

Acute Stroke Systems of Care

Optimizing Patient Care and Improving Outcomes

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**The Joint
Commission**[®]



**American Heart
Association**[®]
**American Stroke
Association**[®]

CERTIFICATION

Meets standards for

Comprehensive Stroke Center

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Disclosures

Speaker's Bureau: Genentech

Objective

- Recognize and describe components of a Stroke System of Care

Cedars-Sinai Medical Center

- Founded in 1902
- More than 2,000 physicians in virtually all medical specialties
- Approximately 13,000 employees
- Over 250 residents and fellows in nearly 60 graduate medical education programs
- Six of Cedars specialties ranked among the Nation's Best in *U.S. News and World Report's* guide to America's Best Hospitals
- Holds the Magnet Excellence in Nursing designation for the 4th time!



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- Emergency Department is a level one trauma center. Providing care to over 88,000 people a year
 - The Saperstein Critical Care tower. State of the art, 150 bed, 250,000 square foot, 11 level tower building with its own helipad
 - Treat approximately 1400 stroke patients/year



The Brain Attack Coalition

Group of professional, voluntary, and governmental entities dedicated to reducing stroke occurrence, disability and death.

Authored two papers outlining guidelines for stroke centers:

1. Primary Stroke Certification published in June 2000 in *JAMA*

- Developed recommendations for the establishment of primary stroke centers to improve medical care for patients with acute stroke

2. Comprehensive Stroke Center published in July 2005 in *Stroke*

- Developed recommendations for establishment of comprehensive stroke centers able to deliver full spectrum of care to seriously ill patient with stroke and cerebrovascular disease

- Concept of Acute Stroke Ready Hospitals discussed



Interactions Within Stroke Systems of Care

**A Policy Statement From the American Heart Association/American
Stroke Association**

Randall Higashida, MD, FAHA, Chair*; Mark J. Alberts, MD, FAHA, Co-Chair*;

David N. Alexander, MD; Todd J. Crocco, MD; Bart M. Demaerschalk, MD;

Colin P. Derdeyn, MD, FAHA; Larry B. Goldstein, MD, FAHA;

Edward C. Jauch, MD, MS, FAHA; Stephan A. Mayer, MD, FAHA; Neil M. Meltzer, MPH;

Eric D. Peterson, MD, FAHA; Robert H. Rosenwasser, MD, FAHA; Jeffrey L. Saver, MD, FAHA;

Lee Schwamm, MD, FAHA; Debbie Summers, RN, MSN, ACNS-BC, FAHA;

Lawrence Wechsler, MD, FAHA; Joseph P. Wood, MD, JD;

on behalf of the American Heart Association Advocacy Coordinating Committee

**Recommendations for the Establishment of Stroke Systems of Care:
Recommendations From the American Stroke Association's Task Force on the
Development of Stroke Systems**

Task Force Members, Lee H. Schwamm, Arthur Pancioli, Joe E. Acker, III, Larry B. Goldstein, Richard D. Zorowitz, Timothy J. Shephard, Peter Moyer, Mark Gorman, S. Claiborne Johnston, Pamela W. Duncan, Phil Gorelick, Jeffery Frank, Steven K. Stranne, Renee Smith, William Federspiel, Katie B. Horton, Ellen Magnis and Robert J. Adams

0-703; originally published online Feb 2, 2005;

1161/01.STR.0000158165.42884.4F

can Heart Association, 7272 Greenville Avenue, Dallas, TX 75214
rt Association. All rights reserved. Print ISSN: 0039-2499. Online

Brief Report

**Drip 'n Ship Versus Mothership for Endovascular Treatment
Modeling the Best Transportation Options for Optimal Outcomes**

Matthew S.W. Milne, BSc (In Progress); Jessalyn K. Holodinsky, MSc;

Michael D. Hill, MD, MSc; Anders Nygren, PhD; Chao Qiu, PhD; Mayank Goyal, MD;

Noreen Kamal, PhD

**Formation and Function of Acute Stroke-Ready Hospitals
Within a Stroke System of Care Recommendations From
the Brain Attack Coalition**

Mark J. Alberts, MD; Lawrence R. Wechsler, MD; Mary E. Lee Jensen, MD;

Richard E. Latchaw, MD; Todd J. Crocco, MD; Mary G. George, MD; James Baranski, BS;

Robert R. Bass, MD; Robert L. Ruff, MD; Judy Huang, MD; Barbara Mancini, RN;

Tammy Gregory, BA; Daryl Gress, MD; Marian Emr, BS; Margo Warren, BA; Michael D. Walker, MD

What is a stroke system of care?

A comprehensive, diverse, longitudinal system that address all aspects of stroke care in an organized and coordinated manner.

**EMS plays a significant role in this system of care!
Training & collaboration are imperative for success**

- Typically the first medical professionals with direct patient contact
- Their initial assessments, actions, treatments, and decisions have significant impact on the patient's subsequent care
- Their role in patient triage, diversion, and routing cannot be under-estimated



Stroke systems of care

GOAL: *Ensure that all stroke patients are rapidly identified, transported, or transferred in a timely fashion to a hospital that care provide the most appropriate level of care for the particular clinical situation*

Functions:

- Effective communication and collaboration
- Promote organized standards approach
- Identify performance measures
- Provide patients and providers tools needed for prevention, treatment and rehab
- Decisions and protocols are patient centered and focused
- Identify and address barriers to success
- Must be customized for each area
- State, region or local to ensure appropriate transitions of care



System Components

- Primary Prevention
- Community Education
- Notification and Response of EMS
- Acute Treatment
- Subacute Stroke Care and Secondary Prevention for Stroke
- Rehabilitation for Stroke
- Quality Improvement



Primary Prevention

Efforts have broad impact on health

Treatment of risk factors

- Hypertension, hyperlipidemia, diabetes, atrial fib other modifiable risk factors, Smoking cessation, obesity, increase exercise
- Post event, antithrombotic, statins, anti-hypertensives

Community Based Education: Primary Prevention

- Need for improved knowledge in the community for stroke signs and symptoms
- Education for all
- Target high risk populations



EMS Response and Notification Needs:

- Knowledgeable dispatchers
- Knowledgeable EMS Providers
- Assessment tools
- Destination Protocols- Bypass?
- Air vs Ground
- t-PA Checklists
- Requires Clinical Decision Support Tools
- Relationships within Regional Stroke Systems
- Data to drive performance and care delivery



Quality Improvement Metrics

% of people presenting in treatment window
% arriving by EMS

Readmissions

Length of stay

Seven day phone calls.

Outcomes: Modified Rankin and Quality of Life scales, functional status

Morbidity & Mortality

Discharge destination

Percentage of stroke patients who receive the appropriate level of rehabilitation services in the system



EMS Target Times

Dispatch time is less than 1 minute

Turnout time (call received to in route) is <1 minute

EMS response time is <8 minutes (receipt of call by dispatch to arrival on scene)

The on scene time is <15 minutes (barring extenuating circumstances)

Travel time is equivalent to trauma or acute myocardial infarction calls



Edward C. Jauch, J. L. (2013). Guidelines for the Early Management of Patients With Acute Ischemic Stroke : A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. Stroke, 1-77. Implementation strategies for Emergency Medical Services Within Stroke Care Systems of Care



Acute Stroke Care

A stroke system should determine the acute stroke treatment capabilities and limitations of all hospitals and make these available to primary care providers, EMS, and the public.

A stroke system should identify the roles played by each type of hospital in the system and define the responsibilities of those roles.



Legislation is leading the push towards certification

Many states including California & Florida require hospitals to be Joint Commission certified in order to receive stroke patients via EMS.

PSCs remain the backbone of Stroke Systems of Care due to their large numbers and high medical impact

Community hospitals continue to lead the way in terms of PSC formation

EMS continues to be key in systems of care



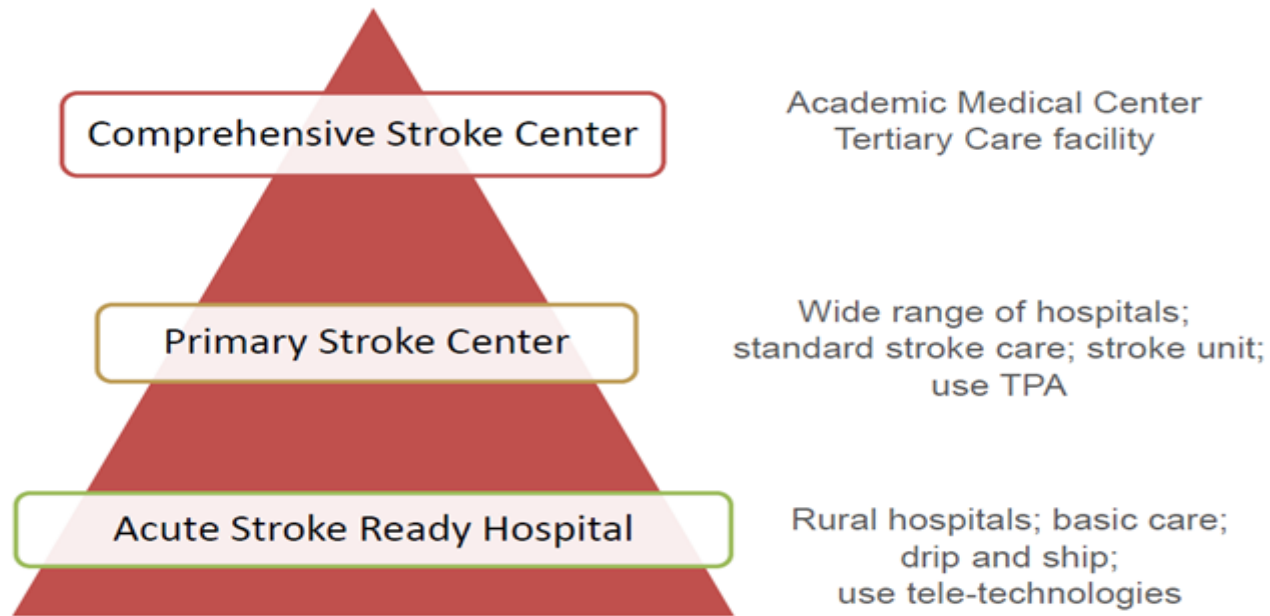
Did the Need Really Exist?



- 66% of hospitals surveyed did not have stroke protocols
- 82% did not have rapid identification for acute stroke patients
- Most acute care hospitals lacked the necessary staff and equipment to provide optimal, safe and effective emergency care for these patients
- Patients waited an average of 3-6 hours to seek treatment; some urban minority populations show a 22 hour delay in seeking help
- EMS was not consistently trained to recognize stroke
- Only 3% of eligible patients received the only FDA-approved ischemic stroke treatment



Tiered levels of Stroke Care



The Joint Commission has posted requirements for the new

Thrombectomy-capable Stroke Center (TSC) certification

for field review. It will be posted to collect comments until May 29th at which point they will reconvene the technical advisory panel to finalize the program requirements.

Tiers of stroke Care

ASRH

- Neurologist –24/7 in person or via telestroke (within 20 minutes)
- Transfer protocols with PSC or CSC
- IV t-PA available –anticipate transfer if treated
- No stroke unit required

PSC

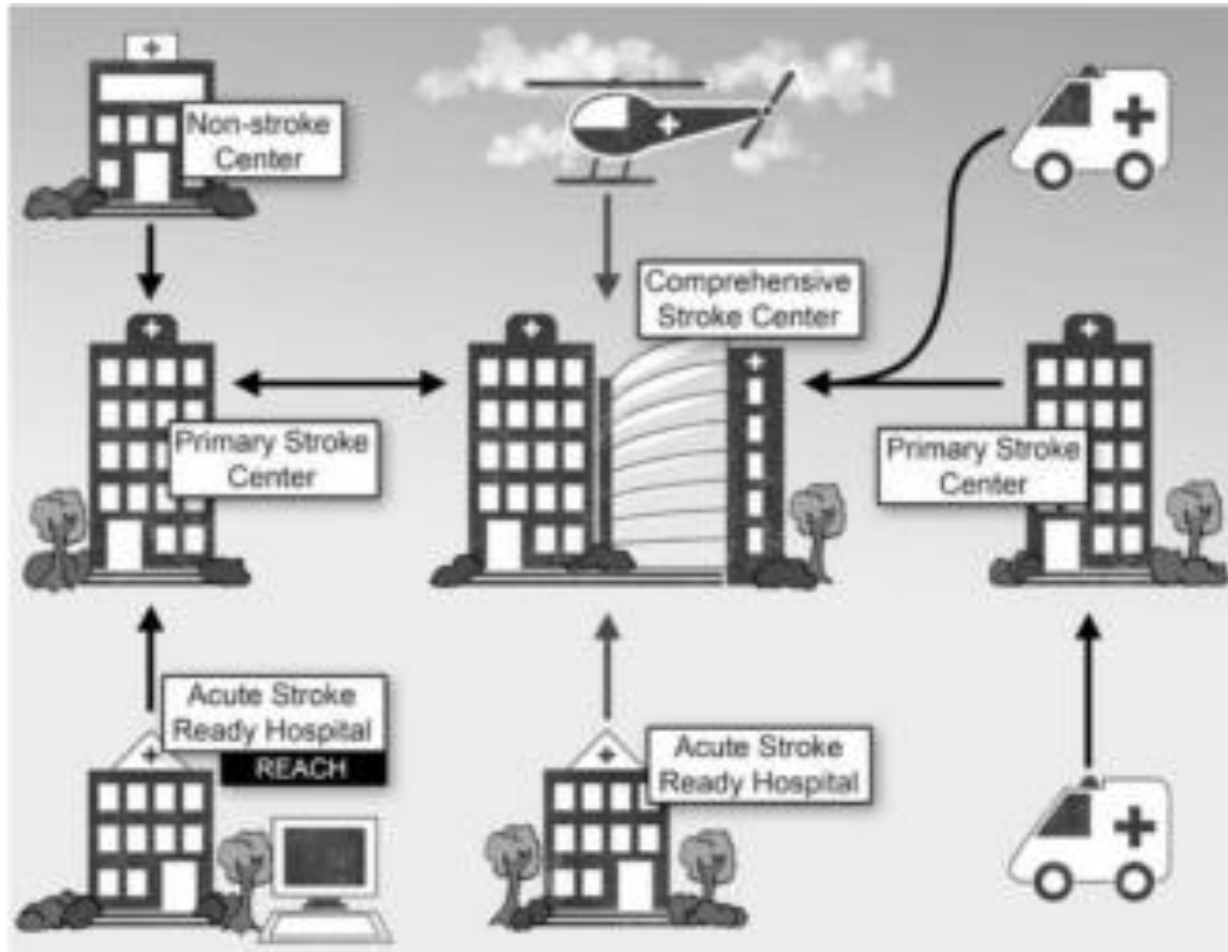
- Stroke unit or designated beds
- CTA/MRA available 24/7
- Neurologists 24/7 in person or via telestroke
- IV t-pa treatment
- Neurosurgery avail within 2 hr with OR staffed 24/7

CSC

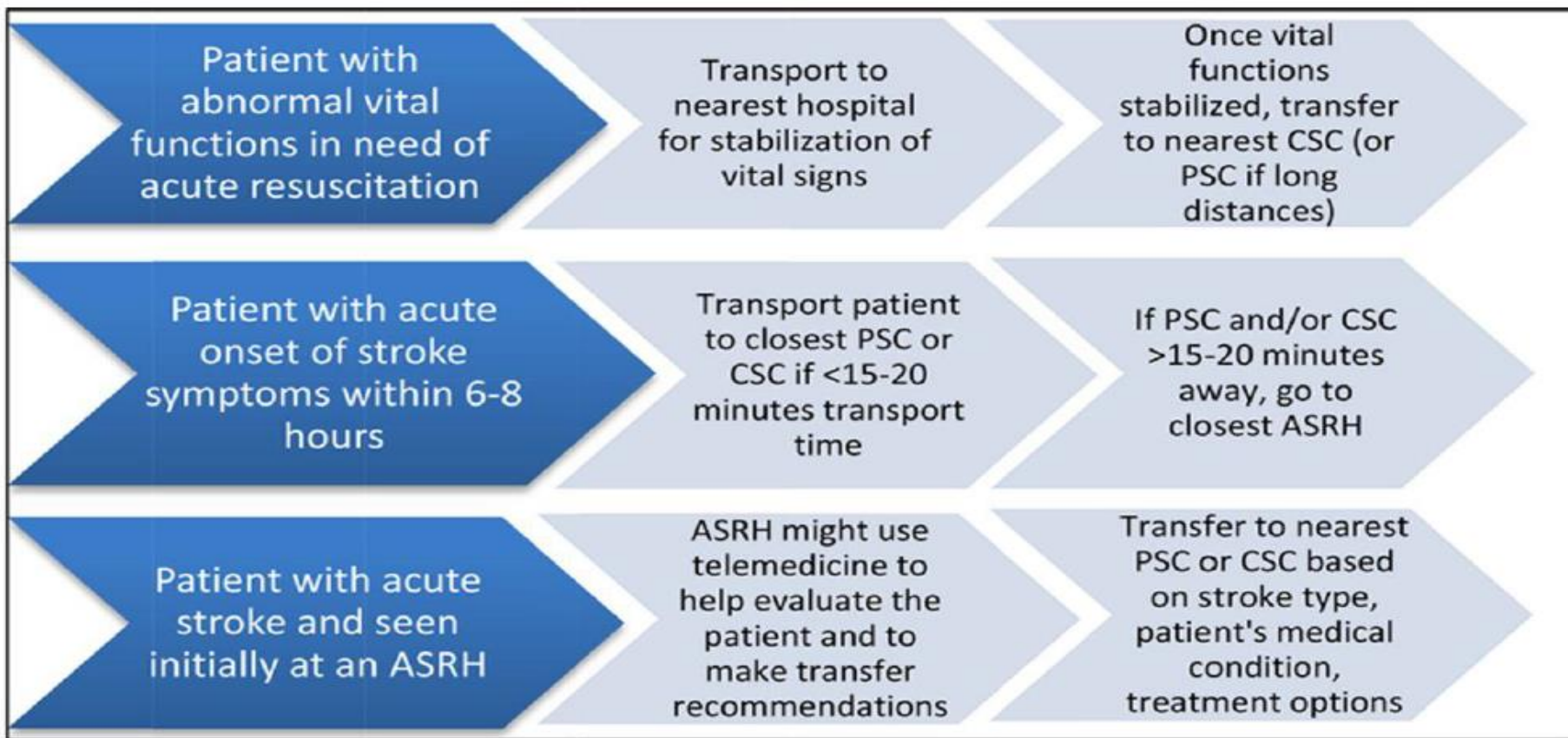
- Dedicated neuro ICU with 24/7 staffing
- Catheter angio24/7
- Able to meet concurrent needs of multiple complex stroke patients
- 24/7 neurointerventionalist, neurosurgeon, neurologists
- Aneurysm clipping/coiling, carotid stenting/CEA, endovascular care
- Patient centered stroke research
- Additional volume requirements for IV t-PA and SAH clip/coil volume



Treatment and Routing Options



Guiding principles for field triage of patients with suspected acute stroke.



Higashida R et al. *Stroke* 2013;44:2961-2984



Large vessel Occlusion

Ischemic strokes: Promptly to CSC

- Longer times from stroke onset to initiation of IA therapy and revascularization are associated with lower chances of good clinical outcomes
 - Achieving reperfusion at 310 minutes, compared to 280 minutes, corresponds to a 10.6% decrease in the probability of a good outcome.



Khatri et al., Neurology 2009; 73 (13): 1066-1072



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Routing concerns

Lessons from Trauma -when in doubt transport to a trauma center!

Who should be rerouted?

LVO high NIH SS?

Lots of benefits taking patients to CSC

hemicraniectomy, bleeds, endovascular candidate

Which scale to use in the field? *more research needed*

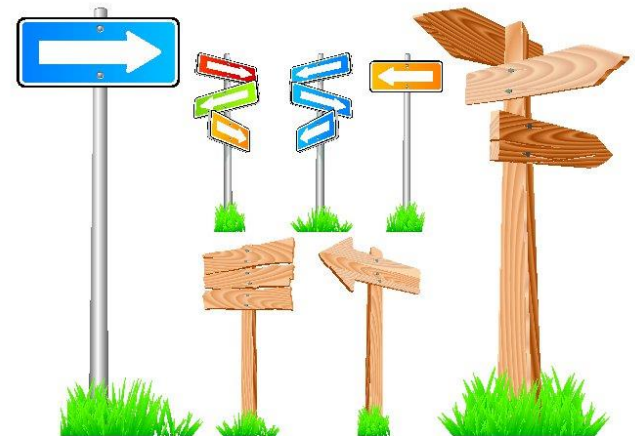
NIHSS- too complicated

LAMS- highest specificity

RACE-too complicated

C-STAT (CPSS)- easiest to remember

Urban vs Rural areas (more hospitals)



Routing concerns

Acceptable rates of over triage?

Stemi 15% Trauma 20-50%

Allowable transport time to bypass? (15-30 minutes)

No perfect routing system- when in doubt ..just be quick

No one size fits all system



A stroke system should use organized approaches to optimize subacute care

Organized Stroke teams

- Stroke units
- Written protocols
- Order Sets
- Neuroscience nurses, educated in the management of the stroke patient.
- Clinical research



Patient Education

All patients, care givers & loved ones need to know the signs and symptoms of stroke.

- Reduction of risk factors
- Education about the hidden deficits of stroke: depression and cognitive deficits
- Lifestyle modification
- Medication compliance

Family Risk Assessment

Respite care

Stress

Coping

depression



Systems of Stroke Care: Rehabilitation

Stroke rehabilitation should be provided by an appropriately trained and staffed multi-disciplinary team, including

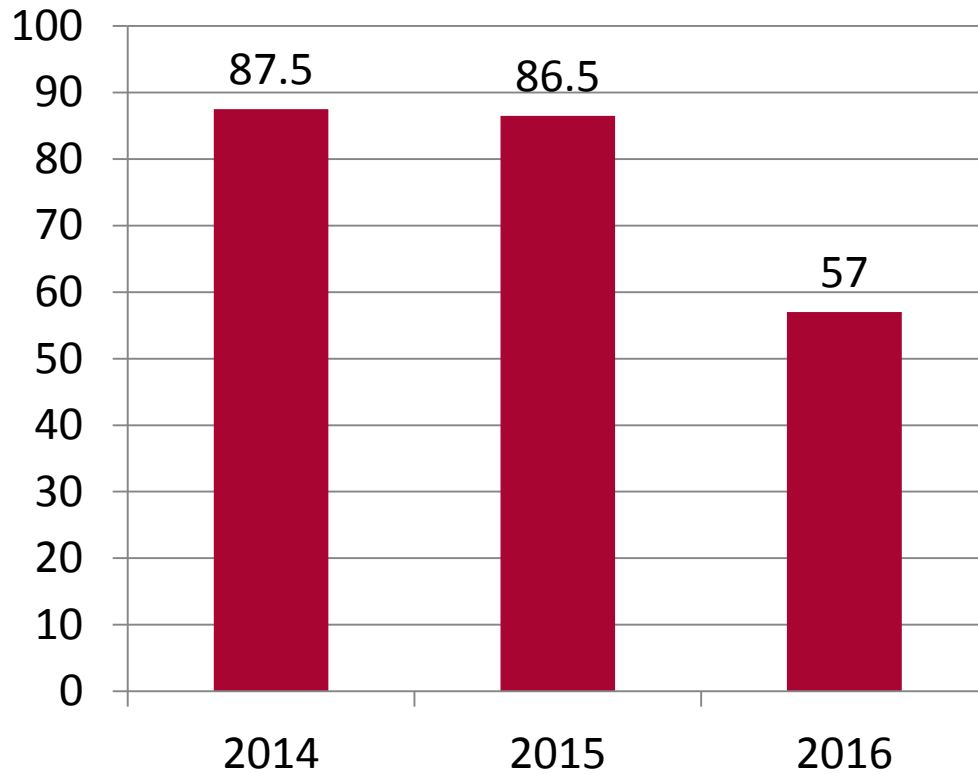
- Neurorehabilitation physicians
- Rehabilitation nurses
- Physical and Occupational therapists
- Speech-language pathologists,
- Recreational therapists, social workers, neuropsychologists
- Vocational counselors
- Families and the patient should be a fully involved member of this team.

Stroke patients who receive care in an inpatient rehabilitation facility are more likely to return to the community with better functional outcomes



t-PA Patients Treated Faster with use of Telestroke

Median DTN time



■ Median DTN time



Mobile Stroke Units.....

Mobile stroke units seem revolutionary
Genuine hope that they will improve outcomes for selected stroke patients
Not yet any evidence that this is the case.
They are expensive and research shows financially not-sustainable.
Without widespread deployment, they stand to benefit few





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Questions?

