

# Telemedicine Initiatives



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# Public Health Impact of Strokes: United States

- Every 45 seconds, someone in the U.S. has a stroke.
- Approximately 700,000 strokes occur each year, of which 200,000 are recurrent
- Stroke is the 3<sup>rd</sup> leading cause of death, and is the leading cause of long-term care disability.
  - 5 million Americans are currently living with effects of stroke.
- Smoking, physical inactivity, diabetes, high blood pressure, and heart rhythm disturbances all increase the risks of having a stroke.
- The American Heart Association projects strokes will cost the US nearly \$58 billion in 2006.

# Public Health Impact of Strokes: New York State

- Strokes killed 6,855 New Yorkers in 2004.
  - 33.45 deaths per 100,000 population.
- There were 51,666 hospitalizations due to stroke in 2004.
- *On average, each year for the past 6 years, 42,000 patients have been treated for strokes at hospitals in New York State, 28 percent under the age of 65.*

# Types of Stroke

## ■ Ischemic stroke

- Caused by blood clot that blocks a blood vessel or artery in brain.
- Accounts for 80% of all strokes.

## ■ Hemorrhagic stroke

- Caused by a blood vessel that breaks and bleeds into the brain.
- Accounts for 20% of strokes.

# Prompt, Effective Treatment is Critical to Patient Recovery

- Studies show risk of death and disability is greatly reduced when patient receives prompt, appropriate treatment.
- The longer blood flow is cut off to the brain, the greater the damage.
  - Thus the saying, “**Time is Brain.**”
- Treatment with a clot-busting drug called t-PA has been shown to improve outcomes.
  - Intravenous t-PA must be given within 3 hours of onset of symptoms.

# The Problem

- Nationally, only a small percentage of patients with ischemic stroke are being treated with t-PA.

# Stroke Survivors

- NIH study of survivors of ischemic stroke age 65 and older:
  - 50% had partial paralysis
  - 30% were unable to walk without assistance
  - 19% had cognitive impairment
  - 35% had depressive symptoms
  - 26% were institutionalized in a nursing home

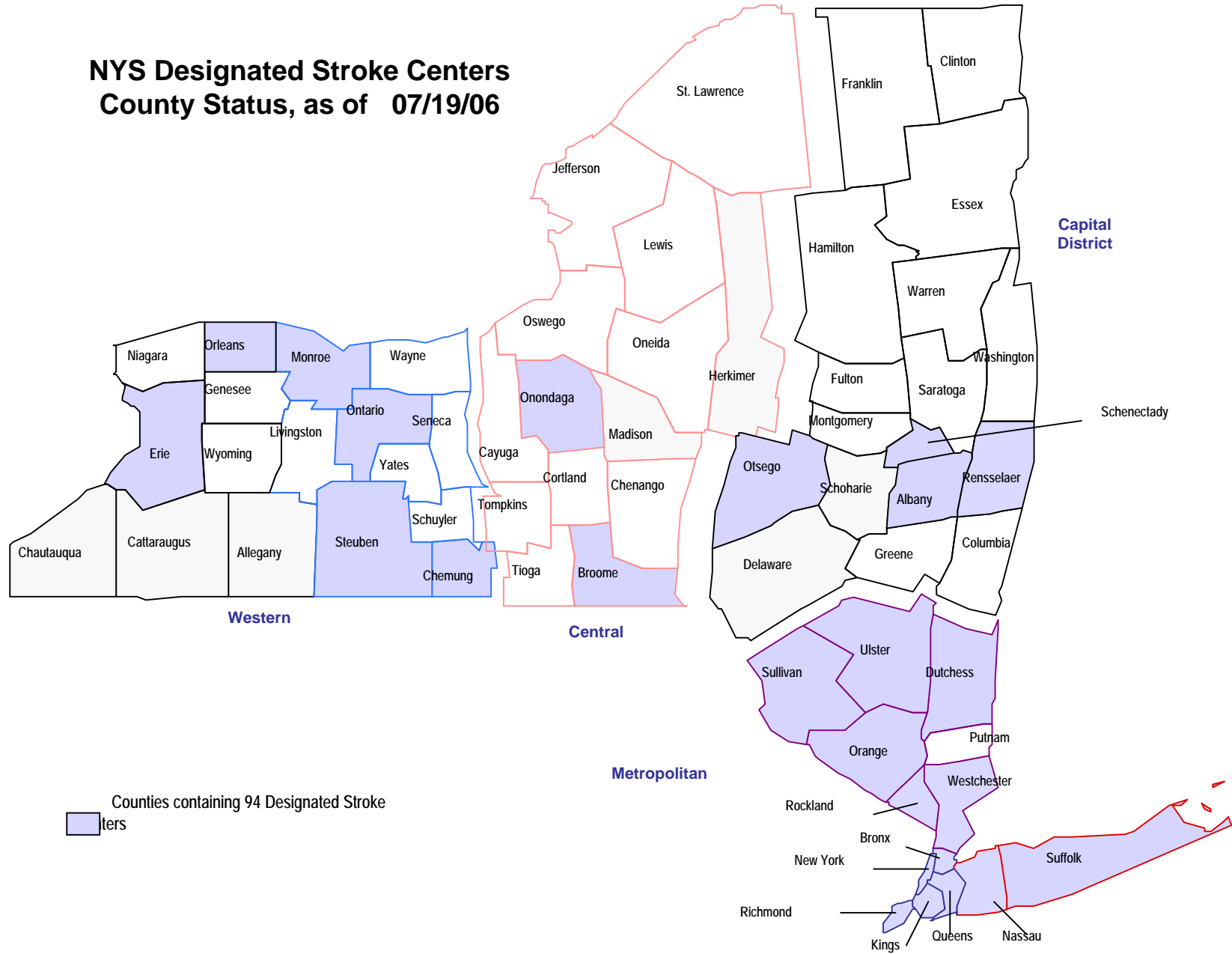
# How NYS is Responding

- 2004 – NYSDOH invited all hospitals in New York State to apply for designation as a Stroke Center.
  - To date, 94 hospitals are designated as Stroke Centers
  - Designation continues on an on-going basis
- Hospital requirements for designation include:
  - Meeting the response times established by Brain Attack Coalition/ National Institute of Neurological Disorders and Stroke.
  - Must have acute stroke teams available 24 hours per day, 7 days a week.
  - Must have a neurologist on staff and immediately available.

# NIH Targets for IV t-PA

- Door to MD..... 10 min
  - Door to CT..... 25 min
  - Door to CT interpretation..... 45 min
  - Door to tPA..... 60 min
- 
- Access to Neurology..... 15 min
  - Access to Neurosurgery..... 2 hrs
  - Door to admission..... 3 hrs

# NYS Designated Stroke Centers County Status, as of 07/19/06



Counties containing 94 Designated Stroke Centers

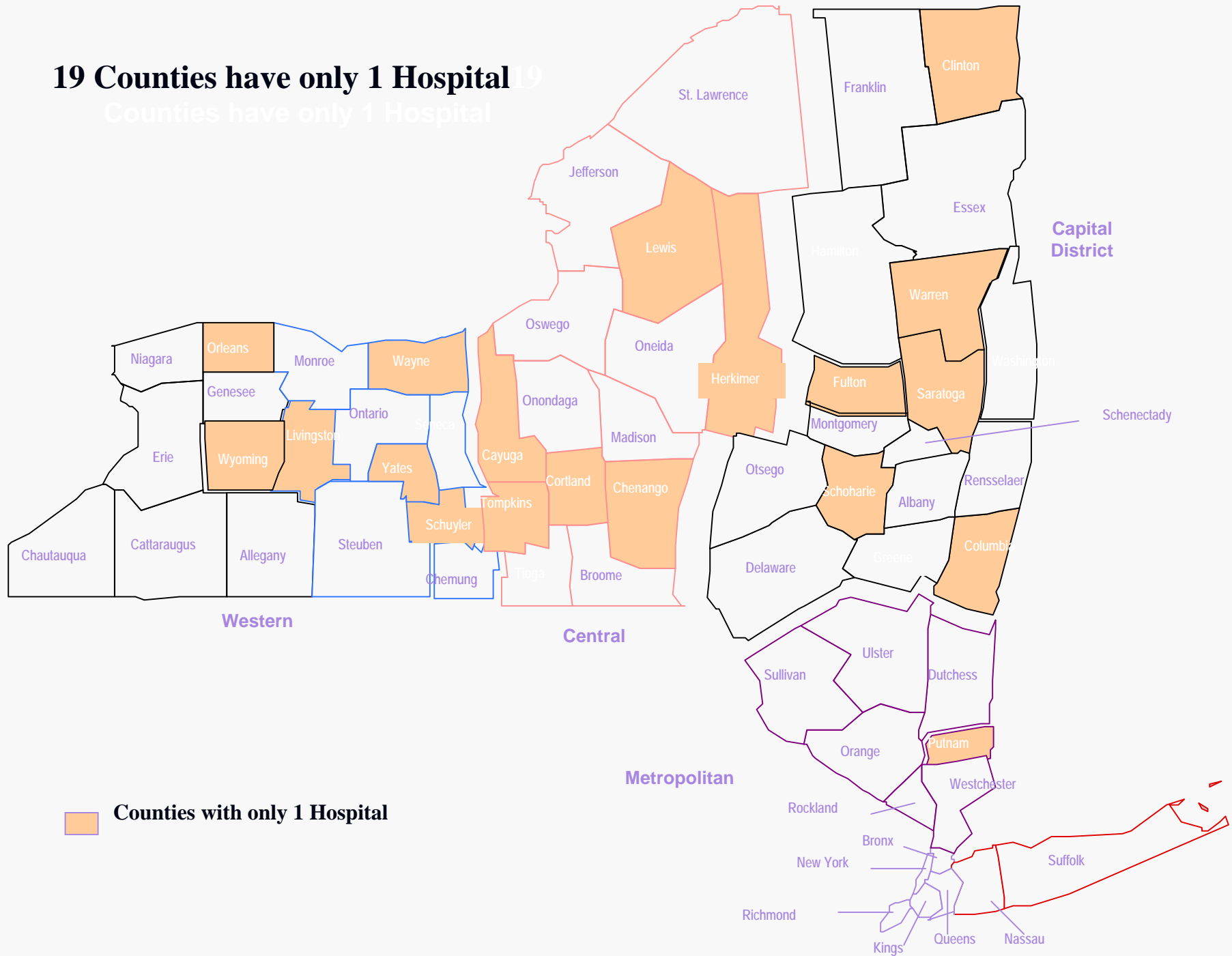
# Special Issues Facing Rural Residents

- 5 counties have no hospital.
- 19 counties have just 1 hospital.
- Lack of access to neurologists in rural areas significantly limits stroke diagnosis and treatment.
- Many rural hospital ED physicians do not have the support systems in place to safely administer t-PA to stroke patients.
- Travel time to nearest NYSDOH designated Stroke Center may place the patient beyond the 3-hour maximum time from onset of symptoms until treatment with t-PA.



# 19 Counties have only 1 Hospital

Counties have only 1 Hospital



# Neurologists in New York State

- Approximately 1,107 full-time practicing Neurologists in New York State.
  - Represent about 2% of all practicing physicians in NYS.
- Average age of Neurologists = 51
- 40% are age 55 or older.
- Nearly 80 percent are over age 45.

Source: 2004 NYS Physician Supply,  
Center for Workforce Studies, SUNY Albany

# Lack of Neurologists in Rural Areas

Neurologists per 100,000 population

Long Island -- 7.9

NYC -- 6.4

Capital District -- 6.3

Hudson Valley -- 5.2

Finger Lakes -- 4.5

Southern Tier -- 3.9

Western New York -- 2.8

Central New York -- 2.5

North Country -- 1.5

Mohawk Valley -- 0.7

Source: 2004 NYS Physician Supply,  
Center for Workforce Studies, SUNY Albany

# Part of NYS initiatives to improve access and quality in health care through advances in technology

- Electronic records
- Electronic drug prescriptions
- Telemedicine

# Telestroke Initiative

- Purpose:
  - To expand access to life-saving stroke treatment for thousands of rural New Yorkers who live too distant from designated Stroke Centers, and would otherwise not be able to obtain treatment within 3 hours of onset of symptoms
  - To provide optimal stroke care regardless of :
    - *Distance*
    - *Resources*
    - *Geography*

# Benefits of Telestroke

- Provides rapid, real-time access to stroke expertise for community hospitals
- Allows hospitals with resource limitations to evaluate and treat acute stroke patients with intravenous t-PA
- Allows hospitals to apply for NYSDOH Primary Stroke Center designation
- Allows greater clinical, educational, and research collaboration between larger medical centers and affiliated community hospitals

# New York's Rural Telemedicine Initiative for Stroke Treatment

- Uses Remote Evaluation of Acute Ischemic (REACH) stroke system developed by Neurology department at Medical College of Georgia. (REACH MD Consult Inc.)
- 100% web-based service that provides decision support solutions for remote diagnosis and evaluation of acute diseases, such as stroke.
- Permits “real time” interactive consultation service to take place between a specialist physician located at one site and the patient and patient’s physician or healthcare provider at another site.
  - The “hub” site is where the medical specialist is located.
  - The “spoke” site is the rural hospital where the referring health professional and patient are located.

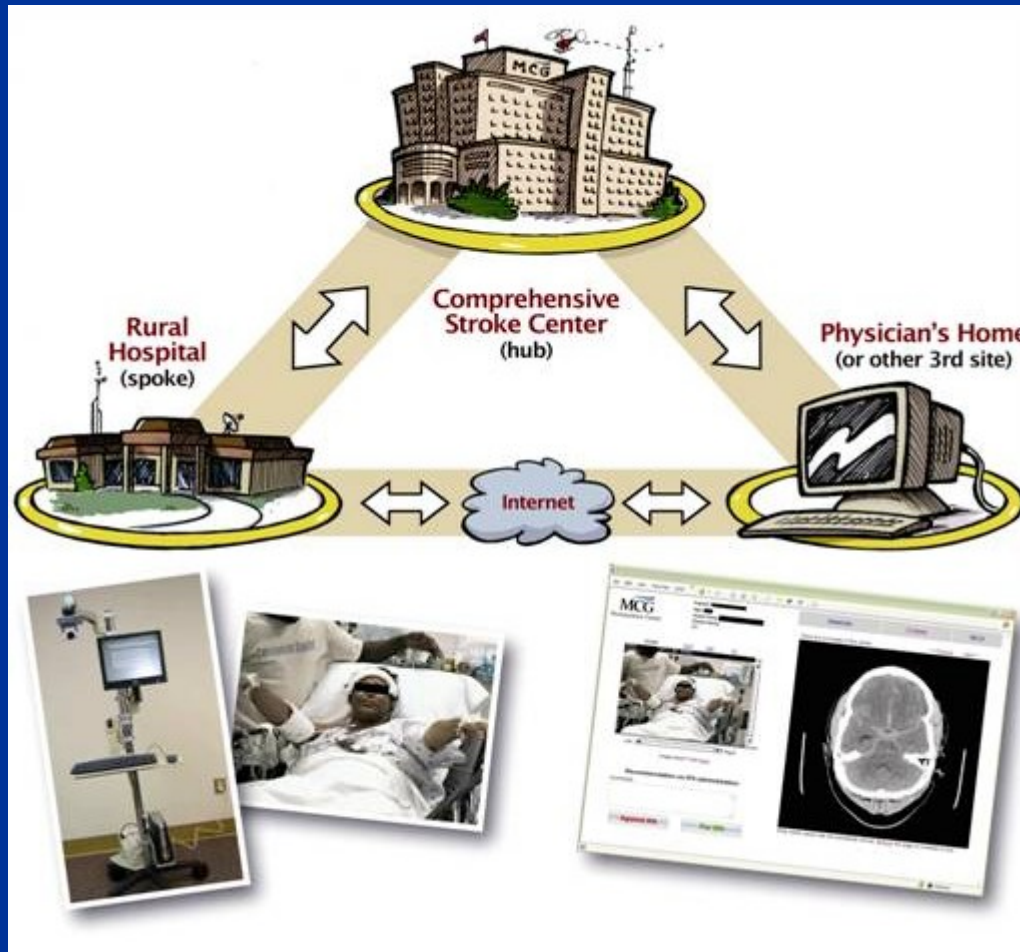
# Georgia Prior to 2003

- Intravenous t-PA was not used in rural hospitals
- There were no neurologists in many rural areas
- ED physicians were not comfortable using IV t-PA
- There was a multimillion dollar lawsuit against a Georgia rural hospital for not treating an acute stroke patient with IV t-PA
- 2/3 of stroke patients were first presenting to rural EDs, and then getting transferred too late to receive IV t-PA at larger facilities

# Georgia's Solution

- 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
- There was no system that was flexible enough to meet their needs, so they custom built their own and called it REACH
- It was designed in collaboration with rural ED staff

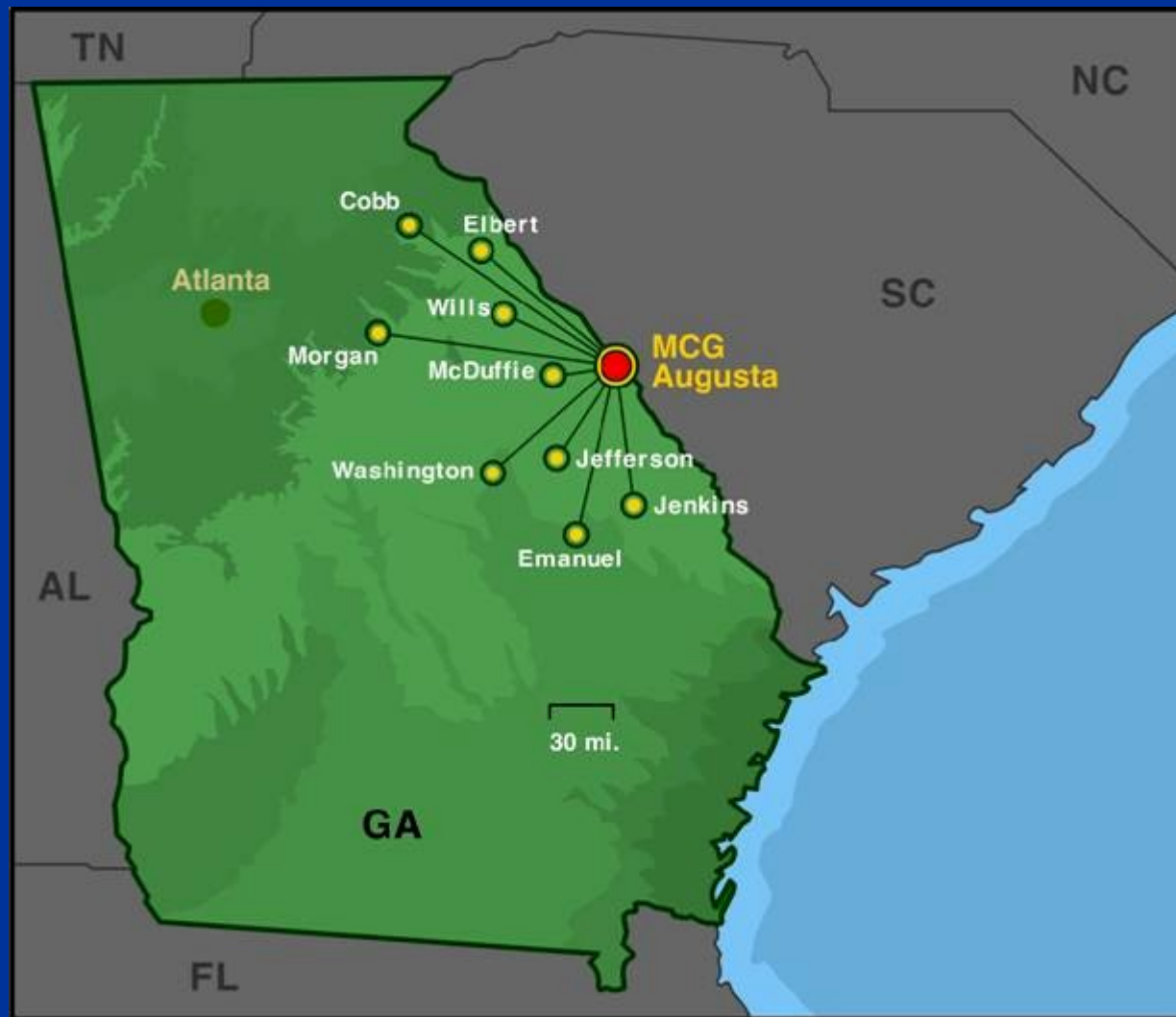
# MCG REACH Model



- Web-based
- Easy to use
- Low cost
- Consultant mobile
- Tested and proven
- Published top journals
- Integrates “decision support”, patient video, and CT images into one screen

Remote Evaluation of Acute IsCHemic Stroke (REACH)  
<http://visitors.reachmcg.com>

# REACH has “flattened” East Georgia



Rural hospitals with bed size of 10-75 in a “Hub and Spoke Model”

# How it works

- Physicians specialized in treating strokes at a Designated Stroke Center will be able to rapidly examine patients with stroke symptoms who are brought to a rural hospital.
- Network allows for full-time (24/ 7) availability of New York State licensed neurologists credentialed to practice in “spoke” hospital.
- A neurologist will remotely examine patients in rural emergency rooms and/or inpatient hospital settings and will also review computed tomography (CT) scans and other patient information.
- Neurologist will make recommendations regarding treatment, including the use of t-PA when appropriate.
- Neurologist can use any secure broadband-connected laptop/computer using wireless Web-based equipment.

# 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

## Required Technology using REACH MD Consult Inc.

### ■ Spoke Hospital

- REACH Cart
  - Computer, UPS
  - Keyboard
  - Monitor, Mouse
  - Wireless Bridge
- CT Scanner
  - DICOM 3.0 Compatible
  - IP Enabled
- Internet Connection
  - 768 kbps upstream
- Telephone

### ■ Hub Hospital

- No Hardware On-site
- No Software On-site
- All Hardware & Software Hosted by REACH

### ■ Physician

- Laptop or PC
- Broadband Internet Connection
- Web Camera
- Telephone

# Consultant screen with drop down NIH SS

Microsoft Internet Explorer


File Edit View Favorites Tools

MCG  
Neuroscience Center

Patient: [REDACTED]  
Age: [REDACTED]  
Onset Time: [REDACTED]  
Observed by:  
CC:

Patient info CT Scans NIH SS

**Medical College of Georgia**  
ZOOM OUT MID IN  
Mon Mar 10 16:11:09 2003



Up  
Down  
Left Right

Image stuck? Click [Here](#)

**Recommendation on tPA administration:**  
Comments:  
[REDACTED]

**Against tPA** **For tPA**

**NIH Stroke Scale**

**Modified NIH SS**

- 1.c. Open and close eyes, grip and release non-paretic hand Required
- 3. Visual Field (look at nose, wiggle fingers) Required
- 5a. Arm - RIGHT Required
- 5b. Arm - LEFT Required
- 6a. Leg - RIGHT Required
- 6b. Leg - LEFT Required
- 7. Limb ataxia Required
- 8. Sensory (touch arms) Required
- 11. Extinction and inattention: Required

**Optional**

- 1.a. Level of Consciousness Optional
- 1.b. Month and patient age: Optional
- 2. Best gaze (horizontal eye movement) Optional
- 4. Facial Paresis (show teeth) Optional
- 9. Best Language (pics on laminated sheet) Optional
- 10. Dysarthria (words on laminated sheet) Optional

Score

Internet

# Consultant screen with CT scan image and patient live video

Microsoft Internet Explorer

File Edit View Favorites Tools


MCG  
Neuroscience Center

Patient: [REDACTED]  
Age: [REDACTED]  
Onset Time: [REDACTED]  
Observed by:  
CC:

[Patient info](#) [CT Scans](#) [NIH SS](#)

There are 33 images in this series << [Previous](#) [Next](#) >>

**Medical College of Georgia**  
ZOOM [OUT](#) [MID](#) [IN](#)  
Mon Mar 10 16:11:09 2003




Up  
Down

Left Right

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**Recommendation on tPA administration:**  
Comments:

**Against tPA** **For tPA**



If the whole series has not completely arrived, [Refresh](#) the page in a minute or two.

Internet

REACH @ MCG - Microsoft Internet Explorer

File Edit View Favorites Tools

MCG  
Neuroscience Center

Patient Vitals Labs **TPA Orders**

Patient: [REDACTED]  
 Time of onset: [REDACTED] 10:40:00 PM  
 Time Left: 0 hrs 0 mins 0 secs.  
[Change Estimated Time of Onset](#)

**Patient Recommended for tPA Treatment by David Hess, MD**

Comments [Print summary](#)  
 Added 1:37:21 AM: INR pending otherwise a good candidate for tPA, she is on warfarin for atrial fibrillation. Added 1:38:07 AM: as long as INR is less than 1.5 would treat

Followup  
 No antiplatelets, No heparin 24hrs  
 Transport to MCG

**Code Stroke TPA Orders**

Patient Weight is: 158 Kilos - [EDIT WEIGHT](#)

1. Start second large bore IV cannula with normal saline at KVO rate.
2. TPA (Activase® Alteplase) is given according to body weight. Patient's actual or estimated body weight in kilograms: 158 kg  
 (max dose is 90 mg)  
 Patient's dose of TPA is 0.9 mg/kg: 90 cc
3. Administer 10% of total TPA dose over 1-2 minutes -- 90 cc dose x 0.1:  
 9 cc over 1-2 minutes
4. Administer remainder of TPA dose over 60 minutes -- 90 cc dose x 0.9:  
 81 cc over 60 minutes
5. Continue to monitor patient and record data every 15 minutes.

Time of Actual TPA Delivery **tPA reported delivered about 1:40:00 AM**

Done Internet

# REACH Treatment Results

- 59 patients (as of May, 2006) treated with intravenous t-PA at 9 rural hospitals
- Mean onset of symptoms to treatment time was 125 minutes
- 25% were treated under 90 minutes; 50% under 2 hours
- There was only one case of symptomatic ICH (< 2% overall incidence)
- The system has proven itself to enable IV t-PA to be safely delivered in a timely fashion to acute stroke patients

# NYS Phase 1 Kick-off

## September 28, 2006

- Millard Fillmore Gates Hospital serving as Hub hospital with Spoke hospitals.
- Bassett Hospital serving as Hub hospital with Spoke hospitals.

# Phase 1 Implementation will include:

- “Hub” hospital – Bassett Hospital (where specialist is located)
  - Serving “spoke” hospitals: (where patient & referring physician are located)
    - O’Connor Hospital (Delaware County)
    - Little Falls Hospital (Herkimer County)
    - Bassett Hospital Schoharie (Schoharie County)
    - Community Memorial Hospital (Madison County)
- “Hub” hospital – Millard Fillmore Gates Hospital (where specialist is located)
  - Serving “spoke” hospitals: (where patient & referring physician are located)
    - Cuba Memorial Hospital (Allegany County)
    - Memorial Hospital of William & Gertrude Jones (Allegany County)
    - Olean General Hospital (Cattaraugus County)
    - TLC Health Network – Tri-County Memorial Hospital (Cattaraugus County)
    - Brooks Memorial Hospital (Chautauqua County)
    - TLC Health Network – Lake Shore Hospital (Chautauqua County)
    - Westfield Memorial Hospital (Chautauqua County)



-  Committed and Funded
-  Committed
-  Tentative

**Western Region  
Selected Spoke Hospitals and Hub Hospital**



# Some questions that have arisen in connection with telemedicine

- Liability
- Physician credentialing
- Clinical Issues and standards of practice
- Quality Improvement
- Financial reimbursement

# Liability

- The consultant relationship in telemedicine is the same as if the consulting neurologist is on site.
- Liability remains the same as in any other consulting arrangement in medicine.
- For clarity, the responsibilities of all parties involved in the telemedicine arrangement should be documented in a written agreement between the Hub and Spoke hospitals.

# Physician Credentialing

- Hub hospital can serve as the agent for Spoke Hospitals for the purpose of collecting physician credentialing data and primary verification of license and training in accordance with New York State Department of Health regulations and JCAHO requirements.

# Clinical Issues and Standards of Practice

- The Department has convened a Neurology Physician Workgroup to advise on ongoing neurological clinical issues and standards of practice, including telemedicine arrangements.

# Quality Improvement

New York's Stroke Telemedicine Initiative includes a unique data collection and reporting system that allows real-time monitoring of consult & treatment

## ■ Hub hospital data includes:

- Start of consultation
- Start of NIHSS score evaluation
- End of NIHSS score evaluation
- Submission of t-PA recommendation and consultation
- Average consultation time
- Number of consultations
- Number of t-PA recommendations

## ■ Spoke hospital data includes:

- Patient medical info is complete
- Vital signs
- Start of remote consultation
- End of remote consultation
- Average consultation time
- Number of stroke patients admitted
- Number of stroke patients given t-PA
- Number of stroke patients NOT given t-PA

# Financial Reimbursement

- A Medicare reimbursement rate (DRG) is currently available for telemedicine service in stroke emergency care and tPA administration.
- Effective September 1, 2006, New York State established Medicaid reimbursement and coverage of specialist consultations for emergency room and inpatient hospital consultation services via telemedicine interactive audio and video telecommunication system.
- Ongoing meetings are being held with the State Insurance Department and managed care plans to ensure third-party reimbursement of telemedicine services.



# Future Stroke Telemedicine Arrangements

## ■ Syracuse

- SUNY Upstate Medical University Hospital serving as Hub hospital met on October 31, 2006, with potential Spoke hospitals.

## ■ Albany

- Albany Medical Center, serving as Hub hospital, has scheduled a meeting for December 5, 2006, with potential Spoke hospitals.

## ■ Other areas of the State

- NYC already moving forward with stroke telemedicine initiative.
- Other upstate hospitals also interested.

# Other Telemedicine Initiatives on the Horizon

- Interest has been expressed by hospitals in developing telemedicine modules in the delivery of Cardiology, Dermatology, and Psychiatry.
- Some nursing homes have also expressed interest in using telemedicine consults for their patients.

# The Future Of Medicine in NYS

- *Telemedicine is a critical part of the future of medicine*
- NYS is moving ahead of the pack, with implementation of our major telemedicine “hub-spoke” system, to enable a comparable level of initial stroke care to be provided at the most rural of facilities, as is provided at larger, tertiary care facilities
- This is only the first of what should be many other uses of this proposed system
- The NYS Department of Health can take great pride in being the impetus for this change of the practice of medicine, one which will truly raise the bar on the level of care afforded stroke patients today, and patients in general tomorrow

# Questions?

