



Is Intervention for Asymptomatic Carotid Stenosis Indicated Given Modern Medical Management?

Yes, the Data Are Clear!

Christopher J. White MD, MSCAI, FACC, FAHA, FESC, FACP

Chief Medical Services, Ochsner Medical Center

Professor and Chairman of Medicine, Ochsner Clinical School, UQ

System Chair for Cardiovascular Diseases

New Orleans, LA



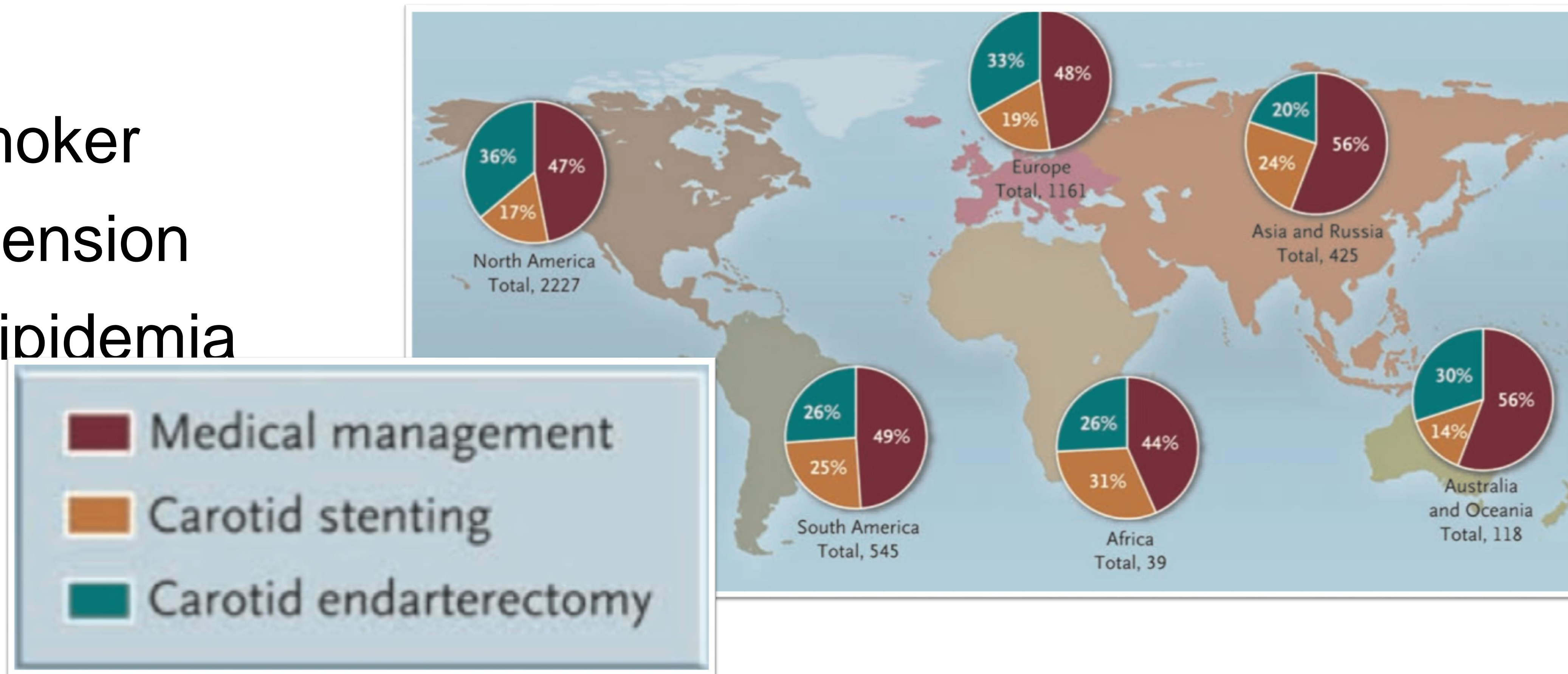
Disclosure Statement of Financial Interest

I, Christopher J. White MD, DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.



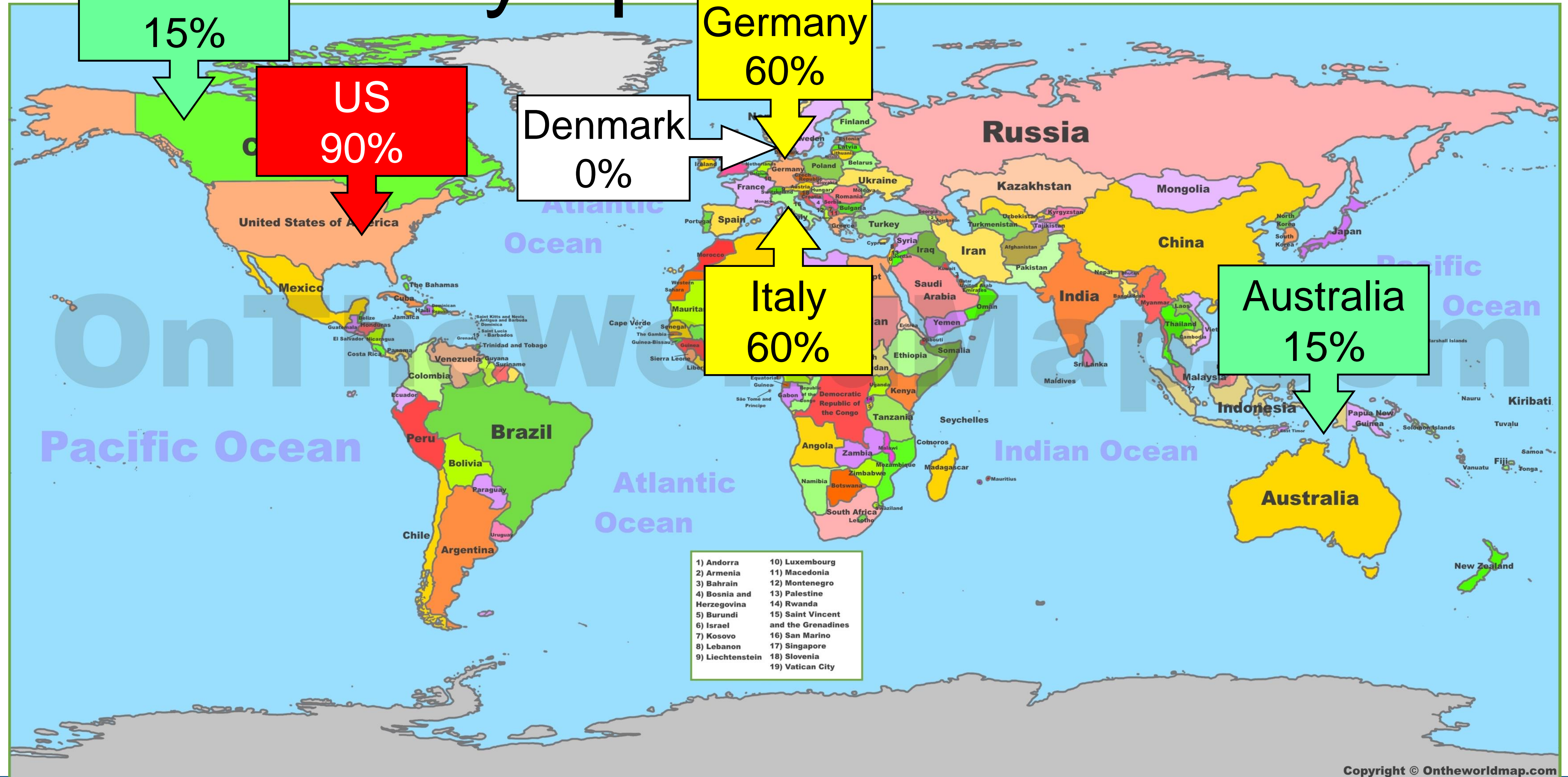
Percent Choosing Treatment Options

- 67-year-old man with a carotid bruit and 80% RICA.
 - nonsmoker
 - hypertension
 - hyperlipidemia





Asymptomatic CEA



Copyright © Ontheworldmap.com

Vikatmaa P, Mitchell D, Jensen LP, et al. Variation in clinical practice in carotid surgery in nine countries 2005-2010: lessons from VASCUNET and recommendations for the future of national clinical audit. Eur J Vasc Endovasc Surg 2012;44:11-7.



Low Risk of Ipsilateral Stroke in Patients With Asymptomatic Carotid Stenosis on Best Medical Treatment : A Prospective, Population-Based Study

Lars Marquardt, Olivia C. Geraghty, Ziyah Mehta and Peter M. Rothwell



- 1153 consecutively imaged patients with stroke or TIA
- 101 (8.8%) had $\geq 50\%$ asymptomatic carotid stenoses (mean age, 75 years; 39% women; 40% age 80 years) recruited consecutively from 2002 to 2009 and given intensive contemporary medical treatment.



ASX: Natural History



Table 3. Average Annual Risk of Vascular Events and Deaths During Follow-Up

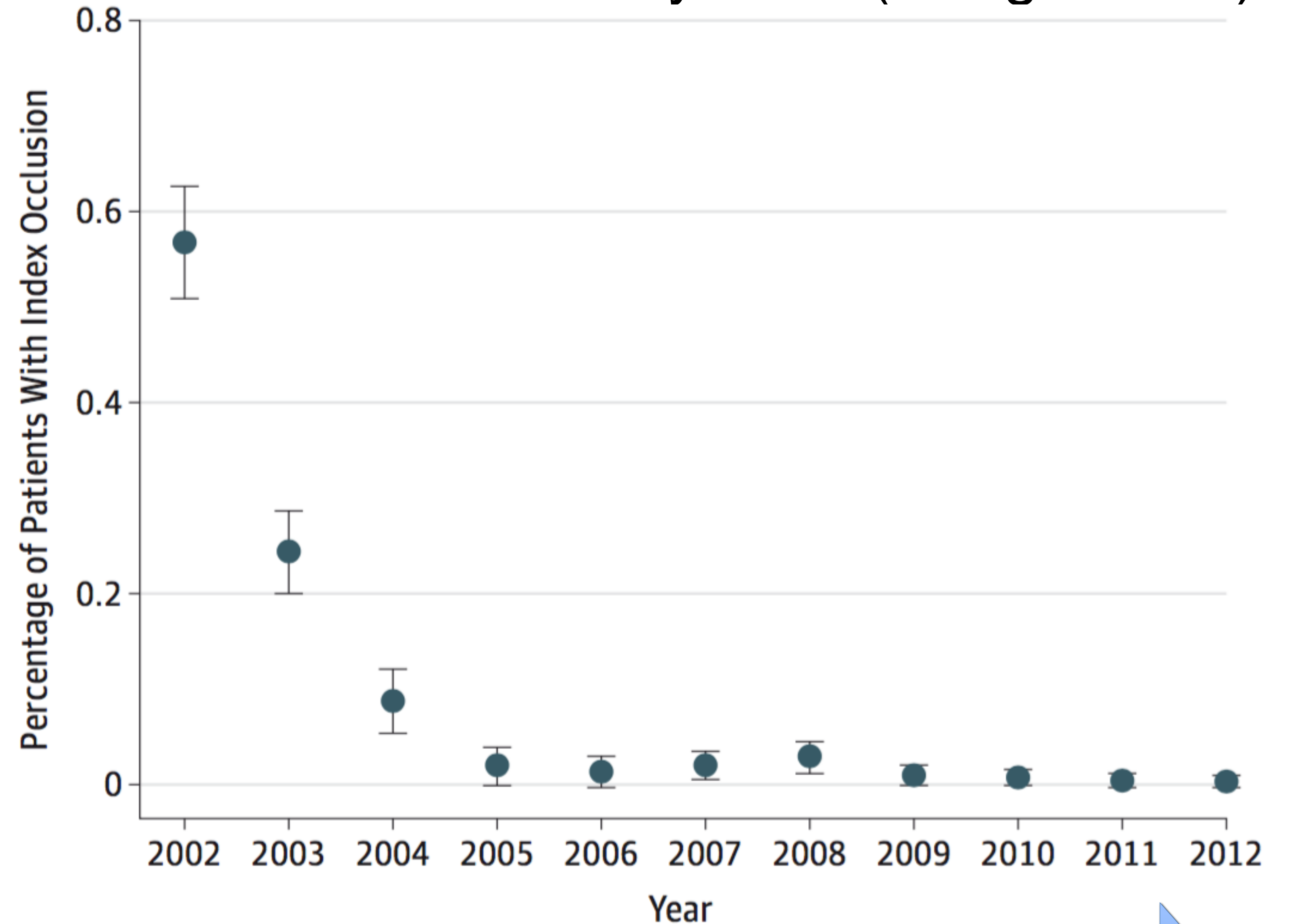
Events	Average Annual Risk, % (95% CI)
Ipsilateral stroke	0.34 (0.01–1.87)
Ipsilateral TIA	1.78 (0.58–4.16)
Other territory stroke	8.32 (5.08–12.85)
Other territory TIA	5.15 (2.74–8.81)
Myocardial infarction	4.70 (2.50–8.04)
Unstable angina	1.03 (0.21–3.01)
Vascular death	7.70 (5.79–12.98)
Nonvascular death	2.01 (0.82–4.76)



Asymptomatic Carotid Stenosis

Occlusion by Year (Yang et al.²)

- Risk of progression to occlusion is low.
 - **ACST¹: 1,469 MED Group:**
 - 94 progressed to occlusion.
 - 12 with symptoms.
 - 1 with stroke.
 - **Yang et al²: 3,681 MED for 20 yrs.**
 - 80% occlusions before 2002.
 - Only 1 stroke with occlusion.



Increased Intensity of MED Rx



Risk Stratification



- Clinical features
- Stenosis severity
- Stenosis progression
- Plaque echolucency/Computerized plaque analysis
- Plaque micro-ulcers
- Transcranial Doppler embolization
- ‘Silent’ infarction on computed tomography
- Impaired cerebral vascular reserve



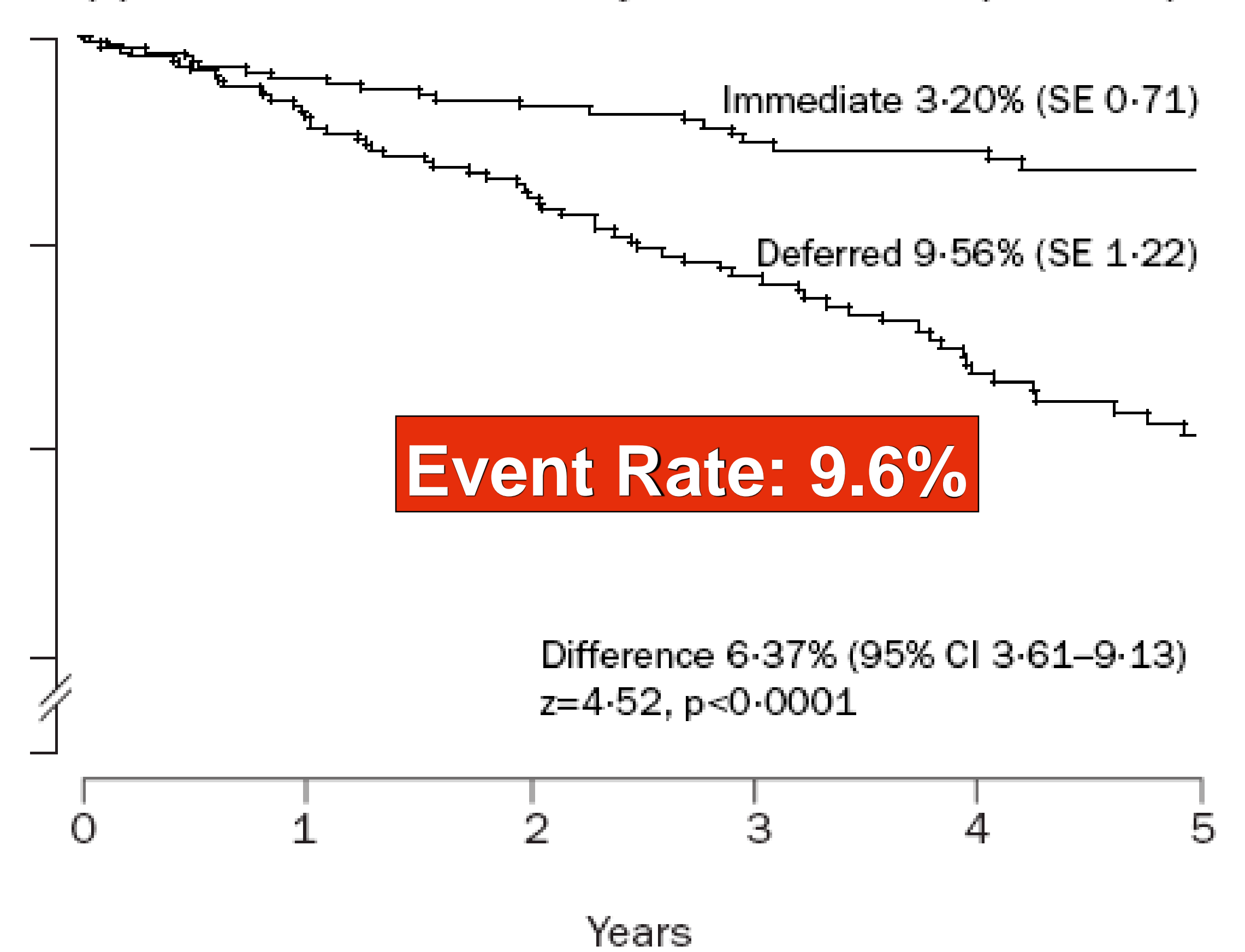
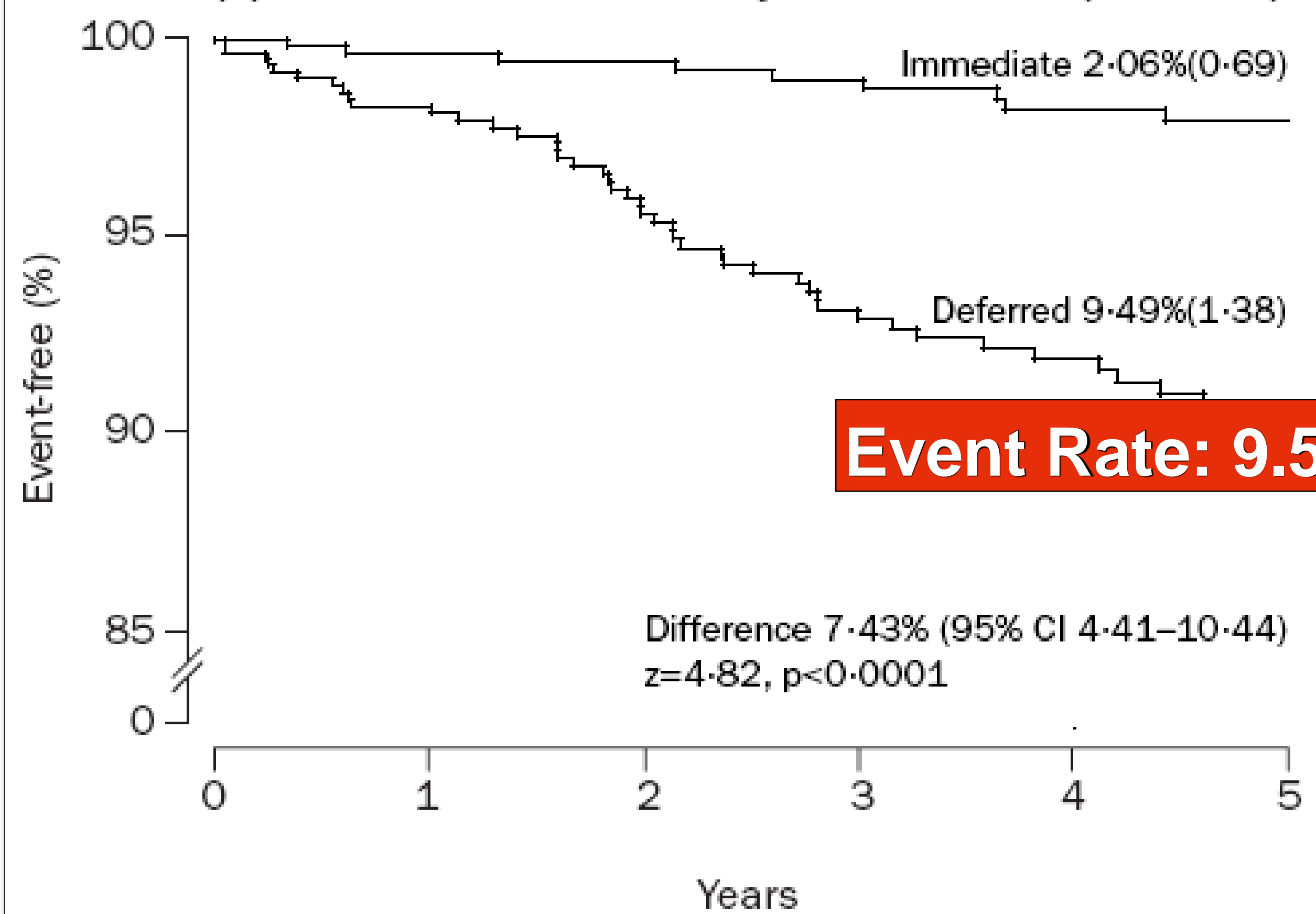
Does Stenosis Affect Event Rate ?

60 – 79% Stenosis

80 – 99% Stenosis

(E) Carotid diameter reduction by ultrasound <80% (mean 69%)

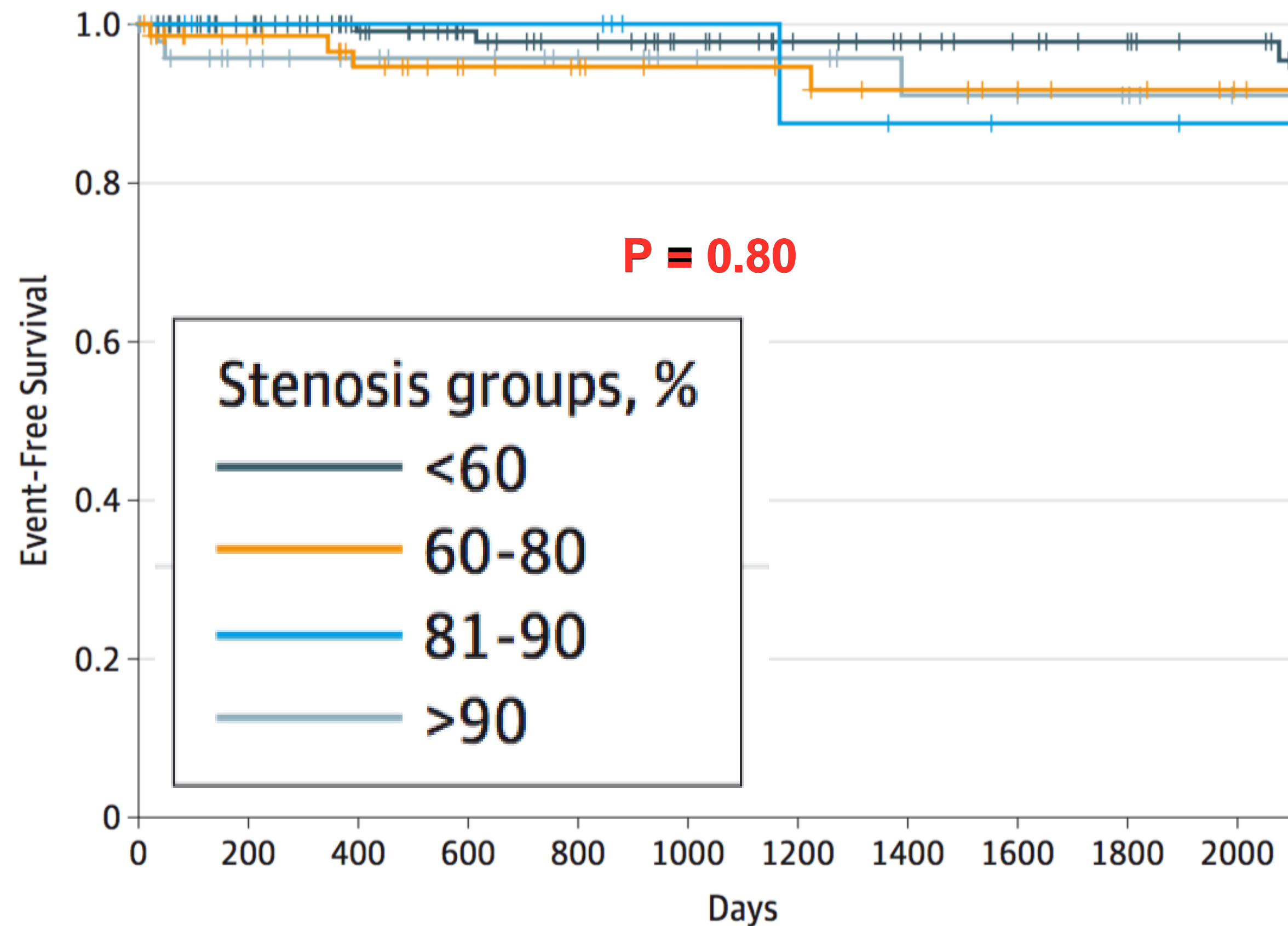
(F) Carotid diameter reduction by ultrasound 80–99% (mean 87%)



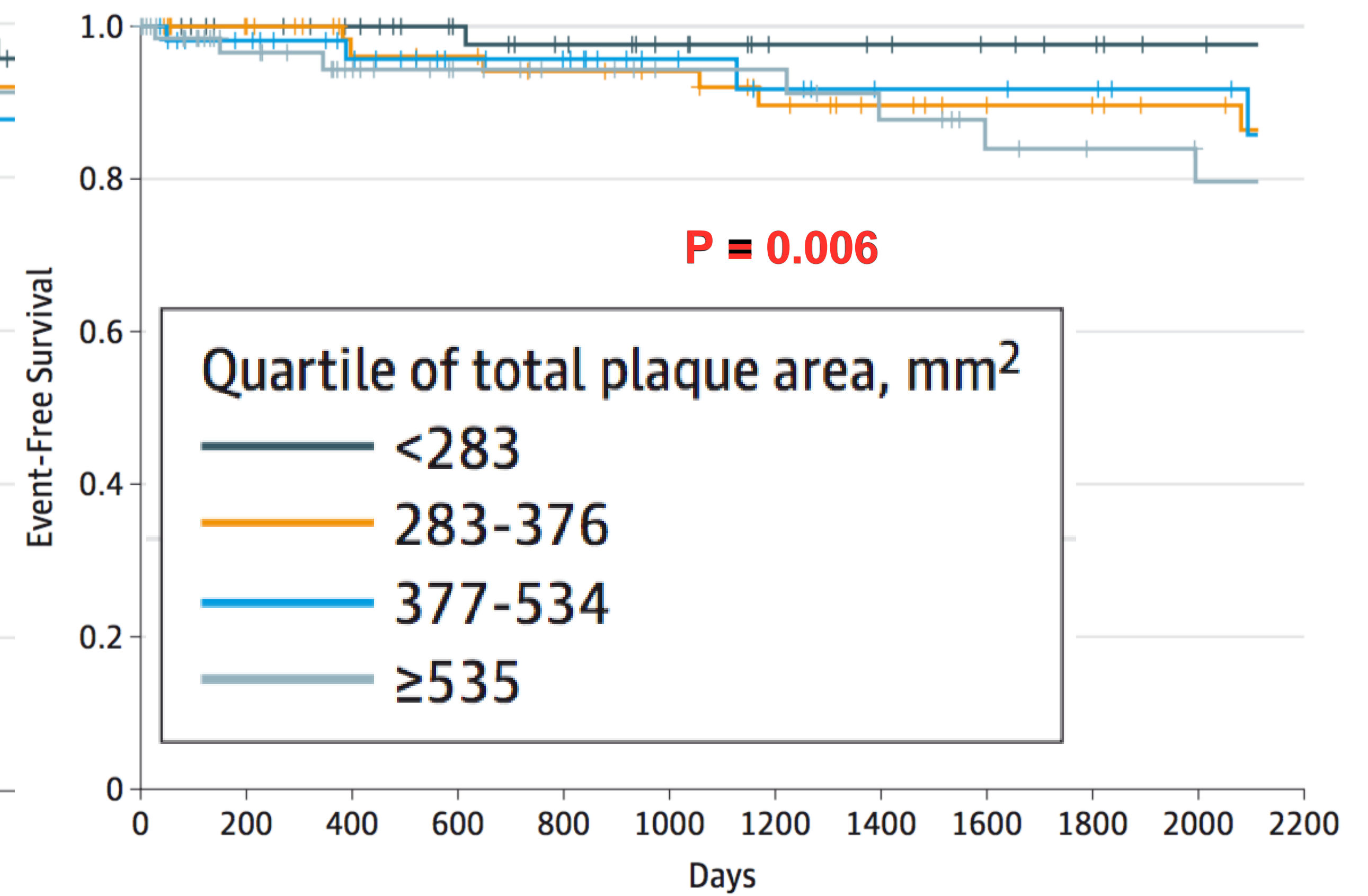
Asymptomatic Carotid Stenosis

Predictors of Stroke

Percent Stenosis



Plaque Burden





CAS vs CEA: Asymptomatic

ACT-1

CREST

SAPPHIRE

ORIGINAL ARTICLE

The NEW ENGLAND
JOURNAL of MEDICINE

ESTABLISHED IN 1812 JULY 1, 2010 VOL. 363 NO. 1

Stenting versus Endarterectomy for Treatment
of Carotid-Artery Stenosis

Thomas G. Brott, M.D., Robert W. Hobson, II, M.D.,* George Howard, Dr.P.H., Gary S. Roubin, M.D., Ph.D., Wayne M. Clark, M.D., William Brooks, M.D., Ariane Mackey, M.D., Michael D. Hill, M.D., Pierre P. Leimgruber, M.D., Alice J. Sheffet, Ph.D., Virginia J. Howard, Ph.D., Wesley S. Moore, M.D., Jenifer H. Voeks, Ph.D., L. Nelson Hopkins, M.D., Donald E. Cutlip, M.D., David J. Cohen, M.D., Jeffrey J. Popma, M.D., Robert D. Ferguson, M.D., Stanley N. Cohen, M.D., Joseph L. Blackshear, M.D., Frank L. Silver, M.D., J.P. Mohr, M.D., Brajesh K. Lal, M.D., and James F. Meschia, M.D., for the CREST Investigators†

The NEW ENGLAND
JOURNAL of MEDICINE

ESTABLISHED IN 1812 OCTOBER 7, 2004 VOL. 351 NO. 15

Protected Carotid-Artery Stenting versus Endarterectomy
in High-Risk Patients

Jay S. Yadav, M.D., Mark H. Wholey, M.D., Richard E. Kuntz, M.D., M.Sc., Pierre Fayad, M.D., Barry T. Katzen, M.D., Gregory J. Mishkel, M.D., Tanvir K. Bajwa, M.D., Patrick Whitlow, M.D., Neil E. Strickman, M.D., Michael R. Jaff, D.O., Jeffrey J. Popma, M.D., David B. Snead, Ph.D., Donald E. Cutlip, M.D., Brian G. Firth, M.D., Ph.D., and Kenneth Ouriel, M.D., for the Stenting and Angioplasty with Protection in Patients at High Risk for Endarterectomy Investigators*

Randomized Trial of Stent versus Surgery for Asymptomatic Carotid Stenosis

Kenneth Rosenfield, M.D., M.H.C.D.S., Jon S. Matsumura, M.D., Seemant Chaturvedi, M.D., Tom Riles, M.D., Gary M. Ansel, M.D., D. Chris Metzger, M.D., Lawrence Wechsler, M.D., Michael R. Jaff, D.O., and William Gray, M.D., for the ACT I Investigators*

Study or Subgroup	CAS		CEA		Weight	Odds Ratio M-H, Random, 95% CI
	Events	Total	Events	Total		
ACT I 2016	41	1089	12	364	22.9%	1.15 [0.60, 2.21]
Brooks et al	0	43	0	42		Not estimable
CREST 2016	42	594	41	587	49.2%	1.01 [0.65, 1.58]
SAPPHIRE 2008	25	117	35	120	28.0%	0.66 [0.37, 1.19]
Total (95% CI)		1843		1113	100.0%	0.92 [0.68, 1.26]

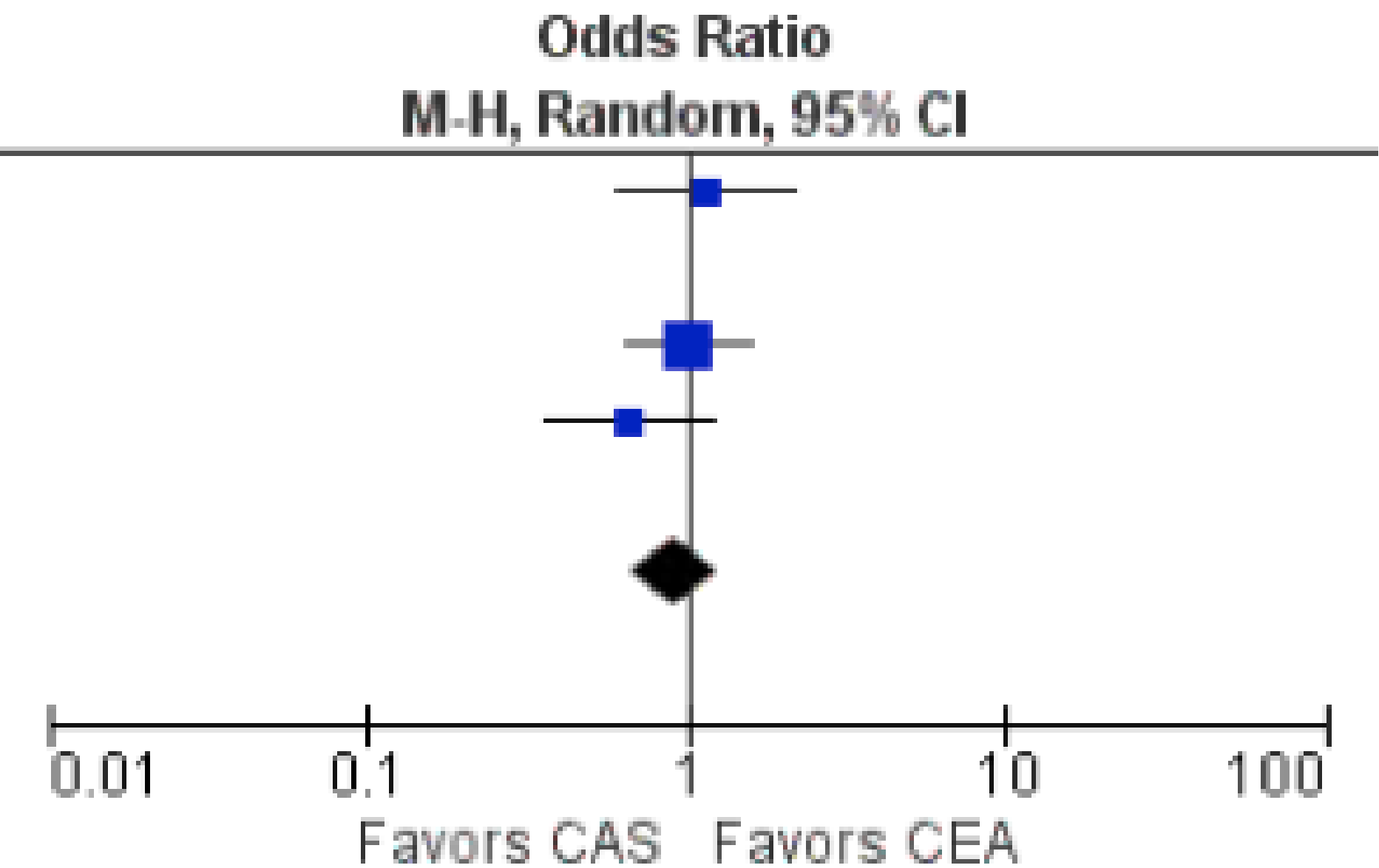
Total events

108

88

Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 1.83$, $df = 2$ ($P = 0.40$); $I^2 = 0\%$

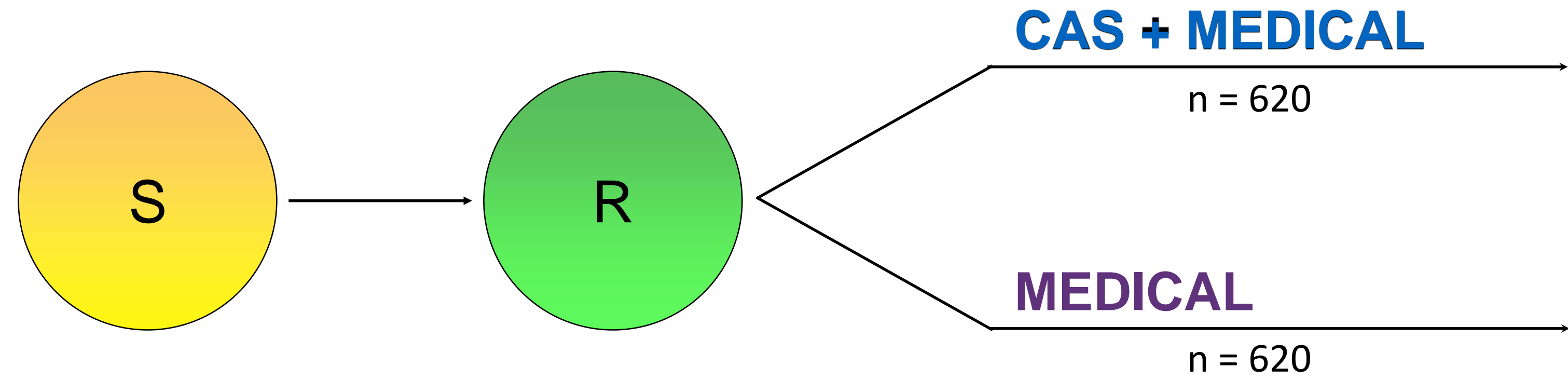
Test for overall effect: $Z = 0.49$ ($P = 0.62$)



Death, Stroke, or MI during peri-procedural period and Ipsilateral Stroke during 4 year follow up

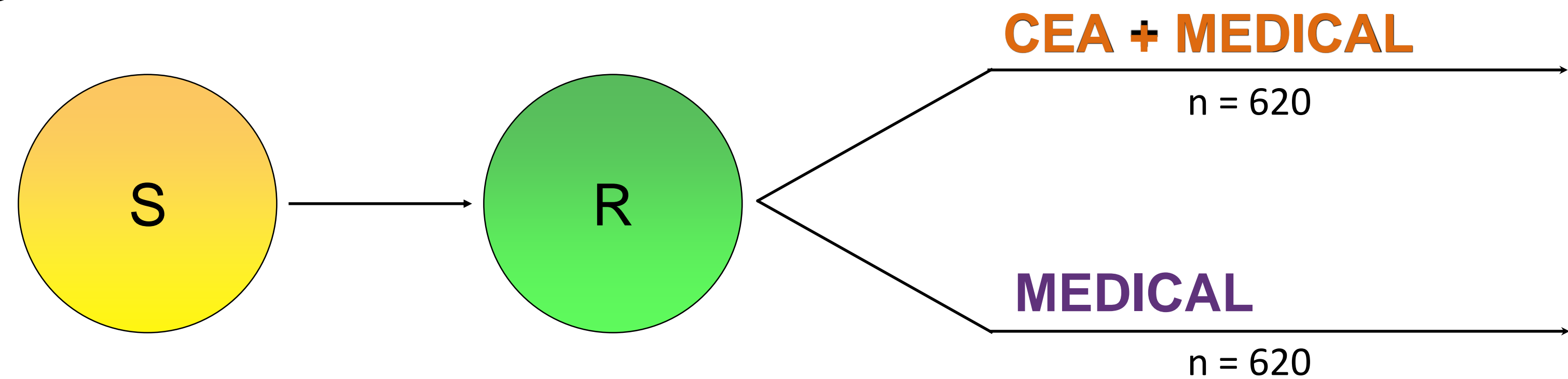


NIH CREST - 2



Inclusion Criteria

- Asymptomatic for ≥ 6 mos
- Stenosis $\geq 70\%$
- Eligible for CEA/CAS



ENDPOINT

Endpoint = all 30 day stroke & death plus 4 yr ipsilateral stroke.



Stroke Prevention

ASYMPTOMATIC > 70%

- Randomize to CREST - 2.
- Best medical therapy.
- Equipoise for CAS vs. CEA.
- Expertise for CAS and CEA important.

RISK FACTOR
Blood Pressure
Atrial Fibrillation
Smoking
Cholesterol
Diabetes
Exercise
Diet
Stroke in Family



CONCLUSION



- A small percentage (<10%) of asymptomatic carotid patients will likely benefit from revascularization (CAS or CEA).
- We just can't tell which ones at this time.
- The best recommendation is to select pts with “vulnerable” plaques who fail guideline directed medical therapy.
 - ★ TCD microemboli
 - ★ Plaque progression over time.
 - ★ Bulky homogenous echolucent plaque.