

Telestroke

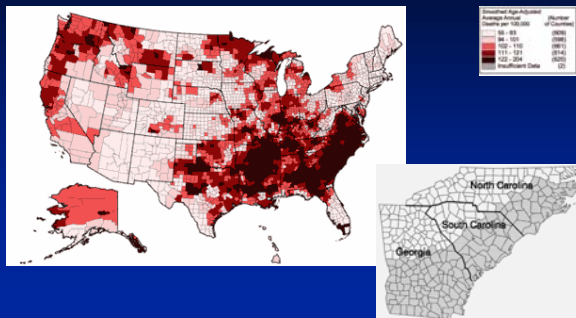
The World is "Flat": A Brief Future of Acute Stroke Care

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Disclosures

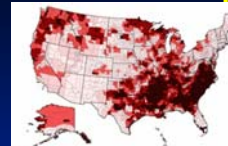
- Genentech Speaker's Bureau
- Boehringer Ingelheim Speaker's Bureau
- Astra Zeneca Advisory Board
- Co-Founder REACHMDConsult, Inc, Board of Directors

U.S. Stroke Belt



Source: US Census Bureau Postcensal Population Estimates (DC9 430-438.9) (1991-1997)

Lack of Stroke/Neurology Expertise



- Poor Quality of Stroke Care:
 - ◆ Low use of tPA < 2%
- Momentum to improve quality
 - ◆ JCAHO Stroke Center Certification
 - ◆ Legislative and State Health Department Statewide plans: (Mass, NC, NY, NJ, Fla, Ga)
 - ◆ National Initiatives: Coverdell registry, STOP Stroke Act
- Hospital Payment for Stroke Care TRIPLED in 2006

BUT

- "We can't get anyone (neurologists) to take ED call" – Hospital CEO
- "We have 100 rural hospitals without any Neurologist coverage. We need REACH"- NY State Health Department

U.S. Stroke Belt

Georgia Facts

- Population 9,072,576*
- 29.6% Black
- 57,906 sq mi (largest state east of Mississippi river)
- 141.4 per/sq mi
- First in peanuts, Vidalia onions

Stroke System Models

1. "Cincinnati" model: stroke specialist drives to urban/suburban hospitals
2. Telephone "drip and ship"
3. Helicopter "ship and drip"
4. Telestroke
5. Telestroke with helicopter

The problem in Georgia prior to 2003

- tPA not used in rural hospitals-not even available in many pharmacies
- No neurologists in these rural areas and ED physicians not comfortable using tPA
- Lawsuit of a Georgia rural hospital for not treating with tPA
- 2/3 of MCG stroke patients were first presenting to rural EDs and then getting transferred TOO LATE to be treated with tPA

Medicolegal issues

- Lawsuits for “failing” to treat with tPA
- American Academy of Emergency Medicine and Canadian Association of Emergency Physicians have position statements that “tPA is not the standard of care for ischemic stroke”

Solution devised

- Basic principle: Start treatment in rural ED and provide the right care at the right place by the right doctor
- Develop a “user friendly” web-based telestroke system
- None on the market so we custom built our own and called it REACH
- Designed with help/advice of staff in rural EDs

Case presentation

- 62 yo WF with history of paroxysmal atrial fibrillation
- On the way to exercise class, falls and has left sided weakness and severe neglect
- EMS brought to local community hospital
- Evaluated by telestroke (REACH)



Remote Evaluation of Acute IsChemic Stroke: www.reachmcg.com
Visitors website: visitors.reachmca.com

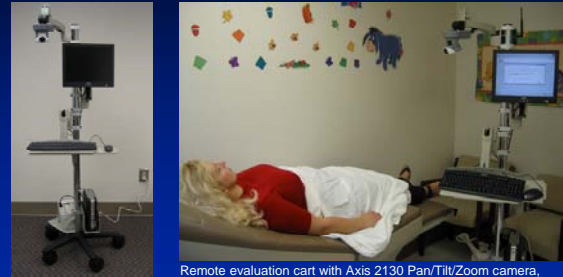
CT scan within one hour of onset of symptoms



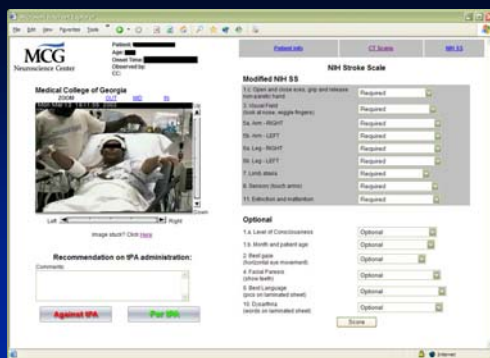
Case presentation

- Neglect and left hemiparesis
- Bruise over left orbit
- Glucose 76
- NIH Stroke Scale Score of 18

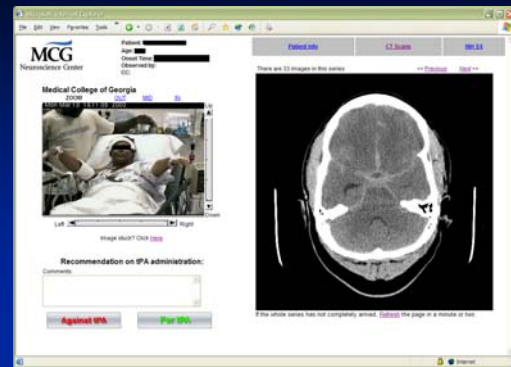
REACH Mobile Cart in ED



Remote evaluation cart with Axis 2130 Pan/Tilt/Zoom camera, 1.5 Ghz Dell PC workstation and LCD monitor, A Linksys WET11 wireless bridge, Netgear 5 port switch, and universal power supply

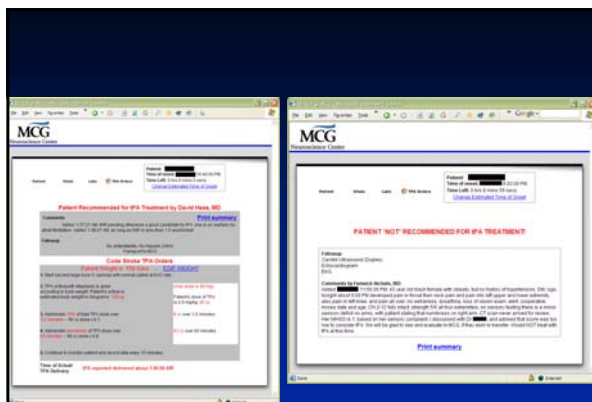


Wang S et al Remote Evaluation of Acute Ischemic Stroke. Reliability of National Institutes of Health Stroke Scale via Telemedicine. Stroke 2003 Sept 18 e pub



Treatment

- Treated with intravenous tPA at 1 hour 50 minutes from time of onset
- Transferred to MCG
- NIH 13 (left leg stronger)
- At 4 hours 30 minutes taken to interventional suite



"Yes" to tPA and "No" to tPA screens at rural sites

Follow up

- Reperfusion of right MCA territory by 7 hours and 30 minutes
- Listening to Beethoven and conversing
- Recovers to NIH of 8 (weakness of left arm)
- Discharged to Walton Rehab Hospital

IV tPA Plus

- Bridging with IV tPA to IA tPA
- Merci Device and other mechanical thrombolysis methods
- Use of transcranial doppler to use ultrasound-enhanced thrombolysis

REACH has "flattened" East Georgia



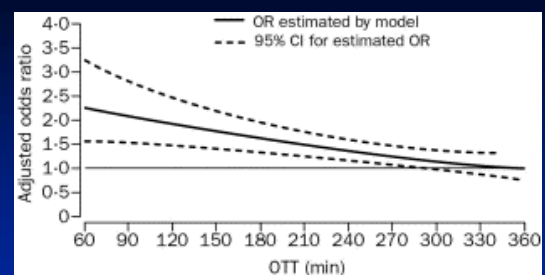
Hess DC, et al. REACH: clinical feasibility of a rural telestroke network. Stroke. 2005 Sep;36(9):2018-20.



The Rural Sites

REACH MCG

- 74 patients treated at 9 rural hospitals with tPA
- Mean onset to treatment time (OTT) of 126 minutes
- ¼ treated under 90 minutes; ½ under 2 hours
- 2 symptomatic ICH (2/74) 3%

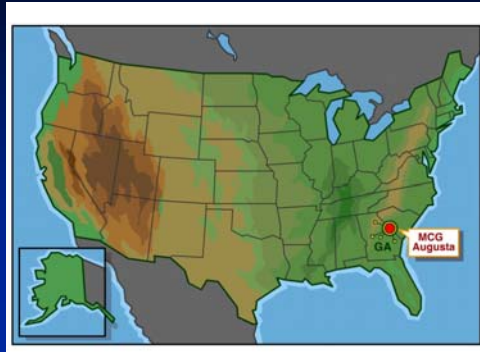


Earlier treatment with tPA leads to better outcomes (Lancet 2004)

Comparison of Onset to Treatment times (OTT) between systems

System	OTT	<90 min (%)	< 2 hr (%)
REACH (N=50)	128	24	50
MCG ED (n=26)	146	19	35
Published stroke systems	148	<5-10	28 (Houston)

National network of hubs and spokes

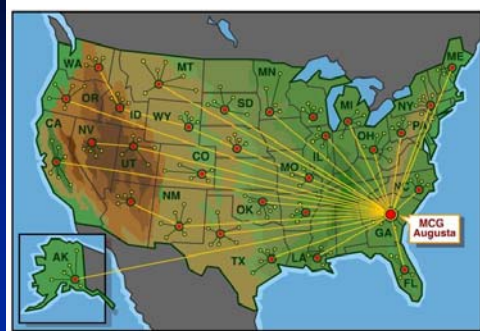


Telestroke can "flatten" any state



NY State Rural Telestroke system enabled by REACH

Flatten the U.S.: Quality Stroke Care Anywhere



Combination treatment with tPA

- Reduce risk of ICH associated with tPA
- Extend window of tPA beyond 3 hours
- Added protective effect

Telestroke and Clinical Trials

- Can telestroke be used to recruit and enroll patients into clinical stroke trials?

MCG Experience in NovoSeven Clinical Trial (FAST)

- 9 patients enrolled
- 6 identified and consent process started via REACH telestroke system in rural hospitals
- Helicopter sent to transport

Does telestroke lead to better outcomes?

- Studies to date are limited
- Difficult to distinguish specific effect of telestroke from staff education

TEMPiS in Bavaria (Audebert HJ, Lancet 2006;9:742-8)

- Open intervention trial of telestroke-directed care vs control of 3122 patients
- 5 community hospitals in telestroke network vs 5 control community hospitals
- Treatment in telestroke group had better outcomes (44% vs 54% poor outcome at 3 mos)

Ischemic stroke and Intracerebral hemorrhage

- | | |
|----------------------------------|----------------------------------|
| ■ tPA | ■ Activated Factor VII |
| ■ Short window (3-4 hrs) | ■ Short window (3-4 hrs) |
| ■ Fibrinolytic | ■ Hemostatic |
| ■ Requires system of stroke care | ■ Requires system of stroke care |

Most urgent needs

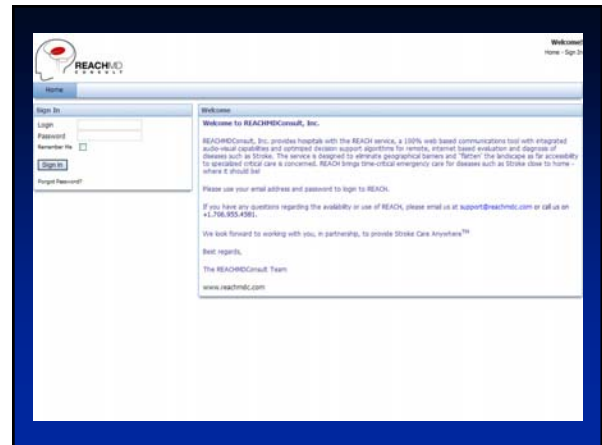
- Systems of stroke care organized by state health departments
- Every American should have quality stroke care regardless of geography
- This will best be achieved with telestroke systems

“Fixed” vs Web-based Telestroke

- Fixed uses dedicated ISDN lines
- Consultant must travel to dedicated sites
- Mobile uses the web (broadband access)
- Consultant can be anywhere*
- Fast access
- REACH, BF (USCD)
- Tempis (Bavaria)
- Mass General, BST

REACH 2.0

- Combines 2 way video, CT viewing (PACS) and decision support (e.g. NIHSS, “prompts”, tPA dosing) on ONE SCREEN
- Built in database, reports, record retrieval
- Designed for “hub and spoke” for regional stroke specialists



Telestroke Issues

- State licensure issues and credentialing
- Reimbursement (NY State Medicaid solving problem in NY)
- Medicolegal (advantages of recording, documentation)
- Cost

Conclusions

- Telestroke can “flatten” stroke care and bring a stroke specialist to ANY rural, community hospital
- Web-based telestroke systems are “fast” with potentially very short onset to treatment times
- Telestroke offers a solution for underserved areas (frontier, rural, suburban, and urban)