

NCCEP EMS Protocol Committee

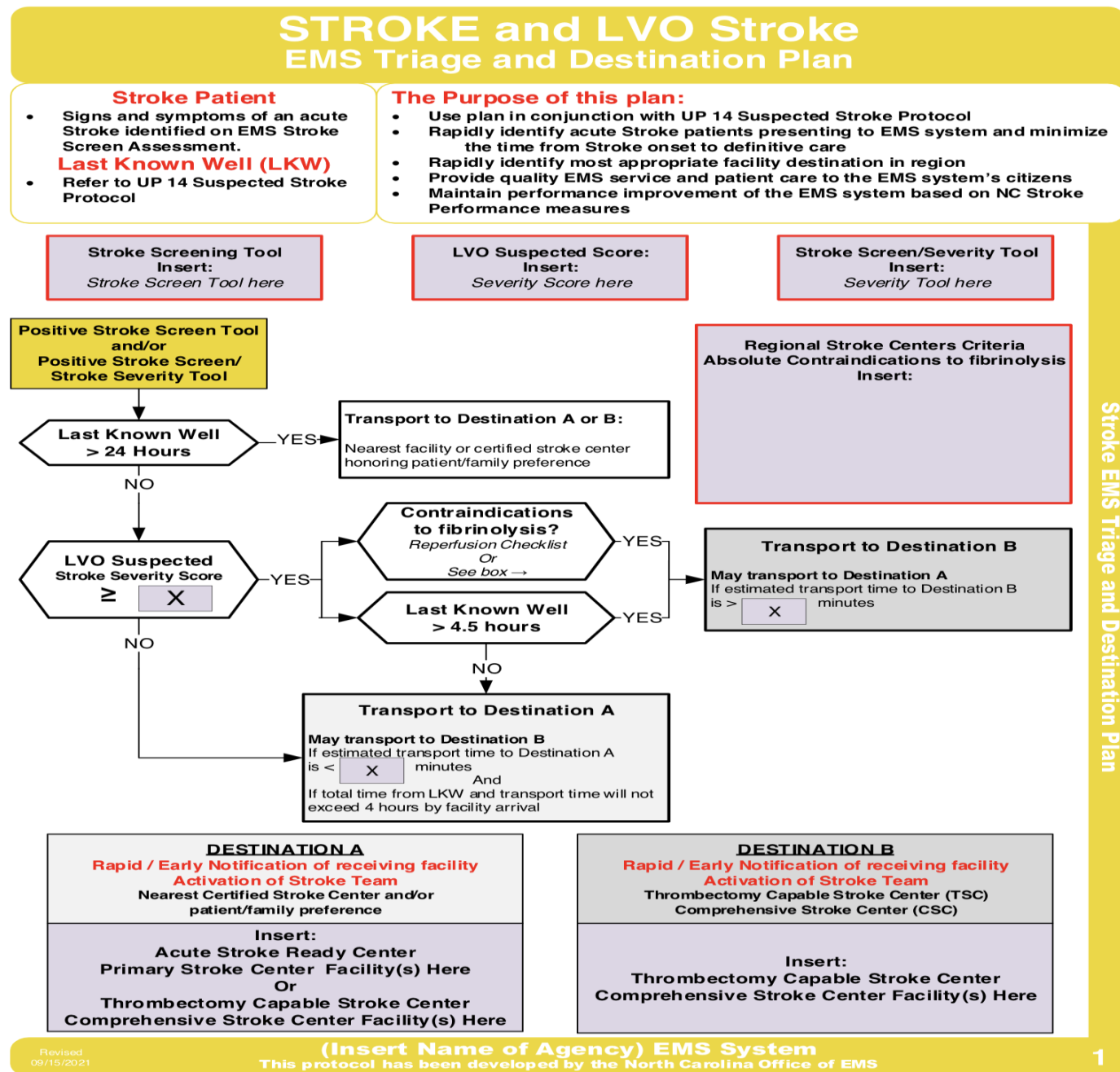
Stroke Triage and Destination Template EMS Decision-making in Acute Stroke

Darrell Nelson, MD

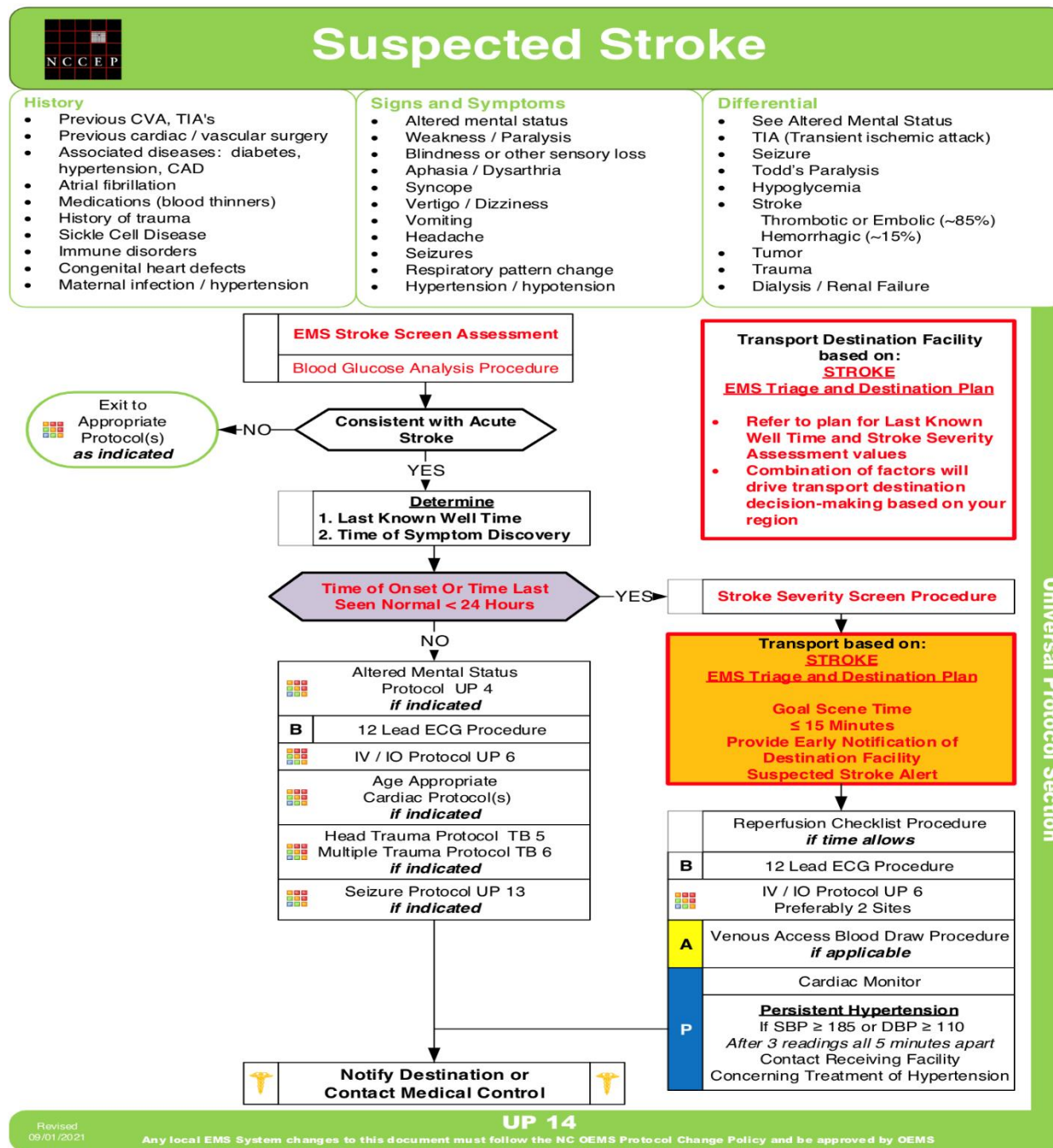
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EMS Decision-making in Acute Stroke



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EMS Decision-making in Acute Stroke

STROKE CENTERS ACUTE STROKE READY HOSPITAL

Hospital	City	State	Effective Date	Accreditation Agency
Angel Medical Center Inc	Franklin	NC	6/23/2018	Joint Commission
Columbus Regional Healthcare System	Whiteville	NC	1/11/2019	DNV-GL
Vidant Roanoke Chowan Hospital	Ahoskie	NC	7/26/2018	Joint Commission
Vidant Chowan Hospital	Edenton	NC	12/28/2018	Joint Commission
Vidant Bertie Hospital	Windsor	NC	1/28/2019	Joint Commission
Novant Health Mint Hill Medical Center	Charlotte	NC	11/26/2018	Joint Commission
Hoke Healthcare, LLC	Raeform	NC	4/2/2018	Joint Commission
Moses H. Cone Memorial Hospital Operating Corporation	Greensboro	NC	4/25/2018	Joint Commission
MHMission Hospital McDowell	Marion	NC	2/26/2019	Joint Commission

ADVANCED COMPREHENSIVE STROKE CENTER

Hospital	City	State	Effective Date	Accreditation Agency
Carolinas Medical Center	Charlotte	NC	11/29/2017	Joint Commission
Duke University Hospital	Durham	NC	11/11/2017	Joint Commission
Mission Hospital, Inc.	Asheville	NC	9/28/2019	Joint Commission
Moses H. Cone Memorial Hospital Operating Corporation	Greensboro	NC	2/10/2018	Joint Commission
New Hanover Regional Medical Center	Wilmington	NC	5/30/2019	DNV-GL Healthcare
Novant Health Forsyth Med Ctr dba for Forsyth Memorial Hosp.	Winston Salem	NC	3/9/2019	Joint Commission
Novant Health Presby Medical Ctr for ThePresbyterianHospital	Charlotte	NC	5/24/2019	Joint Commission
Vidant Medical Center	Greenville	NC	9/4/2018	Joint Commission
University of North Carolina Hospitals	Chapel Hill	NC	2/13/2019	Joint Commission
Wake Forest Baptist Medical Center	Winston Salem	NC	8/7/2019	Joint Commission

ADVANCED PRIMARY STROKE CENTER

Hospital	City	State	Effective Date	Accreditation Agency
Alamance Regional Medical Center, Inc.	Burlington	NC	7/15/2019	Joint Commission
Atrium Health Union	Monroe	NC	12/22/2018	Joint Commission
Atrium Health Cleveland	Shelby	NC	7/10/2018	Joint Commission
Atrium Health Cabarrus	Concord	NC	7/28/2019	Joint Commission
Atrium Health Stanly	Albemarle	NC	7/7/2018	Joint Commission
Atrium Health Lincoln	Lincolnton	NC	4/8/2019	Joint Commission
Atrium Health University City	Charlotte	NC	5/17/2018	Joint Commission

STROKE CENTERS

Cape Fear Valley Health System	Fayetteville	NC	10/13/2018	Joint Commission
Carteret County General Hospital Corporation	Morehead City	NC	4/6/2019	Joint Commission
Catawba Valley Medical Center	Hickory	NC	3/16/2019	Joint Commission
DLP Central Carolina Medical Center, LLC	Sanford	NC	1/26/2019	Joint Commission
DLP Frye Regional Medical Center, LLC	Hickory	NC	8/11/2018	Joint Commission
DLP Wilson Medical Center, LLC	Wilson	NC	7/27/2018	Joint Commission
Duke University Health System d/b/a Duke Regional Hospital	Durham	NC	3/9/2018	Joint Commission
Duplin General Hospital Inc	Kenansville	NC	4/26/2018	Joint Commission
FirstHealth of the Carolinas Inc	Pinehurst	NC	3/17/2018	Joint Commission
Gaston Memorial Hospital, Incorporated	Gastonia	NC	12/15/2018	Joint Commission
Hugh Chatham Memorial Hospital, Inc.	Elkin	NC	9/28/2019	Joint Commission
Iredell Memorial Hospital, Incorporated	Statesville	NC	8/11/2018	Joint Commission
Lake Norman Regional Medical Center	Mooresville	NC	10/8/2019	Joint Commission
Lenoir Memorial Hospital, Incorporated	Kinston	NC	8/20/2019	Joint Commission
Lexington Medical Center	Lexington	NC	8/18/2018	Joint Commission
Nash Hospitals, Inc.	Rocky Mount	NC	11/06/2018	Joint Commission
NH Thomasville Medical Ctr Community General Health Partners	Thomasville	NC	7/13/2019	Joint Commission
Northern Hospital of Surry County	Mount Airy	NC	12/09/2017	Joint Commission
Novant Health Huntersville Med Ctr dbafor Presbyterian Hosp	Huntersville	NC	10/25/2018	Joint Commission
Novant Health Matthews Med Ctr dba for Presbyterian Med Care	Matthews	NC	10/24/2018	Joint Commission
Novant Health Rowan Med Ctr dba for Rowan Regional Med Ctr	Salisbury	NC	7/10/2019	Joint Commission
Onslow Memorial Hospital	Jacksonville	NC	1/17/2019	Joint Commission
Sentara Albemarle Hospital	Elizabeth City	NC	10/4/2018	DNV-GL Healthcare
The Charlotte-Mecklenburg Hospital Authority	Charlotte	NC	6/29/2019	Joint Commission
Vidant Edgecombe Hospital	Tarboro	NC	7/23/2018	Joint Commission
WakeMed	Raleigh	NC	2/26/2019	Joint Commission
WakeMed Cary Hospital	Cary	NC	10/12/2018	Joint Commission
Watauga Medical Center	Boone	NC	3/9/2019	Joint Commission

ADVANCED THROMBECTOMY CAPABLE STROKE CENTER

Hospital	City	State	Effective Date	Accreditation Agency
Duke Raleigh Hospital	Raleigh	NC	12/07/2018	Joint Commission
Rex Hospital	Raleigh	NC	9/17/2019	Joint Commission

EMS Decision-making in Acute Stroke

STROKE EMS Triage and Destination Plan

Pearls

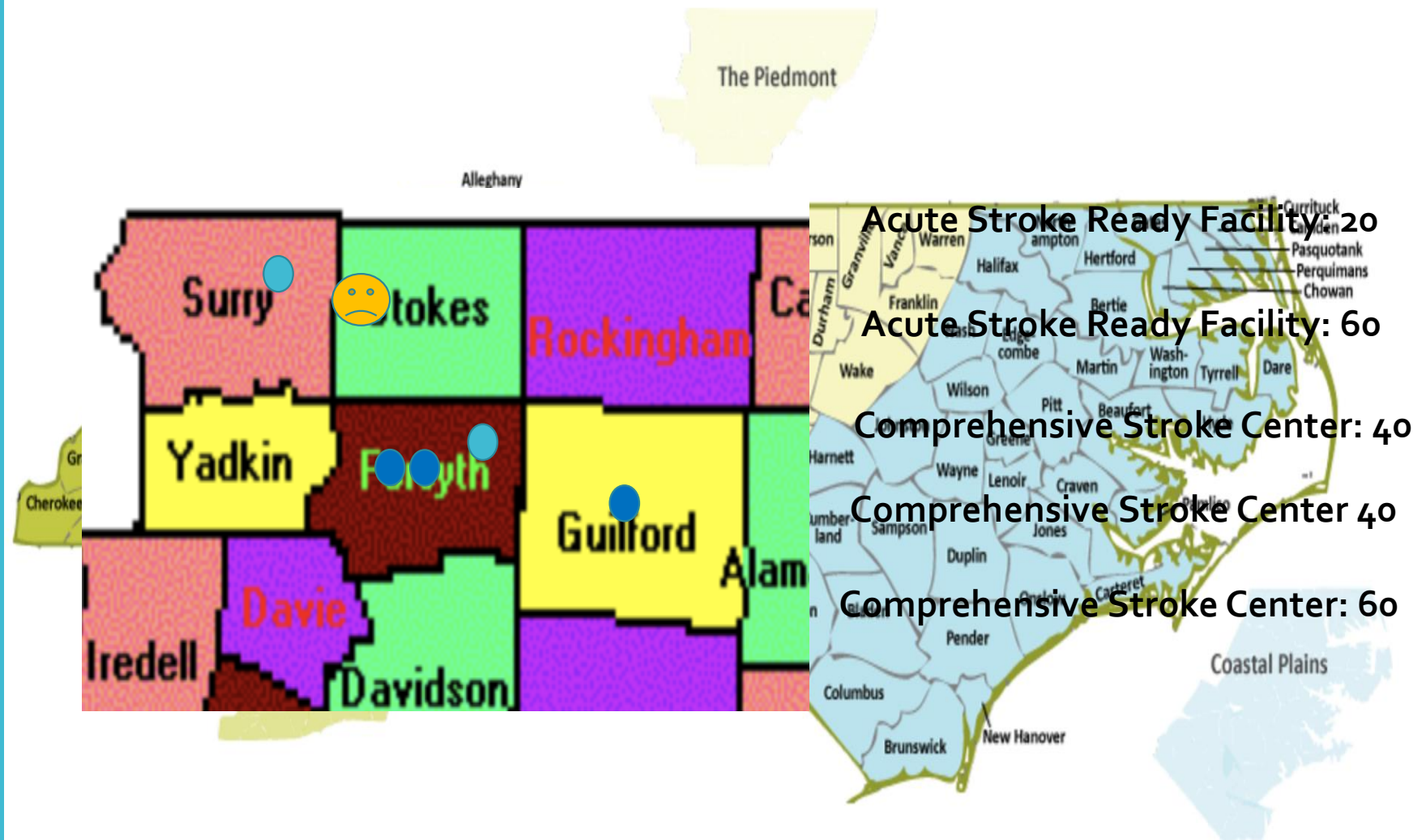
- If unstable airway or unstable hemodynamic condition may divert transport to closest appropriate facility.
- All Stroke patients should be triaged and transported using this plan.
- Expectation: EMS agency will collaborate with their regional stroke resources to establish point-to-point and inter-facility transport workflows for patient requiring higher level of acute care in consideration of potential EMS system impact and regional approach to stroke care.
- Stroke Severity/Large Vessel Occlusion (LVO) Tool and Score:
Score severity and LVO score level should be set based on collaboration with all stroke centers where EMS agency routinely transports in the region. Majority of strokes are NOT large vessel occlusion strokes and inappropriately low severity scores can result in an over-triage of patients to TSC / CSC negatively impacting both the EMS and healthcare system.
- EMS Transport Times in Destination Decisions:
EMS Transport times should be set based on collaboration with all stroke centers where EMS agency routinely transports in the region.
- Reperfusion Checklist and contraindications to fibrinolysis in acute stroke patients:
Systems may use the Reperfusion Checklist or may establish regionally agreed upon absolute contraindications.
- Many EMS systems have a variety of stroke certified medical facilities within similar transport time parameters.
- Destination choices should use regional stroke system of care plans and patient/family preferences in choosing most medically appropriate facility.
- Modality of transport in acute stroke depends on multiple factors, but safest and fastest should be considered, whether ground EMS, air medical EMS, or specialty/critical care ground transport.
Consider air medical transport options when no Comprehensive or Thrombectomy Capable Stroke Centers are within a 60 minute total transport time.

Prioritize Comprehensive Stroke Center over Thrombectomy-Capable Stroke Center when total transport time is < 30 minutes difference.

EMS Decision-making in Acute Stroke



EMS Decision-making in Acute Stroke



EMS Decision-making in Acute Stroke

- First agency/region decision
 - What screen and/or screening-severity tool to use
- Second agency/region decision
 - Severity score cut-off for LVO

STROKE and LVO Stroke EMS Triage and Destination Plan

Stroke Patient

- Signs and symptoms of an acute Stroke identified on EMS Stroke Screen Assessment.
- **Last Known Well (LKW)**
- Refer to UP 14 Suspected Stroke Protocol

The Purpose of this plan:

- Use plan in conjunction with UP 14 Suspected Stroke Protocol
- Rapidly identify acute Stroke patients presenting to EMS system and minimize the time from Stroke onset to definitive care
- Rapidly identify most appropriate facility destination in region
- Provide quality EMS service and patient care to the EMS system's citizens
- Maintain performance improvement of the EMS system based on NC Stroke Performance measures

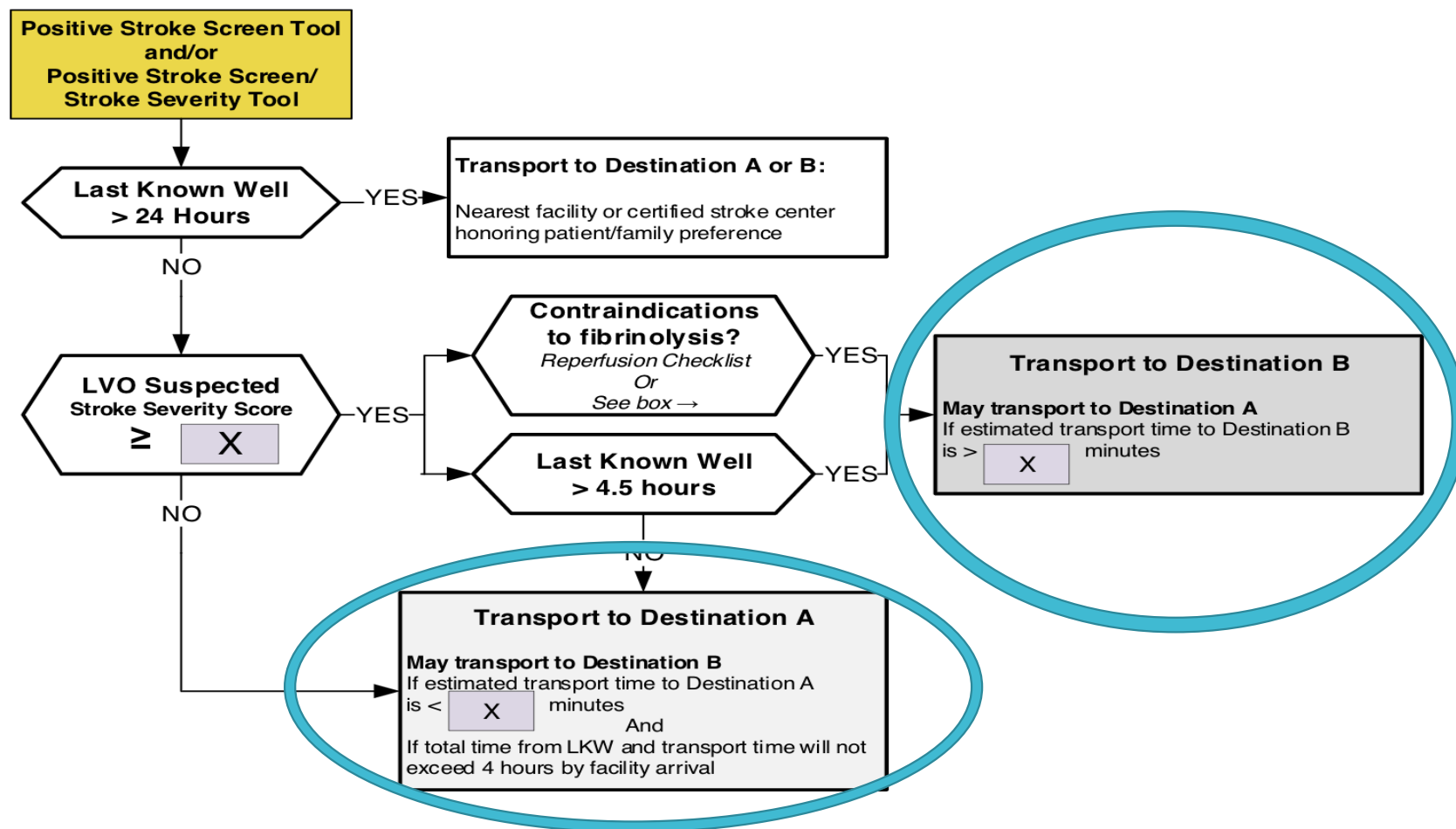
Stroke Screening Tool
Insert:
Stroke Screen Tool here

LVO Suspected Score:
Insert:
Severity Score here

Stroke Screen/Severity Tool
Insert:
Severity Tool here

EMS Decision-making in Acute Stroke

- Third agency decision
 - Estimated transport times to various facilities
 - From patient contact location



EMS Decision-making in Acute Stroke



Reperfusion Checklist



3. Are there any contraindications to fibrinolysis?

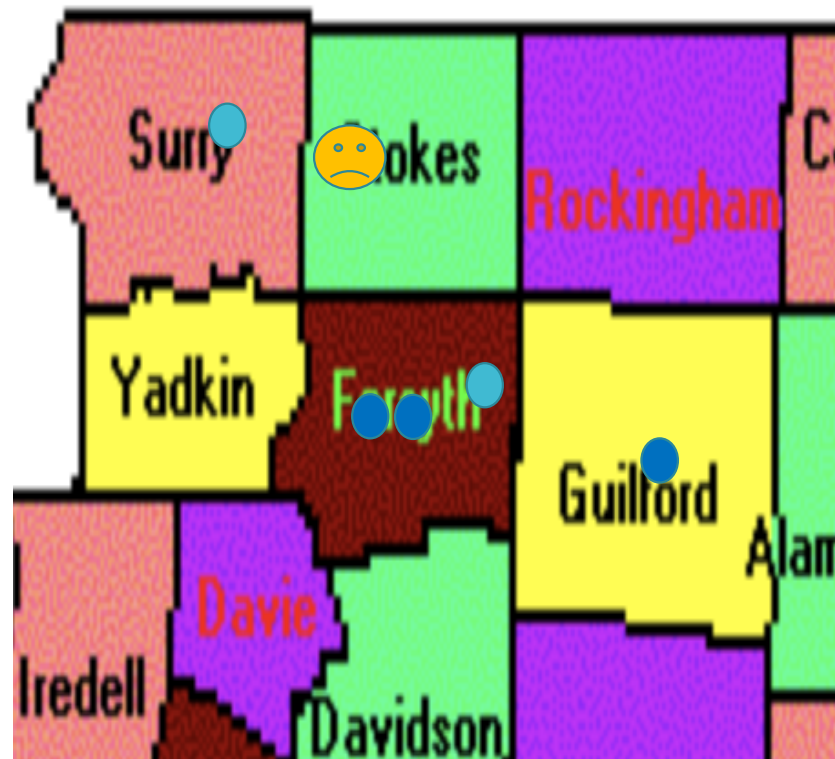
If any of the following are checked "Yes", fibrinolysis MAY be contraindicated.

- | | | |
|------------------------------|-----------------------------|--|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Systolic Blood Pressure greater than 180 mm Hg |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Diastolic Blood Pressure greater than 110 mm Hg |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Right vs. Left Arm Systolic Blood Pressure difference of greater than 15 mm Hg |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | History of structural Central Nervous System disease (tumors, masses, hemorrhage, etc.) |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Significant closed head or facial trauma within the previous 3 months |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Recent (within 6 weeks) major trauma, surgery (including laser eye surgery), gastrointestinal bleeding, or severe genital-urinary bleeding |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Bleeding or clotting problem or on blood thinners |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | CPR performed greater than 10 minutes |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Currently Pregnant |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | Serious Systemic Disease such as advanced/terminal cancer or severe liver or kidney failure. |

Transport to Destination A

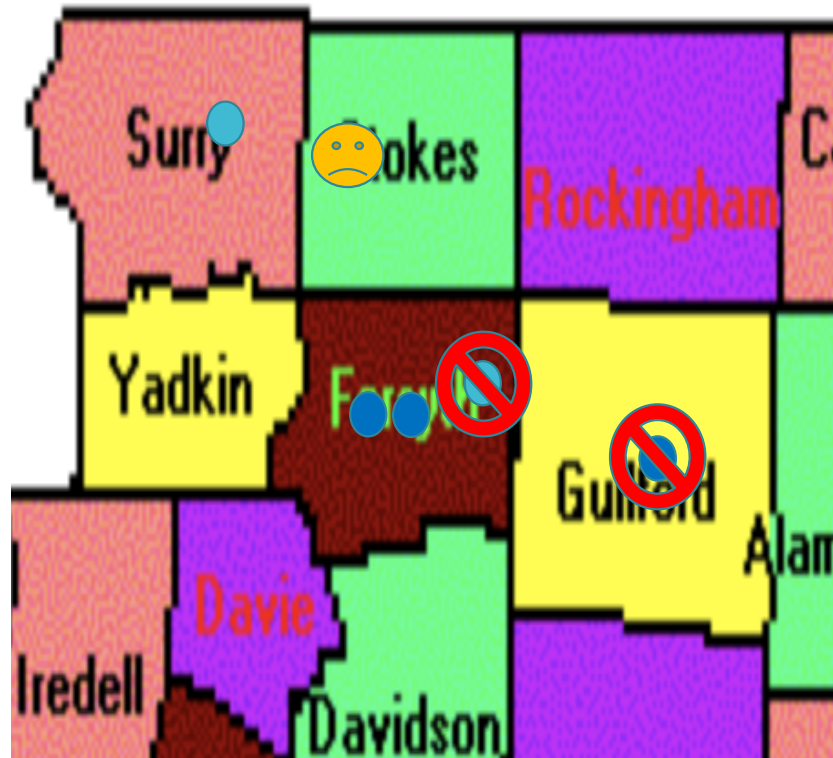
May transport to Destination B
If estimated transport time to Destination A is < minutes And
If total time from LKW and transport time will not exceed 4 hours by facility arrival

EMS Decision-making in Acute Stroke



- 72 y.o. AAM
- Awoke normal, 2 hours later with facial droop and slurred speech
- Blood glucose normal
- 12-Lead normal
- RACE Score 4
- LKW = 3.5 hours
- Where does EMS transport?
- Where did the region set RACE score for LVO?
- What estimated transport parameters were agreed upon?

EMS Decision-making in Acute Stroke



- Region set RACE LVO at 5
- Region set transport to CSC or TSC at < 60 minutes
 - Caveat if total transport will not exceed 4 hours by arrival

EMS Decision-making in Acute Stroke

- **General parameters**
- Rural Areas
 - Decisions between ASR/PSC and TSC/CSC
 - Estimated transport times < 60 minutes
 - Arrival at destination < 4 hours from LKW
- Suburban Areas
 - Decisions between ASR/PSC and TSC/CSC
 - Estimated transport times < 45 minutes
 - Arrival at destination < 4 hours from LKW
- Urban Areas
 - Decisions between ASR/PSC and TSC/CSC
 - Estimated transport times < 30 minutes
 - Arrival at destination < 4 hours from LKW

EMS Decision-making in Acute Stroke

