



# Advancing Stroke Systems of Care to Improve Outcomes

## Target: Stroke Phase III

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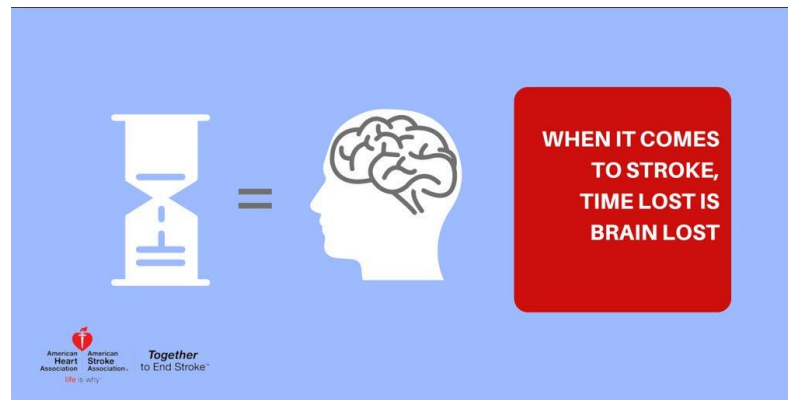


# ACUTE ISCHEMIC STROKE REPERFUSION THERAPY

The benefits of acute ischemic stroke treatment both with intravenous tissue plasminogen activator (tPA) or endovascular therapy are highly time dependent.

Shorter onset to treatment times are associated with improved functional outcomes, lower complication rates, and in some studies lower mortality.

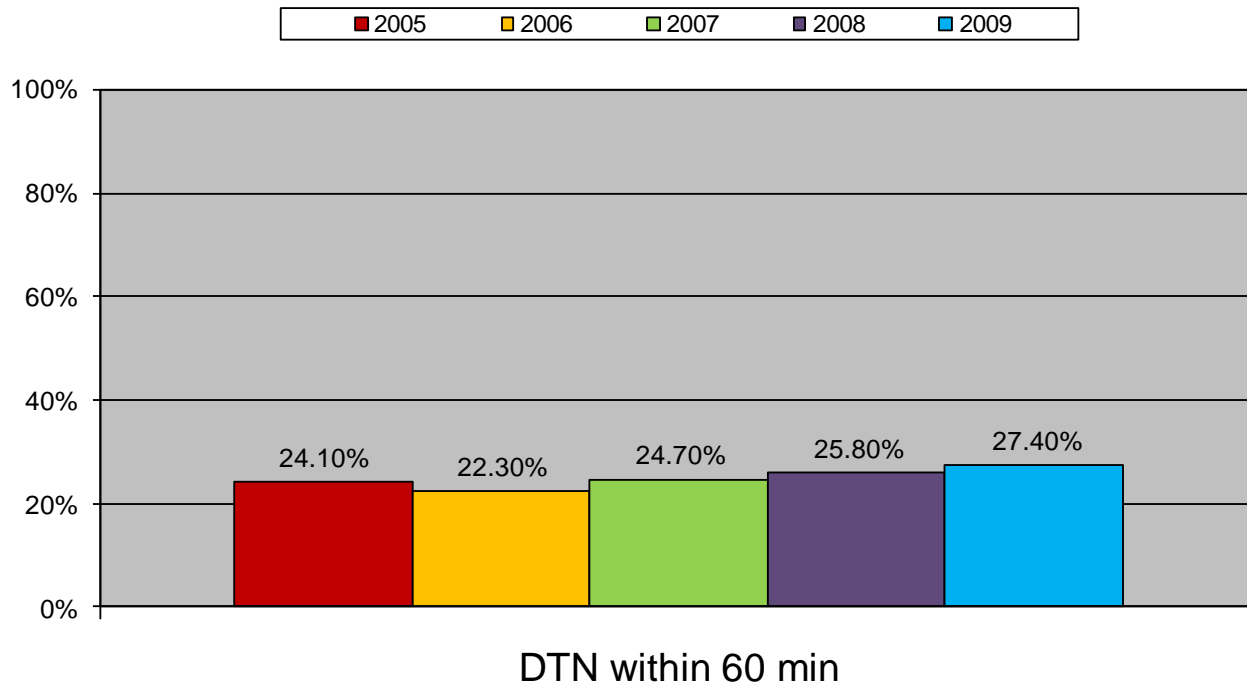
Because of the importance of rapid treatment, AHA/ASA Guidelines recommend a door-to-needle (DTN) time of  $\leq 60$  minutes for IV tPA.





## Substantial Opportunity to Improve Timeliness of IV tPA in Ischemic Stroke

Percent treated within DTN benchmark of 60 minutes



# TARGET: STROKE PHASE I



## TARGET: STROKE PHASE I

- The goal of Target: Stroke was for GWTG participating hospitals to treat at least **50% of tPA treated acute ischemic stroke patients within 60 minutes** of hospital arrival.
- An expert clinical work group performed a literature review to identify **10 key evidence-based strategies** associated with timely tPA administration that could be most rapidly and feasibly adopted by hospitals.

Fonarow GC et al. JAMA. 2014;311(16):1632-1640.



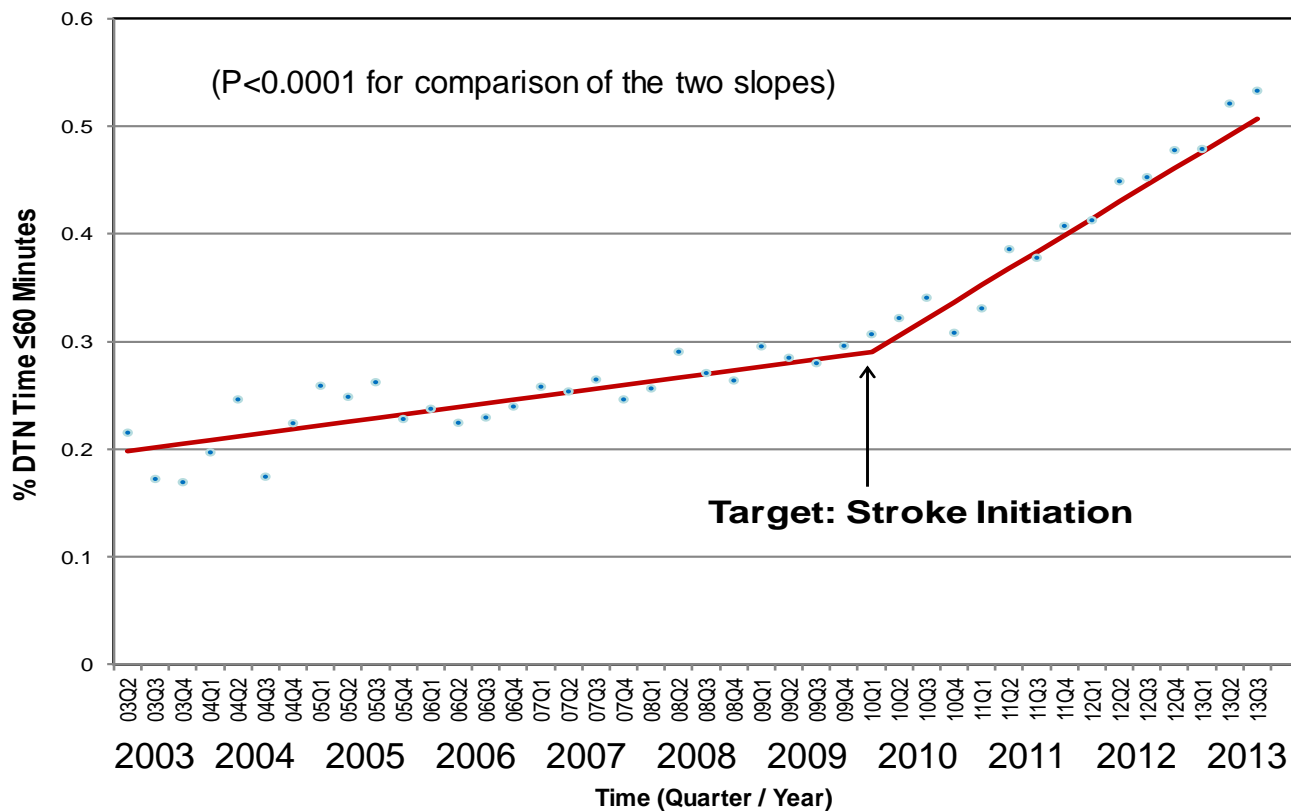
# TARGET: STROKE PHASE I

## 10 KEY BEST PRACTICE STRATEGIES

1. Hospital pre-notification by Emergency Medical Services
2. Rapid triage protocol and stroke team notification
3. Single call/paging activation system for entire stroke team
4. Use of a stroke toolkit containing clinical decision support, stroke-specific order sets, guidelines, hospital-specific algorithms, critical pathways, NIH Stroke Scale and other stroke tools
5. Rapid acquisition and interpretation of brain imaging
6. Rapid Laboratory Testing (including point-of-care testing) if indicated
7. Pre-mixing tPA medication ahead of time for high likelihood candidates
8. Rapid access to intravenous tPA in the ED/brain imaging area
9. Team-based approach
10. Rapid data feedback to stroke team on each patient's DTN time and other performance data



## Time Trend in the Proportion of Patients with DTN Times within 60 Minutes Pre- and Post-Target: Stroke





## TARGET: STROKE PHASE I RESULTS

The Target: Stroke intervention was also associated with an **increase in tPA use**.

tPA use in eligible patients **arriving by 2 hours and treated by 3 hours**: 64.7% pre- vs. 85.2% post-intervention,  $P < 0.0001$

tPA use in eligible patients **arriving by 3.5 hours and treated by 4.5 hours**: 22.5% pre- vs. 63.9% post-intervention,  $P < 0.0001$





## Clinical Outcomes Pre- and Post-Target: Stroke in Patients in Patients with Onset to Treatment Time within 4.5 Hours

Outcome	Pre-Target: Stroke (n=29,986)	Post-Target: Stroke (n=53,234)	P Value	Unadjusted Odds Ratios (95% CI)	P Value	Adjusted Odds Ratios (95% CI)*	P Value*
In-Hospital Mortality	9.95%	8.08%	<0.0001	0.79 (0.75-0.84)	<0.0001	0.90 (0.84-0.95)	0.0004
Discharge Home	37.6%	43.3%	<0.0001	1.25 (1.20-1.29)	<0.0001	1.13 (1.08-1.17)	<0.0001
Ambulatory Status Independent	42.2%	45.9%	<0.0001	1.16 (1.10-1.22)	<0.0001	1.02 (0.96-1.09)	0.4538
Symptomatic ICH	5.74%	4.74%	<0.0001	0.81 (0.75-0.88)	<0.0001	0.84 (0.78-0.92)	<0.0001
Any tPA Complications	6.75%	5.54%	<0.0001	0.80 (0.75-0.86)	<0.0001	0.84 (0.78-0.91)	<0.0001

\*Adjusted for patient characteristics including age, sex, race, medical history of atrial fibrillation, prosthetic heart valve, previous stroke/transient ischemic attack, coronary heart disease or prior myocardial infarction, carotid stenosis, peripheral vascular disease, hypertension, dyslipidemia, and current smoking, stroke severity (NIHSS), arrival time during regular work hours, arrival mode, onset-to-arrival time; hospital characteristics of hospital size, region, teaching status, certified primary stroke center, annual volume of tPA, and annual stroke discharge.

Fonarow GC et al. JAMA. 2014;311(16):1632-1640.

# TARGET: STROKE PHASE II



## TARGET: STROKE PHASE II

**TARGET: STROKE PHASE II WAS LAUNCHED IN 2014 WITH A GOAL OF IMPROVING DTN TIMES TO  $\leq 60$  MIN IN 75% AND  $\leq 45$  MIN IN 50% OF PATIENTS.**

### **NATIONAL GOAL:**

- Achieve DTN times within 60 minutes for 75% of eligible patients
- Achieve DTN times within 45 minutes for 50% of eligible patients

### **ADDITIONAL HOSPITAL RECOGNITION**

- Target: Stroke Honor Roll: existing criteria
- Target: Stroke Honor Roll Elite: DTN  $\leq 60$  minutes in 75% of eligible patients
- Target: Stroke Honor Roll Elite-Plus: DTN  $\leq 60$  minutes in 75% of eligible patients and DTN  $\leq 45$  minutes in 50% of patients

### **ADDITIONAL STRATEGIES**

- Transfer patient directly to CT
- Timer or clock at bedside



# TARGET: STROKE PHASE II

## 12 KEY BEST PRACTICE STRATEGIES

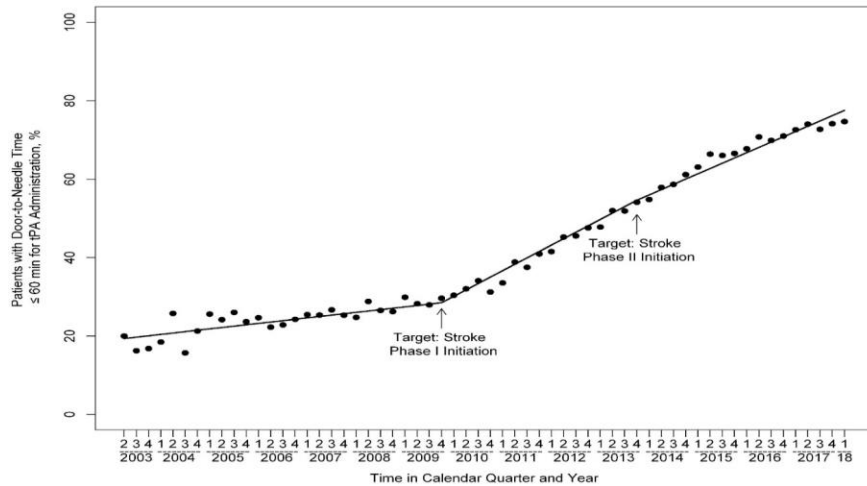
1. Hospital pre-notification by Emergency Medical Services
2. Rapid triage protocol and stroke team notification
3. Single call/paging activation system for entire stroke team
4. Use of a stroke toolkit containing clinical decision support, stroke-specific order sets, guidelines, hospital-specific algorithms, critical pathways, NIH Stroke Scale and other stroke tools
- 5. Timer or clock attached to chart, clipboard, or bed**
- 6. Transfer directly to CT/MRI scanner**
7. Rapid acquisition and interpretation of brain imaging
8. Rapid Laboratory Testing (including point-of-care testing) if indicated
9. Pre-mixing tPA medication ahead of time for high likelihood candidates
10. Rapid access to intravenous tPA in the ED/brain imaging area
11. Team-based approach
12. Rapid data feedback to stroke team on each patient's DTN time and other performance data

Updated from Fonarow GC et al Stroke. 2011;42:2983-2989.

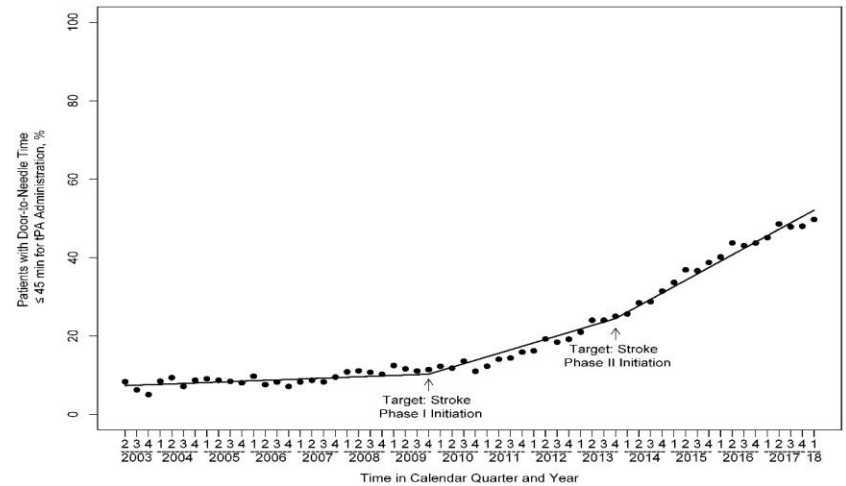


## Time Trend in DTN Times within 60 and 45 Minutes Pre-Target: Stroke, Target: Stroke Phase I, and Target: Stroke Phase II

### DTN $\leq$ 60 Minutes



### DTN $\leq$ 45 Minutes





## TARGET: STROKE PHASE II RESULTS

- **Median DTN times** significantly declined from Pre-Target: Stroke, to Phase I to Phase II: 78 minutes (IQR 47-81) to 66 minutes (IQR 51-87) to 50 minutes (IQR 37-66), absolute difference -28 minutes, ( $P < 0.0001$ ).
- The **% of patients with DTN times  $\leq 60$  minutes** increased from Pre-Target: Stroke to Phase I to Phase II: 26.5% to 42.7% to 68.4%, absolute difference +41.9%, ( $P < 0.0001$ ). In Q3 2018, 75.4% of patients had DTN times  $\leq 60$  minutes (**GOAL met**).
- The **% of patients with DTN times  $\leq 45$  minutes** also increased from Pre-Target: Stroke to Phase I to Phase II: 10.0% to 17.7% to 41.4%, absolute difference +31.4%, ( $P < 0.0001$ ). In Q3 2018, 51.7% of patients had DTN times  $\leq 45$  minutes (**GOAL met**).



**Clinical Outcomes Pre-Target: Stroke, Target: Stroke Phase I,  
and Target: Stroke Phase II**

<b>Outcome</b>	<b>Pre-Target: Stroke (n=24,365)</b>	<b>Post-Target: Stroke Phase I (n=44,257)</b>	<b>Post-Target: Stroke Phase II (74,447)</b>	<b>P value</b>	<b>Adjusted OR 95% CI (Phase I vs Pre Target: Stroke)</b>	<b>Adjusted OR 95% CI (Phase II vs Pre Target: Stroke)</b>
<b>In-Hospital Mortality</b>	10.0%	8.2%	6.2%	<0.0001	0.85 (0.80-0.91)	0.72 (0.67-0.77)
<b>Discharge Home</b>	35.8%	41.5%	49.0%	<0.0001	1.21 (1.16-1.27)	1.35 (1.27-1.45)
<b>Ambulatory Status Independent</b>	41.5%	44.6%	52.7%	<0.0001	1.05 (0.99-1.22)	1.35 (1.27-1.45)
<b>Symptomatic ICH within 36 Hours</b>	5.7%	4.5%	3.6%	<0.0001	0.79 (0.72-0.86)	0.67 (0.61-0.73)

**TARGET: STROKE PHASE III**



# TARGET: STROKE PHASE III NATIONAL GOALS

## PRIMARY GOALS:

- Achieve **door-to-needle times within 60 minutes in 85%** or more of acute ischemic stroke patients treated with IV thrombolytics
- Achieve **door-to-device times (arrival to first pass of thrombectomy device) in 50%** or more of eligible acute ischemic stroke patients **within 90 minutes (for direct arriving patients) and within 60 minutes (for transfer patients)** treated with endovascular therapy (EVT)

## SECONDARY GOALS:

- Achieve **door-to-needle times within 45 minutes in 75%** or more of acute ischemic stroke patients treated with IV thrombolytics
- Achieve **door-to-needle times within 30 minutes in 50%** or more of acute ischemic stroke patients treated with IV thrombolytics



# TARGET: STROKE PHASE III DOOR-TO-DEVICE TIME KEY BEST PRACTICE STRATEGIES

1. Rapid Administration of Alteplase
2. Rapid Acquisition and Interpretation of CT/MR Angiography
3. Rapid Acquisition and Interpretation of Additional Imaging
4. Pre-Notification and Rapid Activation of the Neurointerventional Team
5. Rapid Availability of the Neurointerventional Team
6. Timer or Clock Attached to Chart, Clip Board, or Bed
7. Transfer Directly to Neuroangiography (NA) Suite
8. Transfer Directly from Brain Imaging Suite to NA Suite
9. Endovascular Therapy Ready NA Suite
10. Team Based Approach
11. Anesthesia Access and Protocols
12. Prompt Data Feedback



## TARGET: STROKE PHASE III RECOGNITION

- HONOR ROLL
- HONOR ROLL ELITE
- HONOR ROLL ELITE PLUS
- **HONOR ROLL ADVANCED THERAPY**

# TARGET STROKE PHASE III: RECOGNITION CRITERIA

	TARGET: STROKE PHASE II	TARGET: STROKE PHASE III
HONOR ROLL	Time to thrombolytic therapy within 60 minutes in 50% or more of acute ischemic stroke patients treated with IV tPA	DTN times within 60 minutes for at least <b>75%</b> of applicable patients are required.
HONOR ROLL ELITE	Time to thrombolytic therapy within 60 minutes in 75% or more of acute ischemic stroke patients treated with IV tPA	DTN times within 60 minutes for at least <b>85%</b> of applicable patients are required.
HONOR ROLL ELITE PLUS	Time to thrombolytic therapy within 60 minutes in 75% or more of acute ischemic stroke patients treated with IV tPA AND time to thrombolytic therapy within 45 minutes in 50% of acute ischemic stroke patients treated with IV tPA	DTN times within <b>45 minutes</b> for at least 75% of applicable patients and DTN times within <b>30 minutes</b> for at least 50% of applicable patients.
HONOR ROLL ADVANCED THERAPY	-	<b>DTD times in at least 50% of applicable patients within 90 minutes for direct arriving and within 60 minutes for transfers</b>



**TARGET: STROKE PMT UPDATES  
APRIL 24<sup>TH</sup>, 2019**

# STROKE FORM - REASON FOR DELAY IN IV ALTEPLASE – 30 MINUTES

If IV alteplase was initiated greater than 60 minutes after hospital arrival, were Eligibility or Medical reason(s) documented as the cause for delay:  Yes  No

If IV alteplase was initiated greater than 45 minutes after hospital arrival, were Eligibility or Medical reason(s) documented as the cause for delay:  Yes  No

If IV alteplase was initiated greater than 30 minutes after hospital arrival, were Eligibility or Medical reason(s) documented as the cause for delay:  Yes  No

Eligibility Reason(s):

- Social/Religious
- Initial refusal
- Care-team unable to determine eligibility

Specify eligibility reason:

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Medical Reason(s):

- Hypertension requiring aggressive control with IV medications
- Further diagnostic evaluation to confirm stroke for patients with hypoglycemia (blood glucose < 50), seizures, or major metabolic disorders
- Management of concomitant emergent/acute conditions such as cardiopulmonary arrest, respiratory failure (requiring intubation)
- Investigational or experimental protocol for thrombolysis

Specify medical reason:

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Hospital Related or Other Reason(s):

- Delay in stroke diagnosis
- In-hospital time delay
- Equipment-related delay
- Other

# UPDATED TARGET: STROKE MEASURES

**REPORT 1**

GWTG Standard Measures:	Select Measure
GWTG Enhanced Version & Special Initiative Measures:	Select Measure
GWTG Additional Patient Population Measures:	Consensus Measure Set by Clinical Diagnosis **Consensus-CDC/COV Set** **Consensus-GWTG/PAA Set**
Historic Measures:	Additional Measure Groups **GWTG Stroke Quality Measures**
Format:	<b>**GWTG Target Stroke Set**</b>
	Achievement IV Alteplase Arrive by 2 Hour, Treat by 3 Hour Early Antithrombotics VTE Prophylaxis

Added:

- Door-in-Door-Out Times at First Hospital Prior to Transfer for Acute Therapy
- Time to Intravenous Thrombolytic Therapy - 30 min

**REPORT 1**

GWTG Standard Measures:	<b>**GWTG Target Stroke Set**</b>
GWTG Enhanced Version & Special Initiative Measures:	LDL Documented Intensive Statin Therapy IV Alteplase Arrive by 3.5 Hour, Treat by 4.5 Hour NIHSS Reported
GWTG Additional Patient Population Measures:	Reporting
Historic Measures:	<b>Door-in-Door-Out Times at First Hospital Prior to Transfer for Acute Therapy</b>
Format:	% No IV Alteplase 3 Hour % No IV Alteplase 4.5 Hour

New Reporting Measures

**REPORT 1**

GWTG Standard Measures:	Time to Intravenous Thrombolytic Therapy - 30 min
GWTG Enhanced Version & Special Initiative Measures:	Reasons for no IV Alteplase (hospital-related) Reasons for no IV Alteplase Smoking Cessation Therapies Prescribed
GWTG Additional Patient Population Measures:	<b>Time to Intravenous Thrombolytic Therapy - 30 min</b>
Historic Measures:	Time to Intravenous Thrombolytic Therapy - 45 min Time to Intravenous Thrombolytic Therapy Times

# ADDED MEASURE - DOOR TO START OF REVASCULARIZATION

**REPORT 1**

GWTG Standard Measures:  Select Measure

GWTG Enhanced Version & Special Initiative Measures:  Select Measure

GWTG Additional Patient Population Measures: **Mechanical Endovascular Reperfusion Therapy**  
\*\*MER Measure Set\*\*

Historic Measures: 90-Day Modified Rankin Scores (mRS) following Mechanical Endovascular Reperfusion Therapy (Graphical Display of Distribution)  
Discharge Disposition following Mechanical Endovascular Reperfusion Therapy (Graphical Display of Distribution)

Format: Door to Puncture (DTP) Time within 90 minutes  
Door to Puncture (DTP) Times (Graphical Display of Distribution)  
Door to Recanalization/Reperfusion (DTRp) Times (Graphical Display of Distribution)  
Door to Recanalization/Reperfusion (DTRp) within 120 Minutes  
Door to Start of Revascularization (DTR) Times (Graphical Display of Distribution)

Compare to: **Door to Start of Revascularization (DTR) within 60 minutes for patients transferred from an outside hospital OR 90 minutes for patients presenting directly.**  
(ctrl-click to select multiple)

Door to Start of Revascularization (DTR) within 120 minutes  
Mechanical Endovascular Reperfusion Therapy for Eligible Patients with Ischemic Stroke  
Picture to Puncture (PTP) Time within 60 minutes  
Picture to Puncture (PTP) Times (Graphical Display of Distribution)

**Stroke Measure Logic and Ratio Measure Descriptions - Stroke | Measure Descriptions - Post Hoc Measures**

## Patient Records Report for measure **Door to Start of Revascularization (DTR) within 60 minutes for patients transferred from an outside hospital OR 90 minutes for patients presenting directly.**

Percentage of patients with acute ischemic stroke who receive mechanical endovascular reperfusion therapy and for whom the first pass (i.e., deployment) of the device is <= 60 minutes in patients who are transferred in from an outside hospital or < 90 minutes for patients presenting directly.  
Time Period: Jan 2019 - Mar 2019; Site: AHA UAT Site - Stroke + MER (91870)  
Patients Included: 2; Patients Excluded: 1  
Patients in Numerator: 1; % in Numerator: 50.0%; Patient in Exceptions: 0

Show filters This report shows all records. 3 of 3

Patient ID	Included in Results?	In Numerator?	Exception?	Age:	Final clinical diagnosis related to stroke:	First Pass of a Mechanical Reperfusion Device	Patient location when stroke symptoms discovered:	Hospital Arrival Date and Time	First Pass Date/Time	Discharge Date:	Elective Carotid Intervention	MER delay documented	Specific reason for delay documented in transfer patient (check all that apply):	How patient arrived at your hospital
3563q	Included	No	No	68	Ischemic Stroke	Yes	Not in a healthcare setting	01/01/2019 10:00	01/01/2019 11:40	01/05/2019 10:00	No	No		Transfer from other hospital
3563t	Included	Yes		78	Ischemic Stroke	Yes	Not in a healthcare setting	01/01/2019 10:00	01/01/2019 10:50	01/03/2019 10:00	No	No		Transfer from other hospital

Private





# QUESTIONS