

## ***Stroke Systems Improved Outcomes?***

E. Bradshaw Bunney, MD, FACEP 

**E. Bradshaw Bunney, MD, FACEP**

Associate Professor  
Department of Emergency Medicine  
University of Illinois at Chicago

**Our Lady of the Resurrection Hospital**

E. Bradshaw Bunney, MD, FACEP 

### **Key Clinical Questions**

- What is the current status of primary stroke center designation?
- What is the current status of tertiary stroke center designation?
- What regional or national stroke systems currently exist?
- What networks for evaluation, consultation, and transfer exist?
- How are telemedicine systems utilized in these stroke systems?
- What are the documented benefits and outcome enhancements for stroke patients who are treated in these systems?

E. Bradshaw Bunney, MD, FACEP 

---

**What is the current status of  
primary stroke center designation?**

E. Bradshaw Bunney, MD, FACEP 

### **Major Elements of a Primary Stroke Center**

- **Patient care areas**
  - Acute stroke teams
  - Written care protocols
  - Emergency medical services
  - Emergency department
  - Stroke unit
  - Neurosurgical services
- **Support services**
  - Stroke center director
  - Neuroimaging services
  - Laboratory services
  - Outcome and quality improvement activities
  - Continuing medical education

Alberts MJ, et al. JAMA. 2000;283:3102-3109.

E. Bradshaw Bunney, MD, FACEP 

### **Primary Stroke Centers in the US**

- Approximately 5,000 hospitals in the US
- As of June 2007 there are 352 certified Stroke Centers
- 94 more in the pipeline
- 40 states
- State certification in several states

E. Bradshaw Bunney, MD, FACEP 

### Standardized Measure Set

- **Standardized measures:**
  - Tissue plasminogen activator (t-PA) considered and given
  - Patient discharged on antithrombotics
  - Deep vein thrombosis (DVT) prophylaxis
  - Patients with atrial fibrillation receiving anticoagulation therapy
- **Additional Pilot Measures:**
  - Screen for dysphagia
  - Lipid profile during admission
  - Antithrombotic medication within 48 hours of hospitalization
  - Stroke education
  - Smoking cessation
  - Rehabilitation plan considered

E. Bradshaw Bunney, MD, FACEP 

### Primary Stroke Center Performance Measure Pilot Study

- **Methods:**
  - 30 certified Primary Stroke Centers self-reported data from 11 standardized measures for 12 months
  - Data collected and aggregated monthly
  - Analysis of performance to determine if improvement occurred over time

E. Bradshaw Bunney, MD, FACEP 

### Primary Stroke Center Performance Measure Pilot Study

- **Results:**
  - Absolute positive change in rates for all 11 measures
  - Statistically significant improvement in 8 of 11 measures
  - tPA administration increased 18.26% during the period

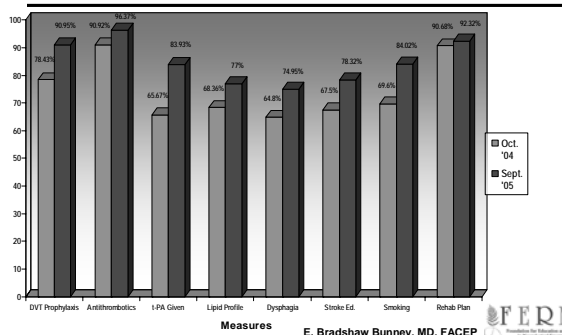
E. Bradshaw Bunney, MD, FACEP 

### Primary Stroke Center Performance Measure Pilot Study

- **Additional Changes in Measures:**
  - DVT Prophylaxis: +12.52%
  - Discharged on antithrombotics: +5.45%
  - Lipid profile: +8.64%
  - Screen for dysphagia: +10.15%
  - Stroke education: +10.82%
  - Smoking cessation counseling: +14.42%
  - Plan for Rehab Considered: +1.64%

E. Bradshaw Bunney, MD, FACEP 

Mean Values and Overall Changes in Pilot Hospital Stroke Performance Measures Over 12 Month Pilot



E. Bradshaw Bunney, MD, FACEP 

### Performance Measures: Next Steps

- Effort underway to align stroke measures across three initiatives:
  - Joint Commission Standardized Measure Set
  - CDC's Coverdell Registry
  - ASA's Get With the Guidelines - Stroke

E. Bradshaw Bunney, MD, FACEP 

## Performance Measures: Next Steps

---

- Value of aligning measures:
  - Ability to compare data across all registries
  - Ability to determine impact of certification on stroke care
  - Limits the burden of data collection on hospitals

---

What is the current status of tertiary stroke center designation?

## Elements of Comprehensive Stroke Center

---

- Health care personnel with specific expertise
  - Vascular neurology
  - Vascular neurosurgery
  - Critical care
- Diagnostic techniques
  - MRI, diffusion, perfusion
  - CTA
  - Carotid duplex
- Surgical intervention
  - Aneurysm clipping
  - Ventriculostomy placement
- Infrastructure
  - ICU
  - OR
  - Stroke registry
- Education
  - Community education
  - Community prevention
  - CME

## Comprehensive Stroke Center Designation

---

- No formal certification established
- Under review by JCAHO
- 1-2 years away

---

What regional or national stroke systems currently exist?

## Stroke Registries

---

- Senator Paul Coverdell from Georgia
- Died July 2000
- CDC awarding grants to states to establish registries
- National link

## Coverdell Stroke Registry

- 6867 stroke admissions at 98 hospitals
- 4 states (MI, GA, OH, MA)
- Less than 2/3 had documented onset times.
- Less than 50% had:
  - dysphagia screening (45%)
  - lipid testing (34%)
  - smoking cessation counseling (21%)
- 3% received rTPA in MI, GA, OH, while 8% received rTPA in MA.
- Conclusion: only a minority of acute stroke patients are treated according to established guidelines.
- Protocols will be redesigned to improve compliance with the established guidelines which may reveal outcomes benefit.

E. Bradshaw Bunney, MD, FACEP 

## What networks for evaluation, consultation, and transfer exist?

E. Bradshaw Bunney, MD, FACEP 

## Stroke Networks

- Consultation agreements
- Rotating call between institutions
- Consolidating resources among a network of hospitals
- Uniform protocol usage
- Maximize therapy usage

E. Bradshaw Bunney, MD, FACEP 

## Rural Nevada

- One designated stroke center
- 25 rural EDs
- One protocol agreed to by all hospitals
- Central stroke team
- Site visits to confirm protocol adherence and promote team approach
- Help to raise the treatment of stroke patients to a common norm

E. Bradshaw Bunney, MD, FACEP 

## How are telemedicine systems utilized in these stroke systems?

E. Bradshaw Bunney, MD, FACEP 

## Telemedicine Systems

- Two-way videoconferencing to connect a treating physician with a remote consultant
- Management option for the treatment of acute stroke patients in hospitals without the resources to provide acute stroke care.

E. Bradshaw Bunney, MD, FACEP 

## Telemedicine Systems

- Telemedicine consultation on 24 acute stroke patients
- 6 (25%) received tPA
  - door to needle time of 106 (+/- 22) minutes
  - consult to needle time of 36 (+/- 15) minutes.
- No protocol violations
- May increase the number of stroke patients receiving therapy
- May assist in delineating a group of patients that can receive optimal treatment at the originating hospital thus improving the utilization of scarce resources.

E. Bradshaw Bunney, MD, FACEP 

What are the documented benefits and outcome enhancements for stroke patients who are treated in these systems?

E. Bradshaw Bunney, MD, FACEP 

## Stroke Systems Outcomes

- To date there is very little data supporting outcome improvement with the use of specific guidelines or protocols.
- Most of the existing data concentrates on the improvement in compliance with protocols thus the possibility of improving outcomes.

E. Bradshaw Bunney, MD, FACEP 

## Stroke Systems Outcomes

- Correlation between the 11 elements of the primary stroke center certification and outcomes
- 16,853 stroke patients from 34 academic medical centers.
- In-hospital mortality rate was 6.3%
- 2.4% of patients received rTPA
- None of the 11 elements decreased in-hospital mortality or increased the frequency of discharge to home
- Four of the elements predicted increased rTPA use
  - written care protocols
  - integrated EMS
  - organized emergency department
  - CME

E. Bradshaw Bunney, MD, FACEP 

## Stroke Systems Outcomes

- 32 hospitals in Brooklyn and Queens
- Comparing stroke treatment before implementation of the BAC guidelines with treatment after guideline implementation
- Use of tPA increased from 2.4 to 5.2%.
- Protocol violations decreased from 11.1 to 7.9%.
- Overall there was improvement in door to doctor, door to CT and door to needle times.
- However, peri-stroke complications and discharge to home were not improved.

E. Bradshaw Bunney, MD, FACEP 

## Key Learning Points

- Stroke center certification provides a method of measuring quality improvement in stroke patient care
- Stroke registries measure quality indicators as well as outcomes
- Stroke networks allow a region to achieve a particular quality standard
- Outcomes measurement needs to be continued to establish the role of stroke systems as well as therapies

E. Bradshaw Bunney, MD, FACEP 

---

# Questions?

ferne\_pv\_2007\_bunney\_systems\_6192007\_finalcd  
7/5/2007 3:49 PM

E. Bradshaw Bunney, MD, FACEP 