

LERN Stroke Pre-Hospital Destination Protocol – Educational Webinar

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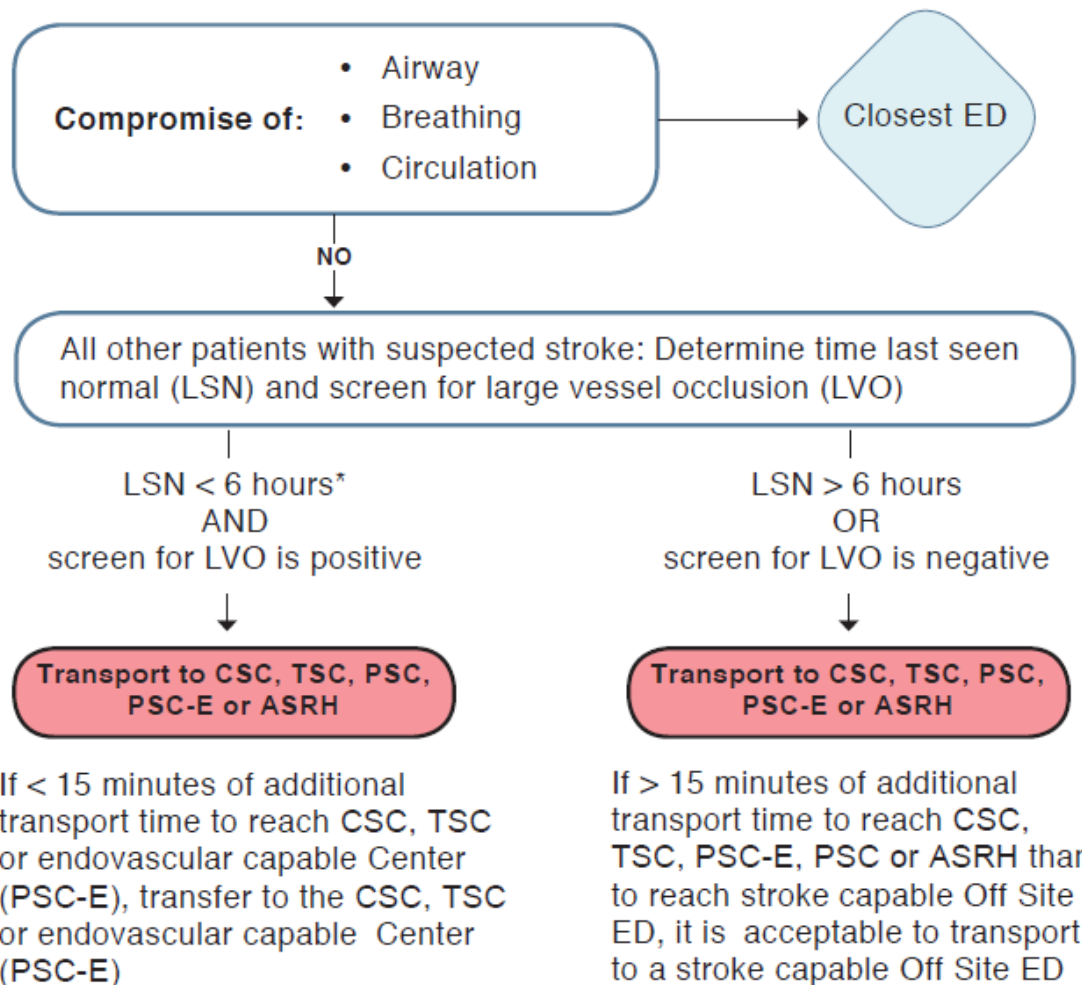
Why change the existing protocol?

Did not address:

- LVO 6-24hrs from LSN
- Stroke of unknown time of onset

STROKE DESTINATION PROTOCOL

The following protocol applies to patients with suspected stroke:



* the LSN < 6 hours should include patients without a definite time of LSN, but who could reasonably be assumed to be within 6 hours of onset, including patients who wake-up with stroke symptoms

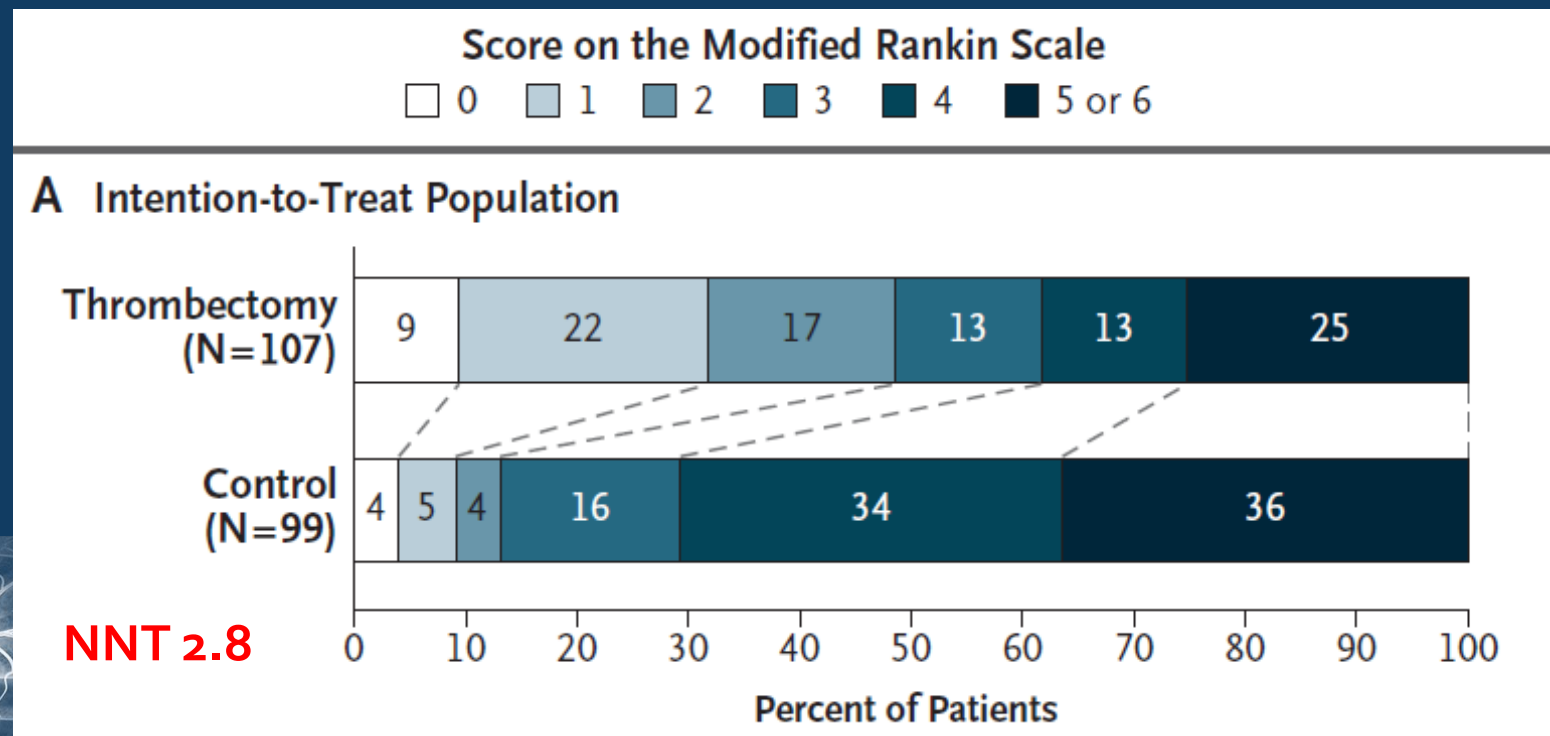
Management of LVO 6-24hrs from LSN

- DAWN
- DEFUSE-3

Thrombectomy 6 to 24 Hours after Stroke with a Mismatch between Deficit and Infarct

Dawn Trial

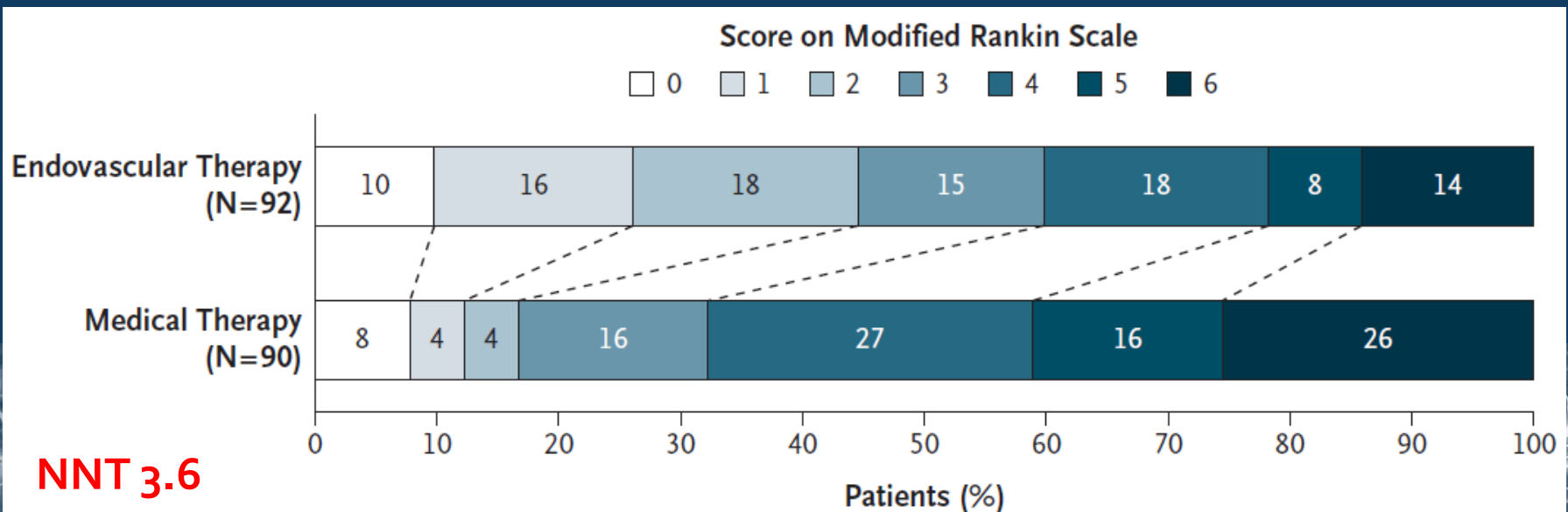
Type of stroke onset — no. (%)‡	Thrombectomy Group	Control Group
On awakening	67 (63)	47 (47)
Unwitnessed stroke	29 (27)	38 (38)
Witnessed stroke	11 (10)	14 (14)



Thrombectomy for Stroke at 6 to 16 Hours with Selection by Perfusion Imaging

DEFUSE₃ Trial

Stroke onset witnessed — no. (%)	Endovascular Therapy	Medical Therapy
Yes†	31 (34)	35 (39)
No		
Symptoms were present on awakening	49 (53)	42 (47)
Symptoms began during wakefulness	12 (13)	13 (14)



In routine clinical practice, what is the impact?

	0-6hr window	6-24hr window
N	238 (54.5%)	199 (45.5%)
CTA or MRA	221 (92.9%)	127 (63.8%)
LVO	82 (34.5%)	44 (22.1%)
thrombectomy	30 (12.6%)	8 (4%)
mRS \leq 2	11 (36.6%)	4 (50%)

Neuroradiology. 2021 Apr;63(4):603-607. doi: 10.1007/s00234-020-02531-8. Epub 2020 Sep 15.

Stroke of known time of onset

- Time of onset of stroke is known when:
 - 1) the patient is able to provide history
 - 2) the onset of symptoms was witnessed
- When the time of onset of stroke is known,
 - last seen normal (LSN) = time symptoms noted (TSN) = time of stroke onset (TSO)

Stroke of unknown time of onset

- Almost 33% of all patients with ischemic stroke have unknown time of stroke onset
 - Most have symptoms noted upon awakening
 - Others have unwitnessed stroke onset and the patient cannot provide a time of symptom onset
- Historically, excluded from IV lytic

Thrombolytic therapy for patients who wake-up with stroke

[Andrew D Barreto](#)¹, [Sheryl Martin-Schild](#), [Hen Hallevi](#), [Miriam M Morales](#), [Anitha T Abraham](#), [Nicole R Gonzales](#), [Kachi Illoh](#), [James C Grotta](#), [Sean I Savitz](#)

- Two symptomatic intracerebral hemorrhages occurred in treated WUS (4.3%).
- Adjusting for NIHSS imbalance, treated WUS had higher rates of excellent (14% vs 6%; $P=0.06$) and favorable outcome (28% vs 13%; $P=0.006$), but higher mortality (15% vs 0%) compared to nontreated WUS.
- A second comparison adjusting for baseline NIHSS between treated WUS and 174 intravenous tissue plasminogen activator patients treated within 3 hours of symptoms showed no significant differences in safety and clinical outcomes.

MRI-Guided Thrombolysis for Stroke with Unknown Time of Onset

The WAKE UP Trial – RCT IV alteplase vs placebo

- Stroke symptoms upon waking up, or were unable to report the time of onset, and it was at least 4.5 hours since LSN
- MRI showed an acute ischemic lesion on diffusion-weighted imaging but no parenchymal hyperintensity with standard window settings on FLAIR
- Excluded if hemorrhage (n=87)
- Excluded if $>1/3$ MCA territory on DWI (n=45)
- Excluded if thrombectomy planned (n=15)
- Excluded if NIHSS >25
- Excluded if standard contraindication to IV alteplase

The WAKE UP Trial: Thomalla G, Simonsen CZ, Boutitie F, et al. **MRI-Guided Thrombolysis for Stroke with Unknown Time of Onset**. *The New England journal of medicine*. 2018; 379(7):611-622. PMID: [29766770](#)

MRI-Guided Thrombolysis for Stroke with Unknown Time of Onset

The WAKE UP Trial – RCT IV alteplase vs placebo

- Of the 1362 patients screened:
 - 455 were excluded for FLAIR lesion
 - 137 were excluded because the DWI was negative
- The median NIHSS score on arrival was 6.
- 89% of patients had wake up strokes.
- The median time between symptoms noted and alteplase was 3.1 hours.
- The median time between LSN and alteplase was 10 hours.

MRI-Guided Thrombolysis for Stroke with Unknown Time of Onset

The WAKE UP Trial – RCT IV alteplase vs placebo

Table 2. Primary and Secondary Efficacy Outcomes (Intention-to-Treat Population).*

Outcome	Alteplase Group (N= 254)	Placebo Group (N= 249)	Effect Variable	Adjusted Value (95% CI)†	P Value
Primary efficacy end point					
Favorable outcome at 90 days — no./total no. (%)‡	131/246 (53.3)	102/244 (41.8)	Odds ratio	1.61 (1.09 to 2.36)	0.02
Secondary efficacy end points					
Median score on modified Rankin scale at 90 days (IQR)§	1 (1–3)	2 (1–3)	Common odds ratio	1.62 (1.17 to 2.23)	0.003¶
Correlation between treatment re- sponse at 90 days and deficit level at baseline — no./total no. (%)	72/246 (29.3)	44/244 (18.0)	Odds ratio	1.88 (1.22 to 2.89)	0.004¶
Global Outcome Score at 90 days**			Odds ratio	1.47 (1.07 to 2.04)	0.02¶
Median score on Beck Depression Inventory at 90 days (IQR)††	6.0 (2.0–11.0)	7.0 (2.0–14.0)	Mean difference (log _e)	–0.04 (–0.22 to 0.15)	0.69¶
Total score on EQ-5D at 90 days‡‡	1.9±2.1	2.4±2.4	Mean difference	–0.52 (–0.88 to –0.16)	0.004¶
Score on visual analog scale on EQ-5D at 90 days§§	72.6±19.7)	64.9±23.8	Mean difference	7.64 (3.75 to 11.51)	<0.001¶
Median infarct volume at 22–36 hr (IQR) — ml ¶¶	3.0 (0.8–17.7)	3.3 (1.1–16.6)	Mean difference (log _e)	–0.16 (–0.47 to 0.15)	0.32¶

- No safety concern
- 2.4% sICH (ns)
- NNT <9
- THAWS trial also used MRI, but low dose alteplase and terminated early with no difference in outcome

Intravenous thrombolytic treatment and endovascular thrombectomy for ischemic wake-up stroke (Review)

Summary of findings 1. Intravenous thrombolytic treatment compared to standard medical care for wake-up stroke

Intravenous thrombolytic treatment compared to standard medical care for wake-up stroke

Patient or population: people with stroke upon awakening

Setting: hospital emergency department

Intervention: intravenous thrombolytic treatment

Comparison: standard medical care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	No. of participants (studies)	Certainty of the evidence (GRADE)
	Risk with standard medical care	Risk with intravenous thrombolytic treatment			
Independent functional outcome at end of follow-up assessed with: mRS 0 to 2 at follow-up: 90 days	584 per 1000	660 per 1000 (590 to 736)	RR 1.13 (1.01 to 1.26)	763 (5 RCTs)	⊕⊕⊕⊕ HIGH
Symptomatic intracranial haemorrhage at follow-up: mean 90 days	5 per 1000	19 per 1000 (5 to 67)	RR 3.47 (0.98 to 12.26)	754 (4 RCTs)	⊕⊕⊕⊕ HIGH
Death at follow-up: mean 90 days	99 per 1000	67 per 1000 (43 to 106)	RR 0.68 (0.43 to 1.07)	763 (5 RCTs)	⊕⊕⊕⊕ HIGH

EXTEND trial

- 4.5 – 9 hrs from onset or awakening with symptoms
- Perfusion lesion–ischemic core mismatch was defined as a ratio greater than 1.2 between the volume of hypoperfusion and the volume of the ischemic core, an absolute difference in volume greater than 10 ml, and an ischemic-core volume of less than 70 ml.
- No plan for thrombectomy

EX

• 10%

• 25%

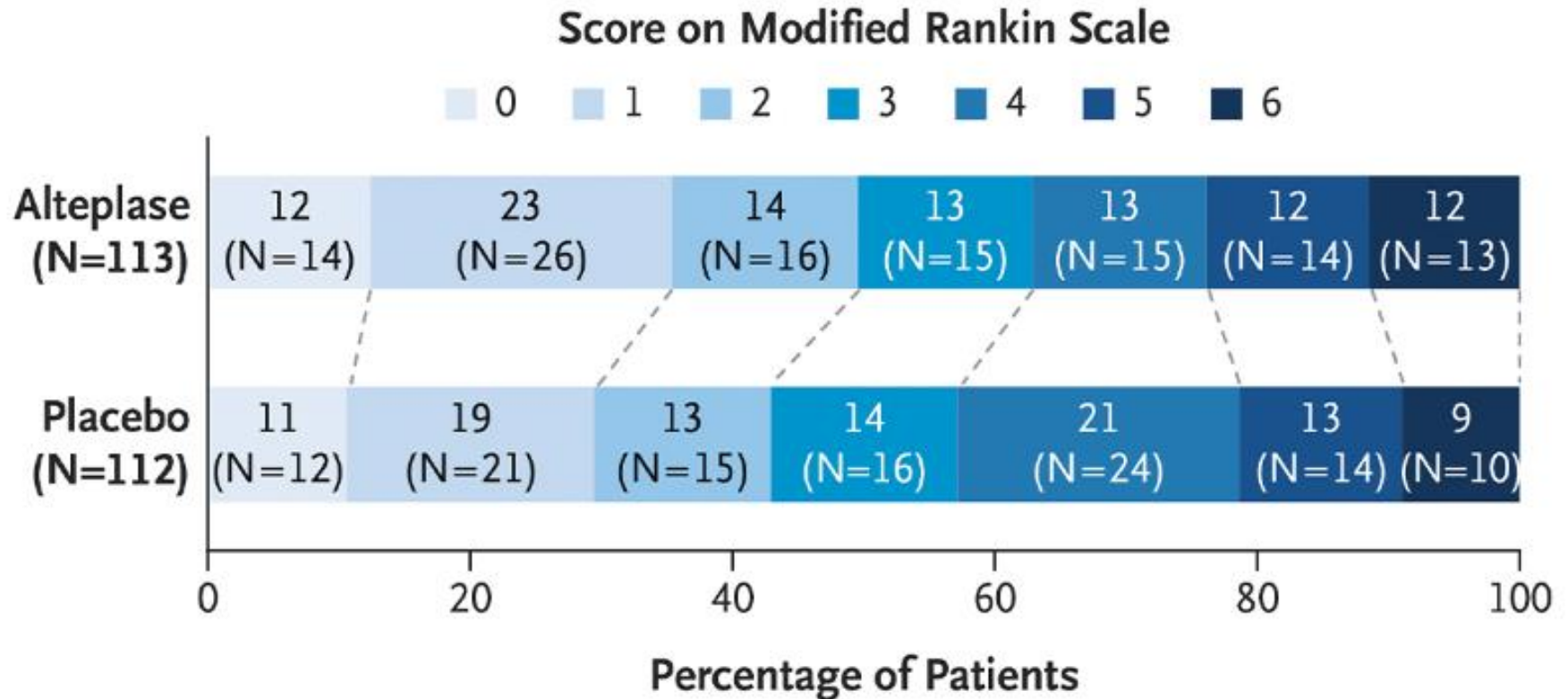
• 65%

Table 2. Efficacy and Safety Outcomes.*

Outcome	Alteplase (N=113)	Placebo (N=112)	Adjusted Effect Size (95% CI)†	P Value	Unadjusted Effect Size (95% CI)†	P Value
<i>no./total no. (%)</i>						
Primary outcome						
Score of 0 to 1 on the modified Rankin scale at 90 days‡	40/113 (35.4)	33/112 (29.5)	1.44 (1.01–2.06)	0.04	1.2 (0.82–1.76)	0.35
Secondary outcomes						
Score on the modified Rankin scale at 90 days						
0	14/113 (12.4)	12/112 (10.7)				
1	26/113 (23.0)	21/112 (18.8)				
2	16/113 (14.2)	15/112 (13.4)				
3	15/113 (13.3)	16/112 (14.3)				
4	15/113 (13.3)	24/112 (21.4)				
5	14/113 (12.4)	14/112 (12.5)				
6	13/113 (11.5)	10/112 (8.9)				
Functional improvement§			1.55 (0.96–2.49)		1.18 (0.74–1.87)	
Functional independence¶	56/113 (49.6)	48/112 (42.9)	1.36 (1.06–1.76)		1.16 (0.87–1.54)	
Percentage of reperfusion at 24 hr						
≥90%	53/106 (50.0)	31/109 (28.4)	1.73 (1.22–2.46)		1.76 (1.23–2.51)	
≥50%	76/106 (71.7)	57/109 (52.3)	1.35 (1.09–1.67)		1.37 (1.10–1.70)	
Tertiary outcomes						
Recanalization at 24 hr	72/107 (67.3)	43/109 (39.4%)	1.68 (1.29–2.19)		1.71 (1.30–2.23)	
Major neurologic improvement						
At 24 hr	32/113 (28.3)	13/112 (11.6)	2.52 (1.40–4.56)		2.44 (1.35–4.40)	
At 72 hr	41/112 (36.6)	25/112 (22.3)	1.70 (1.11–2.59)		1.64 (1.07–2.51)	
At 90 days	56/101 (55.5)	56/99 (56.6)	1.02 (0.80–1.31)		0.98 (0.77–1.25)	
Safety outcomes						
Death within 90 days after intervention	13/113 (11.5)	10/112 (8.9)	1.17 (0.57–2.40)	0.67	1.29 (0.59–2.82)	0.53
Symptomatic intracranial hemorrhage within 36 hr after intervention	7/113 (6.2)	1/112 (0.9)	7.22 (0.97–53.54)	0.053	6.94 (0.86–55.73)	0.07

WORK

EXTEND trial



A

mRS score

	Placebo (n=152)	Alteplase (n=152)	Odds ratio (95% CI)*	p value
Primary outcome				
Excellent outcome (mRS score 0–1) at 3 months	39/151 (26%)	55/152 (36%)	2.06 (1.17–3.62)	0.012
Secondary outcomes				
Functional improvement in mRS score at 3 months†	NA	NA	1.68 (1.11–2.53)	0.014
Functional independence (mRS score 0–2) at 3 months	60/151 (40%)	77/152 (51%)	2.22 (1.25–3.94)	0.006
Early neurological improvement at 72 h‡	36/152 (24%)	58/148 (39%)	2.13 (1.28–3.51)	0.003
Safety outcomes				
Death at 3 months	16/152 (11%)	20/152 (13%)	1.28 (0.60–2.73)	0.52
Symptomatic intracerebral haemorrhage§	1/152 (1%)	7/152 (5%)	7.29 (0.88–60.18)	0.07

0 10 20 30 40 50 60 70 80 90 100

Patients (%)



LOUISIANA

EMERGENCY RESPONSE NETWORK

3. In patients with AIS who awake with stroke symptoms or have unclear time of onset > 4.5 hours from last known well or at baseline state, MRI to identify diffusion-positive FLAIR-negative lesions can be useful for selecting those who can benefit from IV alteplase administration within 4.5 hours of stroke symptom recognition.	Ila	B-R	New recommendation.
<p>The WAKE-UP trial (Efficacy and Safety of MRI-based Thrombolysis in Wake-Up Stroke) randomized 503 patients with AIS who awoke with stroke or had unclear time of onset >4.5 hours from last known well and could be treated with IV alteplase within 4.5 hours of stroke symptom recognition. Eligibility required MRI mismatch between abnormal signal on DW-MRI and no visible signal change on FLAIR. DW-MRI lesions larger than one-third of the territory of the middle cerebral artery (MCA), NIHSS score >25, contraindication to treatment with alteplase, or planned thrombectomy were all exclusions. The trial was terminated early for lack of funding before the designated 800 patients were randomized. Ninety-four percent were wake-up strokes. Median NIHSS score was 6. Median time from last known well was slightly over 10 hours. At baseline, one-third of the patients had vessel occlusion on time-of-flight MRA, and three-quarters of the FLAIR lesions were <9 mL. The end point of an mRS score of 0 to 1 at 90 days was achieved in 53.3% of the IV alteplase group and in 41.8% of the placebo group ($P=0.02$).⁸⁸</p>			See Table XIX in online Data Supplement 1

Patients with wake-up stroke should be evaluated with same urgency as a patient presenting within the window for IV alteplase, because those with DWI+/FLAIR- pattern can benefit from treatment.

New initial destination protocol for stroke



STROKE DESTINATION PROTOCOL

Time of Onset Known

SUSPECTED STROKE:

- Determine TSO: TIME OF STROKE ONSET¹
- Determine LSN: LAST SEEN NORMAL¹
- Determine TSN: TIME SYMPTOMS NOTED¹
- Perform VAN assessment

Time of Stroke Onset
Known?

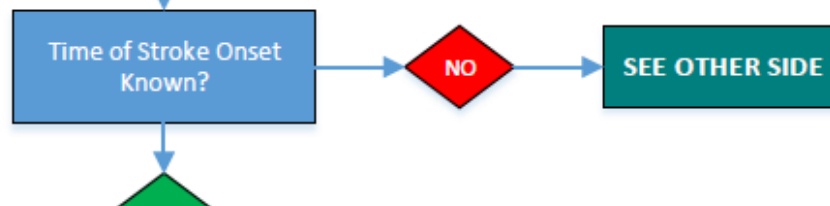
NO

SEE OTHER SIDE

YES

LERN Communication Center
1-866-320-8293

New initial destination protocol for stroke



Guiding Principles:

- ¹ When stroke is witnessed TSO, LSN, and TSN are the same.
- ² Additional transport time is calculated by considering drive time from scene to each facility.

Stroke Facility Definitions: *Endovascular Capable

- *CSC: Comprehensive Stroke Center
- *TSC: Thrombectomy Capable Stroke Center
- *PSC-E: Primary Stroke Center with Endovascular (May not be 24/7. Contact LCC to verify)
- PSC: Primary Stroke Center
- ASRH: Acute Stroke Ready Hospital
- SCOED: Stroke Capable Off Site ED

TSO
hours

TSO > 4.5
hours

Transport to endovascular* capable facility if < 15 min² additional transport time

Otherwise transport to closest stroke facility

endovascular* capable facility if < 30 min² additional transport time

Otherwise transport to closest stroke facility

Transport to closest stroke facility (Excluding SCOED)

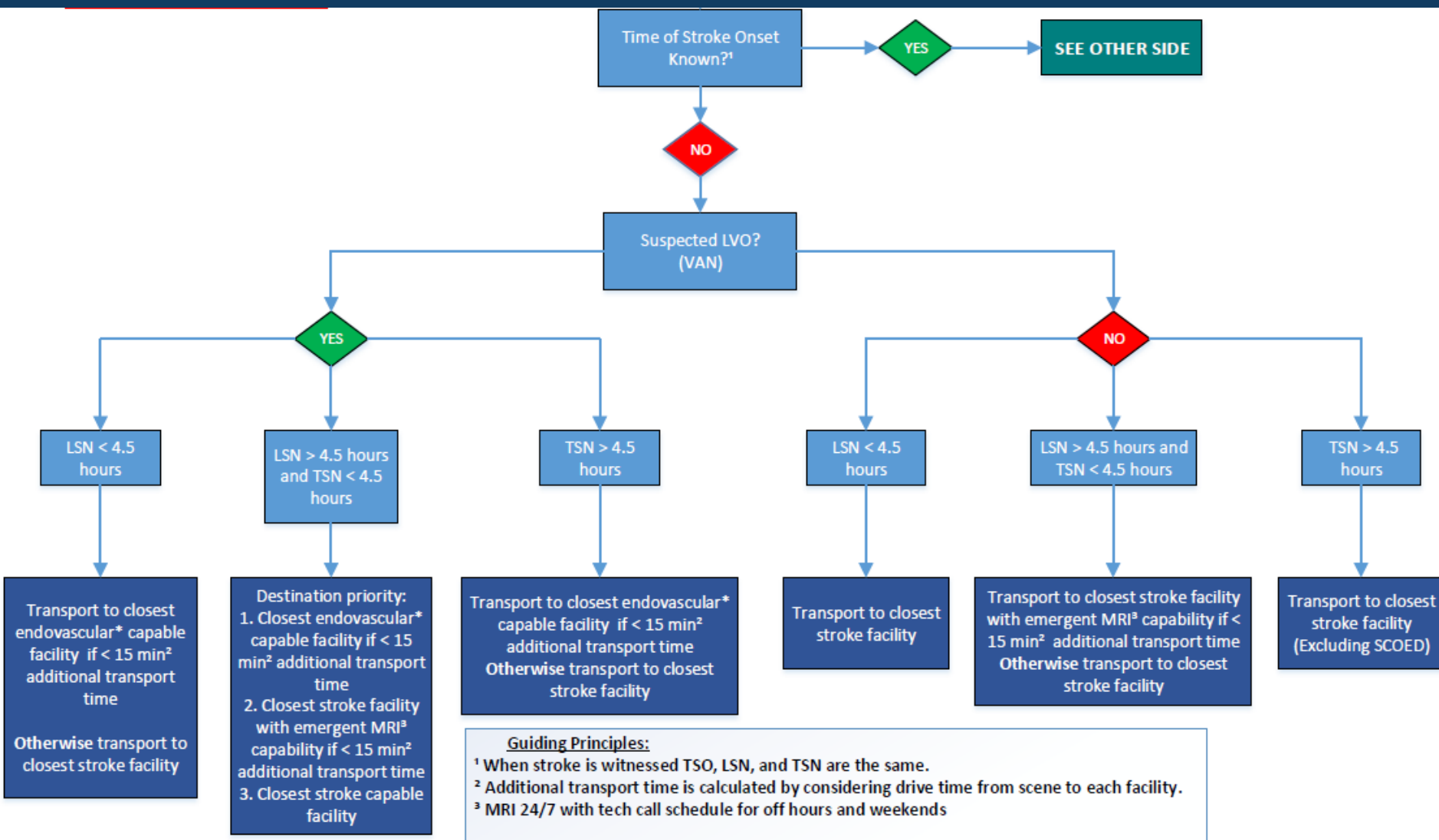
Transport to closest stroke facility

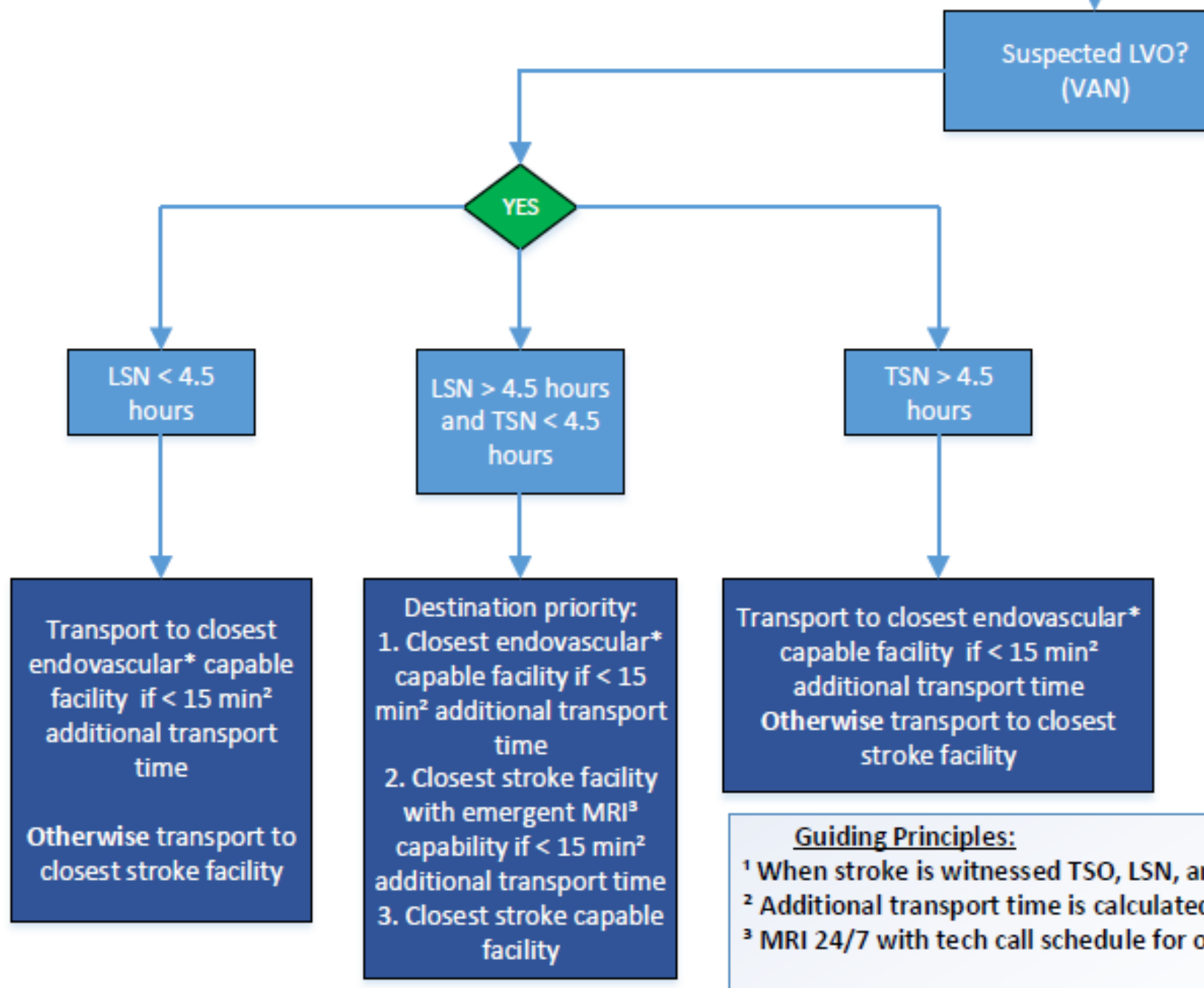
Transport to closest stroke facility (Excluding Stroke Capable Off-Site ED)



LOUISIANA
EMERGENCY RESPONSE NETWORK

New initial destination protocol for stroke





Suspected LVO?
(VAN)

Guiding Principles:

- ¹ When stroke is witnessed TSO, LSN, and TSN are the same.
- ² Additional transport time is calculated by considering drive time from scene to each facility.
- ³ MRI 24/7 with tech call schedule for off hours and weekends

Stroke Facility Definitions: *Endovascular Capable

- *CSC: Comprehensive Stroke Center
- *TSC: Thrombectomy Capable Stroke Center
- *PSC-E: Primary Stroke Center with Endovascular (May not be 24/7. Contact LCC to verify)
- PSC: Primary Stroke Center
- ASRH: Acute Stroke Ready Hospital
- SCOED: Stroke Capable Off Site ED

> 4.5
ours

Transport to closest endovascular facility if < 15 min² additional transport time
Otherwise transport to closest stroke facility

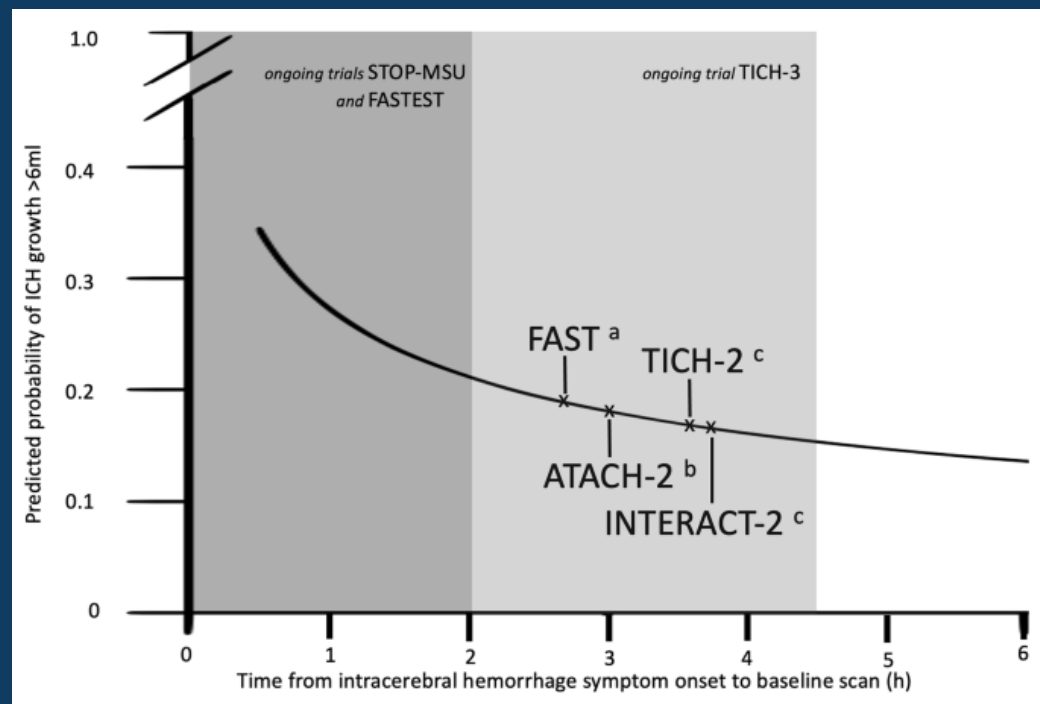
Transport to closest stroke facility

Transport to closest stroke facility with emergent MRI³ capability if < 15 min² additional transport time
Otherwise transport to closest stroke facility

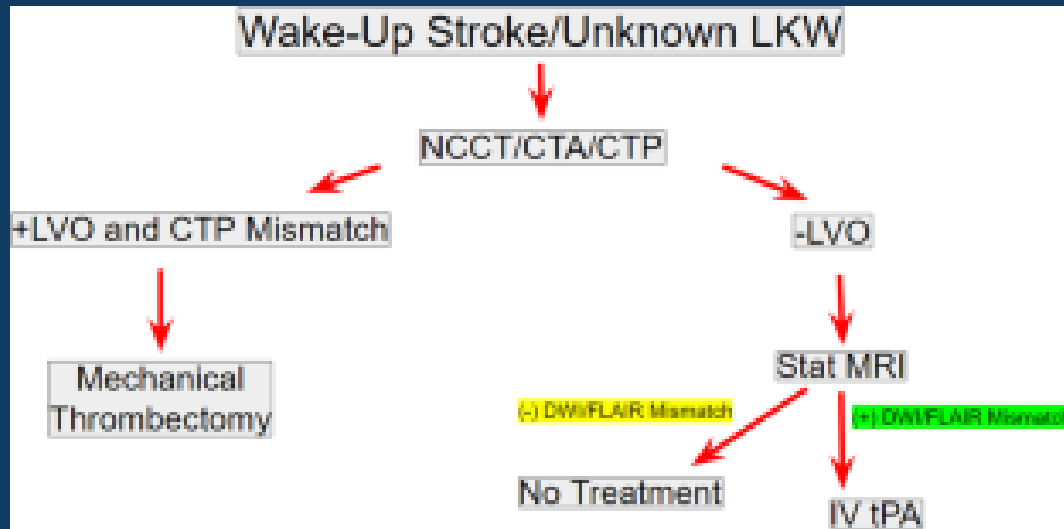
Transport to closest stroke facility (Excluding SCOED)

Hematoma expansion – time from onset of ICH

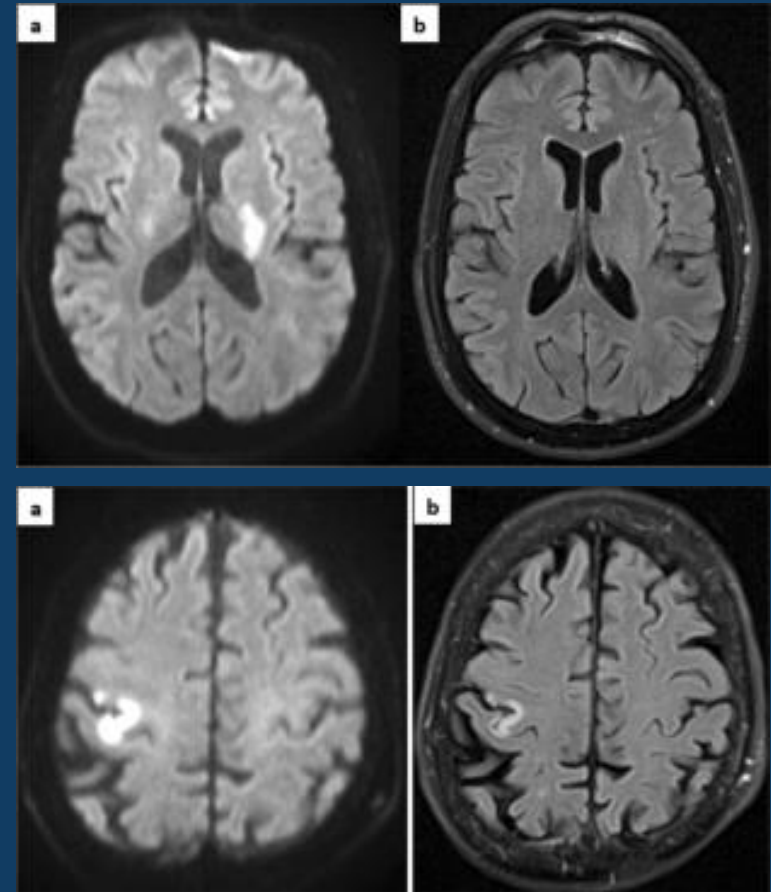
- Multivariate modeling of HE-predictors showed that the predicted probability for HE declined at increasing time from onset to diagnostic imaging.
- The decline was steepest between 0.5 and 3 h, indicating that HE is much more probable within the first 3 h.
- Ongoing bleeding beyond 4 hours of symptom onset is uncommon



Efficiency of advanced imaging to determine eligibility



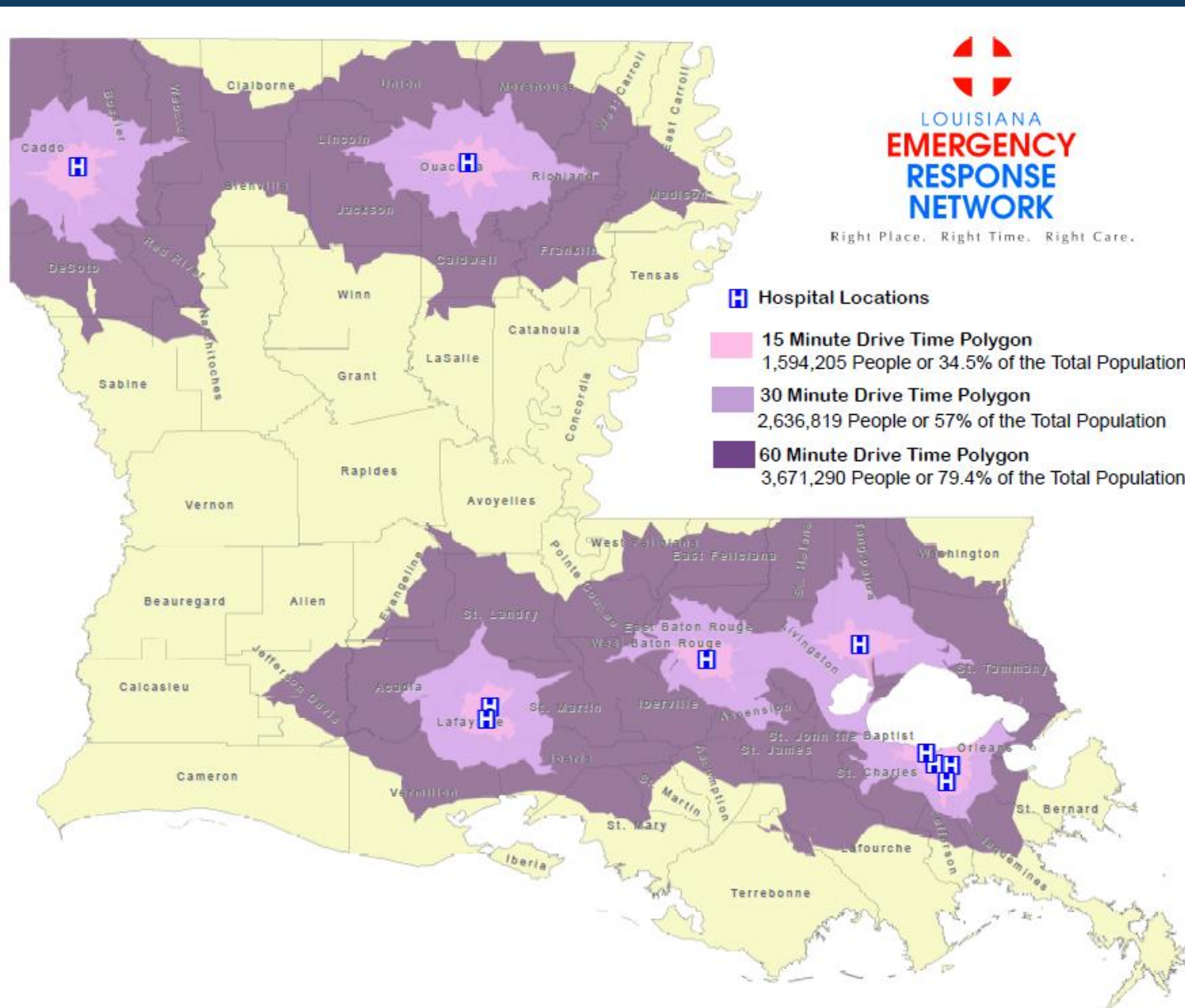
- mean interval between CT and MRI of 1.83 h



Stroke Destination Protocol

- unanimously approved by the LERN Board on 11/16/2023
- protocol will go live on January 1, 2024
- LERN Communication Center (LCC) medics have received education
- LCC medics have practiced using the new Protocol
 - Destination recommendation changed in 6/237 cases

Where are the resources?



MRI 24/7 with tech call schedule for off hours and weekends

Region 4	Stroke Level	MRI	CT	TeleStroke Hub	Endovascular-Stroke	STEMI	Cath Lab Open	Facility Comments
Abbeville General Hospital Last updated on: 11/26/2023 12:16 AM	ASRH	Routine	Yes	Lourdes	--	Referral	--	Cardiology on c....
Acadia St. Landry Hospital Last updated on: 04/17/2023 09:14 AM	SBH	--	Yes	--	--	Referral	--	
Acadian Medical Center Last updated on: 09/27/2023 02:27 PM	SBH	Routine	Yes	NA	--	Referral	No	
Iberia Medical Center Last updated on: 11/26/2023 02:02 AM	ASRH	Routine	Yes	NA	--	Receiving	Yes	
Mercy Regional Medical Center Last updated on: 11/26/2023 06:24 AM	ASRH	Routine	Yes	NA	--	Referral	No	
Ochsner Abrom Kaplan Memorial Hospital Last updated on: 11/26/2023 04:52 AM	ASRH	Routine	Yes	NA	--	Referral	No	
Ochsner Acadia General Hospital Last updated on: 11/26/2023 06:53 AM	ASRH	Routine	Yes	NA	--	Referral	--	Ortho & Urology....
Ochsner Lafayette General Medical Center Last updated on: 11/26/2023 02:24 AM	ASRH	Routine	Yes	NA	--	Receiving	Yes	
Ochsner Lafayette General Orthopedic Hospital Last updated on: 11/26/2023 06:15 AM	ASRH	Routine	Yes	NA	--	Referral	--	
Ochsner St. Martin Hospital Last updated on: 11/23/2023 06:42 AM	ASRH	Routine	Yes	NA	--	Referral	No	
Ochsner University Hospital and Clinics Last updated on: 11/26/2023 06:44 AM	ASRH	Routine	Yes	NA	--	Referral	No	
Opelousas Gen. Health Sys-SouthCamp Last updated on: 11/26/2023 07:26 AM	ASRH	No MRI	Yes	Ochsner	--	Referral	--	
Opelousas General Health System Last updated on: 11/26/2023 07:26 AM	ASRH	Emergent	Yes	Ochsner	No	Receiving	Yes	
Our Lady of Lourdes Heart Hospital Last updated on: 11/26/2023 07:20 AM	ASRH	No MRI	Yes	Lourdes	No	Receiving	Yes	
Our Lady of Lourdes Regional Medical Center Inc. Last updated on: 11/26/2023 07:20 AM	ASRH	Routine	Yes	NA	--	Receiving	Yes	

Definitions

MRI

Definition: MRI

Status Definitions

No MRI

No MRI

Routine

Emergent not available

Emergent

MRI 24/7 with tech call schedule for off hours and weekends

New data requirements – Which hospitals?

- All PSCs, PSC-Es, TSCs, and CSCs

New data requirements – Which patients?

- Patients who present within 3.5 hrs. of time symptoms noted (TSN) who have an unknown time of stroke onset (TSO)

New data requirements – What variables?

- - known Time of Stroke Onset (drop down with yes or no); centers with 24/7 endovascular services should ONLY include patients for whom the answer is no
- - Last Seen Normal (military time) only if known, otherwise left blank; PSCs without 24/7 endovascular services are already providing this
- - Time Symptoms Noted (military time)
- - Arrival time at door (military time); PSCs without 24/7 endovascular services are already providing this
- - Mode of arrival; PSCs without 24/7 endovascular services are already providing this
- - NIHSS; PSCs without 24/7 endovascular services are already providing this
- - Imaging used to determine eligibility for IV lytic (drop down for CT, CTP, MRI)
- - Time imaging for unknown stroke onset completed (military time)
- - Time of IV lytic administration (military time)
- - Reason why unknown stroke onset presenting <3.5 hours from Time Symptoms Noted was not treated with IV lytic (drop down with established stroke on CT, no/small penumbra on CTP, stroke on FLAIR, hemorrhage on imaging, stroke mimic, refusal, other standard IV lytic contraindication, arrived <3.5 hours but unable to treat <4.5 hours)

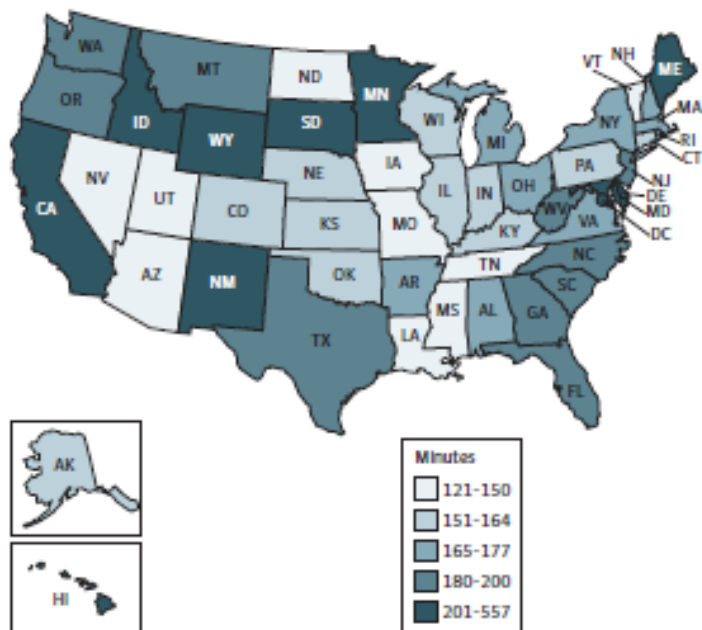
New data requirements – what are the goals?

- learn how patients with unknown time of stroke onset are being evaluated and treated
- establish benchmarks for ASRHs
- strive for a 45 minute turnaround time

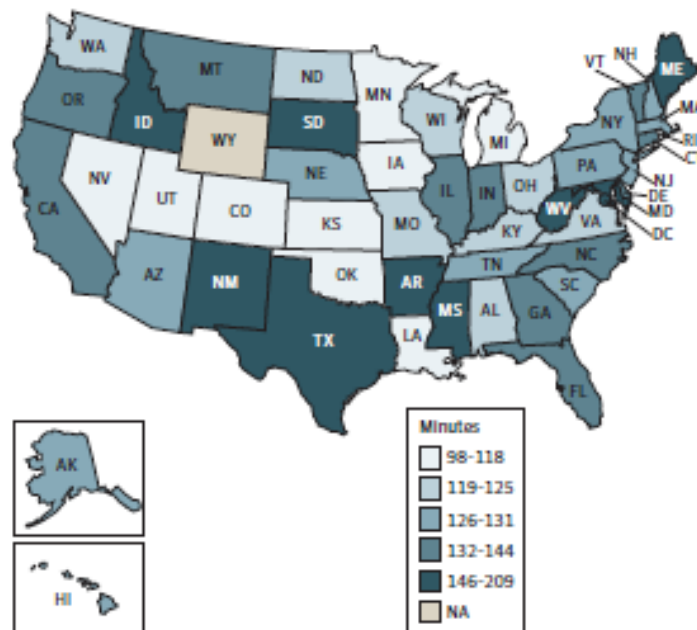
Phase

- US
- in-door
- 21 69

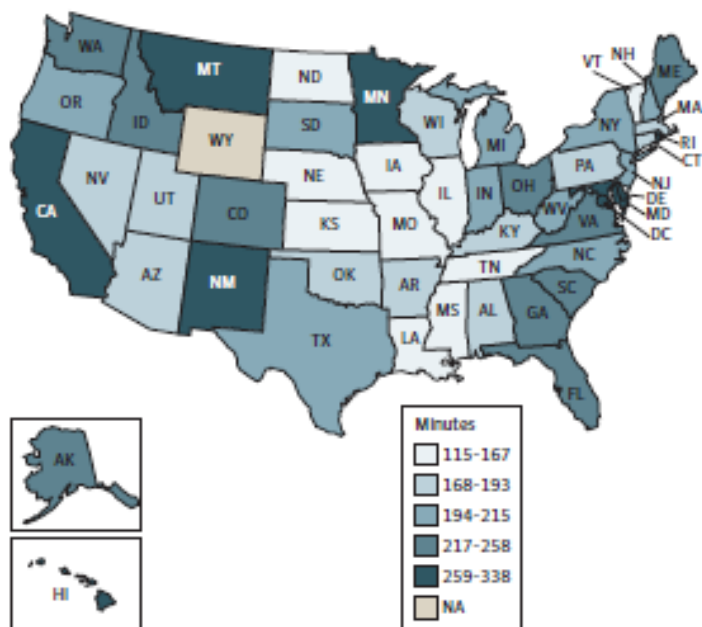
A Overall



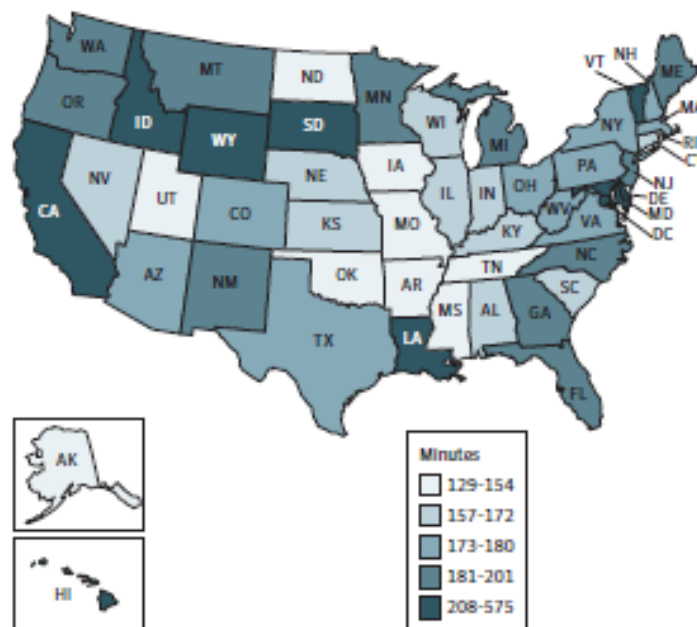
B Acute ischemic stroke eligible for endovascular therapy



C Other acute ischemic stroke



D Hemorrhagic stroke

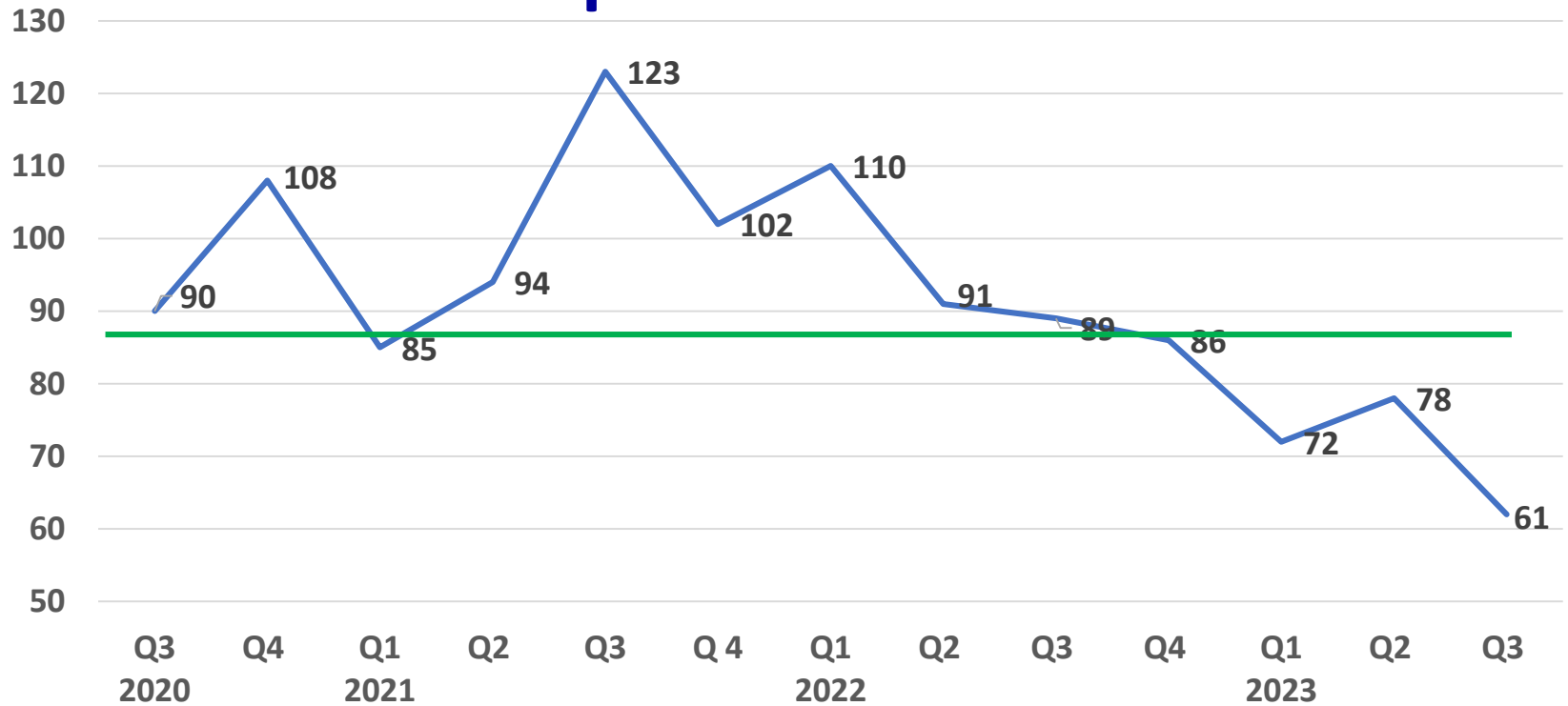


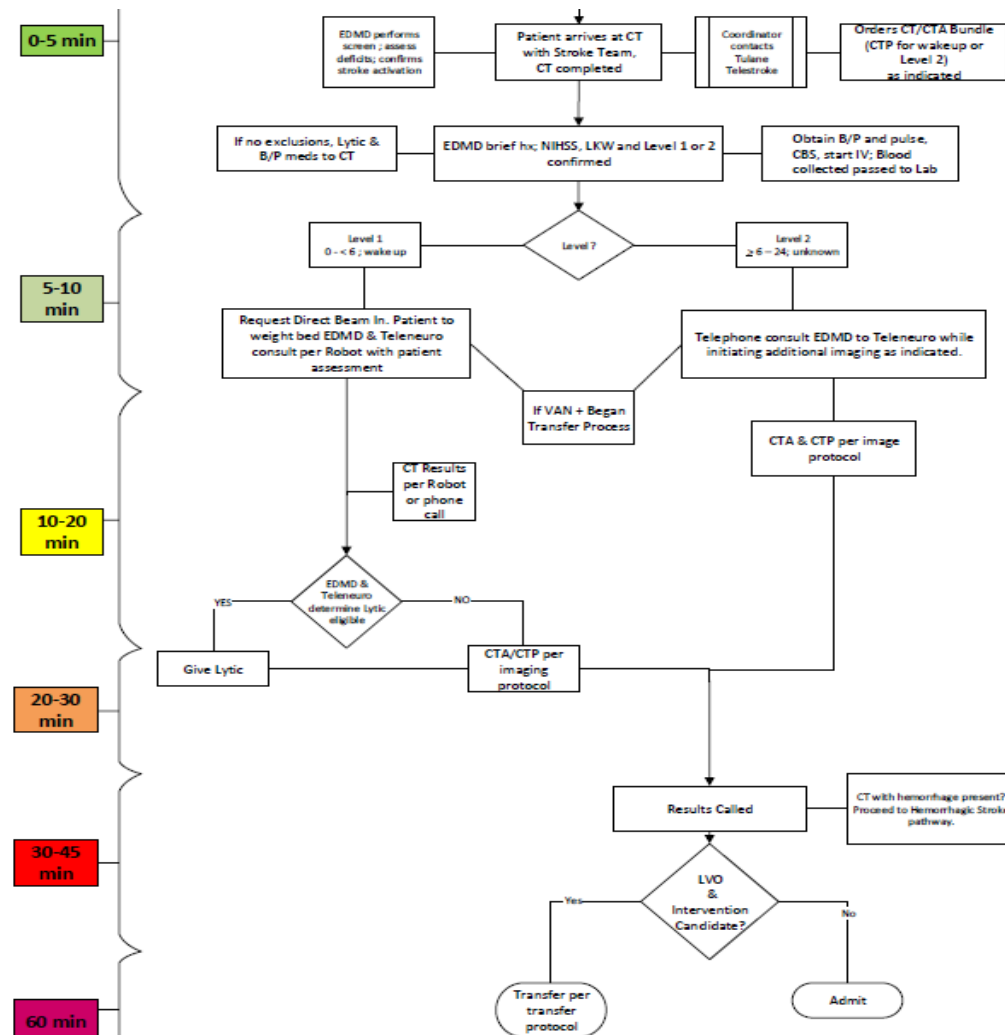
	Q3/Q4 2022 data from PSC ALL <24hrs from LSN & LVO screen+ N=148	Q1/Q2 2023 data from PSC ALL <24hrs from LSN & LVO screen+ N=97	Q3/Q4 2022 data from ASRH ALL <24hrs from LSN N=2094	Q1/Q2 2023 data from ASRH ALL <24hrs from LSN N=2097
% arriving by ambulance	71.6% 106/148	74.2% 72/97	44.2% 925/2094	41.5% 861/2076
NIHSS, median (range), [IQR]	16 (0-39) [7-21] 139/148, 93.9%	13 (1-33) [6-18] 95/97, 97.9%	2 (0-44) [1-7] n=1880, 89.8% LVO+ 13 (0-44), [5-12], n=197 LVO – 2 (0-42), [1-6], n=1595	2 (0-42) [1-6] N=1984, 94.6%
% screened for LVO	100%	100%	93.3% 1893/2030	97.8% 1991/2035
Method of LVO screening	Not required of PSCs	Not required of PSCs	VAN, 50.9 CTA, 27.5 Both, 14.2 Other clinical, 6.1 Other vascular, 1.2	VAN, 51.9 CTA, 29.1 Both, 12.7 Other clinical, 5.2 Other vascular, 1.0
% LVO screen positive	100%	100%	11.1% 209/1888	9.2% 182/1983

	Q3/Q4 2022 data from PSC ALL <24hrs from LSN & LVO screen+ N=148	Q1/Q2 2023 data from PSC ALL <24hrs from LSN & LVO screen+ N=97	Q3/Q4 2022 data from ASRH ALL <24hrs from LSN N=2094	Q1/Q2 2023 data from ASRH ALL <24hrs from LSN N=2097
Door in-Decision, median (range)	50 (0-700) [21-100] N=107	42 (4-171) [27-63] N=95	57 (0-269) [32-97] N=133	55 (0-356) [30-90] N=114
Decision-to-transfer request, median (range)	3 (0-124) [0-10] N=106	0 (0-76) [0-4] N=93	0 (0-103) [0-6] N=128	0 (0-209) [0-9] N=113
Door in-transfer request, median (range), [IQR] minutes	51 (1-710) [31-103] N=103	45 (4-187) [30-64] N=94	66 (5-455) [39-112] N=133	64 (0-374) [35-108] N=122
Transfer request-to- Acceptance, median (range)	(0-908) [3-43] N=98	14 (0-209) [3-30] N=92	20 (0-342) [5-50] N=135	28 (0-238) [10-51] N=119
Acceptance-to-EMS on scene, median (range)	31 (0-270) [16-50] N=66	36 (0-177) [12-60] N=52	45 (0-476) [34-65] N=97	43 (0-177) [27-64] N=92
EMS on scene-to-door out, median (range)	14 (0-451) [7-24] N=73	12 (0-55) [7-17] N=55	3 (0-67) [0-11] N=98	10 (0-113) [3-14] N=92
Acceptance-to-door out, median (range)	47 (0-310) [32-66] N=104	46 (7-186) [27-74] N=92	53 (0-476) [41-80] N=138	53 (6-186) [34-77] N=120
Transfer request- departure, median (range), [IQR] minutes	66 (27-943) [48-96] N=98	66 (7-290) [42-99] N=93	78 (10-477) [59-133] N=134	88 (7-405) [59-125] N=122
Door in-door out time, median (range), [IQR] minutes	131 (39-1284) [95-224] N=116 20.7% met target	120 (32-328) [88-164] N=96 28.1%	152 (50-711) [115-244] N=142 9.9% met target	165 (55-481) [120-226] N=124 11.3% met target

One example of successful DIDO remediation

Rapides DIDO Median





**Rapides Regional
Medical Center**

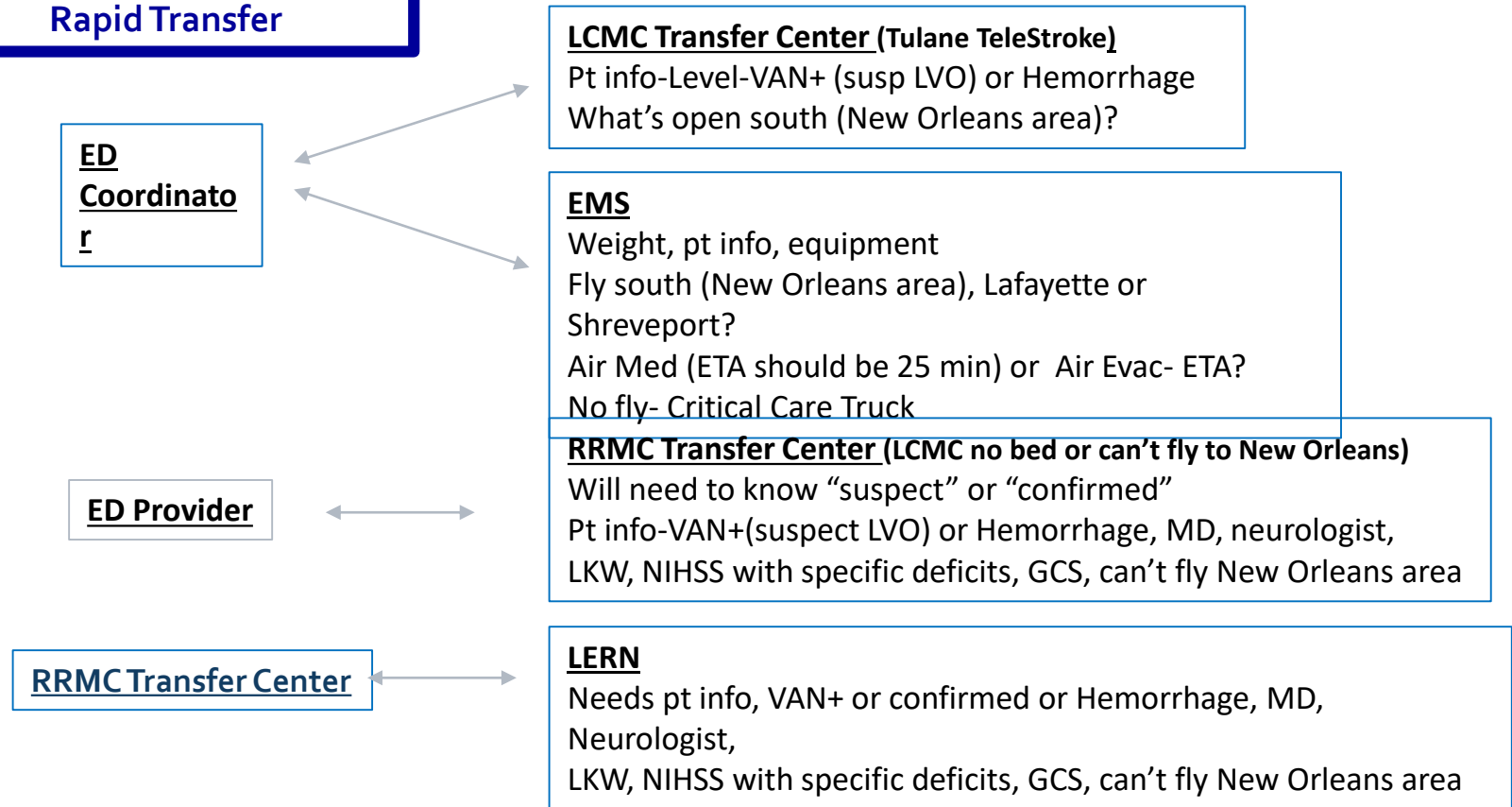
120
YEARS
1903 - 2023



LOUISIANA

EMERGENCY RESPONSE NETWORK

LVO or Hemorrhagic Stroke Rapid Transfer



**Rapides Regional
Medical Center**

120
YEARS
1903 - 2023



LOUISIANA

EMERGENCY RESPONSE NETWORK

Questions?

Stroke: Case Study 1

Scene Town of Zachary North LA EBR EMS
@06:27 EM-7 to LERN Stroke report

History of Presenting Condition

61 year old male @ 06:12 while eating breakfast experienced sudden onset slurring of speech, facial droop on his left with weakness in left side upper and lower limbs. His's wife Mary spotted these sudden onset of symptoms and immediately called for an ambulance, which arrived within 15 mins.

Stroke: Case Study 1

Pre-Hospital Assessment

Vitals: BP 140/90 mmHg Pulse 75 RR: 22 SpO2 98% RA GCS 14 CBG: 180

B.F.A.S.T

Left Facial Droop

Left Motor Weakness: Upper Limb no muscle activation, arm falling quickly. Lower Limb can move the limb, but unable to lift against gravity.

Slurred Speech

VAN

Vision RT gaze preference

Aphasia none

Neglect can't feel touch on the left

Stroke: Case Study 1

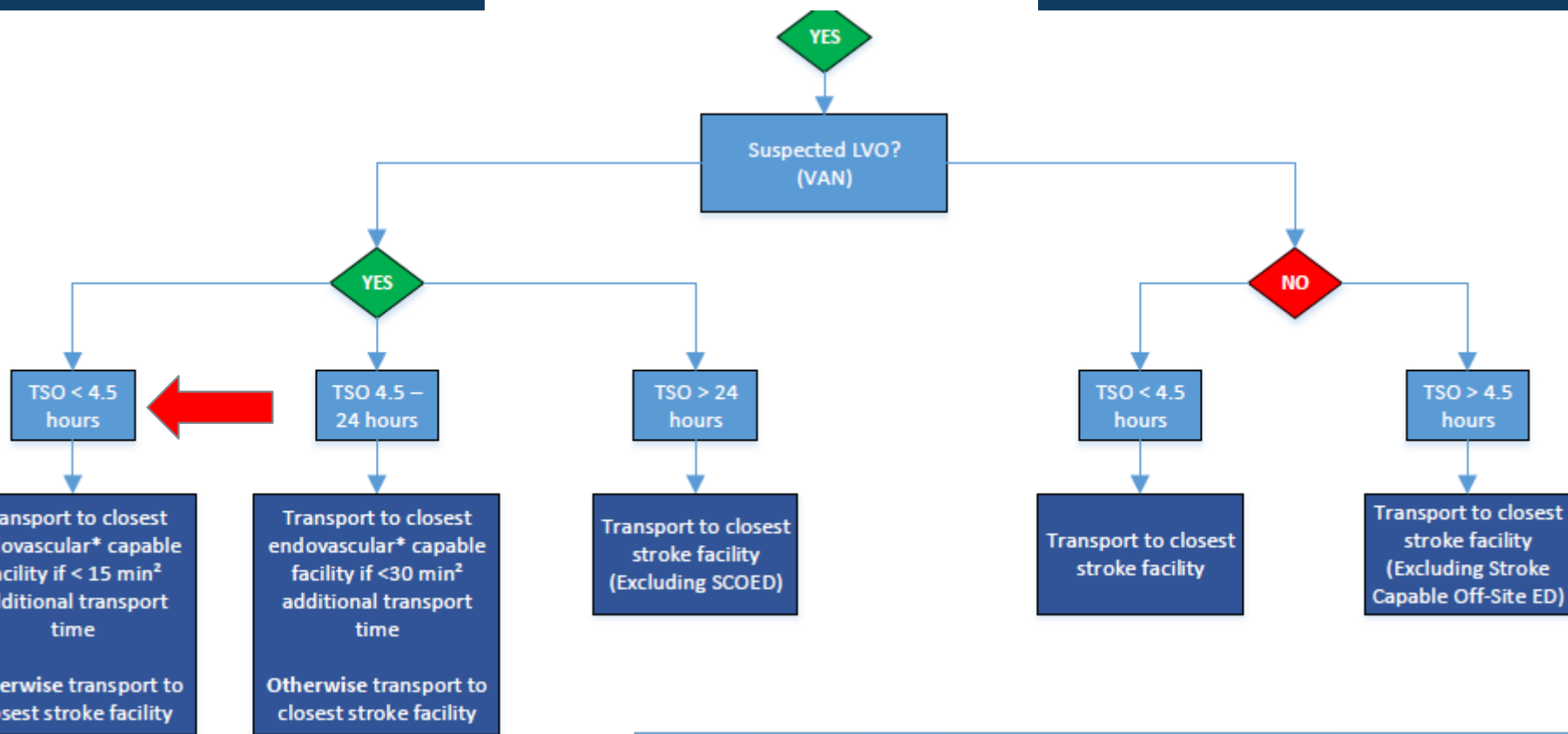
- ☐ Time of onset know?
- ☐ What Is the TSO, LSN and TSN?
- ☐ ETE to Lane 8 minutes
- ☐ ETE to OLOL 30 minutes
- ☐ LCC destination recommendation?

Apply the protocol

Stroke: Case Study 1

STROKE DESTINATION PROTOCOL

Time of Onset Known



Stroke: Case Study 1

Hospital Management

CT

Hyperdensity in the M1 Segment of the Right Middle Cerebral Artery, with no other signs suggestive of an Ischemic Stroke noted.

Provisional diagnosis of Acute Ischemic Stroke secondary to occlusion of the M1 was made.

Patient was treated with intravenous Tissue Plasminogen Activator (tPA).

Transferred to OLOL Endovascular Thrombectomy Initiated at 3hr

Stroke: Case Study 2

Scene Town of Lake Charles LA AASI
@09:10 U-401 to LERN Stroke report

History of Presenting Condition

58 year old male old male awoke at 6:00 and was at work by 7:00. Co-workers had witnessed patient and seemed normal that AM. Found sitting on a pallet at 9:00 and when co-worker attempted to find out what was wrong –co-worker questioned patient and speech was gibberish, he noted left sided facial droop and arm weakness.

911 called Co-worker notified wife

Stroke: Case Study 2

Pre-Hospital Assessment

Vitals: BP 160/100 mmHg Pulse 80 RR: 20 SpO2 97% RA GCS 13 CBG: 98

No blood thinners

B.F.A.S.T

Left Facial Droop

Left Motor Weakness: Upper Limb no muscle activation, arm falling quickly. Lower Limb can move the limb, but unable to lift against gravity.

Slurred Speech

VAN

Vision RT gaze preference

Aphasia cannot follow commands

Neglect normal

Stroke: Case Study 2

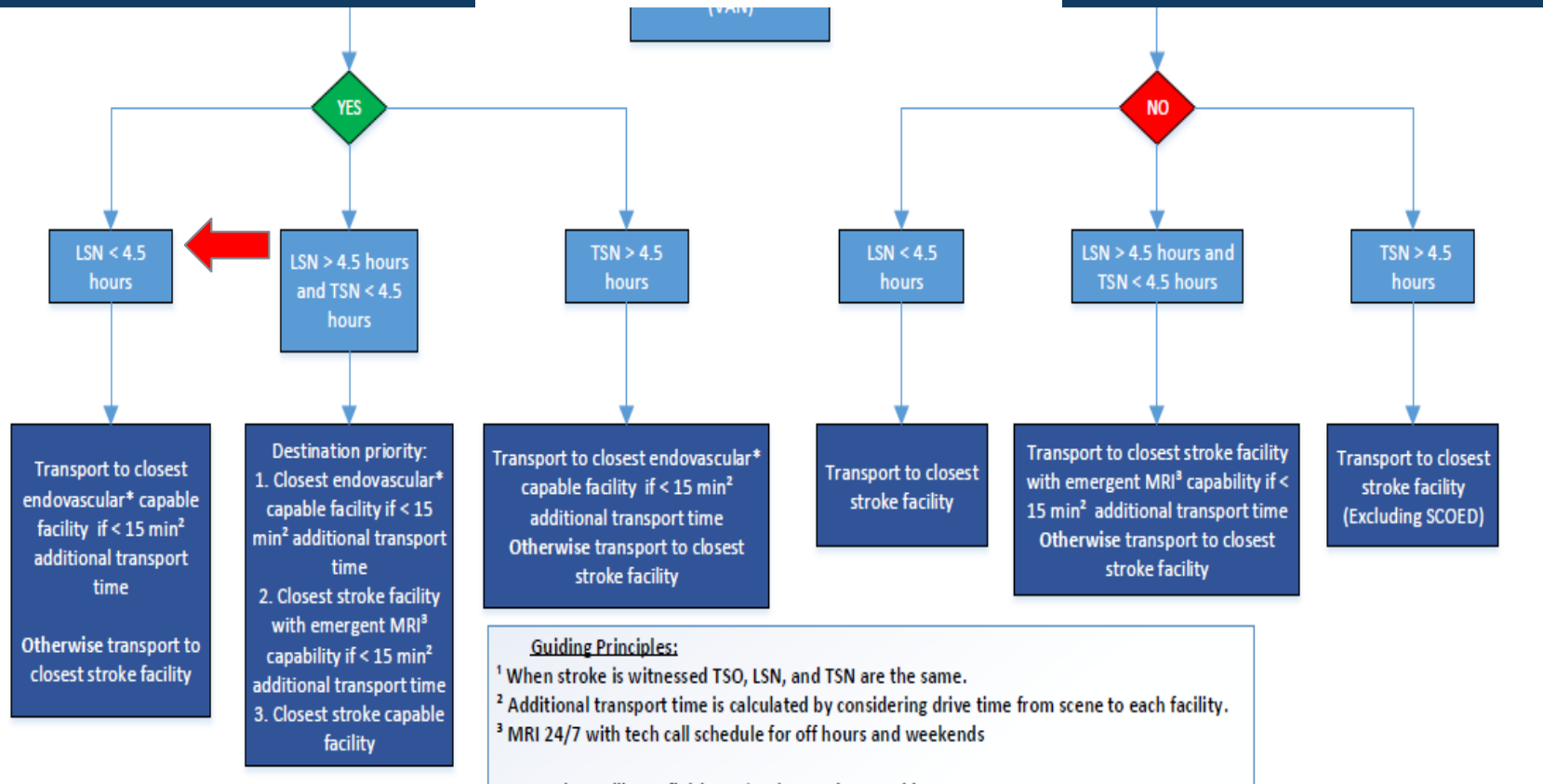
- ☐ Time of onset know?
- ☐ What Is the TSO, LSN and TSN?
- ☐ LCC destination recommendation?
- ☐ Apply the protocol



Stroke: Case Study 2

STROKE DESTINATION PROTOCOL

Time of Onset Unknown



Stroke: Case Study 2

Hospital Management

CT

Negative

NIH 13

Patient was treated with intravenous Alteplase NIH remained 13 and high suspicion of LVO. CT perfusion CT angio

Transferred to Lourdes for Endovascular Thrombectomy

Upon arrival NIHSS –16

Stroke: Case Study 3

Scene Town of LaPlace LA AASI
@07:30 U-62 to LERN Stroke report

History of Presenting Condition

63 year old right handed male, went to bed at 10pm. Patient did not show up to work who notified daughter at 0700 and she went to house and found father in bed with stroke symptoms (dysarthria , left hemiplegia and right gaze preference)

Stroke: Case Study 3

Pre-Hospital Assessment

Vitals: BP 188/110 mmHg Pulse 72 RR: 18 SpO2 98% RA GCS 13 CBG: 98

No blood thinners

B.F.A.S.T

Dysarthria

Left Facial Droop

Left Motor hemiplegia: Upper Limb no muscle activation, arm falling quickly.
Lower Limb unable to lift against gravity.

VAN

Vision RT gaze preference

Aphasia cannot follow commands

Neglect normal

Stroke: Case Study 3

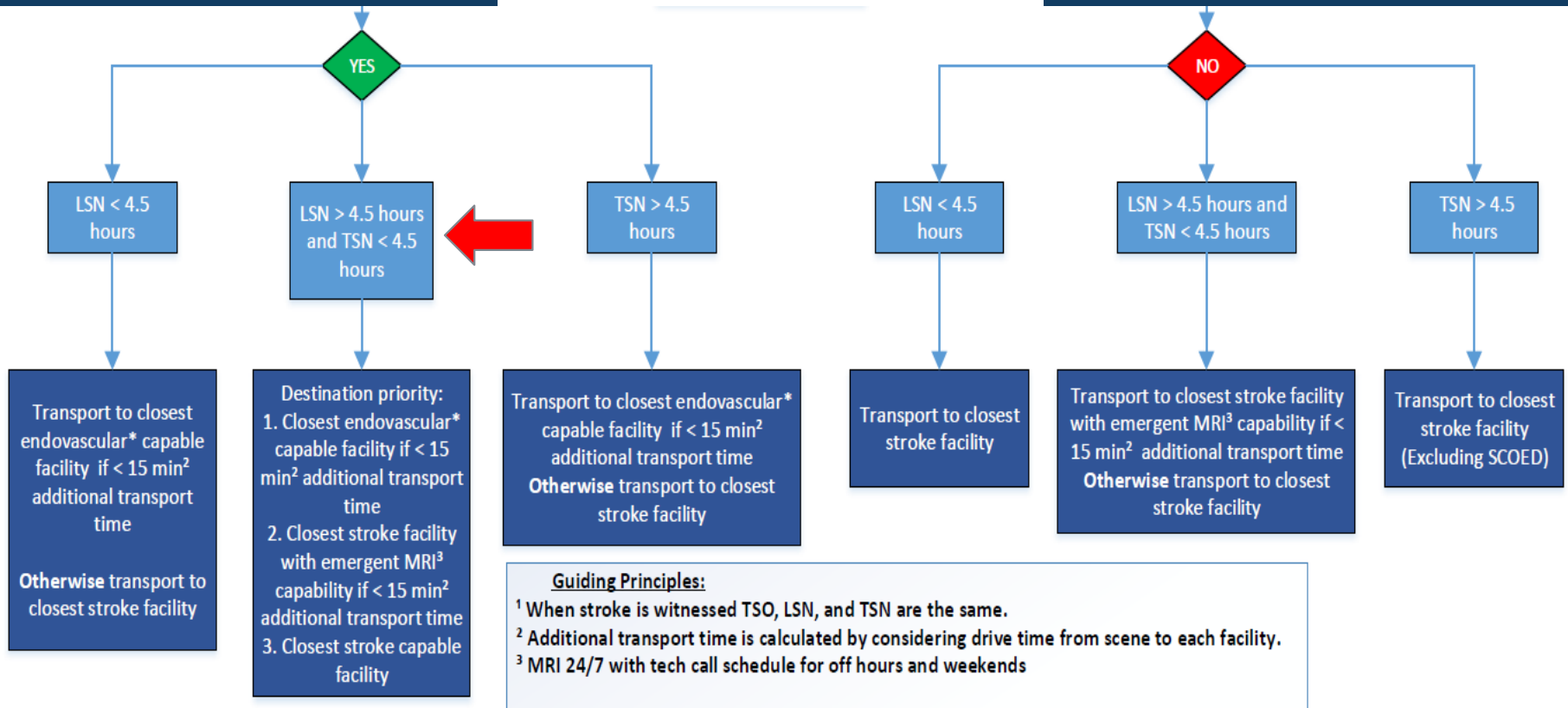
- ☐ Time of onset know?
- ☐ What Is the TSO, LSN and TSN?
- ☐ LCC destination recommendation?
- ☐ Apply the protocol



Stroke: Case Study 3

STROKE DESTINATION PROTOCOL

Time of Onset Unknown



Stroke: Case Study 3

Hospital Management

CT

Negative

NIH 13

Patient was treated with intravenous Alteplase NIH remained 13 and high suspicion of LVO. CT perfusion CT angio

Admitted for thrombectomy

Stroke: Case Study 4

Scene Town of Jennings, LA AASI
@08:40 U-28 to LERN Stroke report

History of Presenting Condition

72 year old male, went to bed at 9pm and had spoken to his son on the phone. Patient did not answer phone at 0800 and son went to house and found father in bed with stroke symptoms @0830. Father is able to report he got weak on the left side could not get out of bed and had a headache shortly after awaking @0700.

Stroke: Case Study 4

Pre-Hospital Assessment

Vitals: BP 158/98 mmHg Pulse 68 RR: 16 SpO2 95% RA GCS 15
CBG: 110

No blood thinners

B.F.A.S.T

Slurred speech

Left Facial Droop

Left Motor hemiparesis: Upper Limb mild drift. Lower Limb able to lift against gravity but also weak.

VAN negative

Stroke: Case Study 4

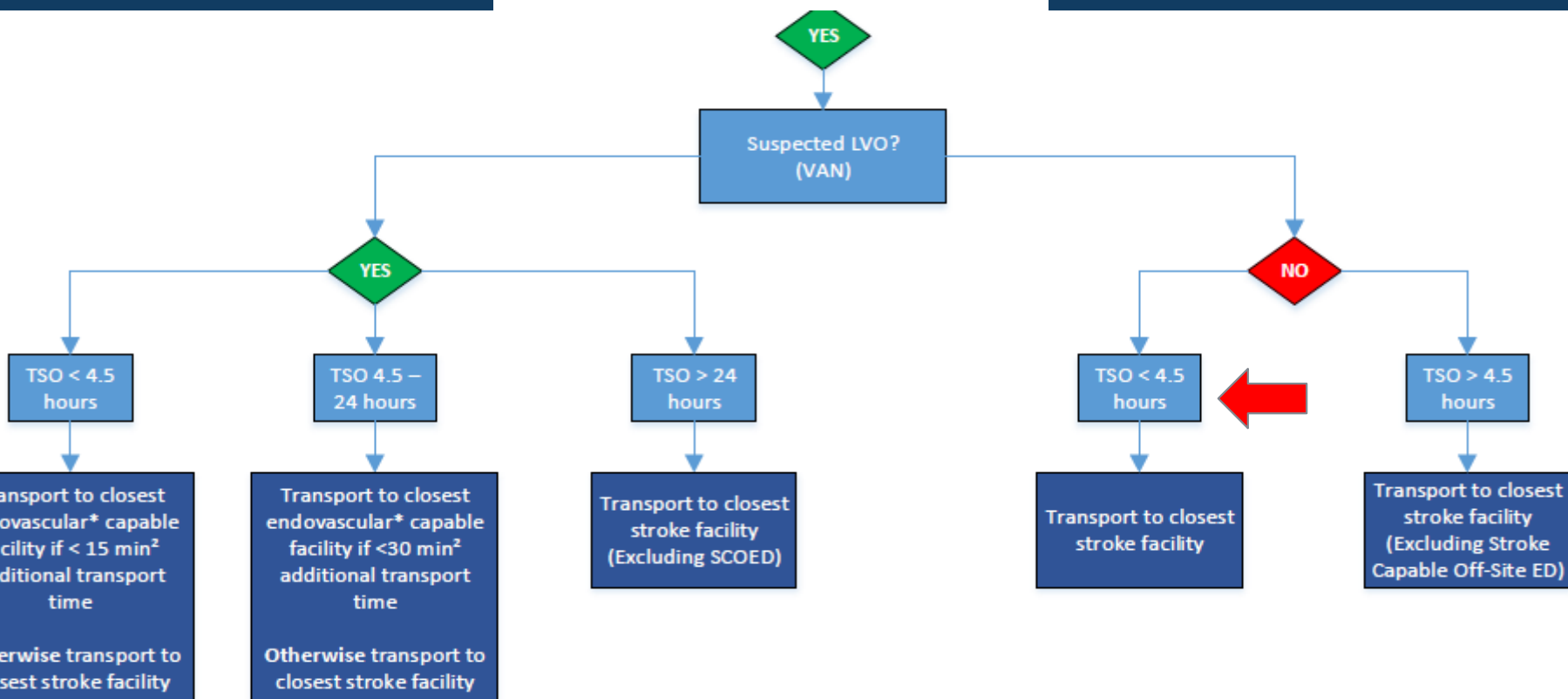
- ☐ Time of onset know?
- ☐ What Is the TSO, LSN and TSN?
- ☐ LCC destination recommendation?
- ☐ Apply the protocol



Stroke: Case Study 4

STROKE DESTINATION PROTOCOL

Time of Onset Known



Stroke: Case Study 4

Hospital Management

LCC notified acute VAN negative stroke

Upon arrival NIHSS –16

CT

Old lacunar on the right

Patient not a candidate for IV lytic. CT perfusion CT
angio and admitted to hospital.

Stroke: Case Study 5

Scene Town of Alexandria LA AASI
@15:32 U-210 to LERN Stroke report

History of Presenting Condition

59-year-old Hispanic man presented with right upper and lower extremity weakness, associated with facial drop and slurred speech. Patient had breakfast with family at 8:30. They dropped him off at home at 9:30. Family called 911 at 3:00PM. Patient denied visual disturbance, headache, chest pain, palpitations, dyspnea, dysphagia, fever, dizziness, loss of consciousness, bowel or urinary incontinence, or trauma.

Stroke: Case Study 5

Pre-Hospital Assessment

Vitals: BP 184/102 mmHg Pulse 80 RR: 18 SpO2
97% RA GCS 15 CBG: 90

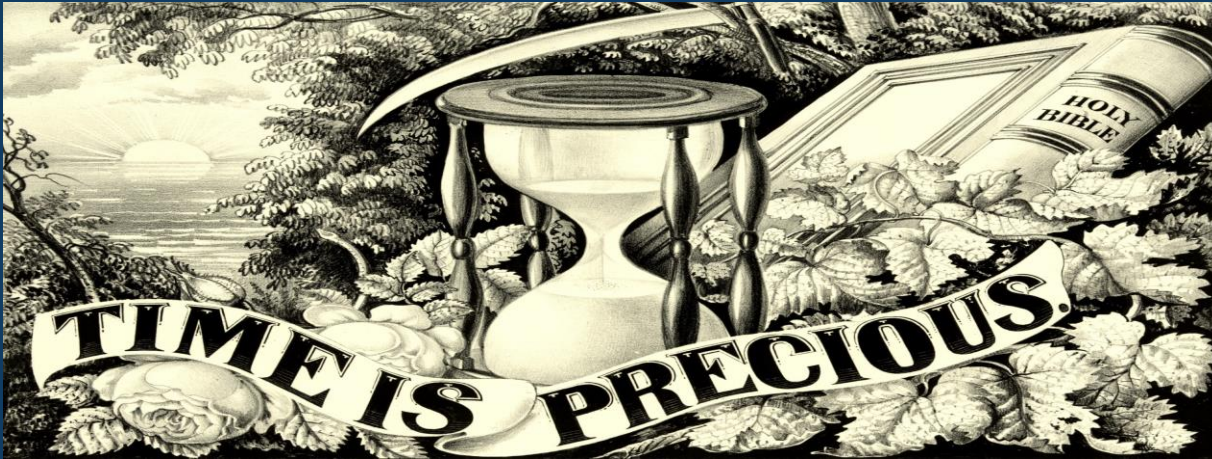
No blood thinners

B.F.A.S.T

VAN negative

Stroke: Case Study 5

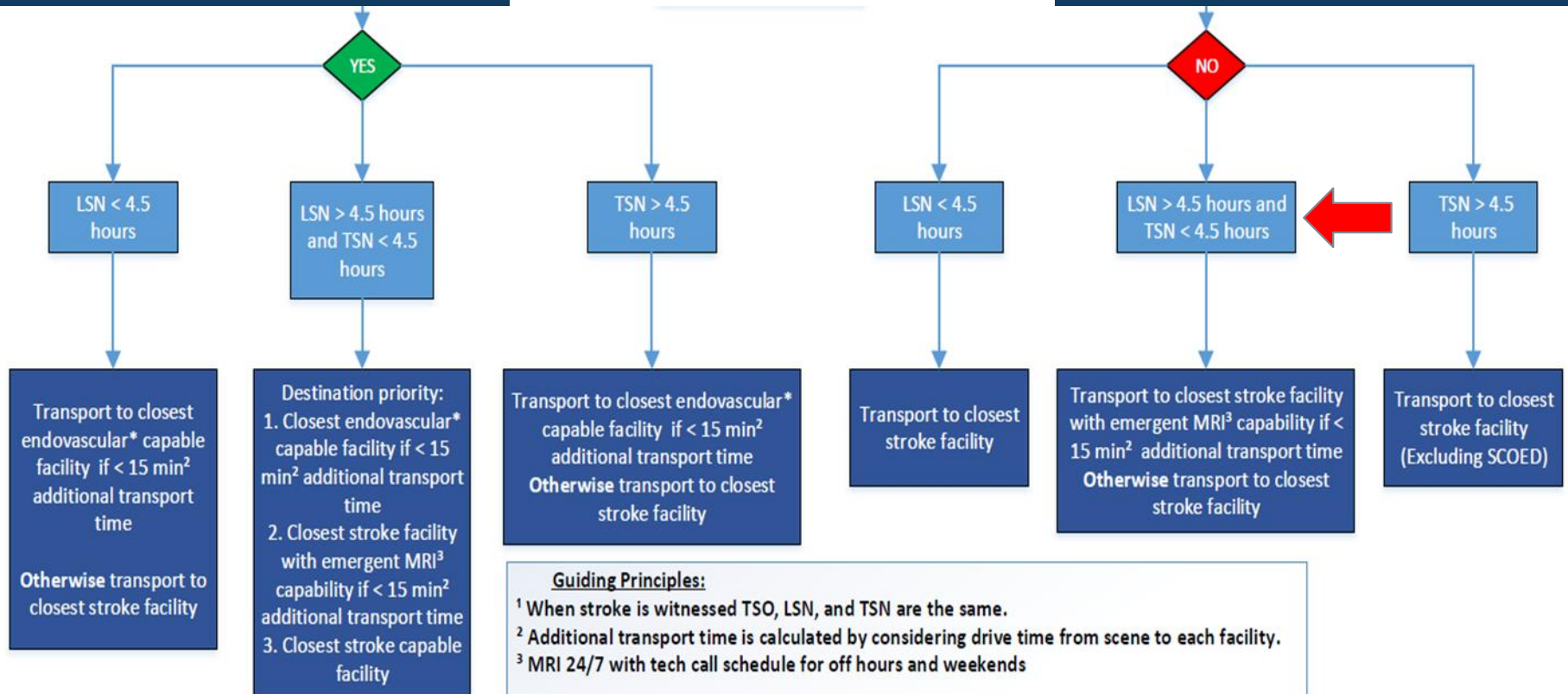
- Time of onset know?
- What Is the TSO, LSN and TSN?
- LCC destination recommendation?
- Apply the protocol



Stroke: Case Study 5

STROKE DESTINATION PROTOCOL

Time of Onset Unknown



Stroke: Case Study 5

- **Hospital Management**

Upon arrival NIHSS –7

CT

- Initial CT angiogram of head and neck reported no acute intracranial findings
- MRI of the head revealed an acute 1.7-cm infarct of the left periventricular white matter and posterior left basal ganglia.