The Alabama Telestroke Network

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Presenter Disclosure Information

Toby Gropen, MD, FAHA
The Alabama Telestroke Network

FINANCIAL DISCLOSURE:
None

UNLABELED/UNAPPROVED USES DISCLOSURE:
None

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Agenda

- The Rationale and Evidence for Telestroke
- The ideal Telestroke Program within the stroke system of care
- Telestroke models
- What is the Alabama Telestroke Network?

Vascular Neurologist Shortage

Year	2005	2006	2008	2009	2011	2012 (as per April 2012)
Total examinees	238	150	343	286	165	56
Grandfathering track	131	84	200	200	1	0
Non-ACGME fellowship track	102	56	92	33	2	0
ACGME fellowship track	5	3	45	37	140	50
Repeat examinees	0	7	6	16	13	6
Total certified	240	139	325	264	147	N/A

Total Vascular Neurologists=1115
717 strokes per VN per year

Leira, E.C.; et al., 2013

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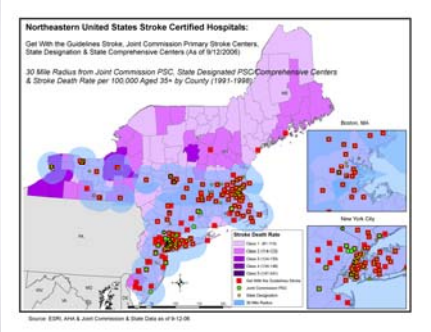
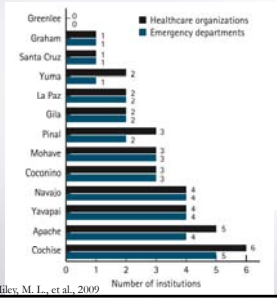
Access to Stroke Centers in the Northeast



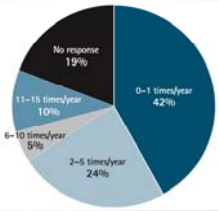
Gropen et al., 2009

Access to emergency care and t-pa in rural Arizona

Services by Rural County



T-PA Administration by rural EDs

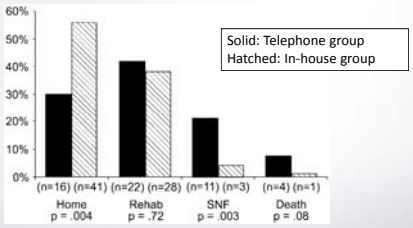


2-4% of rural stroke patients received t-PA vs. 18% in urban areas

Miley, M. L., et al., 2009

Telephone Thrombolysis

- Treatment with telephone consultation increased the number of patients treated with tPA at the referral stroke center by 72%.
- However, the reported patient outcomes were poorer



Frey et al., 2005

Telephone versus Telestroke: STRokE DOC trial in California

- 234 patients were prospectively evaluated.
- Randomized to telemedicine or telephone consultation
- Mean NIHSS score was 9.5 (11.4±8.7 telemedicine, 7.7±7.0 telephone; p=0.0020).
- The primary outcome measure was whether the rt-PA decision was appropriate, as determined using a rigorous, multi-stage, blinded adjudication process
- Correct treatment decision was made more often in telemedicine

Telemedicine N = 110	Telephone N = 111	OR	*P*	Absolute Difference (95% CI)	Number Needed to Assess (NNA) (95% CI)
108 (98%)	91 (82%)	10.9 (2.7–44.6)	0.0009	16 (9–24)	6 (4–12)

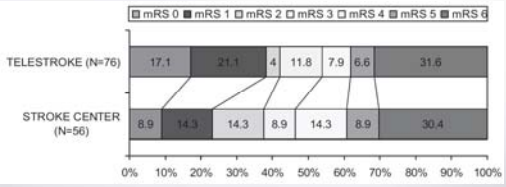
- Mean duration of consultations with telemedicine was longer

	Telemedicine	Telephone	*p*
Consent to decision (consultation duration)	32.0 min N = 107	22.9 min N = 107	0.0001
Onset to decision	258.0 min	230.6 min	0.07
Onset to thrombolysis	157.2 min	143.0 min	0.14

Meyer, et al., 2008; Capampangan, 2009

Telestroke versus in-person evaluation

- Telestroke patients vs. patients treated at hub by the same vascular neurologists
- No difference in functional outcome at 90 days (mRS)



Zaidi, 2011

Telestroke in Rural Georgia

Hospitals By County (City)	Bed Size	Average Stroke Activity (1999-2002)	Emergency Department Volume (Annual)	Distance to MCG (Miles)	No. of Ambulances in County	ALS on Ambulance	African American Population by County
McDuffie (Thomson, GA)	47	54	11,255	32.5	6	Y	37%
Washington (Sandersville, GA)	56	45	8,777	61.6	4	Y	53%
Emanuel (Swainsboro, GA)	72	84	10,104	76.4	4	Y	33%
Jefferson (Louisville, GA)	65	67	6,252	46.5	4	Y	56%
Jenkins (Millen, GA)	10	25	3,312	49.9	3	Y	40%
Wilkes (Washington, GA)	50	33	6,134	54.9	4	Y	43%
Cobb (Royston, GA)	71	60	11,872	102.8	4	Y	9%
Elbert (Elberton, GA)	52	64	7,377	83.7	6	Y	51%
Morgan (Madison, GA)	20	35	4,888	92.7	3	Y	31%

Study	No. Treated	OTT	SD	Lower 95% Confidence Limit	Upper 95% Confidence Limit	% <90 Min	% <120 Min	SICH (%)
MCG ED	26	145.88	46.99	126.9	164.87	19	35	0
REACH	49	127.57	36.33	117.14	138.01	22	50	2

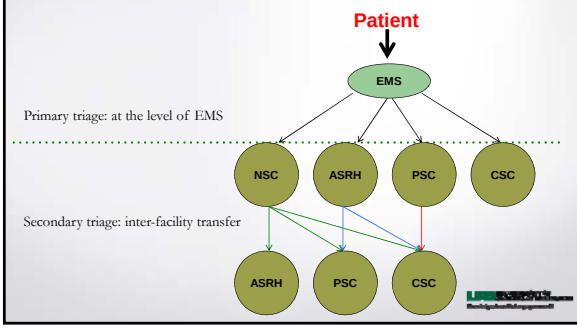
Switzer et al., 2009

Survey of U.S. Telestroke in 2009

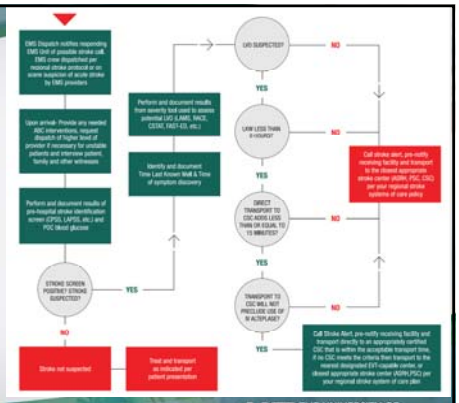
In 65.5% of hubs, >80% of spoke sites were rural
In 51.7% of hubs, >80% of spokes were small hospitals

Silva et al., 2012

Stroke Patient Triage: A Two-Tiered Approach



Severity-Based Stroke Triage for EMS



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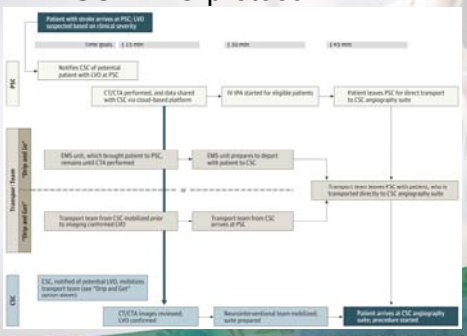
PSC ELVO protocol Study

- Retrospective cohort study
- 14 regional PSCs instructed on the use of a protocol for stroke patients with LAMS ≥ 4
  - ED physician does LAMS on potential stroke patients immediately upon their arrival to the PSC
  - For stroke patients with LAMS ≥ 4, the CSC is notified immediately and CSC critical care transport team is dispatched
  - At PSC, CTA is performed concurrently with noncontract CT of the brain and within 30 minutes of arrival and imaging data is shared with the CSC using a cloud-based platform
  - All patients with confirmed ELVO are directly transported to the CSC angiography suite

McTaggart et al., 2017

PSC ELVO protocol



McTaggart et al., 2017

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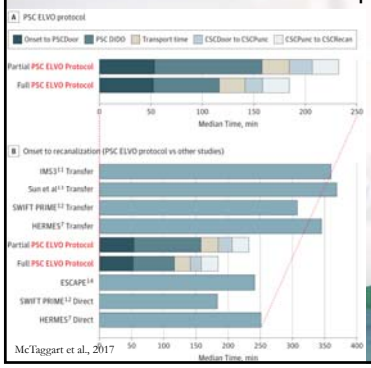
Key time intervals for a partially vs fully executed PSC ELVO protocol



DIDO was reduced from a median time of **104** minutes (95%CI, 82-112 minutes) to a median time of **64** minutes (95%CI, 51-71.0 minutes) (P < .001)

McTaggart et al., 2017

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The ideal Telestroke Program within the stroke system of care

- Provides high-quality, reliable, full-time vascular neurology consultation that is easily accessed
- Facilitates access to timely acute therapies
  - T-PA
  - Mechanical thrombectomy
  - Neurosurgical and neurocritical care expertise
- Facilitates appropriate and rapid triage based on patient needs, hospital capacity, and travel time
  - Nonstroke patients who do not require transfer for stroke center services
  - Stroke patients who may be managed without transfer
  - Patients who require transfer for PSC or CSC services
- Is integrated in the stroke system with
  - the prehospital EMS
  - the interfacility transfer process
  - Receiving facilities/providers in the event of secondary triage
- Minimizes DIDO for patients who need a higher level of care

Hub and Spoke

Potential Advantages	Potential Disadvantages
• Ready ability to establish relationships • Clearly defined destination for advanced stroke care • Continuity of care • Lower administrative burden related to state licensure • Access to hub vascular neurology expertise	• Limited supply of Vascular Neurologists at smaller hubs • Limited services beyond the hub catchment area • Transfer decisions may be unduly influenced by the spoke-hub relationship • Potential to bypass facilities that could provide services in a more timely manner

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Telemedicine Company

Potential Advantages	Potential Disadvantages
• Ability to provide telestroke services to hospitals located outside of the catchment area of the nearest hub • Ability to draw on a large pool of providers who may be anywhere	• Possible barrier to formation of relationships due to a large number of providers • Potential for variable vascular neurology expertise • Lack of access to hub vascular neurology expertise • Lack of continuity of care and delayed triage for advanced care • Higher administrative burden related to state licensure

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Private Practice-Based

Potential Advantages	Potential Disadvantages
• Ready ability to establish relationships • Ability to provide telestroke services to hospitals located outside of the catchment area of the nearest hub	• Potential for variable vascular neurology expertise • Lack of access to hub vascular neurology expertise • Lack of continuity of care and delayed triage for advanced care • Higher administrative burden related to state licensure

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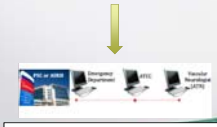
A Proposal: The Alabama Telestroke Network

- Create a State-based network of telestroke provided by Alabama-based neurologists, the Alabama Telestroke Network (ATN)
- Link the Alabama Trauma Communication Center (ATCC) to the ATN by telemedicine to provide a novel model of medical control for stroke triage
- Goal is to provide high-quality telestroke consultation that is integrated with prehospital care and secondary triage/inter-facility transfer

A Proposal: The Alabama Telestroke Network

1. Mobilization of resources starts from the field

Potential Advantages	Potential Disadvantages
• Ready ability to establish relationships • ATCC determines destination for advanced stroke care based on real-time capacity and travel time • Continuity of care with handoff • Lower admin. burden related to state licensure • Access to ATN vascular neurology expertise • Ability to provide telestroke services to hospitals outside of the catchment area of the nearest hub • Ability to draw on a provider pool across the State	• May disrupt traditional referral patterns • May require modification when state lines are crossed • If scaled to other states, will require modification of prehospital systems



2. Telestroke consult with ATCC dispatch of critical care transport team

3. Handoff to physicians at secondary triage destination