

Telemicroscope image showing a person in a white lab coat and mask, likely a telestroke specialist, interacting with a patient or equipment.

Telemicroscope in Acute Stroke Care

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VA U.S. Department of Veterans Affairs THE UNIVERSITY OF ALABAMA AT BIRMINGHAM Knowledge that will change your world

Disclosures

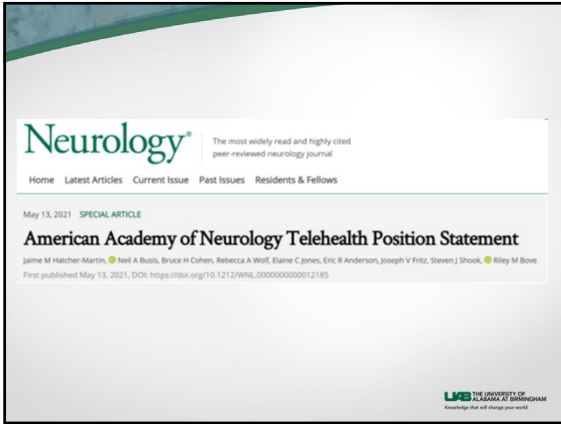
- No financial disclosures related to industry
- Senior consultant with salary support from the VA National Telestroke Program
- Will be showing examples of telehealth service through the American Well platform

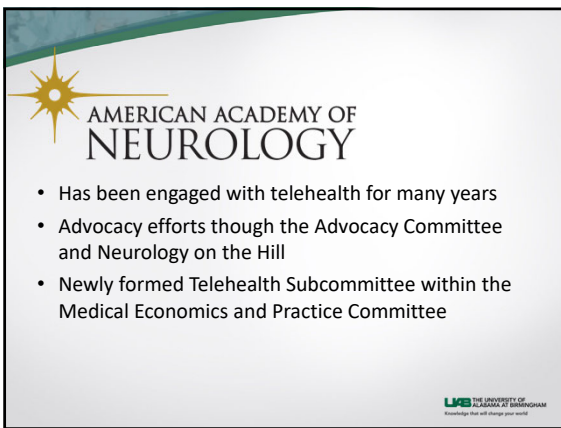
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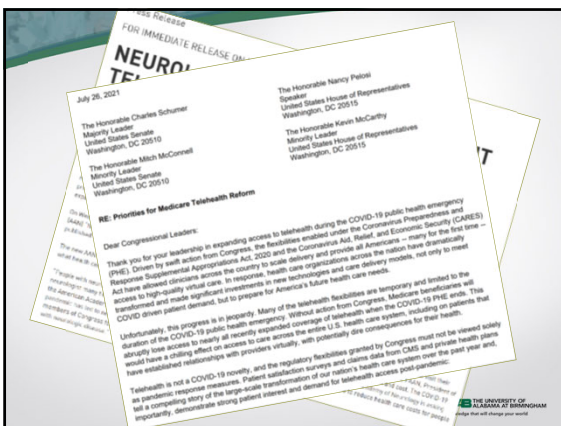
Outline

- Models of Care Delivery
- Tracking Quality in Telestroke
- Patient and Provider Perceptions
- Impact on Disparities

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PRACTICING NEUROLOGISTS & ADMINISTRATORS

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BENCHMARKING DATA
TELEHEALTH AND REMOTE CARE
HEALTH INFORMATION TECHNOLOGY
PATIENT RESOURCES

TELEHEALTH AND REMOTE CARE

Telehealth uses digital information and telecommunication technologies to provide health care when participants are separated in space and/or time. The AAN believes that telehealth will continue to play an essential role in the care of patients with neurologic conditions and supports efforts to implement and improve the ability for neurologists to provide telemedicine services.

Jump to:

[Practice](#) [Advocacy](#) [Education](#) [Additional Resources](#)

TELEHEALTH POSITION STATEMENT

On May 13, 2021, the AAN's updated Telehealth Position Statement was published in *Neurology*®. As described in the statement's abstract, the AAN "supports patient access to telehealth services regardless of location; coverage for telehealth services by all subscriber benefits and insurance; equitable provider reimbursement; simplified state

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Models of Care Delivery

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Care Delivery Models

- Traditional Consultation**
 - Face to face encounter with the Neurologist
 - Direct Examination
 - In-person provider to provider communication
- Resident Consultation**
 - Face to face encounter with neurology trainee
 - Direct Examination
 - In-person provider to provider communication
 - Frequently associated with 24/7 access to neurologic expertise
 - Prolonged treatment time if delays in checking patient out to attending

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Telehealth Care Delivery Models

- E-Consultation**
 - Chart review without direct patient interaction
 - Expands access to neurologist
 - Provides faster care delivery but not for immediate acute care
 - Generally not associated with significant provider to provider communication other than a written consult in the chart
 - No patient engagement
- Telephone Consultation**
 - No direct interaction with the patient and frequently limited or no access to the patient's chart
 - Consultation is provided based solely on provider to provider communication
 - Acute treatment decisions may be made via this method
 - No patient engagement

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Telehealth Care Delivery Models

- Video Telehealth**
 - Rapid video connection with patient
 - Direct history taking and ability to guide and observe neurologic examination
 - Facilitates communication among care providers and with the patient
 - Requires reliable internet connectivity
- Video Telehealth With Resident**
 - Benefits of video telehealth plus additional in-person neurologic expertise
 - Facilitates clearer communication about treatment plan with admitting physician
 - Direct educational interaction with attending

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Telestroke Models

Hub and Spoke

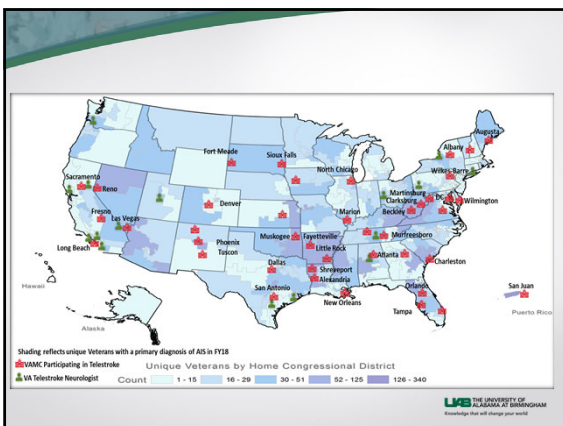
- More common with academic based regional telestroke models
- Built based on local transfer networks and knowledge of local resources
- Facilitates acute treatment decisions and transfer

Distributed Hub

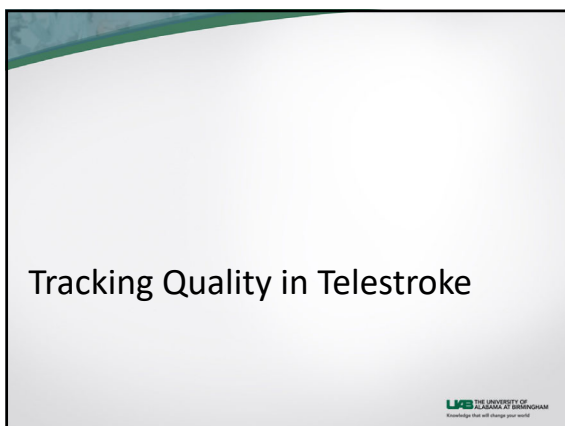
- Used in national telestroke networks
- Physicians are not necessarily based at facilities within the network
- Emphasis is on expanding access to care in underserved regions but is typically not integrated into the regional transfer network


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STROKE GUIDELINE

Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

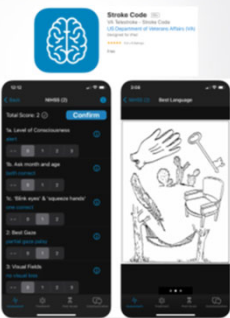
3. The use of telemedicine/telestroke resources and systems should be supported by healthcare institutions, governments, payers, and vendors as one method to ensure adequate 24/7 coverage and care of acute stroke patients in a variety of settings.	I	C-EO	Recommendation reworded for clarity from 2013 Stroke Systems of Care, COI and CEF added to conform with ACC/AHA 2019 Recommendation Classification System. See Table XCV in online Data Supplement 1 for original wording.
4. Telestroke/telestroke evaluations of AIS patients can be effective for correct IV alteplase eligibility decision making.	IIa	B-A	New recommendation.
The STRATOC (Stroke Team Remote Telerate Evaluation Using a Digital Observation Camera) pooled analysis supported the hypothesis that telemedicine consultations, which included telestroke, compared with telephone-only resulted in statistically significantly more accurate IV alteplase eligibility decision-making for patients exhibiting symptoms and signs of an acute stroke syndrome in EDs. ¹⁴			See Table XI in online Data Supplement 1.
5. Administration of IV alteplase guided by telestroke consultation for patients with AIS can be beneficial.	IIa	B-A	New recommendation.
A systematic review and meta-analysis was performed to evaluate the safety and efficacy of IV alteplase delivered through telestroke networks in patients with AIS. MCH rates were similar between patients subjected to telemedicine-guided IV alteplase and those receiving IV alteplase at stroke centers. There was no difference in mortality or in functional independence at 3 months between telestroke-guided and stroke center-managed patients. The findings indicate that IV alteplase delivery through telestroke networks is safe and effective in the 3-hour time window. ¹⁵			See Table XI in online Data Supplement 1.
6. Telestroke networks may be reasonable for triaging patients with AIS who may be eligible for interfacility transfer in order to be considered for emergency mechanical thrombectomy.	IIb	B-III	New recommendation.

Stroke
Volume 50, Issue 12, December 2019, Pages e344-e418
https://doi.org/10.1161/STROKE.0000000000000211

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Accuracy of the Telestroke Evaluation

- Remote ascertainment of the NIHSS has similar reliability to in person examination
- Has been operationalized within apps to allow interactive completion among care team members



Wang S, et al. Stroke, 2003.

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Alteplase Administration

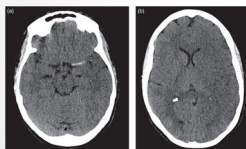
- Telestroke physicians can make recommendations for alteplase and supervise bedside reconstitution
- Compared to patients treated directly at a stroke center, remotely guided administration of alteplase:
 - Is safe
 - Demonstrates improved accuracy of treatment
 - Associated with higher utilization rates
 - Has similar outcomes

Pervez, MA et al. Stroke. 2010.
Switzer, J et al. J Emerg Med, 2009.
Choi, J.Y., et al., Jt Comm J Qual Patient Saf, 2006.
Meyer, B.C., et al. Lancet Neurol, 2008.

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Patients needing a Higher Level of Care

- Telestroke can also help identify patients needing transfer for thrombectomy or malignant cerebral edema.
- Patients transferred following a telestroke consult have faster door to groin puncture times and better outcomes.




Pedragosa A, et al. Cerebrovasc Dis. 2012.
Audebert HJ, et al. Cerebrovasc Dis. 2005

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Cost Effectiveness

- Telestroke networks are cost-effective from both a societal and a hospital perspective.
- Facilitates rapid delivery of acute reperfusion therapies and early transfer
- May also help identify patients who may qualify for clinical trials

Demaerschalk BM, et al. Am J Manag Care. 2013
Switzer JA, et al. Circ Cardiovasc Qual Outcomes. 2013




Going Forward: Tracking Quality

AHA SCIENTIFIC STATEMENT

Telemedicine Quality and Outcomes in Stroke: A Scientific Statement for Healthcare Professionals From the American Heart Association/American Stroke Association


- Site Metrics
 - Door to ED Physician
 - Door to CT
 - Door to Drug
- Telestroke Metrics
 - Door to Consultation
 - Consult to Video
 - Duration of Consult

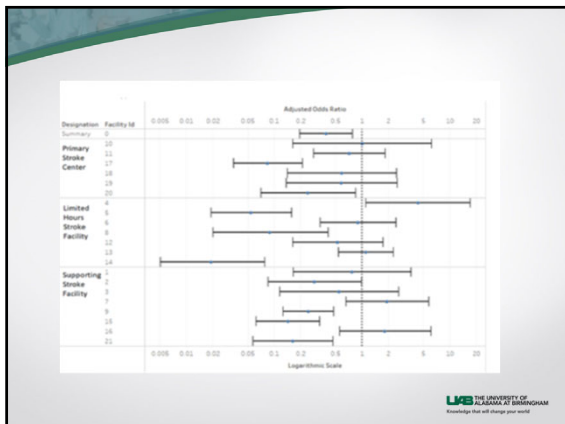
Stroke
Volume 48, Issue 1, January 2017, Pages e3-e25
<https://doi.org/10.1161/STR.0000000000000114>



Going Forward: Tracking Quality

- Treatments
 - Alteplase Rates
- Transfers
 - Rates
 - Door In-Door Out
- Stroke Mimic Rates
- Patient Outcomes
 - Persisting deficits
 - Symptomatic Hemorrhage
 - Complications
 - Disposition
 - Length of Stay
 - Mortality






Patient and Provider Perceptions

Provider Satisfaction

- Telestroke services generally receive positive feedback from providers
- More satisfaction is seen among ED providers in under-resourced areas
- Less is known about overall satisfaction of telestroke providers
 - They rate the service that they provide as high
 - Unclear if this is valued over other clinical activities.

Patient Satisfaction

- Early studies in this area focused on technological aspects.
- Patients may both embrace or resist change with age being an important factor

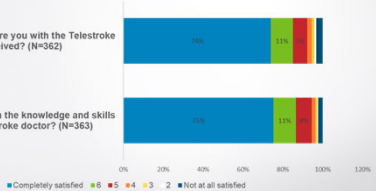


Predictors of Patient Satisfaction

- Analysis of 208 post-telestroke encounter interviews


Overall, how satisfied were you with the Telestroke care you received? (N=362)

How satisfied were you with the knowledge and skills of the onscreen Telestroke doctor? (N=363)



Satisfaction Level	Percentage
Completely satisfied (6)	78%
Satisfied (5)	18%
Satisfied (4)	2%
Satisfied (3)	2%
Satisfied (2)	0%
Not at all satisfied (1)	0%

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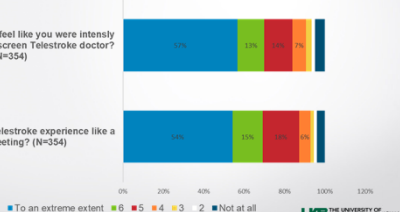


Predictors of Patient Satisfaction

Relatively high telepresence ratings: 69-70% felt the Telestroke encounter was very much like a real encounter and they were intensely engaged (rating of 6 or 7 on a 1-7 scale)


To what extent did it feel like you were intensely engaged with the onscreen Telestroke doctor? (N=354)

To what extent was the Telestroke experience like a face-to-face meeting? (N=354)




Rating	Percentage
6	37%
7	32%
5	14%
4	10%
3	5%
2	2%
1	0%

Rating	Percentage
6	34%
7	36%
5	14%
4	10%
3	6%
2	2%
1	0%




Predictors of Patient Satisfaction

- The emerging theme is that patient satisfaction is driven by:
 - Provider communication
 - Telepresence
- These factors are to some extent modifiable through provider training
- Although important considerations, technological aspects (A/V quality, prior experience with telehealth) had less influence on overall satisfaction




The Patient is the Center of the Consultation



"I didn't have any input...he [Telestroke doctor] was talking to the other doctor."

Enhancing Communication and Telepresence

- The telestroke provider frequently has divided attention
 - the patient
 - family members
 - local care providers
 - robotic camera controls
 - electronic medical records
 - neuroimaging interfaces.
- It is easy to lose focus on the patient which may be perceived as disengagement.



Impact on Disparities




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Disparities in Stroke

- Racial disparities have been reported at nearly every level of stroke management, from EMS triage to rehabilitation
- Despite having a higher incidence of stroke, African Americans:
 - have reduced access to stroke care
 - experience longer ED wait times
 - are less likely to receive acute stroke therapies
- Geographic Disparities
 - Rural versus Urban
 - Stroke Belt

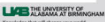
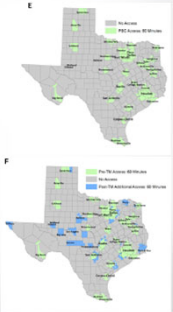
Howard VI et al. *Ann Neurol.* 200.
Karve SJ, et al. *Journal of stroke and cerebrovascular diseases.* 2011.
Hsia AW et al. *Stroke.* 2011.



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Disparities in Stroke

- Telemedicine has the potential to bridge gaps in acute stroke care
 - Affords timely access to neurologic expertise in disadvantaged regions
 - Overcome geographic obstacles
 - Facilitate appropriate disposition to a higher level of care



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Conclusions

- Telemedicine for stroke is a well established care model for acute stroke care
- The role of telemedicine will continue to expand over the next 5-10 years
- Care delivered through telemedicine is similar to in-person care and superior to that which can be delivered by telephone alone
- Patient satisfaction is high but ongoing work is needed to optimize the experience for both the provider and patient