2023 Regional Stroke System Plan

Regional Advisory Council - N (RAC-N)

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RAC-N proudly supports and serves Brazos, Leon, Robertson, Madison, Burleson, Grimes, and Washington Counties covering approximately 5,109 square miles of Southeast Texas

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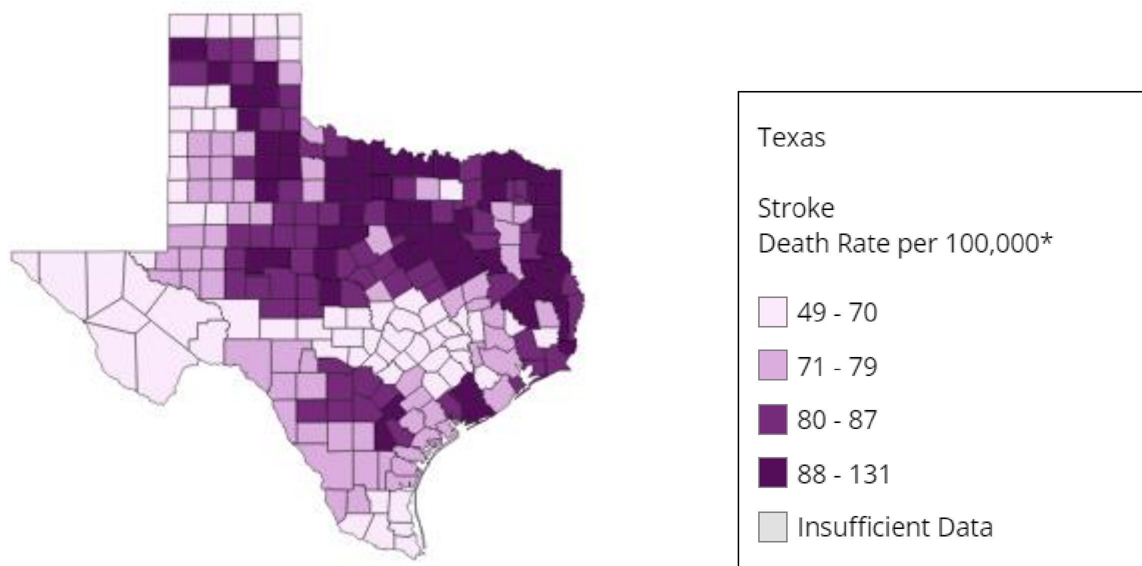
Introduction

Stroke is one of the leading conditions that causes people in the United States to live with functional disabilities. Functional disabilities pertain to the difficulty in performing daily activities that involve vision, hearing, and speech in one's work, job, business, or daily chores. (Benjamin, et al., 2018). Stroke is the 5th most common cause of death in the United States, killing nearly 130,000 people a year. It is expected that by 2030 3.4 million US adults will have had a stroke, (Benjamin, et al., 2018). In 2015, here in Texas stroke was the third leading cause of death (Kus, Bhakta, Bullis, Baudoin, & Auzenne, 2017).

- *In 2020, stroke was the fifth leading cause of death in the United States.*
- *In 2020, stroke accounted for ~1 of every 21 deaths in the United States.*
- *Someone in the United States has a stroke every 40 seconds. Every 3 minutes and 17 seconds, someone dies of stroke.*
- *Every year, more than 795,000 people in the United States have a stroke. About 610,000 of these are first or new strokes.*
- *About 185,000 strokes—nearly 1 of 4—are in people who have had a previous stroke.*
- *About 87% of all strokes are ischemic strokes in which blood flow to the brain is blocked.*
- *In 2018-2019, the direct and indirect cost of stroke in the United States was %56.5 billion. The estimated direct medical cost of stroke was $36.5 billion.*
- *Stroke is a leading cause of serious long-term disability.*
- *Stroke reduces mobility in more than half of stroke survivors age 65 and over.*

Stroke Death Rates



Sources: Heart Disease and Stroke Statistics – 2023 Update; Texas Department of State Health Services

Mission

It is the mission of the Brazos Valley Regional Advisory Council (BVRAC) Stroke System Plan is to facilitate the coordination of stroke providers to ensure the most consistent, efficient, effective and innovative stroke care for all individuals in the Brazos Valley Region who experience an acute stroke. This stroke system plan

will serve as a roadmap for the BVRAC to maintain efficiency, quality, and integrity in all of the services provided with the final destination being a stronger, safer, and healthier Brazos Valley.

Vision

The vision of the RAC-N is to provide comprehensive stroke care through strong partnerships, acute care via rapid response, and injury prevention by means of education and innovative programming. The BVRAC emphatically believes that a dedication to unity, special at-risk populations, and outreach education will continue to catapult not only the BVRAC, but most importantly the entire region into a higher level of service, and prevention.

Philosophy

The essence of an acute stroke care system is the ability to get the right patient to the right hospital at the right time to reduce death and disability. BVRAC members have made great strides toward this goal and continue to collaborate and strive to improve care of the acute stroke patients.

Regional Plan

This plan has been developed in accordance with generally accepted stroke guidelines and procedures for implementation of a comprehensive Emergency Medical Services (EMS) and Stroke System plan. This plan does not establish a legal standard of care, but rather is intended as an aid to decision-making in stroke patient care scenarios. It is not intended to supersede the physician's prerogative to order treatment.

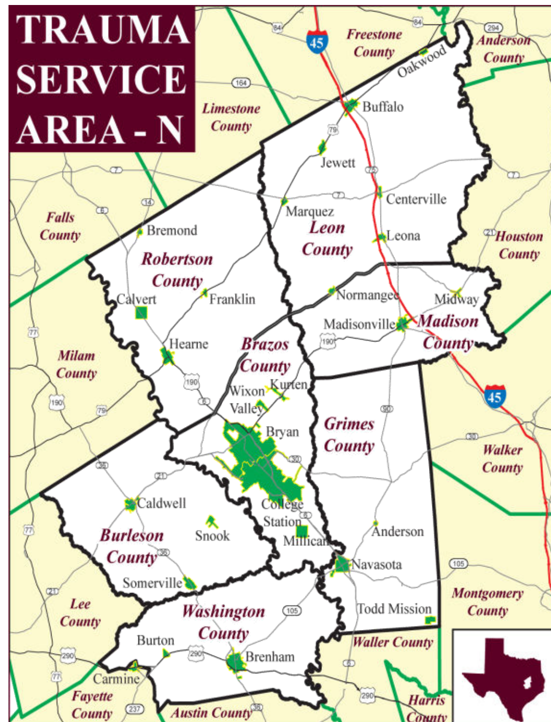
Stroke System of Care Goals

The purpose of the BVRAC Stroke Committee is to help facilitate the development, implementation and operation of a stroke system of care, based on evidence-based standards of care in order to reduce morbidity and mortality related to stroke. BVRAC will encourage participation from surrounding communities in providing stroke care, promoting improvement of facility services, and cooperate with all member entities, agencies and organizations in the establishment of an efficient and effective system of stroke care.

- Identify and integrate resources as a means to obtaining commitment and cooperation.
- Identify and leverage tactics to promote EMS provider participation.
- Establish system coordination relating to access, protocols/procedures and referrals. These structures will establish continuity and uniformity of care among the providers of stroke care.
- Promote internal communication as the mechanism for system coordination which will include the EMS providers, hospitals, and members of the RAC-N Committee.
- Create system efficiency for the patient and programs through continuous quality improvement identify patient needs, outcome data and assist in developing standardization.
- Institute an understanding of the guidelines for Stroke Center designation as dictated by the Texas Department of State Health Services (DSHS).

Regional Demographics

The state of Texas is divided into 22 Trauma Service Areas that account for the 254 counties. A Regional Advisory Council (RAC) for trauma serves each Trauma Service Area. The RACs are charged with developing a system plan, based on standard guidelines, for implementing a comprehensive trauma care system. The development of a regional plan is the ultimate responsibility of the stakeholders and participants of the RACs.. Some elements of the plan are required, while others may be added to best reflect the needs of the community. While the Plan may have numerous components, its heart is the dedication of the professionals who transform these guidelines into reality.



Stroke Service Area – N mirrors the geographical boundaries of the Brazos Valley Council of Governments (BVCOG) known as the Brazos Valley. The Brazos Valley comprises six rural counties (Burleson, Grimes, Leon, Madison, Robertson and Washington) and one urban county (Brazos) that make up the Brazos Valley. The Brazos Valley covers an area of 5109 square miles. Major Interstates and Highways transverse all seven counties of the Brazos Valley and provide a pass-through conduit to major cities including Houston, Dallas, San Antonio, and Austin.

Brazos County (population 242,014) is located in the central portion of the region and encompasses 585.45 square miles. People under 18 years of age make up about one-fifth (19.9%) of the population of Brazos County and people over 65 years of age make up less than one-tenth (10.3%) of the population. The per capita income is $30,186 with a 3.1 percent unemployment rate and 22.6 percent of the population in poverty.

Burleson County (population 18,657) is located in the western portion of the region and encompasses 659.03 square miles. People under 18 years of age make up almost one quarter (21.9%) of the population of Burleson County and people over 65 years of age makeup just over one-fifth (21.3%) of the population. The per capita income is $32,707 with a 3.6 percent unemployment rate and 14.4 percent of the population in poverty.

Grimes County (population 30,754) is located in the south-eastern portion of the region and encompasses 787.46 square miles. People under 18 years of age make up almost one quarter (22.5%) of the population of Grimes County and people over 65 years of age makeup just over one-sixth (19.0%) of the population. The per capita income is $27,693 with a 4.5 percent unemployment rate and 16.1 percent of the population in poverty.

Leon County (population 16,209) is located in the north-eastern portion of the region and encompasses 1,073 square miles. People under 18 years of age make up almost one quarter (22.6%) of the population of Leon County and people over 65 years of age make up just under one-fourth (24.6%) of the population. The per capita income is $30,998 with a 5.2 percent unemployment rate and 16.3 percent of the population in poverty. There are no hospital facilities in Leon County.

Madison County (population 13,661) is located in the central-eastern portion of the region and encompasses 466.07 square miles. People under 18 years of age makeup just over one-fifth (22.1%) of the population of Madison County and people over 65 years of age makeup 15.5 percent of the population. The per capita income is $21,776 with a 4.3 percent unemployment rate and 17.5 percent of the population in poverty.

Robertson County (population 17,153) is located in the north-western portion of the region and encompasses 855.68 square miles. People under 18 years of age make up about one quarter (23.9%) of the population of Robertson County and people over 65 years of age make up 20.9 percent of the population. The per capita income is $27,471 with a 3.8 percent unemployment rate and 16.9 percent of the population in poverty. There are no hospital facilities in Robertson County.

Located in the southernmost portion of the Region, Washington County (population 36,159) encompasses 603.95 square miles. People under 18 years of age makeup just over one-fifth (21.1%) of the population of Washington County and people over 65 years of age makeup just over one-fifth (23.5%) of the population. The per capita income is $36,680 with a 4.0 percent unemployment rate and 14.0 percent of the population in poverty.

County	Population (2010 Census)	Population (2020Census)	Population Estimate (2024)	% <5 Yrs old	% <18 Yrs old	% >65 Yrs old	Land Area / Square Miles	Persons Per Sq. Mi. (2024)
Brazos	194,851	233,849	242,014	5.4%	19.9%	10.3%	585.45	213.38
Burleson	17,187	17,642	18,657	5.6%	21.9%	21.3%	659.03	28.31
Grimes	26,604	29,268	30,754	5.9%	22.5%	19.0%	787.46	39.05
Leon	16,801	15,719	16,209	5.7%	22.6%	24.6%	1,073.15	15.10
Madison	13,664	13,455	13,661	6.3%	22.1%	15.5%	466.07	29.31
Robertson	16,622	16,757	17,153	6.2%	23.9%	20.9%	855.68	20.05
Washington	33,718	35,805	36,159	5.0%	21.1%	23.5%	603.95	59.87
Source: U.S. Census Bureau www.census.gov								

BVCOG is a multi-purpose voluntary organization of, by and for local governments. Originally designated as the federally recognized Brazos Valley Economic Development District in 1966, the council officially reorganized as the Brazos Valley Development Council in 1967 as the result of state legislation. The legislation created 24 statewide planning regions each comprised of a voluntary association of local governments. The regions' boundaries were based upon a number of characteristics including geographic features, economic market areas, labor markets, commuting patterns, and even media coverage areas.

Regional Health Data

Leading Causes of Death in the Brazos Valley Region (per 100,000 population)						
	Heart Disease	Cancer	Stroke	Alzheimer's Disease	Respiratory Disease	Accidents
Brazos	162.8	133.5	41.1	35.9	35.1	26.9
Burleson	292.3	159.7	30.6	34.2	51.5	54.8
Grimes	225.3	171.1	43.3	27.0	53.0	48.9
Leon	174.9	172.5	41.2	36.8	50.6	79.3
Madison	219.4	166.0	59.5	54.0	53.7	55.0
Robertson	235.7	186.7	34.4	24.0	52.5	48.7
Washington	138.7	148.3	30.0	21.9	28.8	49.4
Texas	170.8	148.8	41.9	37.0	40.7	37.9
United States	161.5	146.2	37.0	29.8	38.2	49.3
Source: Center for Community Health Development (2022). 2022 Brazos Valley Regional Health Assessment Report. College Station, TX: Texas A&M School of Public Health						

Public Awareness

Pre-hospital and hospital members should participate in regional stroke awareness campaigns and other public education activities regarding stroke prevention and treatment. All RAC-N members should actively initiate and promote stroke prevention activities.

Requirements for Texas Stroke Center Designations

The Department of State Health Services (DSHS) Stroke Committee recognizes stroke centers/facilities as follows:

Level I: Comprehensive Stroke Center

Level II: Thrombectomy Capable Stroke Center

Level ~~2~~ III: Primary Stroke Center

Level ~~3~~ IV: Support Stroke Facility

DSHS maintains a list on its website of hospitals or centers meeting state approved criteria and their Stroke Center/Facility designation. RAC-N will recognize stroke centers designated by DSHS.

Hospital Stroke Performance Measures

Appropriate stroke care measure:

1. Hospital Arrival Method

2. Advance Notification by EMS

3. National Institutes of Health Stroke Scale (NIHSS) Reported

4. Time to Initial Brain Imaging

5. Time to Intravenous Thrombolytic Therapy – 45 Minutes

6. Time to Intravenous Thrombolytic Therapy – 60 Minutes

7. IV tPA Arrive by 2 Hours, Treat by 3 Hours

8. IV tPA Arrive by 3.5 Hours, Treat by 4.5 Hours

9. Door to Groin for Thrombectomy

10. Door to Thrombectomy

9. Drip-and-Ship

10. Early Antithrombotic

11. Thrombolytic Therapies

12. Thrombolytic Complications

13. Intensive Statin Therapy

14. Antithrombotic Prescribed at Discharge

15. Antihypertensive Prescribed at Discharge

16. Rehabilitation Considered

17. Stroke Education

18. Modified Rankin Scale at Discharge

19. Discharge Disposition

Pre-hospital Triage and Treatment

Goal – Patients will be identified, rapidly and accurately assessed, and based on the severity of their stroke, transported to the nearest appropriate stroke facility in accordance with RAC-N algorithms.

Purpose – Appropriate identification of the stroke patient will ensure that the patient be delivered to the appropriate facility. Notification of the facility will allow proper preparation to reduce time to treatment for the patient. Use of an approved stroke assessment will assist the prehospital provider in determining the patient's need and facility destination decision. Each EMS Medical Director will determine what assessment criteria will be utilized and each staff member will be trained on appropriate use and transport location based on findings.

SEE APPENDIX A – Stroke – Suspected Stroke Guidelines

SEE APPENDIX B – Brazos Valley Stroke Centers

SEE APPENDIX C – Stroke Protocol with Integrated Endovascular Workflow

System Triage –

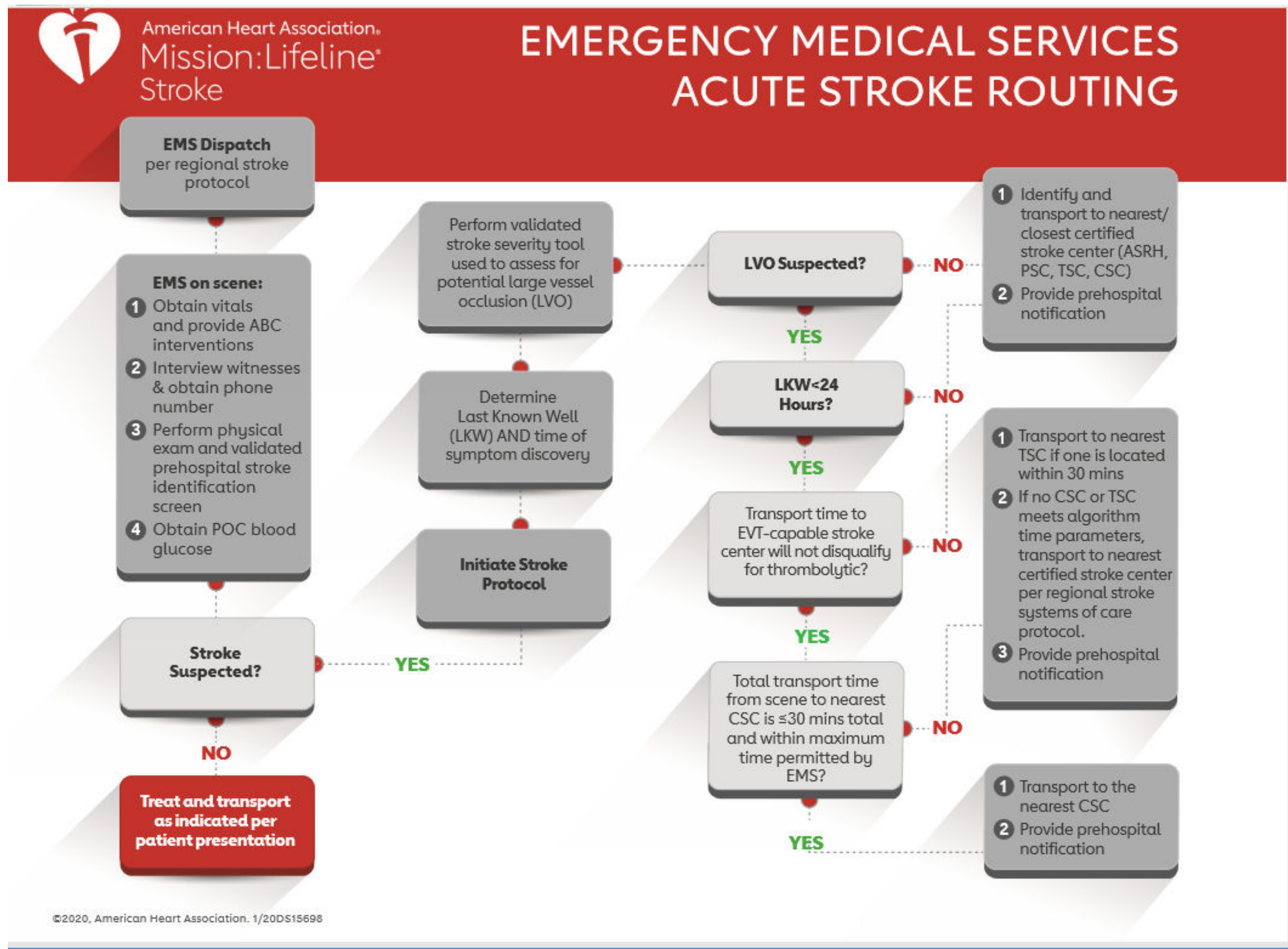
- Unless immediate stabilization (ABC's, cardiac arrest, etc.) is required, patients with a last known well of 3.5 hours or less and negative VAN score will be taken to the closest Certified Stroke Center for treatment and evaluation for thrombolytic treatment. If ground transport is greater than 30 minutes, consider calling for helicopter transport to meet at the closest agreed upon landing zone.
- Patients with last known well of less than 3.5 hours are considered a 'Stroke Alert.' The term 'Stroke Alert' should be used by EMS Providers when calling for Helicopter activation or a notifying a Stroke Center of EMS arrival.
- Patients with a positive VAN scale, regardless of time of onset, should be taken to the closest appropriate Stroke Center for treatment.
- Patients with a last known well of greater than 4 and up to 24 hours and a negative VAN scale should be taken to the closest Primary Stroke Center for treatment.
- Patients with a last known well of greater than 24 hours should be taken to the closes Primary Stroke Center for care.

This is a Regional Guideline. Final authority for patient destination is based on individual agency EMS medical direction which should include consideration of hospital capability and quality. Always follow your agency protocol for patient treatment.

Helicopter Activation

Goal - Regional air transport resources may be used to reduce delays in providing appropriate stroke care.

AHA EMS Acute Stroke Routing



Hospital to Hospital Transfers

Goal –

To ensure stroke patients requiring additional or specialized care and treatment beyond a facility's capability are identified and transferred to an appropriate Stroke Center as soon as possible.

Objectives –

a. To ensure that all regional hospitals make transfer decisions based on standard definitions which classify stroke patients according to the BVRAC facility triage criteria.
b. To identify stroke treatment and specialty facilities within the BVRAC.
c. To establish treatment and stabilization criteria and time guidelines for inter-facility transfer of the stroke patient.

Transfer Discussion –

a. The level of healthcare resources required for acute stroke care is outlined in the pre-hospital triage criteria. When a stroke patient is identified, the transferring facility should call a designated Level III (Primary), Level II (Thrombectomy Capable), or Level I (Comprehensive) stroke facility and advise they have a "Stroke Alert".
b. The Level I, II, or III stroke facility should consult with the provider at the transferring facility to ensure that the patient is stable and determine the best transport decision for the patient (air transport vs. ground transport)
c. The Level I, II or III stroke facility should determine their ability to accept the patient in transfer as soon as possible.

References

1. Centers for Disease Control and Prevention. Underlying Cause of Death, 2018-2021. CDC WONDER Online Database. Atlanta, GA: Centers for Disease Control and Prevention; 2018. Accessed August 27, 2023.
2. Powers, JP, Rabinstein, AA, Ackerson, T, Adeoye, Bambakidis, NC, et al. Guidelines for the Early Management of Patients with Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke
3. American Heart Association Mission: Lifeline Stroke. Emergency Medical Services Acute Stroke Routing, 2020
4. Tsao, CW, Aday, AW, Almarzooq, ZI, Anderson, CAM, Aroroa, P, Avery, CL. Heart Disease and Stroke Statistics – 2023 Update
5. *Stroke Facts*. (2018, October 26). Retrieved from Centers for Disease Control and Prevention: https://www.cdc.gov/stroke/facts.htm
6. Center for Community Health Development (2019). 2019 Brazos Valley Regional Health Assessment Report. College Station, TX: Texas A&M School of Public Health
7. United States Census Bureau.
8. Texas Department of State Health Services

Appendices

Appendix A – Suspected Stroke Guidelines

Appendix B – Brazos Valley Stroke Centers

Appendix C – Stroke Protocol with Integrated Endovascular Workflow

DRAFT August 2023

BVRAC-N Regional Stroke Plan

Appendix A – Suspected Stroke Guidelines

Assessment Guidelines

Time of Onset: ______

Obtain family contact information

Cincinnati Stroke Scale
- Facial Droop
- Arm Drift
- Abnormal Speech
- Complete Vital Signs

VAN (If Cincinnati Positive)
- Limb Weakness plus one of the following:
  - Visual Disturbance
  - Aphasia
  - Neglect

Blood Glucose
12-Lead ECG
Thrombolytic Checklist

Minimum Treatment Guidelines:

- Activate a Stroke Alert
- Oxygen 2-4 L/min if required to correct SpO2 Sat <92%; avoid hyperoxia
- IV NS TKO (as per skill level)
- 2nd Large Bore IV Line if Time Permits
- Consider antihypertensive agent for blood pressure above 220/110

Transport

- Rapid transport to appropriate facility as indicated.
- Divert to the closest hospital for airway or patient instability.
- Consider Air Medical transport for patient deterioration and decrease in transport time.

Treatment Times & Options for Qualifying Patients

IV tPA thrombolytics (up to 4.5 hours from last known well) - ~~tPA is~~ thrombolytics are administered through a~~n~~ peripheral IV ~~line~~ in an attempt to dissolve blood clots.

- Available at All ~~Level 2~~ Stroke Centers & Stroke Ready Hospitals in the Brazos Valley.

~~IA tPA thrombolytics (up to 6 hours from last known well) For Emergent positive Large Vessel Occlusion (LVO). A catheter is threaded through an artery in the groin up to the brain. Once the catheter is in place, t-PA is released directly into the area to dissolve the clot.~~

- ~~Available at CHI St. Joseph Health Regional (Dr. White)~~

Mechanical Thrombectomy (up to 24 hours from last known well or ~~a~~ wake up stroke) For LVO - A catheter is ~~threaded through an artery in the groin~~ inserted into the femoral artery and advanced into the cerebral arteries ~~up to the brain~~. Once the catheter is in place, a ~~tiny~~ mechanical thrombectomy device is used to break up or remove the clot.

- Available at CHI St. Joseph Health Regional (Dr. White)

If last known well is greater than 4.5 hours ~~but less than 24 hours~~ and the patient is VAN negative:
- Transport non-emergently to closest Primary Stroke Center

This is a Regional Guideline. Final authority for patient destination is based on individual agency EMS medical direction which should include consideration of hospital capability and quality. Always follow your agency protocol for patient treatment.

BVRAC-N Regional Stroke Plan

Appendix B – Brazos Valley Stroke Centers

Level I - Comprehensive Stroke Center

- No Certified Comprehensive Stroke Centers in the Brazos Valley

Level II - Thrombectomy Capable Stroke Center

- No Certified Thrombectomy Capable Stroke Centers in the Brazos Valley

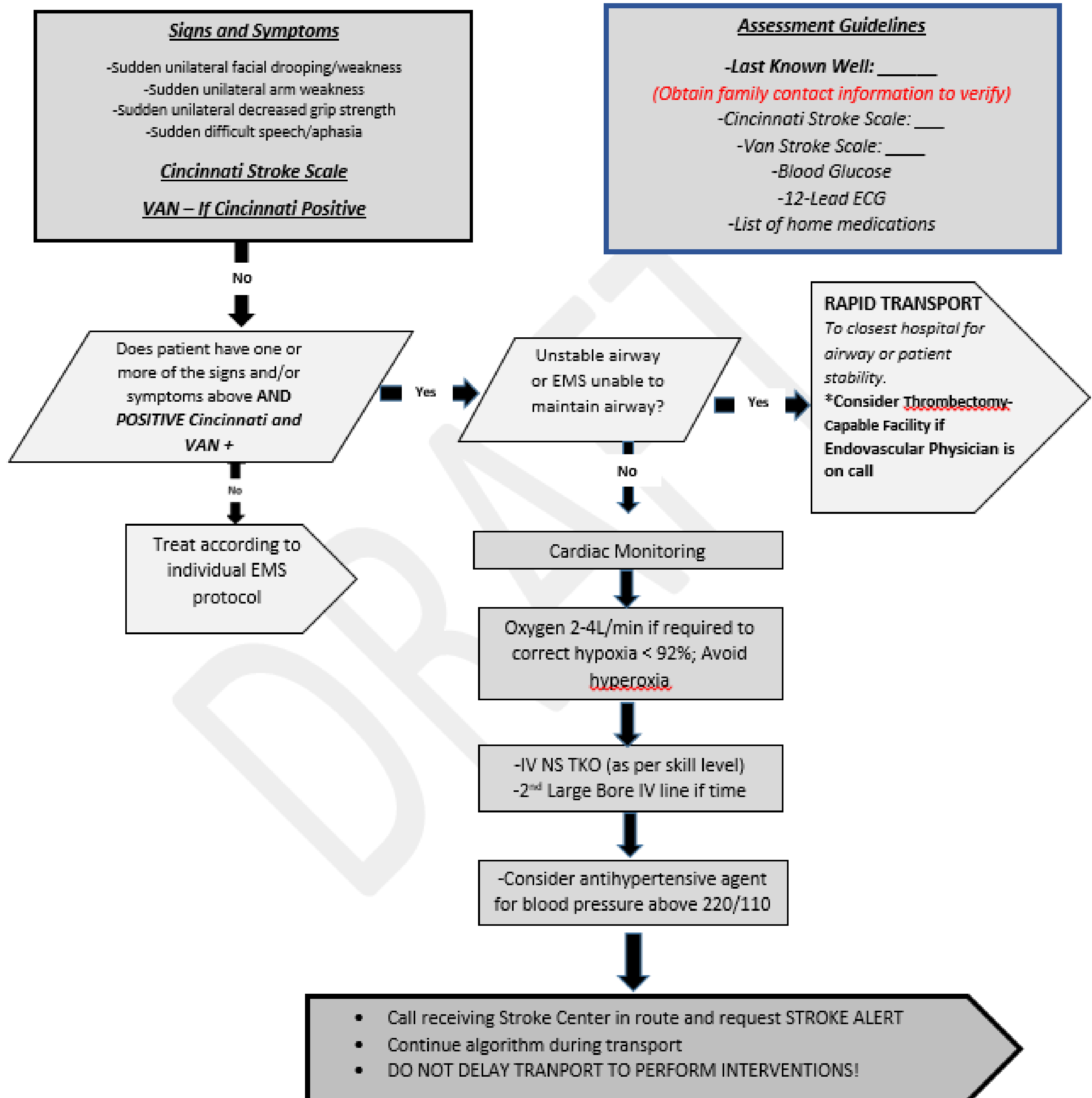
Level III - Primary Stroke Center*

- Baylor Scott & White Medical Center - College Station, TX
- St. Joseph Health Regional Hospital – Bryan, TX
  With Intervention Capabilities – Capable of treating beyond the 4.5 hour window.
- St. Joseph College Station Hospital - College Station, TX

Level IV – Acute Stroke Ready Stroke Center*

- Baylor Scott & White Medical Center Brenham – Brenham, Texas
- CHI St. Joseph Health Burleson – Caldwell, Texas
- CHI St. Joseph Health Grimes – Navasota, Texas
- CHI St. Joseph Health, Madison – Madisonville, Texas

*August 2023: Facilities listed based on previous State designations. Facilities will receive new LEVEL designation at their next on-site survey.



This is only a Guideline. Patient destination is based on individual EMS agency medical direction. Please always follow your agency protocol for treatment and consider your proximity to the closest Designated Stroke Center.

Dev. March 2022/BVRAC-N