

Steps to cardiac prevention

Tom Stuver MD

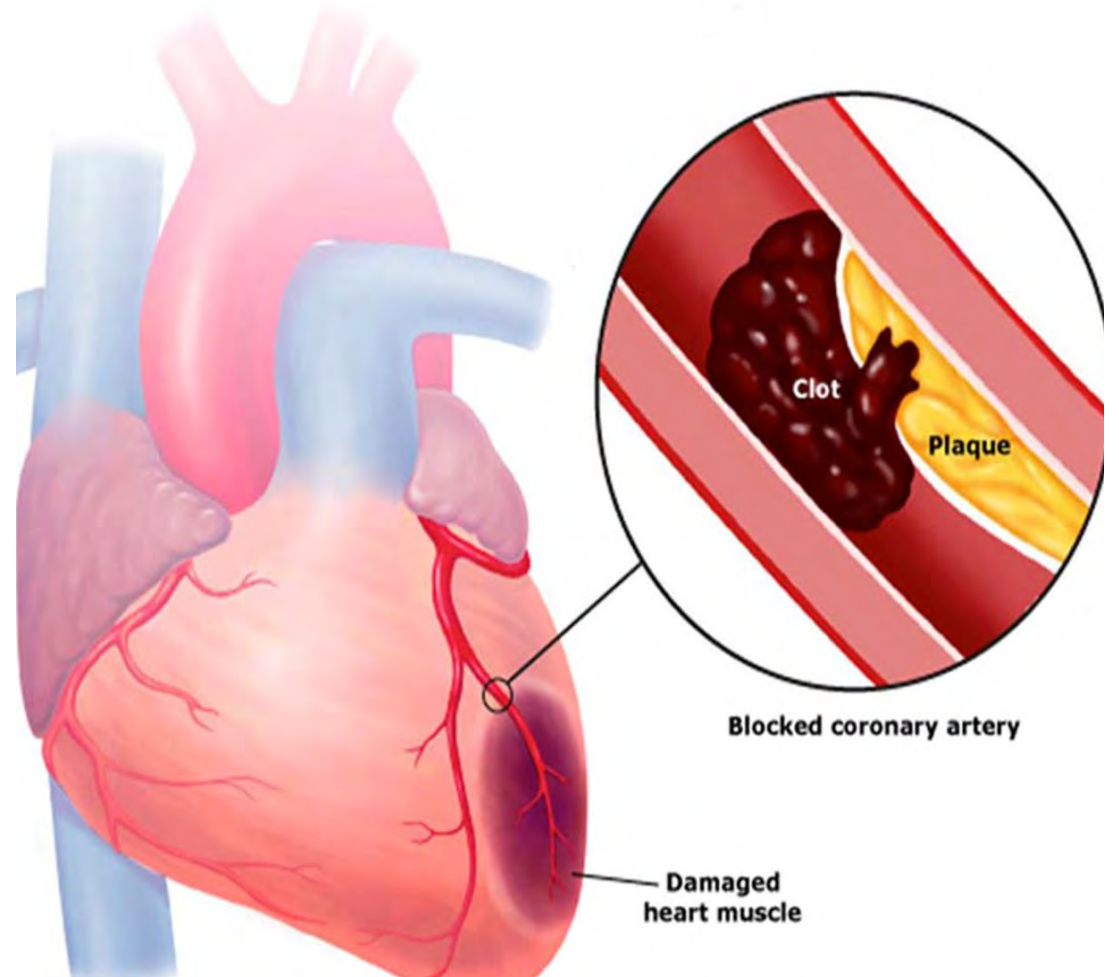
URMC

cardiology

What is a heart attack?

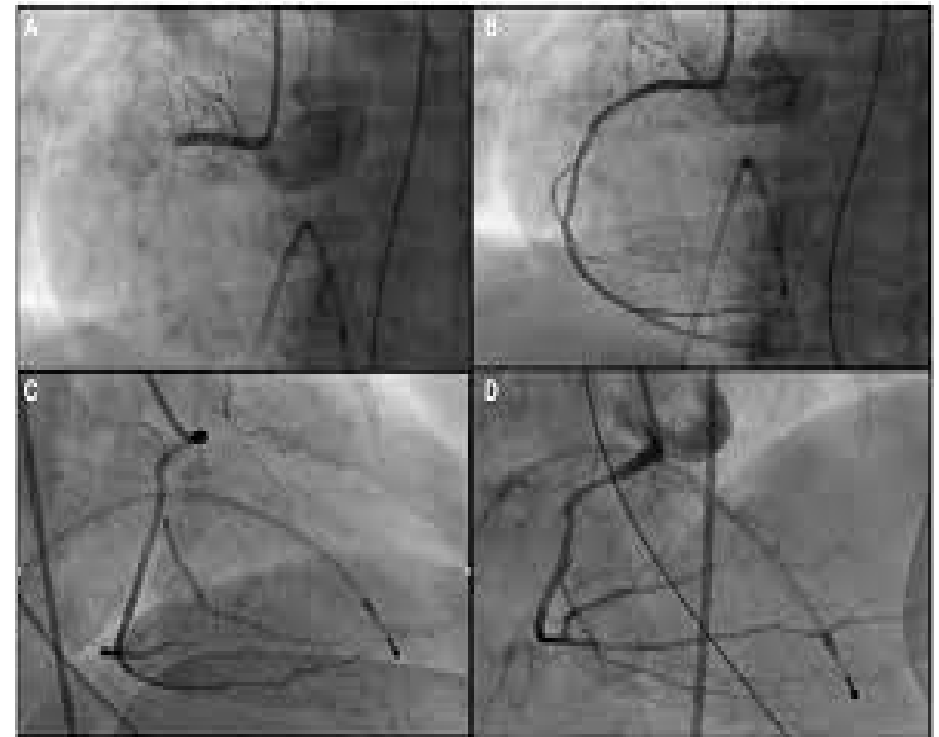
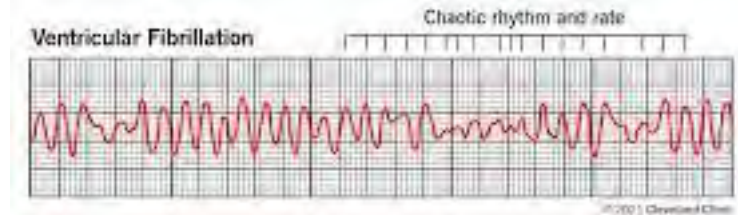
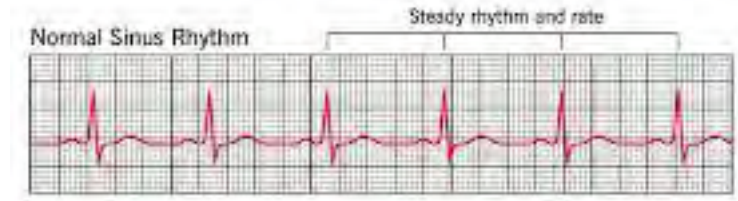
- Symptoms

- generally chest pain sometimes radiation to neck/left arm
- Can be just shortness of breath
- Not all patient have similar symptoms
- Diabetics notoriously have vague or no symptoms
- After 6 hours the damage is permanent

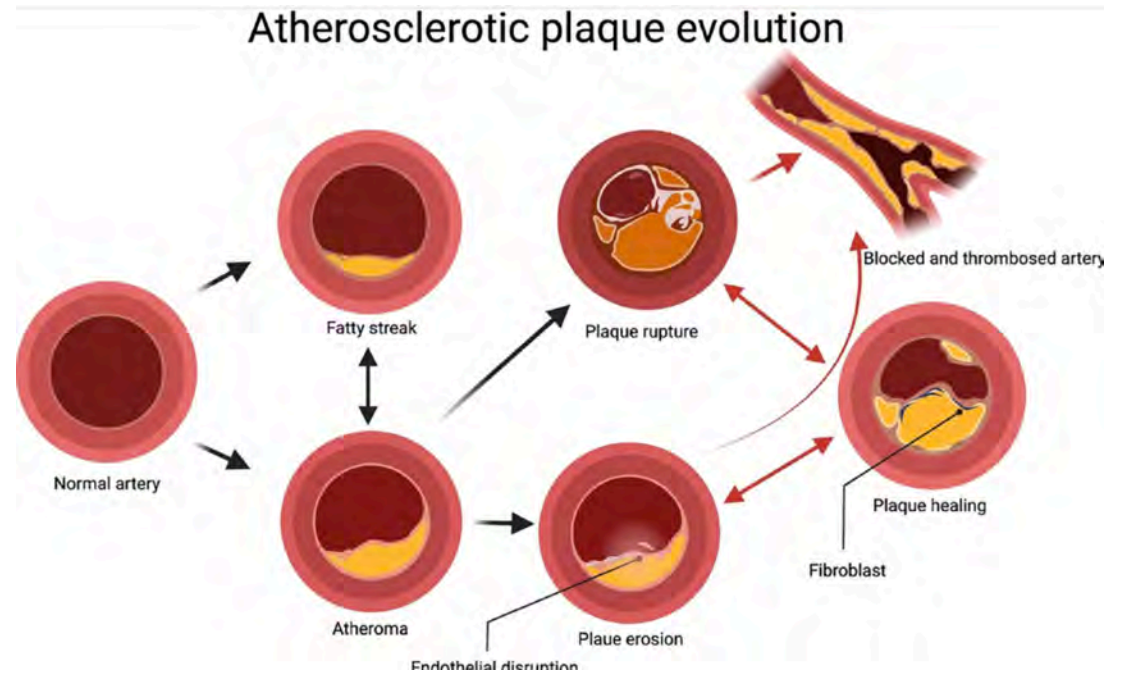


Treatment of a heart attack

- Immediate aspirin
- Never drive yourself to emergency room
- Emergent angiogram and stenting if cath lab available
- If cath lab not available-lytic therapy (blood clot dissolver)
- The sooner the better. Heart muscle does not regenerate



Detection of vulnerable plaques



VULNERABLE Plaques

- Not detected by stress tests
- Therefore need therapy lifestyle to stabilize plaques
- Diet; smoking cessation; BP control; statin therapy; ? Aspirin;
- Can we start therapy earlier if we can detect plaques sooner

Stats

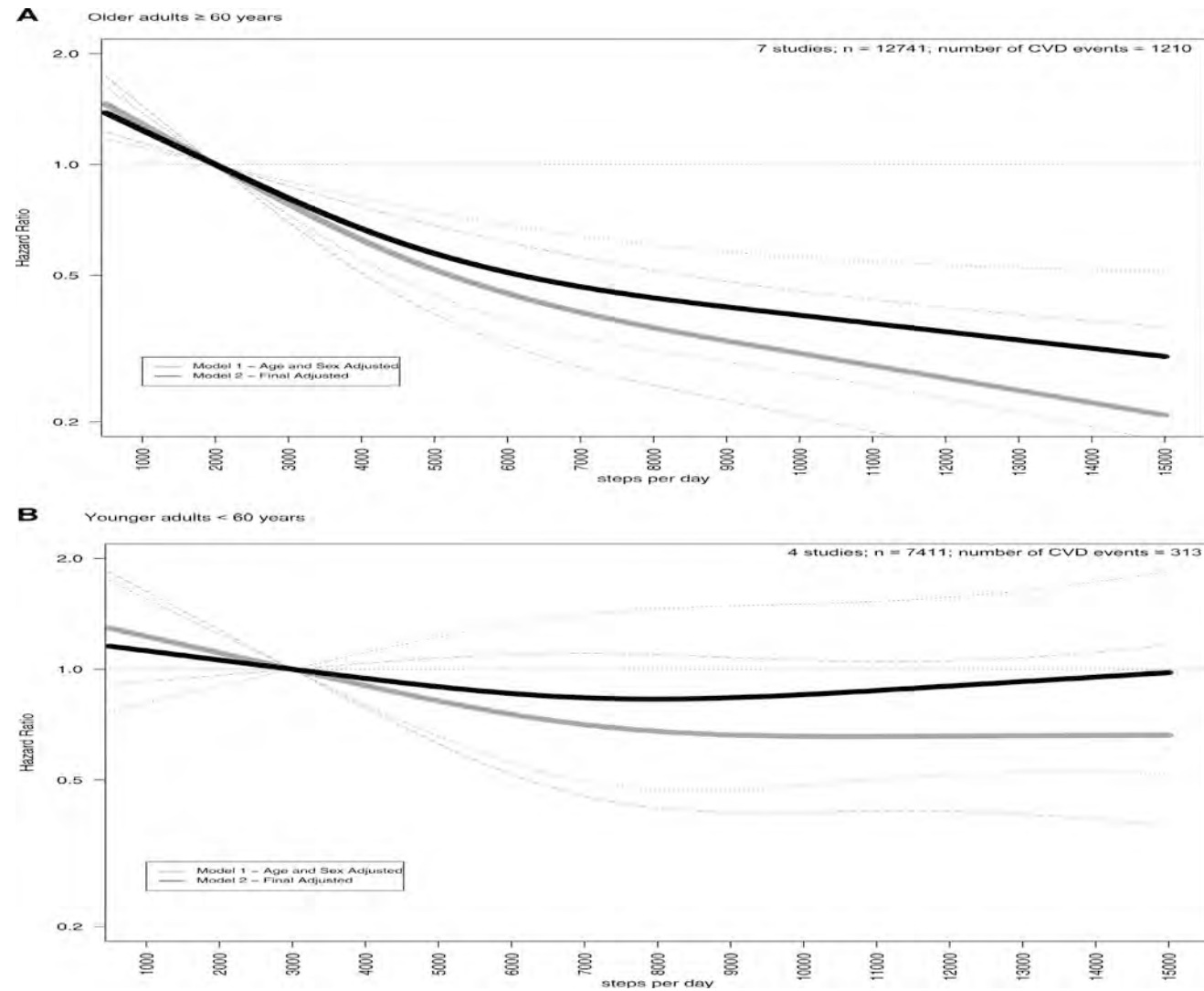
- Cardiovascular disease, accounted for 931,578 deaths in the United States in 2021.
- • Heart disease and stroke claimed more lives in 2021 in the United States than all forms of cancer and chronic lower respiratory disease combined.
- Between 2019 and 2020, direct and indirect costs of total CVD were \$422.3 billion (\$254.3 billion in direct costs and \$168.0 billion in lost productivity/mortality).
- Affects both sexes and all minorities
- • CVD accounted for 12% of total US health expenditures in 2019 to 2020, more than any major diagnostic group.
- • CVD accounted for approximately 19.91 million global deaths in 2021

Steps to prevent advice not always scientifically verified

- Avoid tobacco
- Healthy diet
- Maintain weight
- Adequate exercise
- Treat cholesterol
- ? Aspirin
- Screening for subclinical disease

Physical Inactivity

- • In 2020, only 24.2% in US adults routinely achieved the recommended exercise goal
- . • Among US high school students in 2019, 44.1% were physically active for 60 minutes or more on at least 5 days of the week.
- Goal is 150 minutes per week



Amanda E. Paluch. *Circulation*. Prospective Association of Daily Steps With Cardiovascular Disease: A Harmonized Meta-Analysis, Volume: 147, Issue: 2, Pages: 122-131, DOI: (10.1161/CIRCULATIONAHA.122.061288)

A overview of diet and heart disease

Table. Trials of Dietary Interventions and Coronary Events*

Trial	Patients in Intervention Group	Dietary Intervention	Dietary Fat (Energy) in Treatment Group, %	Energy From P and S Fat in Treatment Group, %	Overall Trial Duration, y	Change in Serum Cholesterol Level, %†	Change in CHD, %‡
Low-Fat Approach							
MRC (low fat) ²²	123 male MI patients	Reduce total fat	22	NR	3	-5	+4
DART ²³	1015 male MI patients	Reduce total fat	32	NR	2	-4	-9
High-Polyunsaturated-Fat Approach							
Finnish Mental Hospital Study ²⁷	676 men without CHD	Reduce saturated fat, increase polyunsaturated fat	35	P = 13; S = 9	6	-15	-44§
Los Angeles Veteran Study ²⁸	424 men; most had no evidence of existing CHD	Reduce saturated fat, increase polyunsaturated fat	40	P = 16; S = 9	8	-13§	-20 in CHD, -31§ in cardiovascular events
Oslo Diet-Heart Study ^{26,49}	206 male MI patients	Reduce saturated fat, increase polyunsaturated fat	39	P = 21; S = 9	5	-14§	-25§
MRC (soy oil) ⁵⁰	199 male MI patients	Reduce saturated fat, increase polyunsaturated fat	46	P:S ratio = 2	4	-15§	-12
Minnesota Coronary Survey ⁵¹	4393 men and 4664 women	Reduce saturated fat, increase polyunsaturated fat	38	P = 15; S = 9	1	-14§	0
Increase Omega-3 Fatty Acid							
DART ²³	1015 male MI patients	Fish twice per week or fish oil (1.5 g/d)	NR	NR	2	NR	-16 in CHD events, -29§ in total mortality
GISSI-Prevenzione ^{52,57}	5686 MI patients, primarily men	Fish oil (EPA + DHA, 1 g/d)	NR	NR	3.5	0	-30§ in cardiovascular death, -45§ in sudden death
Indian Experiment of Infarct Survival 4 ⁵⁸	242 MI patients, primarily men	Fish oil (EPA, 1.08 g/d) or mustard oil (ALA, 2.9 g/d)	NR	NR	1	0	-30§ in fish oil group, -19 in mustard oil group
Whole-Diet Approach							
Lyon Diet Heart Study ^{59,70}	302 MI patients, primarily men	High ALA intake and Mediterranean diet	31	P:S ratio = 0.7	3.8	0	-72§
Indian Experiment of Infarct Survival ^{71,7}	204 MI patients, primarily men	High intake of fruits, vegetables, nuts, fish, and pulses	24	P:S ratio = 1.2	1	-9§	-40§

*Adapted from Hu et al.⁷⁰ P indicates polyunsaturated fat; S, saturated fat; CHD, coronary heart disease; MRC, Medical Research Council; MI, myocardial infarction; NR, not reported; DART, Diet and Reinfarction Trial; GISSI, Gruppo Italiano per lo Studio della Sopravvivenza nell'Infarto Miocardico; EPA, eicosapentaenoic acid; DHA, docosahexaenoic acid; and ALA, α -linolenic acid.
†Change in cholesterol level refers to the percentage change in serum cholesterol level in the treatment group compared with the change in the control group.
‡Change in CHD refers to the percentage difference in coronary event rates in the treatment group compared with the control group.
§P < .05.
||The total duration of the study was 4.5 years, but the mean duration of the intervention was only 1 year.

Mediterranean diet- This dietary pattern is based on food patterns typical of many regions in Greece and southern Italy in the early 1960s.

- emphasizes a diet that is high in fruits, vegetables, bread, other forms of cereals, potatoes, beans, nuts, and seeds.
- includes olive oil as an important fat source and dairy products, fish, and poultry consumed in low to moderate amounts;
- eggs consumed zero to 4 times weekly; and little red meat.
- wine is consumed in low to moderate amounts.
- Studied in patients with disease- small study but did show some benefit

tobacco

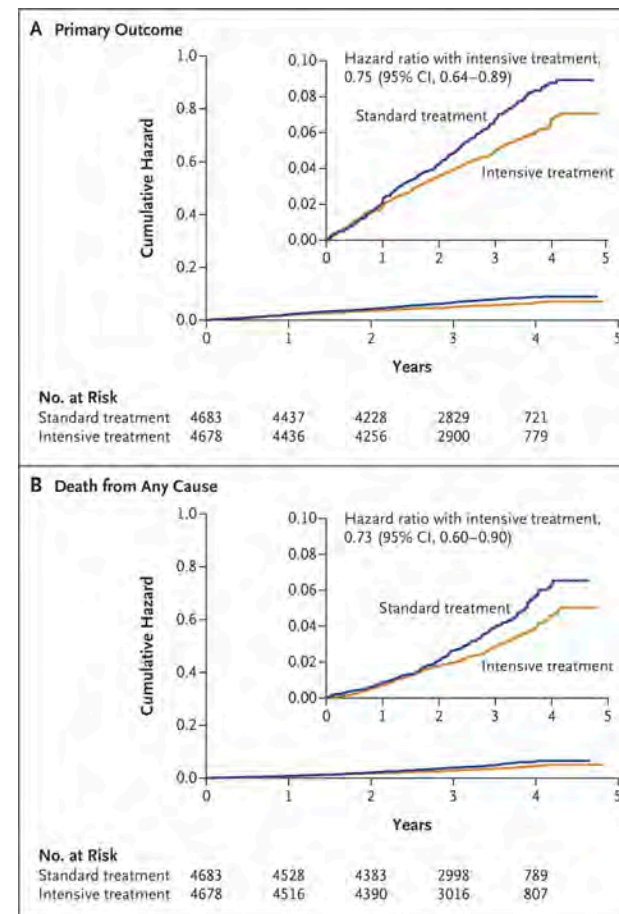
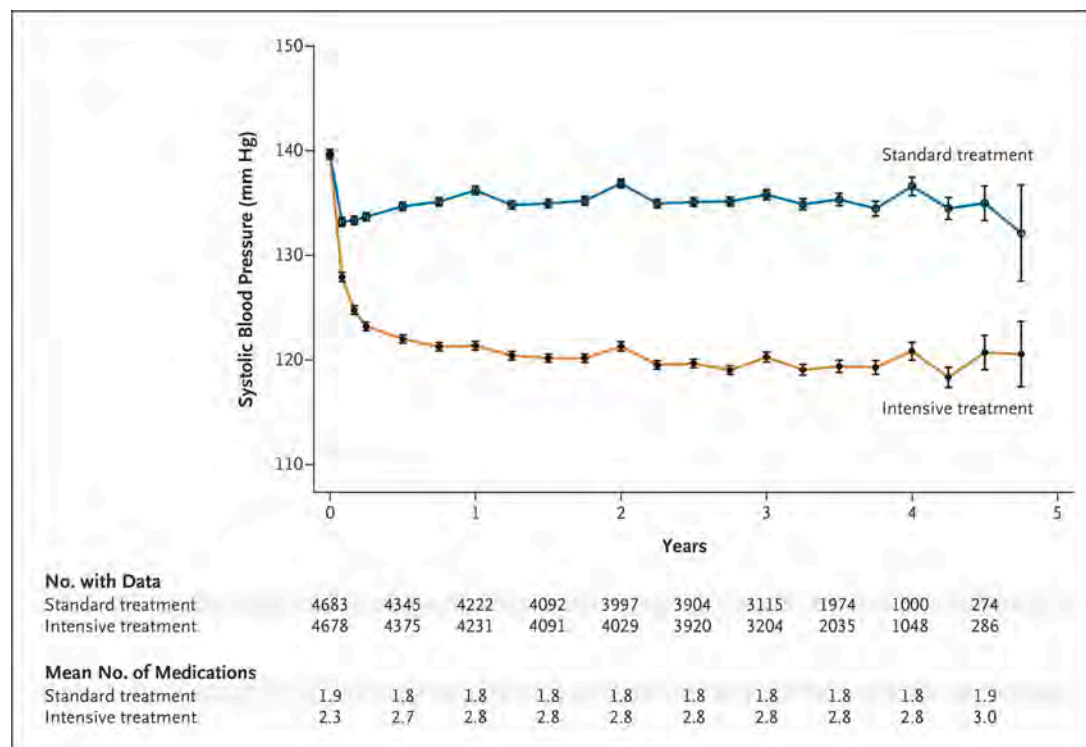
- • In the United States, smoking was the leading risk factor for years of life lost to premature mortality and the third leading risk factor for years of life lived with disability or injury in 2019.
- . • >480 000 Americans die as a result of cigarette smoking and >41 000 die of secondhand smoke exposure each year, ≈1 in 5 deaths annually.
- In 2022,
 - 16.5% of US high school students and 4.5% of middle school students reported current tobacco product use
 - , 2.0% of US high school students and 1.0% of middle school students smoked cigarettes in the past 30 days.
- . • In 2022, 11.5% of US adults reported cigarette use every day or some days (13.1% of males and 10.1% of females).

FDR's BP's

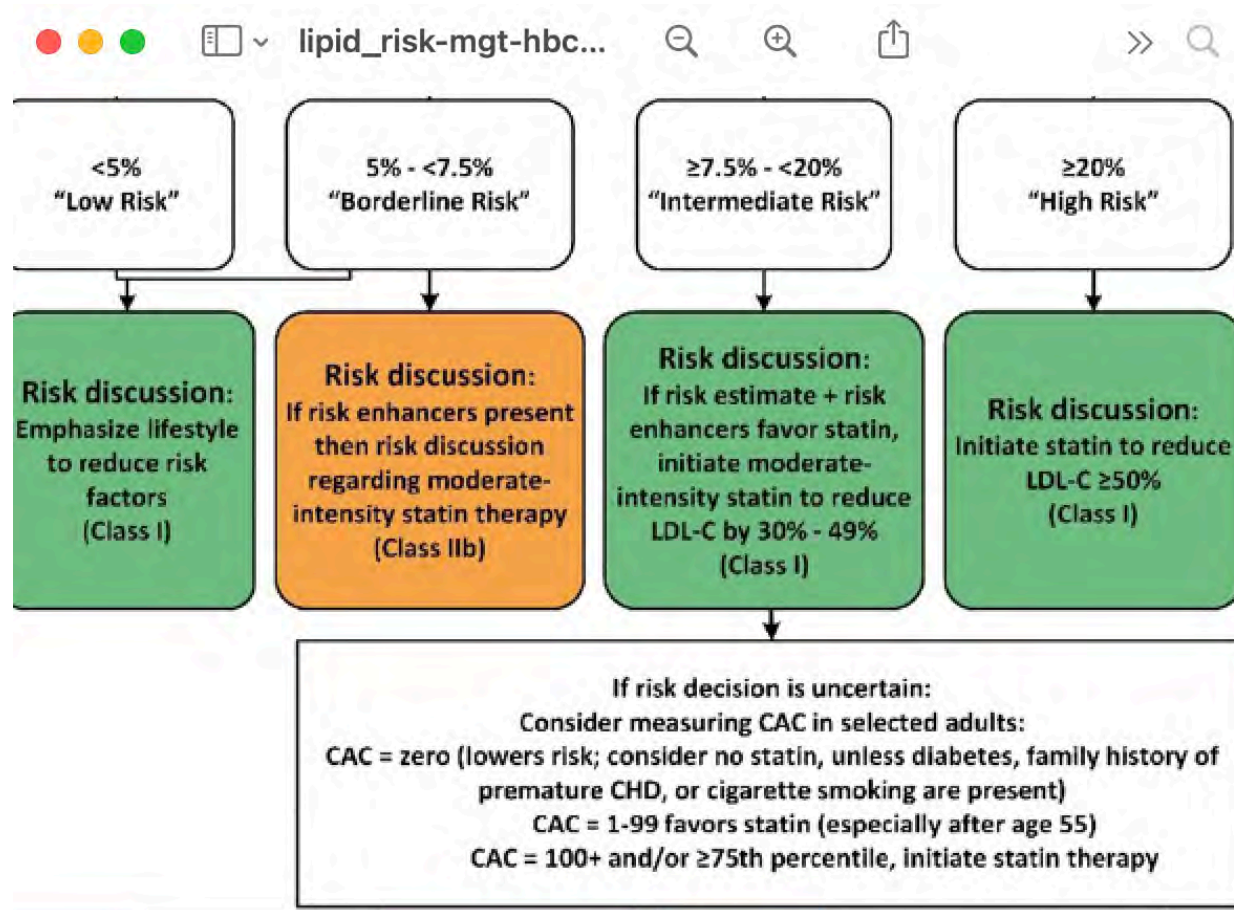
- Blood pressure goal is 130/80

WASHINGTON, D.C.			
April 9, 1944			
9th	202/102	P.M.	198/98
10th	196/94	"	200/104
11th	192/96	"	204/100
12th	200/102	"	204/98
13th	198/100	"	202/98
14th	206/100	"	200/96
15th	208/102	"	196/100
16th	215/102	"	206/120
17th	216/120	"	206/116 (Dr. Bruen 4th sound)
18th	220/120	(4th sound)	Unicap 1; KI 4 x t.i.d. ac.
19th	218/120	P.M.	204/104
20th	212/108	Noon 210/98	9:54 p.m. 190/100 (KI discontinued)
21st	9:05 a.m. 234/126; 10:a.m. (sitting) 210/116; 10:05 a.m. 218/120; (prone, both arms checked) 6:45 p.m. after outing 214/120; 9:50 p.m. 220/114.		
22nd	9:30 a.m. 214/120; 11:30 a.m. 210/114; 6:30 p.m. (after boat trip) 208/110.		
23rd	10:15 a.m. 214/118 (2½ hr drive) 9:45 212/114.		
24th	10:a.m. 222/122 10:30 p.m. 220/116		
25th	10:05 224/116 10 p.m. 214/106 (after luncheon party).		
26th	10. a.m. 214/112 10:30 p.m. 222/110		
27th	10:15 a.m. 222/118; 9:45 p.m. 210/114		
28th	224/124	P.M.	230/120 (one additional digit tablet Tuesday and Friday)
29th	9:a.m. (on awaking) 196/112; (sitting after breakfast) 10:10 236/120; (Prone, after E.K.) 220/118; 2:15 (after lunch) 236/112 (Thesodate discontinued) 9:30 p.m. 210/110		
30th	8:45 (Prone, on awaking) 210/110; (after breakfast) 10:00 206/104; ; after lunch 208/114; 9:00 p.m. 234/120		
May 1st.	Prone 9:a.m. 220/116; Noon 210/110; 2 p.m. (after lunch) 210/106; 10:30 p.m. 210/112.		

BP goal 130/80



Cholesterol



- **risk**

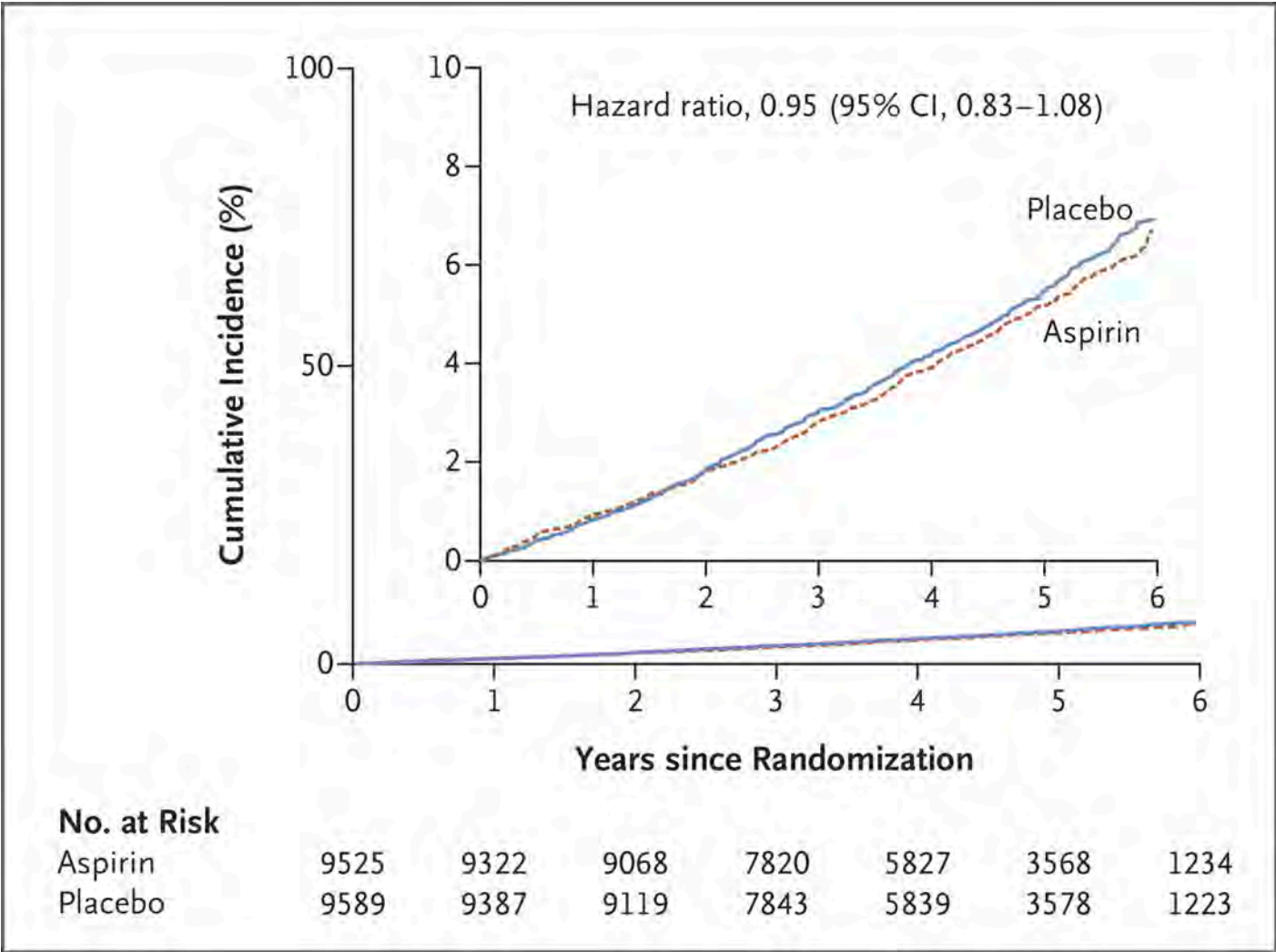
Do we really know the LDL goal??

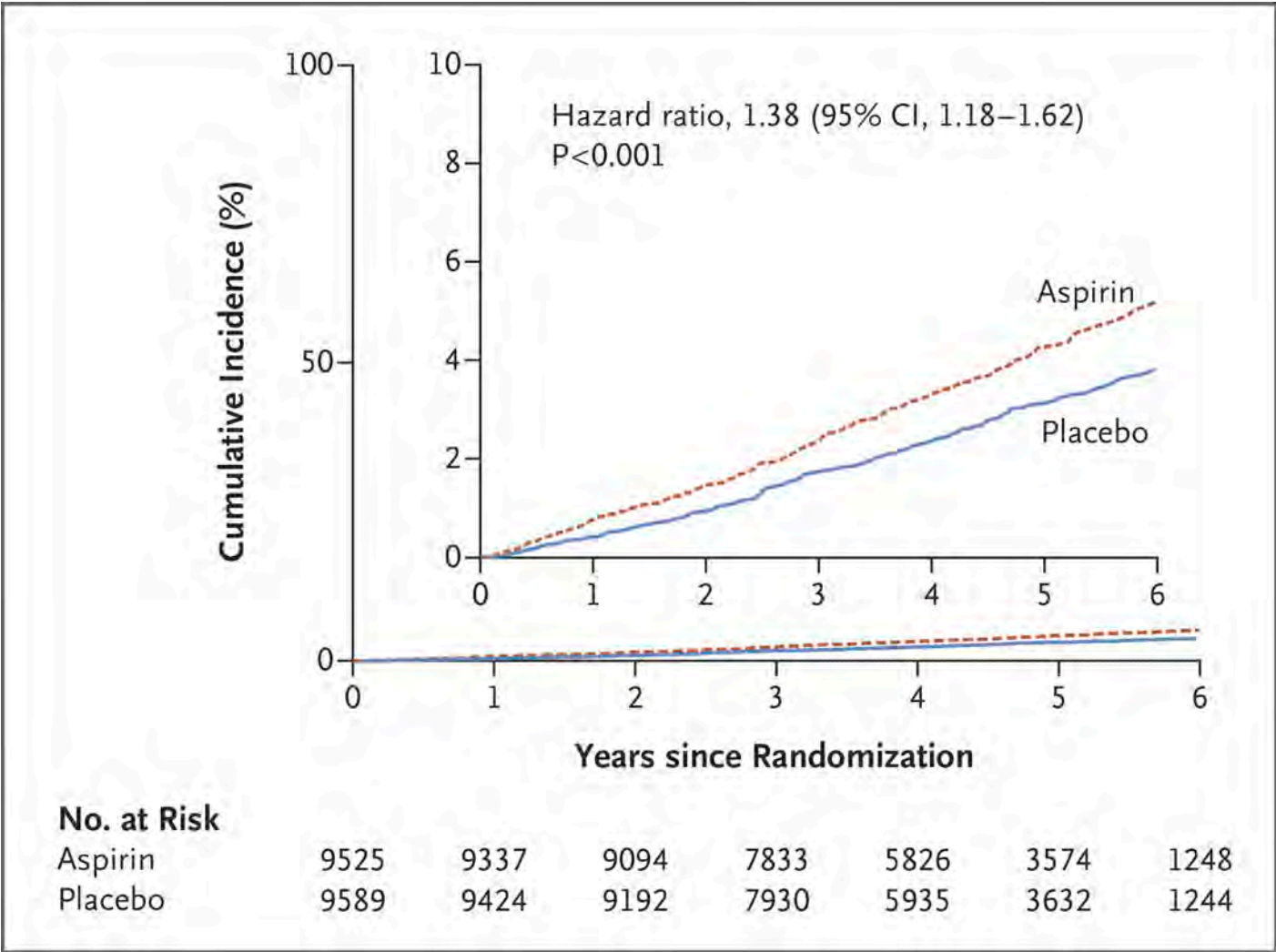
LDL

70

100

Prophylactic Aspirin





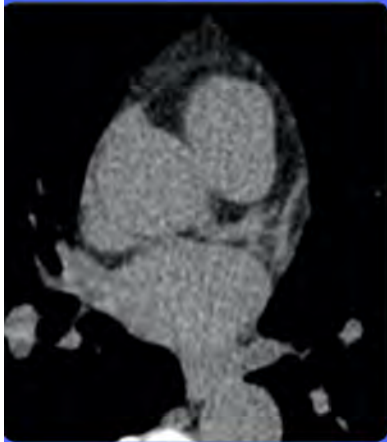
- In older persons without known cardiovascular disease, the use of low-dose aspirin resulted in a significantly higher risk of major hemorrhage and did not result in a significantly lower risk of cardiovascular disease than placebo.

Are we too late to promote prevention

Preclinical detection of plaque

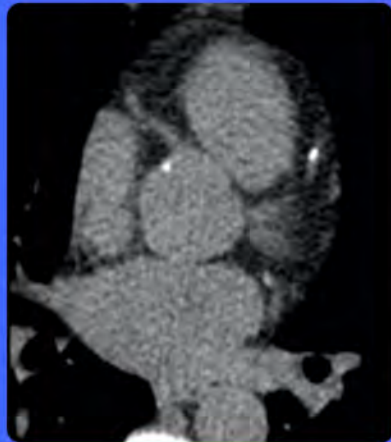
Calcium score

Coronary Calcium Test Scores



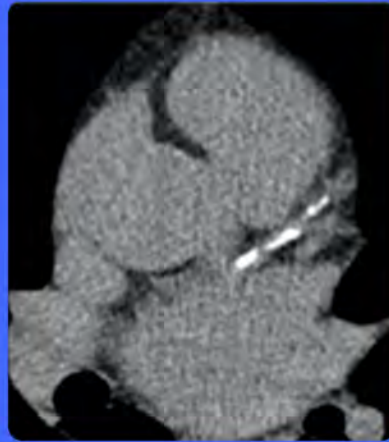
0

No calcium
is detected



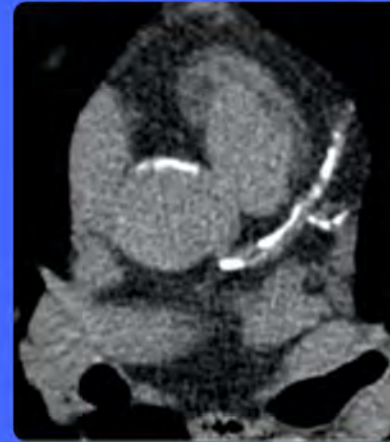
1-100

Mildly increased
risk of
heart disease



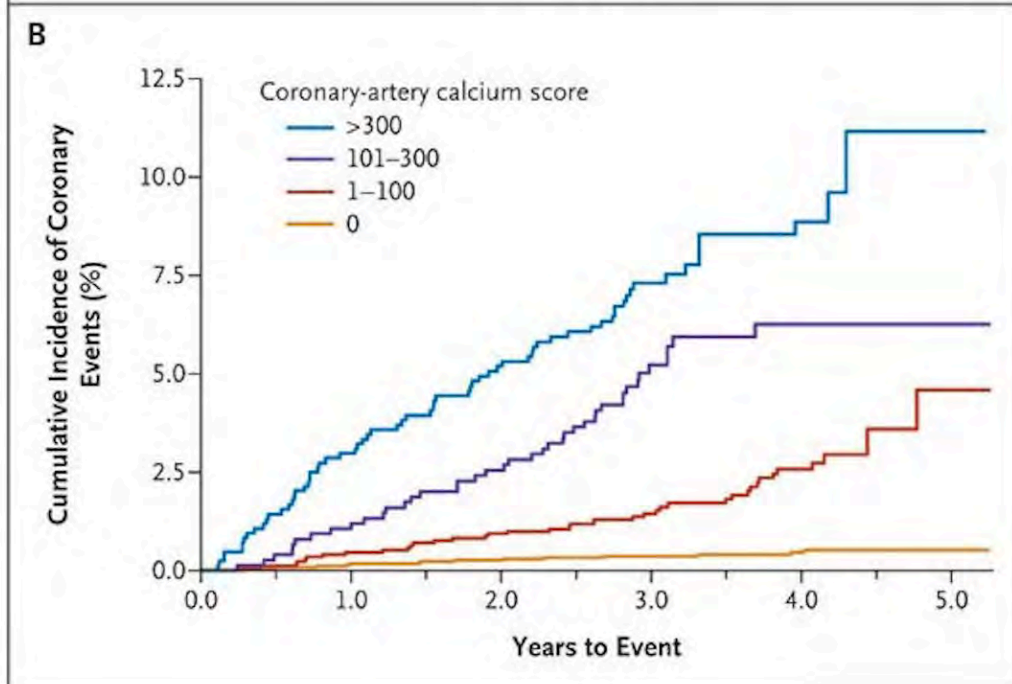
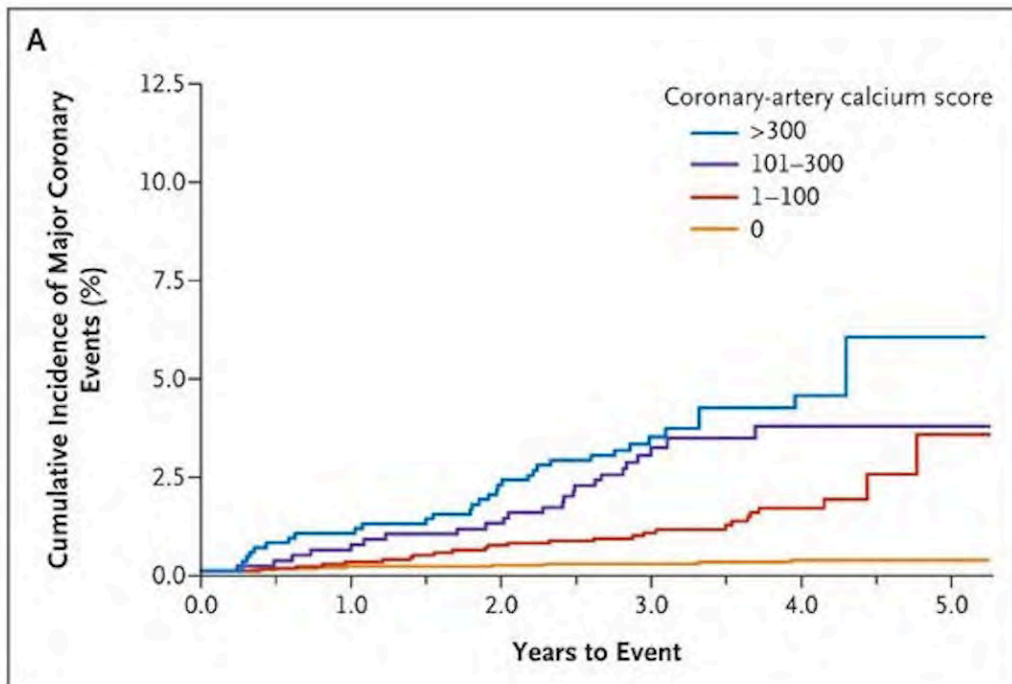
101-299

Moderately
increased risk
of heart disease



300+

Moderately to
severely
increased risk
of heart disease



Conclusion

- The obvious still applies- good weight, no smoking, good diet; regular exercise; treatment of cholesterol; early detection; more aggressive cholesterol care earlier may help