



Enhancing Telehealth Systems to Increase Access and Improve Stroke Outcomes in Maine

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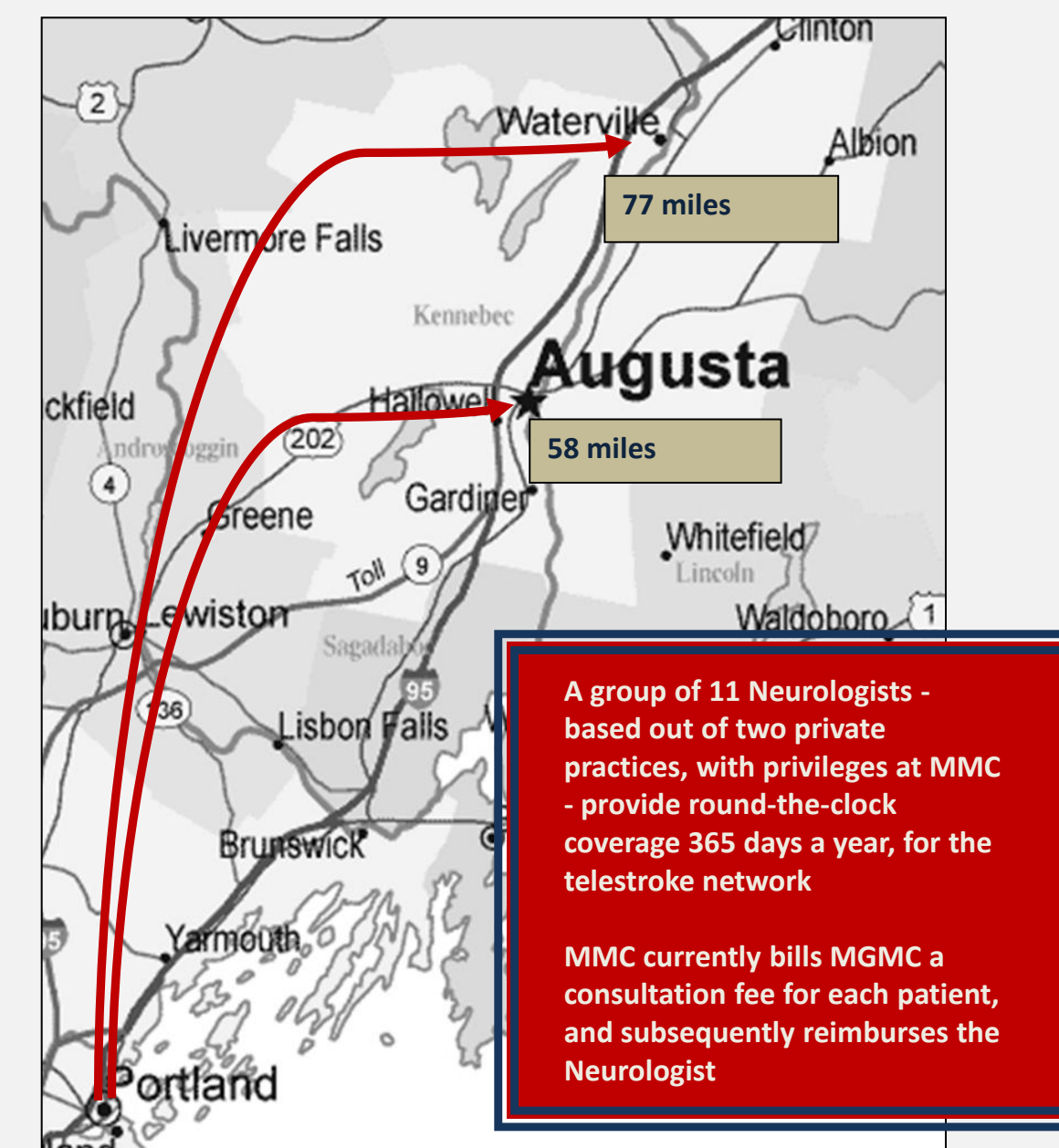


Background

Rapid diagnosis and treatment are essential to improving stroke survival and morbidity. In Maine, multiple factors, including rural geography, limited exposure among Emergency Department providers, and neurology shortages present significant challenges to better outcomes.

In July 2008, the Maine CDC/DHHS Cardiovascular Health Program requested proposals from Maine hospitals, with a goal of addressing these issues, to facilitate improved care and outcomes associated with acute stroke.

In response, Maine Medical Center (MMC-Portland) and MaineGeneral Medical Center (MGMC-Augusta/Waterville) submitted a collaborative proposal, which focused on development and implementation of a telestroke pilot linking MMC neurologists with MGMC Emergency Departments.



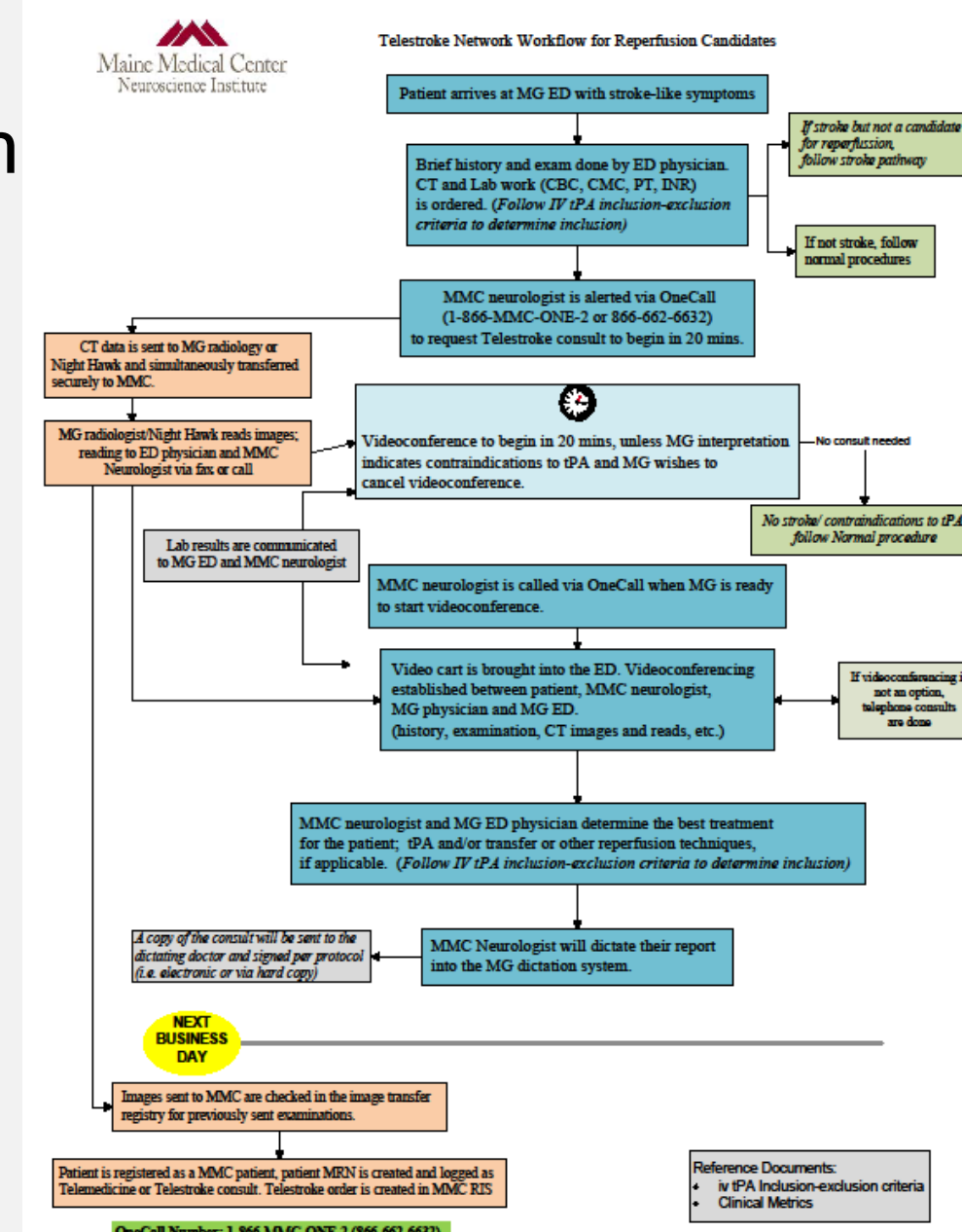
Telestroke Pilot Objectives

To determine whether a telestroke pilot between two Maine hospitals would:

- Increase the number of patients receiving evidence-based stroke care, specifically increased administration of tPA in eligible patients
- Improve patient outcomes, including morbidity and mortality
- Increase provider confidence in acute stroke diagnosis and treatment

Methods

- To increase the number of acute stroke patients receiving evidence-based diagnosis and treatment at MGMC, and thereby improve patient outcomes, stroke teams collaborated to develop a telestroke protocol and instruction manual, to be practiced at each site.
- Training from both clinical and technical perspectives was conducted among neurologists and ED providers at respective sites, to increase provider confidence in the use of telehealth to effectively diagnose and treat acute stroke. Multiple "mock stroke" cases were conducted between MMC neurologists (in-house and remote sites) and MGMC Emergency Departments (two campuses) to identify technical issues, and to familiarize providers with the protocol and equipment. An educational video was produced and can be viewed under the stroke program at: <http://www.mmc.org/neuro>
- Teams worked with IT specialists to increase capacity of existing PACS networks, trouble-shoot technical issues and install units for audio-visual consultations. (PVX videoconferencing at MMC and Tandberg at MGMC)
- To measure ongoing impact of the intervention, a data abstraction tool was developed, and is completed by the MMC neurologist on-call, for each MGMC stroke patient receiving care via the telestroke protocol. Telestroke patient data are entered into a Microsoft Excel database for tracking and analyses.
- Due to the small sample size (N=5 for first quarter of the pilot), statistical analyses have been limited to mean calculations, and comparison of highest and lowest data points, to identify any outliers. Further analyses to determine the significance of specific outcome measures will be conducted when the sample size has reached a number which is conducive to more rigorous statistical analyses.



Pilot Results

All results are based on the first three months of live network linkage between MMC and MGMC: March 1 through May 31, 2009:

- Five out of 33 MGMC stroke patients presented to the ED within 2 hours of symptom onset, were evaluated and considered potential candidates for tPA, and a telestroke consult was established with MMC.
- Stroke teams met pilot time interval goals for all cases: Telestroke consult activation (<20 mins.) and tPA administration in eligible patients (<60 mins.)^{1,2}
- Three of the five patients received tPA at MGMC, and all five were transferred to MMC for follow up.^{1,2} In comparison, just one patient out of 152 MGMC patients diagnosed with ischemic stroke between January and December 2007, received tPA.⁴
- There was one complication among the telestroke patient population - venous thrombosis.^{1,2}
- Technology issues arose during two of the telestroke consults, and included: computer security, delay in receiving PACS images, and camera failure at spoke site.^{1,2}
- Increased provider confidence was observed from multiple perspectives:
 - Within three months of going live, the new protocol and equipment were successfully utilized by five different ED physicians at MGMC. (Represents 25% of ED physicians)
 - Although the initial number of patients is small, the immediate increase of tPA administration among eligible patients is a promising measure to link with provider confidence, given limited use of thrombolytics for stroke at MGMC in the past.

Table 1
Telestroke Time Intervals^{1,2}

Mean activation time: 14 minutes
(Telestroke MGMC to MMC)
(range: 5 to 25 mins.)

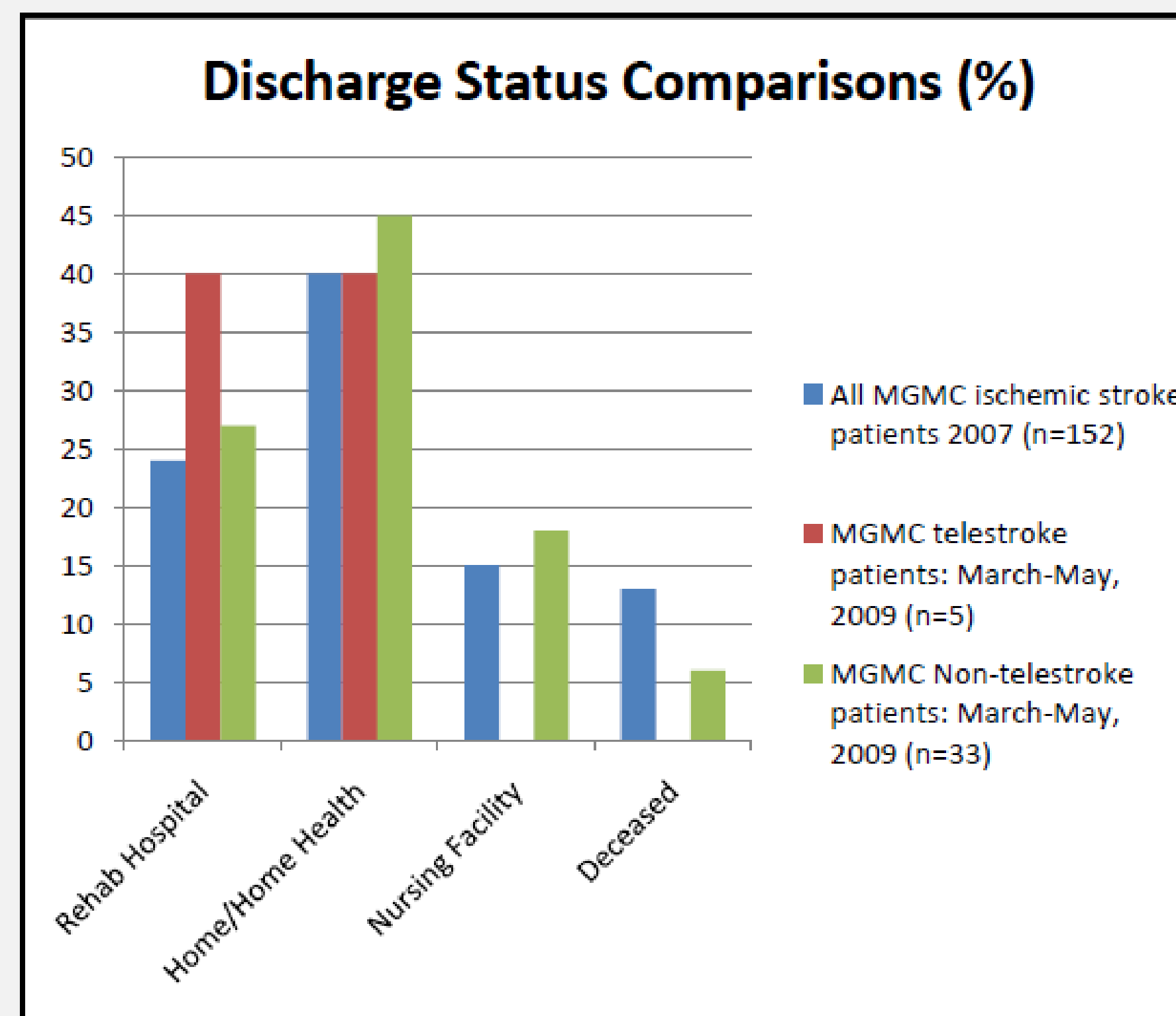
Mean time from activation to tPA administration: 30 minutes
(range: 30 minutes)

Table 2
Patient Demographics^{1,2}

Age, mean + SD (y) 58 ± 21.5
(range: 48-94)

Males/Females 4/1

Chart 1^{1,2,4}



Scott Kemmerer, MD – Medical Director, MGMC Emergency Services:

"This was a wide range of stroke patients – two of whom could not speak at all or had very limited speech, and now are speaking again. National tPA statistics show you have to treat eight patients to have one good outcome. The first two patients we treated had positive outcomes, so we've had some really dramatic success so far."

Acknowledgements

Many thanks to the Stroke and Emergency Department teams, IT specialists and Administrators at Maine Medical Center Neuroscience Institute and MaineGeneral Medical Center, and to the team of Neurologists, for the collegial way in which they came together to implement the telestroke pilot between their facilities, and for their ongoing assistance to help others replicate their success.

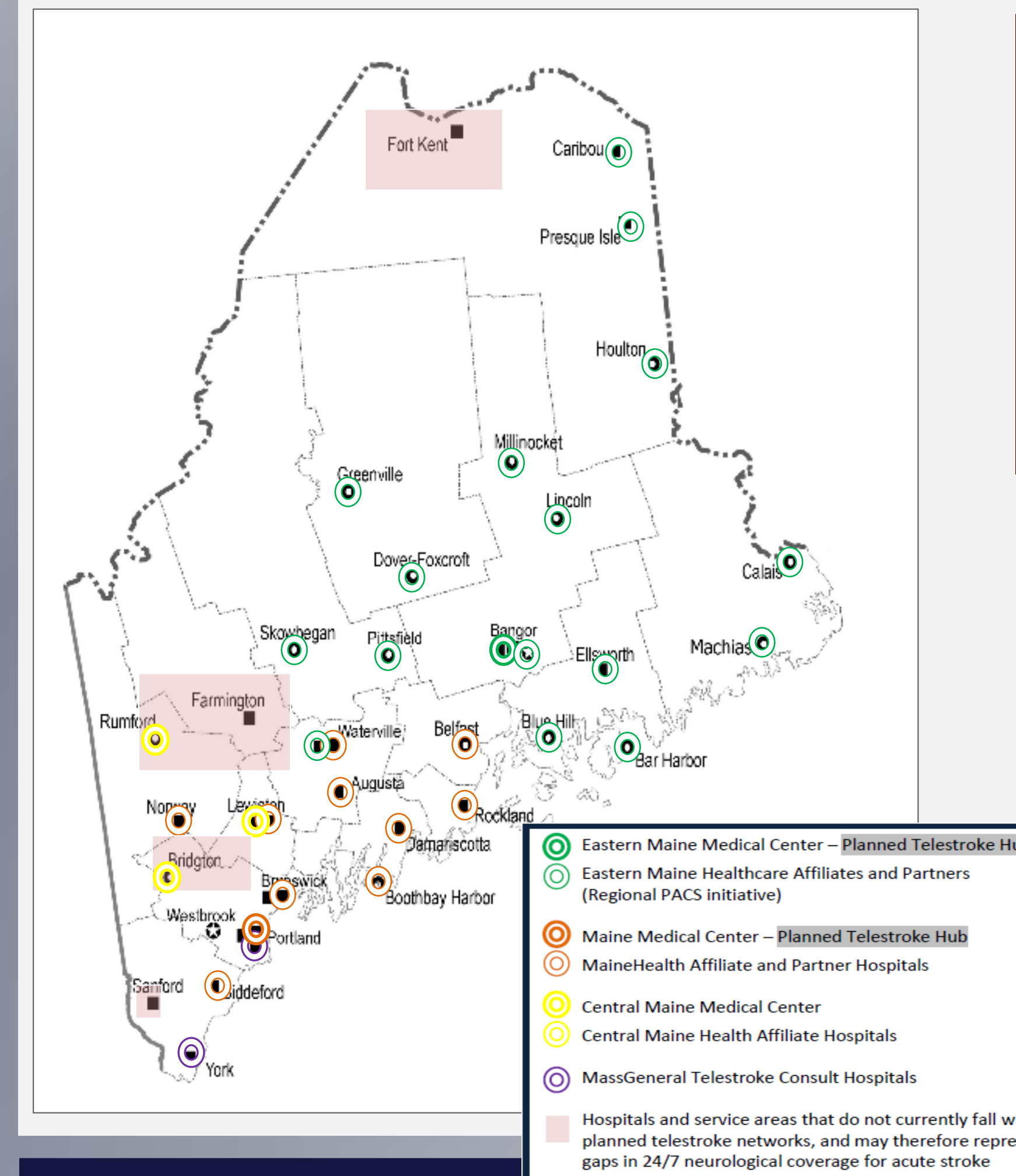
Conclusions/Implications for Practice

Previously, MGMC struggled to maintain on-site neurology coverage due to specialty shortages in Central Maine, and lacked a formal system that promoted regular consultation with MMC neurology. Past consults were by telephone, and happened infrequently. The telestroke network now ensures that: 1) a neurologist is available 24/7/365 for MGMC stroke patients and ED providers, and that 2) a standardized protocol directs evidence-based diagnosis and treatment, both of which have contributed to increased provider confidence, and increased administration of tPA among eligible patients.

As compared to state-wide tPA use, which was 1.8% among all stroke admissions (n=2,001) in Maine for 2006³ the MMC/MGMC telestroke pilot shows promise in significantly increasing rates of tPA use in eligible stroke patients, based on initial results. State-wide partners are utilizing resources developed through the pilot to expand telestroke networks throughout Maine, with a goal of 100% access to round-the-clock neurological consults, regardless of geographic location.

- Maine Medical Center plans to serve as a telestroke hub for MaineHealth's eight affiliate hospitals, and is currently expanding capacity of their existing telehealth platform to effectively support this model.
- Eastern Maine Medical Center (EMMC - Bangor, ME) plans to serve as a hub for 16 Eastern Maine Health Systems affiliate and non-affiliate hospitals from Central to Northern Maine. EMMC has already begun to see a sharp increase in "drip-and-ship" stroke patients, following concentrated outreach to community hospitals in these regions. In FY 2009, there have been 16 tPA patients transported from outlying hospitals⁵, compared to a total of 18 tPA patients among all regional hospitals between the three-year period, 2003 to 2006.³
- Massachusetts General Hospital is currently providing 24/7 neurological access to two hospitals in Southern Maine: York Hospital and Mercy Hospital, via their established telestroke program.

The map below depicts planned and existing hub and spoke networks:



Moving Forward:
During this year's legislative session, Maine passed a law requiring all insurers to reimburse for telehealth services beginning September 2009, which is expected to have a positive impact on state-wide telestroke initiatives. (See copy of Maine Telehealth law below).

PLEASE NOTE: Legislative information cannot perform research, provide legal advice, or interpret Maine law. For legal assistance, please contact a qualified attorney.

An Act to Provide for Insurance Coverage of Telemedicine Services
Be it enacted by the People of the State of Maine as follows:

Sec. 1. 24-A M.R.S.A. §4316 is enacted to read:

§ 4316. Coverage for telemedicine services

1. **Definition.** For the purposes of this section, "telemedicine," as it pertains to the delivery of health care services, means the use of interactive audio, video or other electronic media for the purpose of diagnosis, consultation or treatment. "Telemedicine" does not include the use of store-and-forward, facsimile machine or e-mail.

2. **Coverage of telemedicine services.** A carrier offering a health plan in this State may not deny coverage on the basis that the coverage is provided through telemedicine if the health care service would be covered were it provided through in-person consultation between the covered person and a health care provider. Coverage for health care services provided through telemedicine must be determined in a manner consistent with coverage for health care services provided through in-person consultation. A carrier may offer a health plan containing a provision for a deductible, copayment or coinsurance requirement for a health care service provided through telemedicine as long as the deductible, copayment or coinsurance does not exceed the deductible, copayment or coinsurance applicable to an in-person consultation.

Effective September 12, 2009
H.P.F. 101, L.R. 1271, Item 1, Signed on 2009-09-10 09:00:00.0 - First Regular Session - 124th Maine Legislature, page 1

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References

1. Maine Medical Center/MaineGeneral Medical Center quarterly grant reports submitted to Maine CDC/DHHS Cardiovascular Health Program; Sept. 2008-August 2009.
2. Maine Medical Center Telestroke Patient Database
3. Maine All-Claims Database; Data compiled by Maine Health Data Organization (ICD-9: 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, 434.91, 436, and ICD-9 procedure code: 99.10)
4. MaineGeneral Medical Center Stroke Patient Database
5. Eastern Maine Medical Center GWTG-Stroke Patient Database

