

# Curbside Consults in Cardiology

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February 2, 2018



**Saturated Fats**  
Good Or Bad?



## DISCLOSURE INFORMATION:

No disclosures.

## LEARNING OBJECTIVES:

1. Appraise the evidence related to several case scenarios likely to confront primary care providers in clinical practice.
2. Define prevention and treatment strategies for several common heart conditions.

# Saturated Fats

Good Or Bad?



For years I've been telling my patients to lower their intake of saturated fats and I just heard that may not be right. I give them diet advice from the AHA and I also tell them to exercise and stop smoking. Now I'm beginning to doubt a lot of the advice I've been giving. What's the story?

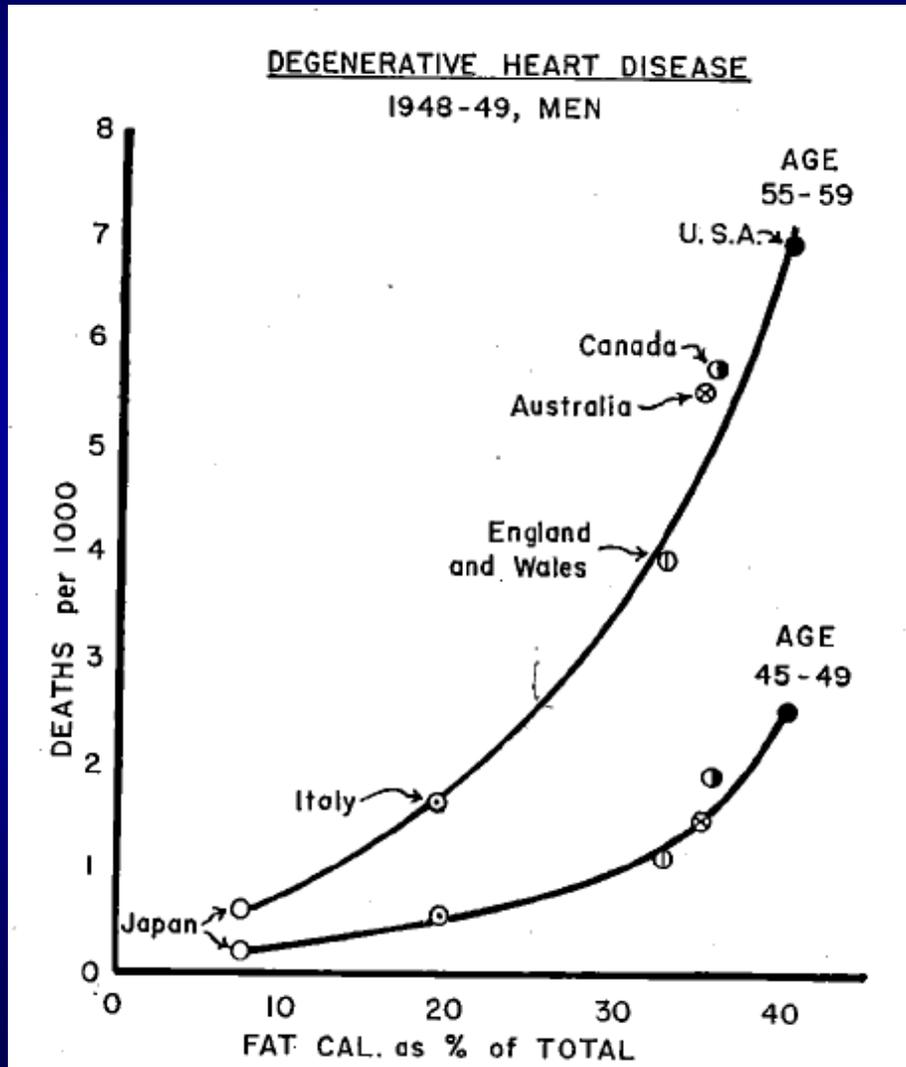
A) It turns out that some things we thought were crystal clear aren't. In fact, a recent study shows that cigarette smoking may reduce death from heart disease.

B) It turns out that some things we thought were crystal clear aren't. In fact, a recent study shows that statins don't really reduce death from heart disease.

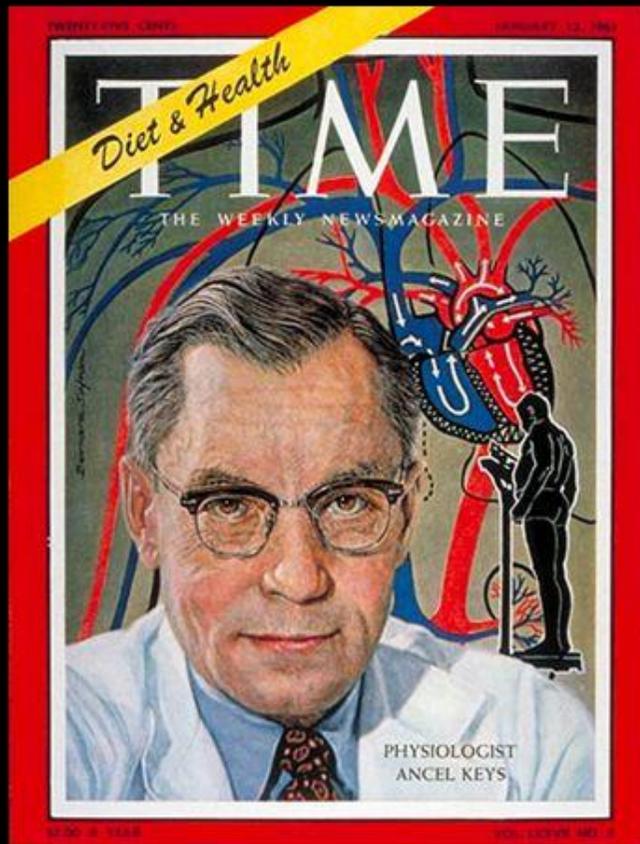
C) It turns out that some things we thought were crystal clear aren't. A recent study shows that saturated fat is not associated with increased mortality.

D) It turns out that some things we thought were crystal clear aren't. A recent study shows that regular exercise increases death from heart disease.

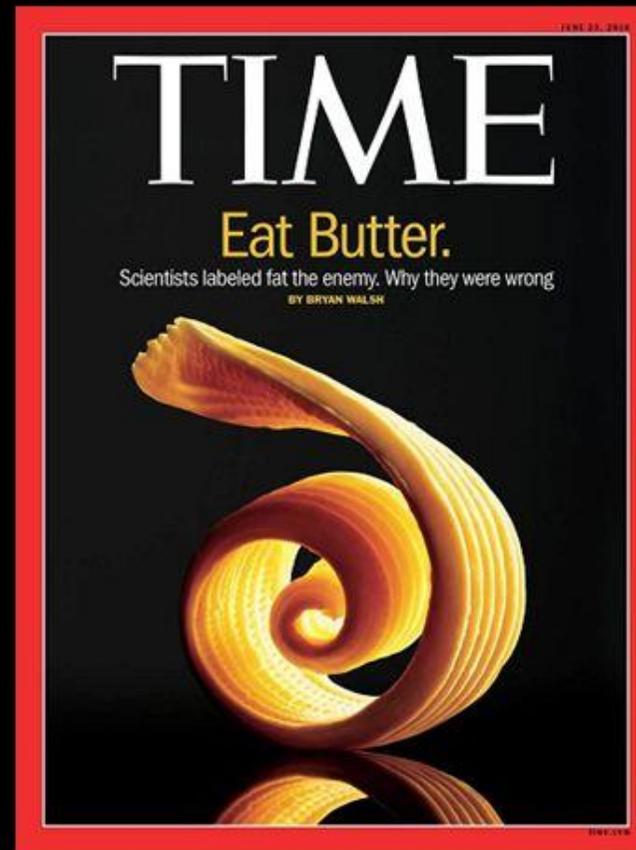
# Dietary Fat and Heart Disease



“Whether or not cholesterol, etc., are involved, it must be concluded that dietary fat somehow is associated with cardiac disease mortality, at least in middle age.”



**Ansel Keys** cover of Time Magazine in 1961. He claimed that saturated fats in the diet clogged arteries and caused heart disease.



Time Magazine cover story in 2014. Scientists were wrong about saturated fats. They don't cause heart disease after all.

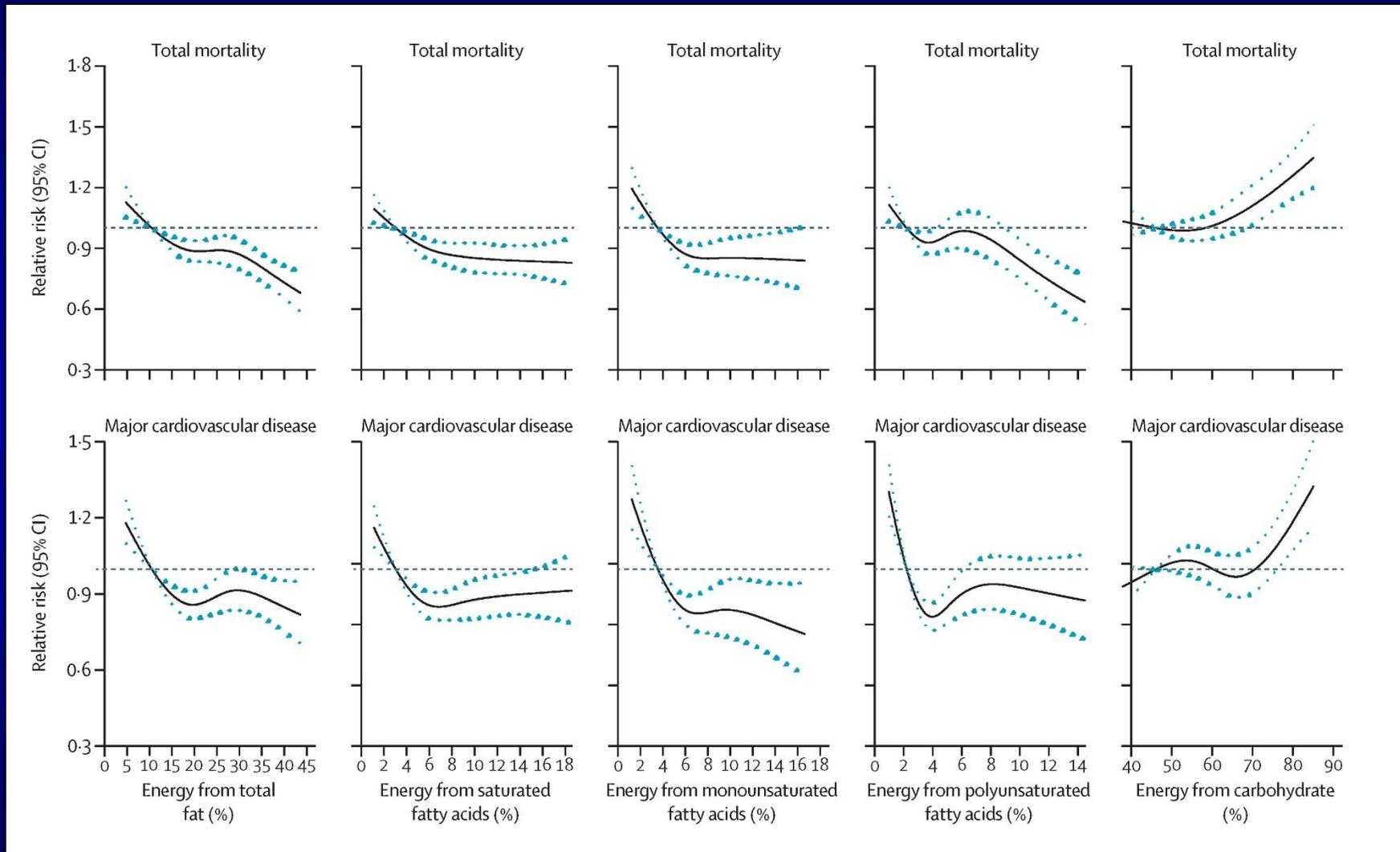
# Prospective Urban Rural Epidemiology (PURE)

- Epidemiological cohort study of 135,335 individuals 35-70 years-old from 18 countries.
- Dietary intake recorded and total mortality and major CVD events followed for 7.4 years.
- Higher carbohydrate intake associated with an increased risk of total mortality (HR =1.28, highest vs. lowest quintile), but not with CVD or CVD mortality.

# Prospective Urban Rural Epidemiology (PURE)

- Total fat and individual types of fat associated with *lower* mortality (HR = 0.77 for total fat, HR = 0.86 for saturated fat, HR = 0.81 for monounsaturated fat, and HR = 0.80 for polyunsaturated fat).
- Higher saturated fat intake was associated with a *lower* risk of stroke (HR 0.79, 95% CI = 0.64-0.98).
- Total fat and types of fat were not associated with CVD or CVD mortality.

# Source of Energy, Mortality, and CVD



# Prospective Urban Rural Epidemiology (PURE)

- Higher total fruit, vegetable, and legume intake was associated with a lower risk of non-CVD and total mortality.

# Saturated and Trans Fats and Health

- Systematic review and meta-analysis of observational studies reporting associations of saturated fat and/or trans unsaturated fat intake and all-cause mortality and CHD/CVD mortality.
- Saturated fat intake was not associated with all-cause mortality (RR 0.99, 95% CI = 0.91-1.09) or CVD mortality (RR 0.97, 95% CI = 0.84-1.12).
- Total trans fat intake was associated with all-cause mortality (RR 1.34, 95% CI = 1.16-1.56) and CHD mortality (RR 1.28, 95% CI = 1.09-1.50).

# Reducing Saturated Fat and Health

- Systematic review (Cochrane Database of Systematic Reviews) of 15 RCTs that examined the effect of replacing saturated fat with carbohydrate, polyunsaturated or monounsaturated fat, and/or protein on all-cause and CVD mortality and CVD events.
- Reducing dietary saturated fat reduced the risk of CVD events (RR 0.83, 95% CI = 0.72-0.96), but had no effect on all-cause (RR 0.97, 95% CI = 0.90-1.05) or CVD mortality (RR 0.95, 95% CI = 0.80-1.12).

# Reducing Saturated Fat in Secondary Prevention

- Systematic review and meta-analysis of 12 studies of reduced/modified fat diets vs. control in patients with established CHD.
- No significant risk reduction was observed in all-cause mortality (RR 0.92, 95% CI = 0.68-1.25) or CVD mortality (RR 0.96, 95% CI = 0.65-1.42).

## **AHA PRESIDENTIAL ADVISORY**

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# **Dietary Fats and Cardiovascular Disease**

**A Presidential Advisory From the American Heart Association**

“Taking into consideration the totality of the scientific evidence, satisfying rigorous criteria for causality, we conclude strongly that lowering intake of saturated fat and replacing it with unsaturated fats, especially polyunsaturated fats, will lower the incidence of CVD.”

Circulation. July 18, 2017

“The AHA guidelines need to be rethought in the context of all studies in total, including PURE.”

*- Salim Yusuf, MD, DPhil, PI of PURE*

“A nutrition study of PURE's scale and scope is extremely challenging” and the PURE results should “be interpreted with significant caution.”

*- American Heart Association*

For years I've been telling my patients to lower their intake of saturated fats and I just heard that may not be right. I give them diet advice from the AHA and I also tell them to exercise and stop smoking. Now I'm beginning to doubt a lot of the advice I've been giving. What's the story?

It turns out that some things we thought were crystal clear aren't. A recent study shows that saturated fat is not associated with increased mortality.



A 32-year-old woman saw me today for the first time. Both her mother and her father had heart attacks in their 40s. She smokes and asked me about switching to e-cigarettes. I told her I thought they were just as bad. What do you think?

A) They have the same health effects but look way cooler.

B) They have the same general health effects, but have a small, but real, risk of electrocution that is statistically higher than being struck by lightning.

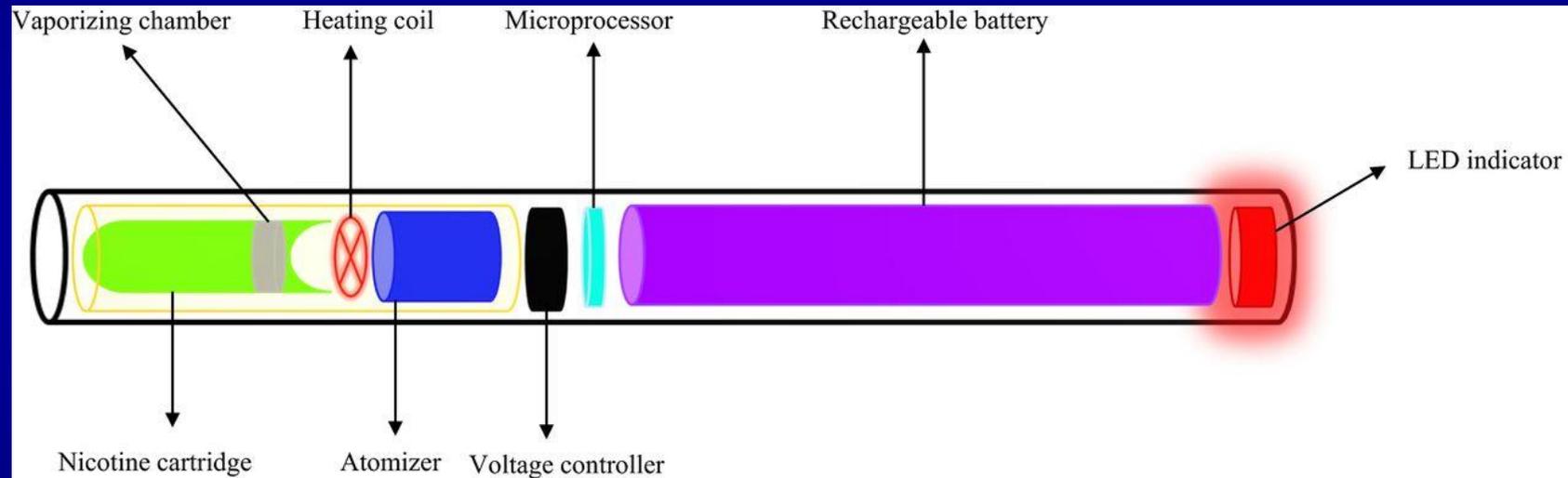
C) They seem to have slightly less health risks than conventional cigarettes.

D) They're OK to smoke as long as you also eat lots of saturated fat.

# Electronic Cigarettes

- Also known as vape pens, e-cigars, or vaping devices.
- Generate aerosolized mixture of flavored liquids and nicotine.
- Devices differ by nicotine concentrations in e-liquids, volumes of e-liquids per product, carrier compounds, additives, flavors, and battery voltage.

# Electronic Cigarettes



Nicotine cartridge = e-liquid container

Heating coil = heats e-liquid

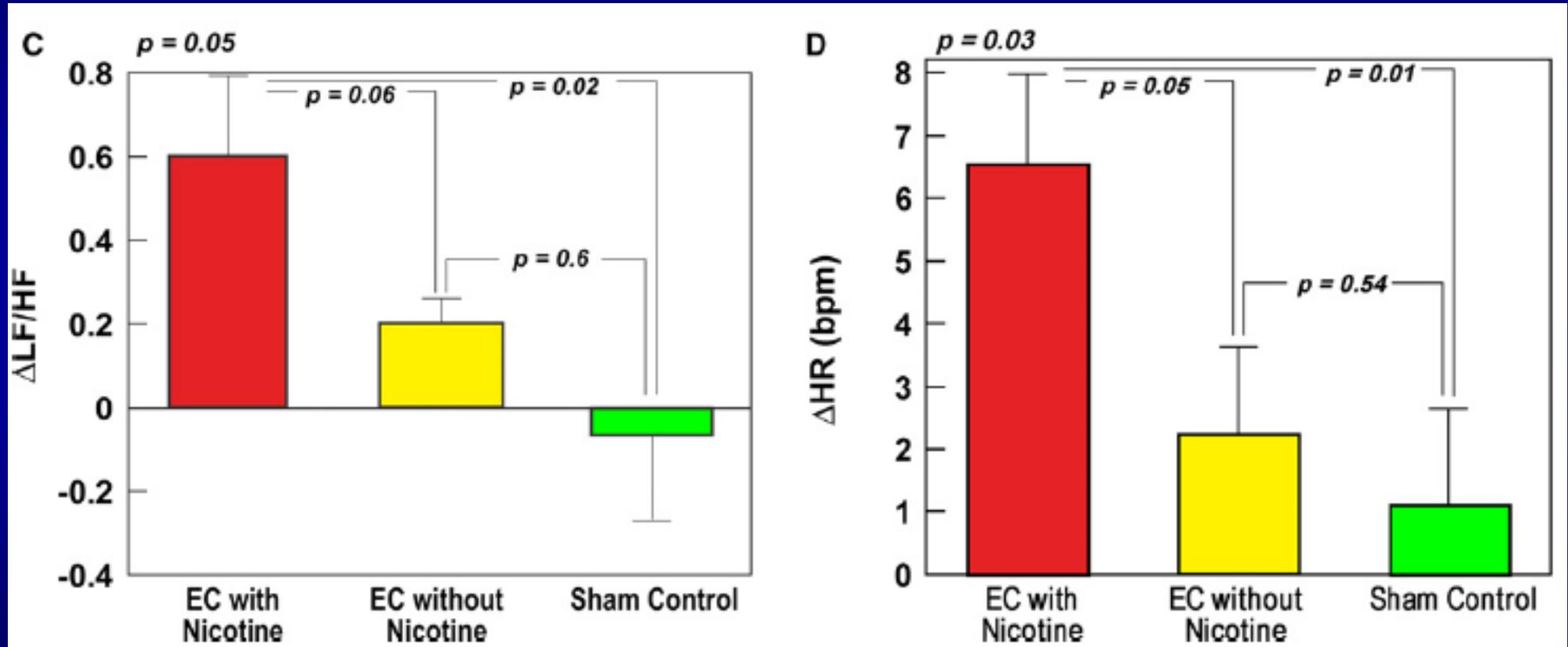
Atomizer = generates e-vapor

LED indicator present in some devices to simulate glow of a burning cigarette

# Sympathomimetic Effects Due to Nicotine

- Healthy volunteer nonsmokers (N = 33) smoked either e-cigarettes with nicotine, e-cigarettes without nicotine, or sham control.
- Cardiac sympathetic activity determined by heart rate variability.
- Exposure to e-cigarettes with nicotine shifted sympathovagal balance toward sympathetic predominance; this was not seen with e-cigarettes without nicotine or sham control.

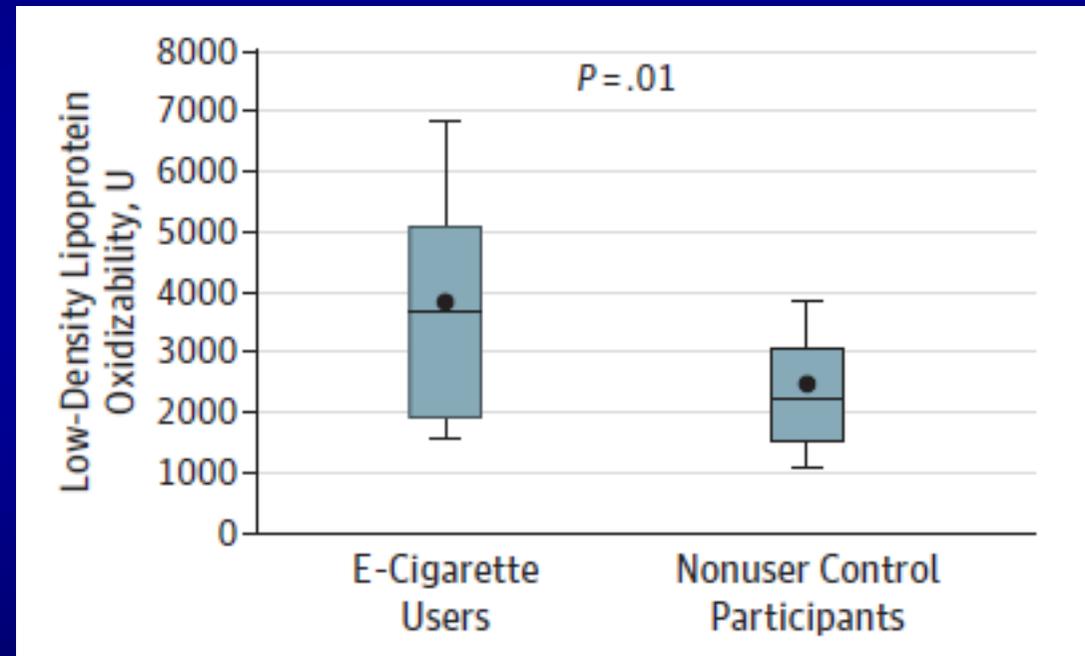
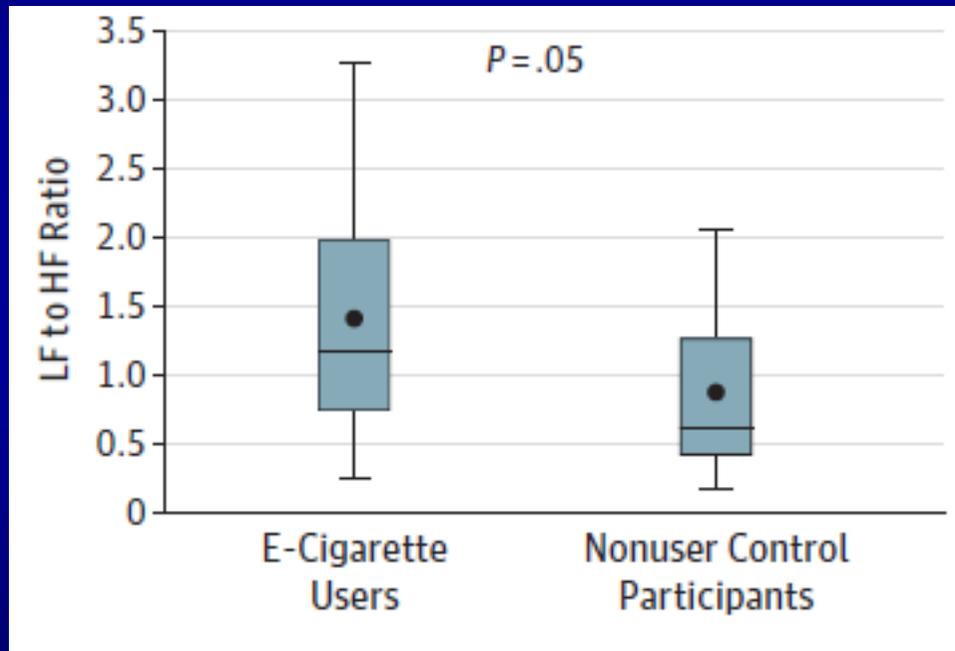
# Sympathomimetic Effects Due to Nicotine



# Habitual Electronic Cigarette and CVD Risk

- Cross-sectional case-control study of habitual e-cigarette users (ages 21-45 years, no current tobacco use, no health problems or prescription meds, N = 23) and non-user controls (N = 19).
- Of 42 participants, 35% were women, 35% Caucasian, mean age 27.6 years.
- LF/HF ratio of heart rate variability and LDL oxidizability both significantly increased in e-cigarette users consistent with sympathetic predominance and increased oxidative stress.

# Habitual Electronic Cigarette and CVD Risk



# Electronic Cigarettes and Health Risks

- Study of exhaled carbon monoxide (eCO), and total 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL) in 10 smokers and 20 e-cigarette users (9 second-generation devices and 11 third-generation devices).
- Both e-cigarettes delivered cigarette-like amounts of nicotine; third-generation devices matched amount and speed of nicotine delivery.
- Smokers had 4-7 times higher eCO ( $p < 0.0001$ ) and NNAL ( $p < 0.01$ ) vs. e-cigarette users.

# Electronic Cigarettes and Health Risks

“With the exception of nicotine and particulates, potentially toxic constituents are generally present in much lower levels in EC aerosol compared with cigarette smoke. Notably, EC particles are different from cigarette smoke particles, and their toxicity is unknown. Most of the cardiovascular effects demonstrated with EC use in humans are consistent with the known sympathomimetic effects of nicotine. Therefore, we believe that although ECs might pose some cardiovascular risk, particularly in people with pre-existing CVD, the risk is less than that of cigarette smoking.”

A 32-year-old woman saw me today for the first time. Both her mother and her father had heart attacks in their 40s. She smokes and asked me about switching to e-cigarettes. I told her I thought they were just as bad. What do you think?

They seem to have slightly less health risks than conventional cigarettes.



I saw a 55-year-old Caucasian man today with type 2 diabetes. He has no other medical problems and no other CVD risks. Should I recommend aspirin for primary prevention?

A) I would. The data are quite strong that daily ASA reduces CVD and CVD mortality in diabetics.

B) I would. The data are quite strong that daily ASA reduces CVD and CVD mortality in diabetics over 50.

C) I would not. The data are strong that daily ASA reduces CVD and CVD mortality in diabetics over 50 but the risk of intracranial bleeding is very high.

D) I would not. The data are not very strong that daily ASA reduces CVD and CVD mortality in diabetics like him, and it does increase bleeding.

# Aspirin in Primary Prevention in Diabetics

- The ADA, AHA, and ACC Foundation recommend low-dose ASA for the primary prevention of CVD in adults with diabetes, based on individual CVD risk and risk of bleeding.
- Antiplatelet therapy with ASA in adults at low CVD risk is not recommended by the Fifth Joint Task Force of the European Society of Cardiology and Other Societies on CVD Prevention in Clinical Practice.

# **AHA/ADA Scientific Statement**

## **Update on Prevention of Cardiovascular Disease in Adults With Type 2 Diabetes Mellitus in Light of Recent Evidence**

**A Scientific Statement From the American Heart Association and the American Diabetes Association**

### **Recommendations**

- 1. Low-dose aspirin (75–162 mg/d) is reasonable among those with a 10-year CVD risk of at least 10% and without an increased risk of bleeding (ACC/AHA Class IIa; Level of Evidence B) (ADA Level of Evidence C).**
- 2. Low-dose aspirin is reasonable in adults with diabetes mellitus at intermediate risk (10-year CVD risk, 5%–10%) (ACC/AHA Class IIb; Level of Evidence C) (ADA Level of Evidence E).**

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## Final Recommendation Statement

### *Aspirin Use to Prevent Cardiovascular Disease and Colorectal Cancer: Preventive Medication*

*Recommendations made by the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.*

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#### Recommendation Summary

Population	Recommendation	Grade (What's This?)
Adults aged 50 to 59 years with a $\geq 10\%$ 10-year CVD risk	The USPSTF recommends initiating low-dose aspirin use for the primary prevention of cardiovascular disease (CVD) and colorectal cancer (CRC) in adults aged 50 to 59 years who have a 10% or greater 10-year CVD risk, are not at increased risk for bleeding, have a life expectancy of at least 10 years, and are willing to take low-dose aspirin daily for at least 10 years.	<b>B</b>
Adults aged 60 to 69 years with a $\geq 10\%$ 10-year CVD risk	The decision to initiate low-dose aspirin use for the primary prevention of CVD and CRC in adults aged 60 to 69 years who have a 10% or greater 10-year CVD risk should be an individual one. Persons who are not at increased risk for bleeding, have a life expectancy of at least 10 years, and are willing to take low-dose aspirin daily for at least 10 years are more likely to benefit. Persons who place a higher value on the potential benefits than the potential harms may choose to initiate low-dose aspirin.	<b>C</b>
Adults younger than 50 years	The current evidence is insufficient to assess the balance of benefits and harms of initiating aspirin use for the primary prevention of CVD and CRC in adults younger than 50 years.	<b>I</b>



Current 10-Year  
ASCVD Risk

8.5%

Previous 10-  
Year  
ASCVD Risk

~0%

Lifetime ASCVD Risk 50%

## Patient Demographics

Current Age

55

Age must be between 40-79

Sex

✓ Male

Female

Race

✓ White

African American

Other

## Current Labs/Exam

Total Cholesterol (mg/dL)

170

Value must be between 130 - 320

HDL Cholesterol (mg/dL)

46

Value must be between 20 - 100

LDL Cholesterol (mg/dL) ⓘ

100

Value must be between 30-300

Systolic Blood Pressure (mm of Hg)

120

Value must be between 90-200

## Personal History

History of Diabetes?

✓ Yes

No

On Hypertension Treatment?

Yes

✓ No

Smoker: ⓘ

Yes

Former

✓ No

# Aspirin in Primary Prevention in Diabetics

- Systematic review and meta-analysis of 10 RCTs of aspirin vs. placebo (or no treatment) in people with diabetes and no history of CVD.
- Significant reduction in major adverse cardiovascular events (RR .90, 95% CI = 0.81-0.99) with ASA. However, when a trial with some patients with CVD was excluded, this was not significant.
- There was no significant reduction in MI, CHD, CVA, CVD mortality or all-cause mortality.

## Aspirin vs placebo or no treatment (control) for primary prevention of CV disease in patients with diabetes\*

Outcomes	Number of trials (n)	Weighted event rates		At 3.8 to 10 y	
		Aspirin	Control	RRR (95% CI)	NNT (CI)
MACE†‡	6 (12 277)	6.3%	7.0%	10% (-2 to 22)	NS
MACE†	7 (15 988)	9.1%	10%	10% (1 to 19)	99 (53 to 990)
MI	7 (11 618)	6.6%	7.9%	16% (-11 to 36)	NS
Stroke	8 (11 254)	3.5%	4.0%	14% (-8 to 31)	NS
CHD	5 (5485)	5.6%	5.7%	2% (-21 to 21)	NS
CV mortality	5 (10 058)	6.6%	7.0%	6% (-26 to 29)	NS
All-cause mortality	5 (10 058)	10%	11%	6% (-5 to 17)	NS
				<b>RRI (CI)</b>	
Any bleeding	3 (7281)	3.1%	1.4%	123% (-21 to 534)	NS
GI bleeding	3 (4846)	3.1%	1.5%	112% (-37 to 610)	NS

\*CHD = coronary heart disease; CV = cardiovascular; GI = gastrointestinal; MACE = major adverse cardiovascular events; MI = myocardial infarction; NS = not significant; other abbreviations defined in Glossary. Weighted event rates, RRR, RRI, NNT, and CI calculated from control event rates and relative risks in article using a random-effects model.

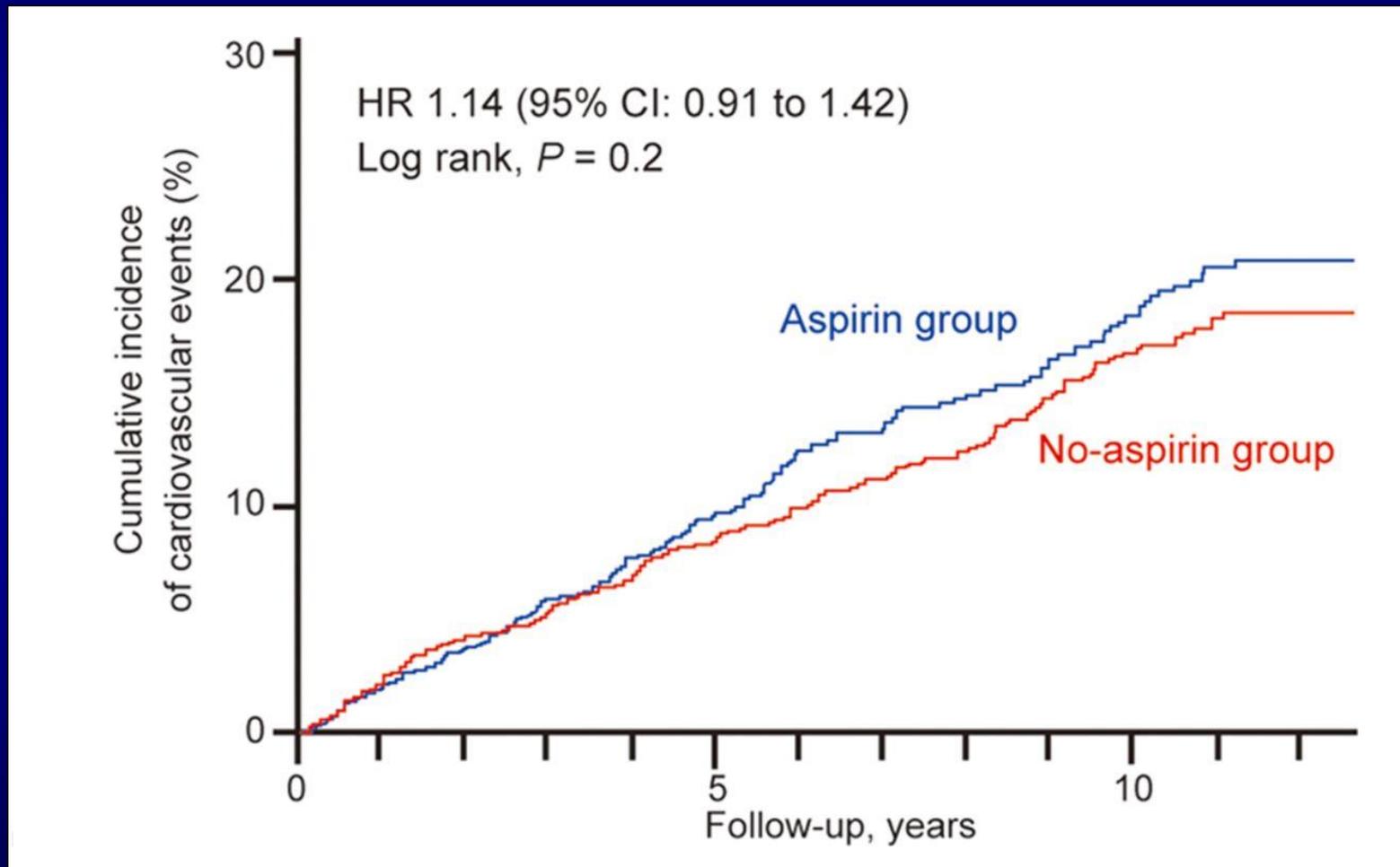
†Composite of nonfatal MI, nonfatal stroke, or CV mortality.

‡Analysis with removal of the Early Treatment Diabetic Retinopathy Study, which included a small proportion of patients with preexisting CVD.

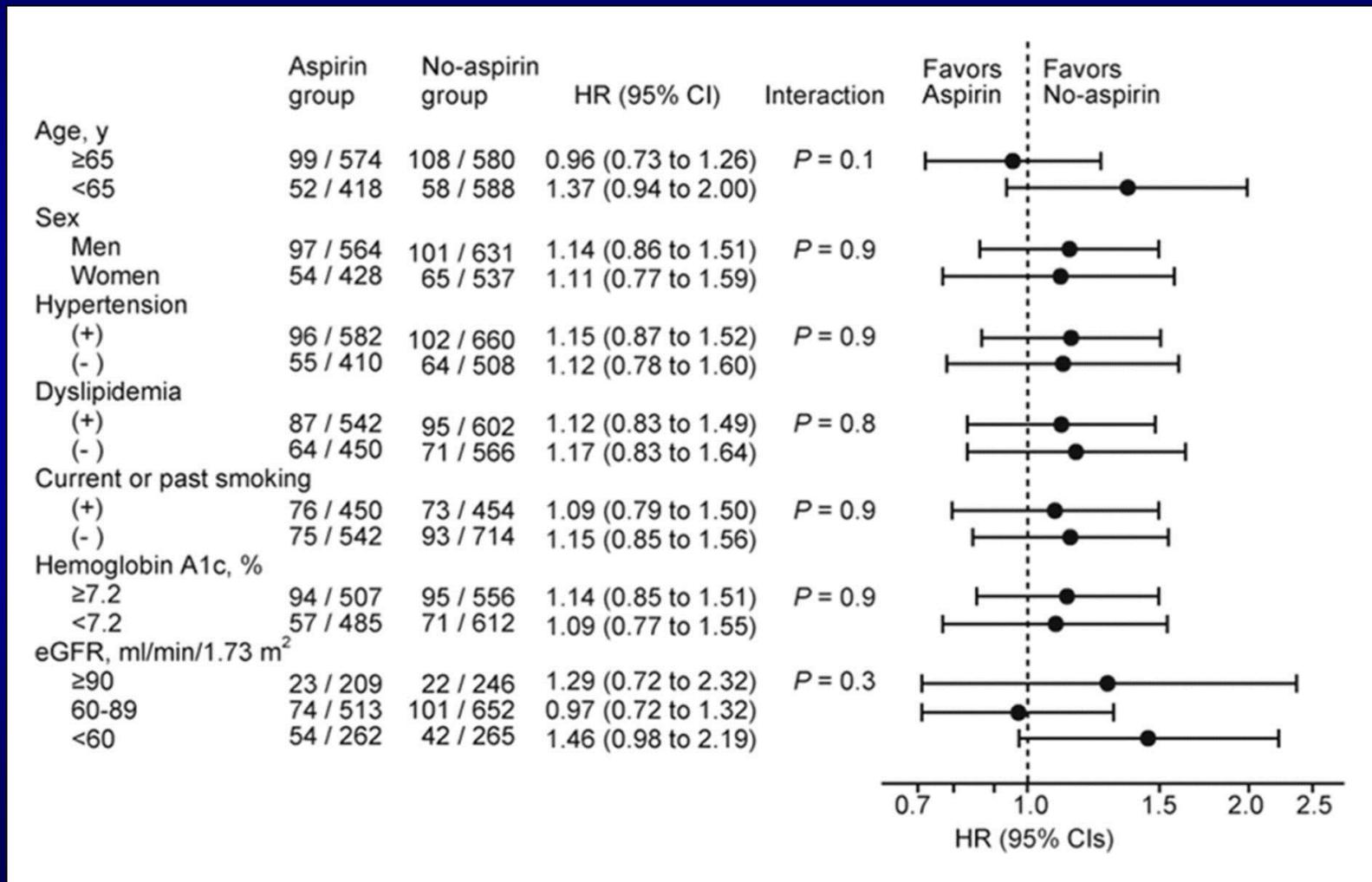
# Japanese Primary Prevention of Atherosclerosis with Aspirin for Diabetes (JPAD)

- Randomized, open-label controlled trial of low-dose ASA in 2,539 Japanese patients with type 2 diabetes and without pre-existing CVD.
- After a median follow-up of 10.3 years, low-dose ASA did not reduce CVD events (HR 1.14, 95% CI = 0.91-1.42).
- ASA increased the risk of GI bleeding (2% vs. 0.9%,  $P = 0.03$ ).

# Japanese Primary Prevention of Atherosclerosis with Aspirin for Diabetes (JPAD)



# Japanese Primary Prevention of Atherosclerosis with Aspirin for Diabetes (JPAD)



I saw a 55-year-old Caucasian man today with type 2 diabetes. He has no other medical problems and no other CVD risks. Should I recommend aspirin for primary prevention?

I would not. The data are not very strong that daily ASA reduces CVD and CVD mortality in diabetics like him, and it does increase bleeding.



I saw a woman today who just moved here from California. She is 77-years-old and has well-controlled HTN and stable CAD on daily ASA. She had a NSTEMI 5 years ago and hasn't had any problems since then. She has no history of AFIB, but her ECG showed that today. What would you have recommended?

- A) Adding an oral anticoagulant.
- B) Adding clopidogrel.
- C) Stopping ASA and starting an oral anticoagulant.
- D) Nothing. ASA is good enough for AFIB and CAD.
- E) Substituting clopidogrel for ASA.

## CHADS<sub>2</sub> score = 2

1 point for age  $\geq 75$  and 1 point for HTN:  
*moderate risk for thromboembolism – management should include an oral anticoagulant*

## CHA<sub>2</sub>DS<sub>2</sub>-VASc score = 2

2 points for age  $\geq 75$ , 1 point for female, 1 point for HTN:  
*moderate-high risk for thromboembolism – management should include an oral anticoagulant*

# More than 1 in 3 Patients with AFIB and a Moderate-to-High Risk of Stroke are Treated with ASA Alone

- Examined patients enrolled in the ACC Practice Innovation and Clinical Excellence (PINNACLE) registry between 2008 and 2012.
- Among 210,380 outpatients with AFIB and a CHADS<sub>2</sub> score  $\geq 2$ , 38.2% were treated with ASA alone and 61.2% with an oral anticoagulant.
- Among 294,642 outpatients with CHA<sub>2</sub>DS<sub>2</sub>-VASc  $\geq 2$ , 40.2% were treated with ASA alone.



## Antithrombotic Therapy for VTE Disease

### Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines

*Clive Kearon, MD, PhD; Elie A. Akl, MD, MPH, PhD; Anthony J. Comerota, MD; Paolo Prandoni, MD, PhD; Henri Bounameaux, MD; Samuel Z. Goldhaber, MD, FCCP; Michael E. Nelson, MD, FCCP; Philip S. Wells, MD; Michael K. Gould, MD, FCCP; Francesco Dentali, MD; Mark Crowther, MD; and Susan R. Kahn, MD*

**3.1. For patients with AF and stable coronary artery disease (eg, no acute coronary syndrome within the previous year) and who choose oral anticoagulation, we suggest adjusted-dose VKA therapy alone (target international normalized ratio [INR] range, 2.0-3.0) rather than the combination of adjusted-dose VKA therapy and aspirin (Grade 2C).**

# Antiplatelet Therapy for Patients with Stable CAD and Atrial Fibrillation

- Study of 8,700 patients with AFIB and stable CAD (mean age 74.2, 38% women) followed for 3.3 years.
- Relative to oral anticoagulation alone, the risk of MI/CHD death was similar for OCA + ASA (HR 1.12, 95% CI = 0.94-1.34) or OCA + clopidogrel (HR 1.53, 95% CI = 0.93-2.52).
- Bleeding risk increased when OCA was combined with ASA (HR 1.50, 95% CI = 1.23-1.82) or clopidogrel (HR 1.84, 95% CI = 1.11-3.06).

# Antiplatelet Therapy for Patients with Stable CAD and Atrial Fibrillation

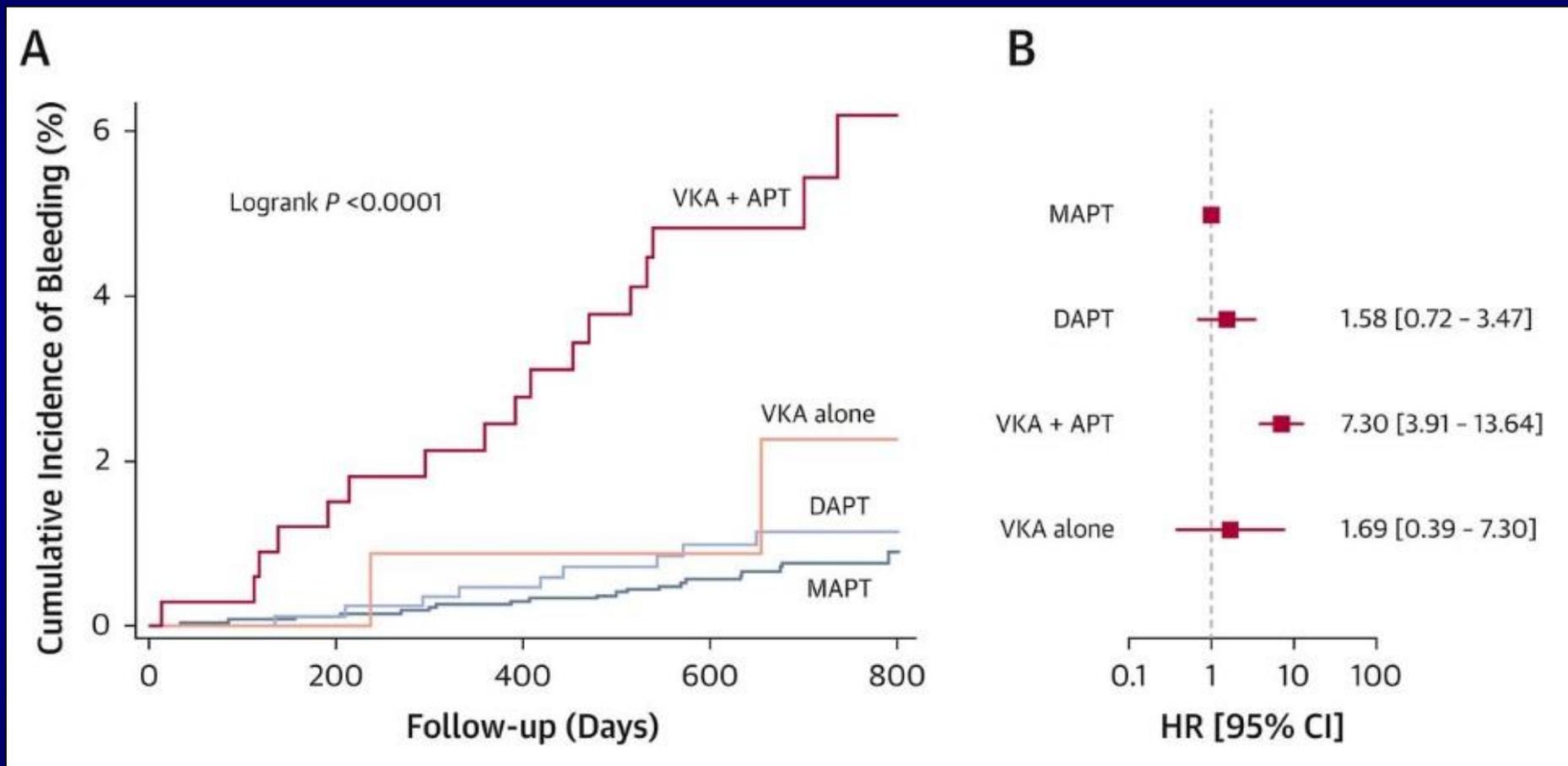
**Table 3. Risk of the Combined Outcome of Myocardial Infarction, Thromboembolism, Bleeding, and All-Cause Mortality**

Treatment	Number of Events	Crude Rate	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
VKA plus aspirin plus clopidogrel	39	20.8	1.33 (0.96–1.84)	1.70 (1.22–2.36)
VKA plus clopidogrel	39	19.0	1.28 (0.92–1.77)	1.42 (1.02–1.97)
VKA plus aspirin	298	13.8	1.00 (0.90–1.12)	1.15 (1.03–1.29)
VKA	490	13.8	Reference	Reference
Aspirin plus clopidogrel	243	26.3	1.71 (1.46–2.00)	1.63 (1.39–1.91)
Clopidogrel	111	20.4	1.43 (1.16–1.75)	1.29 (1.04–1.59)
Aspirin	2222	19.4	1.39 (1.26–1.53)	1.35 (1.22–1.49)

# Major Bleeding in Patients with Stable CAD

- Study of 4,184 consecutive outpatients with stable CAD followed for 2 years.
- There were 51 major bleeding events during follow-up (0.6%/year). Most bleeds were GI (54.9%); about 1 in 5 was intracranial.
- Major bleeding was significant associated with death (adjusted HR 2.89, 95% CI = 1.73-4.83).
- The most important predictor of major bleeding was use of an oral anticoagulant (HR 4.69, 95% CI = 2.60-8.44).

# Major Bleeding Risk of Anticoagulants Related to Combination with Antiplatelet Agents

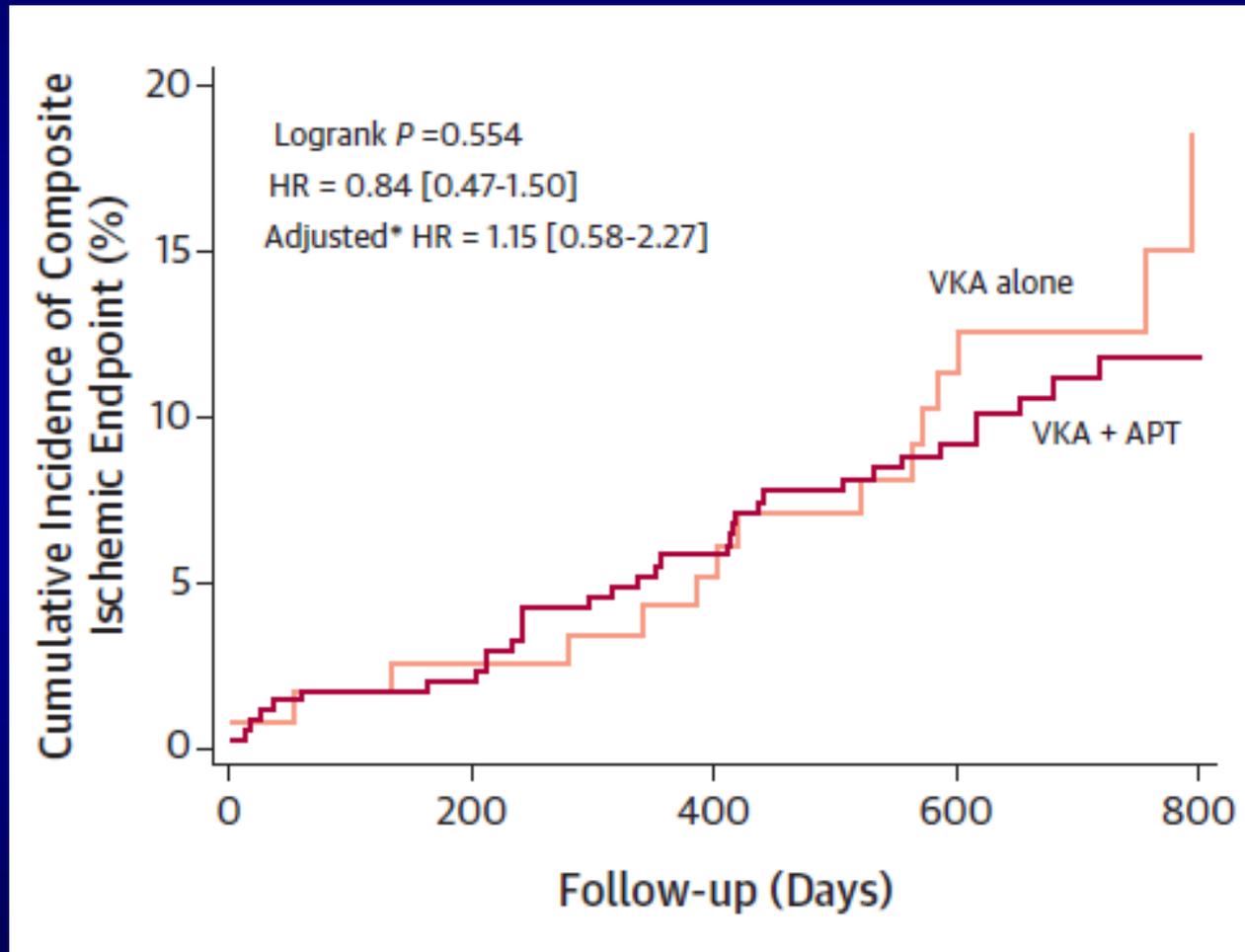


VKA = vitamin K antagonist

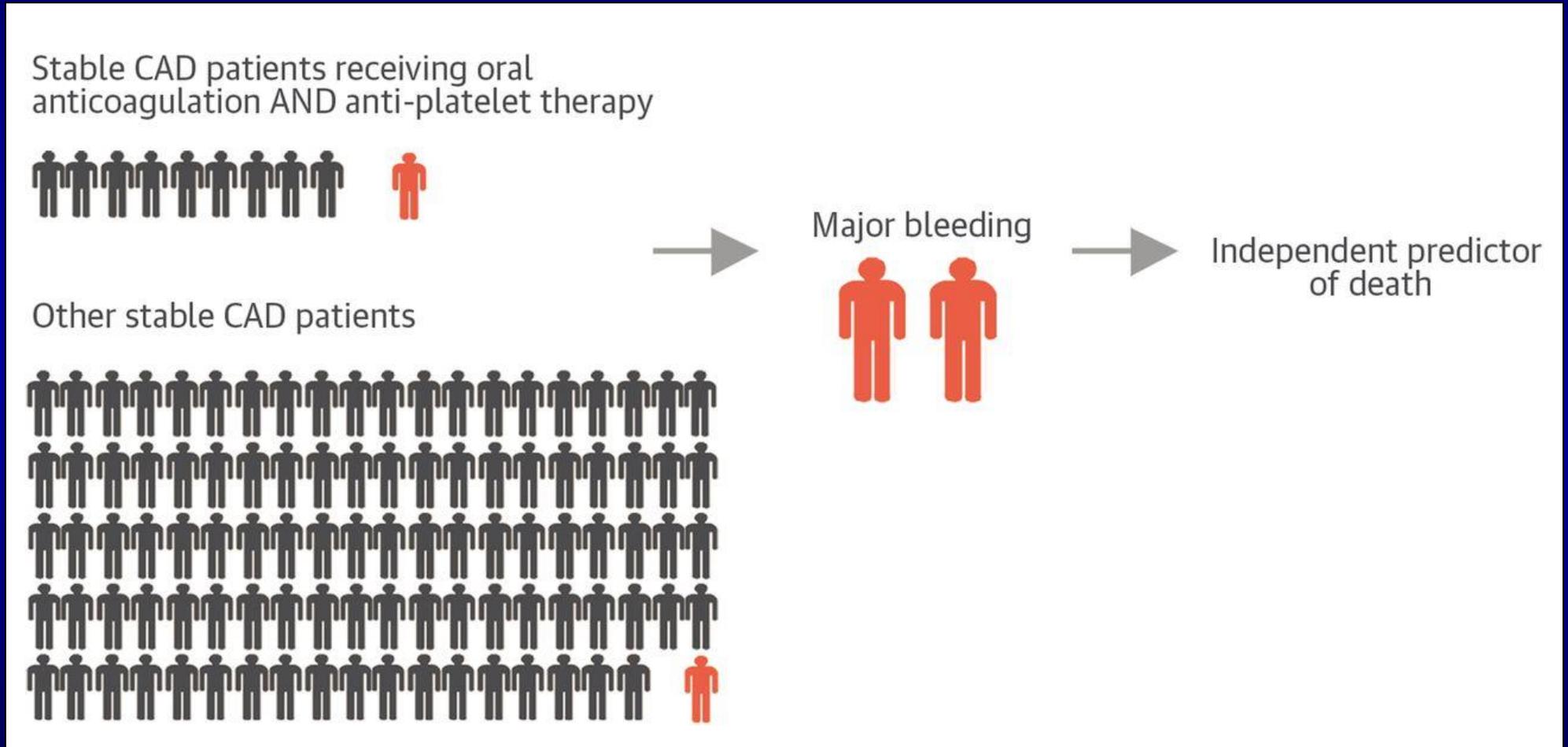
MAPT = mono-antiplatelet therapy

DAPT = dual-antiplatelet therapy

# Adding ASA Doesn't Reduce Ischemic Risk in Patients Taking Oral Anticoagulants



# Major Bleeding is Rare in Patients with Stable CAD, but Risk is Increased with Anticoagulants



“When oral anticoagulation is required, the use of concomitant antiplatelet therapy is associated with an important increase in bleeding, with no evidence of a decrease in ischemic events. For the clinician, the important message is to avoid long-term use of antiplatelet agents in combination with oral anticoagulation in stable CAD patients...”

I saw a woman today who just moved here from California. She is 77-years-old and has well-controlled HTN and stable CAD on daily ASA. She had a NSTEMI 5 years ago and hasn't had any problems since then. She has no history of AFIB, but her ECG showed that today. What would you have recommended?

**Stopping ASA and starting an oral anticoagulant.**



I saw a 44-year-old man who was recently discharged from the hospital after a small stroke. No definite cause was found, but a TEE showed a PFO with an atrial septal aneurysm and a pretty large interatrial shunt. He was started on aspirin, but it seems to me that he should have the PFO closed, since the success rate is so high and there are few complications. What do you think?

A) PFOs are definitely associated with stroke. Now that percutaneous closure is possible, everyone who has one should have it closed.

B) The role of PFO closure to prevent first stroke or TIA is not clear, but closure is definitely indicated in all patients who've had a stroke and have a PFO.

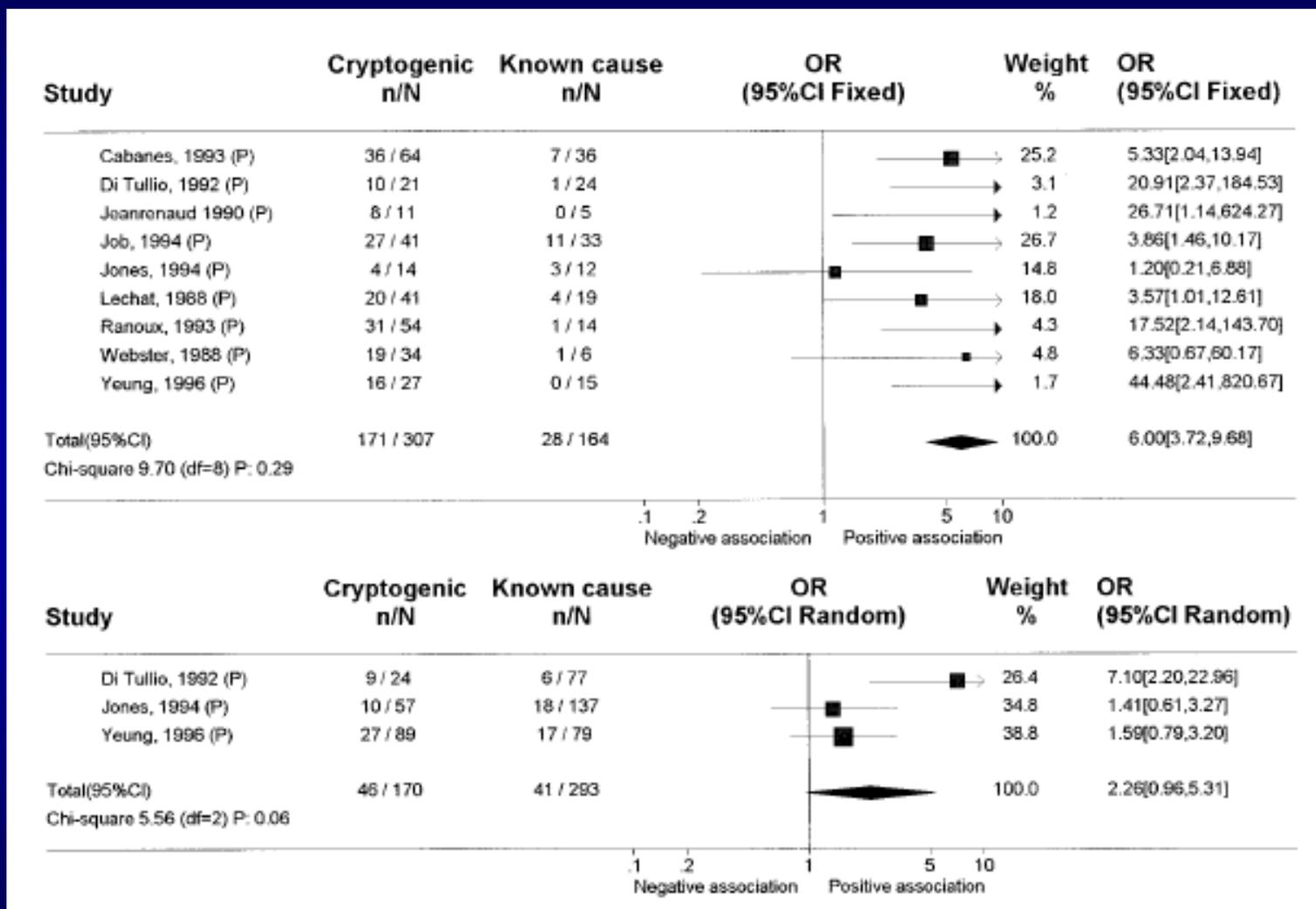
C) It would probably be appropriate for this type of patient to have his PFO closed.

D) A recent study showed that antiplatelet therapy is superior to PFO closure for patients like this.

# PFOs and Cryptogenic Stroke

- About 20-30% of ischemic strokes are cryptogenic.
- PFOs are found in about 20-25% of the general population.
- There is about twice the prevalence of PFO in patients with cryptogenic stroke.
- This association does not itself demonstrate causality; for example, PFOs may be associated with abnormal atrial function and/or AFIB.

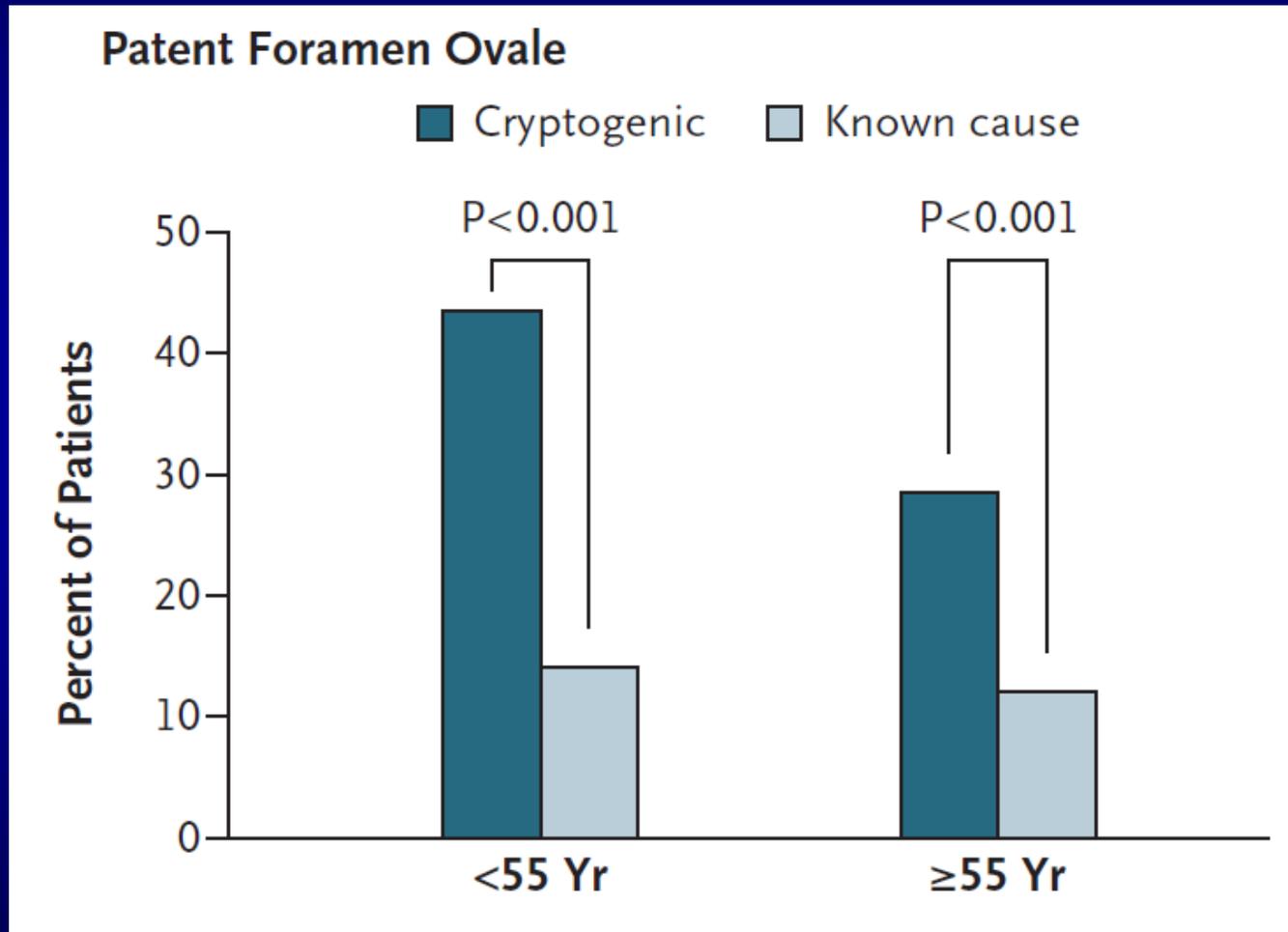
# Presence of PFO in Cryptogenic Stroke



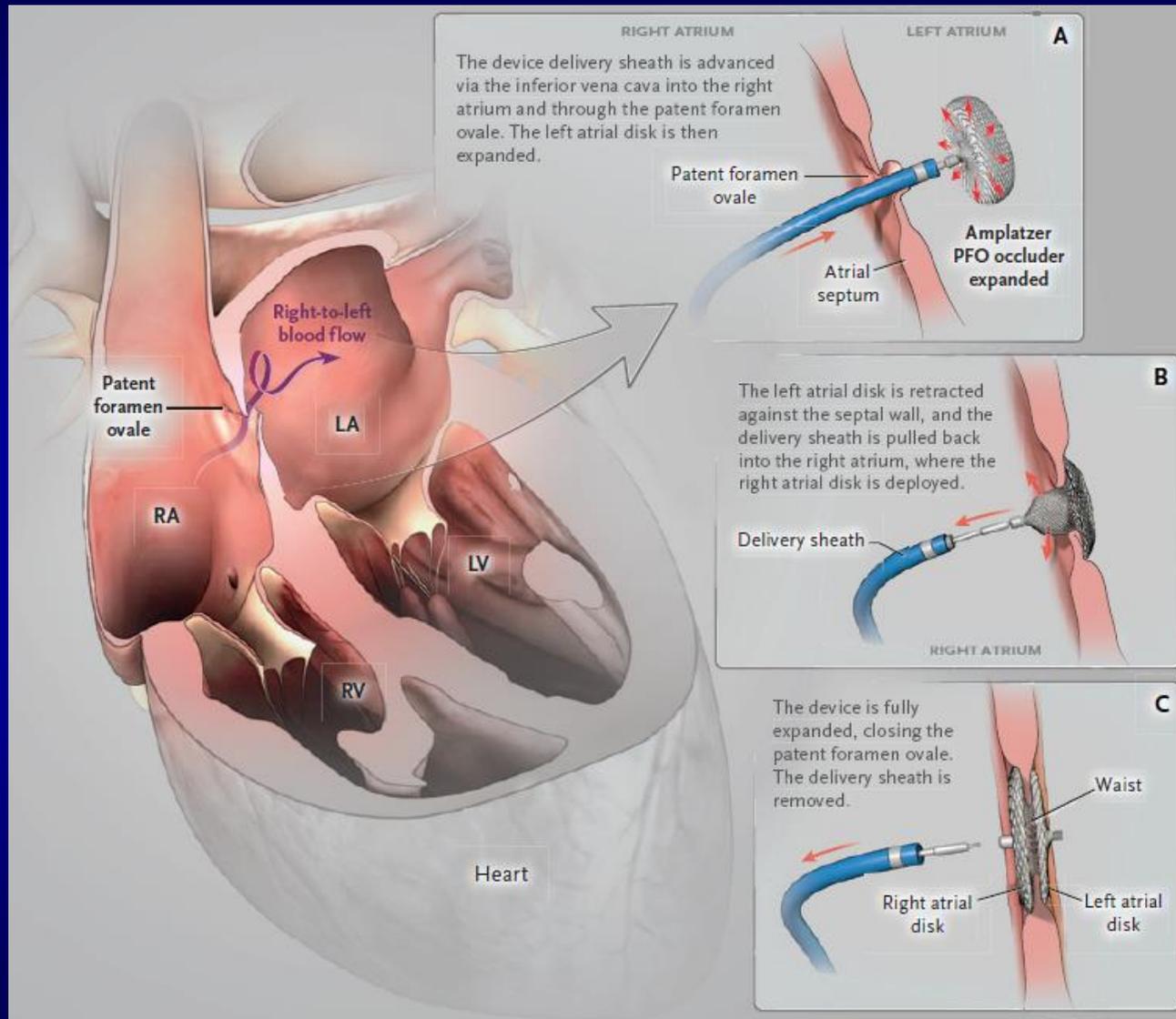
# Prevalence of PFO in Cryptogenic Stroke

- Prospectively examined 503 patients with a CVA.
- Determined the prevalence of PFO (by TEE) in the 227 patients with cryptogenic stroke and the 276 patients with stroke of known cause.
- Compared the 131 patients < 55 years of age to the 372 patients  $\geq$  55 years of age.
- PFOs about 3X more likely among patients with cryptogenic stroke.

# Prevalence of PFO in Cryptogenic Stroke



# Percutaneous PFO Closure



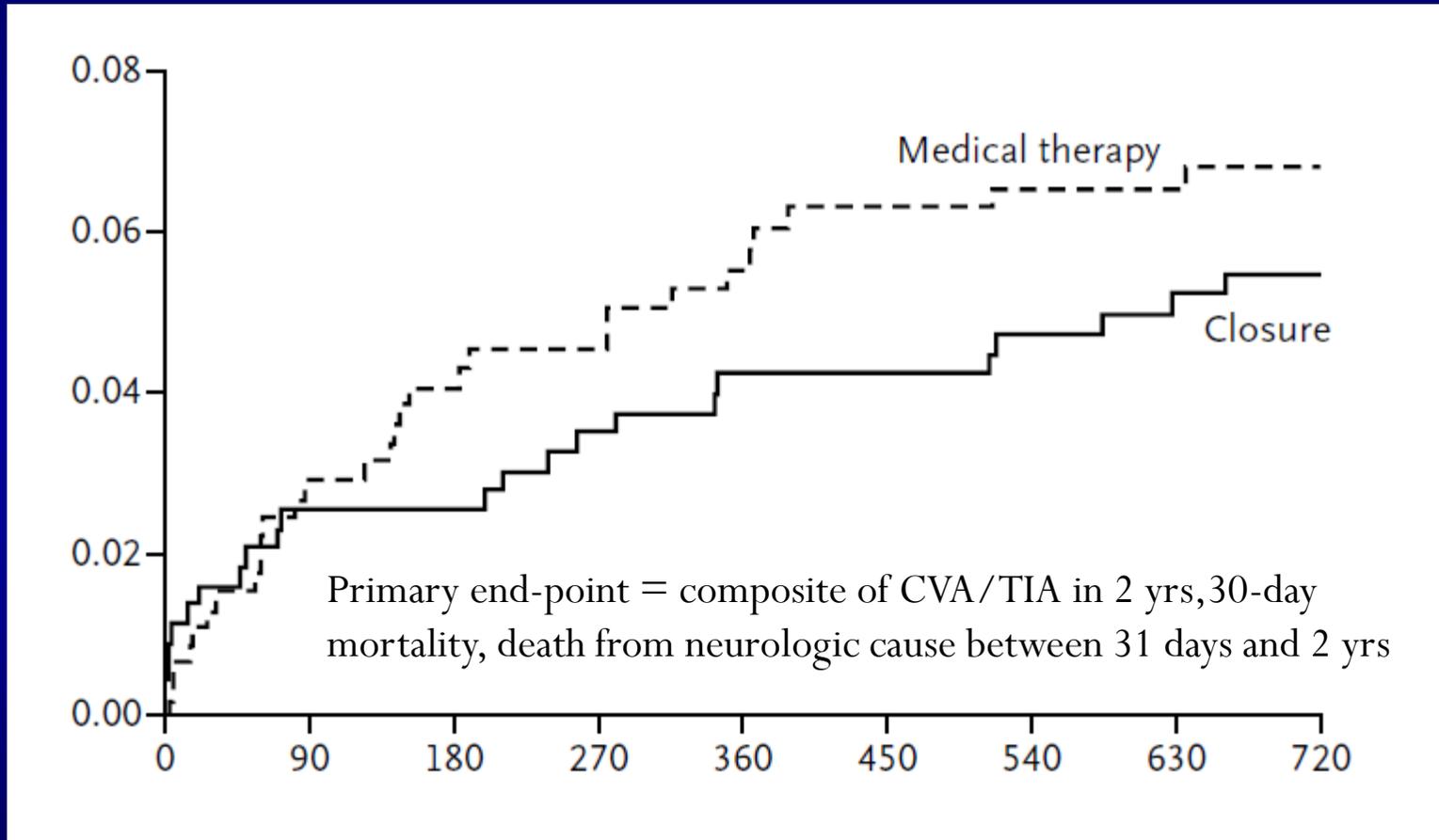
# PFO Closure vs. Medical Therapy

- Multicenter, randomized, open-label trial of percutaneous PFO closure (STARFlex device) vs. medical therapy for 909 patients 18-60-years of age with a cryptogenic stroke/TIA and a PFO.
- Patients in PFO closure group received daily ASA for 2 years and clopidogrel for 6 months.
- Patients assigned to medical therapy received warfarin, ASA, or both.

# PFO Closure vs. Medical Therapy

- Primary end point = CVA/TIA in 2 years, death from any cause in first 30 days, or death from neurologic causes between 31 days and 2 years.
- Primary end point = 5.5% in the closure group vs. 6.8% in medical therapy group (adjusted HR, 0.78; 95% CI, 0.45 -1.35; P = 0.37).
- A cause other than paradoxical embolism was usually present in recurrent CVA/TIA.

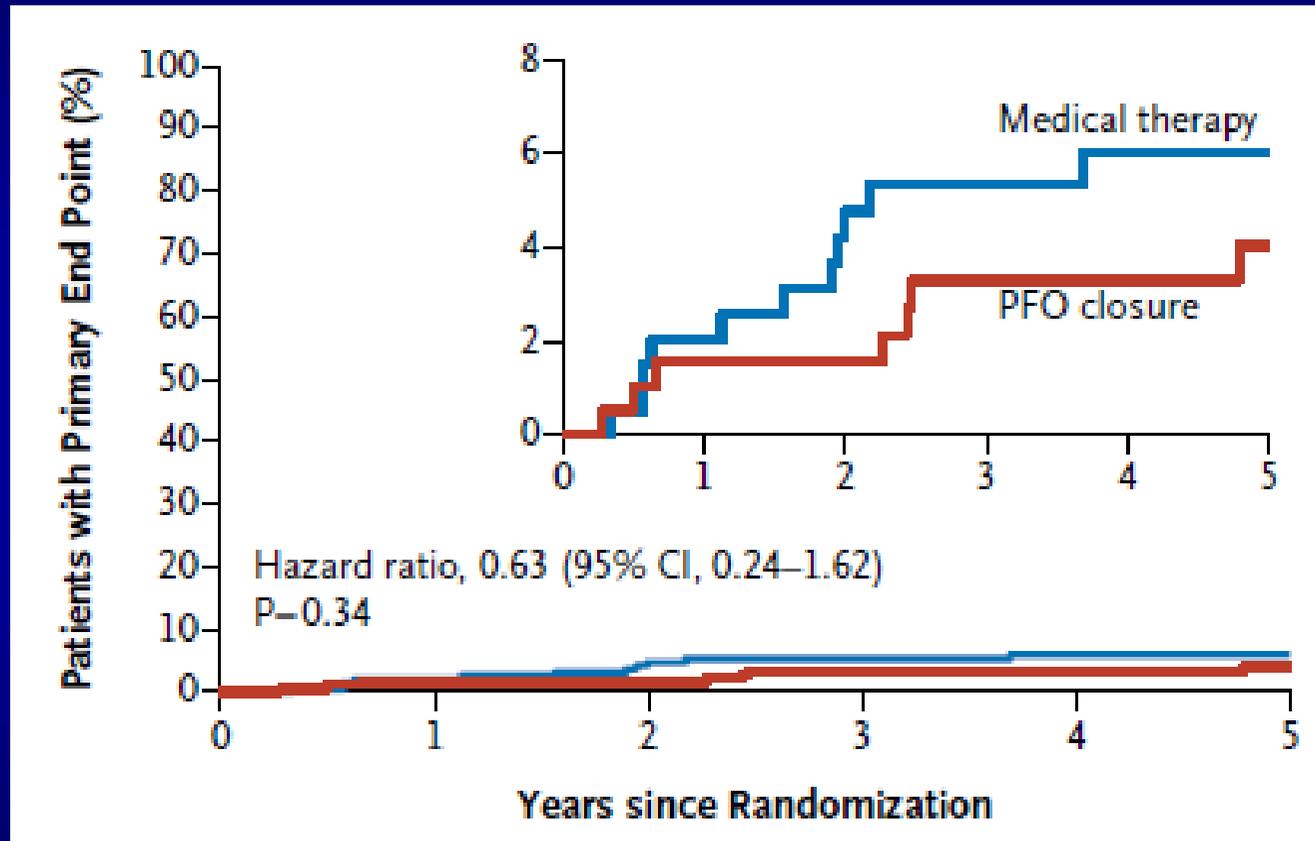
# PFO Closure vs. Medical Therapy



# PFO Closure vs. Medical Therapy

- Multicenter trial of 414 patients (mean age 44 years) with PFO and CVA/TIA or peripheral embolic event randomized to PFO closure (N = 204) vs. medical therapy (N = 210).
- Primary outcome = composite of death, CVA/TIA or peripheral embolism.
- At approximately 4 years, no difference in primary outcome (HR for PFO closure vs. medical therapy 0.63, 95% CI = 0.24-1.62, P = 0.34).

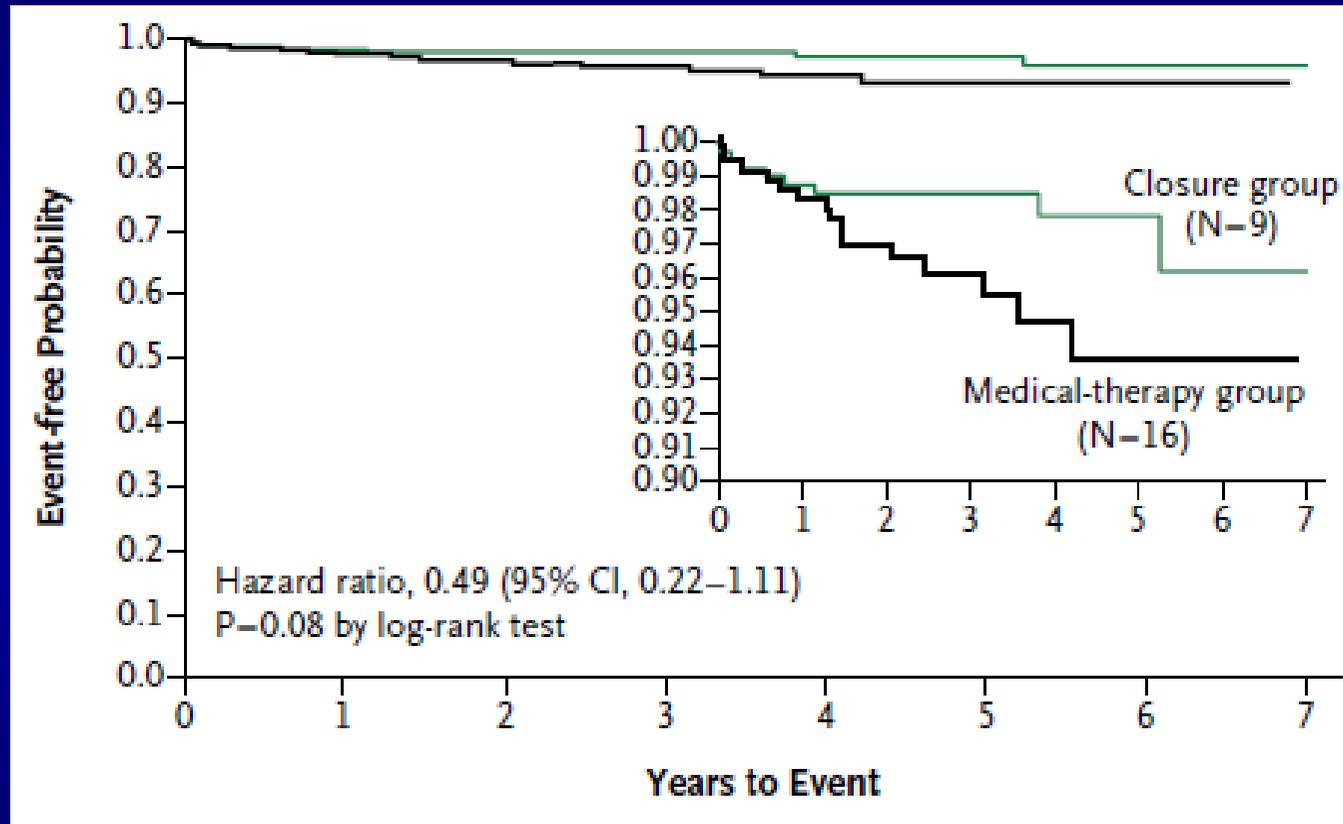
# PFO Closure vs. Medical Therapy



# PFO Closure vs. Medical Therapy

- Multicenter trial of 980 patients (mean age 46 years) with CVA attributed to PFO randomized to PFO closure (N = 499) vs. medical therapy (N = 481, antiplatelet therapy in 75% or warfarin in 25%).
- At 2.1 years, there was a trend toward lower recurrent stroke in PFO closure group (HR 0.49, 95% CI = 0.22-1.11, P = 0.08).

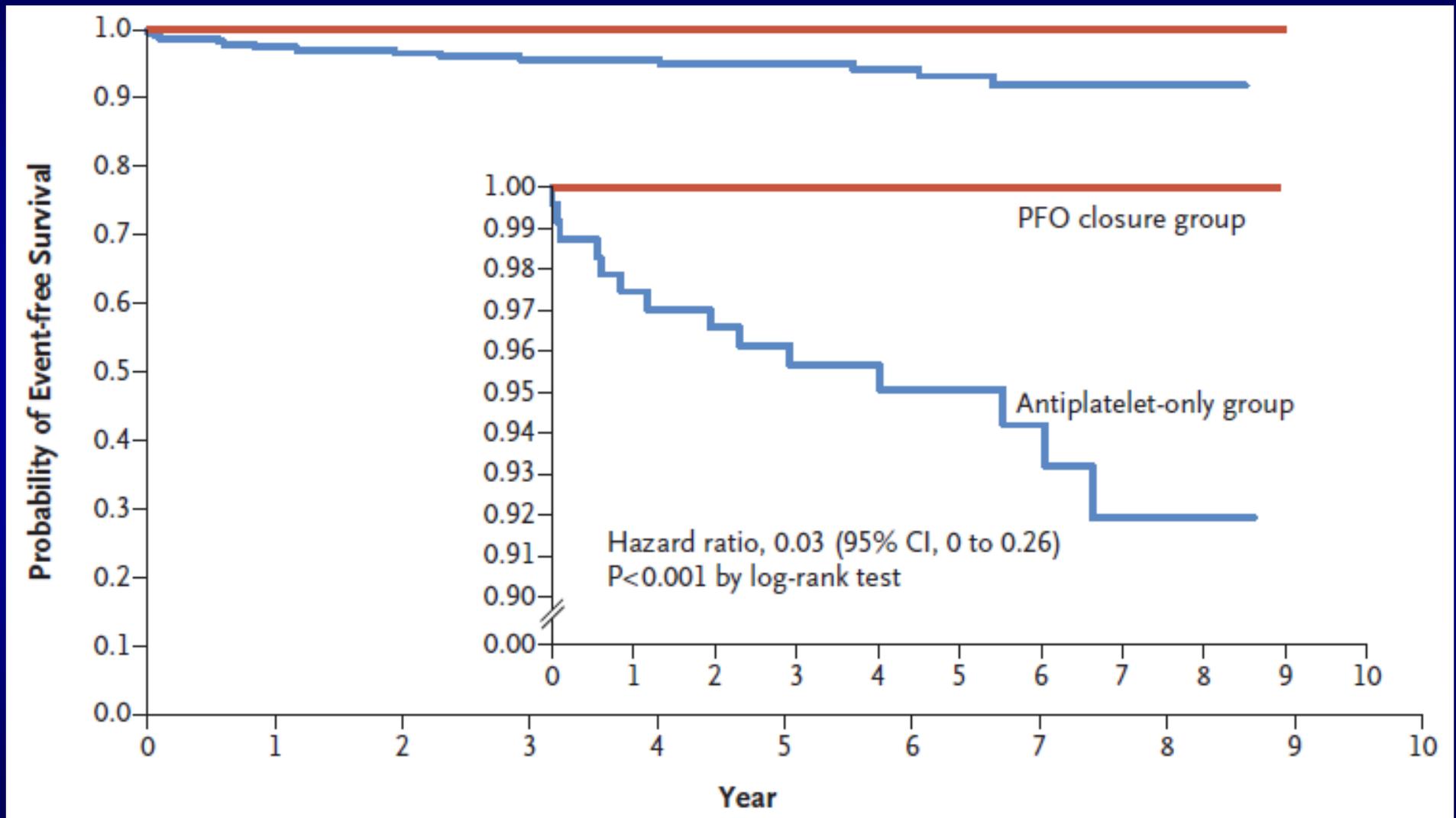
# PFO Closure vs. Medical Therapy



# PFO Closure vs. Medical Therapy

- Multicenter trial (1:1:1 ratio) of 663 patients (mean age 43 years) with recent CVA attributed to PFO (with atrial septal aneurysm or large interatrial shunt) randomized to PFO closure + antiplatelet therapy (N = 238) vs. antiplatelet therapy alone (N = 235) vs. oral anticoagulation (N = 187).
- At 5.3 years, no stroke in PFO group vs. 14 in antiplatelet group ( $P < 0.001$ ).
- More AFIB in PFO closure (4.6% vs. 0.9%,  $P = 0.02$ ).

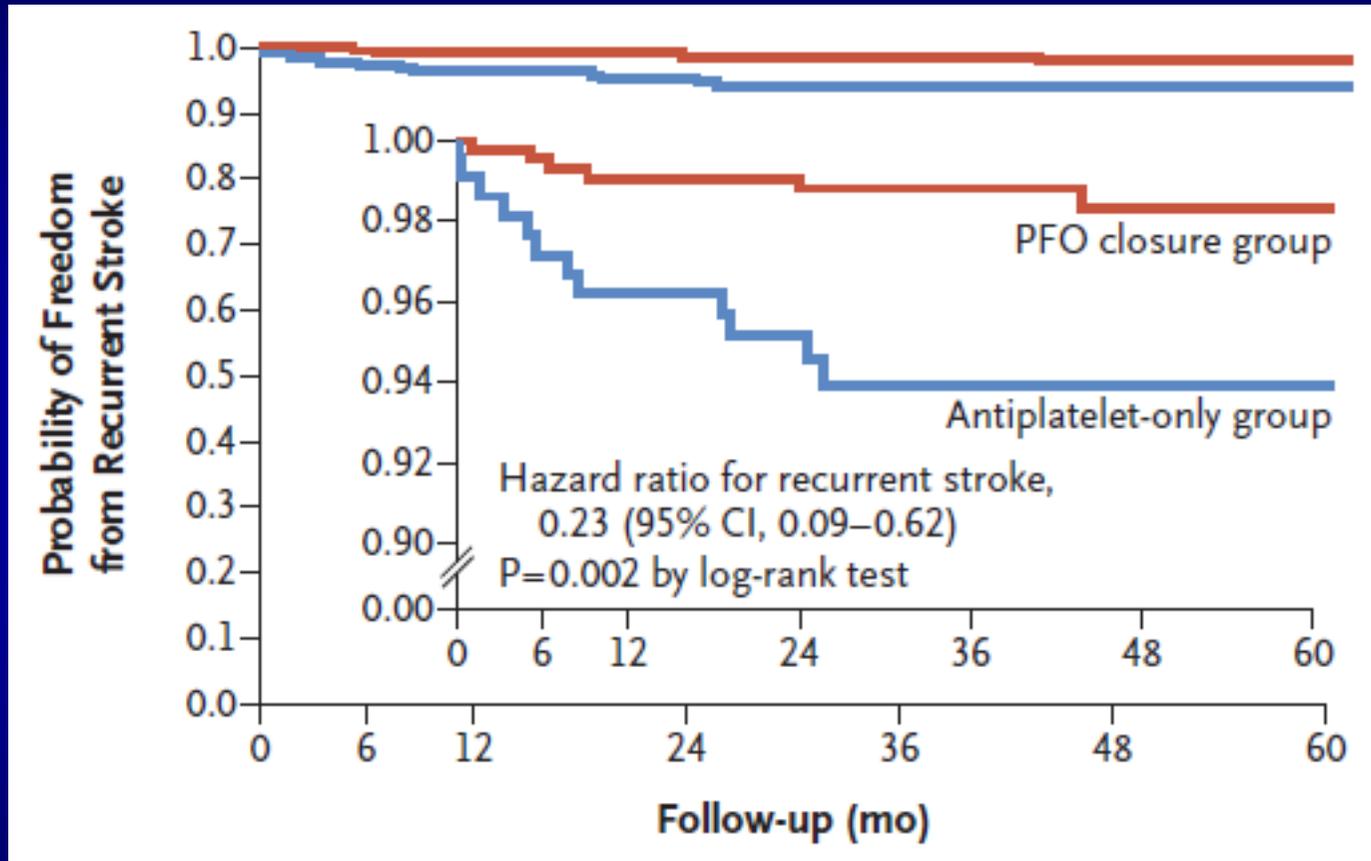
# PFO Closure vs. Medical Therapy



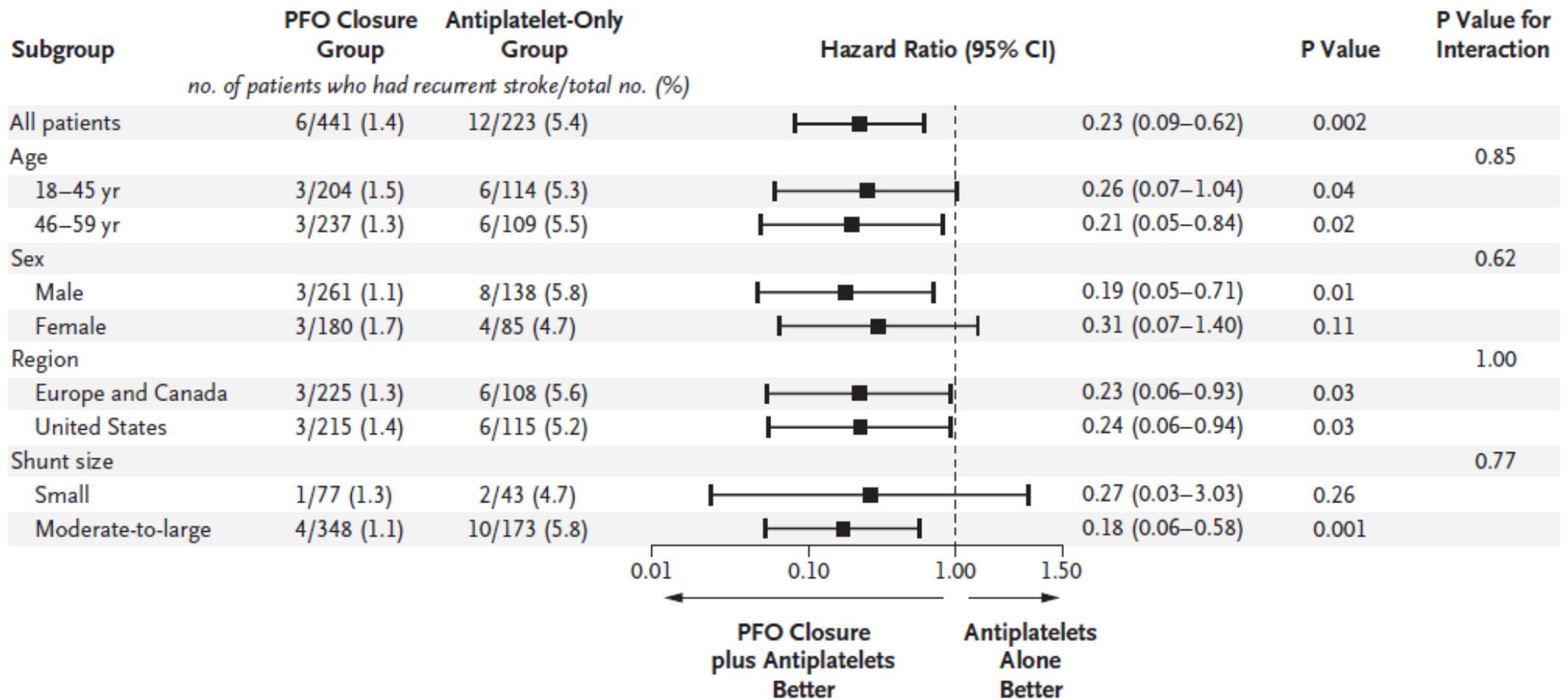
# PFO Closure vs. Medical Therapy

- Multicenter trial of 664 patients (mean age 45 years) with recent CVA attributed to PFO randomized (2:1 ratio) to PFO closure + antiplatelet therapy (N = 441) vs. antiplatelet therapy alone (N = 223).
- Co-primary outcomes = Clinical CVA and 2-year incidence of CVA (clinical or silent stroke on imaging).
- At 3.2 years, clinical CVA in 1.4% PFO closure vs. 5.4% antiplatelet only (P = 0.002). New brain infarctions 5.7% PFO closure vs. 11.3% antiplatelet (P = 0.04). AFIB higher in PFO closure (6.6% vs. 0.4%, P < 0.001).

# PFO Closure vs. Medical Therapy



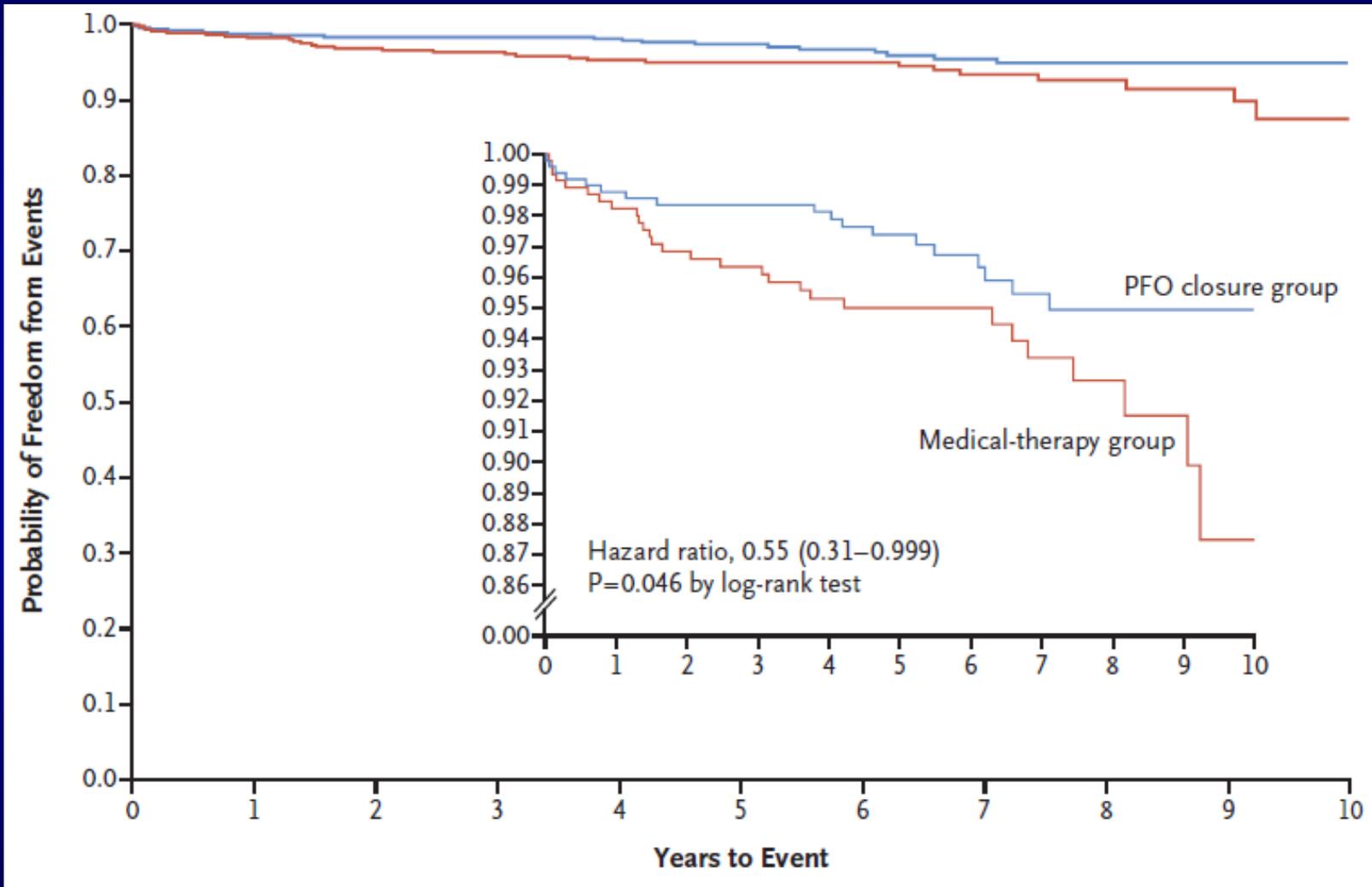
# PFO Closure vs. Medical Therapy



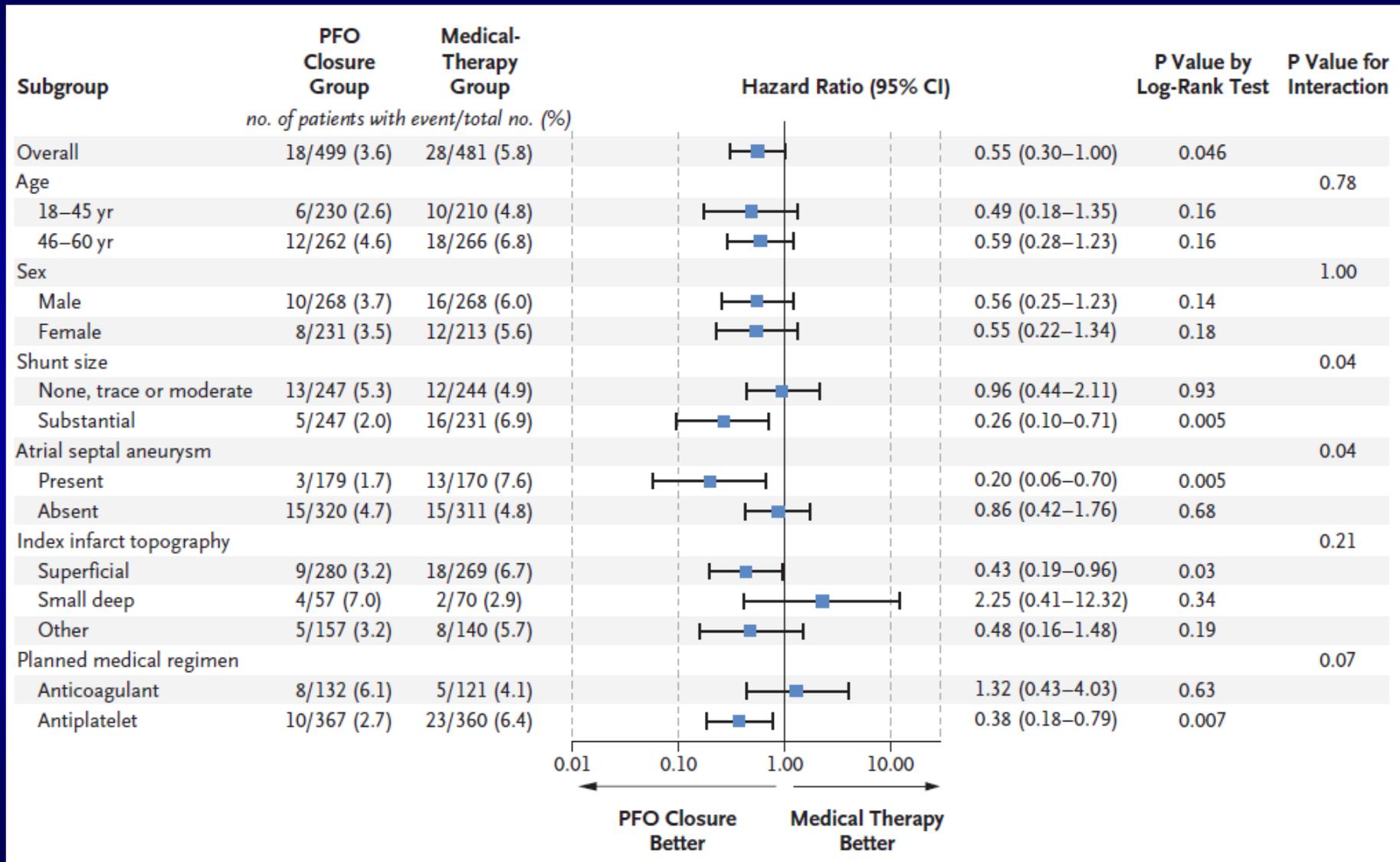
# PFO Closure vs. Medical Therapy

- Multicenter trial of 980 patients (mean age 46 years) with CVA attributed to PFO randomized to PFO closure + antiplatelet therapy (N = 499) vs. medical therapy (N = 481, antiplatelet therapy or warfarin).
- Primary outcome = CVA or death.
- At 5.9 years, 0.58 recurrent CVA per 100 patient-years in PFO closure vs. 1.07 per 100 patient-years in medical therapy (HR 0.55, 95% CI = 0.31-0.999, P = 0.046). Recurrent CVA of undetermined cause lower in PFO closure (HR 0.38, 95% CI = 0.18-0.79, P = 0.007).

# PFO Closure vs. Medical Therapy



# PFO Closure vs. Medical Therapy



# PFO Closure vs. Medical Therapy

## *What's Changed?*

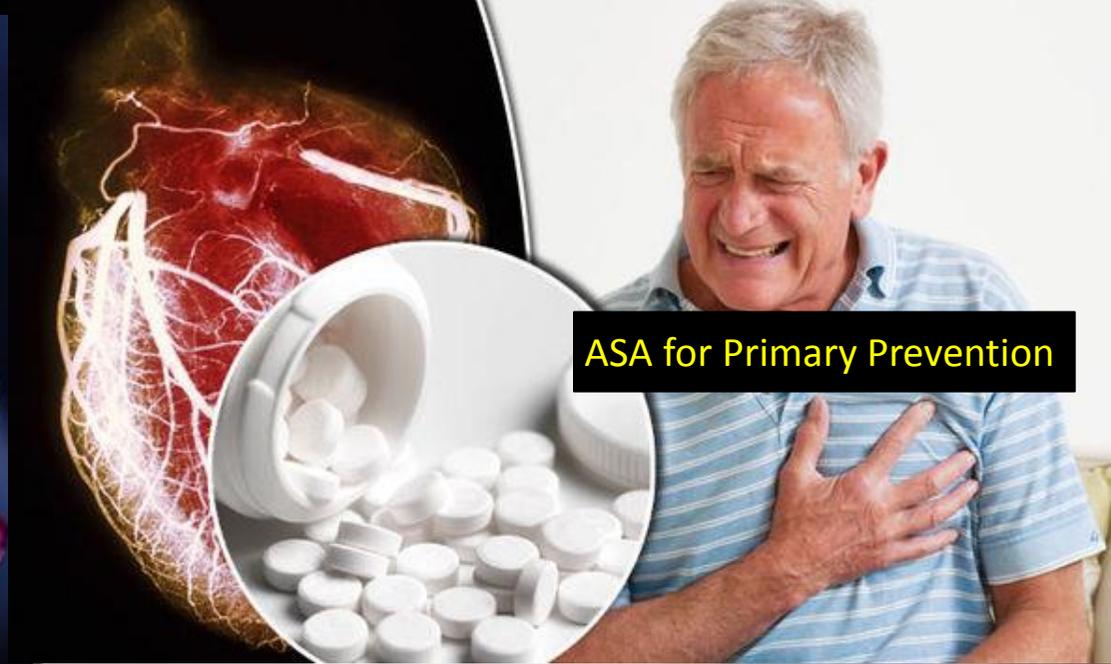
- Earlier trials (e.g., CLOSURE I) allowed inclusion of patients with types of strokes (e.g., lacunar infarcts) that would not benefit from PFO closure.
- More recent trials have more stringent entry criteria (e.g., CLOSE trial required patients to have large interatrial shunt and/or an atrial septal aneurysm).

I saw a 44-year-old man who was recently discharged from the hospital after a small stroke. No definite cause was found, but a TEE showed a PFO with an atrial septal aneurysm and a pretty large interatrial shunt. He was started on aspirin, but it seems to me that he should have the PFO closed, since the success rate is so high and there are few complications. What do you think?

It would probably be appropriate for this type of patient to have his PFO closed.



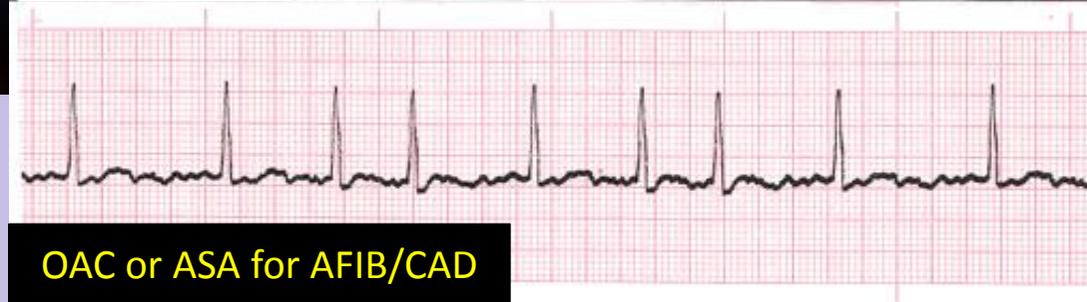
Health Effects of e-Cigarettes



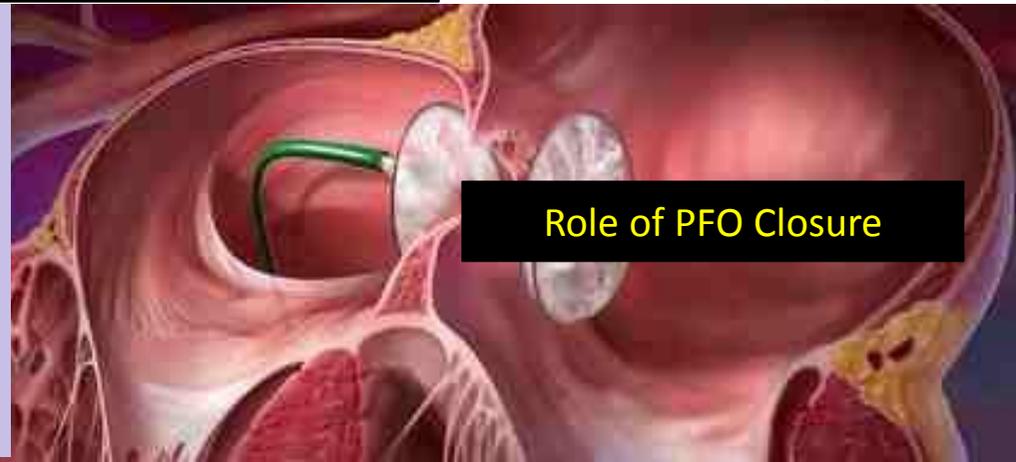
ASA for Primary Prevention



Health Effects of Dietary Fat



OAC or ASA for AFIB/CAD



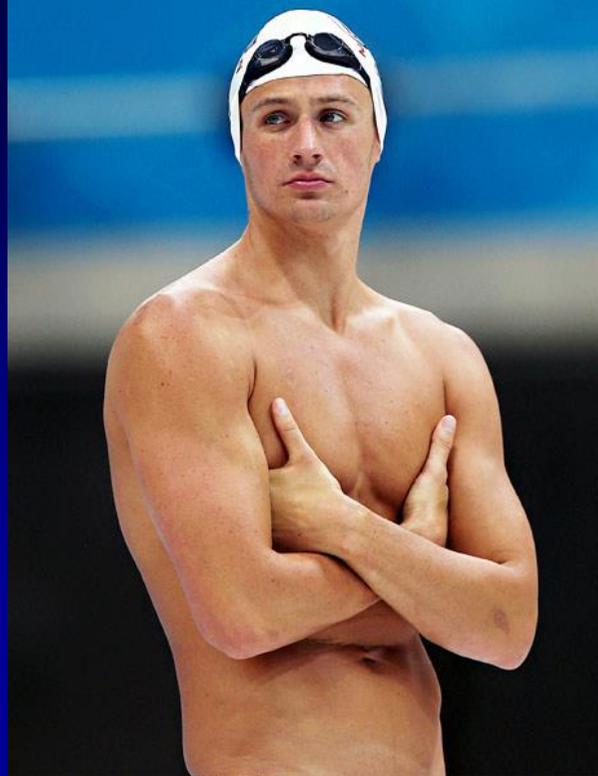
Role of PFO Closure

# EXTRA CREDIT

Which one of the following Olympic athletes was born with tetralogy of Fallot?



Olympic volleyballer  
Lindsey Berg



Olympic swimmer  
Ryan Lochte



Olympic gymnast  
Simone Biles



Olympic snowboarder  
Shaun White



Olympic swimmer  
Missy Franklin

# Shaun White

