

# **Secondary Prevention of Ischemic Stroke and TIA**

**Ralph L. Sacco, MS MD FAHA FAAN  
Professor of Neurology & Epidemiology  
Head, Stroke & Critical Care Division  
Associate Chair of Neurology**

**Neurological Institute, Columbia University  
The New York Presbyterian Hospital**

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**Disclosures: Consultant for Boehringer Ingelheim, Sanofi,  
GlaxoSmithKline, Merck, Wyeth**

**Honorarium for CME speaking: BI, Sanofi, BMS**

# Presenter Disclosure Information

## FINANCIAL DISCLOSURE

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# Expected Benefits of Primary Stroke Centers

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- Improved efficiency of patient care
- Increased use of acute stroke therapies
- Fewer peristroke complications
- **Reduced morbidity and mortality**
- **Improved long-term outcomes**
- Reduced costs to health care system
- Increased patient satisfaction

# Outcomes After Ischemic Stroke

## Stroke Recurrence

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30 day	3%-10%
1 year	5%-14%
5 year	25%-40%

## Mortality

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30 day	8%-20%
1 year	15%-25%
5 year	40%-60%

## Functional Disability

- 24%-53% of stroke survivors with complete or partial dependence

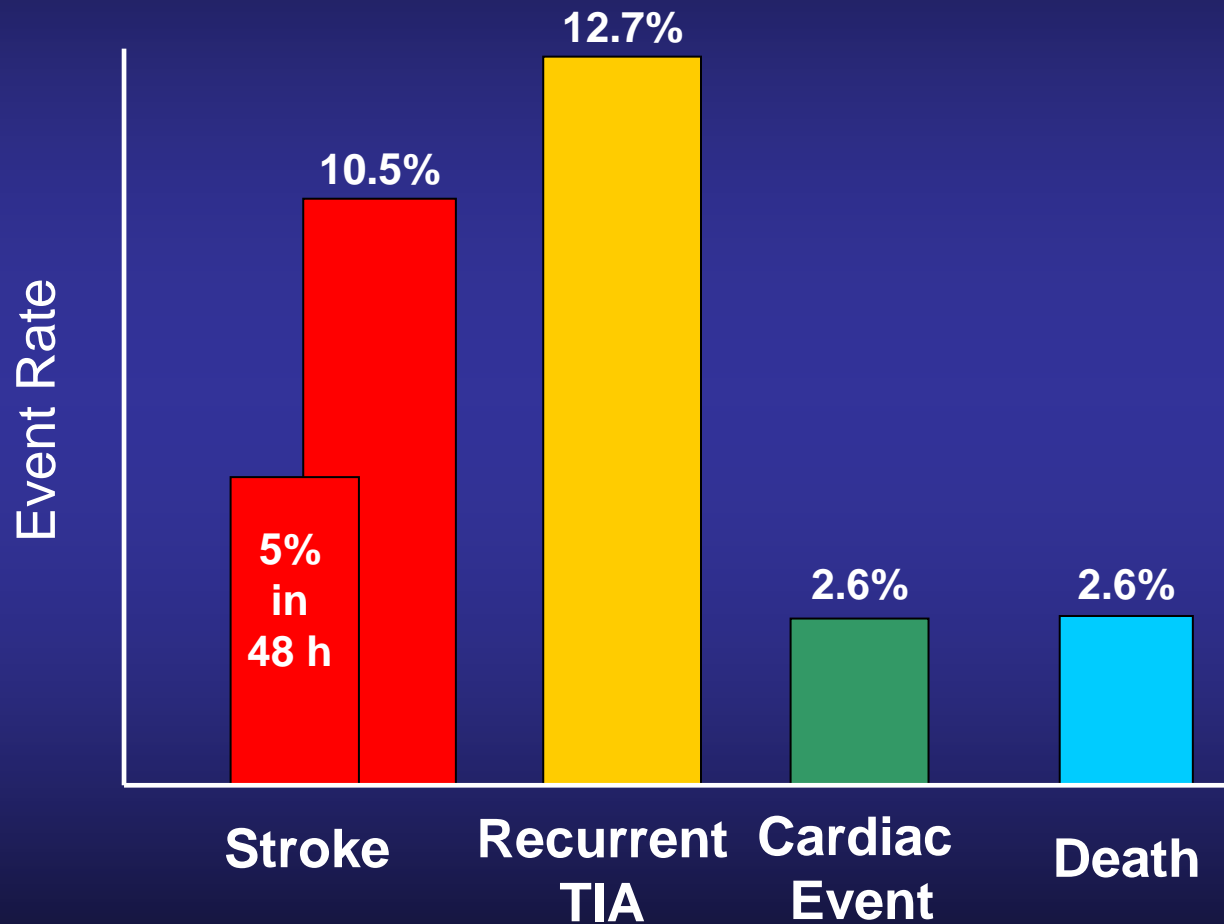
## Quality of Life

- 27% decrement in mean quality of well-being score at 6 months

## Dementia or Cognitive Decline

- 34% at 52 weeks poststroke

# 3-Month Outcomes After TIA in ED



Johnston SC, et al. *JAMA*. 2000;284:2901-2906.

# Evidence-based Guidelines

## AHA/ASA Guideline

### Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack

A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke

Co-Sponsored by the Council on Cardiovascular Radiology and Intervention

*The American Academy of Neurology affirms the value of this guideline.*

Ralph L. Sacco, MD, MS, FAHA, FAAN, Chair; Robert Adams, MD, FAHA, Vice Chair; Greg Albers, MD; Mark J. Alberts, MD, FAHA; Oscar Benavente, MD; Karen Furie, MD, MPH, FAHA; Larry B. Goldstein, MD, FAHA, FAAN; Philip Gorelick, MD, MPH, FAHA, FAAN; Jonathan Halperin, MD, FAHA; Robert Harbaugh, MD, FACS, FAHA; S. Claiborne Johnston, MD, PhD; Irene Katzan, MD, FAHA; Margaret Kelly-Hayes, RN, EdD, FAHA; Edgar J. Kenton, MD, FAHA, FAAN; Michael Marks, MD; Lee H. Schwamm, MD, FAHA; Thomas Tomsick, MD, FAHA

# AHA Classes and Levels of Evidence

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- **Class I** Agreement the treatment is useful and effective
- **Class II** Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a treatment.
  - **Class IIa** Weight of evidence is in favor of the treatment.
  - **Class IIb** Usefulness/efficacy is less well established by evidence
- **Class III** Evidence and/or general agreement that the treatment is NOT useful/effective and in some cases may be harmful.
- Levels of Evidence
  - **A:** Data derived from multiple randomized trials.
  - **B:** Data derived from a single randomized trial or nonrandomized studies.
  - **C:** Consensus opinion of experts.

# **Secondary Stroke Prevention**

- **Risk Factor Control**
  - BP, Blood glucose, Cholesterol
- **Lifestyle modifications**
  - Smoking cessation, alcohol reduction
  - Weight control, physical activity
- **Re-vascularization procedures: ICAE and CAS**
- **Antithrombotic Treatments**
  - Anticoagulants
  - Antiplatelet therapy

# Blood Pressure Control

## ASA 2006 Secondary Stroke Recs

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- **Antihypertensives** are recommended beyond the hyperacute period (Class I, Evidence A).
  - Benefit for those with & w/o HTN (Class IIa, Evidence B)
  - Target BP level and reduction are uncertain, but normal BP levels are <120/80 by JNC-7 (Class IIa, Evidence B).
- **Lifestyle modifications** have been associated with BP reductions and should be included (Class IIb, Evidence C).
- **Optimal drug regimen** uncertain; data support diuretics and the combination of diuretics and an ACEI (Class I, Evidence A).

# Diabetes

## ASA 2006 Secondary Stroke Recs

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- More **rigorous control of HTN and dyslipidemia** should be considered in patients with DM.
  - BP targets of 130/80 mm Hg (Class IIa, Evidence B). ACEIs and ARBs are recommended as first-choice medications for patients with DM (Class I, Evidence A).
- **Glucose control** is recommended to near normoglycemic levels to reduce microvascular complications (Class I, Evidence A) and possibly macrovascular complications.
- **Hemoglobin A1c** goal <7% (Class IIa, Evidence B).

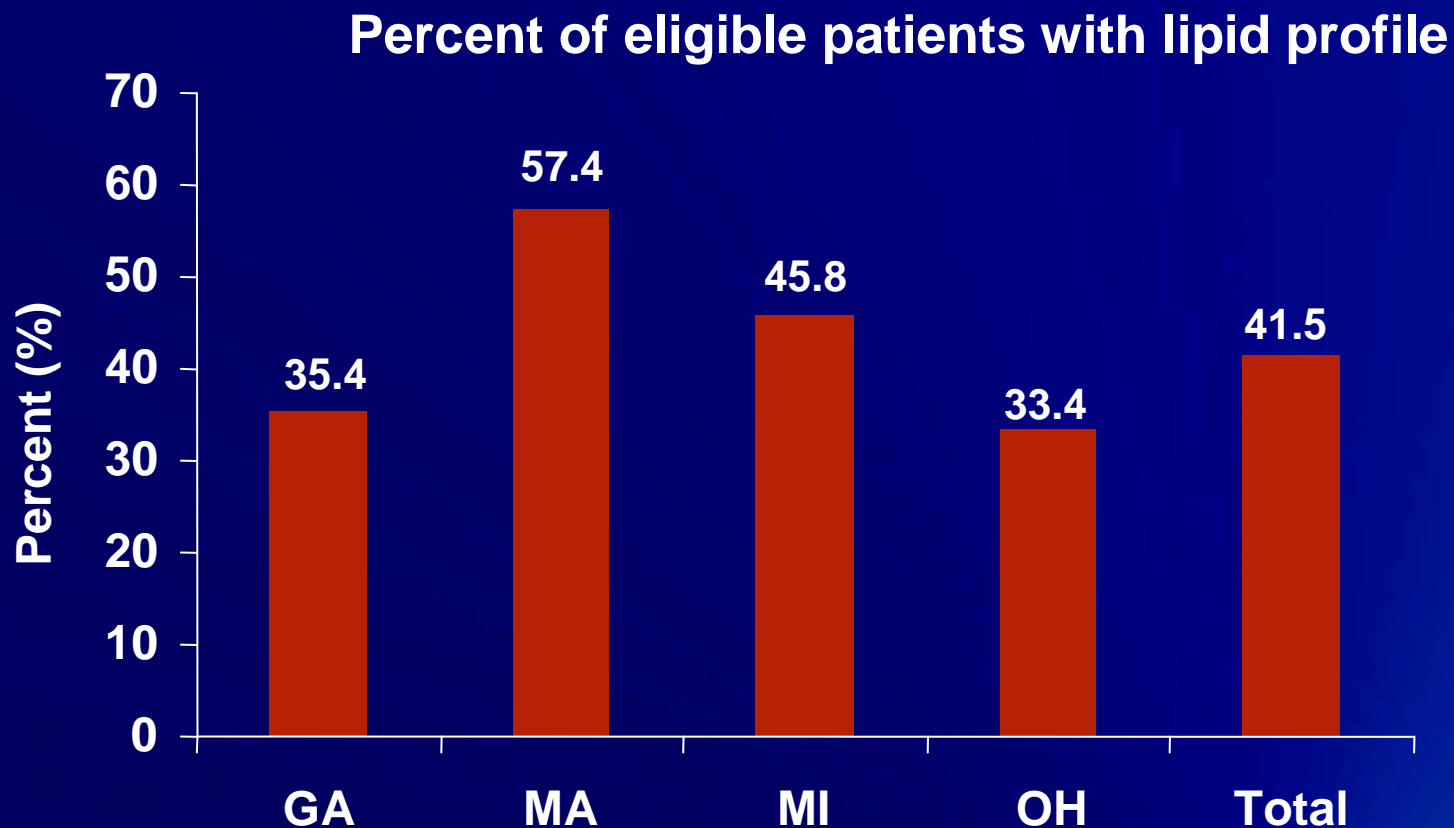
# Cholesterol Control

## ASA 2006 Secondary Stroke Recs

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- Those with elevated chol, CHD, or evidence of an atherosclerotic origin should be managed according to **NCEP III** (Class I, Evidence A).
- **Statins** are recommended with target LDL-C of <100 mg/dL and <70 mg/dL for the very high-risk (Class I, Evidence A).
- Those with no pre-existing indications for statins (nl chol levels, no CHD, or no atherosclerosis), are **reasonable to consider for statins** to reduce the risk of vascular events (Class IIa, Evidence B).

# Undertreatment of Stroke Risk Factors: Low Rate of In-Hospital Lipid Profiling



Paul Coverdell National Acute Stroke Registry. Preliminary results from four state pilot prototypes of the Paul Coverdell National Acute Stroke Registry. Paper presented at the 28<sup>th</sup> International Stroke Conference, Phoenix, Ariz, February 13-15, 2003.

# **Lifestyle Issues**

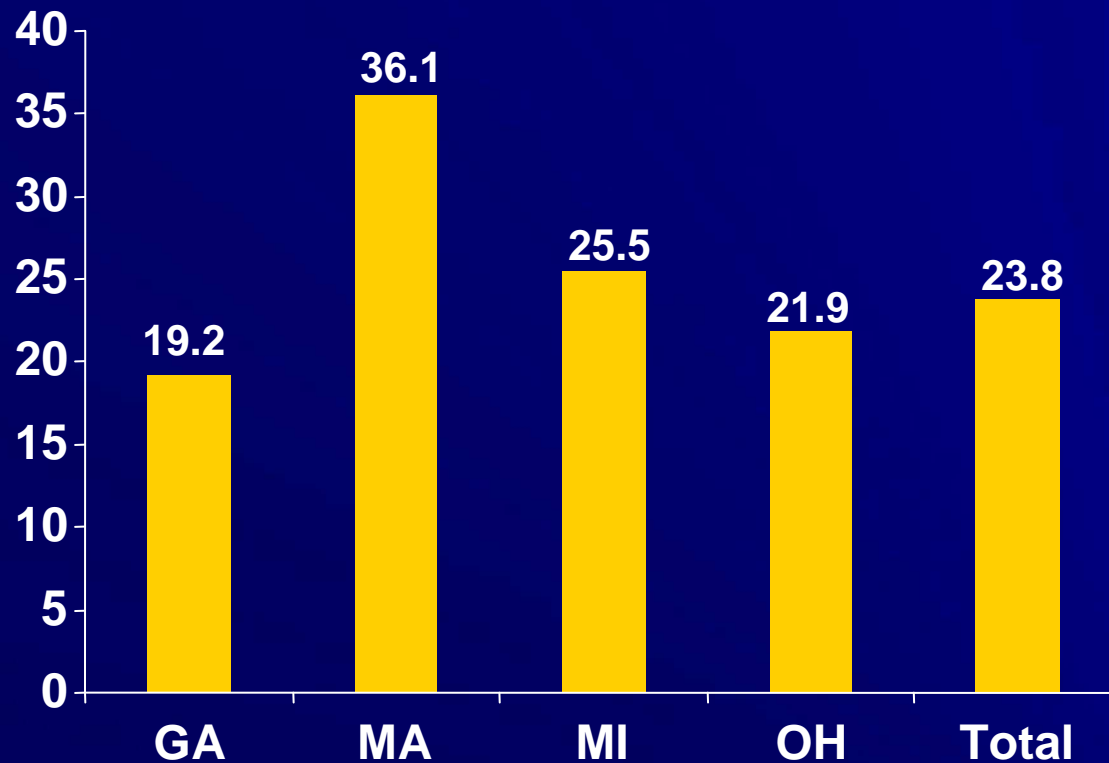
## **ASA 2006 Secondary Stroke Recs**

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- **Cigarette Smoking**
- **Alcohol Use**
- **Physical Inactivity**
- **Obesity**

# Smoking Cessation: Insufficient Counseling

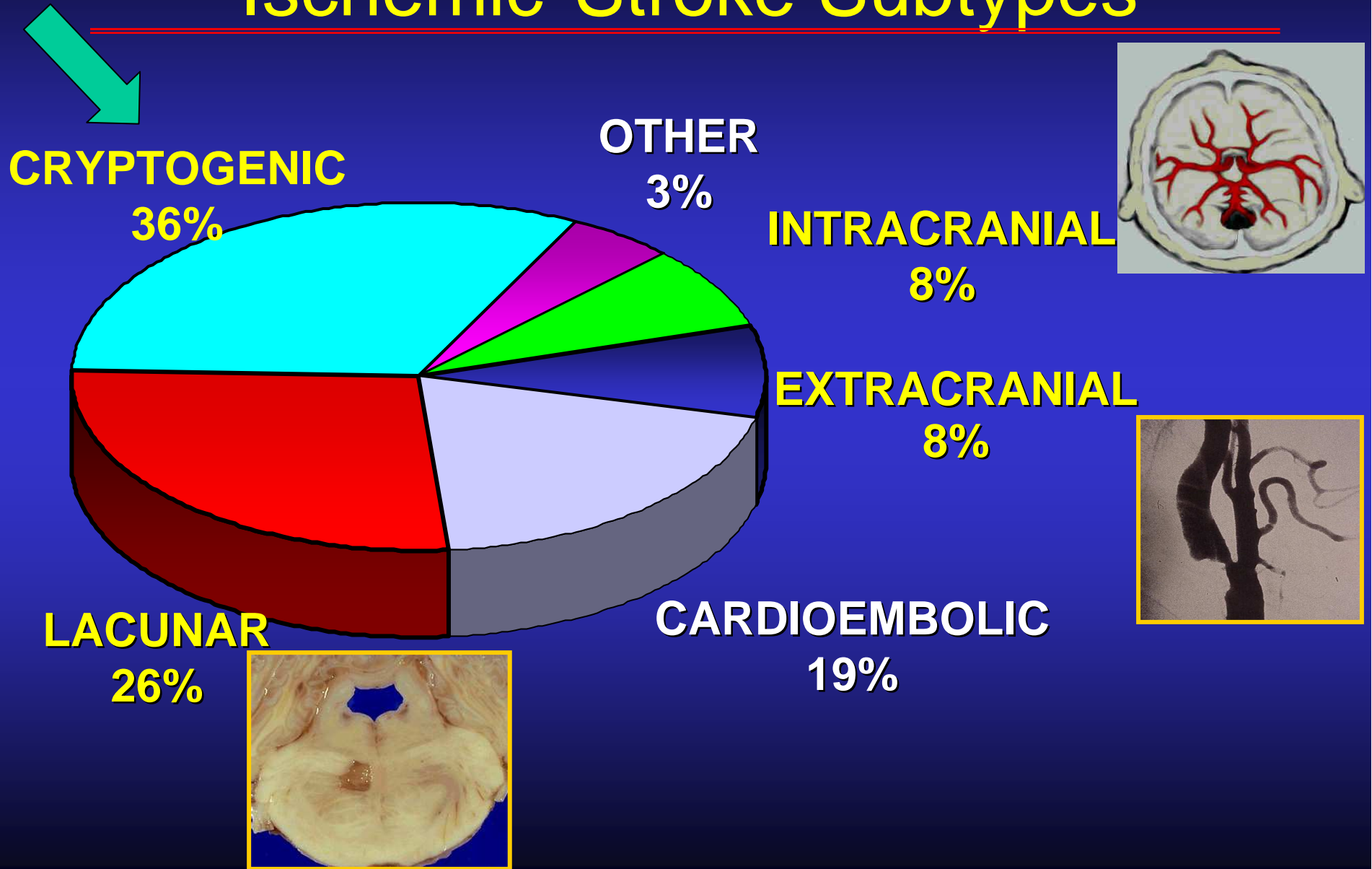
Percent of eligible patients given counseling pre-discharge



Paul Coverdell National Acute Stroke Registry. Preliminary results from four state pilot prototypes of the Paul Coverdell National Acute Stroke Registry. Paper presented at the 28<sup>th</sup> International Stroke Conference, Phoenix, Ariz, February 13-15, 2003.

# NORTHERN MANHATTAN STROKE STUDY

## Ischemic Stroke Subtypes



# Carotid Endarterectomy

## ASA 2006 Secondary Stroke Recs

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- Ipsilateral **severe (70% to 99%) carotid stenosis**, CEA is recommended (Class I, Evidence A).
- Ipsilateral **moderate (50% to 69%) carotid stenosis**, CEA is recommended depending age, gender, comorbidities, and the severity of symptoms (Class I, Evidence A).
- **Stenosis < 50%**, there is no indication for CEA (Class III, Evidence A).
- **Surgery within 2 weeks** is suggested rather than delaying surgery (Class IIa, Evidence B).

# **Carotid Angioplasty and Stenting ASA 2006 Secondary Stroke Recs**

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- **CAS may be considered (Class IIb, Evidence B)**
  - Stenosis (>70%) difficult to access surgically,
  - medical conditions that greatly increase the risk for surgery, or
  - when other circumstances exist such as radiation-induced stenosis or restenosis after CEA.
- **CAS is reasonable when performed by operators with morbidity and mortality rates of 4% to 6% (Class IIa, Evidence B).**

# Angioplasty and Stenting

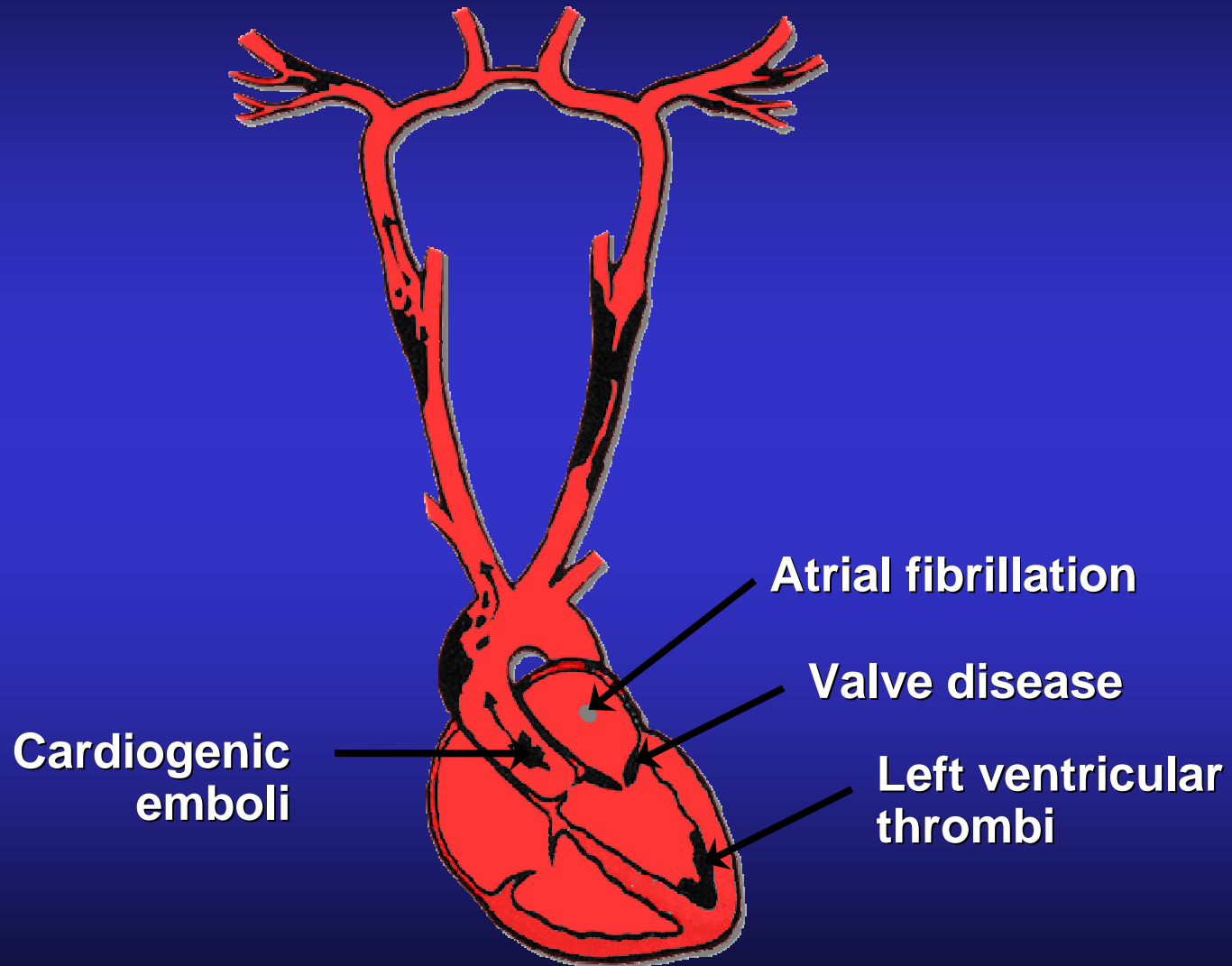
## ASA 2006 Secondary Stroke Recs

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- Endovascular treatment for **extracranial vertebral stenosis** may be considered when patients are having symptoms despite medical therapies (antithrombotics, statins, and other treatments for risk factors) (Class IIb, Level of Evidence C).
- For patients with hemodynamically significant **intracranial stenosis** who have symptoms despite medical therapies, the usefulness of endovascular therapy is uncertain and is considered investigational (Class IIb, Level of Evidence C).

# Evaluation of the Vascular System

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Reprinted with permission from Albers GW, et al. *Chest*. 2001;119:300S-320S.

# Atrial Fibrillation

## ASA 2006 Secondary Stroke Recs

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- For patients with ischemic stroke or TIA with persistent or **paroxysmal (intermittent) AF**, anticoagulation with adjusted-dose **warfarin** (target INR 2.5, range 2.0 to 3.0) is recommended (Class I, Evidence A).
- For patients unable to take oral anticoagulants, **aspirin 325** mg per day is recommended (Class I Evidence A).

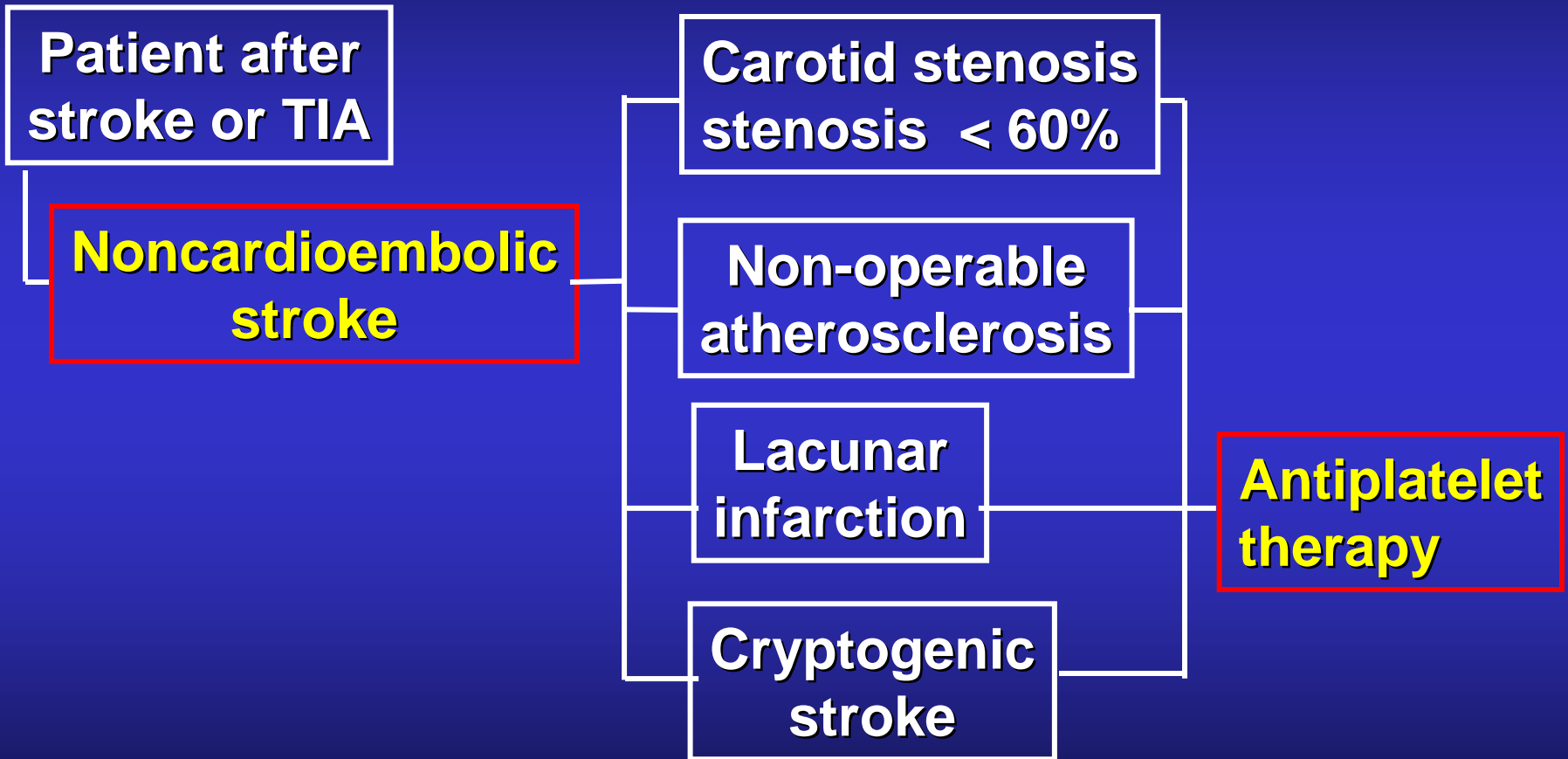
# Other Cardiac Conditions

## ASA 2006 Recommendations

- **Warfarin**
  - LV Thrombus
  - Rheumatic Mitral Valve Disease
  - Prosthetic Valves
- **Warfarin or Antiplatelets**
  - Dilated Cardiomyopathy
- **Antiplatelets**
  - Mitral Valve Prolapse
  - Mitral Annular Calcification
  - Aortic Valve Disease

# Ischemic Stroke Prevention

## Non-cardioembolic Stroke



# Stroke Prevention - Non-cardioembolic ASA 2006 Secondary Stroke Recs

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- For patients with noncardioembolic ischemic stroke or TIA, **antiplatelet agents** are recommended rather than oral anticoagulation to reduce the risk of recurrent stroke and other cardiovascular events (Class I, Evidence A).

# Stroke Prevention - Non-cardioembolic ASA 2006 Recommendations

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- **Acceptable options for initial therapy (Class IIa, Level of Evidence A).**
  - aspirin (50-325 mg qd)
  - the combination of aspirin and extended-release dipyridamole (25/200 mg bid)
  - clopidogrel (75 mg qd)

# Antiplatelets

## ASA 2006 Secondary Stroke Recs

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- Compared to aspirin alone, both the combination of aspirin and extended-release dipyridamole and clopidogrel are safe.
- The combination of **aspirin and extended-release dipyridamole** is suggested over aspirin alone. [Class IIa, Level A]
- **Clopidogrel** is suggested over aspirin alone based on direct comparison trials. [Class IIb, Level B]

# Antiplatelets

## ASA 2006 Secondary Stroke Recs

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- The **addition of aspirin to clopidogrel** increases the risk of hemorrhage and is not routinely recommended for stroke or TIA patients. [Class III, Level A]
- For patients **allergic to aspirin**, clopidogrel is recommended. [Class IIa, Level B]

# Antiplatelets

## ASA 2006 Secondary Stroke Recs

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- Insufficient data are available to make evidence-based recommendations regarding choices between antiplatelet options other than aspirin. Selection of an antiplatelet agent should be **individualized based on patient risk factor profiles, tolerance, and other clinical characteristics.**

# **Other Circumstances**

## **ASA 2006 Secondary Stroke Recs**

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- **Dissections**
- **PFO and Hyperhomocystinemia**
- **Hypercoagulable states**
- **Sickle Cell Disease**
- **Cerebral Venous Thrombosis**
- **Stroke and Pregnancy**
- **Post-menopausal hormone therapy**
- **Anticoagulation after cerebral hemorrhage**

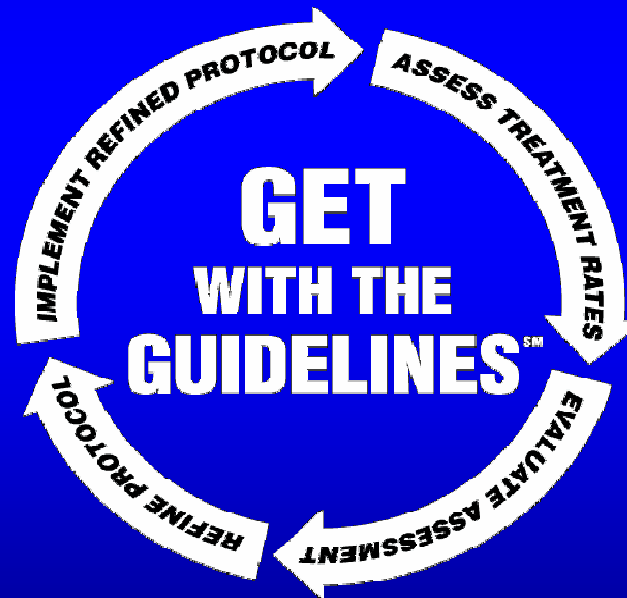
American Stroke  
Association<sup>SM</sup>

A Division of American  
Heart Association



# GWTG-Stroke

## 2005 ASA International Stroke Abstract Presentations



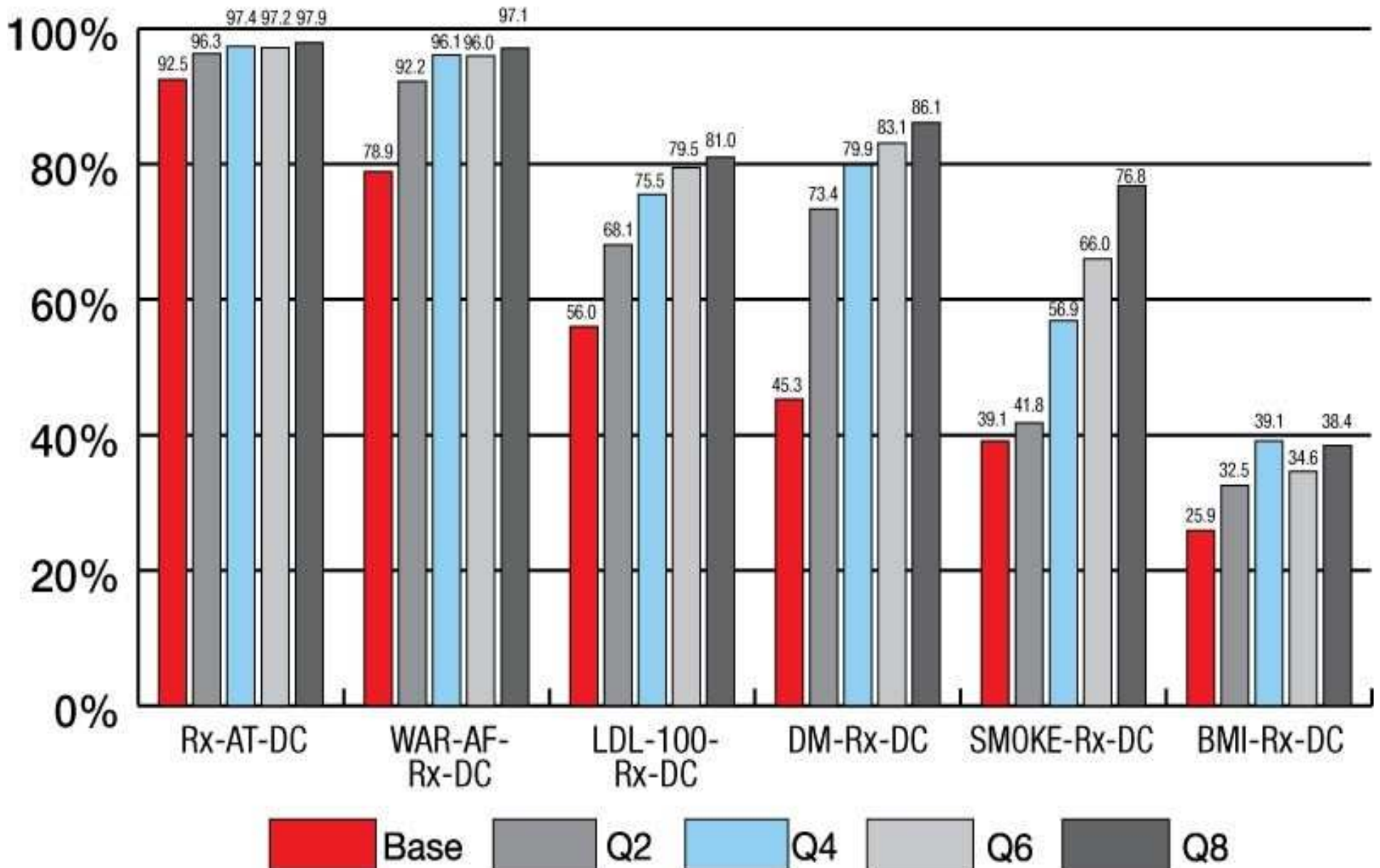
**GET WITH THE  
GUIDELINES<sup>SM</sup>**

**STROKE**

# Measuring Secondary Prevention

- Smoking Cessation Counseling
- Lipid and Cholesterol Lowering Therapy
- Anti-thrombotics
- Weight and Exercise Management
- Atrial Fibrillation Management
- Diabetes Management

**Table B: Get With The Guidelines—Stroke Produces Sustainable Improvements in Hospital-Based Acute Stroke Care**



# **Prevention of Stroke among TIA and Stroke Survivors**

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- **Stroke and TIA patients have a high risk of recurrence that begins early after an event.**
- **BP, blood glucose, and cholesterol need aggressive treatment with lifestyle modifications and medications.**
- **Surgery, angioplasty, oral anticoagulants and antiplatelet decisions depend on the stroke diagnostic subtype.**
- **Evidence-based approaches for secondary stroke prevention need to begin during the acute hospitalization phase.**