Best Practices in Highly Coordinated Telestroke Systems of Care – *or 5 habits of highly effective telestroke networks*

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Northeast Cerebrovascular Consortium

October 25, 2019

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Presenter Disclosure Information

FINANCIAL DISCLOSURE:

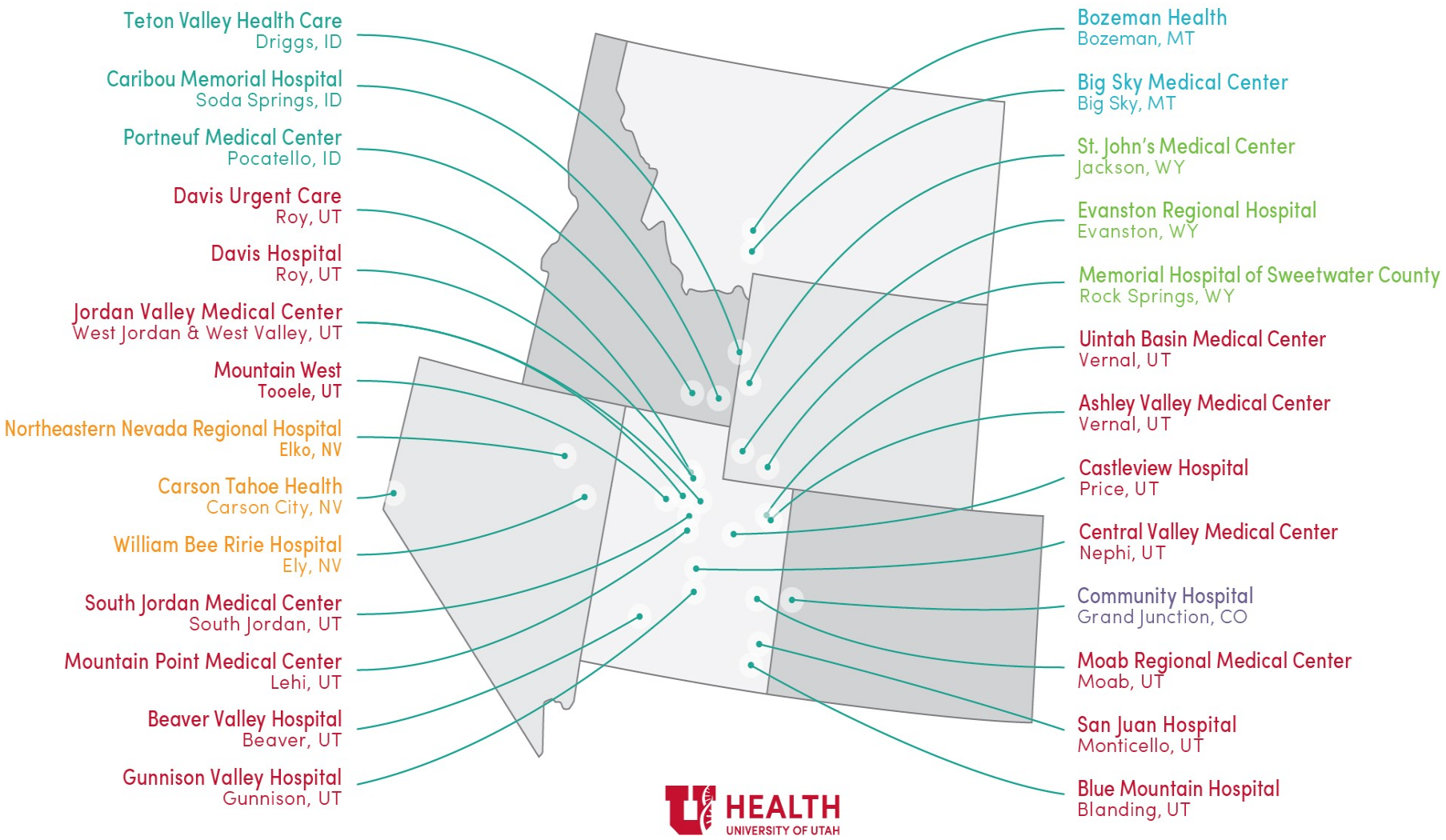
None

UNLABELED/UNAPPROVED USES DISCLOSURE:

None

Telestroke: the Utah network

UUH Telestroke Sites



Critical access sites: Ashley Regional, Vernal, UT

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BLUE MOUNTAIN
HOSPITAL
BLUE MOUNTAIN
HOSPITAL

Beaver Hospital, UT

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“Urban” Telestroke Sites

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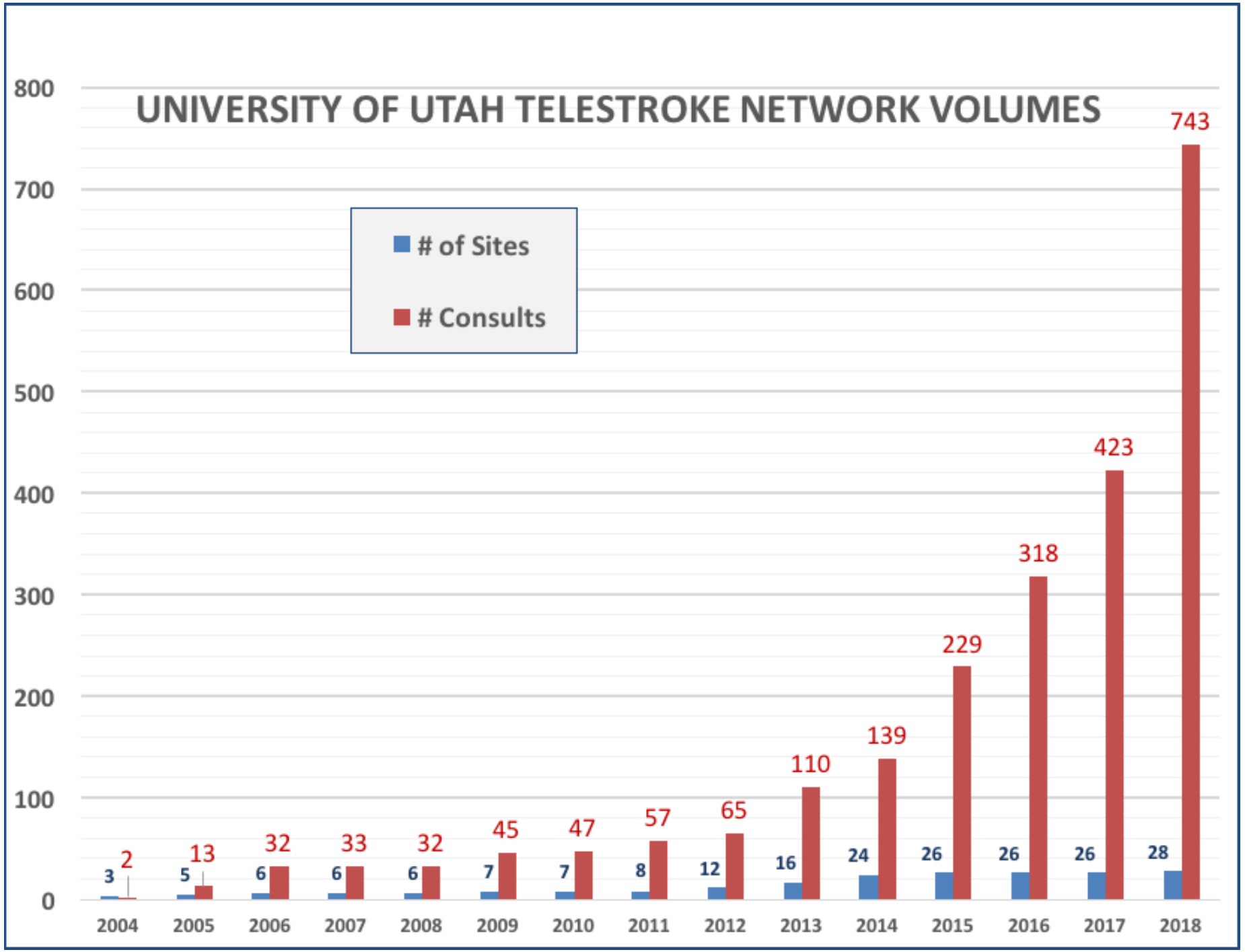
UNIVERSITY OF UTAH TELESTROKE NETWORK VOLUMES
# of Sites
Consults
800
700
600
500
400
300
200
100
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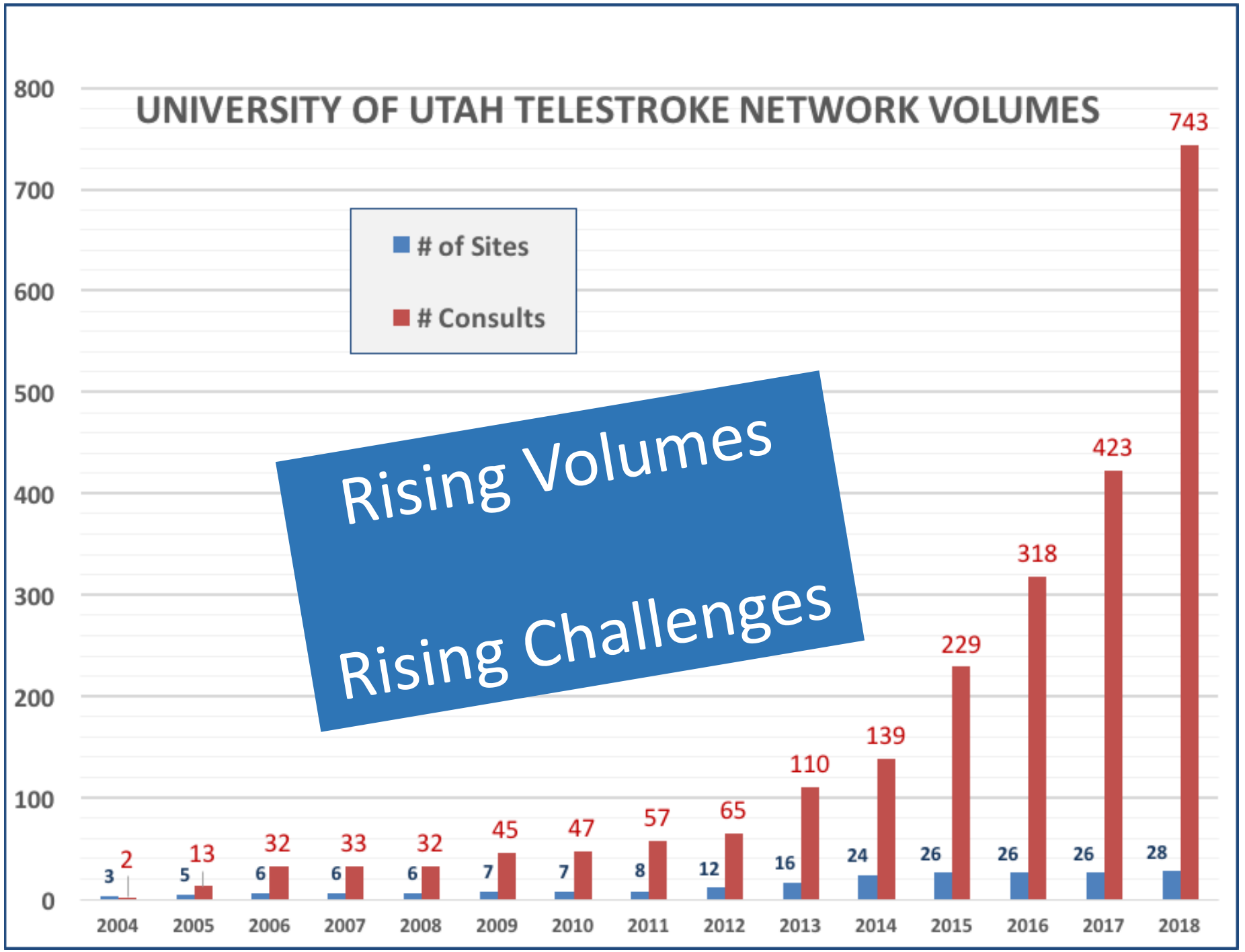
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
3 5 6 6 6 7 7 8 12 16 24 26 26 26 28
2 13 32 33 32 45 47 57 65 110 139 229 318 423 743


UNIVERSITY OF UTAH TELESTROKE NETWORK VOLUMES
# of Sites
Consults
Rising Volumes
Rising Challenges
800
700
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300
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100
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2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
3 5 6 6 6 7 7 8 12 16 24 26 26 26 28
2 13 32 33 32 45 47 57 65 110 139 229 318 423 743

5 Habits of Highly Effective Telestroke Networks

1) EDUCATE
2) QUANTITATE
3) COORDINATE
4) MOTIVATE
5) ADVOCATE

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EDUCATE at all levels

PATIENTS, FAMILIES
COORDINATORS
NURSES
PHYSICIANS

Community Education

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Comprehensive Stroke Center
January 2019 Newsletter

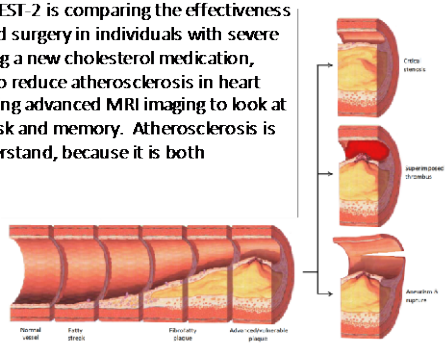
Atherosclerosis: a Frequent, Preventable Stroke Cause

Dr. Chelsea Meyer (Vascular Neurology Fellow)

Strokes are typically caused by blockage of blood to the brain, which can occur for multiple reasons. A frequent stroke cause is atherosclerosis, or hardening of the arteries, which causes about 20-40% of strokes. Atherosclerosis is seen in most people's arteries after the age of 60. Atherosclerosis is also a major cause of heart disease. To reduce risk of these common health problems, it's essential to understand atherosclerosis. Atherosclerosis starts with cholesterol attaching to the walls of arteries, forming a "fatty streak" (Figure). These "fatty streaks" then attract immune cells, which create a fibrofatty plaque. This plaque has a hard top layer and soft inner layer (Figure) and it can block blood flow in two ways: First, the plaque may become so large that it blocks blood flow through the artery. This is called "artery stenosis". Second, pieces of the plaque may break off and block a smaller artery downstream. This is called "thromboembolism".

Because most people with atherosclerosis don't have symptoms prior to a stroke, it is important to reduce the risk as much as possible, regardless of if you've had a stroke. The most significant risk factors are high cholesterol and cigarette smoking, and diabetes, high blood pressure, and an inactive lifestyle. Smoking can increase plaque by 50% while exercise has the opposite effect, reducing stroke risk stroke by 27%. Medications can also prevent atherosclerosis-related stroke and heart disease. Cholesterol-lowering medications, like statins, are used to reduce further plaque build-up with a 16% stroke reduction. Aspirin is used to prevent platelets from causing blockages in narrowed arteries. If the artery is severely narrow, then surgery can be considered in select cases.

The University of Utah participates in multiple stroke studies involving atherosclerosis. CREST-2 is comparing the effectiveness of medications versus medication and surgery in individuals with severe atherosclerosis. PINNACLE is studying a new cholesterol medication, Alirocumab, which has been shown to reduce atherosclerosis in heart arteries. The University is also studying advanced MRI imaging to look at plaques and their impact on stroke risk and memory. Atherosclerosis is an important cause of stroke to understand, because it is both preventable and treatable.



Better Outcomes through Clinical Trials: Introducing the UT Stroke Trials Network (StrokeNet)

For the second time, the University of Utah Stroke Center has been named one of 25 national Regional Coordinating Centers in the NIH-funded Stroke Trials Network (StrokeNet). Utah StrokeNet includes 9 stroke centers in Utah, Colorado, and Arizona, each conducting innovative national research trials.

Kinga Aitken, MD, MPH (Research Associate)

Knowing more about clinical research ahead of time can help you make more informed decisions about whether participation in our trials is right for you.

What is clinical research?

Clinical research is the study of human health and illness. It is the way we learn how to prevent, diagnose, and treat illness. Clinical research must follow strict rules that are approved by the FDA and ethical committees of the research teams.

What is a multicenter trial?

A multicenter trial is a trial that is being conducted at multiple sites at the same time. This way, enough participants can be enrolled in less time and the results can be available sooner.

What is a placebo?

Placebo represents a harmless pill or procedure that is not meant to affect health. Researchers use placebos during studies to help them understand what effect a new drug or some other treatment might have on a particular condition. For instance, some people might be given a new drug thought to lower cholesterol. Others would get a placebo. None of the people in the study will know which they got. Researchers then compare the effects of the drug and the placebo. This helps them to determine the effectiveness of the new drug as well as side effects.

What is randomization?

Randomization is a method based on chance alone by which study participants are assigned to a treatment group. This minimizes the differences among groups by equally distributing people with certain characteristics among the treatment groups. The researchers do not know which treatment is better.

Introducing ARCADIA and CREST-2 Trials

We currently have 2 active stroke prevention trials in UT StrokeNet: ARCADIA and CREST-2. **ARCADIA** (or Atrial Cardiopathy and Antithrombotic Drugs after Cryptogenic Stroke) compares the effects of Aspirin vs Apixaban in patients who suffered a stroke with unknown cause. **CREST-2** (or Carotid Revascularization and Medical Management for Asymptomatic Carotid Stenosis) compares surgery *and* intensive medical management to intensive medical management only in patients with severe carotid stenosis.

Did you know that patients who participate in clinical trials including the placebo group have better outcomes than patients who don't participate?

Researchers aren't exactly sure why, but it's likely because the clinical and research staff pay more attention to patients in trials. Being a patient at the University of Utah or one of the other UT StrokeNet sites means you have the opportunity to participate in the best stroke trials available in the US.

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QUARTERLY TELESTROKE NEWSLETTER

2019 Elaine J. Skalabrin Stroke Symposium Reminder

All site receive 2 free registrations for the Stroke Symposium on May 17th. You must register you attendees with Jaleen by May 10th! Emailed jaleen.smith@hsc.utah.edu

Coming soon to a camera near you!

Our newest attending, Dr. Vivek Reddy!
Look for him on telestroke soon!

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QUARTERLY TELESTROKE NEWSLETTER

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TeleStroke News

SLICE THICKNESS ON CTA AFFECTS LVO IDENTIFICATION

A word from Radiologist, Scott McNally, MD, PhD

In acute stroke, timely identification of large vessel occlusions is absolutely necessary to enable fast door-in-door-out times to get to the thrombectomy suite at the U (or other thrombectomy-capable center). Large vessel occlusions can be difficult to identify. Often CT scanners are set to a default slice thickness of 2.0, 2.5 or even 3 mm. This is inadequate for detecting large vessel occlusions because those vessels are of similar diameter and clots may be easily missed.

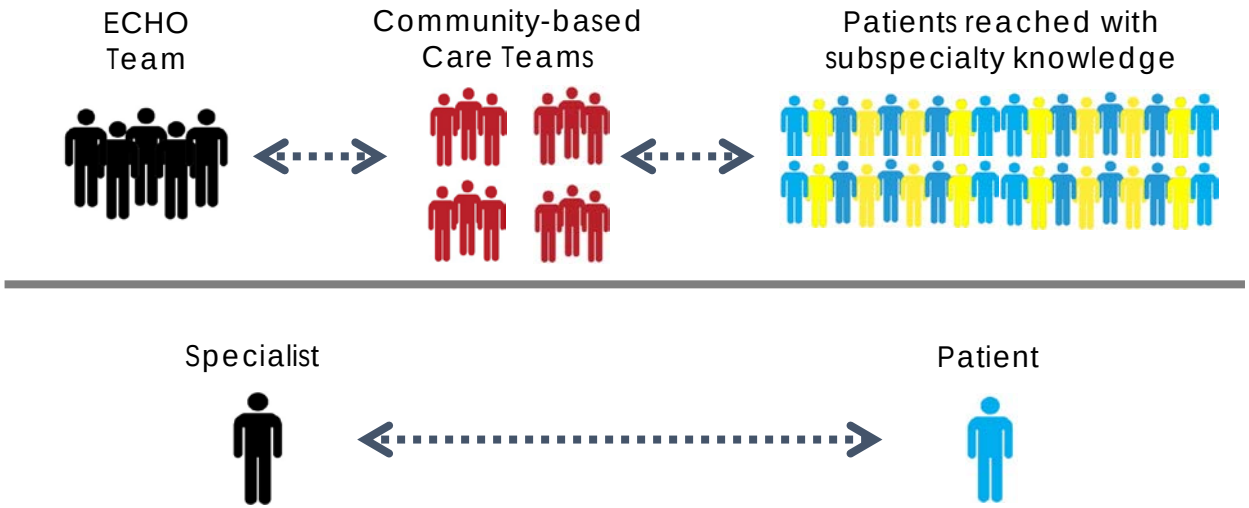
Because of this, **we recommend using an axial slice thickness on CTA of 1.0 mm or less for visual diagnosis and ideally 0.625 mm or less to allow automated occlusion detection software**. We also recommend multiplanar reformats in the coronal and sagittal planes with 1 to 2 mm slice thickness.

How do you know your CTA's slice thickness? The easiest way is to ask your CT technologist. If you find out your hospital's slice thickness is >1.0 mm, ask your radiologists if it can be modified. The University of Utah Health neuroradiologists can assist you with discussions with your radiology department – just ask Jaleen to put you in contact!

Project ECHO: Extension for Community Health-Care Outcomes

"Moving Knowledge, Not People"

- **Cost-free** partnership between community providers and a UUH interdisciplinary team of professionals
- The mission: to develop and enhance the capacity to effectively treat chronic, common, and complex diseases in rural and urban underserved areas.



- **Clinician-to-Clinician**
- **Live, web-based**
- **Case reviews with community presenters**
- **Teaching**
- **CME provided**
- **FREE**

Project ECHO model vs. Telemedicine

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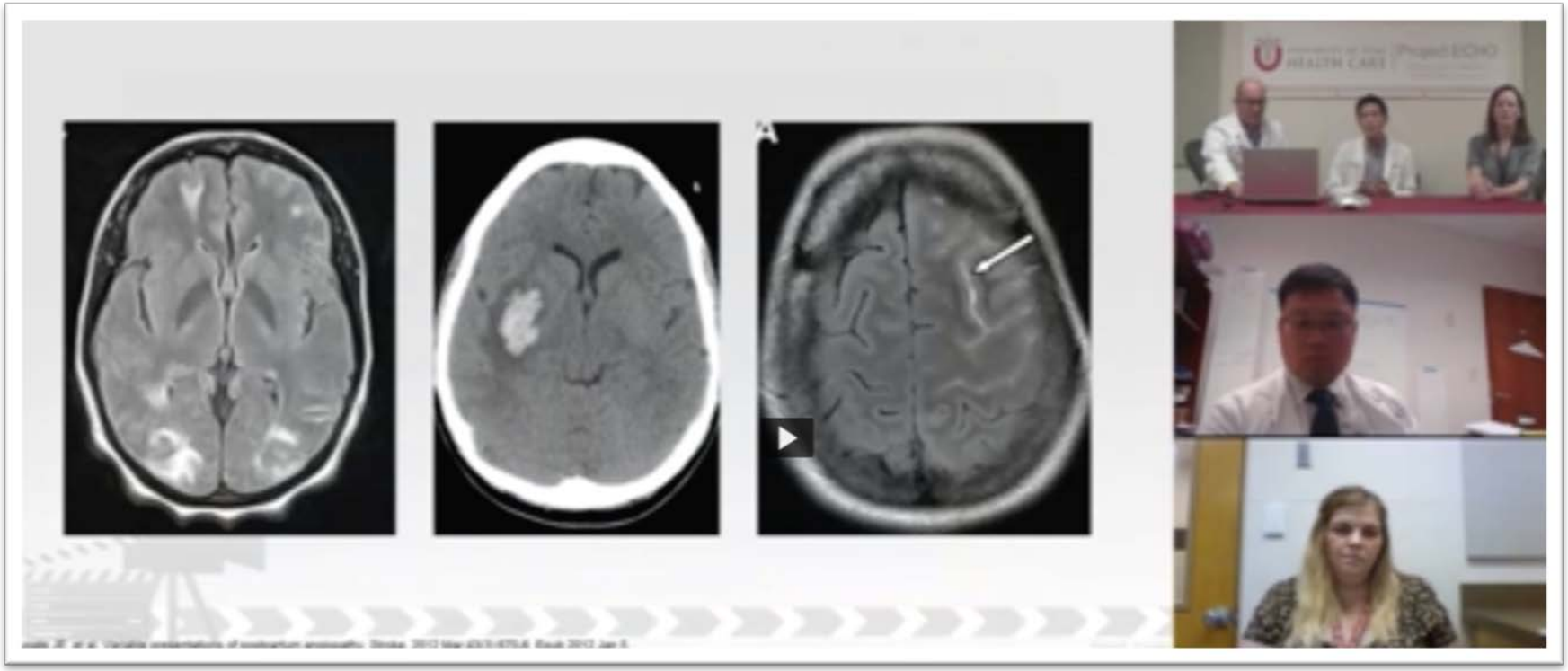
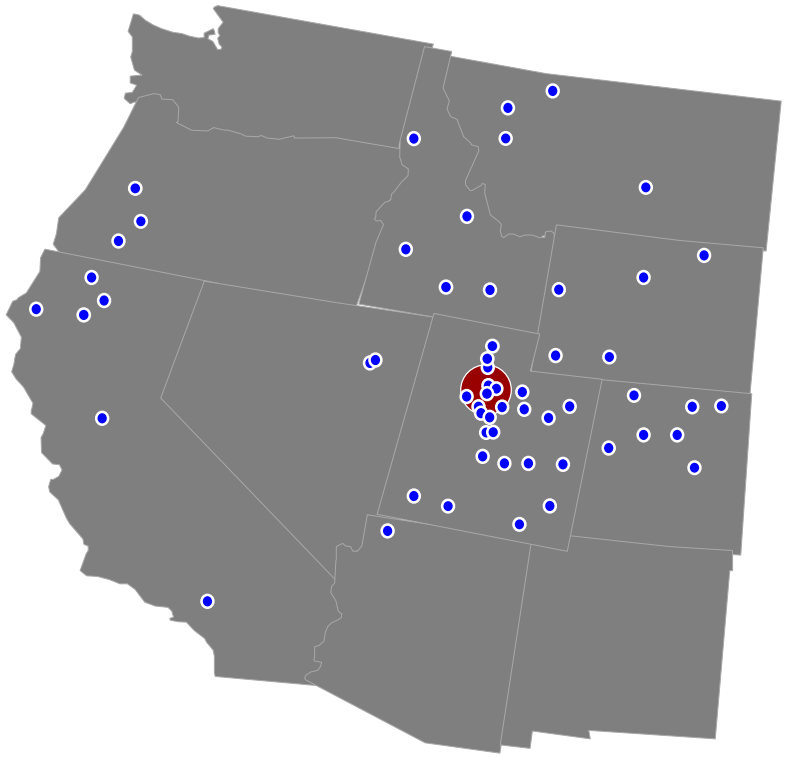
WHAT DOES **ECHO** LOOK LIKE?



Project ECHO **spokes**



WHO PARTICIPATES?

- MDs
- DOs
- NPs
- PAs
- Pharmacists
- Nurses
- Midwives
- Genetic Counselors
- Specialists
- Generalists
- Private Practices
- IHS
- Hospitals
- Training Programs

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Stroke Project ECHO - topics

6/16/2016	The Need for Speed: The Importance of Timing in Endovascular Treatment Windows
9/16/2017	Living on the Edge: New Guidelines for tPA in Stroke
1/26/2017	Northwest Regional Telehealth Resource Center: “Stroke ECHO: Keeping Expert Stroke Care in the Community”
2/2/2017	From Dusk till Dawn: Current Management and Future Directions of Wake-Up Strokes
6/16/2017	Project ECHO Pregnancy Care: Stroke and Pregnancy
6/22/2017	Look Who’s Talking: Stroke and Stroke Prevention in Pregnancy
9/28/2017	There will be Blood: Evaluation and Management of Hemorrhagic Stroke
2/22/2018	Short Circuit: Best Practices for Telestroke Consultation
5/3/2018	A Wrinkle In Time: Extended Windows for Endovascular Stroke Treatment
8/30/2018	Breaking Bad Blood: Hemorrhagic Complications of Alteplase Treatment
1/31/2019	First Blood: Vascular Headache Emergencies
6/6/2019	Where the wild things are: Management of Pediatric Stroke
9/26/2019	The Long Night: Extended tPA windows and the changing landscape of Stroke Care

UUHC Bi-Directional TS Quality Review

- As our program has matured:
  - Higher complexity of stroke cases
  - Fewer spoke – to – hub transfers
- **No built-in mechanism for timely feedback on care pathway or patient outcomes**

GOAL:

- Develop and conduct a bi-directional quality improvement program within our telestroke network
- Cases are reviewed by providers and quality experts from *both* hospitals
- Safe place to discuss difficult cases
- Sharing of best practices
- Communication between facilities includes opportunities for improvement and systems change when needed.

TRANSFORMING LEADERS

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QUANTITATE:
Telestroke Quality

2016

AHA/ASA Scientific Statement

Telemedicine Quality and Outcomes in Stroke

A Scientific Statement for Healthcare Professionals From the American Heart Association/American Stroke Association

The American Academy of Neurology affirms the value of this statement as an educational tool for neurologists.

Endorsed by the American Telemedicine Association

Lawrence R. Wechsler, MD, FAHA, Chair;
Bart M. Demaerschalk, MD, MSc, FRCPC, FAHA, Vice Chair;
Lee H. Schwamm, MD, FAHA, Vice Chair; Opeolu M. Adeoye, MD, MS, FAHA;
Heinrich J. Audebert, MD; Christopher V. Fanale, MD; David C. Hess, MD;
Jennifer J. Majersik, MD, MS, FAHA; Karin V. Nystrom, APN;
Mathew J. Reeves, BVSc, PhD, FAHA; Wayne D. Rosamond, PhD, MS, FAHA;
Jeffrey A. Switzer, DO, MCTS; on behalf of the American Heart Association Stroke Council; Council on Epidemiology and Prevention; and Council on Quality of Care and Outcomes Research

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Quality: Suggested Time Points for TS Documentation

Wechsler, 2016. AHA/ASA Scientific Statement.

OBJECTIVES:

- Initiate IV tPA to eligible patients within 1 hour of patient arrival
- **Similar to a primary stroke center, monitoring critical time points in a patient's care path, telestroke process metrics should include all aspects of the chain of care.**
- **Telestroke technology should not delay acute stroke therapy.**

TS TIMES TO DOCUMENT:

- Patient's last known well
- Patient arrival at spoke hospital
- CT and labs done, reviewed
- Telestroke request, response
- Diagnosis
- Treatment eligibility decision
- Start of IV tPA treatment
- Disposition determination
- Time of transfer and arrival at destination (door in – door out)

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TeleStroke News

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Best Practice Standards

Door to CT	Door to Call	Door to Camera	Call to Camera	Door to tPA	Door In Door Out
15 Mins	15 Mins	30 Mins	15 Mins	60 Mins	90 Mins

<Hospital Name> TeleStroke Metrics

Month	Door to CT	Door to Call	Door to Camera	Call to Camera	Door to tPA	Door In Door Out
Jan	12 min	24 min	50 min	15 min	115 min	187 min
Feb	10 min	16 min	26 min	10 min	44 min	70 min
Mar	5 min	110 min	117 min	8 min	- -	- -

U of U TeleStroke Metrics

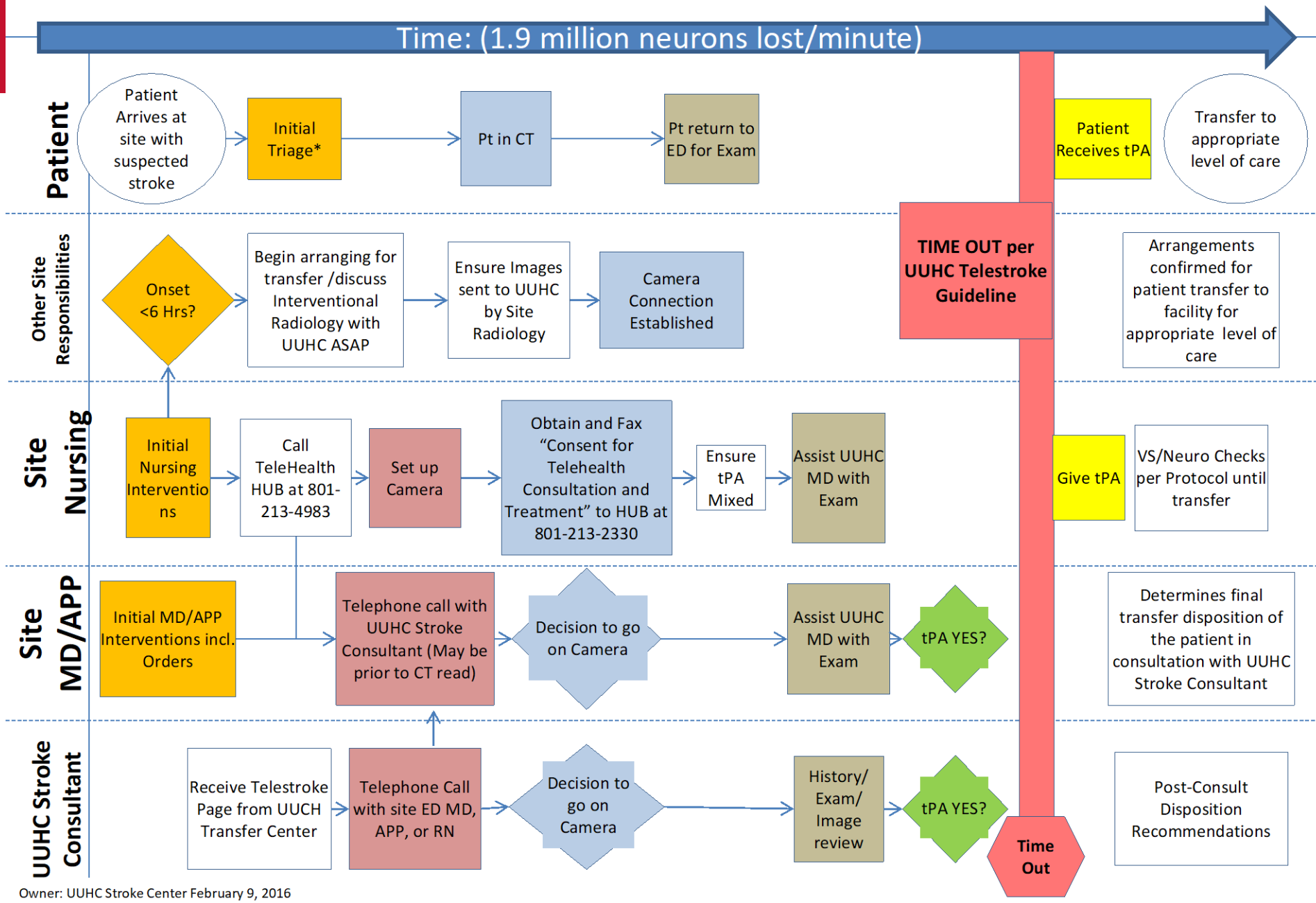
Month	Door to CT	Door to Call	Door to Camera	Call to Camera	Door to tPA	Door In Door Out
Jan	12 min	32 min	47 min	15 min	79 min	154 min
Feb	17 min	40 min	50 min	11 min	58 min	150 min
Mar	15 min	41 min	51 min	11 min	82 min	121 min

COORDINATE:

Parallel processing
Transfers timeliness
Transfer appropriate patiens

*Color coding approximates steps executed in parallel.

UUHC TeleStroke Process Guideline



Owner: UUHC Stroke Center February 9, 2016

The Need for Speed – DIDO

Second Graders Honored for Saving Teacher's Life

- 67 yo woman with DM, HTN
- Presented with left sided weakness, forced right gaze deviation
- NIHSS 18

Gloria Thacker, Mountain West Medical Center, Tooele, UT

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Community Education again!

KSL.com

According to Scott Rounds, emergency department director at Mountain West Medical Center, stroke signs and symptoms include facial drooping, arm weakness and slurred speech.

"Rapid stroke treatment is critical because each second that brain cells go without oxygen (in the case of blockage or ischemia) the chances of a good outcome are reduced," Rounds told KSL.com in an email. "That is why patients presenting with the above-noted symptoms need to be taken immediately to a facility where effective interventions can be applied. Mountain West Medical Center is a Stroke Receiving Hospital where patients can receive early diagnosis and treatment by skilled clinicians working in partnership with the University of Utah Stroke Neurology team via the Telestroke Program."

Signs of a stroke — the FAST method

F Face drooping: Is one side of the face slack or numb? Can the person smile normally?

A Arm weakness: Are both arms functional. Does one droop downward, or is the subject unable to lift one?
S Speech difficulty: Is the subject able to speak normally, or is there a slur?

T Time to call 911: If any of the above symptoms exist, call for help immediately. Be sure to check the time at which the symptoms began appearing.

Information courtesy of strokeassociation.org

Gloria Thacker, Tooele teacher

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UUH Door-In-Door-Out Improvement Project

Reduce Door-In-Door-Out Times because …

- It's patient oriented.
- It's a critical metric associated with clinical outcomes.
- It's a statewide effort led by Utah Stroke Task Force.
- Recommendation of transfers < 75 minutes.

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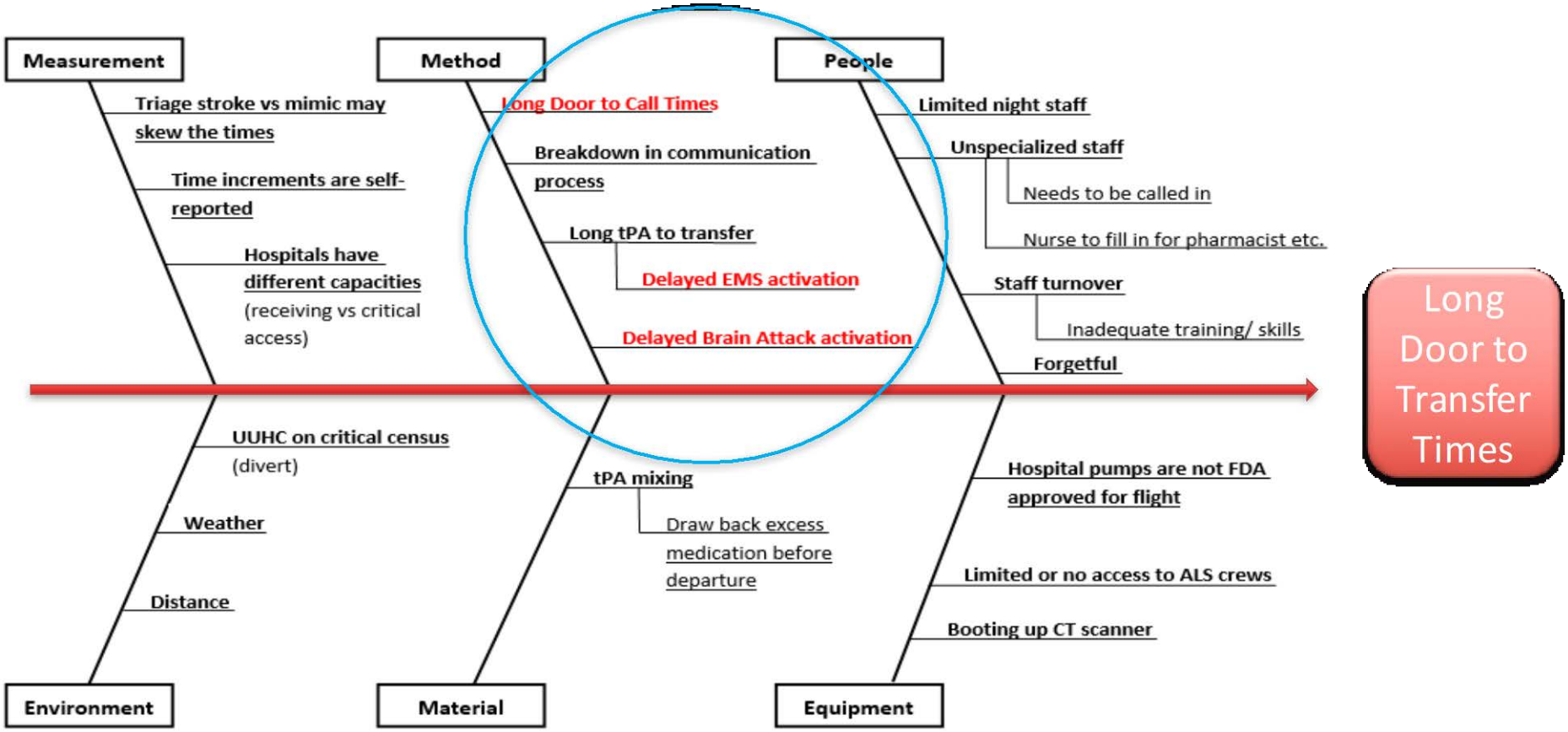
Root Cause Analysis - Conducted interviews with 5 hospitals to determine causes of slow DIDO



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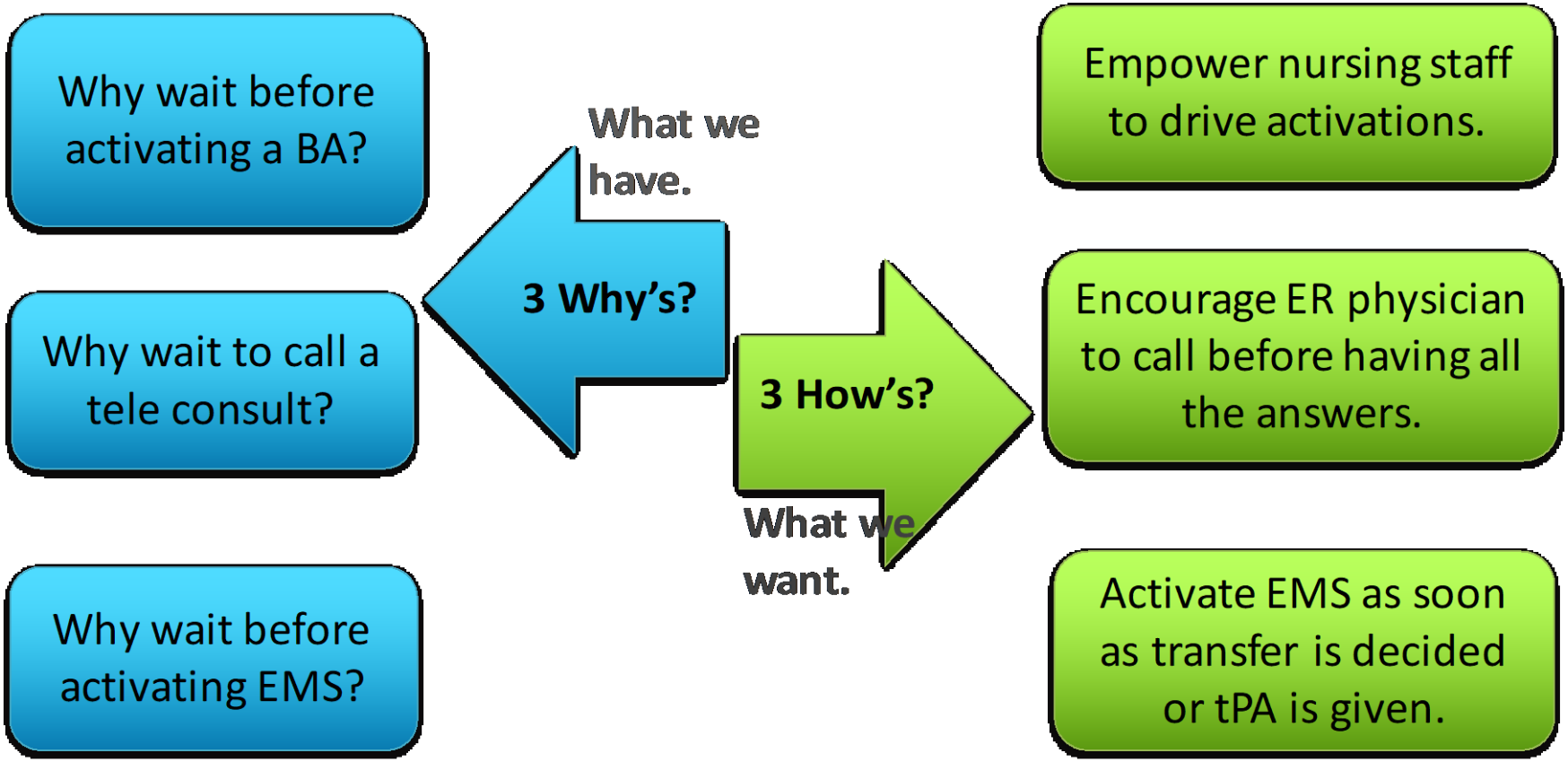
Targeted Root Causes



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tPA is given.

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Tips and Tricks for Improving your Door-In-Door-Out Times (DIDO)

University of Utah Health's, TeleStroke program is launching a new quality improvement initiative. This latest improvement effort will be on improving Door-In-Door-Out times (the time from arrival at a primary stroke center or stroke receiving facility to transfer for higher level of care). There is now overwhelming evidence that endovascular treatment is effective up to 24 hours. Timely, efficient treatment, and transfer continues to be important for patients who present at a primary stroke center, or stroke receiving facility.

What you can do:

- Empower staff to initiate TeleStroke earlier in the process.
- Immediately send the non-contrast head CT. No need to wait for a full Radiology read.
- Implement use of a Large Vessel Screening Scale by nursing at triage.
- Activate EMS/ flight team as soon as a decision for tPA or transfer is made.

What we are doing:

- Quicker identification and initiation for tPA administration on eligible patients.
- Internally improving transfer protocols and wait times for transfer patients.

If you have any further questions or ideas, please contact:

Jaleen Smith, TeleStroke Coordinator
Jaleen.smith@hsc.utah.edu
801-585-1586
or
Angeliqua Pochert, QI Coordinator
Angeliqua.pochert@hsc.utah.edu
801-587-9935

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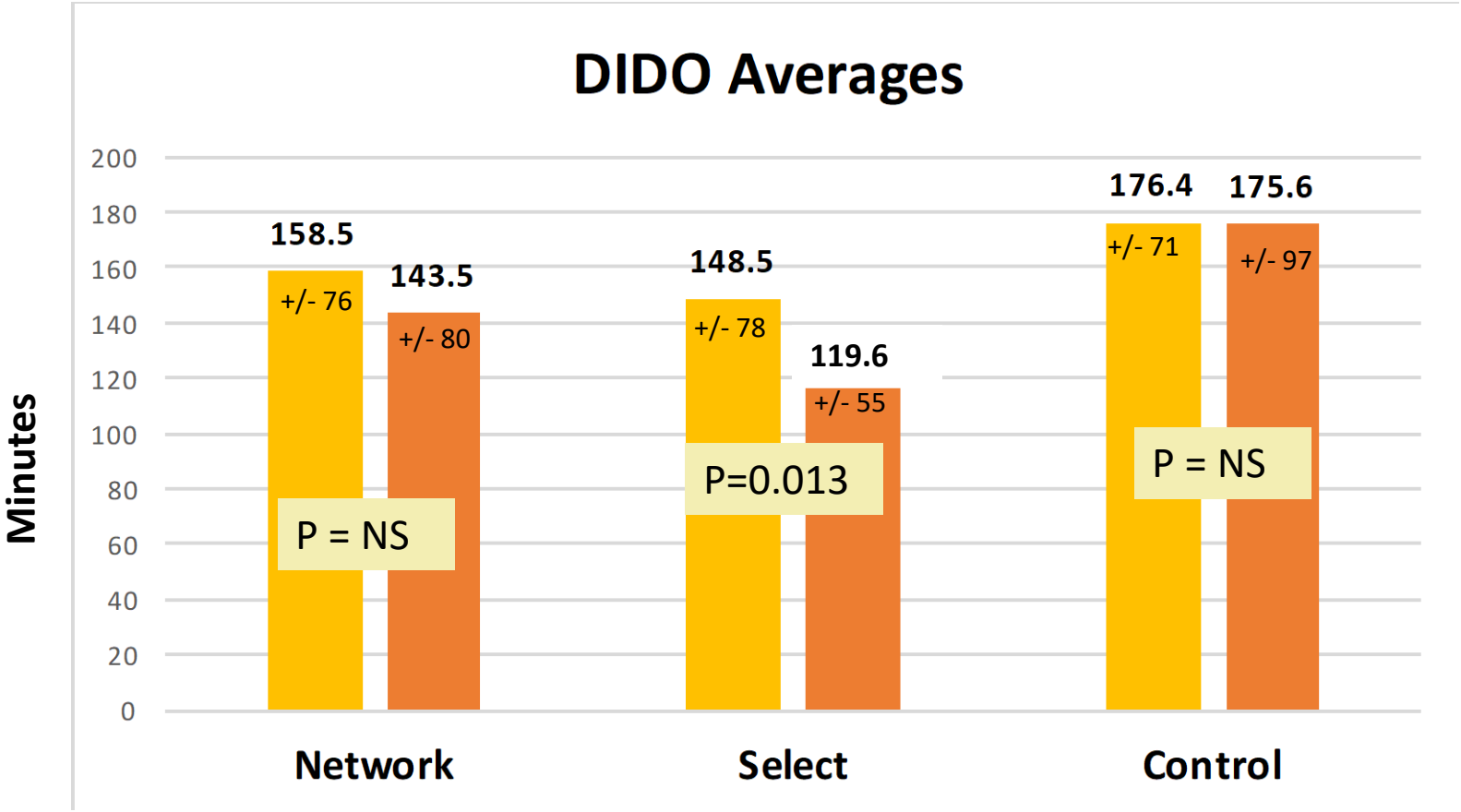
Results:
Jan 2017 - Mar 2018 vs Apr 2018 – Jul 2019



Pochert, Ekstrom, Smiht, Chung, Hannon, Majersik.. Improving Telestroke Care: decreasing "door-in–door-out" times (DIDO). NRTC, 2019, Anchorage, AK.

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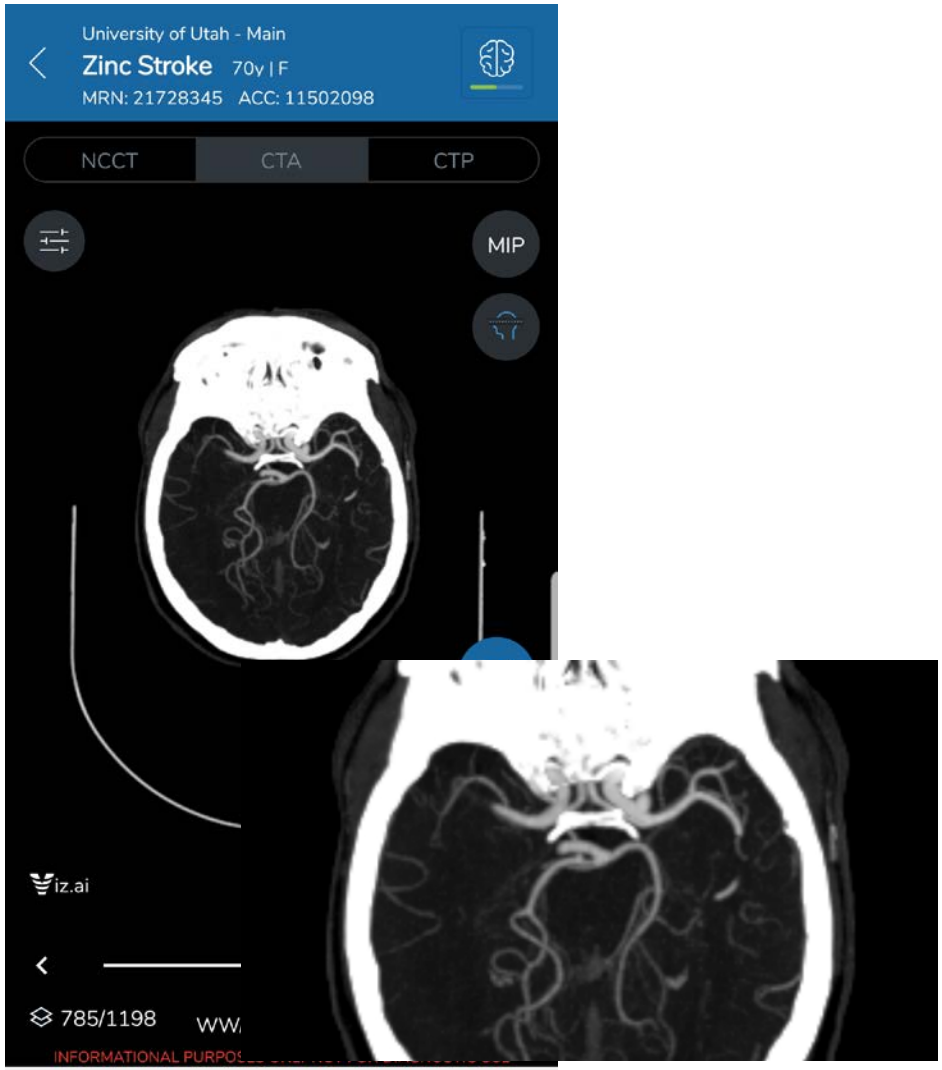
COORDINATE: Choosing the right patient to transfer

CTA integrated into TS protocols

- AHA Massachusetts CTA Workgroup formed
- Developed CTA protocols
- Launched statewide CTA initiative
  - Includes contracting statewide for data sharing
  - Altering GWTG to include door-to-CTA as a metric
- Next steps: metric development, implementation

*Modified slide used with permission from **Dr. Leslie-Mazwi, MGH***

LVO Auto - Detection



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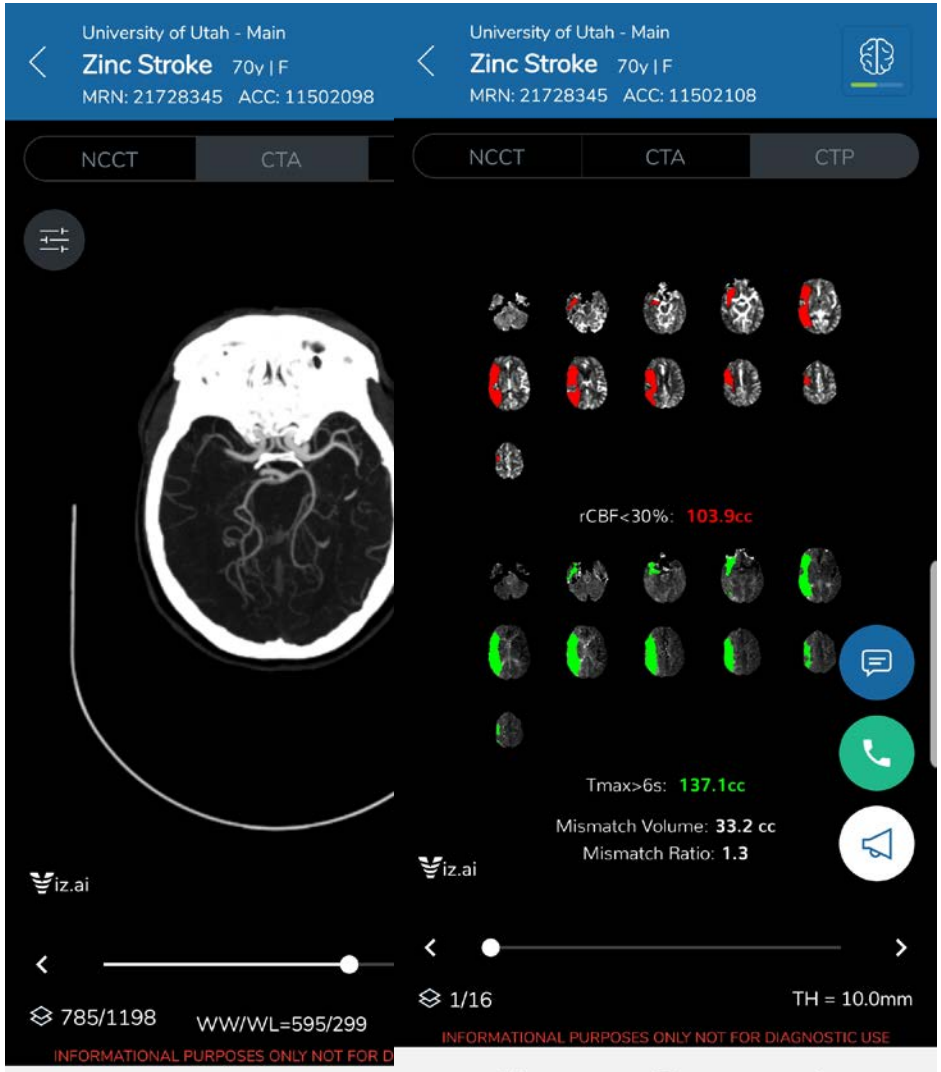


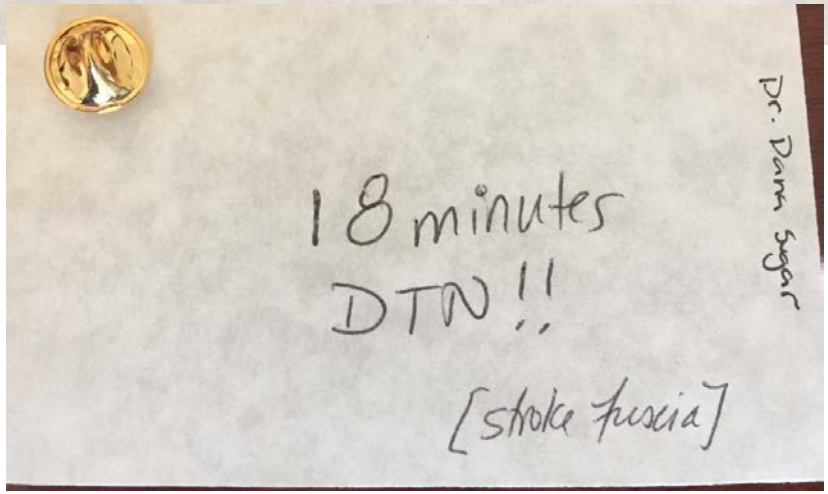
MOTIVATE

Awarding Internal Successes: DTN

Door to Needle Champion Awards

Each second 32,000 neurons die during a stroke.
Here is a neuron to represent and remind you of
all the ones you saved.
Thank you for your amazing work!

Stroke Center
Jennifer Majersik, MD
Ramesh Grandhi, MD
Tyler Harman, BSN, RN



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Awarding TS Sites for Best DIDO (and DTN)

Hospital Honored for Quickly Treating Stroke Patients

Feb 7, 2019 12:00 AM

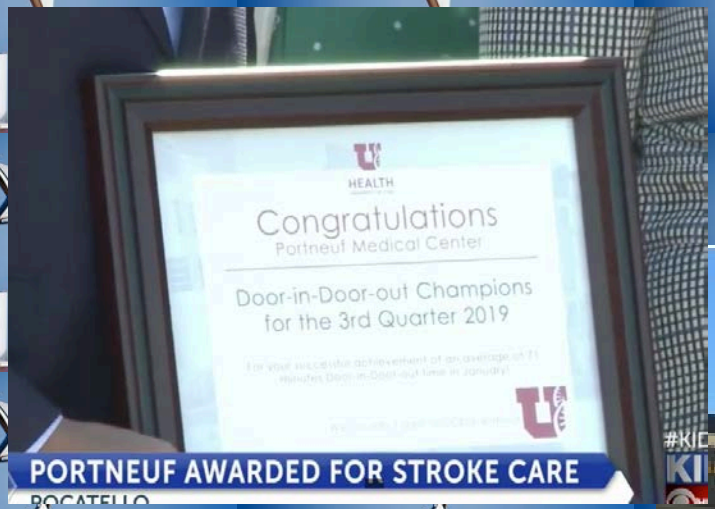
Mountain West Medical Center is the fastest among 28 rural hospitals in the Intermountain West in treating stroke patients using a University of Utah Hospital TeleStroke Program, a health official says.

"They (MWMC) have the fastest door-in, door-out time," said Jaleen Smith, coordinator of the program. "They are super fast, super bright and wonderful to work with." The telestroke program helps at hospitals where there is limited access to professionals who can diagnosis and treat stroke patients when time is a challenge.

According to recent statistics over a three-month period, emergency crews at MWMC averaged 86 minutes from the time a stroke patient arrived via ambulance at the Tooele hospital to the time they left to be admitted at the University of Utah Hospital.

[Source: Mark Watson, mwatson@tooeletranscript.com, Tooele Transcript Bulletin: http://tooeleonline.com/hospital-honored-for-quickly-treating-stroke-patients/]

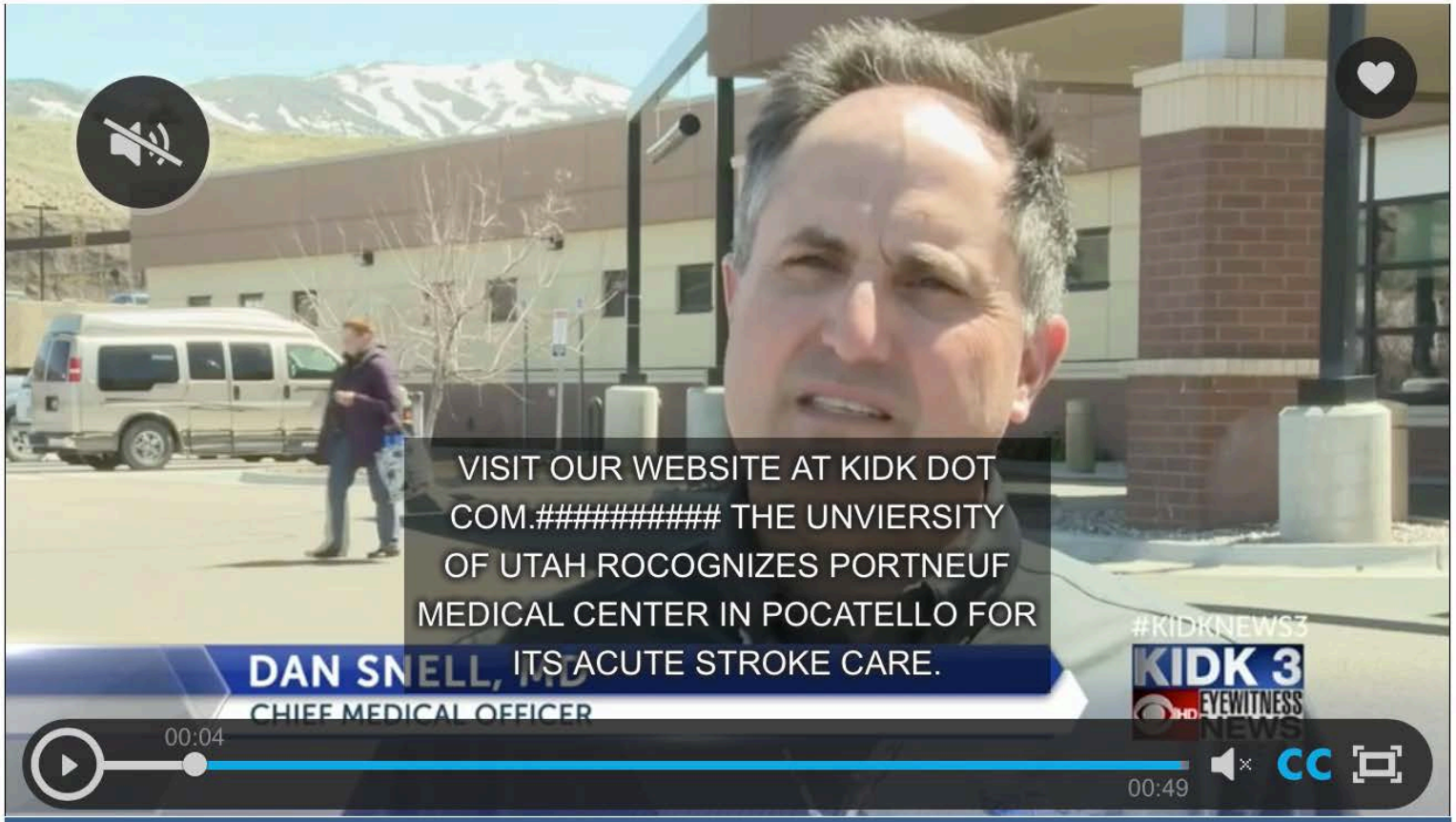
Awarding TS Sites for Best DIDO (and DTN)



Updated: Apr 19, 2019 08:04 PM MDT

Portneuf Medical Center awarded for acute stroke care

POCATELLO, Idaho (KIFI/KIDK) - Portneuf Medical Center is being recognized for its acute stroke care.



Portneuf Medical Center awarded for acute stroke care

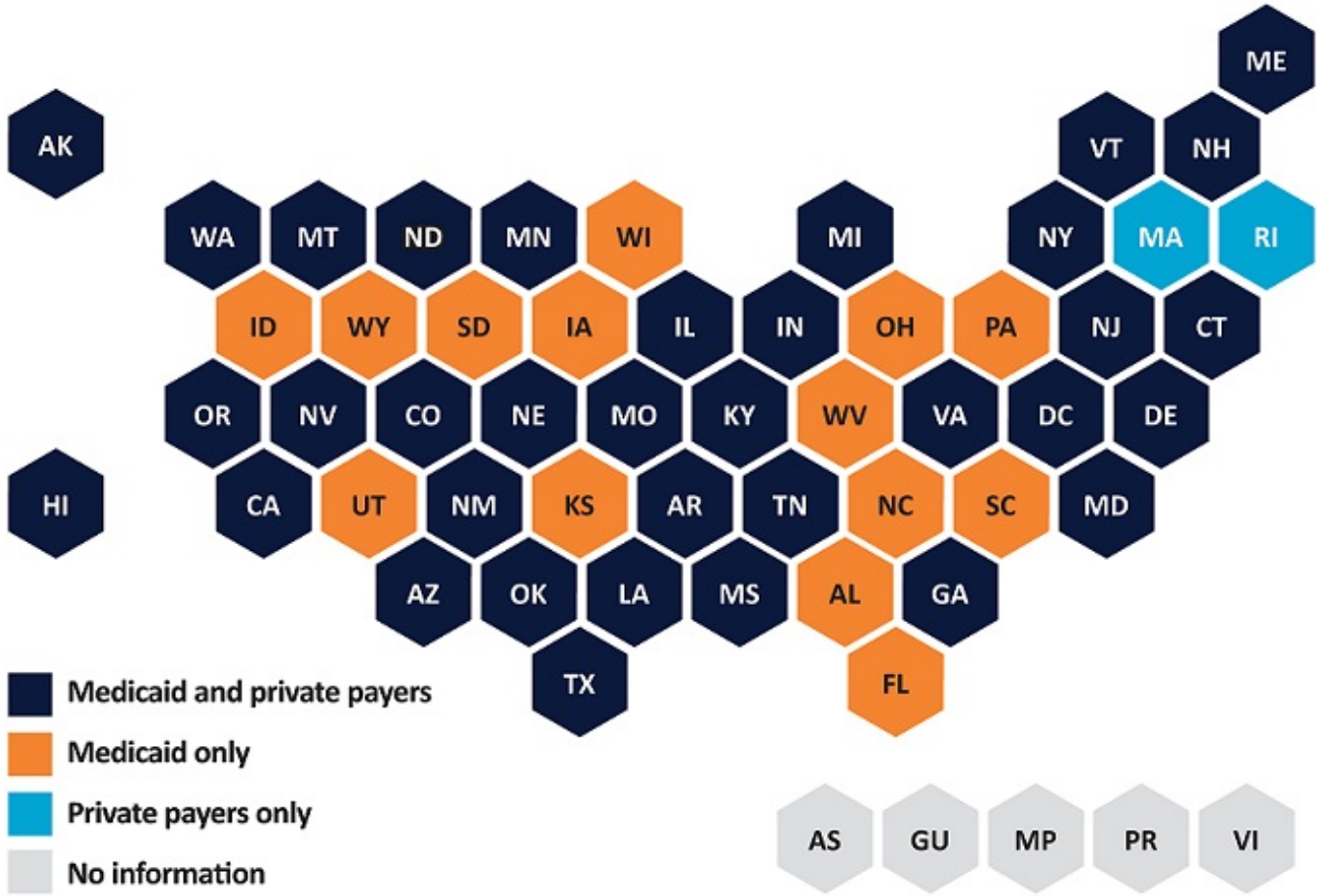
POCATELLO, Idaho (KIFI/KIDK) - Portneuf Medical Center is being recognized for its acute stroke care.

ADVOCATE for the Long Game Local, State, & National for parity

(many other issues)

Brain and Life Magazine 2019

Economics: 38 States and DC force Private Insurance to reimburse for telehealth (increases every year)



Note: Rhode Island's law will go into effect January 2018.

Source: NCSL, Center for Connected Health Policy, 2017

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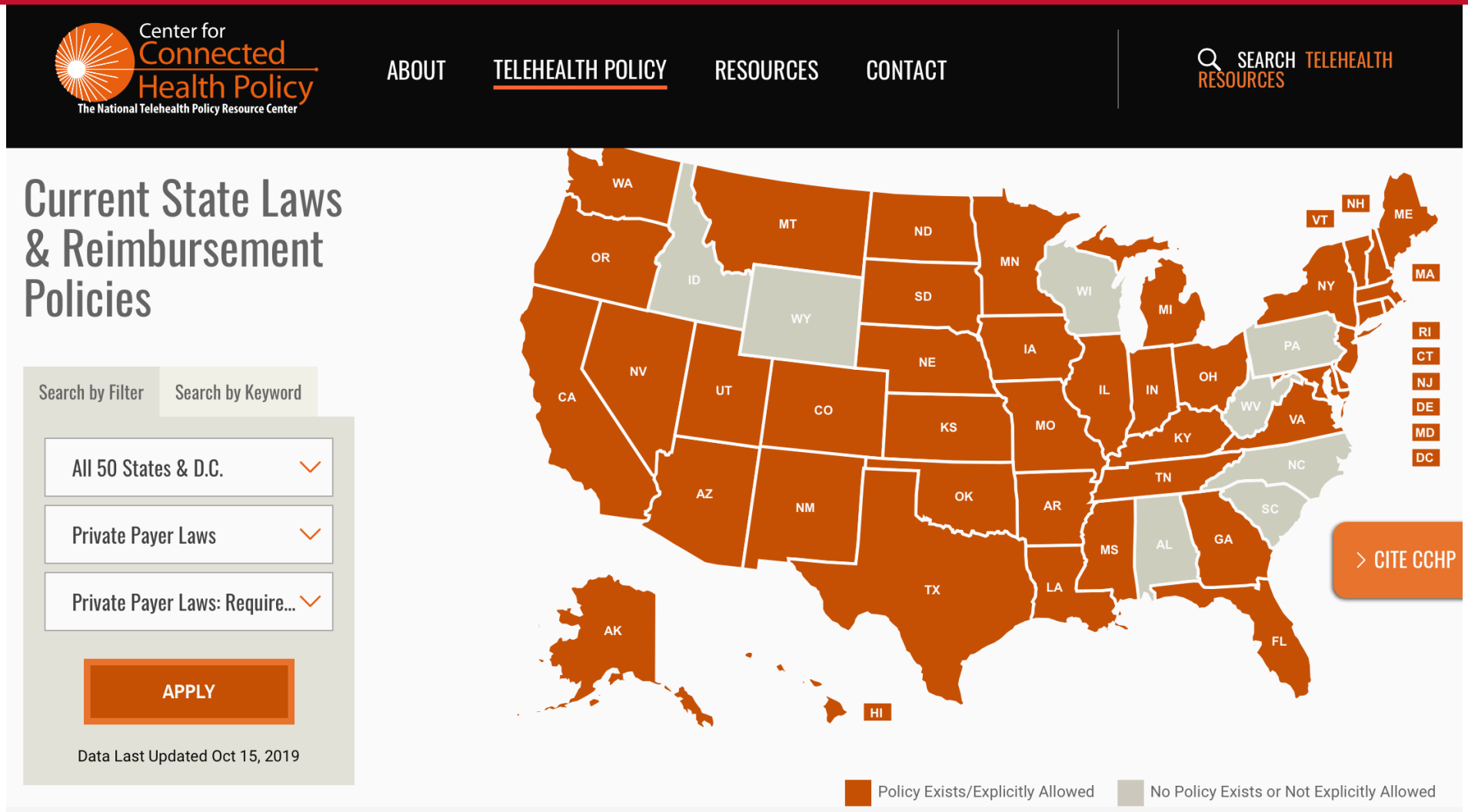
Presence of Private Payer Laws by State



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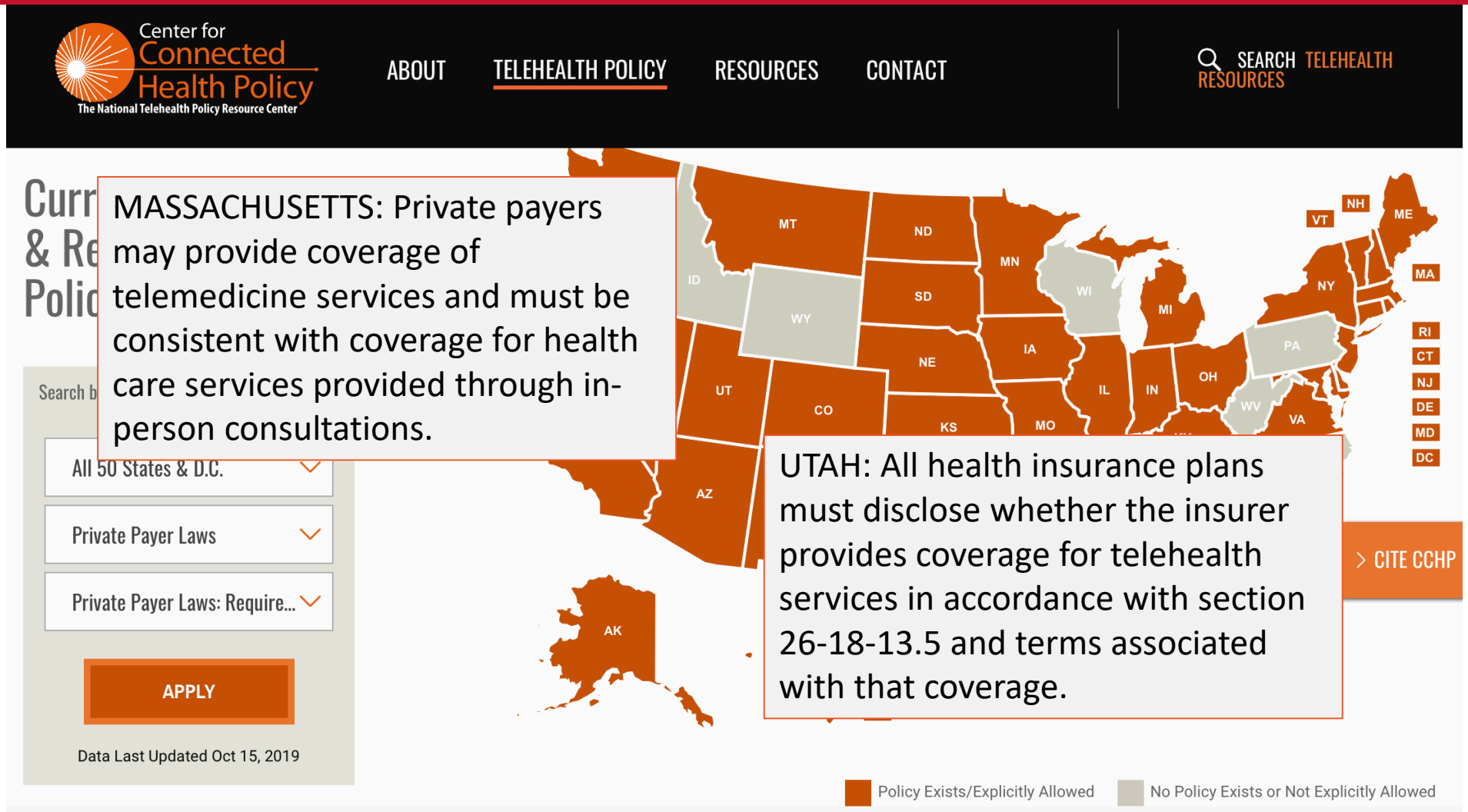
Presence of Private Payer Laws by State



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NATIONAL ADVOCACY: Furthering Access to Stroke Telemedicine Act – the FAST Act

The Need:

- 40% of Medicare beneficiaries live in counties where hospitals administer tPA less the national average treatment rate of 2.4 %.
- Approximately 94% of all strokes occur in an urban or suburban area
- But CMS didn't cover telehealth if patient is in a Metropolitan Statistical Area

The 1st Proposed Answer: the FAST Act

- US H.R. 1148 / S. 431 - Big push by AAN & AHA/ASA since 2014

Creating High-Quality Results and Outcomes Necessary to Improve Chronic (CHRONIC) Care Act of 2017 (Sens Wyden (D-Ore.), & Hatch (R-UT), Warner (D-Va.), Isakson (R-Ga.)

American Heart Association | American Stroke Association
life is why

AMERICAN ACADEMY OF NEUROLOGY

National STROKE Association

CNS

American Association of Neurological Surgeons

American Telemedicine Association

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“Neurology on the Hill”
Feb 2017

AMERICAN ACADEMY OF NEUROLOGY®

“Neurology on the Hill” Feb 2017

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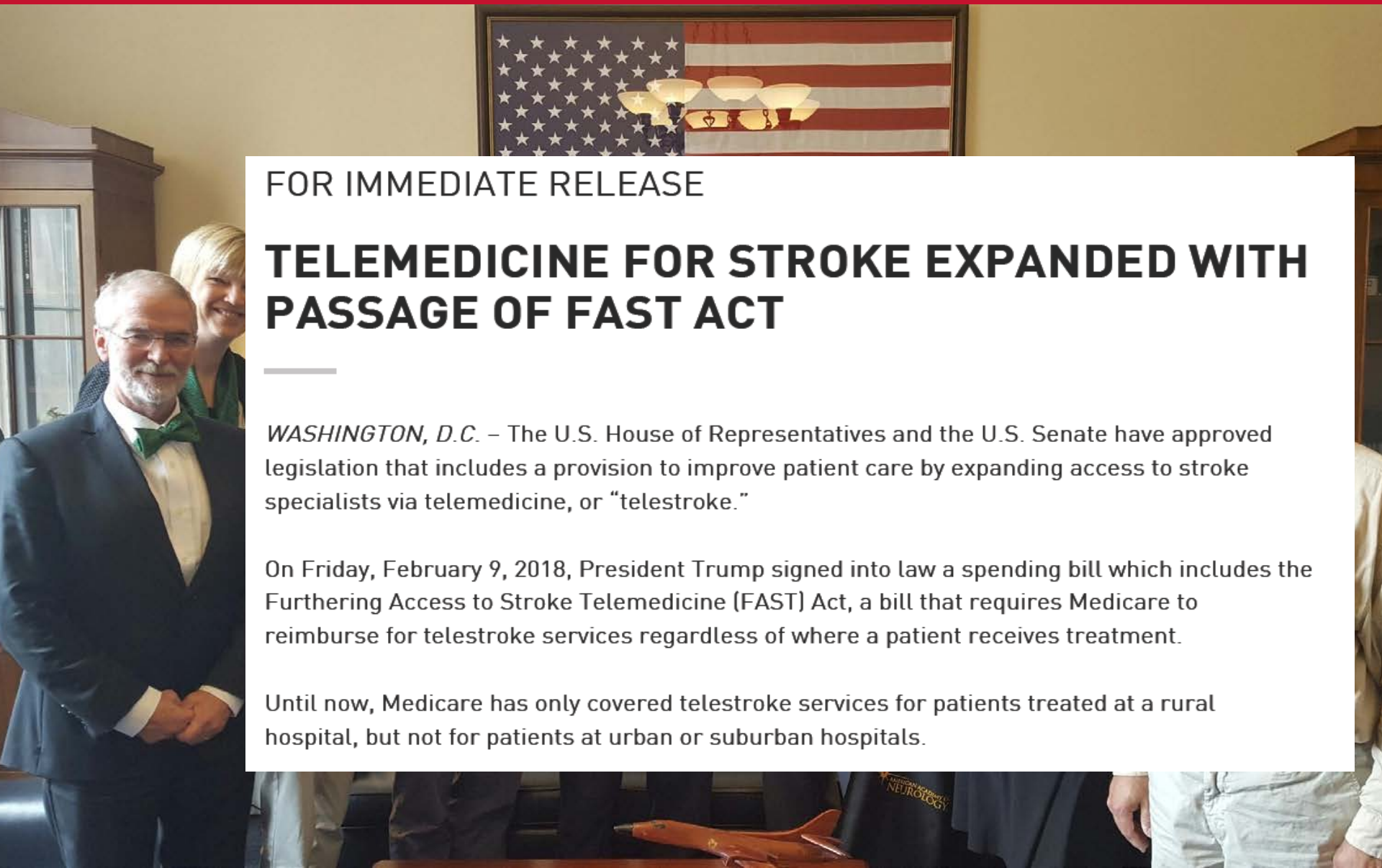

FOR IMMEDIATE RELEASE

TELEMEDICINE FOR STROKE EXPANDED WITH PASSAGE OF FAST ACT

WASHINGTON, D.C. – The U.S. House of Representatives and the U.S. Senate have approved legislation that includes a provision to improve patient care by expanding access to stroke specialists via telemedicine, or “telestroke.”

On Friday, February 9, 2018, President Trump signed into law a spending bill which includes the Furthering Access to Stroke Telemedicine (FAST) Act, a bill that requires Medicare to reimburse for telestroke services regardless of where a patient receives treatment.

Until now, Medicare has only covered telestroke services for patients treated at a rural hospital, but not for patients at urban or suburban hospitals.

ECHO Act: (S. 2873) (Sens. Hatch, R-UT, Schatz, D-HI)

S.2873 - ECHO Act

114th Congress (2015-2016)

LAW Hide Overview ✖

Sponsor: Sen. Hatch, Orrin G. [R-UT] (Introduced 04/28/2016)

Committees: Senate - Health, Education, Labor, and Pensions | House - Energy and Comm

Latest Action: 12/14/2016 Became Public Law No: 114-270. (TXT | PDF) (All Actions)

Roll Call Votes: There has been 1 roll call vote

Tracker:

Introduced > Passed Senate > Passed House > To President > **Became Law**

Requires the DHHS to report on Project ECHO impact, efficacy, barriers, use recommendations, and future funding

Summary (4) | Text (5) | Actions (17) | Titles (9) | Amendments (1) | Cosponsors (16) | Committees (2) | Related Bills (1)

Summary: S.2873 — 114th Congress (2015-2016)

Listen to this page

There are 4 summaries for S.2873. Public Law (12/14/2016) Bill summaries are authored by CRS.

Opportunites

EDUCATE

QUANTITATE

COORDINATE

MOTIVATE

ADVOCATE