Wisconsin Speed and Efficiency Toolkit

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OVERVIEW

Every second counts when treating a patient afflicted with stroke. Stroke is the fifth leading cause of death in the United States and a leading cause of disability. About 795,000 people have a stroke each year in the United States. This means one stroke occurs every 40 seconds on average (CDC, 2021). State and regional stroke systems of care, and initiatives that combine and utilize resources and expertise within them, have been shown to be an effective way to reduce morbidity and mortality. The stroke system of care (SSoC) begins with an increase in public awareness around stroke signs and symptoms and continues from stroke onset, "…through emergency medical services evaluation and transport, in-hospital, and to outpatient care and follow up." (CDC, 2021). It is incumbent on Wisconsin hospitals to offer stroke patients seamless, timely care regardless of where they fall in the care continuum. The goal of a SSoC is to ensure all stroke patients receive rapid recognition, treatment, and transport to a hospital capable of providing the appropriate level of stroke care, and to optimize their recovery.

Opportunities for improving SSoC exist across Wisconsin. Stroke care delivery may at times lack systematic stroke protocols or have limited personnel with stroke expertise, which may result in a lack of clear coordination and inefficient resource allocation leading to unfavorable stroke outcomes. Hospitals without substantial stroke-specific resources (spoke), which are disproportionately smaller and located in rural areas, may encounter these situations, and require transfer to a larger hospital (hub) which is able to manage and treat more complex stroke patients. (Wisconsin Telestroke, 2022). Spoke hospitals are often critical access hospitals (CAH). A CAH is generally described as having no more than 25 beds and is 35-miles from the nearest hospital. For further defining characteristics of a CAH visit Critical Access Hospitals | CMS.

This *Speed and Efficiency Toolkit* will focus on the unique needs of the 58 CAHs in Wisconsin (WI) in the treatment of the acute stroke patient. To assist a CAH in providing the best care to their communities, the Wisconsin Coverdell Stroke Program (Coverdell) and American Heart Association (AHA) partnered to develop a Speed and Efficiency Task Force (TF). This is the second TF of this partnership, the first being the Telestroke TF, whose findings are summarized in the *Wisconsin Telestroke Toolkit*, which will be referenced in this publication.

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TASK FORCE AND CHARTER

In January of 2022 a survey was distributed to CAH stroke coordinators participating in Coverdell. The purpose of the survey was to gather information on the current landscape of Coverdell CAHs in providing time-sensitive stroke care as it relates to EMS pre-notification, intravenous (IV) thrombolytic door to needle time, and door-in-door out processes. After reviewing the survey replies, the need was determined to create a Speed and Efficiency TF. The Speed and Efficiency TF first met in May 2022 and was facilitated by Coverdell and AHA, with 23 participating CAHs, which represent 12 hospital systems.

The mission of the Speed and Efficiency TF was to strengthen comprehensive stroke care in WI by discussing and directly addressing the issues of Coverdell CAHs in providing time-sensitive stroke care based on best practices and guidelines. A charter was created (See Appendix 1) to guide the Speed and Efficiency TF with the defined mission, vision, and goals. Starting in May of 2022, the Speed and Efficiency TF met on six occasions with ad hoc communication among members in between formal meetings. The Speed and Efficiency TF reviewed hospitals' protocols, algorithms, order sets, and shared models of care. This toolkit is a result of the Speed and Efficiency TF's work and summarizes our findings from this review and incorporates the

American Heart Association and American Stroke Association recommendations and resources. See references and resources on pages 15-18.

The scope of this toolkit encompasses the acute stroke patient arriving to the emergency department (ED) of a CAH either by private/public transportation or emergency medical services (EMS). The toolkit will provide the end-user with resources to coordinate effective acute stroke processes, and encourage involvement within the local SSoC. Implementation of recommendations within this toolkit will assist the CAH in building their acute stroke processes and protocols.

EMS

Any effort to improve SSoC processes requires EMS involvement that stresses the importance of their pre-arrival actions. In the stroke care continuum, the initial assessment and actions performed prior to hospital arrival by EMS providers will have significant impact on the patient's subsequent care.

For quicker and more effective treatment, EMS providers are ideally the first contact a stroke patient has with medical professionals.

To assist EMS in care of the acute stroke patient, the Coverdell team developed a document to assist EMS in identifying an accurate last known well (LKW) time titled, *The Importance of an Accurate Last Known Well and Symptom Onset Time* (Wisconsin, 2019). Precise identification of LKW and symptom onset time are essential to direct patient care, treatment, and for the purposes

of determining eligibility for thrombolytic therapy. Also, to support EMS in determining the correct hospital destination, AHA published *Stroke Rural Transport Recommendations* in 2021.

A YouTube video was released in April 2022, titled *EMS for Stroke: The First Line of Defense.* "This educational video explores considerations in EMS pre-hospital stroke care relating to: identification of stroke, community education to drive stroke awareness, stroke capabilities of different hospitals, and routing protocols." The Telestroke TF formed a subgroup to review this and other existing EMS education to discern if additional education was needed. At the time of publication of this toolkit, this subgroup has reviewed existing EMS education and is determining the needed resources to fill existing gaps.

There are multiple EMS committees in Wisconsin:
- Professional Ambulance Association of WI (PAAW)
- Wisconsin Fire Chiefs Association
- Wisconsin EMS Association
- Professional Firefighters of Wisconsin
- Physicians Advisory Committee, EMS Advisory Board (PAC)
- WI EMS Advisory Board
- Wisconsin Chapter, American College of Emergency Physicians

The above EMS content is also found in the *Wisconsin Telestroke Toolkit*

SPEED AND EFFICIENCY FRAMEWORK
To guide our meetings and subsequent work, the Speed and Efficiency TF created a framework (See Appendix 2) where process items were identified:
- EMS pre-notification
- Stroke team
- Imaging
- National Institutes of Health Stroke Scale (NIHSS)
- Dysphagia screen
- Telestroke
- Intravenous (IV) thrombolytics
- Transport
- Door-to-needle (DTN)
- Feedback

EMS pre-notification

The Telestroke TF developed a one-page resource *The Importance of EMS Pre-Notification* which states, "For quicker and more effective treatment, EMS providers are ideally the first contact a stroke patient has with medical professionals. EMS pre-notification of a suspected acute stroke patient assists the receiving hospital to assemble the appropriate personnel and resources before the patient arrives, which will increase the probability of the appropriately screened acute stroke patient receiving time-sensitive thrombolytic therapy. Eligible stroke patients can receive IV thrombolytics within 4.5 hours of LKW, and mechanical thrombectomy within 24 hours of LKW." (Powers, 2018). Initial assessment and actions performed prior to hospital arrival will have significant impacts on the patient's subsequent care. This document also reviews the goals for EMS pre-notification, the verbiage EMS should use when pre-notifying a hospital of a suspected stroke patient, stroke mimics, and the importance of case reviews. See the framework in Appendix 2 for EMS pre-notification challenges and associated practice successes. The Speed and Efficiency TF identified that EMS pre-notification was not a mandatory data element in the EMS data registry or Wisconsin Ambulance Run Data System (WARDS). As a result, Coverdell worked with the Wisconsin Department of Health EMS Data Manager to ensure pre-notification was added as a mandatory question in WARDS.

Stroke team

It is essential for a CAH to have a designated stroke team. The team's value is multi-faceted, as it ensures stroke care is performed in an organized and efficient manner, dedicated staff are trained in protocols including the delivery of IV thrombolytics and is an independent predictor of decreased mortality (Alberts, 2013). The Speed and Efficiency TF discussed the challenges of forming a dedicated stroke team, which included having a formal code stroke process, identifying the stroke team with clarification of roles, and ensuring the team is trained in stroke protocols and current guidelines. Practice successes include identifying a leadership stroke champion to assist in developing a stroke program and networking with CAHs who have developed their stroke program.

AHA has a *Clinical Tools and Resources* site with a plethora of resources for hospitals to assist in addressing the aforementioned stroke team challenges, including:
- *Massachusetts Acute Stroke: Idealized DIDO Protocol*
- *Door-in-Door Out Best Practice Strategies*
- *Target: Stroke Best Practices*
- *Target: Stroke Phase III Suggested Time Intervals Goals*

Imaging

The Speed and Efficiency TF discussed the challenges with attaining a rapid computed tomography (CT) of the head to assist in determining the acute stroke patient's treatment path. Not all CAHs have a CT tech in-house 24/7. For these hospitals, it is imperative for an onsite member of the team to turn the CT scanner on, in preparation for the CT tech's arrival at the

hospital, which will occur within 30 minutes from call. To further mitigate time delays, a promising practice at some hospitals is having the Telestroke provider review the case and assess the patient before the CT is completed.

For those CAHs with 24/7 in-house CT techs, the use of overhead paging has proved useful in notifying the entire multi-disciplinary team of an incoming potential acute stroke patient. In addition, these announcements increase staff recognition of the frequency of stroke, and increase patient and visitor interest in learning more about stroke awareness and prevention.

AHA's *Clinical Tools and Resources* site includes *Target: Stroke Phase II Direct to CT Protocol,* which recommends: "…transport of stroke patients by EMS directly to the imaging suite and bypassing the conventional ED triage and full assessment process…" The direct to CT protocol also provides a review of items that should be included in a stroke protocol and actions to be completed before patient arrival, all of which have been associated with faster door to treatment times.

National Institutes of Health Stroke Scale

The NIHSS is a screening tool that measures the severity of a stroke and assists in determining the patient's treatment course. The performer of the NIHSS must be trained and certified in the 11-item screening. For nurses at CAHs, there is a low volume need for this screening, thus large variability in confidence and competence in executing the NIHSS exists.

The Speed and Efficiency TF discussed the challenges of completing the NIHSS during the video consult process. Typically, the bedside nurse will assist the telestroke provider in assessing the NIHSS. An important distinction during a telestroke video exam is the scoring is often completed and documented by the telestroke provider. It is important the CAH understands their role in the performing the NIHSS to streamline the transfer process.

The nurse should be confident in the assessment components of the NIHSS, particularly visual fields, limb ataxia, sensation, and extinction/inattention. When performed incorrectly, these assessments can negatively impact the telestroke provider's ability to accurately assess the patient. Incorporating performing the NIHSS into annual training with teach back may increase its overall usage at CAHs. To aid in this training, a demonstration video was developed, which is available as an open-source resource. The AHA has resources for scoring the NIHSS, including tips for the patient in a coma, or who is intubated or aphasic (Ashcraft, 2021). AHA's Lifelong Learning site has several test groups where the participant can learn how to administer or review the NIHSS. (Wisconsin Telestroke, 2022)

Coverdell also offers a resource to assist participating hospitals in educating their stroke teams. Hemispheres™ Stroke Competency Series is an online stroke education curriculum based on clinical practice guidelines, and consists of 10 modules, of which one is NIHSS certification.

Dysphagia screen

Like the NIHSS, the dysphagia screen is a low volume stroke screen at CAHs. Performing a dysphagia screen is important to prevent aspiration pneumonia as stroke patients' incidence for difficulty swallowing is 40%–78% (Ashcraft, 2021). AHA guidelines recommend:

- A trained nurse or a speech pathologist should perform a swallowing screen within 24 hours of admission to a hospital using a validated evidence-based tool and before giving food, fluids, or oral medications.
- Refer patients who fail the swallowing screening to a speech pathologist for a swallowing assessment. (Ashcraft, 2021).

Barriers to completing the screen include there is no consensus on the optimal screening tool, and hospitals need to ensure the tool utilized is validated. *Validity and reliability of swallowing screening tools used by nurses for dysphagia: A systematic review* was published by Jiang, et al in 2016. This review evaluated studies on dysphagia published 1992-2015 to determine which tool can best be utilized by nurses for patients with neurological disorders. The findings of the review are supportive of utilizing a standardized bedside swallowing screen.

To ensure screening of the majority of stroke patients, the Speed and Efficiency TF identified a best practice of performing the dysphagia screen on all patients receiving a CT of the head while in the ED. This ensures those presenting with weakness or dizziness, regardless of whether they had already been assessed for stroke, receive a dysphagia screen to prevent choking and aspiration.

Telestroke

The *Wisconsin Telestroke Toolkit*'s scope covers the acute stroke patient arriving at the ED of a community hospital. The toolkit provides the end-user with resources to coordinate effective telestroke processes and involvement within the local stroke systems of care. Use of the toolkit will assist the hospital site or system in building a telestroke program and infrastructure.

The Speed and Efficiency TF discussed the structure of the *Wisconsin Telestroke Toolkit*, and reviewed specific CAH protocols, as well as benefits, barriers, and challenges of the process, to ensure the toolkits were complementary.

IV thrombolytics

The above-mentioned survey identified three barriers CAH hospitals are experiencing regarding administering IV thrombolytics. They are listed in order of most identified barrier to least identified:

- Stroke expertise not readily available
- Concerns regarding complications (for example, bleeding)
- Staff not comfortable/educated in administering IV thrombolytics

Stroke expertise not readily available. To ensure a consistent provider message throughout Wisconsin, the Telestroke TF developed, and the Speed and Efficiency TF reviewed, the

Telestroke Consult Criteria document (See Appendix 3). This document details the criteria for initiating a telestroke consult: a patient is 18 years or older, has stroke symptoms of acute onset, LKW within 24 hours, and have one or more of the BEFAST signs. The Telestroke TF also determined the call to the telestroke consult needs to occur simultaneously while the patient is being taken for brain imaging, and the telestroke link needs to be initiated within 20 minutes of the emergency physician and/or acute stroke team determining it is necessary. This is in alignment with stroke certifying bodies' recommendations.

Concerns regarding complications was addressed. According to Yaghi, the incidence of spontaneous intracerebral hemorrhage after IV alteplase varies from 2% to 7%. We performed a data review using the stroke registry Get With The Guidelines® (GWTG) to determine the incidence of bleeding complications in the 11 Wisconsin Coverdell CAHs from which we have data. In 2021, there were 200 transfers who received IV Alteplase. Of those, 2.5% (n=5) had a symptomatic hemorrhage detected prior to transfer.

Comfort in thrombolytic administration was identified as a hindrance towards reducing stroke impact and was also addressed as part of the Speed and Efficiency TF's efforts. Identifying staff member(s) and their role(s) in the mixing process, once the recommendation is given to administer IV thrombolytics (Alteplase or Tenecteplase), was determined to be critical to meeting an optimal treatment time. It is recommended to collaborate with the pharmacy department to develop reconstitution guidelines and protocols. For review, Genentech has developed [Reconstituting Guidelines for Activase® (alteplase)](). There are also publicly available resources (including videos on YouTube and other sites) containing demonstrations of the reconstitution of IV thrombolytics. Both TFs recognized the importance of performing annual competencies for mixing IV thrombolytics. An example of a hospital's IV thrombolytics competency (Aspirus Langlade) can be found here: [Competency Assessment Form for Emergency Department (wha.org)]()

Data was shared from GWTG, specifically, comparative DTN times within 60 minutes. When reviewing this data, we noted a 38.7ppt difference between CAHs (n=12 hospitals) and non-CAHs (n=44 hospitals) in the Wisconsin Coverdell Stroke Program in the proportion of cases for which DTN time of 60 minutes or less was achieved.

2021 Door-to-Needle Time in 60 minutes, or less, by hospital type: Wisconsin Coverdell Hospitals (n=56)
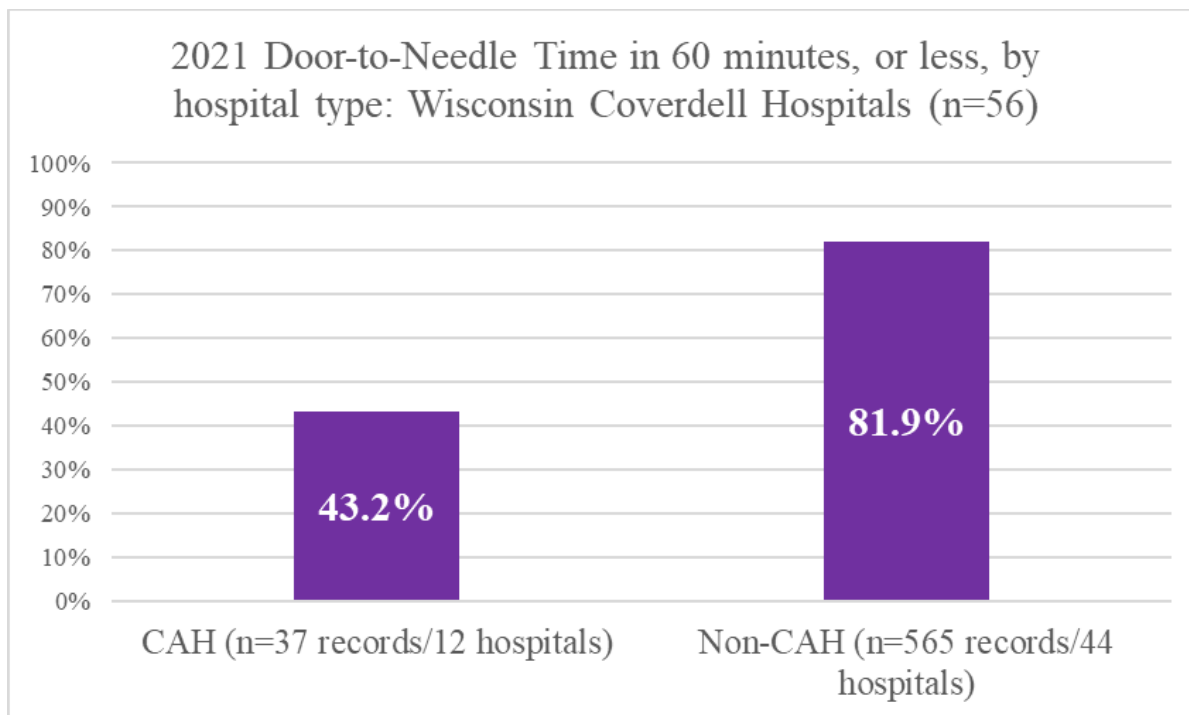
Conducting mock stroke drills was discussed, as they provide an opportunity for hospitals and EMS to evaluate their protocols and provide opportunities to decrease door to treatment times, and increase capacity to improve outcomes (American Stroke Association, 2021). The American Stroke Association (ASA) has an excellent resource for mock stroke drills titled, *How-To Guide Stroke Simulation Event*. ASA also has a checklist and feedback form for use when conducting a stroke drill.

Transport

With respect to the treatment and transfer process, the Telestroke TF identified barriers that can adversely impact patient outcomes, including:

- Delays in thrombolytic mixing
- Hospitals are at capacity and have difficulty in accepting IV thrombolytic patients
- Delays in time between when the transfer decision is made to the actual transfer
- Difficulty in finding ground transport, or EMS with qualified personnel to transport

The Telestroke TF partnered with the Wisconsin Department of Health Services EMS Section to discuss ground transport challenges, as well as finding qualified personnel to transport. Coverdell has met with statewide EMS partners to address the issues and will continue to keep this communication open as a bridge between hospitals and EMS. While improving ground transport availability requires significant resources, many of which are not under local control, both TF's identified promising practices they could incorporate to mitigate this resource-dependent impact:

Education
- Establish a protocol illustrating not every stroke needs to be transferred as urgently as a large vessel occlusion (LVO)
- Ensure education on LVO scales and diversion among EMS and hospitals is provided to establish an understanding that a Code LVO is on the same level as a Code ST-elevation myocardial infarction (STEMI) and should be treated with the same urgency

Process and practice
- Call ground EMS or air transport early in the process (prior to imaging) and have on stand-by
- Establish processes to ensure EMS time and other resources are used efficiently
- Track internal quality metrics (including inter-facility transfer) to ensure processes are supporting expedited patient transfer practices

Structural
- If possible, pursue regionalization of care to streamline transfer opportunities and communication
- Investigate the possibility of contracting with a private agency

There have been recent published resources addressing the door-in door-out (DIDO) time of acute stroke patients. One of these is AHA's *Door-in-Door out Best Practice Strategies*, developed by the Western States Task Force. A second resource, titled *Massachusetts Acute Stroke: Idealized DIDO Protocol* can be found through the AHA's Clinical Tools and Resources page.

Door-to-Needle

During discussions of the DTN framework process, we explored data metrics currently collected, who the data are shared with, and what tool or registry the data is collected in. To always keep the value of model sharing at the forefront of conversations, participants shared specific quality improvement (QI) projects they have used to decrease DTN times.

AHA has many resources to assist CAHs in collecting and evaluating their DTN times. Target: Stroke Phase III Patient Time Tracker is one such tool, which provides process time goals for a DTN time of 30, 45, or 60 minutes, as well as door to device times. The Stroke Quality Feedback Report is located in the AHA's Clinical Tools and Resources page and is, "an example of a stroke quality feedback report that can be used by hospitals to reduce their door to needle times."

As stated in the TS Taskforce Toolkit, GWTG-Stroke is an online continuous QI AHA stroke data registry. Stroke programs utilize GWTG-Stroke for thorough and comprehensive stroke care data collection in order to identify areas for improvement. It is recommended that spokes move to collecting their stroke data in GWTG-Stroke, which provides easy-to-retrieve hospital and comparison data. While GWTG does have a cost associated with it, there are agencies in Wisconsin that can assist with this. Please contact Kelsey McCauley, AHA at Kelsey.McCauley@heart.org for more information.

Feedback

Communication between hub and spokes hospitals is essential in building a trusting working relationship. Spoke hospitals must vigilantly collect work-flow times and metrics of the acute stroke patient to assess their processes. Sharing individual or median times data with the hub at least quarterly is essential in assuring patients receive the best care.

To assist in building the hub-spoke relationship it is recommended the hub hospital attend the CAH or spoke hospitals' stroke team meetings. It is also essential the hub hospital provide spoke hospitals data comparing initial and final diagnoses so they can evaluate for stroke mimics, and outcomes data such as length of stay, complications, and discharge disposition. This feedback assists in building the relationship and provides loop closure, learning, and celebratory opportunities for the spoke hospital. If the spoke CAH and hub hospitals are from the same system and share an EHR, data is easily retrievable. To aid in data transparency and sharing where a common EHR does not exist, *Mission: Lifeline Stroke Feedback Form* is available in GWTG for users and contains many time-based valuable metrics that can be easily shared amongst hospitals, including:

- EMS pre-notification to stroke team activated
- Referring hospital discharge to receiving hospital arrival
- Patient arrival to first NIHSS score performed
- Patient arrival to ED Physician assessment
- Stroke team activation to stroke team arrival
- Patient arrival to brain imaging initiated
- Patient arrival to IV alteplase initiated
- Patient arrival to first pass of a clot retrieval device

Next Steps

The Speed and Efficiency TF will continue to meet quarterly to discuss and directly address the issues of Coverdell CAH (spoke) hospitals in providing time-sensitive stroke care. We will update this toolkit with resources and guidelines as they are published.

LIST OF ACRONYMS

AHA	American Heart Association
CAH	Critical Access Hospital
CDC	Centers for Disease Control and Prevention
Coverdell	Wisconsin Coverdell Stroke Program
CT	Computed Tomography
DTN	Door-to-Needle
ED	Emergency Department
EMS	Emergency Medical Services
GWTG	Get With The Guidelines®
IV	Intravenous
LKW	Last Known Well
LVO	Large vessel Occlusion
NIHSS	National Institutes of Health Stroke Scale
QI	Quality Improvement
SSoC	Stroke Systems of Care
STEMI	ST-elevation myocardial infarction
TF	Taskforce
WARDS	WI Ambulance Run Data System
WI	Wisconsin

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APPENDICES

Appendix 1-Charter

AHA and Coverdell Project Charter – Speed and Efficiency in Stroke Care	
Mission:	To develop comprehensive stroke care in Wisconsin by discussing and directly addressing the issues of Coverdell Critical Access Hospitals (CAH; spoke hospitals) in providing time-sensitive stroke care (for example, EMS pre-notification, door to needle, etc.) based on best practices and guidelines.
Vision:	Bring together Coverdell CAH Stroke Coordinators/Stroke Leads to discuss and share current and needed practices to increase EMS pre-notification and decrease door-to-needle (DTN) times.
Goals:	Process: • By April 2023 finalize CAH Hospital Toolkit/documents available for dissemination and sharing on virtual platforms (for example, Coverdell website) Outcomes: • By June 2023, increase CAH % of stroke patients EMS pre-notifies from 77.3% in 2021 to 80.0%. • By June 2023, increase CAH % of ischemic stroke patients who receive IV thrombolytics within 60 minutes of arrival from 2021 of 43.2% to 50.0%. • By June 2023, decrease CAH CT Median Time for arrivals within 4.5 hours from 2021 of 15 minutes to 14 minutes which is equal to All Hospitals in 2021.
Project Leads	• Sue Abelt, Quality Improvement Manager, AHA • John Bowser, Director, Wisconsin Coverdell Stroke Program, DHS • Dot Bluma, Coverdell Stroke Project Specialist, MetaStar
Milestones	<table><tr><th>Date</th><th>Activity</th></tr><tr><td>March and April 2022</td><td>Recruit Coverdell CAH partners to join project focused on improving use of EMS, maximizing pre-notification, and reducing DTN time in catchment area</td></tr><tr><td>May 2022-October 2022</td><td>Conduct monthly meetings to discuss, assess, and evaluate practices to address project goals; move to quarterly as determined by the Task Force</td></tr><tr><td>January 2023</td><td>Task Force review of draft documents/toolkit</td></tr><tr><td>April 2023</td><td>Toolkit/documents published</td></tr></table>
Measurement of Success	• Review the DTN process as defined by Target Stroke. Identify approaches CAHs have difficulty implementing and integrating into their process flows, and QI initiatives to carry out to overcome the barriers. • Improvement in WI CAH outcome data: increase EMS pre-notification; decrease arrival to CT and DTN.
Communication	• Inform Stroke Coordinators of Wisconsin (SCOW) and Coverdell learning Collaborative (CLC) of activities and progress of this Task Force • Publish best practice toolkit/documents to AHA/Coverdell website
Issues and Constraints	Possible Constraints: • Stroke Coordinators/Stroke Leads lack of resource time for meeting attendance. • Project leads with competing priorities that could delay content writing.

Appendix 2-Framework

Process Item	Challenges	Practice Successes	WI Consensus Documents	GWTG Measure
Speed & Efficiency Task Force Topic Framework				
Pre-arrival				
EMS Pre-notification	Not mandatory in WARDS-conversations occuring at EMS meeting in June-21June: mandatory Not specific enough in EMS report Abstractor unaware of acceptable documents/where documentation is	Educate local EMS on the importance of pre-notification -Autonomy to call a stroke code/alert -Non-punitive for stroke alert called that was not a stroke Ensure EMS report is in the EHR Created a cheat sheet for triage RN-all asking for the same information Hospitals provide feedback to EMS	The Importance of EMS Pre-Notification EMS For Stroke: The First Line of Defense AHA Stroke Rural Transport Recommendations	Pre-notification Special Initiatve tab-feedback form for EMS
In-hospital				
Stroke Team	Code stroke process Identifed stroke team with clariffication of roles Team trained in stroke protocols	Identify leadership stroke champion to assist in developing stroke program Network with CAH's who have developed their stroke program	Massachusetts Acute Stroke: Idealized DIDO Protocol Door-in-Door Out Best Practice Strategies Target: Stroke Best Practices Target: Stroke Phase III Suggested Time Intervals Goals	Additional Time Tracker
Imaging	24/7 CT Tech not in-house	Promising new practice: Those sites with no 24/7 CT tech-TS reviews case and assess pt. before CT is completed Turn CT on ASAP Stroke Alert overhead paged 24/7	Target: Stroke Phase II Direct to CT Protocol	% Door to CT <= 25 min Non contrast brain CT or MRI interpreted within 45 minutes of presentation
NIHSS	Low volume screen	For telestroke, the RN needs to be proficient at assisting the Neurologist in the screening, not score	NIHSS Scenario's video Hemispheres 3.0 NIHSS Tips AHA Lifelong Learning Website	NIHSS Reported

Speed & Efficiency Task Force Topic Framework				
Process Item	**Challenges**	**Practice Successes**	**WI Consensus Documents**	**GWTG Measure**
Dysphagia Screen	Low volume screen No consensus on optimal screening tool	Perform the dysphagia screen on all patients going for a CT of the head	Care of the Patient With Acute Ischemic Stroke	Dysphagia Screen
Telestroke	See Telestroke Task Force Topic Framework		WI Telestroke Task Force Toolkit Clinician Panel video	
IV Thrombolytics	Staff not comfortable/educated in ordering/administering IV thrombolytics Concerns regarding complications (e.g., bleeding) Low volume, high risk Stroke expertise not readily available	Performing Mock Code drills	How-To Guide Stroke Simulation Event ASA Stroke Scenario Tracking Form Target: Stroke Clinical Tools and Resources	Thrombolytic Therapies
	Mixing timely	IV Thrombolytics: Tenectaplase vs Alteplase Reconstitute IV thrombolytic after head CT shows no hemorrhage Provider can call pharmacy and request them to mix alteplase ahead of imaging results for a potential candidate. Pharmacy can initiate the mixing. Once the CT is resulted negative, the provider can then place the alteplase order, pharmacy then brings the calculated dose bedside. Develop process of who will mix once recommendation is given Annual mixing competency	Competency Assessment Form for Emergency Department	

Interfacility Transport	Delays-Difficulty in finding ground transport, or EMS with qualified personnel to transport	Education 1. Establish a protocol illustrating not every stroke needs to be transferred as urgently as a large vessel occlusion (LVO) 2. Ensure education on LVO scales and diversion among EMS and hospitals is provided to establish an understanding that a Code LVO is on the same level as a Code STEMI and should be treated with the same urgency Process and Practice 1. Call ground EMS or air transport early in the process (prior to imaging) and have on stand-by 2. Establish processes to ensure EMS time and other resources are used efficiently 3. Track internal quality metrics (including inter-facility transfer) to ensure processes are supporting expedited patient transfer practices Structural 1. If possible, pursue regionalization of care to streamline transfer opportunities and communication 2. Investigate the possibility of contracting with a private agency	Telestroke Task Force Toolkit Telestroke Consult Criteria AHA Stroke Rural Transport Recommendations	Door-in-Door-Out Time at First Hospital Prior to Transfer for Acute Therapy
Quality Improvement				
DTN	Metrics to collect	Break the process down to ID where the delays are Collect multiple times in the process beyond what GWTG collects Work your process backwards from the goal time and focus on internal processes the hospital has control over i.e. aim for more aggressive times for DTN Transparency of data	Stroke Alert Log/Data Capture Target: Stroke Phase III Patient Time Tracker Stroke Quality Feedback Report	GWTG Target Stroke Set Time to Intravenous Thrombolytic Therapy - 60 min
Hospitals Feedback	Data to HUB: Who completes documentation Metrics/information needed from spoke	Find a key person to collaborate with for data sharing Invite HUB Stroke Coordinator to CAH stroke team meetings Review transferred patients outcomes electronically if CAH and HUB share an EHR	Mission: Lifeline Stroke Feedback Form	

Telestroke Consult Criteria

Telestroke: The application of telemedicine in the evaluation of patients presenting with acute stroke, with the goal of improving access and delivery of care to stroke patients who are unable to be immediately treated by a local neurologist.

The use of telestroke is meant to assist providers in delivering advanced therapies to acute stroke patients in an efficient and cost-effective manner to ensure access to all available treatments. Currently a small percentage of eligible patients receive intravenous thrombolytics; part of this is due to the lack of available neuro expertise during the acute stroke phase, specifically in rural areas. Eligible stroke patients can receive Intravenous (IV) thrombolytics within 4.5 hours of last known well (LKW), and mechanical thrombectomy within 24 hours of LKW.

Utilizing telestroke has many benefits including: identifying patients requiring transfer to a higher level of care, an increased use of thrombolytic therapies (IV and mechanical), quicker diagnoses, improved management of intracerebral hemorrhage patients, and improved outcomes for those not treated with thrombolytics.
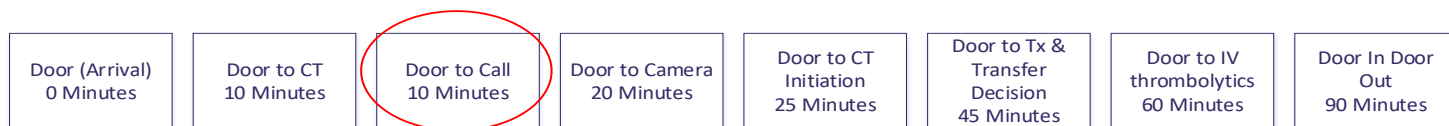
The American Heart Association and Wisconsin Coverdell Stroke Program formed a Task Force of Stroke Coordinators at leading hospital systems in Wisconsin with a mission to develop comprehensive telestroke care by discussing and directly addressing the issues of spoke hospitals in providing time-sensitive stroke care based on best practices and guidelines. The Task Force determined criteria for initiating a telestroke consult.

Telestroke Consult Criteria

If a patient is 18 years or older, acute onset, LKW within 24 hours, and have one or more of the following BEFAST criteria, a Telestroke Consult will be initiated:

- BALANCE Sudden loss of coordination or balance
- EYES Sudden change in vision
- FACE Sudden weakness on one side of the face or facial droop
- ARM Sudden arm or leg weakness or numbness
- SPEECH Sudden slurred speech, trouble speaking, trouble understanding speech
- TERRIBLE HEADACHE Sudden onset of a terrible headache

The Telestroke Task Force developed a timeline for the patient who meets telestroke criteria. As interpretation of imaging is a key component to determining treatment, the Task Force determined the call to the telestroke consult needs to occur simultaneously while the patient is being taken for brain imaging. The acute stroke-ready hospital certifying agencies of the Joint Commission and Det Norske Veritas guidelines are for the telemedicine link to be initiated within 20 minutes of the emergency physician and/or acute stroke team determining it is necessary.

| Door (Arrival) 0 Minutes | Door to CT 10 Minutes | Door to Call 10 Minutes | Door to Camera 20 Minutes | Door to CT Initiation 25 Minutes | Door to Tx & Transfer Decision 45 Minutes | Door to IV thrombolytics 60 Minutes | Door In Door Out 90 Minutes |

*Hospitals are encouraged to reduce door-to-needle times for eligible patients being treated with intravenous thrombolytics by establishing more aggressive goals.

References:

Schwamm, L. et al. (2009) A Review of the Evidence for the Use of Telemedicine Within Stroke Systems of Care. Retrieved from: A Review of the Evidence for the Use of Telemedicine within Stroke Systems of Care | Stroke (ahajournals.org)

Weschler, L. et al. (2017). Telemedicine Quality and Outcomes in Stroke. Retrieved from Telemedicine Quality and Outcomes in Stroke: A Scientific Statement for Healthcare Professionals from the American Heart Association/American Stroke Association (ahajournals.org)