

PREHOSPITAL PEDIATRIC STROKE TRIAGE AND MANAGEMENT

1. Goals:

To increase EMS awareness and identification of strokes in the pediatric population (infants and children less than 18 years of age) and to facilitate rapid triage and transport to the nearest appropriate facility.

2. Purpose:

Pediatric Stroke is a rare disease that is nevertheless among the top ten causes of death in children.¹ However, rapid recognition and appropriate treatment of pediatric stroke can profoundly improve outcomes for these children, sparing them from decades of disability.^{2,3} Thrombectomy has been shown to improve outcomes in pediatric patients with large-artery occlusion stroke, and current American Heart Association guidelines now support consideration of mechanical thrombectomy and IV thrombolysis in appropriately selected pediatric patients.^{4,5} This guidance document is designed to help EMS providers quickly recognize and triage pediatric stroke patients, thereby improving outcomes throughout the state.

The **GETAC Prehospital Pediatric Stroke Triage Algorithm** was developed in consultation with EMS, EMS leaders, and local, regional, and state medical authorities. The GETAC pediatric stroke algorithm was developed in consultation with the GETAC Stroke, EMS, Pediatric, EMS Medical Directors Committees and the Council. Available guideline statements⁵ and guidance from the GETAC Pediatric Stroke Task Force (a consensus of expert opinion based on clinical experience among Vascular Neurologists, Neuroendovascular Surgeons, Hematologists, and Pediatricians) were integral to the development of this resource document and algorithm.⁵⁻¹³ The recommendations were developed to ensure that all pediatric patients with a known or suspected stroke are rapidly identified, assessed, and triaged as outlined below. Standardizing care to enable rapid diagnosis and timely appropriate treatment will improve patient outcomes.⁹⁻¹² The prehospital pediatric stroke triage and transport recommendations serve to direct the regional triage of pediatric patients with acute stroke to the most appropriate facility. See **Annex A: GETAC Pediatric Prehospital Stroke Triage Algorithm**. There are currently no formal national or statewide guidelines, certification programs, or designation systems for pediatric stroke centers. As such, EMS Medical Directors should identify and designate appropriate receiving facilities for pediatric patients with suspected or confirmed stroke based on local resources and capabilities. These recommendations can serve as a resource to support that process and guide regional decision-making.

A pediatric stroke destination should have personnel available to care for pediatric stroke patients, including access to a pediatric intensive care unit. These centers should maintain a multidisciplinary team capable of managing pediatric stroke and its complications,

administering antiplatelet and anticoagulant therapies, providing thrombolytic treatment, and performing endovascular thrombectomy when indicated. In addition, pediatric stroke destinations should have the necessary technical capabilities, including advanced imaging with MRI when available, as well as established policies and procedures to ensure timely, coordinated, and high-quality care for pediatric stroke patients.⁹⁻¹² Pediatric hospitals lacking these capabilities should establish protocols to rapidly identify, stabilize, consult, and transfer pediatric stroke patients to centers with appropriate treatment and rehabilitative resources.⁹⁻¹²

In regions where a Mobile Stroke Unit is available and operational, and when age-appropriate and in accordance with local protocols, EMS should consider dispatching an MSU for suspected pediatric stroke patients. MSUs may facilitate rapid on-scene imaging, specialist consultation, and early treatment, potentially reducing time to diagnosis and intervention. Use of MSU should be guided by regional protocols and resource availability.

3. Prehospital Triage of Stroke in Pediatric Patients

Pediatric stroke may present with age-dependent and often nonspecific symptoms, including focal neurologic deficits, seizures, altered mental status, or unexplained headache or irritability, requiring a high index of suspicion for timely recognition.^{9,14-16}

Sudden onset of any of the following suggests the possibility of acute stroke:

- Numbness or weakness of the face, arm, and/or leg (especially on one side of the body)
 - Confusion
 - Trouble speaking or understanding language.
 - Visual disturbances, including double vision or loss of vision in one or both eyes.
 - Altered mental status
 - Trouble walking
 - Dizziness
 - Loss of balance or coordination
 - Severe headache with no known cause, particularly when associated with altered mental status, which may suggest hemorrhagic stroke.
- ❖ Patients presenting with any of the above neurologic signs, especially in the presence of relevant risk factors or underlying conditions, should be triaged and managed as a suspected acute stroke.

Patients with any of the following are at higher risk for acute stroke:

- Heart disease
- History of blood vessel problems in the brain
- History of stroke
- Sickle cell disease
- Cancer

- History of blood clots

Common pediatric stroke mimics:

- Alcoholic intoxication
- Cerebral infections
- Drug overdose
- Hypoglycemia
- Hyperglycemia
- Genetic/metabolic disorders
- Atypical migraines
- Neuropathies (e.g., Bell's palsy)
- Seizure
- Post-ictal state
- Tumors

Basic Level

In suspected pediatric stroke cases, assess and treat ABCDEs per universal pediatric recommendations:

- **A (Airway):** Airway support and ventilation assistance are recommended for patients with acute stroke who have decreased consciousness or who have a compromised airway. Suctioning and oropharyngeal or nasopharyngeal airway as needed to ensure airway patency.
- **B (Breathing): Provide** supplemental oxygen as needed to maintain oxygen saturation > 94% with continuous monitoring. Consider using end-tidal CO₂ monitoring when available.
 - **NOTE:** Some patients with congenital heart disease may have lower baseline oxygen saturation targets (e.g., 80–90%). If the patient's baseline is unclear, confirm typical saturation levels with parents or caregivers when possible.
- **C (Circulation):** Evaluate and treat signs/symptoms of shock according to the Shock Clinical Practice Guidelines
- **D (Disability):** Assess and document GCS, pupillary size, and reactivity.
- **E (Exposure/Environmental):** Assess for evidence of traumatic injury, especially head injury.

Stabilization and Initial Management:

- If there is evidence of shock, treat according to the shock clinical practice guidelines.
- If hypoglycemia is present (POC glucose < 70 mg/dL),¹⁷ treat according to the clinical practice guidelines for diabetic emergencies.
- If seizures occur, treat according to the seizure clinical practice guidelines.
- Position the patient supine with the head of the bed (HOB) elevated to 30 degrees.
- Continuous cardiac monitoring during transport is recommended.

Cardiovascular Examination:

- Record blood pressure, rate, rhythm, respiratory rate, and oxygen saturation.
- Obtain a 12-lead ECG when feasible, provided it does not delay transport.

Neurological Assessment for Pediatric Stroke:

- Weakness of the face, arm, and/or leg, particularly on one side of the body.
- Numbness affecting one side of the face or body.
- Confusion
- Trouble speaking or understanding language.
- Visual disturbances, including double vision or loss of vision in one or both eyes.
- Altered mental status
- Trouble walking
- Dizziness
- Loss of balance or coordination
- Severe headache with no known cause, particularly when associated with altered mental status, which may suggest hemorrhagic stroke.
- Seizure with a persistent postictal focal deficit (e.g., weakness) that does not resolve within approximately 15 minutes.

History:

Interview the patient, family members, and other witnesses to determine symptoms, the time of symptom discovery, and the last known well (LKW), defined as the last time the patient was without symptoms. Obtain a focused history, including seizure at onset, head trauma, recent surgeries, history of bleeding disorders or coagulopathy, and signs suggestive of brain hemorrhage, such as sudden severe headache, nausea/vomiting with headache, or loss of consciousness. Document contact information, including a mobile phone number for the next of kin and witnesses.

- ❖ **NOTE:** For “wake-up strokes,” the last known well time is the last time the patient was witnessed to be at baseline, which may have been the night before. The time they are found is the time of symptom discovery.

Additional History:

- Obtain relevant past medical history, including prior and recent surgeries.
- Document allergies (e.g., iodinated contrast)
- Obtain history of pre-existing significant disability (e.g., inability to walk independently).
- Obtain device and implant history (e.g., left ventricular assist device, pacemaker, prosthetic valve, ventriculoperitoneal shunt).

Medications:

- Obtain a complete list of medications, including antiplatelet agents (e.g., aspirin, clopidogrel/Plavix) and blood thinners such as direct thrombin inhibitors (e.g., dabigatran/Pradaxa), factor Xa inhibitors (fondaparinux/Arixtra, rivaroxaban/Xarelto, apixaban/Eliquis, edoxaban/Savaysa), low molecular weight heparin (enoxaparin/ Lovenox), unfractionated heparin, bivalirudin, argatroban, warfarin (Coumadin).
- When possible, document the timing of the last dose of these medications.

Management:

EMS personnel should address ABCDEs in accordance with universal pediatric guidelines. Additional initial management steps include:

- Prevent aspiration by positioning the patient with HOB at 30 degrees. Ensure airway patency with suctioning and an oropharyngeal or nasopharyngeal airway as needed.
 - Advanced airway management should be performed per pediatric guidelines.
- Provide supplemental oxygen as needed to maintain oxygen saturation > 94%.
 - Adjust targets in patients with known congenital heart disease who may have different baseline oxygen saturation goals.
- Treat hypotension according to regional pediatric protocols.
- Maintain blood pressure within appropriate age-based parameters, avoiding levels greater than 20% above the 95th percentile for age.^{5,12} Contact online medical control if systolic blood pressure remains persistently above this range. The table below provides an example of the upper limit of systolic blood pressure by age.

Age	Goal Systolic Blood Pressure
1-4 years	<130mmHg
5-10 years	<145mmHg
11-17 years	<160mmHg

- Hypoglycemia (blood glucose < 70 mg/dL) should be promptly treated in patients suspected of having acute ischemic stroke.¹⁷ Evidence in adults demonstrates that persistent hyperglycemia during the first 24 hours after stroke is associated with worse outcomes and an increased risk of hemorrhagic transformation. Accordingly, a target blood glucose range of 140-180 mg/dL is recommended.⁵
- To facilitate an expedited stroke workup upon ED arrival, place two peripheral IVs when feasible, provided this does not delay transport.

System Triage:

- The goal on-scene time is 10-15 minutes or less. If the family is not transported with the patient, encourage them to proceed directly to the ED.
- **Refer to Annex A: GETAC Pediatric Prehospital Stroke Triage Algorithm** for guidance on pediatric prehospital stroke triage.

Destination Decision-Making for Suspected Pediatric Stroke in Rural, Urban, and Suburban Areas

Age Criteria and Appropriateness for ADULT Stroke Facilities: Adult stroke centers may vary in their capabilities and willingness to evaluate and treat patients under 18 years of age. EMS Medical Directors, in collaboration with stroke facility leadership, should define age-appropriate destination protocols based on regional resources, institutional capabilities, and hospital policies.

Triage Recommendation:

1. Pediatric patient with suspected stroke who is medically stable and last known well **≤ 24 hours**; triage based on the following criteria:

Age appropriateness for adult stroke facility:

- For pediatric patients with suspected stroke who are below the age threshold for evaluation at adult stroke centers, **age < appropriate:**
 - Transport suspected stroke patient to the nearest **Pediatric Stroke Destination***
 - **Pediatric Stroke Destination** – EMS Medical Director will identify and recommend local pediatric stroke destinations. These are typically pediatric hospitals capable of caring for pediatric patients with stroke. Please note that there are currently **NO** formal national or statewide guidelines, certifications, accreditations, or recognition systems for Pediatric Stroke Destinations or pediatric stroke center certification.
 - If a Pediatric Stroke Destination is not accessible within **≤ 60 minutes** total transport time by air or ground, or if the patient is unstable, transport to the nearest appropriate pediatric facility.
- For pediatric patients with suspected stroke, **age ≥ appropriate:**
 - Perform a validated stroke severity screening tool to assess for potential large vessel occlusion (LVO), such as the RACE score.^{5,18}
 - **If LVO Screening is Positive:**
 - Transport the patient to the nearest adult Comprehensive Stroke Center (CSC/ Level 1) if it is within **≤ 30 minutes** from the nearest Pediatric Stroke Destination and within a total transport time of **≤ 60 minutes** by air or ground.
 - If a CSC is not available within 30 minutes, transport to the nearest Thrombectomy Capable Stroke Center (TSC/ Level 2) if it is within **≤ 30 minutes** from the nearest Pediatric Stroke Destination and within a total transport time of **≤ 60 minutes** by air or ground.
 - If neither a CSC nor TSC is available within **≤ 30 minutes**, transport to the nearest Pediatric Stroke Destination.

- If no Pediatric Stroke Destination is available within ≤ 60 minutes, or the patient is unstable, transport to the nearest appropriate pediatric facility.
 - **If LVO Screening Tool Negative:**
 - Transport suspected stroke patients to the nearest Pediatric Stroke Destination.
 - If a Pediatric Stroke Destination is not accessible within a total transport time of ≤ 60 minutes by air or ground, or the patient is unstable, transport to the nearest pediatric facility or the most appropriate facility.
- 2. Pediatric patient with suspected stroke who is medically stable and last known well **> 24 hours**; triage based on the following criteria:
 - For pediatric patients with suspected stroke, **for all ages:**
 - Transport the patient to the nearest Pediatric Stroke Destination.
 - If a Pediatric Stroke Destination is not accessible within a total transport time of ≤ 60 minutes, or the patient is unstable, transport to the nearest appropriate pediatric facility.
 - ❖ **For all ages:** consider air medical transport if total transport time is anticipated to exceed 60 minutes.
 - ❖ **Stroke Prenotification:** Notify the receiving facility as early as possible that a suspected pediatric stroke patient is en route prior to arrival. Early prenotification allows for activation of appropriate resources prior to patient arrival.
 - Prenotification should include patient age, last known well, time of symptom discovery, current vital signs, stroke screening tool score (if performed), and key symptoms (e.g., weakness on one side, altered mental status, etc.).
 - ❖ **Hand-off Goal:** Target a streamlined EMS-to-ED handoff time of ≤ 120 seconds to facilitate rapid triage and continuation of care.

(Note – This document represents a revision of the 2025 GETAC Pediatric Stroke Triage Recommendations, updated to align with the latest guideline statements and adapted from the North Central Texas Trauma Regional Advisory Council (NCTTRAC) Regional Stroke Plan.)

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