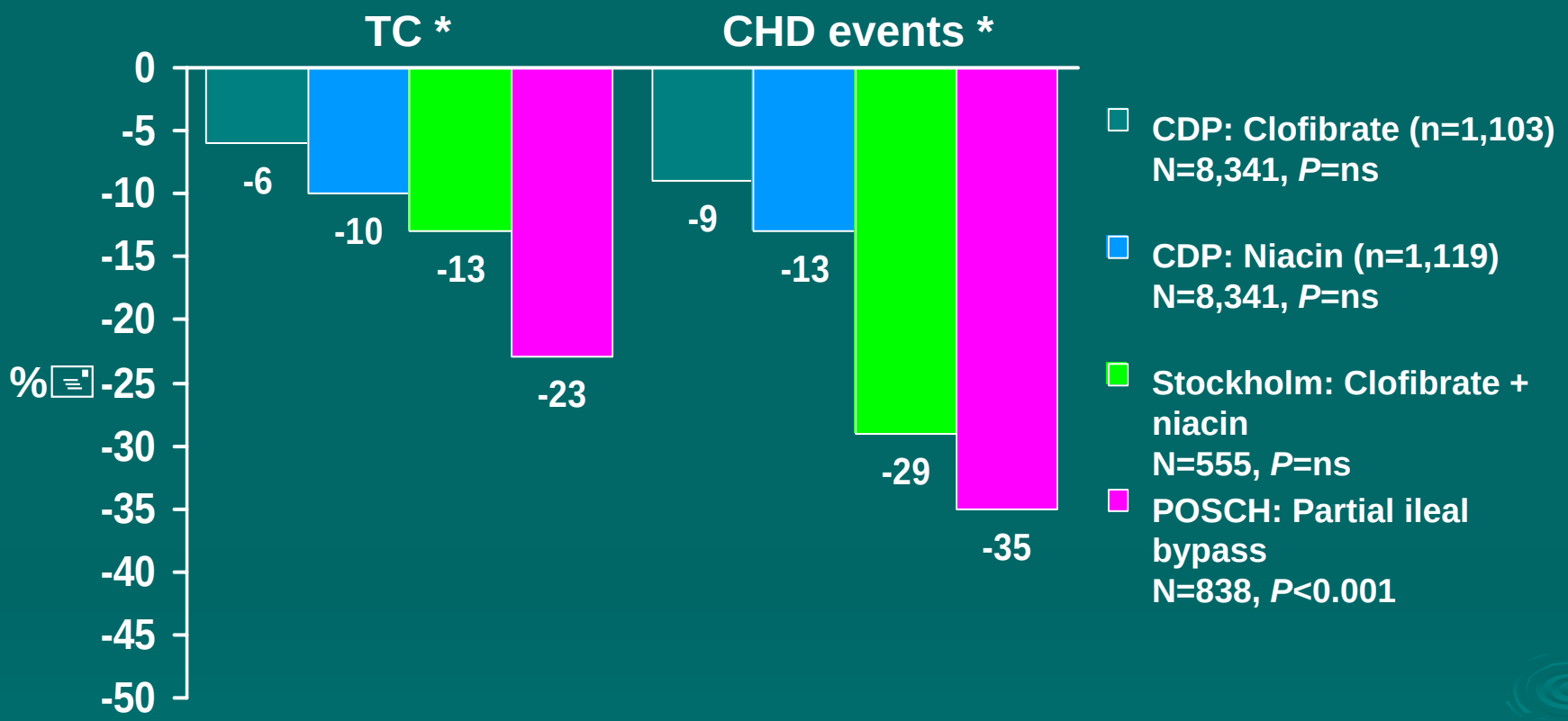
- Oslo: Diet/smoking cessation N=1,232, *P*=0.02
- WHO: Clofibrate N=15,745, *P*<0.05
- Upjohn: Colestipol N=2,278, *P*≤0.02
- LRC-CPPT: cholestyramine N=3,806, *P*<0.05
- HHS: Gemfibrozil N=4,081, *P*<0.02

N=number enrolled.

* Net difference between treatment and control groups (*P* values are for events).

Adapted from Levine GN et al. *N Engl J Med.* 1995;332:512-521.

Early Secondary-Prevention Trials: Overview

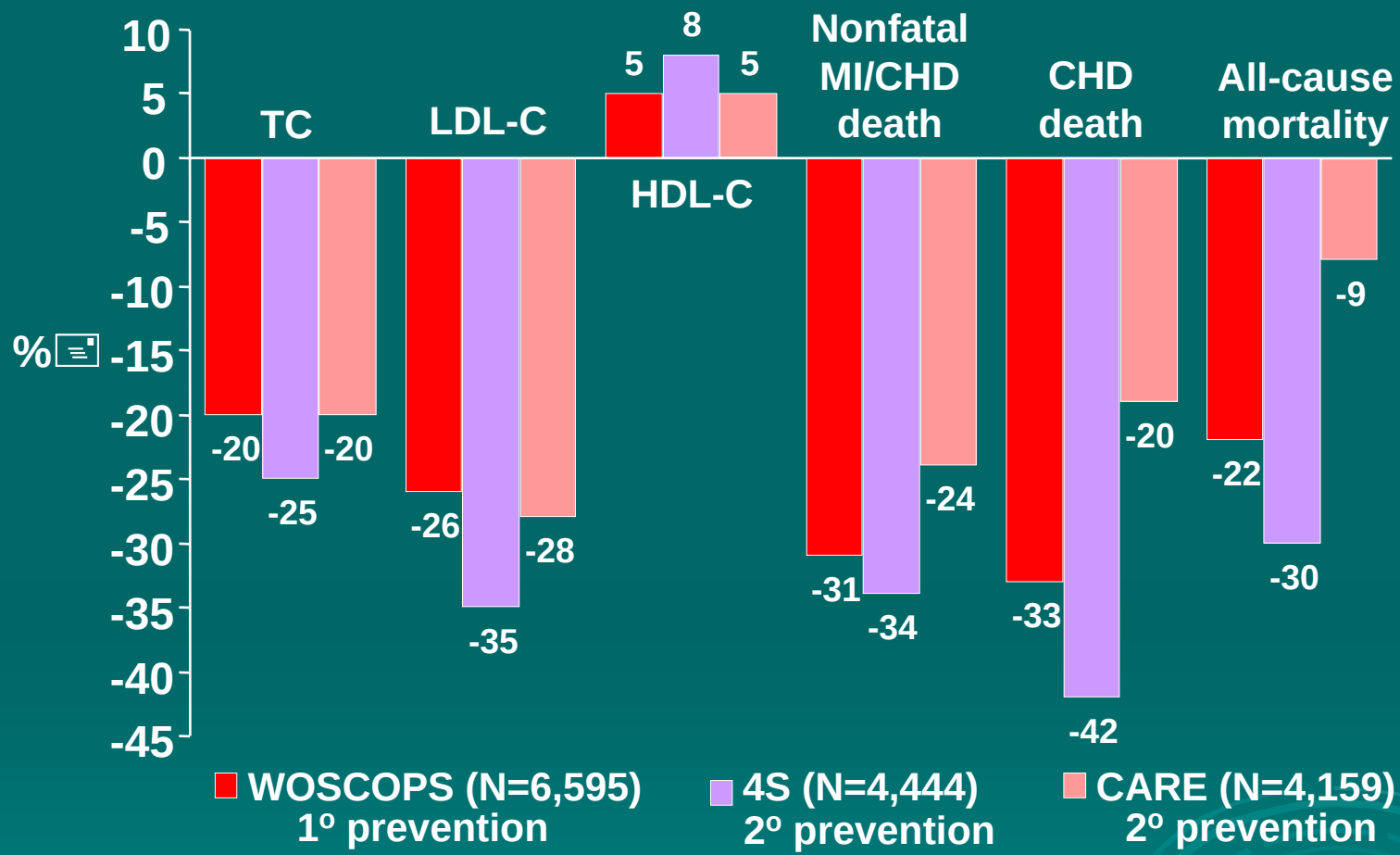


N=number enrolled; ns=not significant.

* Net difference between treatment and control groups (*P* values are for events).

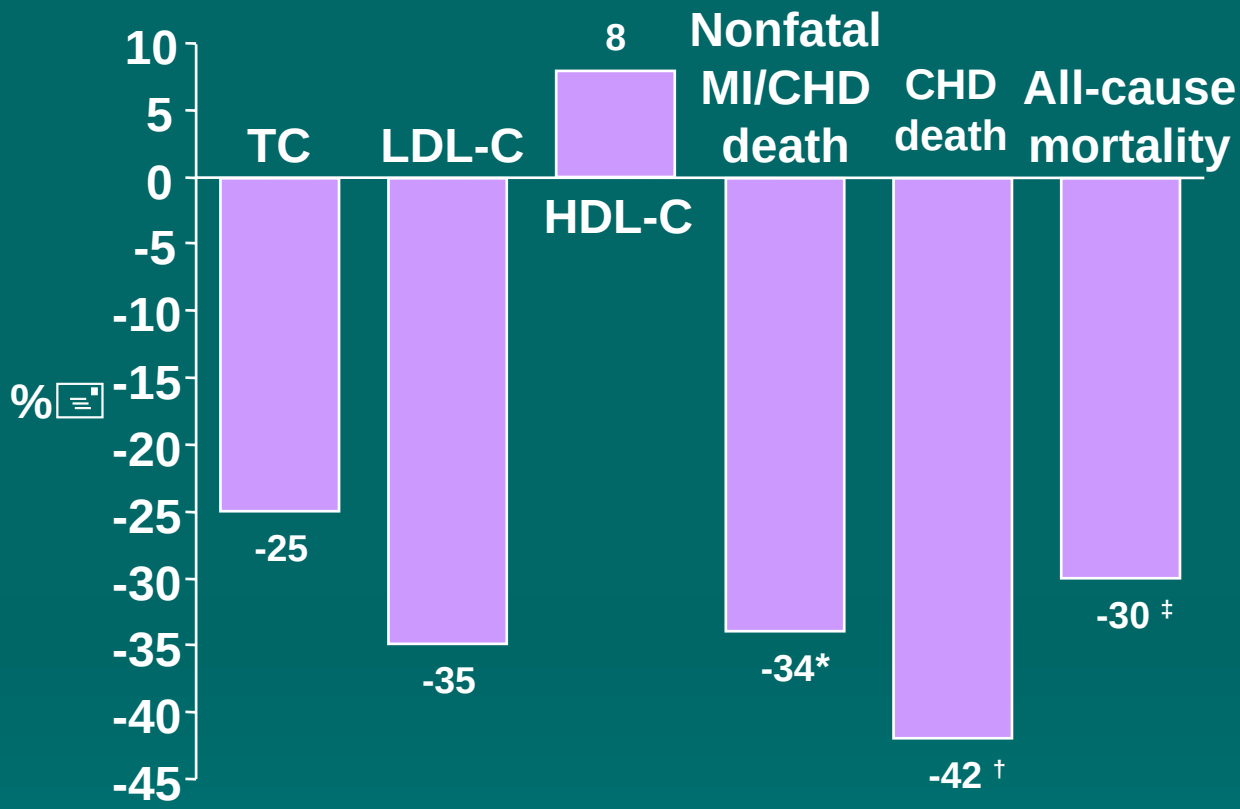
Adapted from Levine GN et al. *N Engl J Med.* 1995;332:512-521.

Summary of Effects of Lipid Lowering on Lipids and Clinical Events in Recent Statin Trials



N=number enrolled.

4S: Effect of LDL-C Lowering on Coronary Events in Secondary Prevention Trial in Men and Women



Subjects: 4,444 (81% men, 19% women)

Age range: 35-70 yr

Mean baseline TC: 261 mg/dL

Mean baseline LDL-C: 188 mg/dL

Duration: 5 yr

Intervention: Simvastatin 20-40 mg/day

*$P<0.00001$.

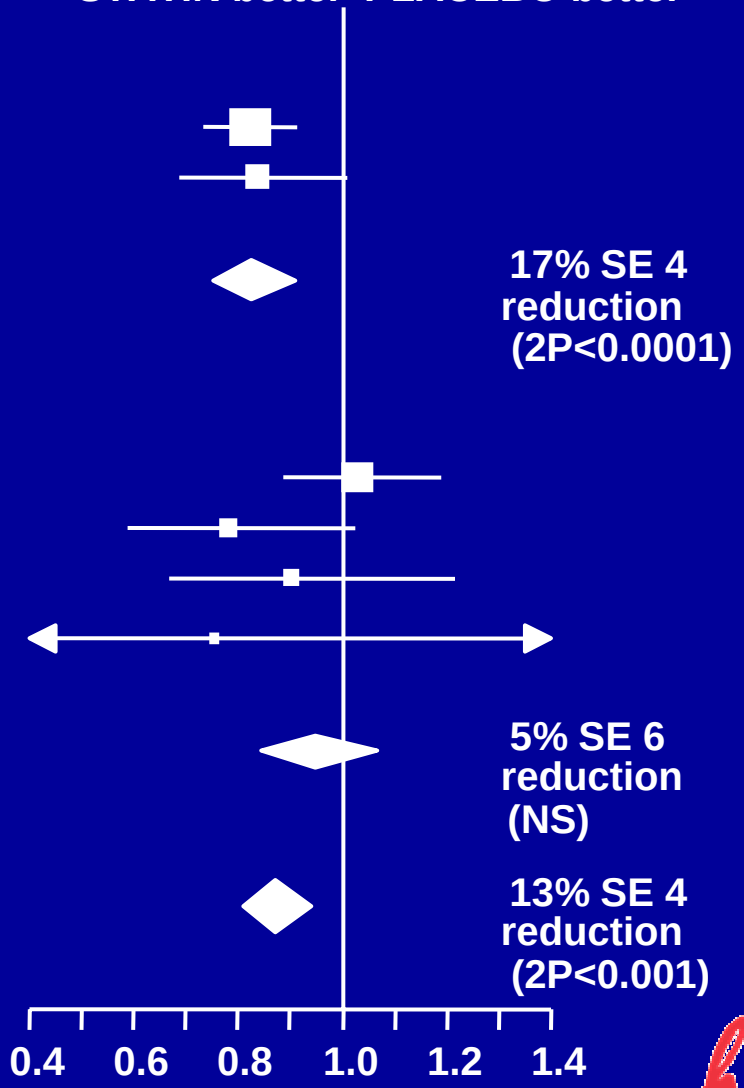
†95% CI: -27 to -54.

‡$P=0.003$.

4S Group. *Lancet*. 1994;344:1383-1389.

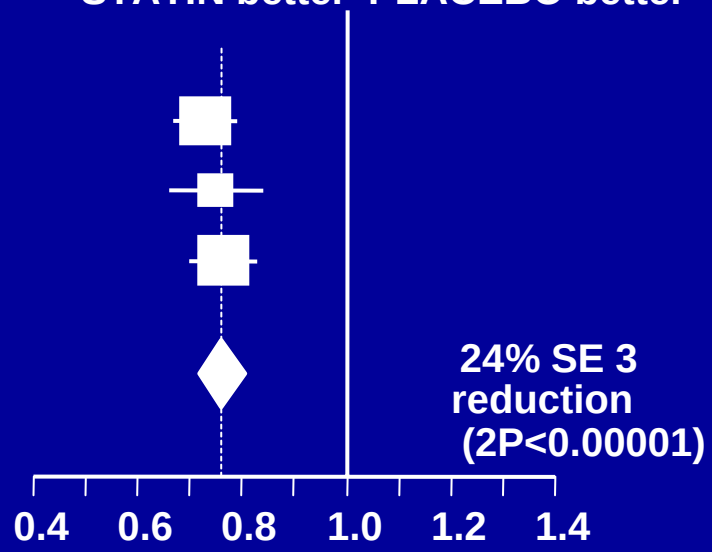
SIMVASTATIN: CAUSE-SPECIFIC MORTALITY

Cause of death	SIMVASTATIN (10269)	PLACEBO (10267)
Vascular		
Coronary	587	707
Other vascular	194	230
ANY VASCULAR	781 (7.6%)	937 (9.1%)
Non-vascular		
Neoplastic	359	345
Respiratory	90	114
Other medical	82	90
Non-medical	16	21
NON-VASCULAR	547 (5.3%)	570 (5.6%)
ALL CAUSES	1328 (12.9%)	1507 (14.7%)

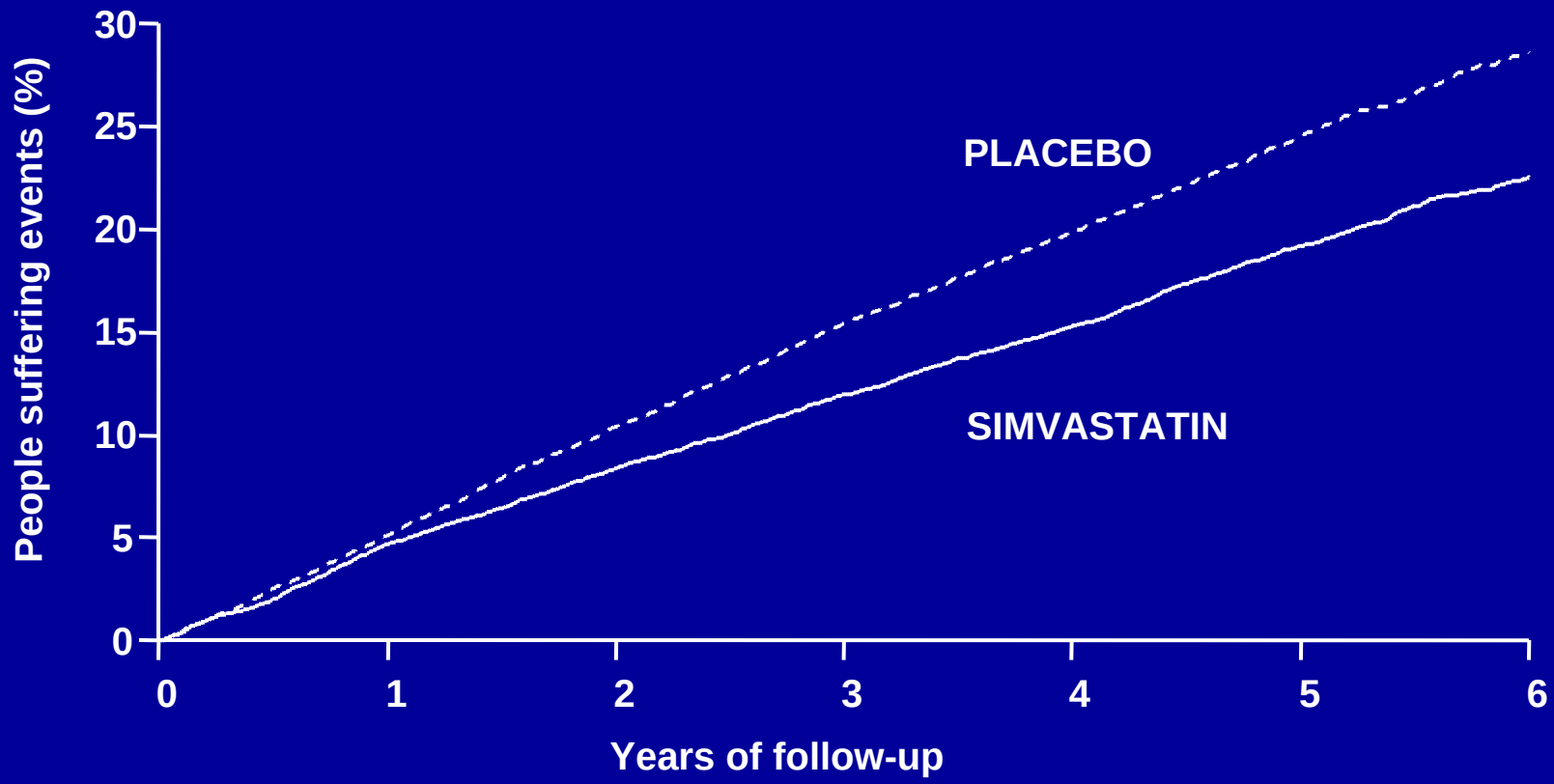


SIMVASTATIN: MAJOR VASCULAR EVENTS

Vascular event	SIMVASTATIN (10269)	PLACEBO (10267)
Major coronary	898	1212
Any stroke	444	585
Revascularisation	939	1205
ANY OF ABOVE	2033 (19.8%)	2585 (25.2%)



SIMVASTATIN: MAJOR VASCULAR EVENT by YEAR



Benefit/1000 (SE):	5(3)	20(4)	35(5)	46(5)	54(7)	60(18)

SIMVASTATIN: Main conclusions

After allowance for non-compliance, 40mg daily simvastatin safely reduces the risk of heart attack, of stroke, and of revascularisation by about one-third

5 years of statin treatment typically prevents these “major vascular events” in about:

100	of	every	1000	people with previous MI
80	"	"	"	other CHD
70	"	"	"	cerebrovascular disease
70	"	"	"	other arterial disease
70	"	"	"	diabetes (age 40+)

irrespective of cholesterol level
(or age, or sex, or other treatments)

ATP III: LDL-C, HDL-C, TC Classification

LDL-C (mg/dL)	
<100	Optimal
100–129	Above, near optimal
130–159	Borderline high
160–189	High
≥190	Very high
HDL-C (mg/dL)	
<40	Low
≥60	High
TC (mg/dL)	
<200	Desirable
200–239	Borderline high
≥240	High

Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 2001;285:2486-2497.

Risk Stratification for Primary Prevention in Adults: Classification Based on Total Cholesterol and HDL-C

Cholesterol level	HDL-C	Follow-up
Desirable blood cholesterol <200 mg/dL	≥35 mg/dL	Repeat testing within 5 yr
	<35 mg/dL	Perform fasting lipoprotein analysis
Borderline-high blood cholesterol 200-239 mg/dL	≥35 mg/dL and <2 other risk factors	Reevaluate risk status in 1-2 yr
	<35 mg/dL or ≥2 other risk factors	Perform fasting lipoprotein analysis
High blood cholesterol ≥240 mg/dL		Perform fasting lipoprotein analysis

Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 1993;269:3015-3023.

ATP III: Assessment of Risk

For persons *without* known CHD, other forms of atherosclerotic disease, or diabetes:

- Count the number of risk factors.
- Use Framingham scoring for persons with ≥2 risk factors* to determine the absolute 10-year CHD risk.

*For persons with 0–1 risk factor, Framingham calculations are not necessary.

Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 2001;285:2486-2497.

ATP III: Risk Categories, LDL-C Goals

Risk Category	LDL-C Goal (mg/dL)
CHD and CHD risk equivalents (10-year risk >20%)	<100
≥2 risk factors (10-year risk ≤20%)	<130
0–1 risk factor*	<160

*Almost all people with 0–1 risk factor have a 10-year risk <10%; thus, Framingham risk calculations are not necessary.

Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 2001;285:2486-2497.

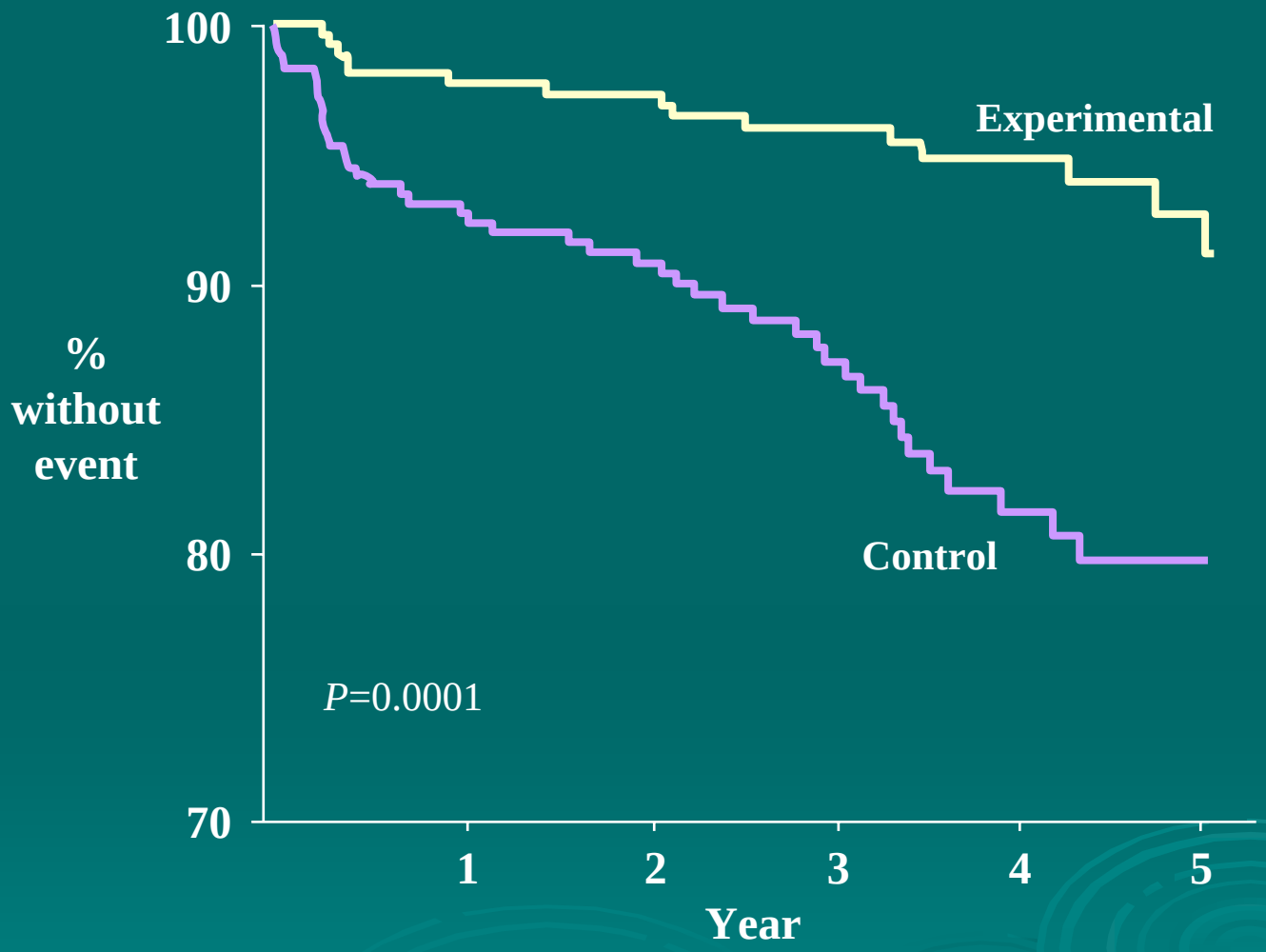
Dietary Therapy for Elevated Blood Cholesterol

Nutrient*	Recommended intake	
	Step I Diet	Step II Diet
Total fat	<30% of total calories	
• Saturated fatty acids	8-10% of total calories	<7% of total calories
• Polyunsaturated fatty acids	≤10% of total calories	
• Monounsaturated fatty acids	≤15% of total calories	
Carbohydrates	≥55% of total calories	
Protein	~15% of total calories	
Cholesterol	<300 mg/day	<200 mg/day
Total calories	To achieve and maintain desirable weight	

*Calories from alcohol not included.

Expert Panel on Detection, Evaluation, and Treatment of High Blood cholesterol in Adults, JAMA 1993

Lyon Diet Heart Study: Cumulative Survival Without Cardiac Death and Nonfatal MI



de Lorgeril M et al. Circulation. 1999;99:779-785.

LDL-C Treatment Cut points and Targets for Therapy

Primary and Secondary Prevention

Patient category	Initiation level (mg/dL)		LDL-C target (mg/dL)
	Diet	Drug	
No CHD, <2 other RF	≥160	≥190	<160
No CHD, ≥2 other RF	≥130	≥160	<130
With CHD or other atherosclerotic disease	>100	≥130	≤100

RF = risk factors.

Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 1993;269:3015-3023.

ATP III:
LDL-C Treatment Cutpoints for Therapy

Risk Category	Initiate TLC*	Consider Drug Therapy
CHD and CHD risk equivalents	≥100 mg/dL	≥130 mg/dL (100–129 mg/dL: drug optional)†
≥2 risk factors	≥130 mg/dL	10-year risk 10%–20%: ≥130 mg/dL 10-year risk <10%: ≥160 mg/dL
0–1 risk factor	≥160 mg/dL	≥190 mg/dL (160–189 mg/dL: drug optional)

***Therapeutic lifestyle changes**

†Some authorities use LDL-C–lowering drugs if TLC does not achieve LDL-C <100 mg/dL; others use drugs to modify HDL-C and TG.

Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 2001;285:2486-2497.

ATP III Pharmacologic Treatment

	Statins	Fibrates	Niacin	BAS
LDL-C	↓↓↓	↓	↓	↓↓
HDL-C	↑	↑↑	↑↑↑	↑
TG	↓↓	↓↓↓	↓↓↓	– ↑

BAS: Bile acid sequestrant

ATP III: Management of Very High LDL-C

- LDL-C ≥190 mg/dL usually traced to genetic forms of hypercholesterolemia
- Recommended actions:
  - Early detection in young adults through cholesterol screening to prevent premature CHD
  - Family cholesterol testing to identify affected relatives
  - Combination drug therapy usually required to achieve target LDL-C levels

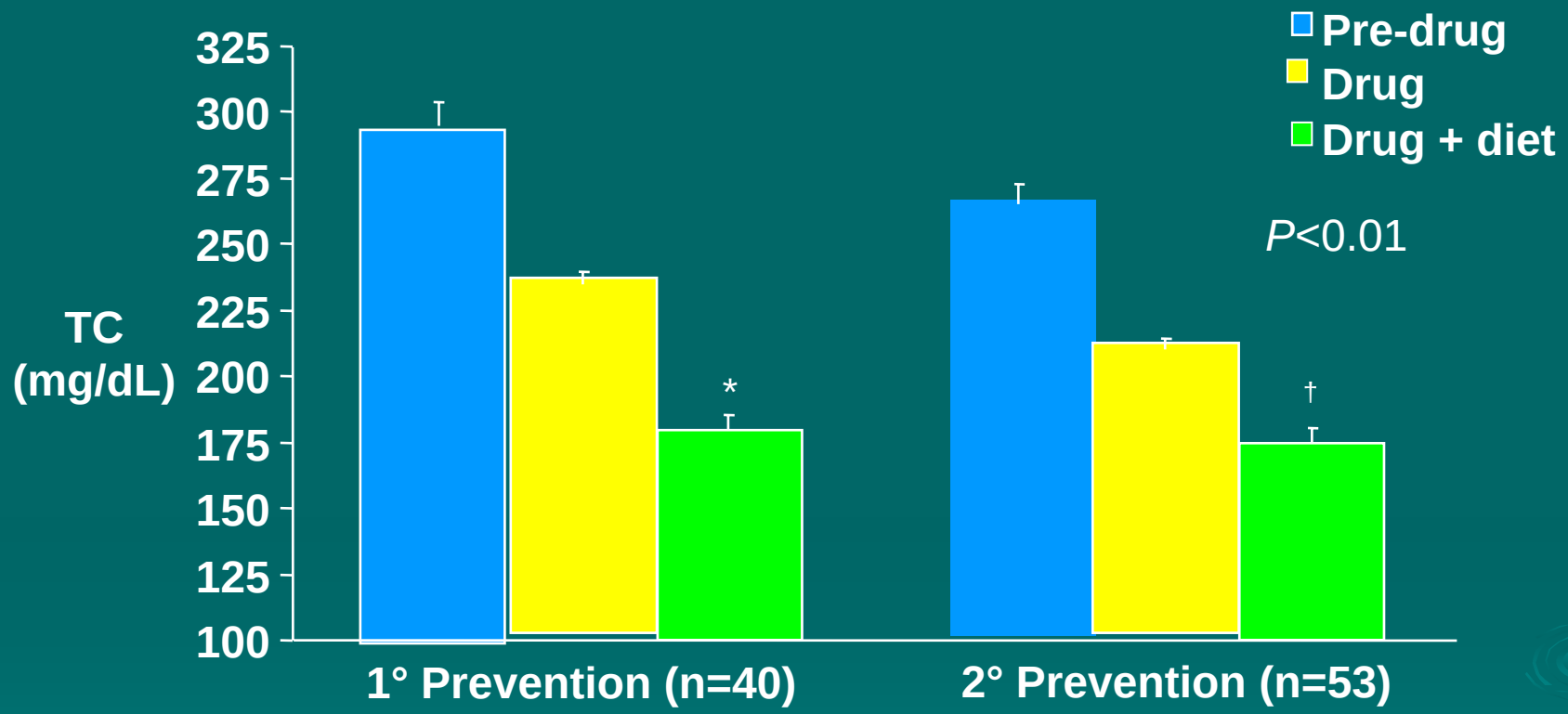
Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 2001;285:2486-2497.

ATP III:
New Features of Guidelines—
Updated Lipid/Lipoprotein Classifications

- Optimal LDL-C level: identified as <100 mg/dL
- Categorical low HDL-C: raised to <40 mg/dL to more accurately define patients at increased risk
- TG classification cutpoints: lowered to focus more attention on moderate elevations
  - normal: <150 mg/dL
  - borderline high: 150–199 mg/dL
  - high: 200–499 mg/dL
  - very high: ≥500 mg/dL

Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 2001;285:2486-2497.

Effects of Drug Therapy and Diet on Lipids



* 84% reached NCEP LDL target (<130 mg/dL).

† 63% reached NCEP LDL-C target (<100 mg/dL).

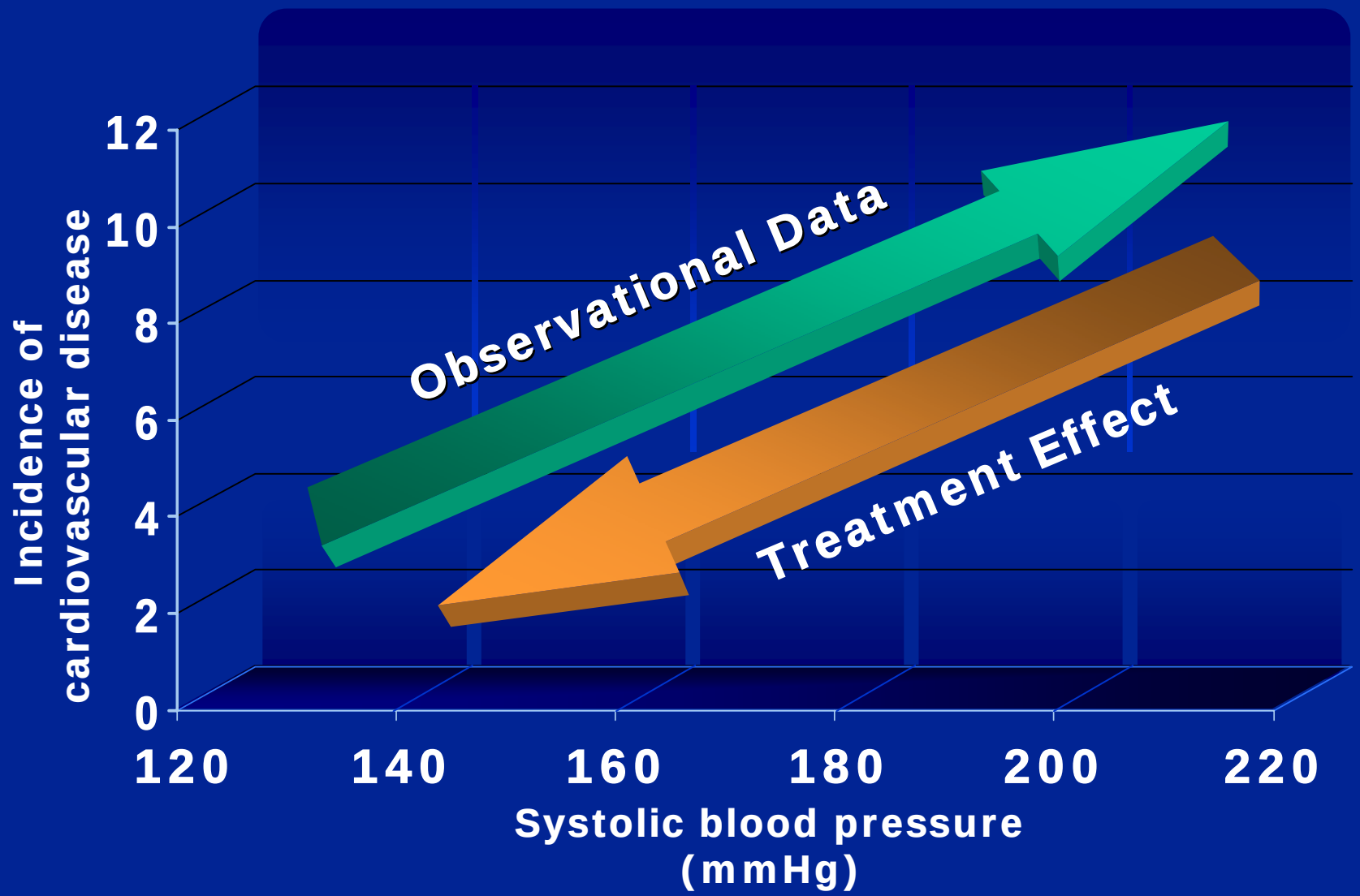
Barnard RJ, et al. *Exerpta Medica Brief Reports*. 1997;1112-1114.

BARRIERS TO ACHIEVING RISK-FACTOR REDUCTION

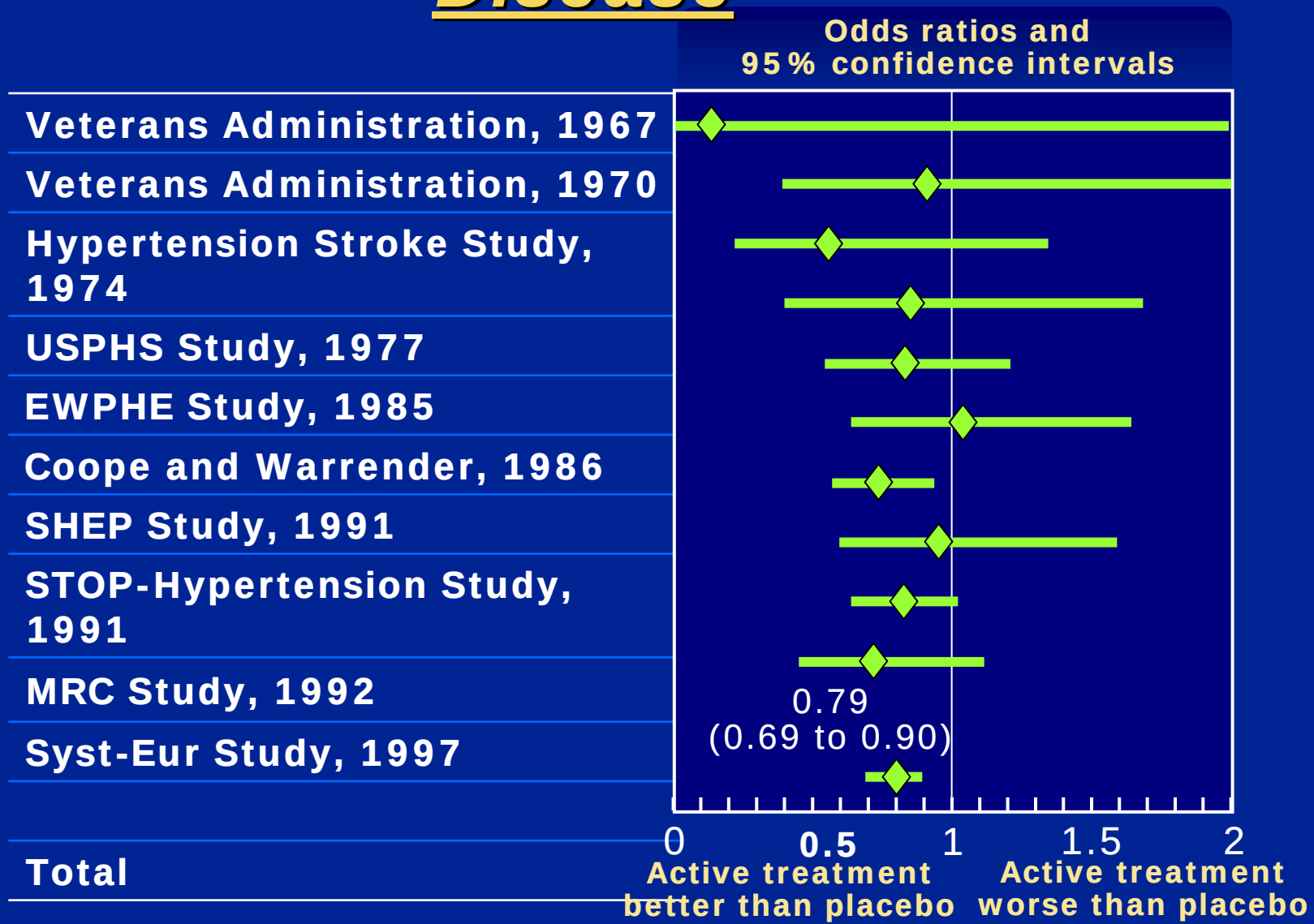
- Community and societal barriers to the prevention of CVD
- Medical setting barriers.
- Patient-related barriers to CVD prevention.
- CV Myths:
  1. Heart disease is going away
  2. Living with heart disease is not so bad
  3. Heart disease is a good way to die
  4. Only older people have strokes
  5. Women do not get heart disease
  6. No more research is needed

Hypertension

Hypertension Treatment Effect Mirrors Observational Data

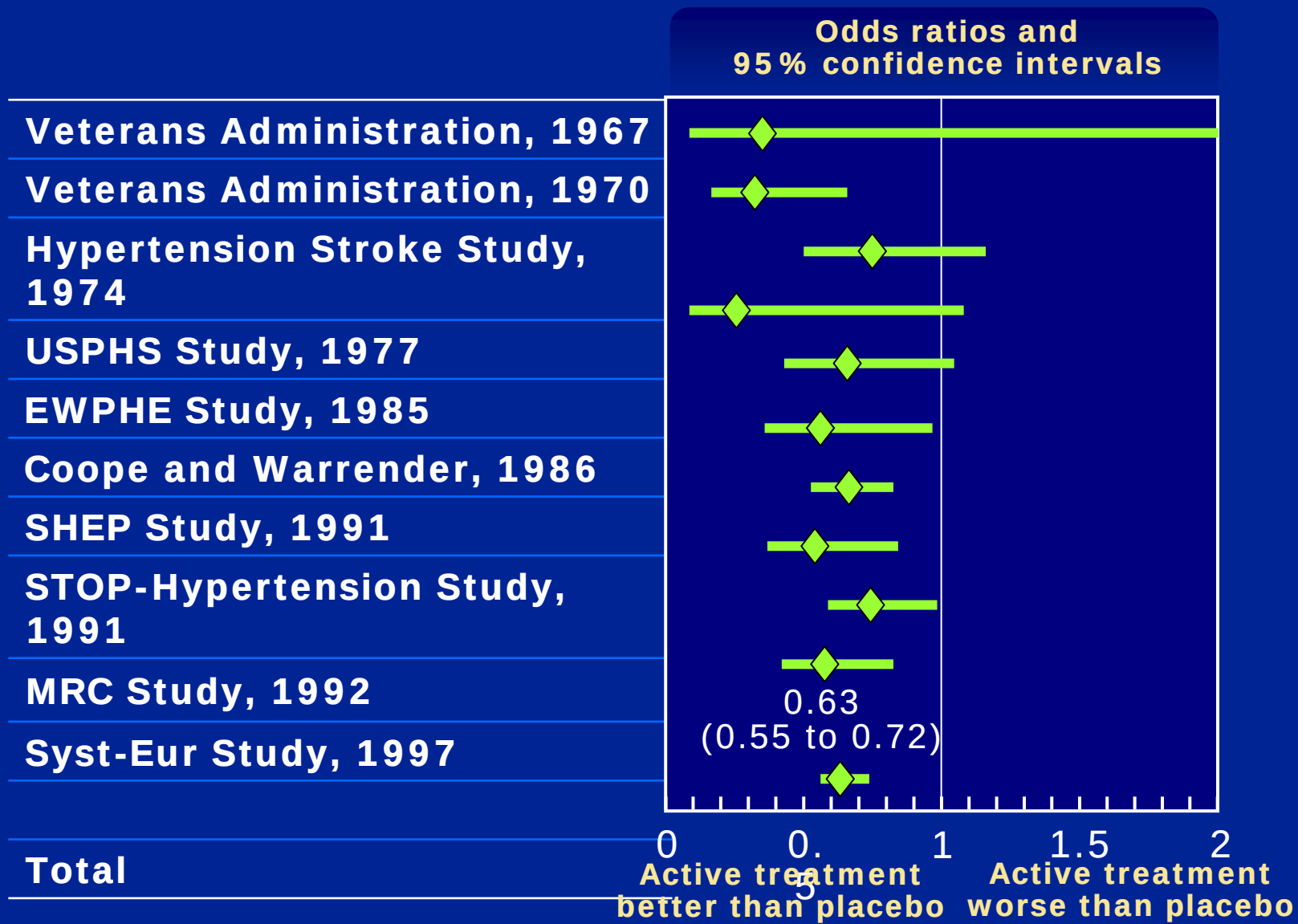


Relative Risk for Coronary Heart Disease



He J, et al. Am Heart J. 1999; 138:211-219.

Relative Risk for Stroke



He J, et al. Am Heart J. 1999; 138:211-219.

Blood Pressure Classification

BP Classification	SBP mmHg		DBP mmHg
Normal	<120	and	<80
Prehypertension	120–139	or	80–89
Stage 1 Hypertension	140–159	or	90–99
Stage 2 Hypertension	≥160	or	≥100

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Benefits of Lowering BP

	Average Percent Reduction
Stroke incidence	35–40%
Myocardial infarction	20–25%
Heart failure	50%

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Goals of Therapy

- Reduce CVD and renal morbidity and mortality.
- Treat to BP <140/90 mmHg or BP <130/80 mmHg in patients with diabetes or chronic kidney disease.
- Achieve SBP goal especially in persons ≥50 years of age.

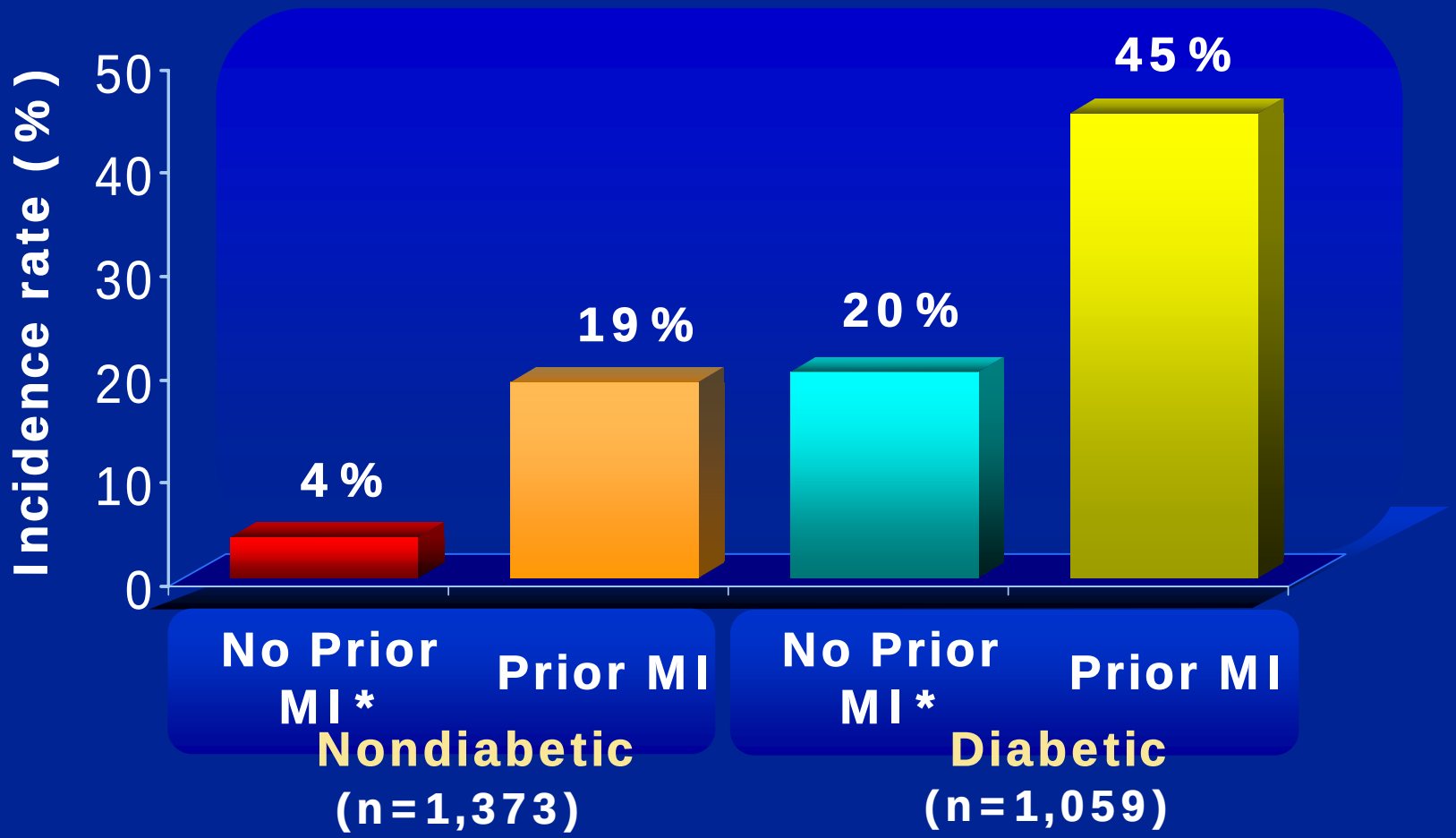
JNC VII JAMA 2003

Classification and Management of BP for adults

BP classification	SBP* mmHg	DBP* mmHg	Lifestyle modification	Initial drug therapy	
				Without compelling indication	With compelling indications
Normal	<120	and <80	Encourage		
Prehypertension	120–139	or 80–89	Yes	No antihypertensive drug indicated.	Drug(s) for compelling indications. ‡
Stage 1 Hypertension	140–159	or 90–99	Yes	Thiazide-type diuretics for most. May consider ACEI, ARB, BB, CCB, or combination.	Drug(s) for the compelling indications.‡ Other antihypertensive drugs (diuretics, ACEI, ARB, BB, CCB) as needed.
Stage 2 Hypertension	≥160	or ≥100	Yes	Two-drug combination for most† (usually thiazide-type diuretic and ACEI or ARB or BB or CCB).	

*Treatment determined by highest BP category.
†Initial combined therapy should be used cautiously in those at risk for orthostatic hypotension.
‡Treat patients with chronic kidney disease or diabetes to BP goal of <130/80 mmHg.

7-Year Incidence of Fatal and Nonfatal MI

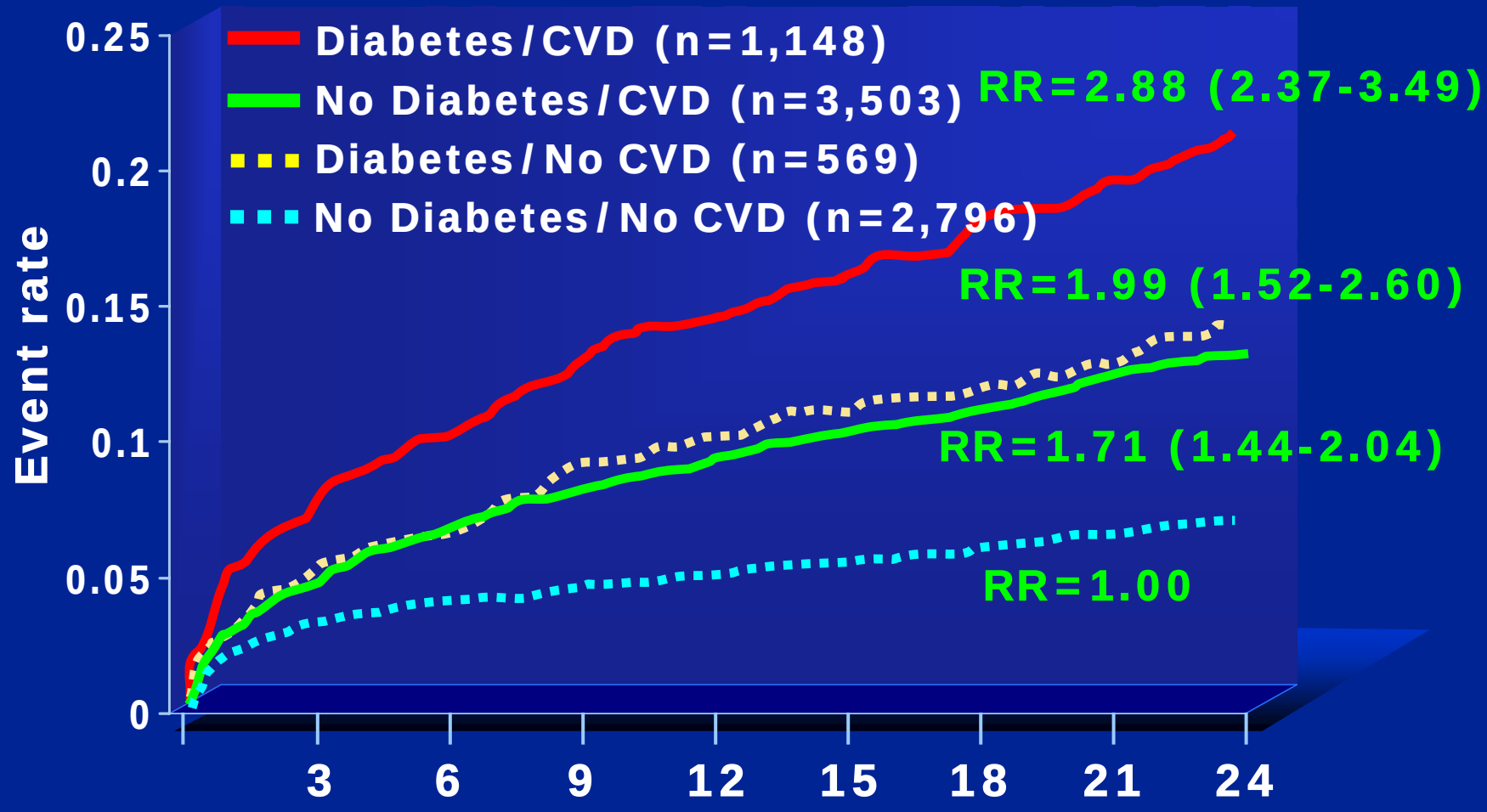


*At baseline MI=myocardial infarction

P<0.001 for prior MI vs. no prior MI and for diabetes vs. no diabetes

Haffner SM, et al. N Eng J Med. 1998;339:229-234.

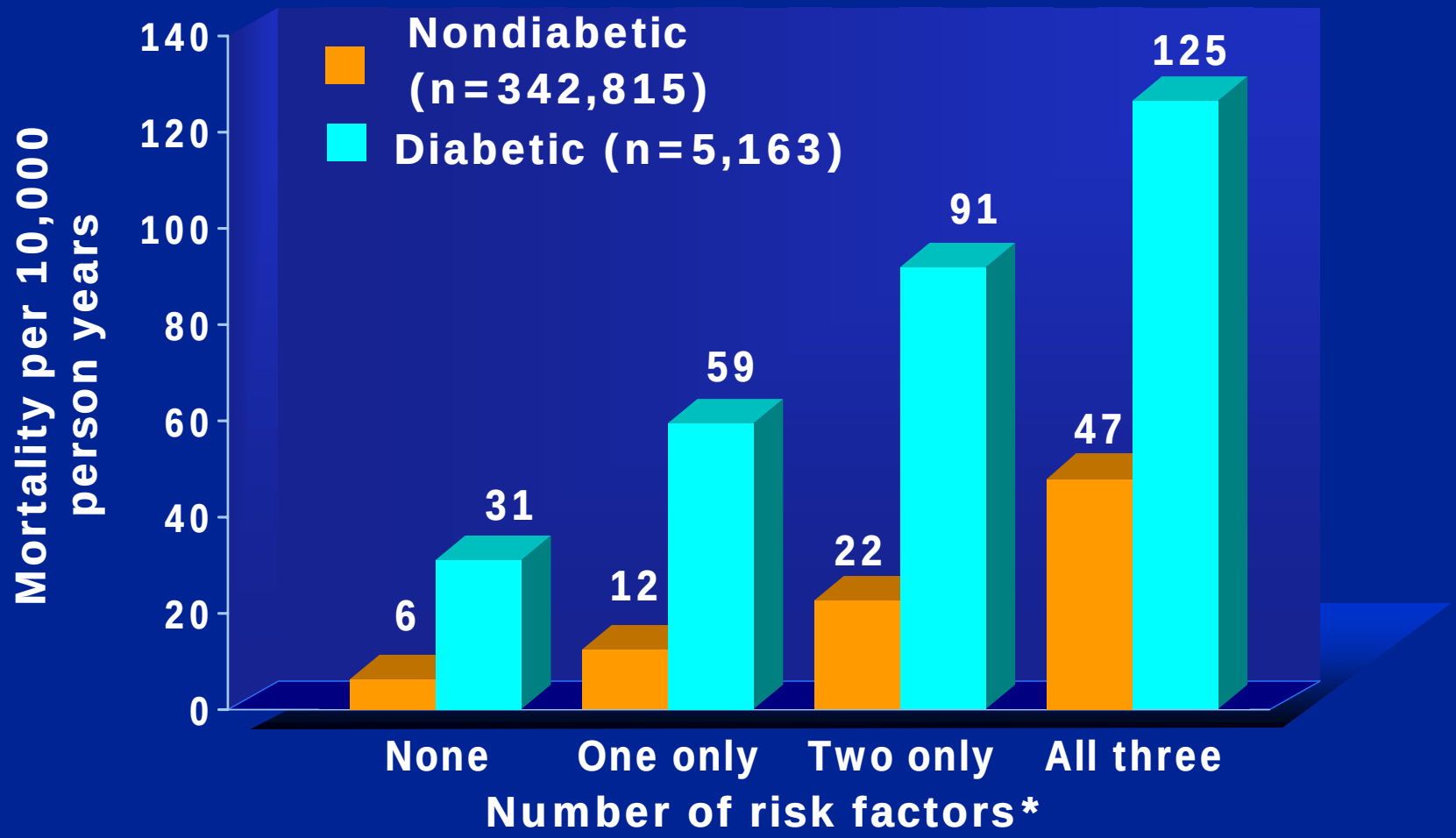
OASIS Study Mortality by Diabetes and CVD Status



OASIS=Organization to Assess Strategies for Ischemic Syndromes
CVD=cardiovascular disease RR=relative risk (95% confidence intervals)

Malmberg K, et al. Circulation. 2000;102:1014-1019.

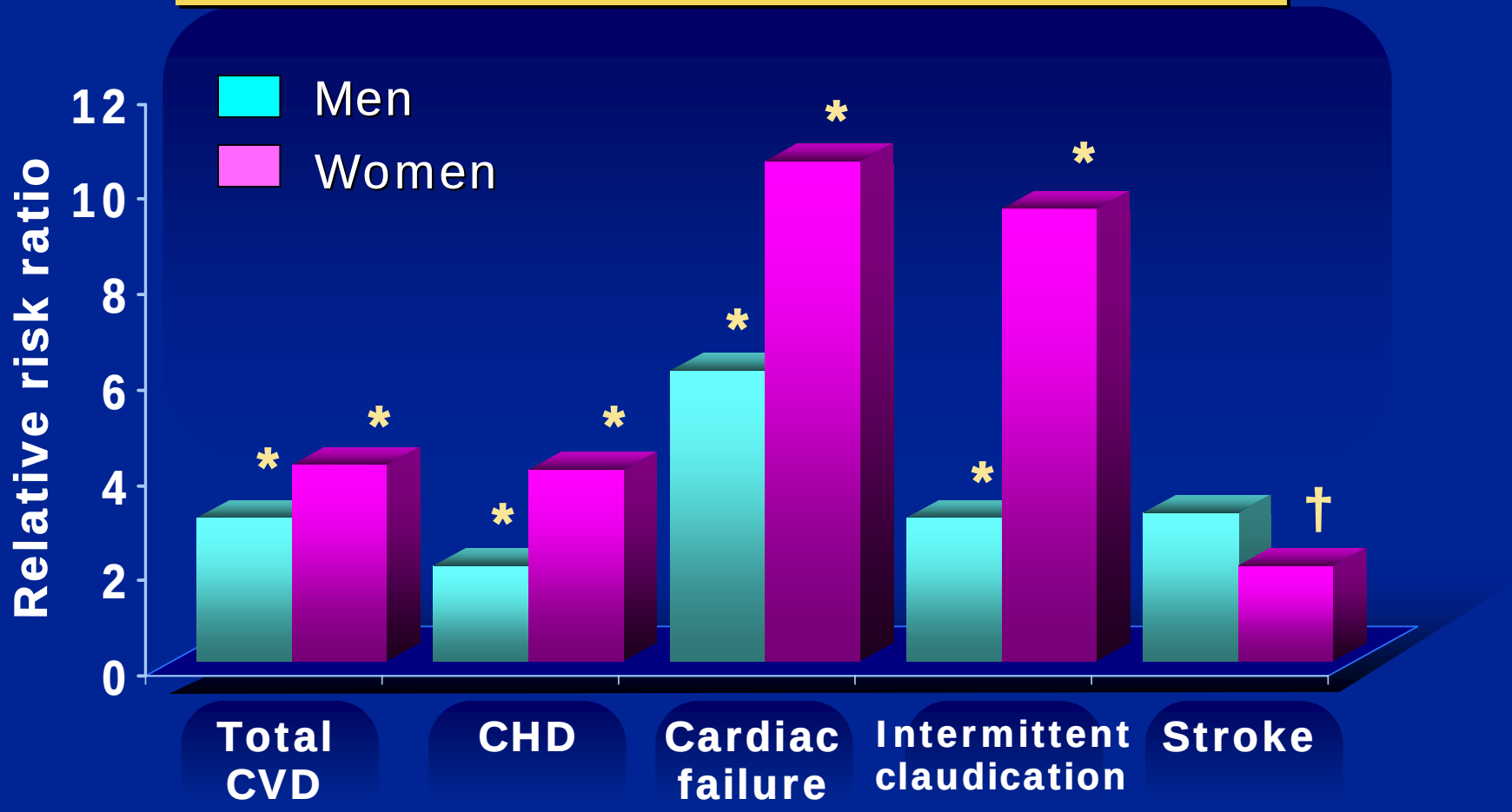
Impact of Diabetes on Cardiovascular Mortality in MRFIT



MRFIT=Multiple Risk Factor Intervention Trial
*Risk factors analyzed: smoking, hypercholesterolemia, and hypertension.

Stamler J, et al. Diabetes Care. 1993;16:434-444.

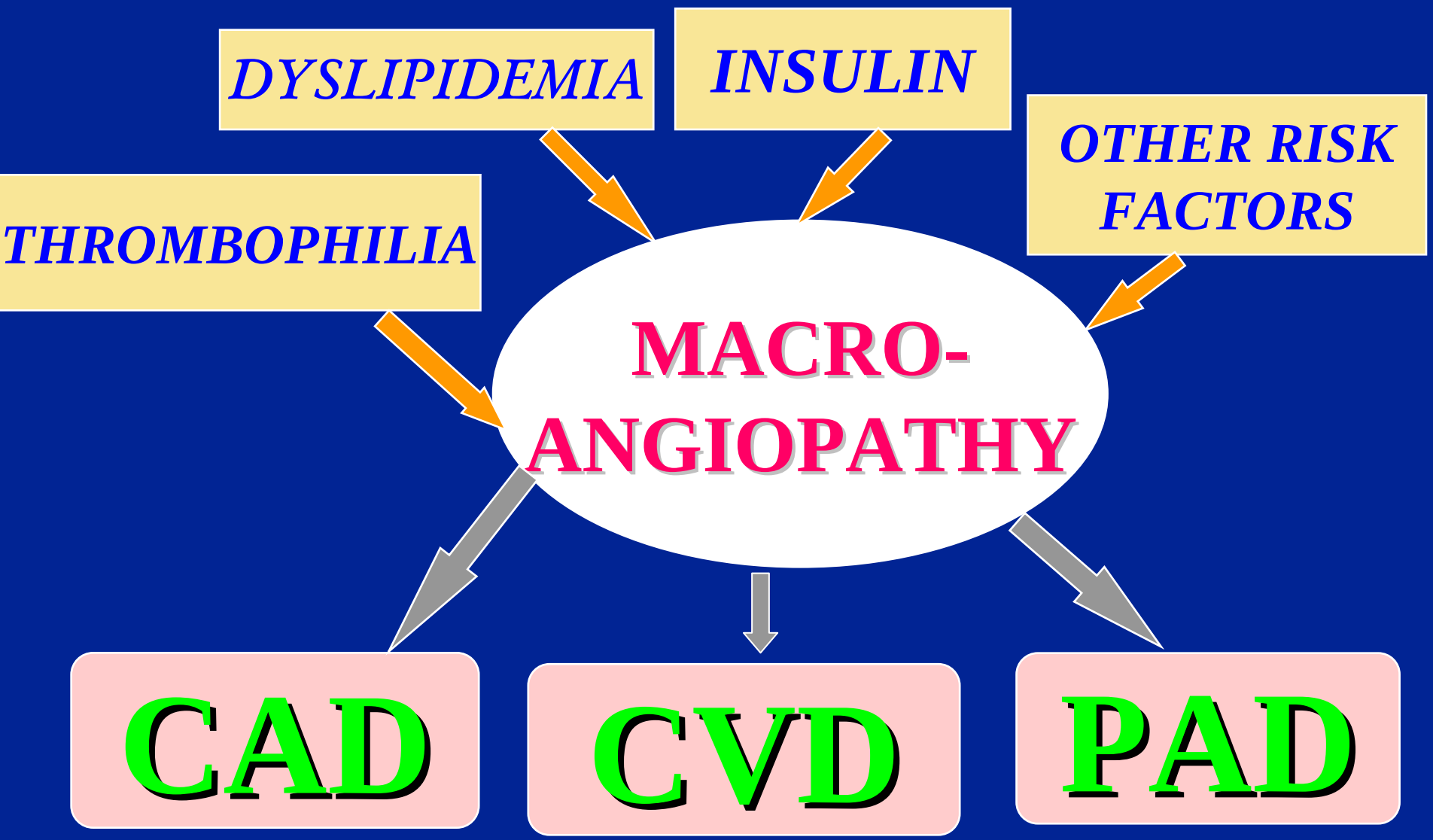
Framingham Heart Study
CVD Events in Diabetics



CVD=cardiovascular disease CHD=coronary heart disease *P<0.01 †P<0.05

Wilson PWF, Kannel WB. In: Hyperglycemia, Diabetes and Vascular Disease. Ruderman N, et al. eds. Oxford;1992.

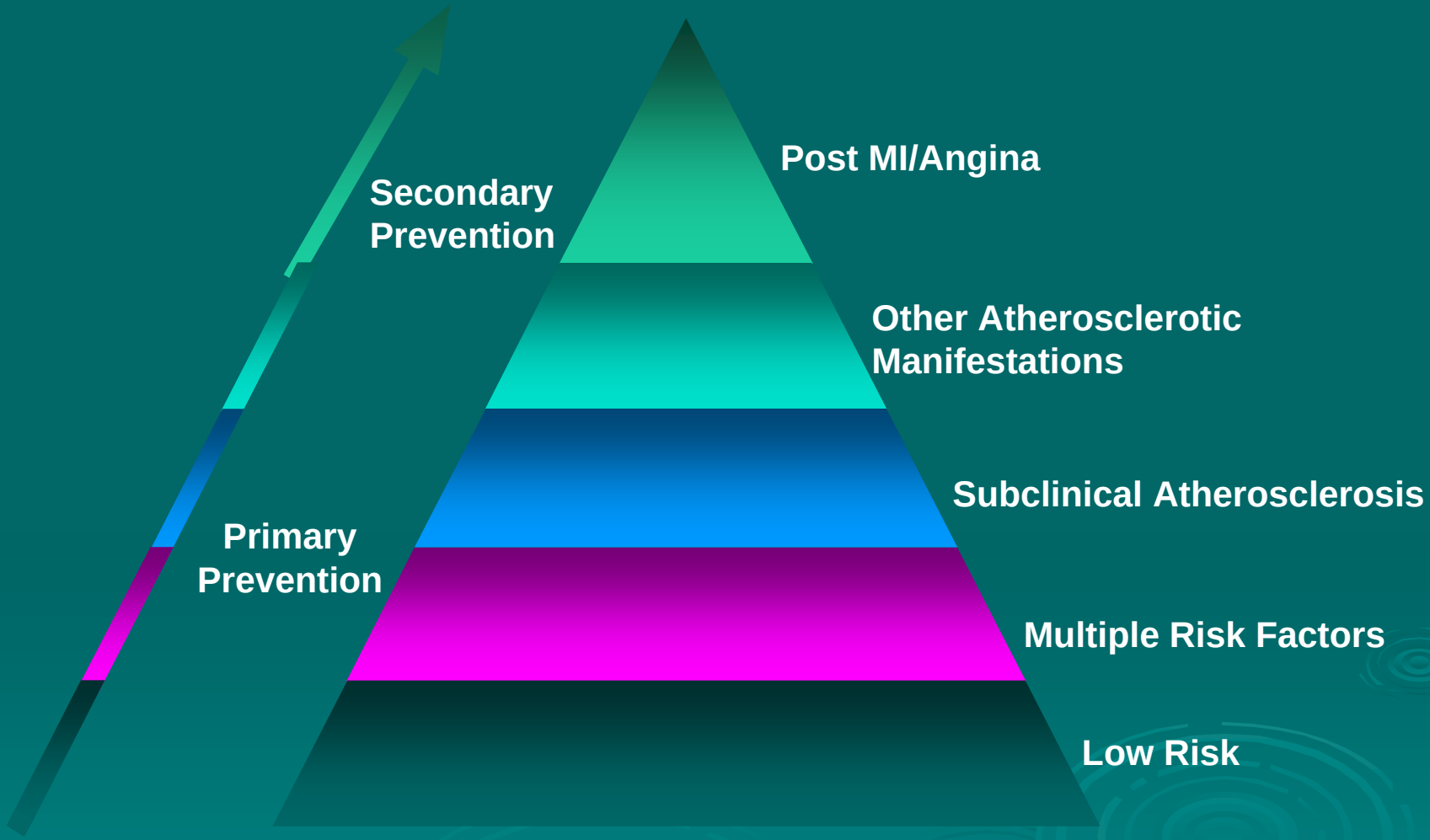
Pathogenesis of Diabetic Macroangiopathy



CVD In DM
Summary of Key Points

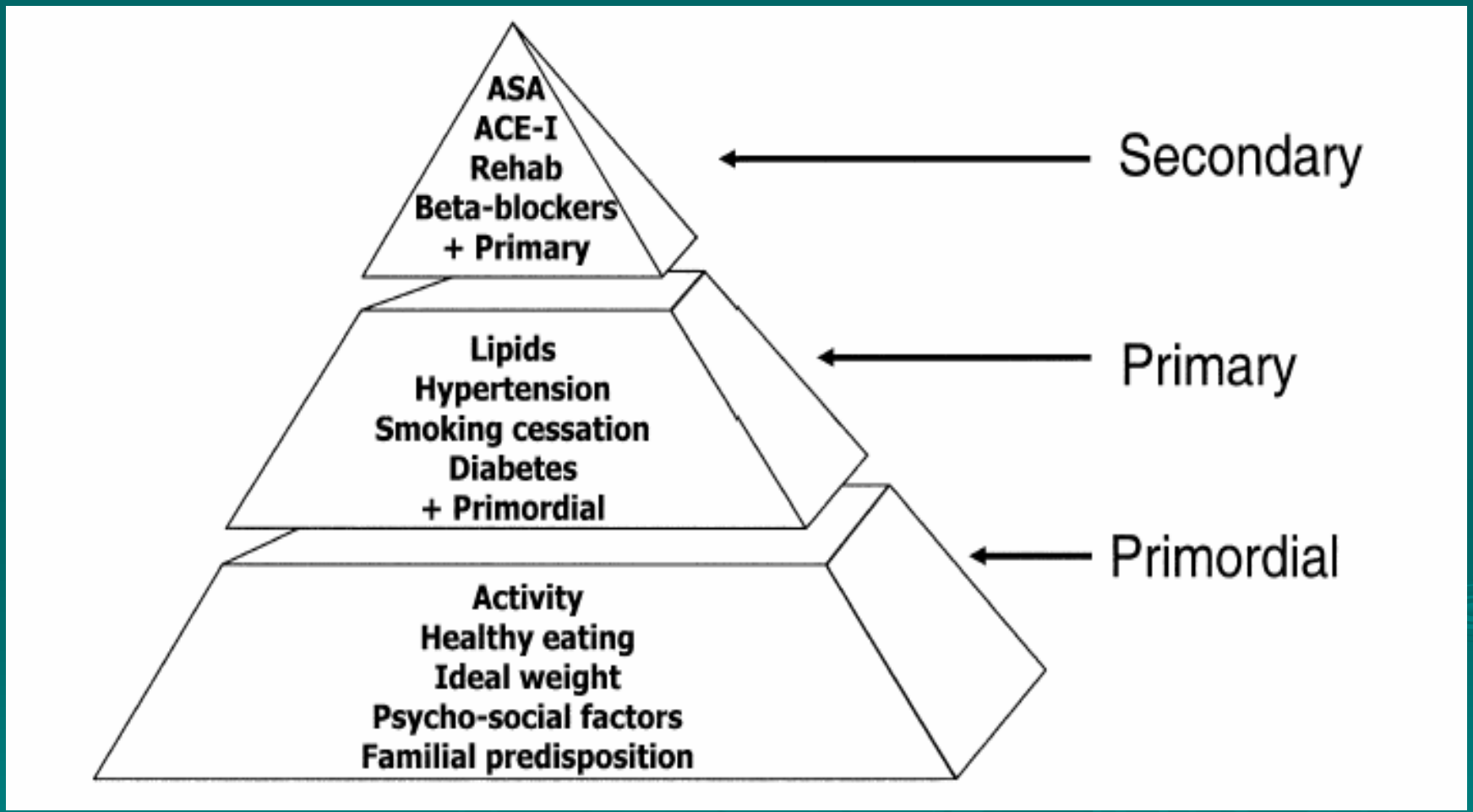
- Diabetics are at increased risk for all types of fatal and non-fatal cardiovascular (CV) events
- The protection afforded nondiabetic women is lost in diabetic women
- There is an increasingly negative impact on CV morbidity and mortality as the number of risk factors increases.
- The risk of myocardial infarction (MI) in a diabetic without prior MI is as great as the risk of MI in a nondiabetic with a previous MI
- Microalbuminuria is a potent predictor of cardiovascular risk in diabetics, even more than in nondiabetics

Continuum of Patients at Risk for a CHD Event



Courtesy of CD Furberg.

CVD Prevention Pyramid



ACC Guidelines 2001 For Prevention of Atherosclerosis

Goals	Intervention Recommendations
Smoking: complete cessation	Assess tobacco use. Strongly encourage patient and family to stop smoking and to avoid secondhand smoke. Provide counseling, pharmacological therapy, and formal smoking cessation programs as appropriate.
BP control: <140/90 mm Hg or <130/85 mm Hg if heart failure or renal insufficiency <130/80 mm Hg if Diabetes	Initiate lifestyle modification in all patients with blood pressure >130 mm Hg systolic or 80 mm Hg diastolic. Add blood pressure medication, individualized to other patient requirements and characteristics (ie, age, race, need for drugs with specific benefits)

ACC Guidelines 2001 For Prevention of Atherosclerosis

Goals	Intervention Recommendations
Lipid management: Primary goal LDL ,100 mg/dL	Start dietary therapy in all patients Promote physical activity and weight management. Assess fasting lipid profile in all patients Add drug therapy according to the following guide: ➢LDL< 100 mg/Dl No LDL-lowering therapy ➢LDL 100–129 mg/dL Therapeutic options: • statin or resin •Fibrate or niacin (if low HDL orhigh TG) •Consider combined drug therapy ➢LDL >130 mg/dL •Intensify LDL-lowering therapy •Add or increase drug therapy •with lifestyle therapies

ACC Guidelines 2001 For Prevention of Atherosclerosis

Goals	Intervention Recommendations
Lipid management: Secondary goal If TG >200 mg/dL, then non-HDL should be <130 mg/dL	➢If TG >150 mg/dL or HDL <40 mg/dL: Emphasize weight management and physical activity. Advise smoking cessation. ➢If TG 200–499 mg/dL: Consider fibrate or niacin after LDL-lowering therapy* ➢If TG >500 mg/dL: Consider fibrate or niacin before LDL-lowering therapy* ➢Consider omega-3 fatty acids as adjunct for high TG
Physical activity: Minimum goal 30 minutes 3 to 4 days/week Optimal daily	➢Assess risk, preferably with exercise test ➢Encourage minimum of 30 to 60 minutes of aerobic activity (walking, jogging, cycling ➢Increase in daily lifestyle activities (e g, walking breaks at work, gardening, household work). ➢ Advise medically supervised programs for moderate to high-risk patients.

ACC Guidelines 2001 For Prevention of Atherosclerosis

Goals	Intervention Recommendations
Weight management: BMI 18.5–24.9 kg/m2	➢Calculate BMI and measure waist circumference ➢Monitor response of BMI and waist circumference to therapy. ➢Start weight management and physical activity as appropriate. When BMI $25 kg/m2, goal for waist circumference is <40 inches in men and <35 inches in women.
Diabetes management: Goal HbA1c ,7%	➢Appropriate hypoglycemic therapy to achieve near-normal fasting plasma glucose, as indicated by HbA1c. ➢Treatment of other risks (e g, physical activity, weight management, blood pressure, and cholesterol management).

ACC Guidelines 2001 For Prevention of Atherosclerosis

Goals	Intervention Recommendations
Antiplatelet agents/ anticoagulants:	➢Start and continue indefinitely aspirin 75 to 325 mg/d if not contraindicated. ➢ Consider clopidogrel 75 mg/d or warfarin if aspirin contraindicated. Manage warfarin to INR 2-3 for those not able to take aspirin or clopidogrel.
ACE inhibitors:	➢Treat all patients indefinitely post MI; start early in stable high-risk patients (anterior MI, previous MI, Killip class II) ➢Consider chronic therapy for all other patients with coronary or other vascular disease unless contraindicated.
B-Blockers:	➢Start in all post-MI and acute ischemic syndrome patients. Continue indefinitely. Observe usual contraindications. ➢Use as needed to manage angina, rhythm, or BP in all other patients.

Conclusions

- Atherothrombosis is:
  - leading cause of death worldwide
  - A leading cause of disability
  - A lifelong disease and occurrence of events is unpredictable
  - Adversely affects peoples' quality of life
- The presence of multiple risk factors increases the risk of atherothrombotic events
- People with a history of atherothrombotic events i.e. myocardial infarction and stroke are at a far greater risk of having a subsequent event

1. American Heart Association. *2002 Heart and Stroke Statistical Update.* AHA, 2002

Conclusions

- Lifestyle intervention to discontinue smoking, make healthier food choices, increase aerobic exercise and moderating alcohol consumption is important in all coronary and other atherosclerotic disease prevention programs
- In patients with CHD, or other major atherosclerotic disease, rigorous control of BP, lipids, and glucose is recommended
- Cardioprotective drug therapy should be considered and prescribed in selected patients:
  - Aspirin for all patients
  - B-blockers at the doses prescribed in the clinical trials following MI, particularly in high risk patients, and for at least three years. Verapamil or diltiazem should be considered as alternatives to B-blocker when this drug class is contraindicated

Conclusions

- Cholesterol lowering therapy (statins) at the doses prescribed in the clinical trials
- ACE inhibitors at the doses prescribed in the clinical trials for patients with symptoms or signs of heart failure at the time of MI, or in those with persistent left ventricular systolic dysfunction (ejection fraction less than 40%)
- Anticoagulants for patients at risk of systemic embolisation with large anterior infarctions, severe heart failure, left ventricular aneurysm, or paroxysmal tachyarrhythmias.

➢ Integration of care of coronary and other atherosclerotic disease between hospital and general practice is essential by using common protocols to ensure optimal long term lifestyle, risk factor, and therapeutic management

Thank You