

Marist
Center for Lifetime Study
Your Heart and Your Health

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Health

Preventative Cardiology:

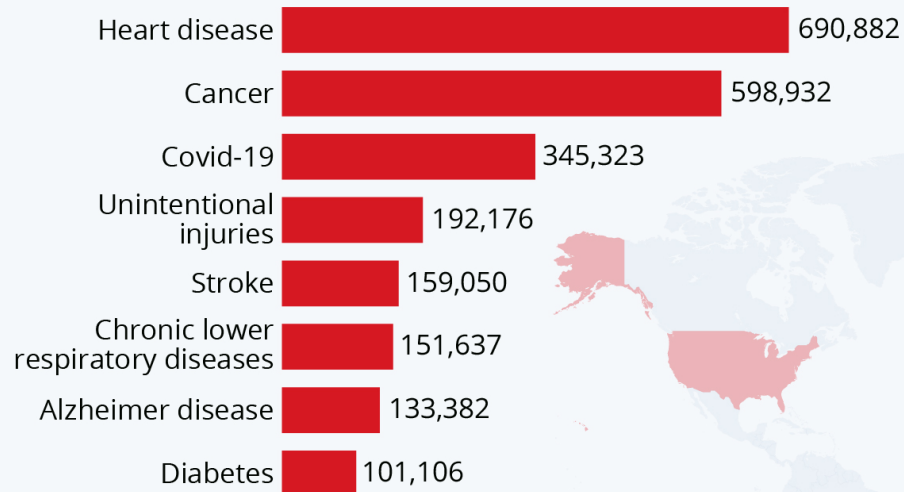
High Blood Pressure/Hypertension
High Cholesterol

Preventing Heart Disease

- Why do we care?

Covid-19 Was America's Third Leading Cause Of Death In 2020

Number of deaths for all leading causes of death in the U.S. in 2020



Source: Centers for Disease Control and Prevention



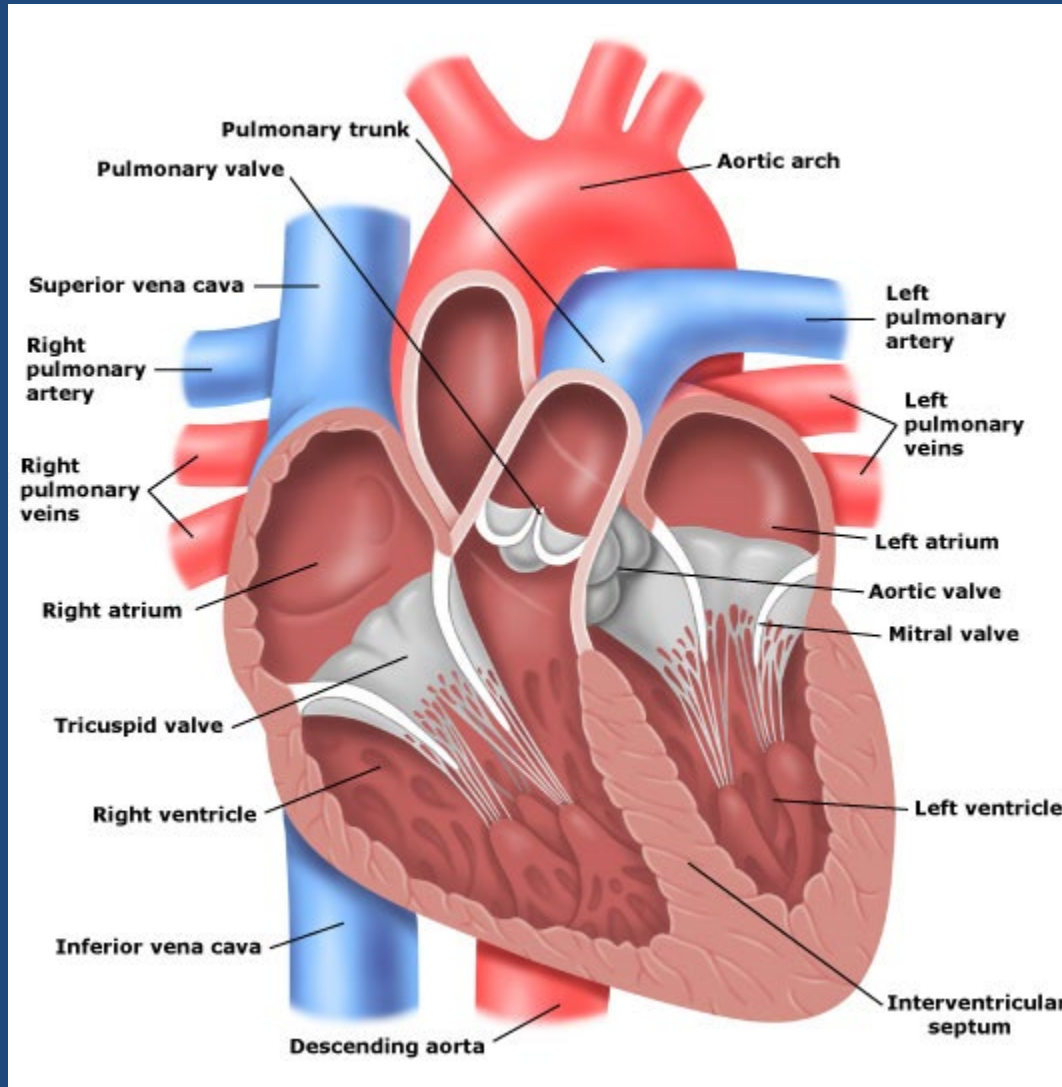
Heart Disease Risk Factors

- Nonmodifiable
 - Age
 - Sex
 - Family history

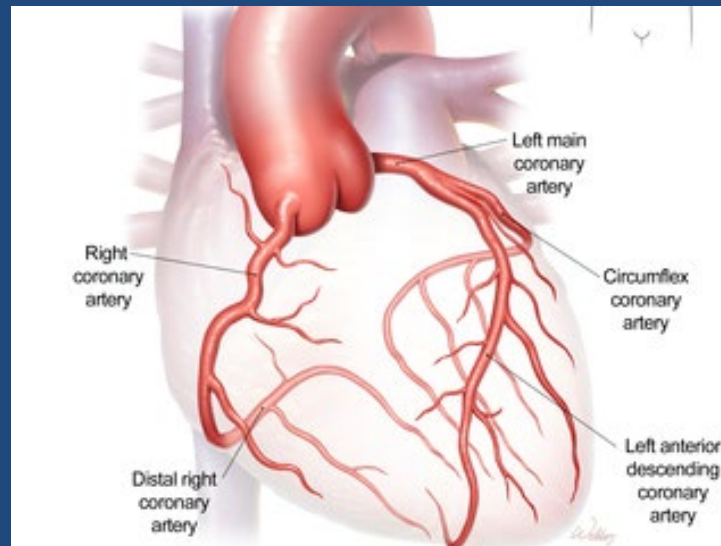
Heart Disease Risk Factors

- Modifiable
 - Smoking
 - Blood pressure
 - Cholesterol
 - Weight
 - Activity level
 - Diabetes
 - Diet
 - Stress
 - Alcohol

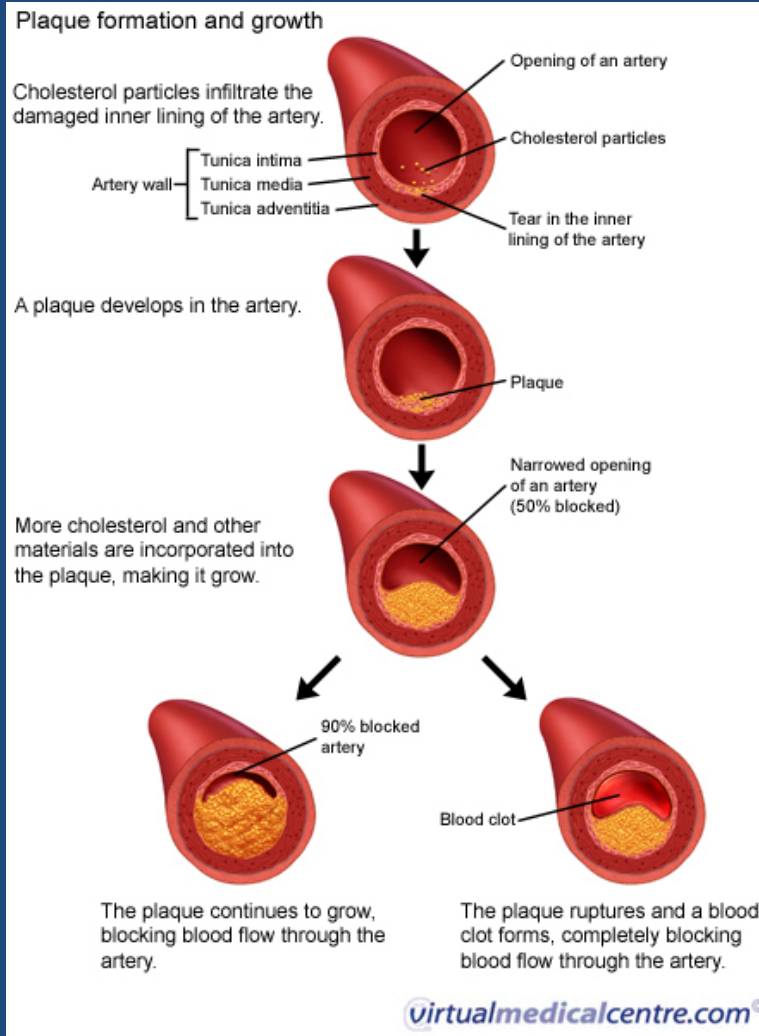
Anatomy



Anatomy – Coronary Arteries



Heart Disease



Circulation

Volume 140, Issue 11, 10 September 2019; Pages e596-e646
<https://doi.org/10.1161/CIR.0000000000000678>



ACC/AHA CLINICAL PRACTICE GUIDELINE

2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

Donna K. Arnett, PhD, MSPH, FAHA, Co-Chair, Roger S. Blumenthal, MD, FACC, FAHA, Co-Chair, Michelle A. Albert, MD, MPH, FAHA, Andrew B. Buroker, Esq, Zachary D. Goldberger, MD, MS, FACC, FAHA, Ellen J. Hahn, PhD, RN, Cheryl Dennison Himmelfarb, PhD, RN, ANP, FAHA, Amit Khera, MD, MSc, FACC, FAHA, Donald Lloyd-Jones, MD, SCM, FACC, FAHA, J. William McEvoy, MBBCh, MEd, MHS, Erin D. Michos, MD, MHS, FACC, FAHA, Michael D. Miedema, MD, MPH, Daniel Muñoz, MD, MPA, FACC, Sidney C. Smith Jr, MD, MACC, FAHA, Salim S. Virani, MD, PhD, FACC, FAHA, Kim A. Williams Sr, MD, MACC, FAHA, Joseph Yeboah, MD, MS, FACC, FAHA, and Boback Ziaeian, MD, PhD, FACC, FAHA

Heart Health

- The most important way to prevent atherosclerotic vascular disease, heart failure, and atrial fibrillation is to promote a healthy lifestyle throughout life.
- Adults who are 40 to 75 years of age and are being evaluated for cardiovascular disease prevention should undergo 10-year atherosclerotic cardiovascular disease (ASCVD) risk estimation and have a clinician–patient risk discussion before starting on pharmacological therapy, such as antihypertensive therapy, a statin, or aspirin. In addition, assessing for other risk-enhancing factors can help guide decisions about preventive interventions in select individuals, as can coronary artery calcium scanning

Heart Health

- All adults should consume a healthy diet that emphasizes the intake of vegetables, fruits, nuts, whole grains, lean vegetable or animal protein, and fish and minimizes the intake of *trans* fats, red meat and processed red meats, refined carbohydrates, and sweetened beverages. For adults with overweight and obesity, counseling and caloric restriction are recommended for achieving and maintaining weight loss.

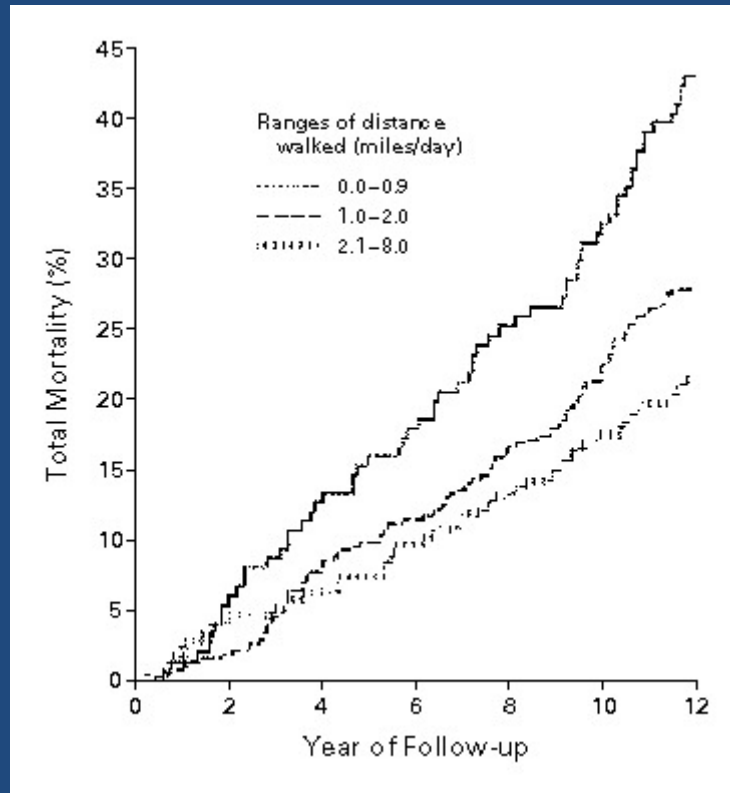
Heart Health

- Adults should engage in at least 150 minutes per week of accumulated moderate-intensity physical activity or 75 minutes per week of vigorous-intensity physical activity.
- Address diabetes and tobacco
- Aspirin should be used infrequently in the routine primary prevention of ASCVD because of lack of net benefit.

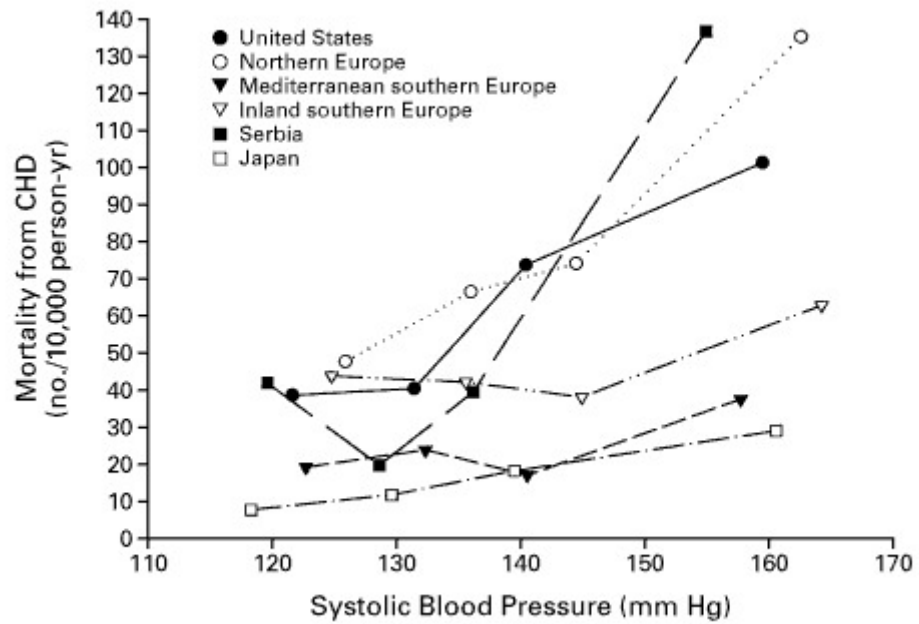
Heart Health

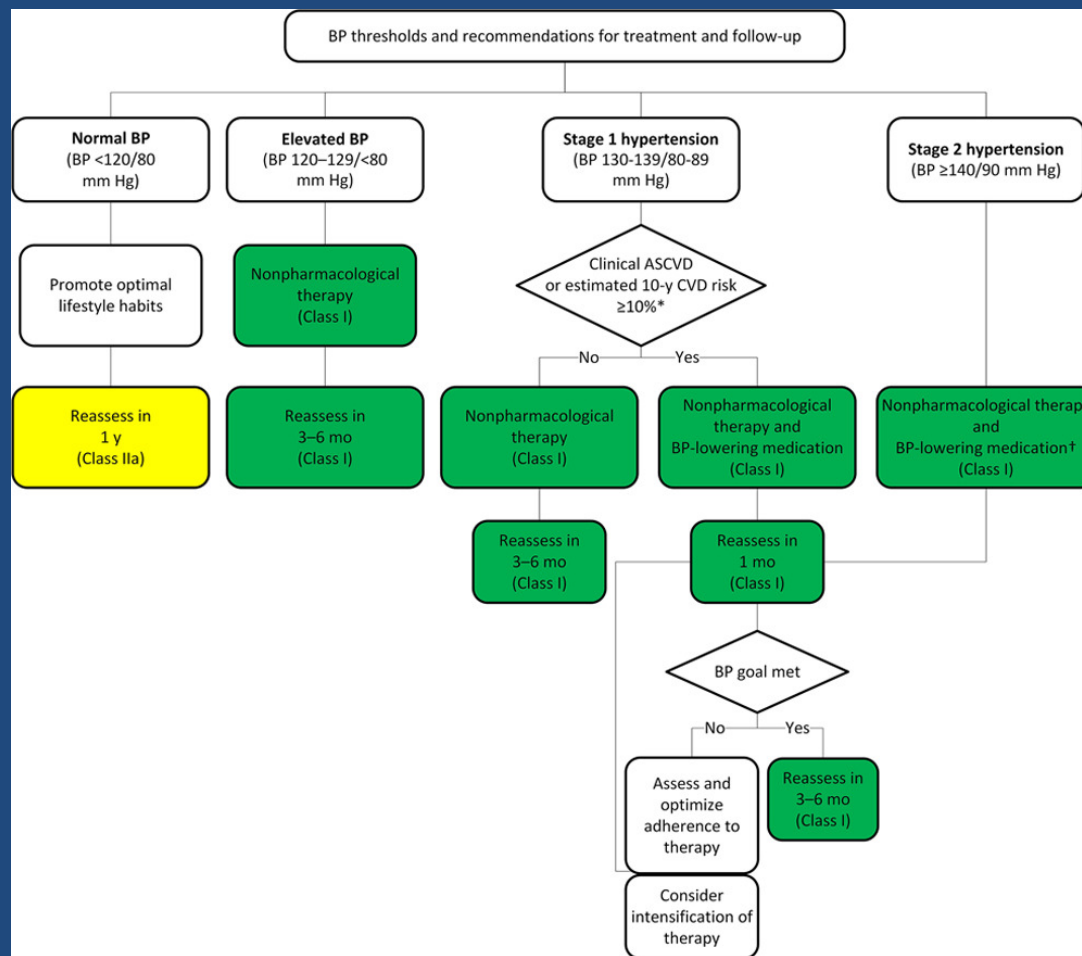
- Statin therapy is first-line treatment for primary prevention of ASCVD in patients with elevated low-density lipoprotein cholesterol levels (≥ 190 mg/dL), those with diabetes mellitus, who are 40 to 75 years of age, and those determined to be at sufficient ASCVD risk after a clinician–patient risk discussion.
- Nonpharmacological interventions are recommended for all adults with elevated blood pressure or hypertension. For those requiring pharmacological therapy, the target blood pressure should generally be $< 130/80$ mm Hg.

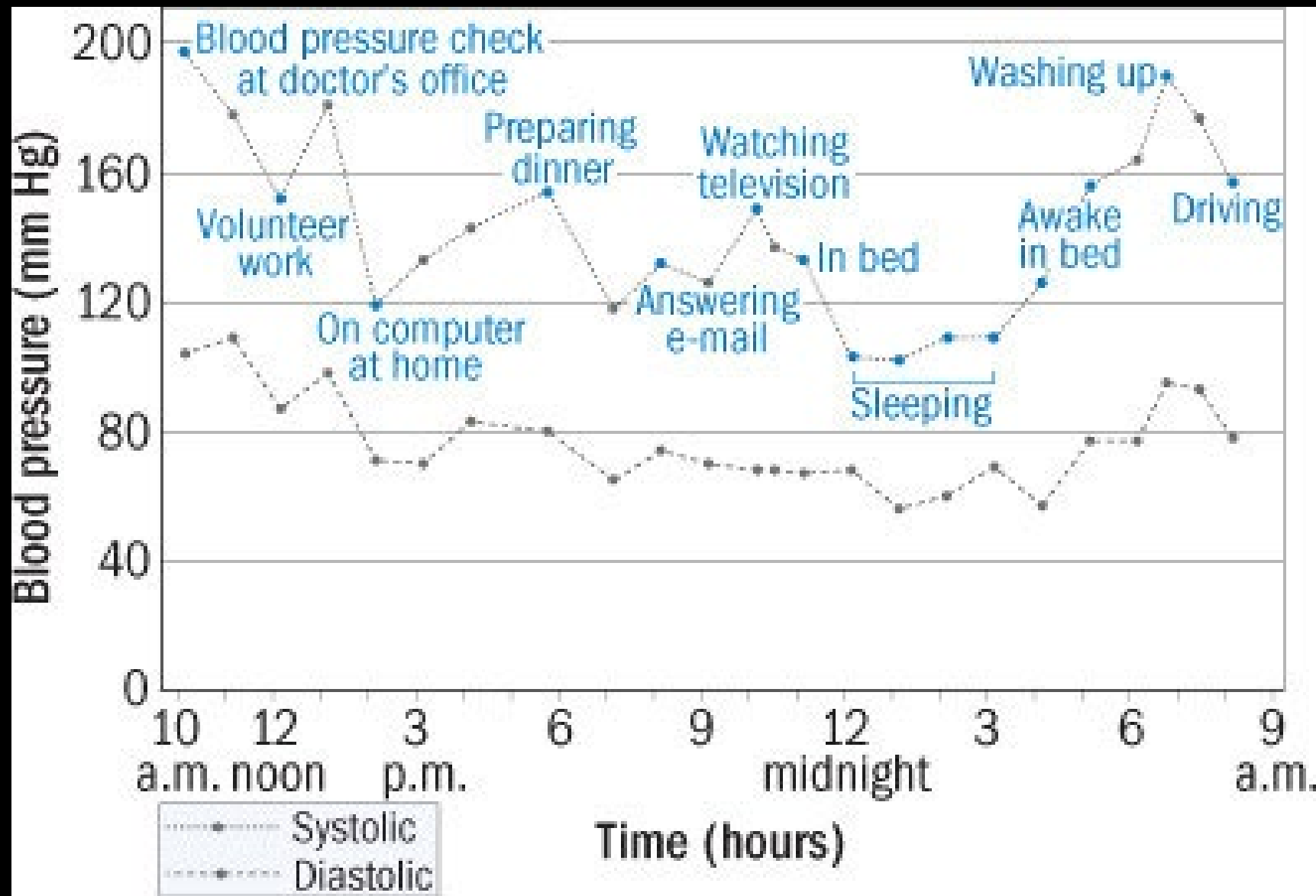
Walking



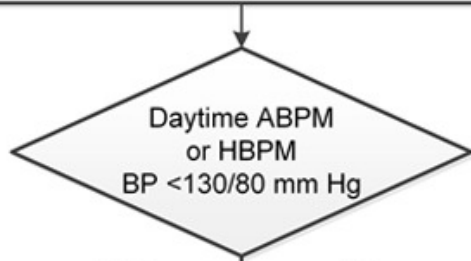
Blood Pressure







Office BP: $\geq 130/80$ mm Hg but $< 160/100$ mm Hg
after 3 mo trial of lifestyle modification and
suspected white coat hypertension



Yes

No

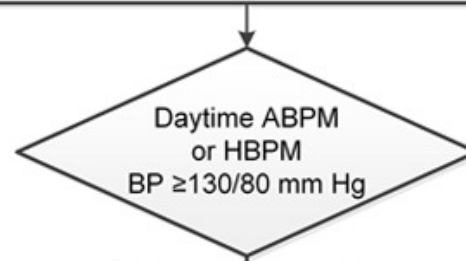
White Coat Hypertension

- Lifestyle modification
- Annual ABPM or HBPM to detect progression (Class IIa)

Hypertension

Continue lifestyle modification
and start antihypertensive drug
therapy (Class IIa)

Office BP: $120-129/<80$ mm Hg
after 3 mo trial of lifestyle modification and
suspected masked hypertension



Yes

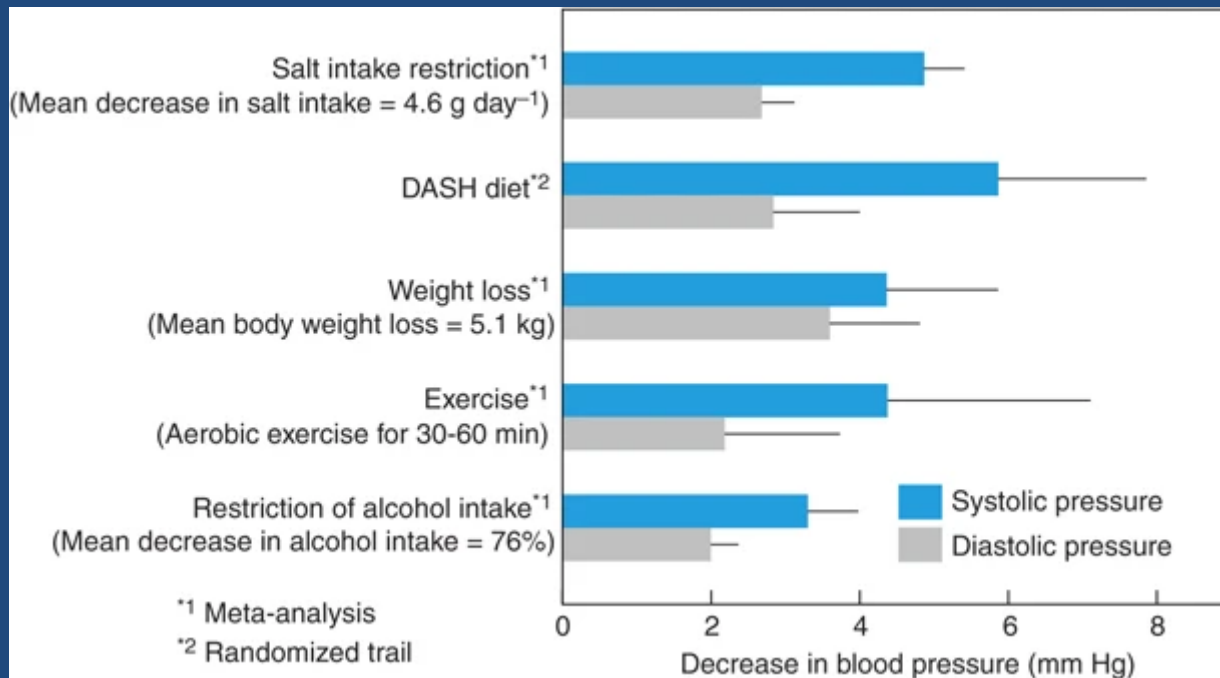
No

Masked Hypertension

Continue lifestyle modification
and start antihypertensive drug
therapy (Class IIa)

Elevated BP

- Lifestyle modification
- Annual ABPM or HBPM to detect masked hypertension or progression (Class IIa)



Hypertension – Pharmacologic Therapy

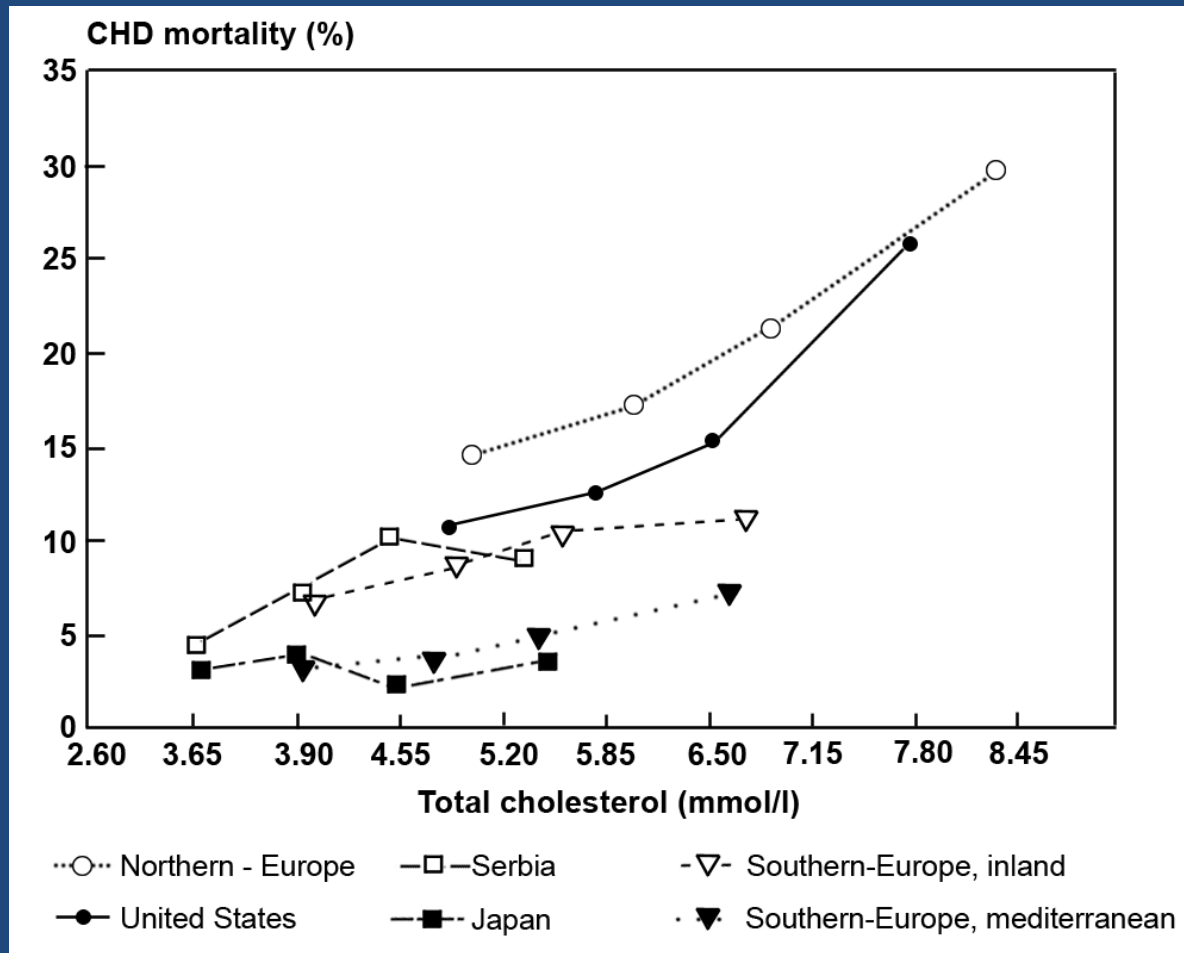
- **Beta-blockers**
 - Beneficial for certain heart rhythm issues
 - Certain agents beneficial in congestive heart failure
 - Helpful after heart attacks
 - Side effects: fatigue, slow heart rate
- **Calcium channel blockers**
 - Side effect: swelling
 - May be helpful for some heart rhythm problems
 - Try to avoid in congestive heart failure
- **Diuretics**
 - Use with caution in patients with kidney issues
 - Agents used for BP control don't generally cause excessive urination
 - Can cause electrolyte problems
- **Ace-inhibitors/Angiotensin Receptor Blockers (ARBs)**
 - Ace-I can cause cough
 - Beneficial in diabetes, congestive heart failure, vascular disease
 - Caution in kidney disease

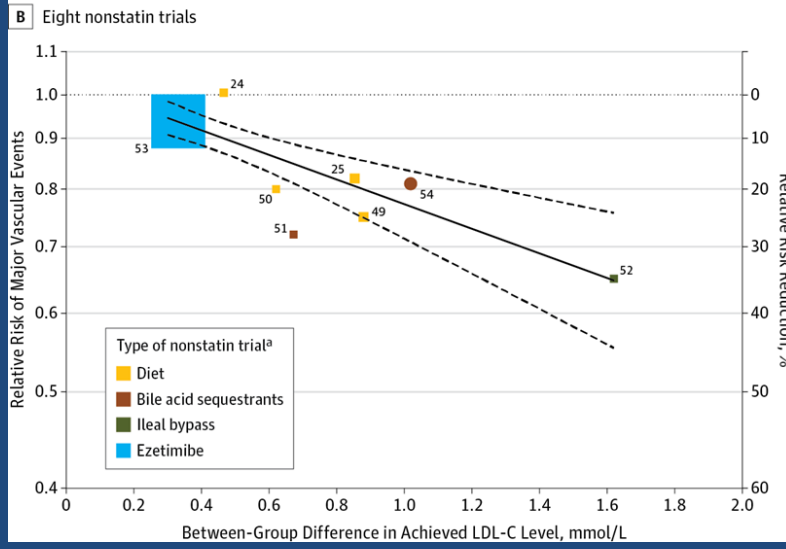
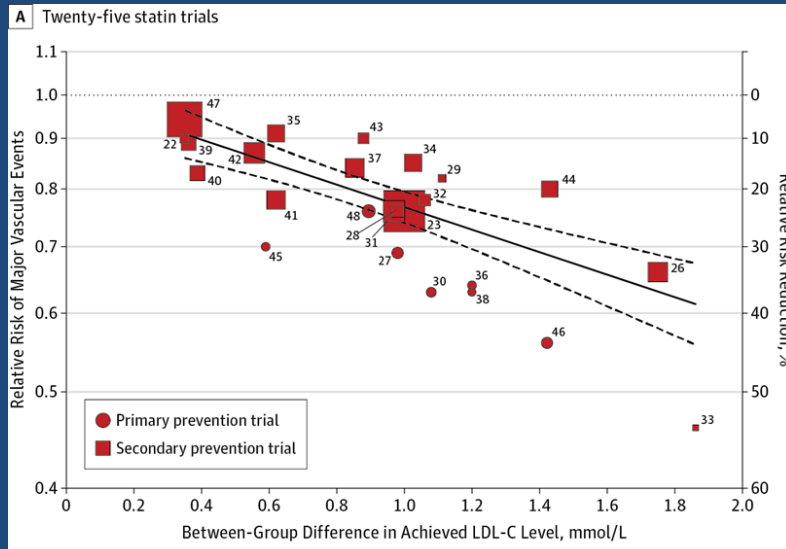
Cholesterol

What is cholesterol

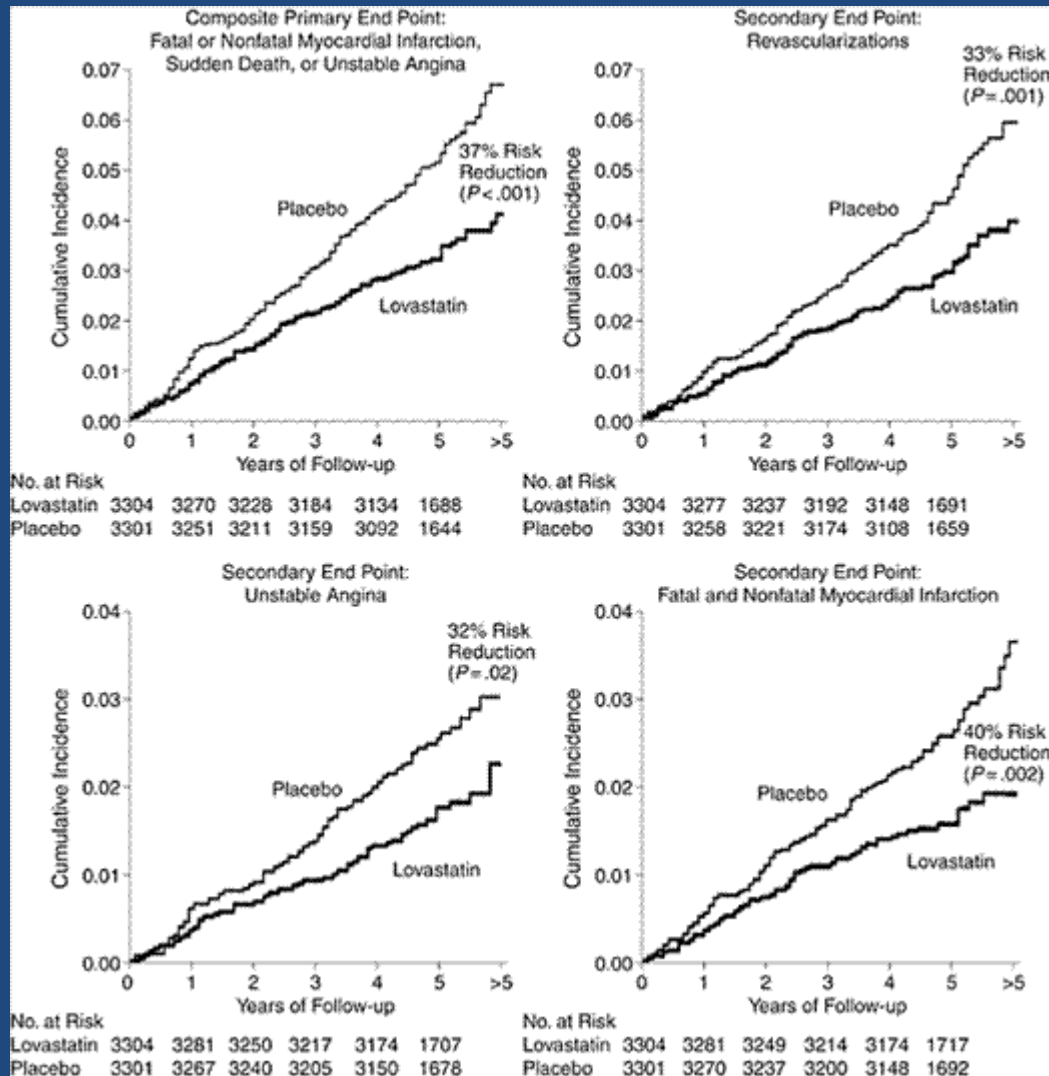
- Waxy substance
- Not inherently bad
 - Body needs it to build cells and make vitamins
- Too much cholesterol can lead to plaque buildup in arteries
- LDL – bad chol (most treatments focus on this)
- HDL – good
- Triglycerides – fat in blood stream

Cholesterol

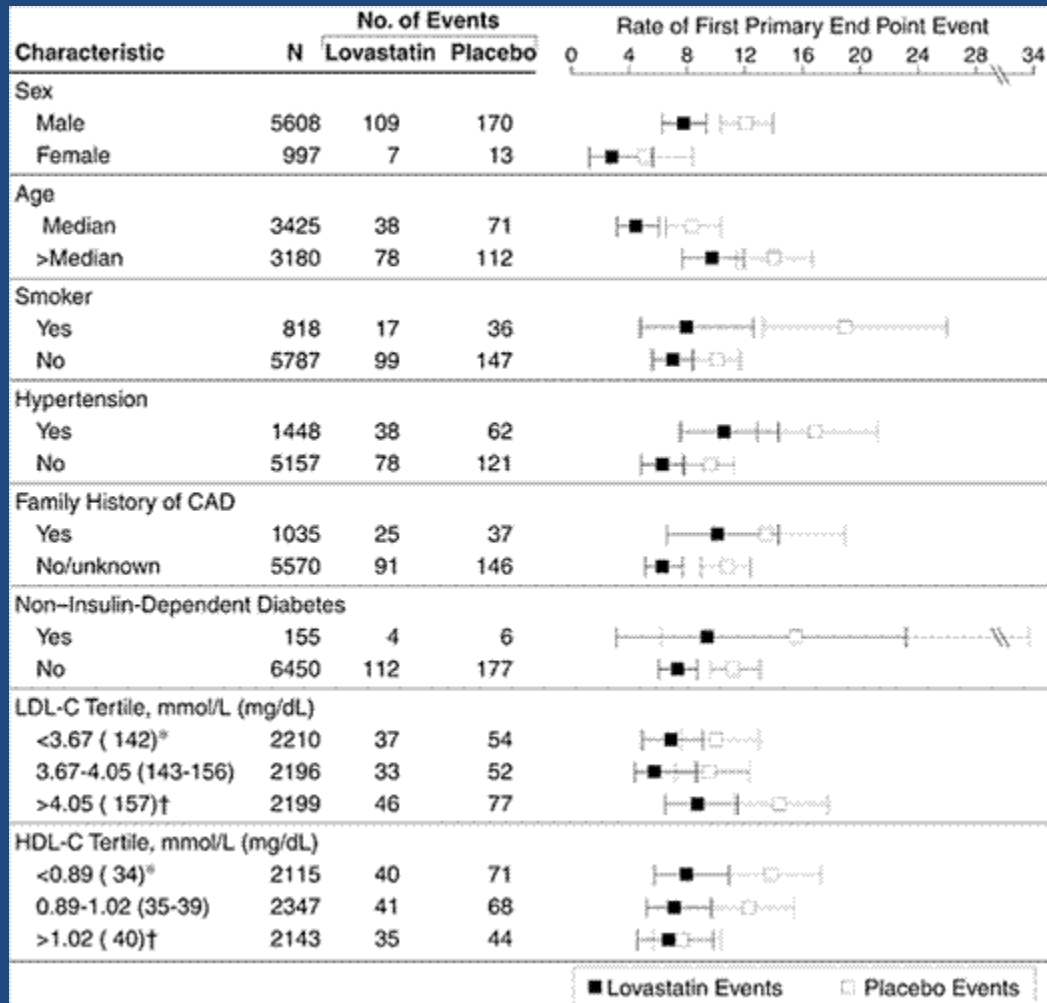




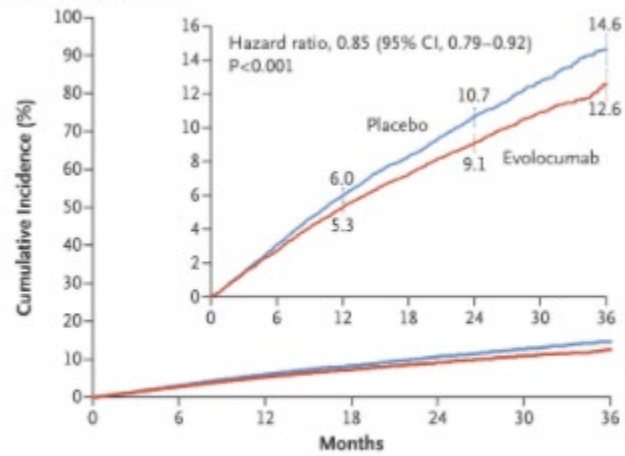
Statins



Statins

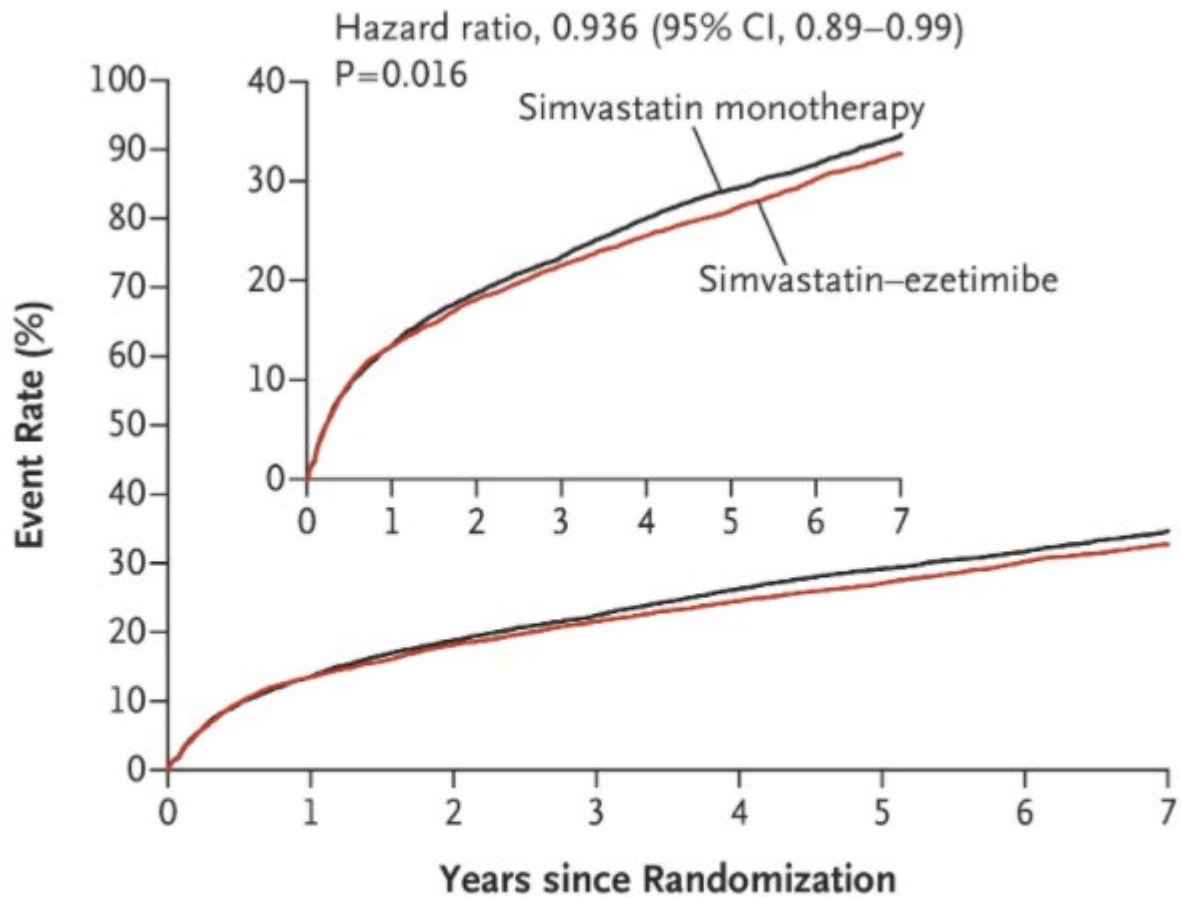


A Primary Efficacy End Point



No. at Risk

Placebo	13,780	13,278	12,825	11,871	7610	3690	686
Evolocumab	13,784	13,351	12,939	12,070	7771	3746	689



No. at Risk

Simvastatin-ezetimibe	9067	7371	6801	6375	5839	4284	3301	1906
Simvastatin	9077	7455	6799	6327	5729	4206	3284	1857

Cholesterol – Pharmacologic Therapy

- Statins
- Ezetimibe (Zetia)
- PCSK-9 inhibitors

Theoretical Patient

- 55 yo male on BP meds
- Feels he is healthy, feels well and exercises
- BP is a little elevated
- Told by PCP his cholesterol is high and he should go on medications
- Doesn't want to go on medications unless "I really need it"
- Total cholesterol -220
- HDL 30
- LDL 140



ASCVD Risk Estimator Plus

Estimate Risk

Therapy Impact

Advice

12.4%
Intermediate
**Current 10-Year
ASCVD Risk****

Lifetime ASCVD Risk: **50%** Optimal ASCVD Risk: **3.6%**

Current Age ⓘ *

55

Age must be between 20-79

Sex *

Male

Female

Race *

White

African American

Other

Systolic Blood Pressure (mm Hg) *

135

Value must be between 90-200

Diastolic Blood Pressure (mm Hg) ○

95

Value must be between 60-130

Total Cholesterol (mg/dL) *

220

Value must be between 130 - 320

HDL Cholesterol (mg/dL) *

30

Value must be between 20 - 100

LDL Cholesterol (mg/dL) ⓘ ○

140

Value must be between 30-300

History of Diabetes? *

Yes

No

Smoker? ⓘ *

Current ⓘ

Former ⓘ

Never ⓘ

On Hypertension Treatment? *

Yes

No

On a Statin? ⓘ ○

Yes

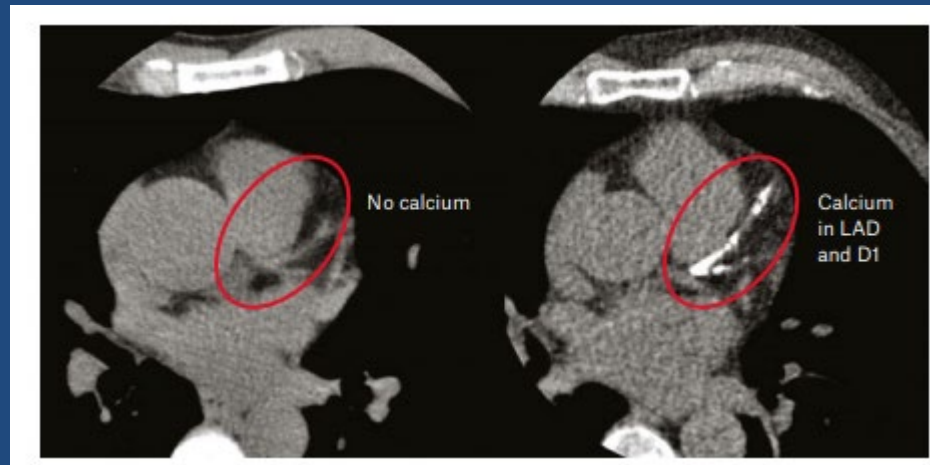
No

On Aspirin Therapy? ⓘ ○

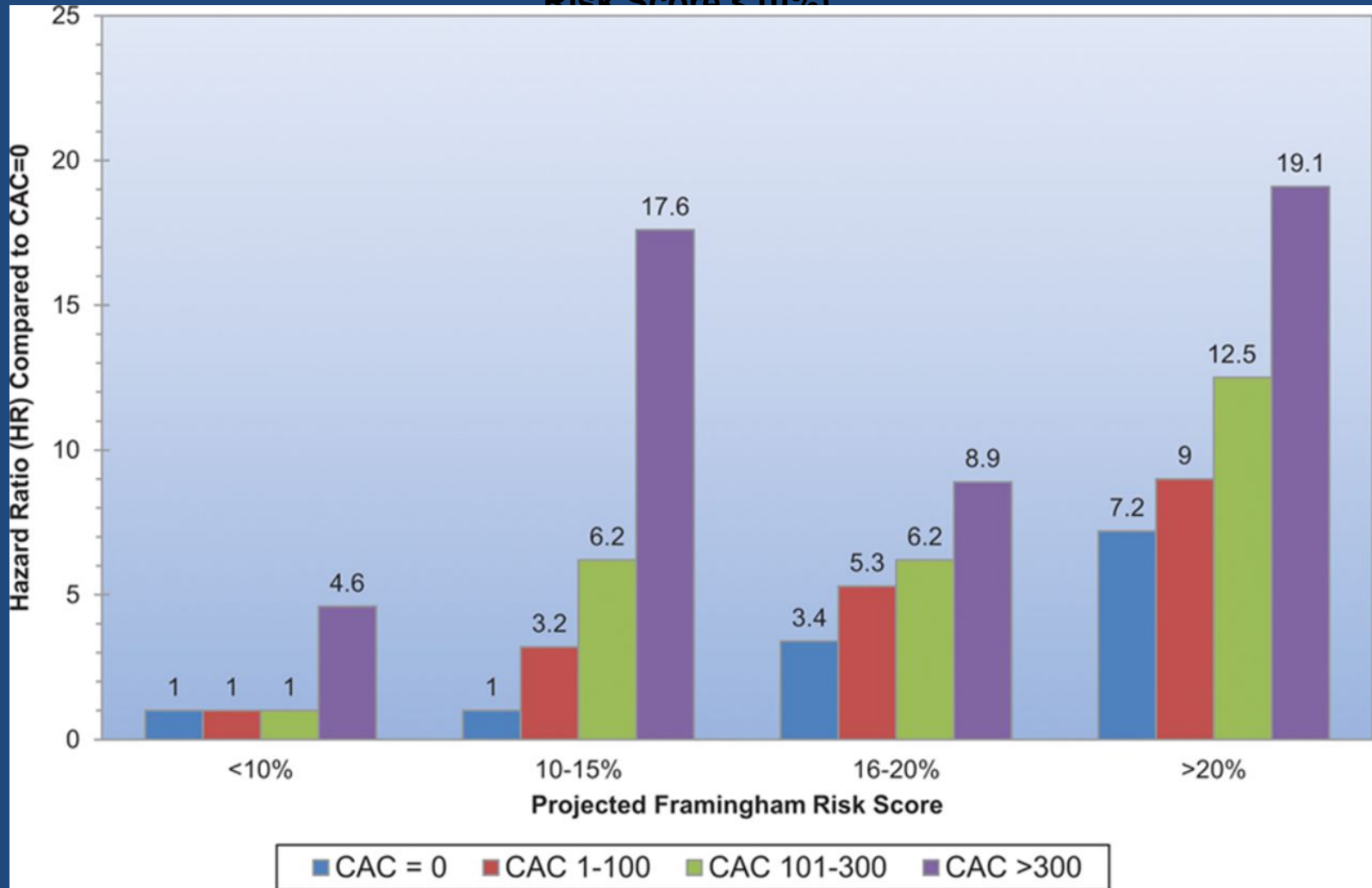
Yes

No

Calcium Score



Hazard ratios (HRs) for coronary heart disease events associated with coronary calcium scores: US adults (reference group, coronary artery calcification [CAC]=0 and Framingham Risk Score <10%)

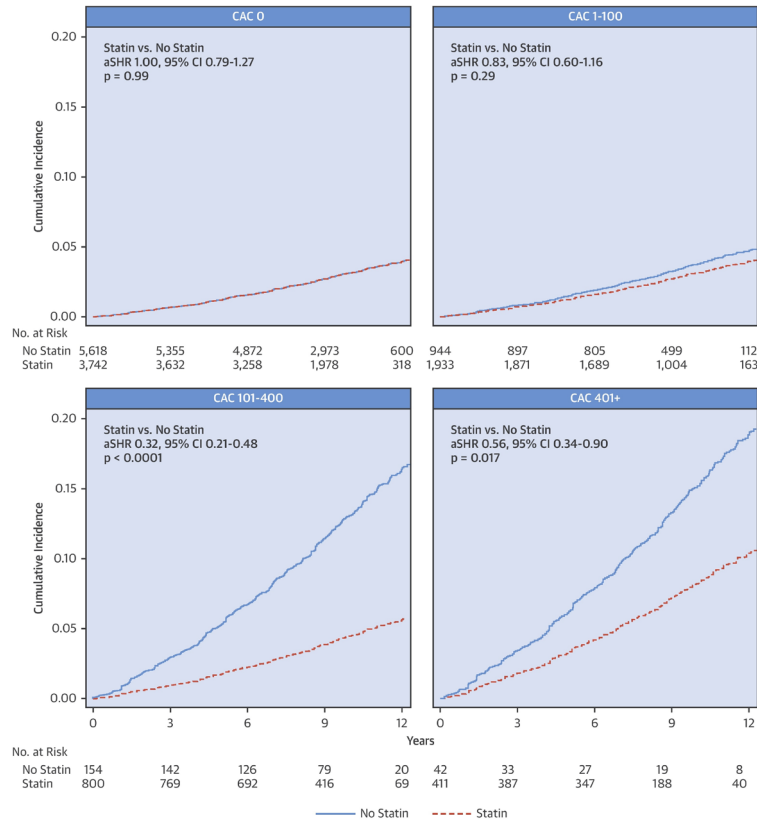


Dariush Mozaffarian et al. *Circulation*. 2016;133:e38-e360

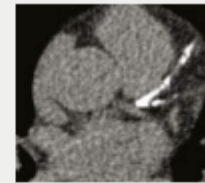
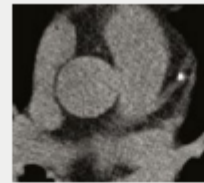
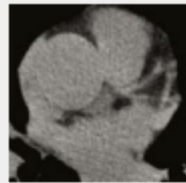
Table 1. Interpretation of coronary calcium score^a

Calcium score	Interpretation	Risk of myocardial infarction/stroke at 10 years
0	Very low risk	<1%
1-100	Low risk	<10%
101-400	Moderate risk	10-20%
101-400 and >75th percentile	Moderately high risk	15-20%
>400	High risk	>20%

CENTRAL ILLUSTRATION: Cumulative Incidence of MACE Stratified by Statin Treatment and CAC Severity



Mitchell, J.D. et al. *J Am Coll Cardiol.* 2018;72(25):3233-42.



CAC = 0

CAC = 1-100

CAC >100

Population (% patients) ²⁵		56%	26%	18%
Annual coronary event rate ²⁶		0.1%	0.5%	1.9%
Annual cardiovascular event rate ²⁵		0.4%	0.8%	2.4%
NNT to prevent one coronary event over five years				
NNT aspirin ²⁵	FRS <10%	2,036	571	173
NNH = 442 for major bleeding	FRS ≥10%	808	146	92
NNT statin ²⁶		549	94	24

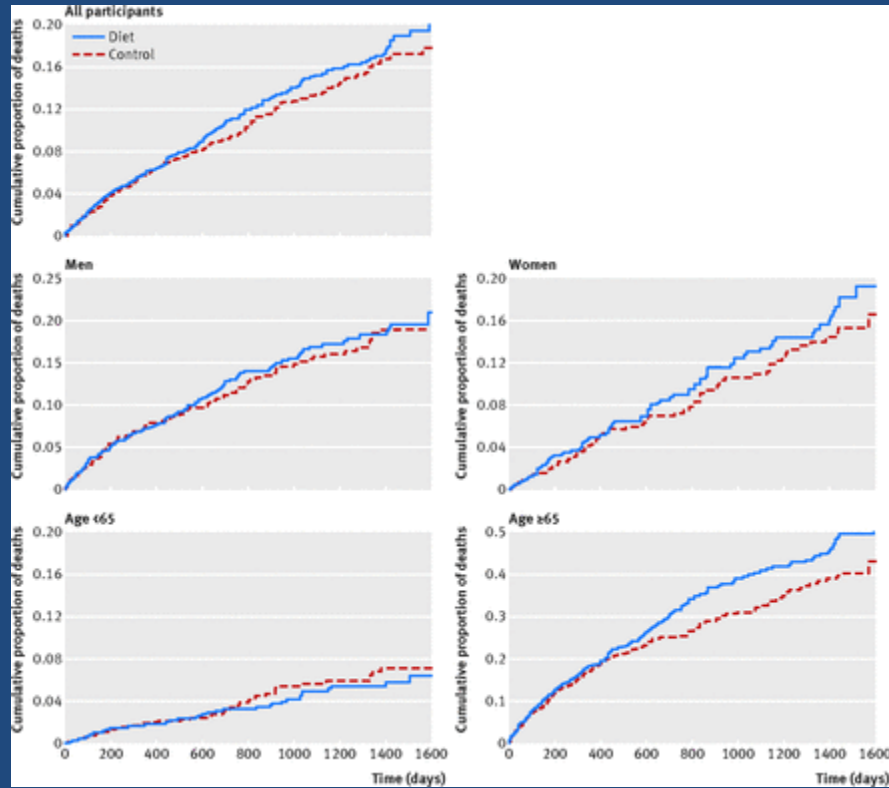
Reassure

Individualise statin + aspirin

Recommend statin + aspirin

All patients: Lifestyle management and risk factor control

Diet



BMJ 2016; 353

Diet

