

LVO? Got to Go!

Improving DIDO Times

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Drive to Decrease Door In Door Out

- LERN DIDO data submission began Q3 2020
- Primary Stroke Centers and Acute Stroke Ready facilities submit quarterly
- Goal of 90 minutes
- Remediation pathway is included when goals are consistently not met
- Goal target to decrease to 75 minutes (over time)

Why Does Decreased Door In Door Out Matter?

- Time is Brain-1.9 million brain cells die each minute when stroke goes untreated
- 2021 Ischemic stroke death rate 162,890 in US
- Incidence of Large Vessel Occlusion in acute ischemic stroke – 29.2%
- Every hour increase from stroke onset to endovascular thrombectomy start, can result in 5.3% decreased probability in functional independence

Facility Acute Stroke Process

- EMS pre-alert for stroke with VAN assessment and pre-activation
- Establish a stroke team that is pre-alerted for EMS and immediately on arrival for Walk-Ins
- Walk-Ins are activated by nursing staff
- Team arrival within 5 minutes
- Parallel process as opposed to linear process with specific roles and timed goals
- Stroke Launch Pad in CT (if you don't, then why?)

Facility Acute Stroke Process-continued

- Thrombolytic administration in CT
- Pause post CT for thrombolytic, if a candidate, or bundle CT with CTA if not a candidate
- CTA Head/Neck for almost all (VAN+ and posterior sx)
- Intense provider and staff education on process change
- Stroke Coordinator or similar role to respond to stroke alerts when available
- Mock stroke alert drills

Facility Tools and Resources for Acute Stroke Alert

- Acute Stroke Check List (not source of data collection)
- Stroke binders in various places with resources
 - EMS phone numbers
 - LERN call center phone number
 - Higher Level of Care facility phone numbers
 - B/P treatment protocol
 - Imaging protocol
 - Thrombolytic Inclusion/Exclusion guidelines



Rapides Regional Medical Center

Emergency Department

CHECKLIST: STROKE

Place patient sticker here

Thrombolytic must be given within **45 MINUTES** of patient ARRIVAL

TIME	INDICATOR	GOAL	COMMENTS
	Arrival Time	_____	
	Last Known Normal	Goal Time ≤ 24 HRS or <u>unk</u>	
	Code Stroke Activation	≤ 3 MIN	<i>DO NOT go to a room, Go Directly to CT</i>
	Patient in CT	≤ 8 MIN	
	Actual Weight in kg: _____	≤ 10 MIN	
	Initial Vitals: BP: _____ HR: _____ NIH: _____	≤ 10 MIN	<i>If BP is ≥185/110 mmHg, treatment with antihypertensive medication(s) should begin right away</i>
	POC Blood Glucose: _____	≤ 10 MIN	<i>Alert MD if CBG < 50 or > 400mg/dl</i>
	IV Access Initiated		<i>If done PTA document in initial triage note</i>
	Antihypertensive Initiation (if applicable)	≤ 10 MIN	<i>Follow BP Algorithm, See Back Page for Goals</i>
	Labs Collected	≤ 30 MIN	<i>INR results needed quickly for Warfarin</i>
	Thrombolytic Administration	≤ 45 MIN	<i>Administration of thrombolytic should be performed in CT when possible to reduce Door to Needle time</i>
	CXR	N/A	<i>As indicated per provider order</i>
	EKG	N/A	<i>As indicated per provider order</i>
	Dysphagia Screen: Pass Fail		<i>Complete screening prior to PO intake! <u>Must be documented in Meditech</u></i>

1a	LOC (Level of Consciousness)	0- Alert 1- Sleepy but arouses 2- Cannot stay awake 3- No purposeful response	6a	Motor Leg LEFT	0- No drift full 5 secs 1- Drifts down (not hit bed) 2- Drifts down (hits bed) 3- Can move but cannot lift 4- No movement
1b	LOC Questions	0- Both Correct 1- One correct/intubated 2- Neither correct	6b	Motor Leg RIGHT	0- No drift full 5 secs 1- Drifts down (not hit bed) 2- Drifts down (hits bed) 3- Can move but cannot lift 4- No movement
1c	LOC Commands	0- Obeys both 1- Obeys one 2- Obeys neither	7	Coordination (Limb ataxia)	0- Normal or no movement 1- Clumsy in one limb 2- Clumsy in both limbs
2	Lateral gaze (Best gaze)	0- Normal side to side movement 1- Partial side to side movement 2- No side to side eye movement	8	Sensory (Feeling)	0- Normal 1- Decreased sensation 2- Can't feel or no withdrawal to pain
3	Visual Fields (hemianopia)	0- Normal visual fields 1- Partial blindness 1 side 2- Complete blindness 1 side 3- Bilateral hemianopia/Blind in both eyes 4 fields	9	Speech-Content (aphasia, or "best language")	0- Correct full sentences 1- Wrong/ incomplete sentence 2- Words do not make sense 3- Cannot speak at all (global aphasia)
4	Facial weakness (palsy)	0- Normal 1- Mild 1 side droop with smile 2- Obvious droop at rest 3- Upper and lower facial paralysis	10	Speech- Slurring (Dysarthria)	0- No slurring 1- Slurs but can understand 2- Slurs but not understand UN- Intubated/ <u>other</u> barrier
5a	Motor Arm LEFT	0- No drift full 10 secs 1- Drifts down (not hit bed) 2- Drifts down (hits bed) 3- Can move but cannot lift 4- No movement	11	Neglect (Extinction and inattention)	0- No neglect 1- Partial neglect 2- Complete neglect
5b	Motor Arm RIGHT	0- No drift full 10 secs 1- Drifts down (not hit bed) 2- Drifts down (hits bed) 3- Can move but cannot lift 4- No movement			

Notes:

Blood Pressure Parameters and goals

Hemorrhagic

Nontraumatic Subarachnoid Hemorrhage:

SBP Goal <140 mmHg

Nontraumatic Intracerebral Hemorrhage:

SBP Goal 130 - 150 mmHg

Ischemic

Non-Tenecteplase Cases:

SBP < 220 mmHg (Do not rapidly lower)

Tenecteplase Cases:

Before Administration: <185/110

After Administration: <180/105

Table 1 Vision, aphasia, neglect emergent large vessel occlusion screening tool

Stroke VAN

How weak is the patient? Raise both arms up	☐ Mild (minor drift) ☐ Moderate (severe drift—touches or nearly touches ground) ☐ Severe (flaccid or no antigravity) ☐ Patient shows no weakness. Patient is VAN negative
(exceptions are confused or comatose patients with dizziness, focal findings, or no reason for their altered mental status then basilar artery thrombus must be considered; CTA is warranted)	
Visual disturbance	☐ Field cut (which side) (4 quadrants) ☐ Double vision (ask patient to look to right then left; evaluate for uneven eyes) ☐ Blind new onset ☐ None
Aphasia	☐ Expressive (inability to speak or paraphasic errors); do not count slurring of words (repeat and name 2 objects) ☐ Receptive (not understanding or following commands) (close eyes, make fist) ☐ Mixed ☐ None
Neglect	☐ Forced gaze or inability to track to one side ☐ Unable to feel both sides at the same time, or unable to identify own arm ☐ Ignoring one side ☐ None

Patient must have weakness plus one or all of the V, A, or N to be VAN positive. VAN positive patients had 100% sensitivity, 90% specificity, positive predictive value 74%, and negative predictive value 100% for detecting large vessel occlusion. CTA, CT angiography; VAN, vision, aphasia, and neglect.

Physician with Stroke Expertise

- Emergency Room Physician with additional stroke education and proficient in the NIHSS
- https://lern.la.gov/wp-content/uploads/ED-provider-emergent-STROKE-care-version-6_20250505.pdf
- Neurologist
- TeleStroke
- Neurologist/TeleStroke notified on patient arrival
- Assessment within 10 minutes of arrival including VAN
- Began Thrombolytic discussion with patient while waiting on CT interpretation

Door to Imaging Interpretation

- CT Head within 20-30 minutes
- CTA Head and Neck within 45 minutes
- Lagniappe- AI imaging per App

EMS Roles in Decreasing DIDO

- Pre-alert with VAN screening
- EMS standby in ED, waiting CTA results when VAN+
- Agreements for pre-notification and transport request for VAN+ patients that arrive POV
- Air EMS pre-notified for VAN+ and launches as weather permits if arrived POV or initially by ground (depending on location)
- Sends ground EMS backup if unable to fly
- Agreement to dispatch without confirmed LVO per CTA and without confirmed facility acceptance
- EMS turn around goal— at bedside to transport -10 minutes

Higher Level of Care Agreements

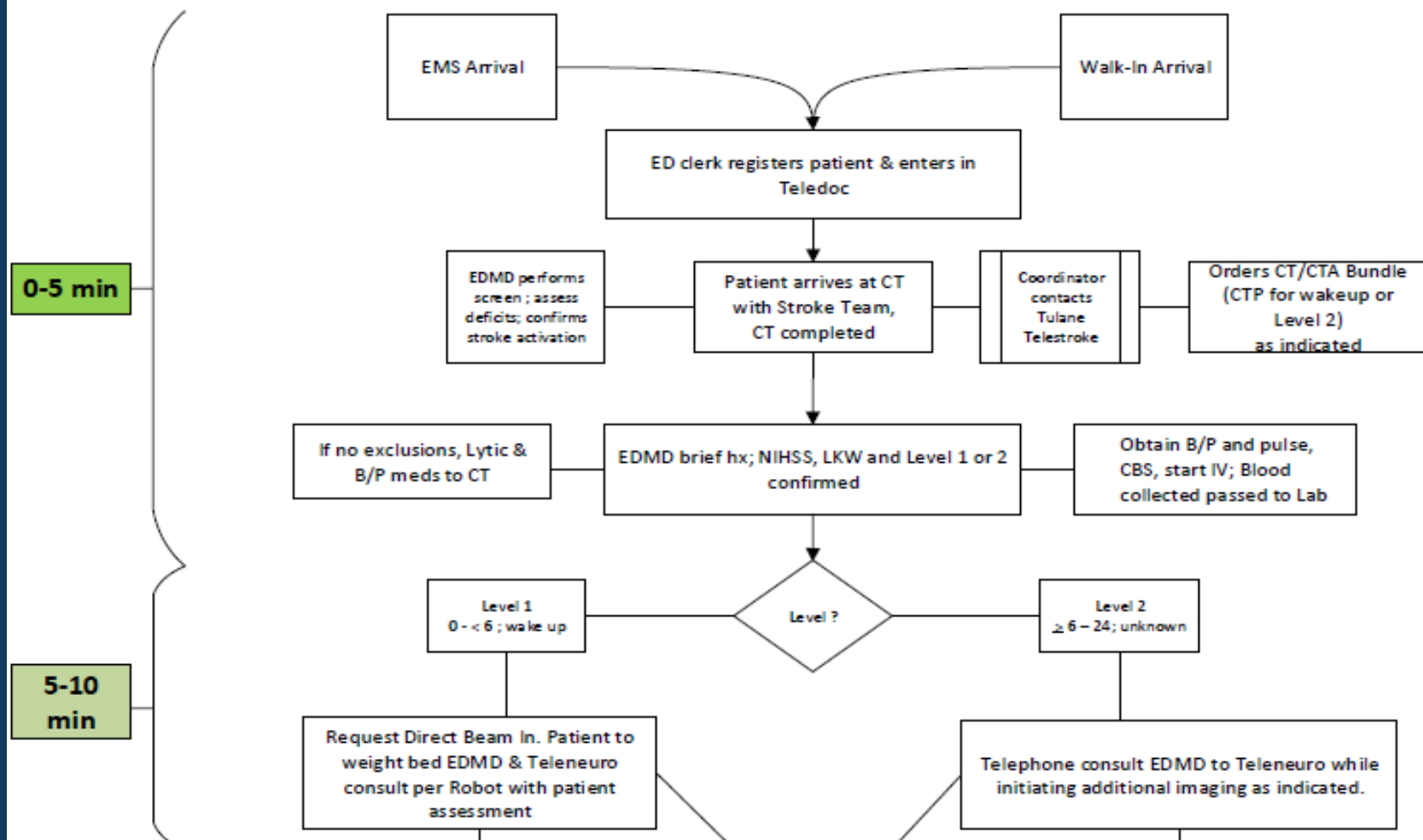
- Establish relationships and agreements with Thrombectomy Capable and Comprehensive Stroke Centers
- Begin bed shopping for VAN+ patient. Initially, just need to know: If patient is LVO+ per CTA, would they have a bed?
- Automatic accept when CTA confirms thrombectomy eligible
- LERN state call center can assist with finding acceptance

Improvement Opportunities and Team Recognition

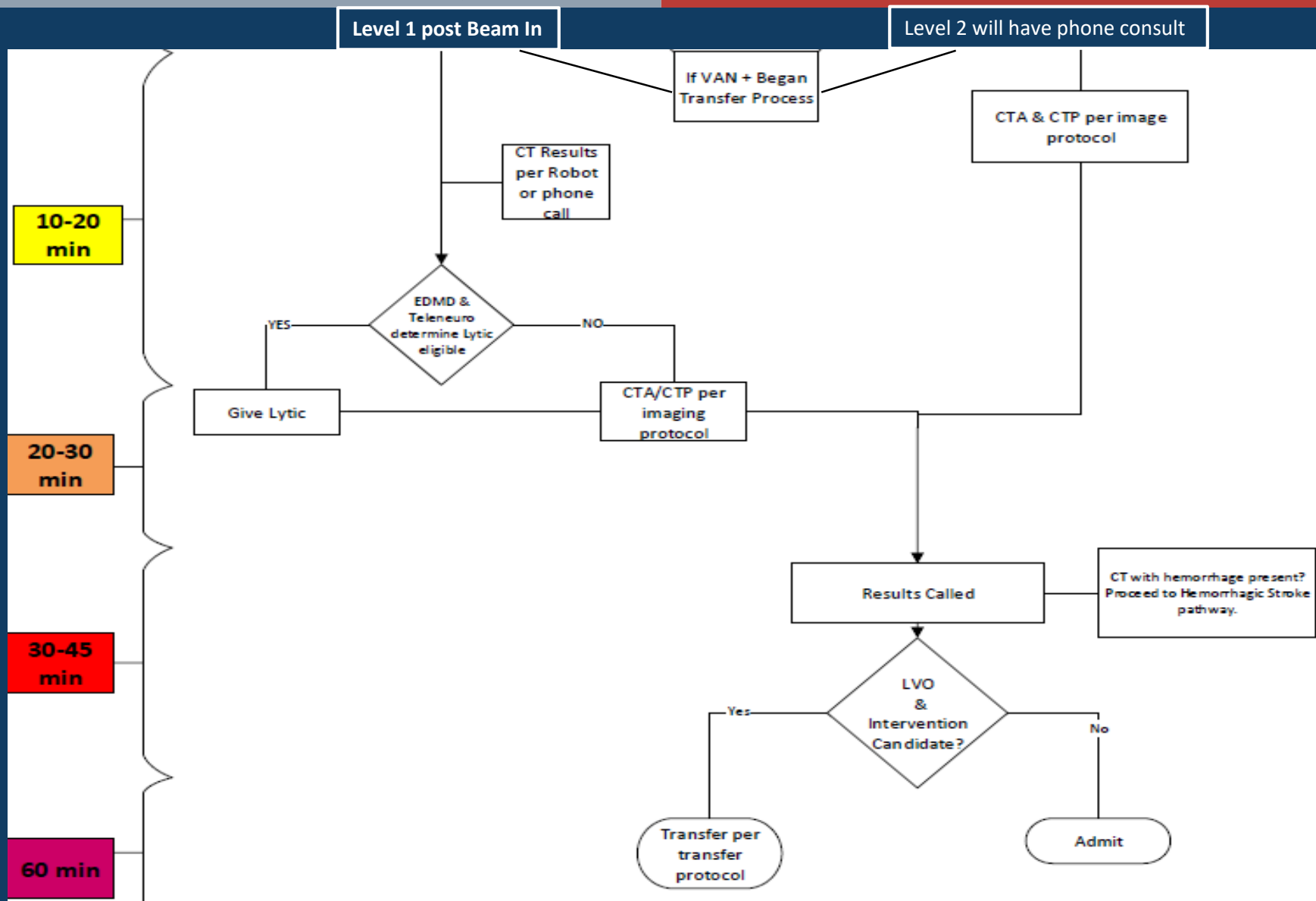
- Establish EMS meetings with local EMS company
- Establish team meeting times to discuss outliers and opportunities including EMS leadership
- Give feedback to higher level facilities when barriers are met
- Give team recognition when goals met and include EMS
- Be transparent with LERN when reasons for DIDO delay are recognized on data submission

RRMC ED Acute Stroke Pathway Level 1 or Level 2 Activation

per ED Stroke Activation Process



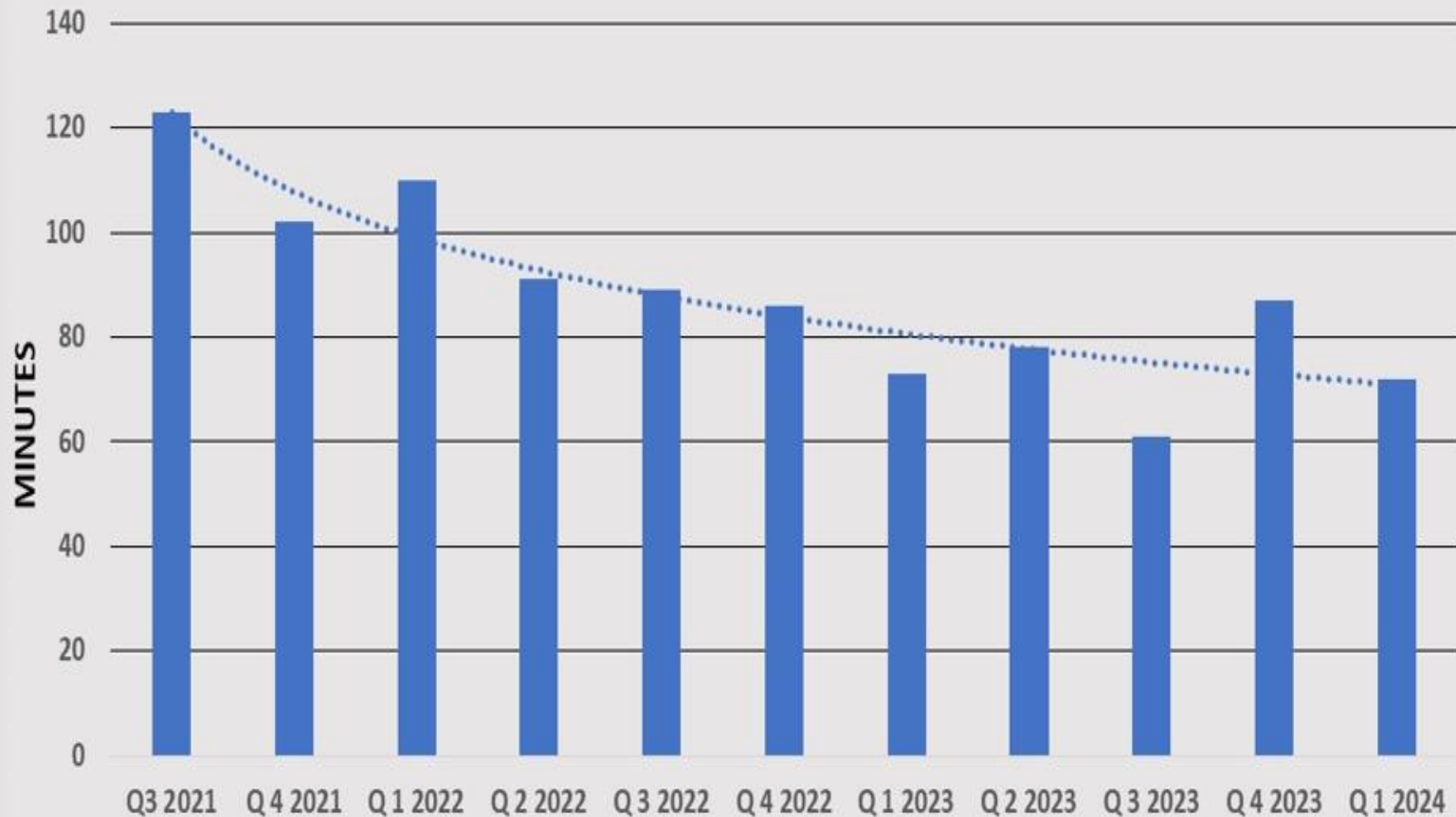
Continued Stroke Pathway



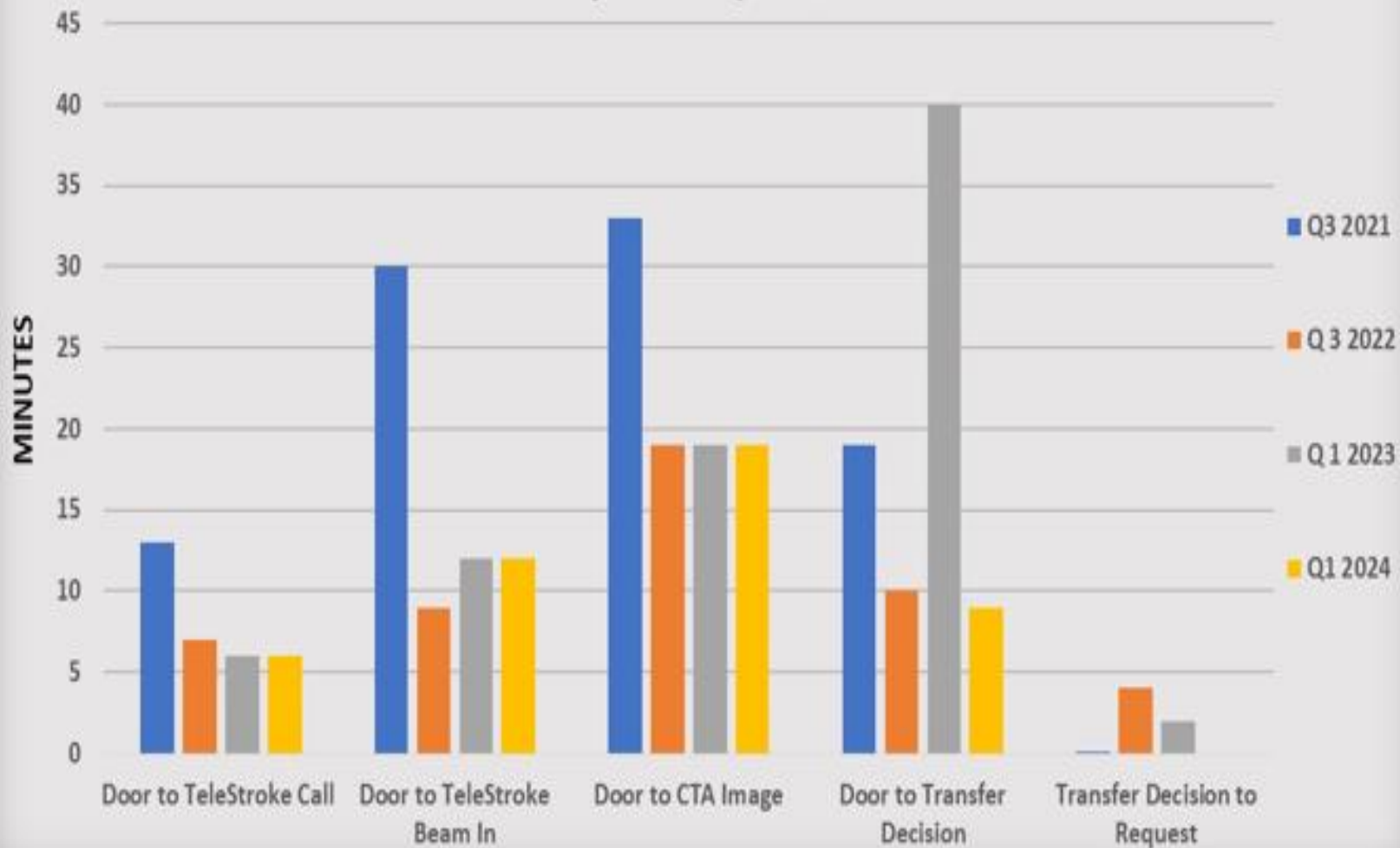


**Rapides Regional
Medical Center**

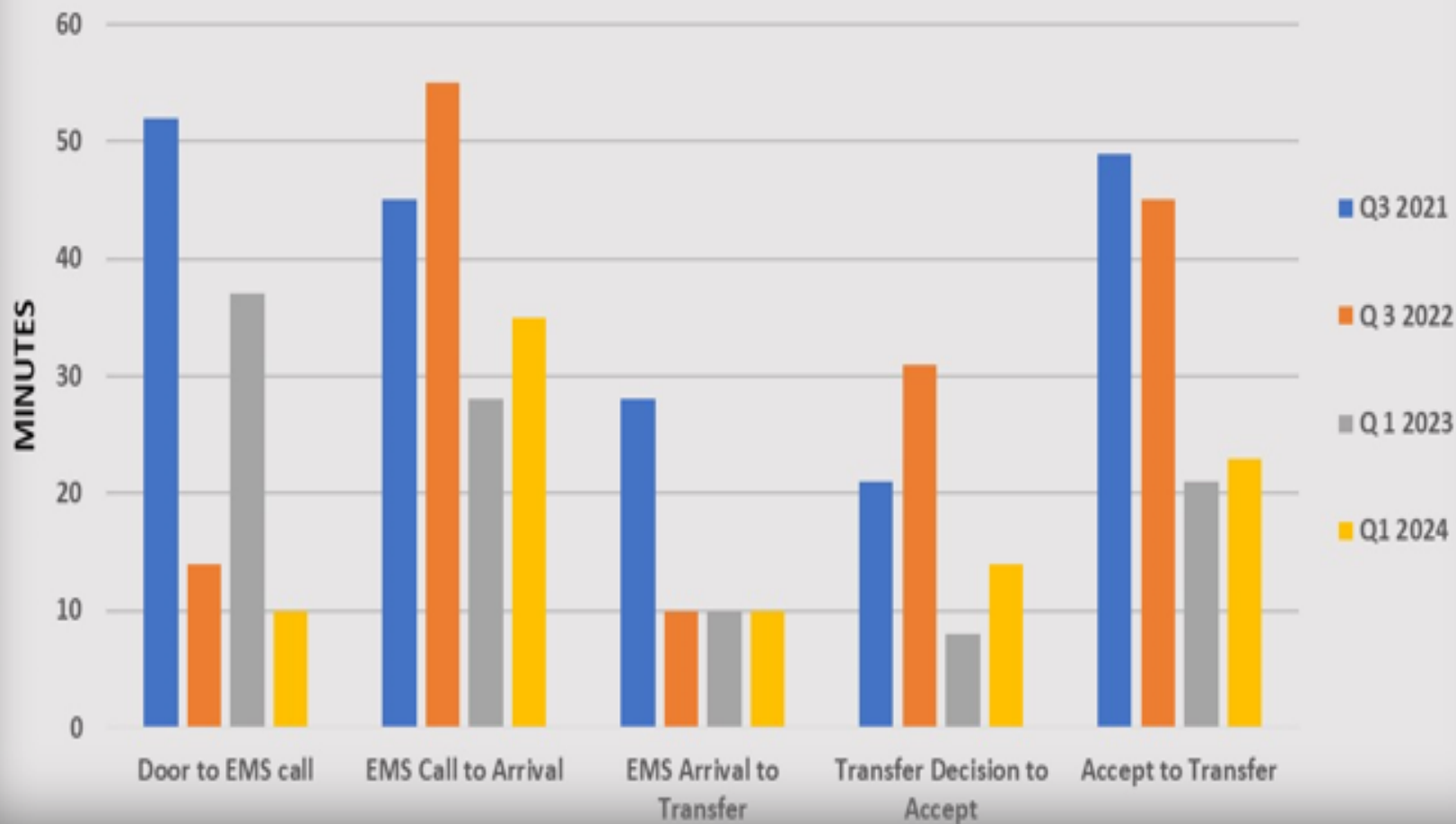
DIDO Median in Minutes Q3 2021- Q1 2024



Process Measures for ED Stroke Alert Q3 2021-Q1 2024



EMS/Transport Measures for ED Stroke Alert Q3 2021- Q1 2024



References

- Brinjikji W., Demchuk A., Murad M., Rabinstein, A., McDonald R., McDonald J., Kallmes, D., (2017) Neurons over nephrons. *Stroke*, 2017, 48(7),1862-1868. <https://www.ahajournals.org/doi/10.1161/strokeaha.117.016771>
- Duloquin G., Graber M., Garnier L., Valentin C., Comby, P. O., Baptiste L., Mohr S., Benoit D., Guéniat J., Blanc-Labarre C., Hervieu-Bègue M., Osseby, G. V., Giroud M., & Bejot Y. (2020). Incidence of acute ischemic stroke with visible arterial occlusion. *Stroke*, 51(7), 2122-2130. <https://www.ahajournals.org/doi/10.1161/STROKEAHA.120.029949>
- Heller M., Krieger P., Finefrock D., Nguyen T., Akhtar S. (2016). Contrast CT scans in the emergency department do not increase risk of adverse renal outcomes. *Westjem. Western Journal of Emergency Medicine*, 17(4), 404-408. <https://westjem.com/original-research/contrast-ct-scans-in-the-emergency-department-do-not-increase-risk-of-adverse-renal-outcomes.html>
- Hinson J., Ehmann M., Klein E. (2020) Evidence and patient safety prevail over myth and dogma: Consensus guidelines on the use of intravenous contrast media. *Annals of Emergency Medicine*, 76(2), 149-152. <https://www.annemergmed.com/action/showPdf?pii=S0196-0644%2820%2930212-2>
- Jahan, R., Saver, J. L., Schwamm, L. H., Fonarow, G. C., Liang, L., Matsouaka, R. A., Xian, Y., Holmes, D. N., Peterson, E. D., Yavagal, D., & Smith, E. E. (2019). Association between time to treatment with endovascular reperfusion therapy and outcomes in patients with acute ischemic stroke treated in clinical practice. *JAMA : The Journal of the American Medical Association*, 322(3), 252–263. <https://doi.org/10.1001/jama.2019.8286>
- Lee Y., Hsieh C., Chang T., Li C. (2019). Contrast-induced acute kidney injury among patients with chronic kidney disease undergoing imaging studies: A meta-analysis. *AJR*, 213(4), 728-735. <https://researchoutput.ncku.edu.tw/en/publications/contrast-induced-acute-kidney-injury-among-patients-with-chronic->
- Martin S. S., Aday A. W., Almarzooq Z. I., Anderson C. A. M., Arora P., Avery C. L., Baker-Smith C. M., Barone Gibbs B., Beaton A. Z., Boehme A. K., Commodore-Mensah Y., Currie M. E., Elkind M. S. V., Evenson K. R., Generoso G., Heard D. G., Hiremath S., Johansen M. C., Kalani R., Kazi D. S., Ko D., Liu J., Magnani J. W., Michos E. D., Mussolino M. E., Navaneethan S. D., Parikh N. I., Perman S. M., Poudel R., Rezk-Hanna M., Roth G. A., Shah N. S., St-Onge M. P., Thacker E. L., Tsao C. W., Urbut S. M., Van Spall H. G. C., Voeks J. H., Wang N. Y., Wong N. D., Wong S. S., Yaffe K., Palaniappan L.P. On behalf of the American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2024). Heart disease and stroke statistics: A report of US and global data from the American Heart Association. *Circulation*, 149(8), e347–e913. <https://www.ahajournals.org/doi/10.1161/CIR.0000000000001209>
- Mayer S., Viarasilpa T., Panyavachiraporn N., Brady M., Scozzari D., Harn M., Miller D., Katramados A., Hefzy H., Malik S., Marin H., Kole M., Chebl A., Lewandowski C., Mitsias P. (2020). CTA-for-all. *Stroke*, 51(1), 331-334. <https://www.ahajournals.org/doi/10.1161/STROKEAHA.119.027356>
- Mulder M., Jansen I., Goldhoorn R., Venema E., Chalos V., Compagne K., Roozenbeek B., Lingsma H., Schonewille W., Wijngaard I., Jelis Boiten J., Vos J., Roos Y., Oostenbrugge R., Zwam W., Majoie C., Lugt A., Dippel D. For the MR CLEAN Registry Investigators. (2018). Time to endovascular treatment and outcome in acute ischemic stroke. *Circulation*, 138(3), 232–240. <https://doi.org/10.1161/CIRCULATIONAHA.117.032600>



Thank You!

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