

# SVS CAS Concepts

FDA  
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# Disclosure Information

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No commercial financial interests,  
arrangements, or affiliations to disclose

SVS support

# RCT vs. Non-randomized Trials

- SVS supports priority to RCTs over other forms of approaching this issue
- Issues well established
- Disadvantages of selection, treatment & assessment biases balanced by ability to accrue large "n" in real world experience
- Propensity score and covariate adjustment may allow analysis

# Concept: Non-RCT monitored with specialty society registries

- In CAS / CEA world, robust measurement tools already exist in the clinical realm
- Sufficient to answer subset questions
- Fit properly / best in concert with RCTs
- Answer questions of high risk for CAS just as
  - we focus on high risk for CEA

# CAS / CEA Registry Tool

- Economical web-based tool for outcomes data collection
- Ability to analyze
  - Baseline risk factors
  - Routine MAE
  - Plaque characteristics
  - Stenosis impact
- >150 measured variables
- Long-term follow-up

# Registry Specific Goals

- Facility compliance with CMS requirements
- Ability to analyze risk-adjusted large “n”
- Compare CEA & CAS subgroups
- Long-term follow-up data
- Broad-based Specialty involvement with Agency advice

# Vascular Registry Steering Committee

- SVS
- SIR
- Ad-hoc members:
  - AHRO
  - FDA
  - CMS
  - New England Research Institute (NERI)

# Multispecialty Participation

- Cases Entered by:
  - Interventional cardiologists
  - Interventional radiologists
  - Neurosurgeons
  - Vascular surgeons
  - Interventional neuroradiologists

# Vascular Registry Data Engine

- New England Research Institute - NERI
- Founded 1986
- NIH & biomedical research

# CF20 Form: Pre-procedural Diagnostics

https://studydev.neriscience.com - ADEPT Development - User Site - Data Entry Session: ID Numbe - Microsoft Int...

AA3. Date of assessment	<input type="text" value="05/25/2005"/>	mm/dd/yyyy		
AA4. Procedure	<input checked="" type="radio"/> CAS	<input type="radio"/> CEA		
AA5. Target side	<input type="radio"/> Right	<input checked="" type="radio"/> Left		
AA6. Reimbursement category	<input checked="" type="radio"/> CMS	<input type="radio"/> Commercial	<input type="radio"/> IDE	<input type="radio"/> Post-approval

**SECTION A: Carotid Symptoms**

A1. <a href="#">Symptomatology</a>	<input checked="" type="radio"/> Symptomatic	<input type="radio"/> Asymptomatic	
A2. <a href="#">Stroke Ipsilateral</a>	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
A2a. If Yes, indicate time interval	<input type="radio"/> ≤ 30 days	<input type="radio"/> 1-12 months	<input type="radio"/> > 12 months
A3. <a href="#">TIA Ipsilateral</a>	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
A3a. If Yes, indicate time interval	<input type="radio"/> ≤ 12 months	<input type="radio"/> > 12 months	
A4. <a href="#">Amaurosis fugax or TMB Ipsilateral</a>	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
A4a. If Yes, indicate time interval	<input type="radio"/> ≤ 12 months	<input type="radio"/> > 12 months	

**SECTION B: CMS Qualifying High Risk Factors**

B1. Physiologic <b>(Select all that apply)</b>	
B1a. None	<input type="checkbox"/>
B1b. <a href="#">NYHA CHF Class III/IV</a>	<input checked="" type="checkbox"/>
B1c. LVEF<30%	<input type="checkbox"/>
B1d. <a href="#">Unstable angina</a>	<input type="checkbox"/>
B1e. <a href="#">Recent MI (within 30 days)</a>	<input type="checkbox"/>
B1f. Other from approved IDE CAS trials	<input type="checkbox"/>
B2. Anatomic <b>(Select all that apply)</b>	
B2a. None	<input checked="" type="checkbox"/>
B2b. Recurrent stenosis	<input type="checkbox"/>

AA1. Patient ID

Trusted sites

# CF40 Form: Follow-up Visit

https://studydev.neriscience.com - ADEPT Development - User Site - Data Entry Session: ID Numbe - Microsoft Internet Explorer

**SECTION B: ENDPOINT EVALUATION (since last evaluation)**

**B1. Clinical outcome measures (Select all that apply)**

<input type="checkbox"/>	B1a. <a href="#">Stroke</a>	B1a1. Major <input type="checkbox"/>	B1a2. Minor <input type="checkbox"/>
	B1a3. Date of stroke	<input type="text"/> mm/dd/yyyy	
<input type="checkbox"/>	B1b. <a href="#">TIA</a>	B1b1. Single <input type="checkbox"/>	B1b2. Multiple <input type="checkbox"/>
	B1b3. Date of TIA	<input type="text"/> mm/dd/yyyy	
<input type="checkbox"/>	B1c. <a href="#">Amaurosis fugax or TMB</a>		
	B1c1. Date of TMB	<input type="text"/> mm/dd/yyyy	
<input type="checkbox"/>	B1d. <a href="#">Myocardial infarction</a>	B1d1. Q wave <input type="checkbox"/>	B1d2. Non Q <input type="checkbox"/>
	B1d3. Date of MI	<input type="text"/> mm/dd/yyyy	

**B2. Procedure-related outcome measures (Select all that apply)**

		1. Side		
		Right	Left	Bilateral
<input type="checkbox"/>	B2a. <a href="#">Residual stenosis</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>	B2b. <a href="#">Re-stenosis (&gt;50% restenosis by ultrasound)</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>	B2c. <a href="#">Target vessel re-do revascularization</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>	B2d. <a href="#">Target lesion re-do revascularization</a>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>	B2e. Stent migration/deformation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>	B2f. Distal embolization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**B3. Was repeat carotid duplex ultrasound performed** Yes  No

<input type="checkbox"/>	B4. <a href="#">Right side % stenosis</a>	B4a. < 50% <input type="radio"/>	50 - 69% <input type="radio"/>	70 - 79% <input type="radio"/>	≥ 80% <input type="radio"/>
<input type="checkbox"/>	B5. <a href="#">Left side % stenosis</a>	B4a. < 50% <input type="radio"/>	50 - 69% <input type="radio"/>	70 - 79% <input type="radio"/>	≥ 80% <input type="radio"/>

AA1. Patient ID

Trusted sites

# On-line Help

https://studydev.nerisience.com - ADEPT Development - User Site - Data Entry Session: ID Numbe ...

E1a. Type of exam  CT  MRI

E2. Were results normal  Yes  No

E3. CT/MRI results (Select all that apply)

E3a. Tumor

E3b. Arteriovenous malformation (AVM)

**Microsoft Internet Explorer**

 If abnormal, enter NIH SS score:  
If abnormal result is checked in F4, please enter NIH Stroke Scale score. Expected range is between 1 and 22. If score is above 22 patient has severe neurological limitations then a confirmation is required.

Special Values:  
-9 = Missing : Requires Confirmation and Override Reason

OK

F4. NIH SS  Normal  Abnormal  Not Done

F4a. If abnormal, enter NIH SS score

**SECTION G: Laboratory Results**

G1. Creatinine

G1a. Not Done

G1b. mg/dL

X

Cancel ? lab ok

F4a. If abnormal, enter NIH SS score Trusted sites

# Hyperlinked Definitions

https://studydev.neriscience.com - ADEPT Development - User Site - Data Entry Session: ID Numbe ...

Symptomatic    Asymptomatic

A2. [Stroke Ipsilateral](#)     Yes     No

A2a. If Yes, indicate time interval     < 30 days  
 1-12 months  
 > 12 months

A3. [TIA Ipsilateral](#)     Yes     No

A3a. If Yes, indicate time interval     < 12 months     > 12 m

A4. [Amaurosis fugax or TMB Ipsilateral](#)     Yes     No

A4a. If Yes, indicate time interval     < 12 months     > 12 m

**SECTION B: CMS Qualifying High Risk Factors**

B1. Physiologic (Select all that apply)

B1a. None   

B1b. [NYHA CHF Class III/IV](#)   

B1c. LVEF<30%   

B1d. [Unstable angina](#)   

B1e. [Recent MI \(within 30 days\)](#)   

B1f. Other from approved IDE CAS trials   

B2. Anatomic (Select all that apply)

B2a. None   

B2b. Recurrent stenosis   

B2c. Radical neck dissection   

B2d. Contralateral occlusion   

B2e. Prior radiation to neck   

B2f. Contralateral laryngeal nerve injury/palsy   

B2g. High anatomic lesion (C2 or higher)   

Cancel    ?    [Icons]    [Icons]

F4a. If abnormal, enter NIH SS score

https://studydev.neriscience.com - ADEPT Development - User Site - Carotid Defini...

**Transient Ischemic Attack (TIA)** is defined as any focal ischemic neurological deficit of abrupt onset lasting at least 30 seconds but resolving completely within 24 hours. Thus TIA resolving entirely (< 24 hrs) is the same as the definition of TIA.

**Ipsilateral TIA** is a TIA as defined above occurring in the same hemisphere as the CAS or CEA procedure.

**Transient Monocular Blindness (TMB)**, also referred to as **amaurosis fugax**, is defined as any focal retinal deficit of abrupt onset lasting at least 30 seconds but resolving completely within 24 hours.

**Ipsilateral TMB** is a TMB as defined above occurring in the same hemisphere as the CAS or CEA procedure.

**Myocardial Infarction (MI)** is defined as  
*Q wave MI required one of the following criteria:*

- Chest pain or other acute symptoms consistent with myocardial ischemia and new pathological Q waves in two or more contiguous ECG leads
- New pathologic Q waves in two or more contiguous ECG leads and elevation of cardiac enzymes

*Non-Q wave MI:*

- CK ratio >2, CK-MB >1 in the absence of new, pathological Q waves

**Recent MI** is an MI as defined above occurring within last 30-days.

Done    [Icons]    Trusted sites

# On-line Validation

https://studydev.neriscience.com - ADEPT Development

Site ID: 101 - General Heart Hospital

Patient ID: 1010001

E3b. Arteriovenous malformation (AVM)

E3c. Brainstem infarct

E3d. Cerebral infarct

E3d1. Right, Left, Bilateral

E3e. Cerebellar infarct

E3e1. Right, Left, Bilateral

E3f. Intracranial hemorrhage

E3g. Other

## SECTION F: Neurological Exam

F1. Cranial Nerves

F2. Motor Exam

F3. Sensory Exam

F4. NIH SS

F4a. If abnormal, enter NIH SS score

## SECTION G: Laboratory Results

G1. Creatinine

G1a. Not Done

G1b. mg/dL

X

https://studydev.neriscience.com - ADEPT Development - Elena Kalita - Validation Failur...

 **Data Entry Validation Error**

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**Lab results: Creatinine**

Please indicate Creatinine result. Expected range is between 0.5 and 5.0 mg/dL. If out of range then provide a confirmation. If Creatinine was not done, please check G1a.

Special Values:  
-9 = Missing : Requires Correction for Form to be Complete

**Confirm current value: 5.5**

Reason:

Initials:

\* The Reason text can be a maximum of 100 characters long.

Done  Trusted sites

# Validation

- Registry format allow validation at whatever level necessary
- Independent patient outcome analysis readily incorporated

# Registry Report Example: Baseline Demographics

Vascular Registry Carotid Procedures Institutional Benchmark

## Report Selection Criteria

Procedure: CAS

	Site xxx	Site *	Site *
Total patients	153		
Total procedures	173		
<u>Pre-Op Risk</u>			
Age (years)	70	69	68
Recent MI	0%	0%	7%
NYHA Class III/IV	55%	0%	7%
Renal Failure	3%	7%	8%
COPD	21%	0%	23%

# CAS Outcomes Example Report

Vascular Registry Carotid Procedures Institutional Benchmark

## Report Selection Criteria

Procedure: CAS

	Site xxx	Site *	Site *
Total patients	153		
Total procedures	173		
<u>Mortality</u>			
Rank	21	19	18
Peri-Op	1%	0%	0%
6-Month	3%	7%	0%
1-Year	1%	7%	0%
> 1-Year	1%	0%	0%
Unknown	0%	0%	0%
<u>Stroke</u>			
Rank	16	24	13
Peri-Op	3%	14%	0%
6-Month	1%	0%	0%
1-Year	0%	0%	0%
> 1-Year	0%	0%	0%

# CEA Outcomes Example Report

Vascular Registry Carotid Procedures Institutions

## Report Selection Criteria

Procedure: CEA

	Site XXX	Site *	Site *
Total patients	269		
Total procedures	297		
<u>Combined Death/Stroke</u>			
Rank	11	8	12
Peri-Op	3%	0%	5%
6-Month	1%	0%	0%
1-Year	0%	0%	0%

# Vascular Registry Activity

- August 2005 to September 2007
- >2500 Procedure forms entered  
~ 50/50 mix CAS /CEA
- >2000 Follow-up forms entered up to 2 years
- 123 Termination forms entered
- 93% Active Ongoing Follow-up

# SVS Recommendations

- Design CAS vs. CEA trials for conventional risk patients using specialty society registry(s)
- Provide accurate audited real-world large “n” data collection
- In the best of worlds, trials would be designed and powered to satisfy CMS subgroup coverage issues / Coverage with Evidence Development