New York State Rural Telemedicine Initiative: A Model for the Country

New York State – 62 Counties

New York City – 5 Counties (Boroughs)

Upstate New York – 57 Counties

Rural Counties - 44

Public Health Impact of Strokes: United States

- Every 45 seconds, someone in the U.S. has a stroke, and every 3 minutes someone dies.

- Stroke is 3rd leading cause of death (about 1 of every 15 deaths).

- Estimated 700,000 strokes occur each year.
    - 500,000 first attacks
    - 200,000 recurrent attacks

- Women accounted for 61% of stroke deaths in the U.S. in 2003.

Public Health Impact of Strokes: United States (cont'd.)

- American Heart Association projects strokes will cost nearly $58 billion in 2006.

  - Includes health care services, medications, and lost productivity.

- Stroke is leading cause of long-term care disability.

  - 5 million Americans currently living with effects of stroke.

Nearly 45% of stroke survivors 65 and older have moderate or severe disability

- 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

What Increases the Risk of Stroke

- Smoking
- Physical inactivity
- Diabetes
- High blood pressure
- Heart rhythm disturbances

Public Health Impact of Strokes:
New York State

- Strokes killed 6,855 New Yorkers in 2004.

  - 33.45 deaths per 100,000 population.

- 51,666 hospitalizations due to stroke in 2004.

- *On average, each year for the past 6 years, nearly 42,000 patients have been treated for strokes at hospitals in New York State.*

  - *Nearly 28 percent involved patients under age 65.*

Incidence and Mortality Rates for Racial and Ethnic Minorities

- National data show that blacks have almost twice the risk of having a first-ever stroke compared with whites.

- Death rates from stroke are substantially higher for African Americans than for whites.

In New York State, the Northern Manhattan Stroke Study at Columbia University found that, compared to whites, Hispanics and African Americans had higher rates of ischemic stroke, the most common
type of stroke.

The Columbia University study also found that, compared to whites, African Americans and Hispanics had significantly higher prevalence of risk factors for stroke – including hypertension, diabetes, high cholesterol, and smoking.

Two Main 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.

Ischemic Stroke:
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."

Ischemic Stroke:
Prompt, Effective Treatment is Critical to Patient Recovery

- Treatment with a thrombolytic agent called tPA has been shown to significantly reduce disability and death associated with Ischemic stroke.
  - t-PA must be given within 3 hours of onset of symptoms.

Many Stroke Victims Don't Receive Prompt Effective Treatment

- Nationally, several studies have shown that, only a small percentage of patients with ischemic stroke are being treated with t-PA.
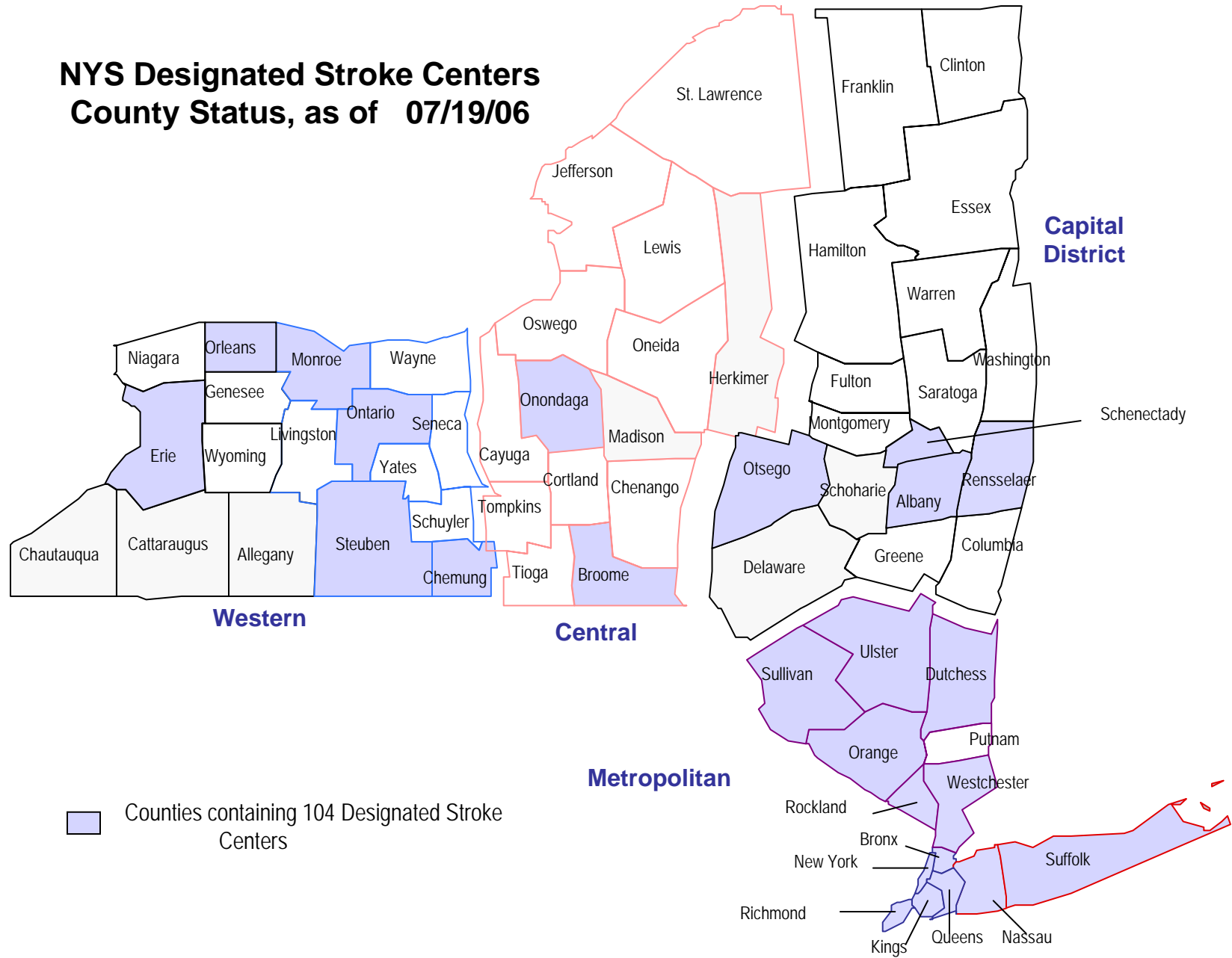
How NYS is Responding

- The NYS Health Department, in collaboration with New York State hospitals, has launched a major initiative to increase New Yorkers' access to prompt, effective stroke treatment.

- 2004 – NYSDOH invited all hospitals in New York State to apply for designation as a Designated Stroke Center.

    - To date, 104 hospitals have received Designated Stroke Center approval.

    - Designation continues on a rolling basis.

How NYS is Responding

- Hospital qualifications for designation include:

    – Must follow diagnostic/treatment protocol and meet response times as established by Brain Attack Coalition and the 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 available.

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

Capital District

Western

Central

Metropolitan

St. Lawrence

Jefferson

Lewis

Oswego

Oneida

Herkimer

Franklin

Clinton

Essex

Hamilton

Warren

Washington

Fulton

Saratoga

Montgomery

Schenectady

Niagara

Orleans

Monroe

Wayne

Genesee

Ontario

Seneca

Livingston

Wyoming

Yates

Erie

Chautauqua

Cattaraugus

Allegany

Steuben

Chemung

Schuyler

Cayuga

Cortland

Tompkins

Tioga

Onondaga

Madison

Chenango

Broome

Otsego

Schoharie

Albany

Rensselaer

Delaware

Greene

Columbia

Ulster

Dutchess

Sullivan

Orange

Putnam

Westchester

Rockland

Bronx

New York

Suffolk

Richmond

Nassau

Kings

Queens

Counties containing 104 Designated Stroke Centers

Full engagement of Emergency Medical Services (EMS) leaders in the project is necessary because our evaluation of data shows that 50% of stroke victims are taken to the hospital by EMS.

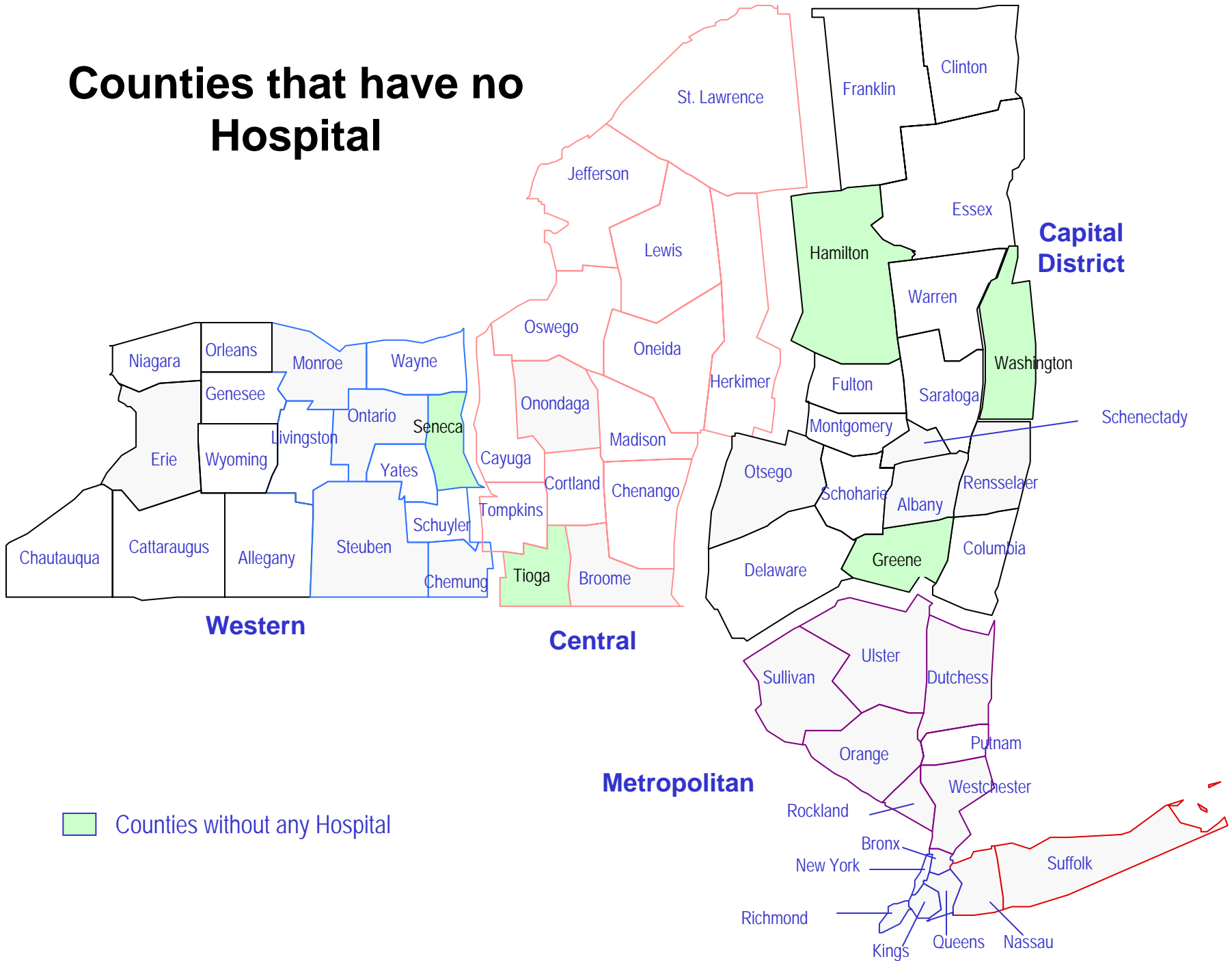The total EMS response time – from the 911 call to arrival of the patient at the hospital – should be within 45 minutes. This timing is critical because the emergency department at the stroke center should begin treatment with tPA within 60 minutes of the patient's arrival.

When these response times are met, the patient stands the greatest chance of survival and recovery.

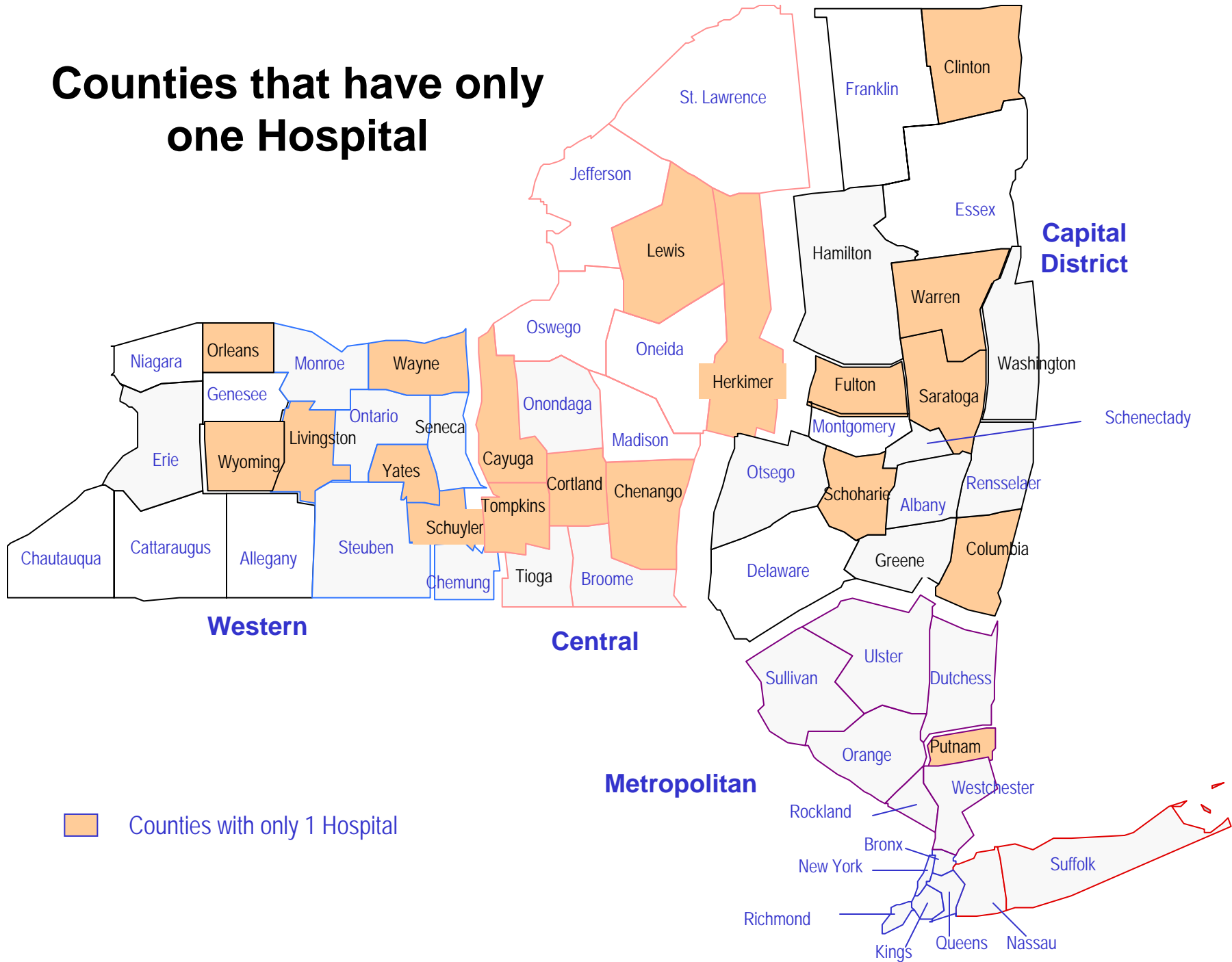# Special Issues Facing Rural Residents That Prompted This Initiative

- 5 New York State counties have no hospital.

- 19 New York State counties have just 1 hospital.

Counties that have no Hospital

St. Lawrence

Franklin

Clinton

Jefferson

Essex

Lewis

Capital District

Hamilton

Warren

Oswego

Washington

Oneida

Fulton

Saratoga

Niagara

Orleans

Monroe

Wayne

Herkimer

Schenectady

Genesee

Ontario

Montgomery

Seneca

Livingston

Onondaga

Madison

Otsego

Schoharie

Albany

Rensselaer

Erie

Wyoming

Cayuga

Chenango

Cortland

Columbia

Yates

Chautauqua

Cattaraugus

Allegany

Steuben

Schuyler

Tompkins

Delaware

Greene

Western

Chemung

Tioga

Broome

Central

Ulster

Dutchess

Sullivan

Orange

Putnam

Metropolitan

Westchester

Rockland

Bronx

New York

Richmond

Suffolk

Kings

Queens

Nassau

⬜ Counties without any Hospital

Counties that have only one Hospital

Niagara

Orleans

Monroe

Wayne

St. Lawrence

Franklin

Clinton

Jefferson

Essex

Capital District

Lewis

Hamilton

Genesee

Ontario

Seneca

Oswego

Oneida

Herkimer

Warren

Washington

Erie

Wyoming

Livingston

Yates

Onondaga

Madison

Fulton

Saratoga

Schenectady

Chautauqua

Cattaraugus

Allegany

Steuben

Cayuga

Cortland

Chenango

Montgomery

Schoharie

Albany

Rensselaer

Tompkins

Schuyler

Chemung

Tioga

Broome

Otsego

Delaware

Greene

Columbia

Western

Central

Metropolitan

Sullivan

Ulster

Dutchess

Orange

Putnam

Westchester

Rockland

Bronx

New York

Suffolk

Richmond

Kings

Queens

Nassau

Counties with only 1 Hospital

Other Issues

- Lack of access to neurologists in rural areas to provide stroke diagnosis and treatment.

- Many rural Hospital Emergency Room physicians do not have the support systems in place to administer t-PA to stroke patients.

- Travel time to nearest Designated Stroke Center may place the patient beyond the 3-hour maximum for treatment with t-PA.

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 (77,000).

- Average age of Neurologists = 51

- 40% are age 55 or older.

- Nearly 80 percent are over age 45.

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

Purpose of Telemedicine Initiative

- To expand access to life-saving stroke treatment for thousands of rural New Yorkers who live too far from designated Stroke Centers and who otherwise might not be able to obtain effective treatment within 3 hours of onset of symptoms.

NYS Rural Telemedicine Initiative:

- Bringing rural New Yorkers access to prompt, effective stroke treatment

- Reduce morbidity and mortality

- Achieve better long-term outcomes in stroke rehabilitation

What is Telemedicine?

- Uses advances in the internet and telecommunications to improve health care service availability in underserved areas.

Uses of Telemedicine

- Alaska uses telemedicine to increase access to primary care in remote areas.

- Home care providers use telemedicine to continuously monitor chronic medical conditions.

- Residents of Indian reservations in South Dakota receive primary care in consultation with doctors at the Mayo Clinic.

- National Cancer Institute uses telemedicine to conduct consults on difficult cancer cases, cancer research, and clinical trial eligibility.

New York's Use of Telemedicine in Rural Areas

- Uses REACH (Remote Evaluation of Acute isCHemic stroke) system developed by REACH MD Consult, Inc. based in Augusta, GA and East Brunswick, NJ .

- 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.

In the REACH System These Sites are Referred to as 'Hub' and 'Spoke'

- 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.

Western Region Example
Selected Spoke Hospitals and Hub Hospital

REACH System

- A service – not a product
- Developed and supported by REACH MD Consult, Inc. in Augusta, GA and East Brunswick, NJ
- 100% web-based service
- Network allows for full time (24/7) availability of New York State licensed neurologists over secure internet
- Stroke patients can be rapidly viewed, from any place, using computer with high speed internet access.
- Allows for secure, 2-way videoconference face-to-face consultation.

System Security Measures

- Health Insurance Portability And Accountability (HIPAA) compliant

- All data sent encrypted over secure internet connection

- Data is not accessible publicly (protected by REACH MD consult and REACH Web application)

- Video transmission is secure – password protected, 128-bit encryption over HTTPS (Hyper Text Transfer Protocol Secure)

How it will work

- 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 tPA when appropriate.

- Neurologist can use any secure broadband-connected laptop/computer using wireless Web-based equipment.

How It Works

- **Camera at top of monitor is directed on patient for viewing by consulting specialist at remote location.**

- **Remote Consultant has complete pan, tilt, zoom and focus controls over the camera**

- **Patient's vital signs, test results, CT scans, and other medical information are transmitted to consultant over secure VPN (virtual private network) tunnel using 128-bit SSL encryption.**

REACH Telemedicine Model
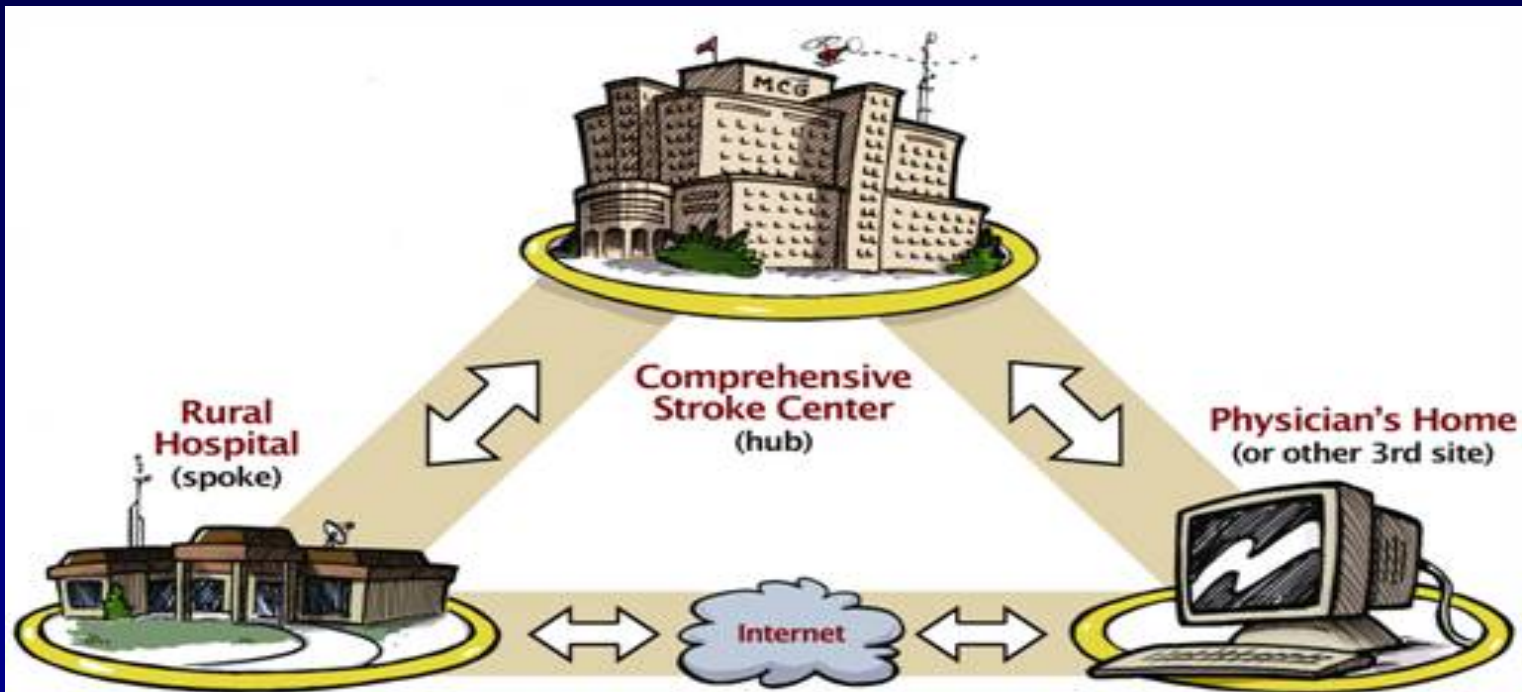
Required Technology using REACH MD Consult Inc.

- **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**

REACH Consult – Step by Step

- Stroke patient admitted in the Spoke ER
- Spoke Nurse / ED Dr. uses REACH Cart to add patient to REACH for consultation
- Spoke CT Technician uses CT Scanner to send patient CT scans to REACH servers
- Spoke Nurse / ED Dr. calls Hub Hospital to initiate a REACH consult with on-call physician
- Hub Hospital routes call to on-call physician
- Physician takes call and logs on to REACH via any PC/laptop and webcam
- Physician performs complete consult, views CT scans and makes recommendation
- Spoke Nurse / ED Dr. receives a complete consultation report in PDF format.
- Spoke Nurse / ED Dr. executes recommendation and ends REACH Consult

How Scan Images are Transmitted

- Dicom is the standard format that will be used.

- Any hospital with Dicom capability can be in the REACH system.

- Hospitals with standard CT scanner will be able to transmit

Consultant screen with CT scan image and patient live video

Consultant screen with drop down NIH Stroke Scale

NIH Stroke Scale
Among Tools Used to Diagnose Patient

- **Level of Consciousness**

- **Gaze**

- **Visual loss**

- **Facial Palsy**

- **Arm/Leg movement**

- **Limb ataxia (muscle coordination)**

- **Sensory loss**

- **Language (use/comprehension)**

- **Dysarthria (difficulty articulating words)**

- **Neglect (degree of inattention)**

- **Takes from 6-9 minutes to complete**

Score of 10 or less: Stroke is mild to moderate; patient is good candidate for t-PA.
Score over 10: Evidence of major stroke; 75% reduced recovery for patients.

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 <u>Neurology Physician Workgroup</u> to advise on ongoing neurological clinical issues and standards of practice, including telemedicine arrangements.

Quality Improvement

New York's Stroke Telemedicine Initiative includes a <u>unique data collection and reporting system</u> 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 tPA recommendation and consultation
  - Average consultation time
  - Number of consultations
  - Number of tPA 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 tPA
  - Number of stroke patients NOT given tPA

Pertinent Issues

Financial:

- Medicare Diagnostic Related Groups (DRG) currently available for stroke emergency care and tPA administration

- Medicaid reimbursement/coverage of specialist consultations via telemedicine currently available effective September 1, 2006 for emergency room and inpatient hospital consultation services.

When is Telemedicine Covered?

- Telemedicine is reimbursable when a patient is located at a spoke site and needed specialist is located at a hub site.

- A consultation involving a patient and a specialist is medically necessary, and a specialist is not available at the spoke site to provide a timely consultation;

- A request for a consultation and the need for a consultation is documented in the patient's medical record;

- The consultation opinion is documented in the patient's medical record and communicated to the requesting provider;

- The consultation code is billed with the appropriate modifier

- The consulting physician is licensed in NYS, practicing within the scope of his/her specialty practice, enrolled in the NYS Medicaid Program and meets the credentialing requirements

Physician Billing for Telemedicine

- Reimbursement will be the same amount as in-person specialist consultations.
- Payment for telemedicine specialist consultations will be limited to codes **99241-99245 and 99251-99255**.
- If t-PA administration and stroke care are given, payment will refer to DRG 880
- DRG 880 pays in the $17,000-$20,000 range depending on the hospital. It includes stroke care and thrombolytic therapy.

Physician Billing for Telemedicine

- If at some point during the inpatient admission it is medically indicated to transfer the patient to a hub or designated stroke hospital, the spoke hospital is eligible for a transfer rate.

- The spoke hospital gets the transfer rate of $1600-1800/day. The hub or designated stroke hospital then becomes eligible for DRG 14.

- DRG 14 pays in the $10,000-12,000 range. It does not include thrombolytic therapy.

FUTURE

Phase Two

- Other areas of the state - NYC hospitals already moving ahead with telemedicine.

- Modules for Cardiology, Dermatology, Psychiatry are being developed.

- Interest is being expressed by several nursing homes and skilled nursing facilities.

REACH 2.0 Reports

The reporting capabilities of REACH.

General Features of REACH Reports

- Generate reports for the following system-defined time periods. Reports are available per hour, per week, per month and per year:

  - All
  - Year-to-Date
  - Current Week
  - Current Month

  - Current Year
  - Last Week
  - Last Month
  - Last Year

General Features of REACH Reports (cont'd.)

- All reports display the total number of records in the report.

- Users can use page navigation controls to access records displayed by the report. These controls are relevant for multi-page reports.

- All reports are real time and reflect data collected until the time of report generation.

Spoke Hospital Reports

Reports are generated as a result of data collected from Spoke Hospital activity.

Spoke Hospital Timestamp Reports

REACH captures timestamps from the Spoke users when:

- A new patient is added
- Patient information is entered
- Incidence information is entered
- Vitals are entered
- Blood vitals are entered
- Remote consultation is started
- Remote consultation is ended

Preliminary Findings of Telemedicine Initiative

- **Studies to date are limited.**

- **Difficult to distinguish specific effect of telestroke from staff education.**

Georgia REACH Network

- 74 patients treated with tPA in 9 rural hospitals (bed size 10-75)
- Mean NIHSS of 13.3
- Mean length of NIHSS exam 7.25 minutes
- Mean onset to treatment 128 minutes
- 2/74 (3%) with symptomatic ICH
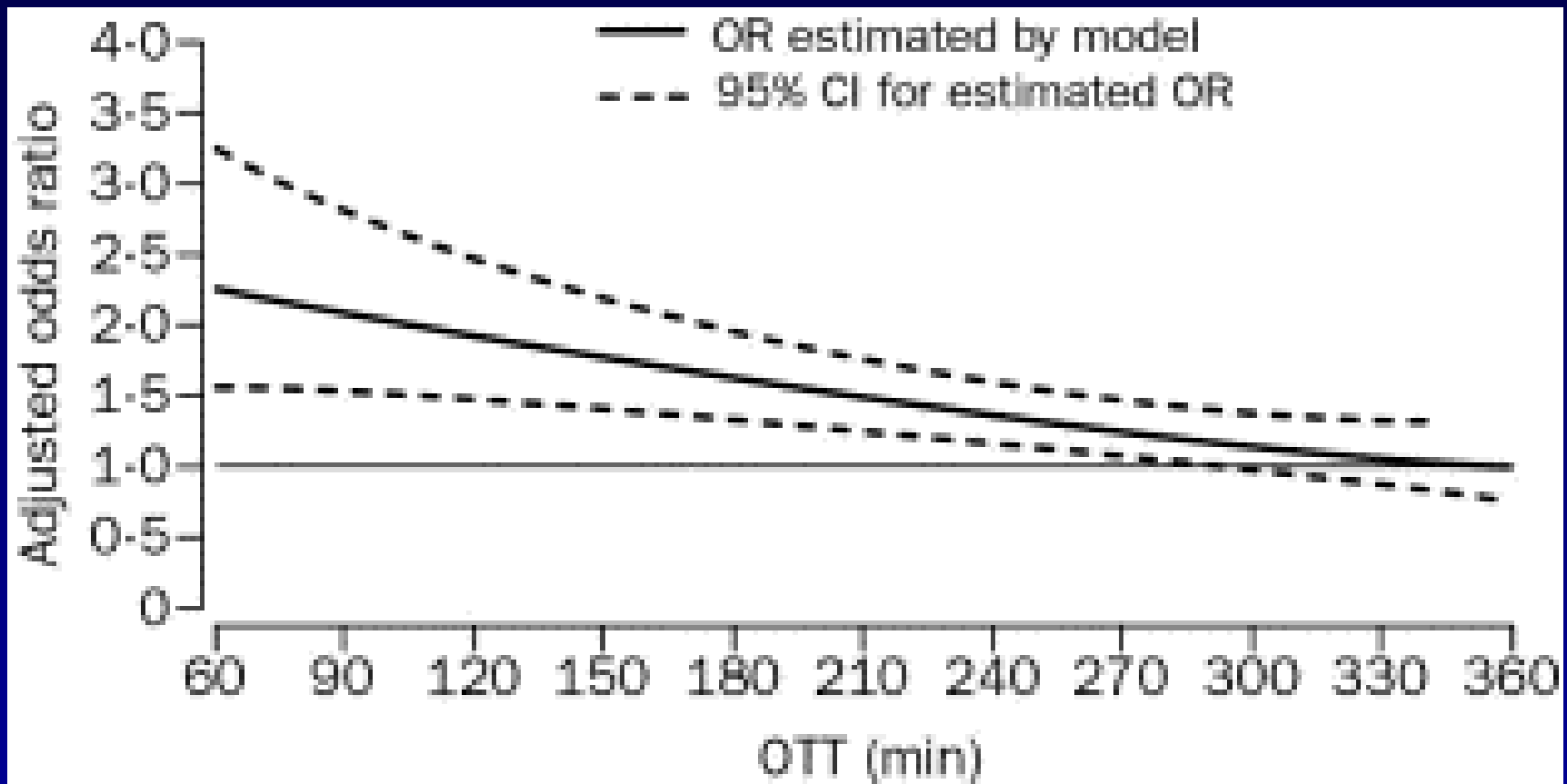
**Earlier treatment with tPA leads to better outcomes
(Hacke et al, Lancet 2004;363:768-774)**

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

- Open intervention trial of telestroke-directed care vs. control of 3,122 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 months.

New York State Preliminary Results

	Patient	Time of Onset	Time In ER Door	Minutes From Onset to In ER	Time of Consult	Minutes From In ER to Consult
	Patient 3 11/19/2006	19:00	19:30	0:30	19:59	0:29
	Patient 2 11/17/2006	10:40	12:00	1:20	12:57	0:57
	Patient 1 11/15/2006	11:00	11:30	0:30	12:50	1:20
Averages				**0:46**		**0:55**

New York State Preliminary Results

	Time of Decision	Minutes from Consult to Decision	Contra-indications Submitted	NIHSS	Diagnosis	Result
	20:18	0:19	20:20	10	TIA	Admitted to S4
	13:02	0:05	13:22	0	Amnesia, TIA	Transferred to MFG
	13:05	0:15	13:06	3	TIA	Discharged to home
Averages		**0:13**				

What are the contraindications to the administration of t-PA?

- If the patient has Hemorrhage
- Time from onset is beyond 3 hours
- Blood pressure is too high and can't be brought down safely
- Presence of intracerebral hemorrhage on CT scan
- Any bleeding problem
- Rapidly getting better while you watch
- Patient had recent surgery
- Symptoms are too mild to justify the risk

Georgia REACH Network:
Reasons for not treating with T-PA

- Rapidly improving
- Beyond time window
- Uncontrolled hypertension
- Bleeding contraindication
- Prolonged INR (on coumadin)
- Poor medical condition
- Too mild (NIHSS<4)
- Intracranial hemorrhage
- Other CT contraindication
- Seizures
- Conversion reactions

Conclusions

- A rural telestroke network designed on a "hub and spoke" model can dramatically increase tPA rates
- This network can remove the "rural penalty" for stroke care
- Now patients in rural areas can receive "expert stroke care" 24 hours per day, 365 days per year, despite where they live.
- Distance and geography no longer matter
- Today: Stroke Care Anywhere™
- By 2010:   Critical Care Anywhere™

Other Issues

Costs of Initiative from REACH

Spoke Hospital:
- $78,400 for 3 years

  Or

- $26,134 /year
- $2,179/month

Hub Hospital:
- $60,000 per year for 3 year period

Cost of tPA

The cost of tPA is $2,300 for a 100 mg vial..

- Which is equivalent to $6-8,000 per patient administration.
- Both Medicare and Medicaid pay for the administration of tPA – currently working with private insurers.

FCC Establishes Rural Health Telemedicine Pilot Program

The Federal Communications Commission has released information about a two-year rural health telemedicine pilot program that aims to enhance public and non-profit health care providers' access to advanced telecommunications and information services. The pilot program will provide funding for up to 85% of an applicant's costs to support the construction of state or regional broadband networks and services provided over those networks. In addition, the pilot program will provide funding to support the cost of connecting rural health facilities to government research organizations, academic, public and private health care institutions with medical expertise and information. The program will also pay for 85% of an applicant's costs for using the advanced telecommunications and information services that will ride over the network. The FCC decided to offer the pilot program after realizing that only 10% of its set aside funding for rural health telemedicine under the Telecommunications Act of 1996 was being utilized. Hospitals can apply electronically for the program.

http://a257.g.akamaitech.net/7/257/2422/01jan20061800/edocket.access.gpo.gov/2006/E6-18759.htm

http://www.fcc.gov/cgb/ecfs/

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Questions?