2023 Stroke Critical Care System Plan Update

Sierra-Sacramento Valley EMS Agency

Updated: Janaury 2024

S-SV EMS Agency Background

The Sierra-Sacramento Valley Emergency Medical Services (S-SV EMS) Agency was founded in 1975 and is a regional multi-county Joint Powers Agency that serves as the local EMS Agency for the counties of Placer, Nevada, Sutter, Glenn, Yuba, Colusa, Butte, Shasta, Siskiyou, and Tehama. S-SV EMS has been delegated planning, development and implementation authority for all EMS components including regional STEMI system planning. The S-SV EMS region covers approximately 21,000 square miles and has an approximate population of 1.3 million residents.

The service area is diverse, and includes both remote rural areas, and large population centers. Within the S-SV EMS region, EMS services are provided by both public and private providers. Hospitals providing stroke services within the S-SV EMS region are well distributed into both rural and urban areas, and well serve the needs of stroke patients. The S-SV EMS region is currently served by the following EMS system resources:

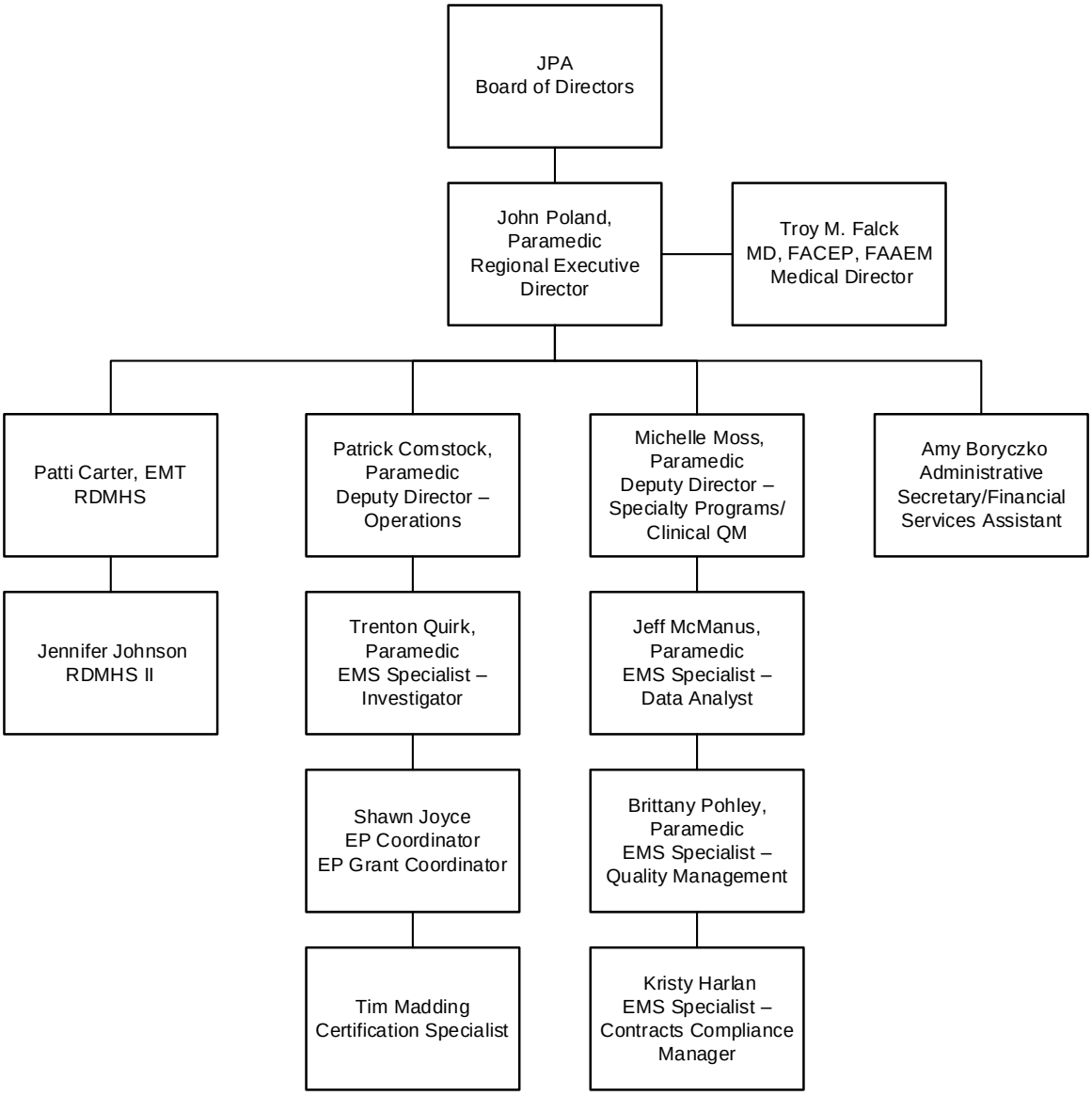
- 96 BLS first responder agencies
- 9 ALS first responder agencies
- 30 BLS/ALS ground ambulance providers
- 8 EMS aircraft providers (6 air ambulance and 2 ALS rescue aircraft providers)
- 17 acute care hospitals, 12 of which are S-SV EMS designated Stroke Receiving Centers

The S-SV EMS Stroke System is continually reviewed/evaluated for quality performance through the following S-SV EMS committees:

- S-SV EMS Regional Stroke Quality Improvement Committee
- S-SV EMS Regional EMS Aircraft Committee
- S-SV EMS Regional Emergency Medical Advisory Committee

S-SV EMS Agency Personnel and Organizational Chart

Michelle Moss, Deputy Director – Specialty Programs/Clinical Quality Management, is primarily responsible for managing/monitoring the S-SV EMS Stroke System. Troy Falck, MD, Medical Director, and John Poland, Regional Executive Director, assist in providing clinical and administrative oversight of the S-SV EMS Stroke System and Jeff McManus, EMS Specialist - Data Analyst and other S-SV EMS staff assist with various S-SV EMS Stroke System related duties as necessary/appropriate.



S-SV EMS Stroke System Changes

In 2022 there were no significant changes to the S-SV EMS stroke system.

Number and Designation of Designated Stroke Receiving Centers

As of January 2023, there are 12 designated Stroke Receiving Centers within the S-SV EMS region (10 – Primary Stroke Receiving Centers and 2 – Thrombectomy Capable Stroke Receiving Centers). The following facilities are currently designated as Stroke Receiving Centers by the S-SV EMS Agency:

Facility Name	County	Designation Type	Agreement Exp.
Enloe Medical Center	Butte	Primary Stroke Center	10/31/2026
Oroville Hospital	Butte	Primary Stroke Center	10/31/2026
Sierra Nevada Memorial Hospital	Nevada	Primary Stroke Center	10/31/2026
Kaiser Roseville Medical Center	Placer	Primary Stroke Center	10/31/2026
Sutter Auburn Faith Hospital	Placer	Primary Stroke Center	10/31/2026
Sutter Roseville Medical Center	Placer	Thrombectomy Center	10/31/2026
Mercy Medical Center Redding	Shasta	Thrombectomy Center	10/31/2026
Shasta Regional Medical Center	Shasta	Primary Stroke Center	10/31/2026
Fairchild Medical Center	Siskiyou	Primary Stroke Center	10/31/2026
Mercy Medical Center Mt. Shasta	Siskiyou	Primary Stroke Center	10/31/2026
St. Elizabeth Community Hospital	Tehama	Primary Stroke Center	10/31/2026
Adventist Health +Rideout	Yuba	Primary Stroke Center	10/31/2026

S-SV EMS Stroke System Data Collection

Pursuant to California Health & Safety Code (Division 2.5, § 1797.227) as well as current S-SV EMS policies and provider agreements, all ALS/LALS non-transport and BLS/LALS/ALS transport prehospital personnel are required to complete CEMSIS and NEMSIS complaint electronic patient care records for all incidents where they arrive at scene of a request for EMS assistance. Further, this electronic patient care record data is required to be submitted to S-SV EMS on an ongoing basis. S-SV EMS currently utilizes an ImageTrend EMS database, established through a contractual agreement with the CALCEMSIS.

In June 2022, S-SV EMS executed a contractual agreement with the American Heart Association (AHA) to utilize their Get With The Guidelines (GWTG) stroke patient data registry tool. All S-SV EMS designated Stroke Receiving Centers are users within the system and S-SV EMS accesses the data as a super-user.

Stroke Critical Care System Neighboring Jurisdiction Integration

Due to the geographical size and location of the S-SV EMS region, EMS patients with a primary impression of Stroke/CVA/TIA are regularly transported to hospitals in neighboring jurisdictions, including Sacramento County (CA), Reno (NV), Medford (OR) and Klamath Falls (OR). S-SV EMS accepts stroke receiving center designation from surrounding LEMSAs and EMS organizations in the states of Nevada and Oregon for EMS identified stroke patient destination purposes. S-SV EMS receives electronic EMS patient care record data on all patients who originate in the S-SV EMS region. Other California LEMSAs are also required to submit hospital data to the California EMS data system to ensure that these patients are captured. S-SV EMS does not routinely receive hospital outcome patient data for patients transported to facilities in the states of Nevada and Oregon. However, even with this limitation we believe it is in the best interest of patient care to continue to transport these specialty patients to the nearest designated specialty receiving facilities in neighboring areas.

S-SV EMS Stroke System Quality Improvement

S-SV EMS staff continually monitor and review prehospital and hospital stroke patient data. Stroke patient data and case reviews are regularly discussed during S-SV EMS regional EMS and specialty care committee meetings, and S-SV EMS staff regularly participate in other regional and facility specific stroke committee meetings. S-SV EMS staff and staff from S-SV EMS designated Stroke Receiving Centers also provide regular education and QA/QI feedback to EMS system participants throughout the S-SV EMS region.

S-SV EMS STEMI System Public Education

All S-SV EMS designated stroke receiving centers are required to provide stroke public education, which is reported to S-SV EMS on an annual basis. In addition, multiple EMS prehospital provider agencies provided stroke public education in various settings on an ongoing basis (health fares and other similar events), which is reported by to S-SV EMS as part of their annual EMSQIP reports/updates.

S-SV EMS STEMI System Policies/Protocols

The following S-SV EMS policies/protocols are currently utilized to direct the prehospital care and management of stroke patients in the S-SV EMS Region:

- Suspected Stroke (N-3)
- Stroke Receiving Center Designation Criteria, Requirements & Responsibilities (507)
- Rapid Re-Triage & Interfacility Transport of STEMI, Stroke & Trauma Patients (510)

Copies of these current policies/protocols are included on the following pages.

Sierra – Sacramento Valley EMS Agency Treatment Protocol	N-3
Suspected Stroke	
Approval: Troy M. Falck, MD – Medical Director	Effective: 12/01/2021
Approval: Victoria Pinette – Executive Director	Next Review: 09/2024

Cincinnati Prehospital Stroke Scale (CPSS)

Component	Normal Result	Abnormal Result
Facial Droop (Ask pt to show teeth or smile)	Both sides of face move equally	One side of face does not move as well as the other side
Arm Drift (Ask pt to close eyes & hold both arms out with palms up)	Both arms move the same, or both arms do not move	One arm does not move, or one arm drifts down compared with the other
Speech (Ask pt to say "you can't teach an old dog new tricks")	Pt uses correct words with no slurring	Pt slurs words, uses the wrong words, or is unable to speak

BLS

- Assess V/S, including SpO_2
- O_2 at appropriate rate if hypoxemic (SpO_2 <94%) or short of breath
- Perform CPSS assessment

Suspect stroke for either of the following:

- New onset symptoms with abnormal CPSS
- New onset altered state (GCS <14) with unidentifiable etiology

If stroke suspected:

- Determine time of onset of symptoms (pt last known normal)
  - When possible, obtain and relay to the receiving hospital the name/contact information of the individual who can verify the time of onset of symptoms (pt last known normal)
- Check blood glucose (if glucometer available)
- Transport as soon as possible (scene time should be ≤10 mins)

ALS

- Consider advanced airway if GCS ≤8 or need for airway protection
- Cardiac monitor, consider 12-lead EKG (do not delay transport to perform 12-lead EKG)
- Obtain blood draw if requested by stroke receiving center
- IV/IO NS TKO (may bolus up to 1000 mL)

Are both the following present?
- Onset of symptoms ≤24 hrs (including wake-up stroke*)
- ≤45 minute transport time to a stroke receiving center

NO →
- Transport to closest appropriate hospital
- Contact base/modified base hospital for destination consultation if necessary

YES →
- Transport to closest stroke receiving center
- Advise of "Stroke Alert" & time pt. last known normal
- Provide pt. identifying information if requested by stroke receiving center

***Wake-up stroke definition:** Pt awakens with stroke symptoms that were not present prior to falling asleep

Sierra – Sacramento Valley EMS Agency Program Policy			
Stroke Receiving Center Designation Criteria, Requirements & Responsibilities			
	Effective: 06/01/2023	Next Review: 05/2026	**507**
	Approval: Troy M. Falck, MD – Medical Director		SIGNATURE ON FILE
	Approval: John Poland – Executive Director		SIGNATURE ON FILE

PURPOSE:

To describe the S-SV EMS stroke critical care system and define stroke receiving center designation criteria, requirements, and responsibilities.

AUTHORITY:

A. HSC, Division 2.5, Chapter 2 § 1797.67 & 1797.88, Chapter 6 § 1798.102, 1798.150, 1798.170 and 1798.172.

B. CCR, Title 13, § 1105 (c).

C. CCR, Title 22, Division 9, Chapter 7.2.

DEFINITIONS:

A. **Acute Stroke Patient** – An EMS patient who meets assessment criteria for a suspected stroke in accordance with S-SV EMS Suspected Stroke Protocol (N-3).

B. **Comprehensive Stroke Center** – An acute care hospital with specific abilities to receive, diagnose and treat all stroke cases and provide the highest level of care for stroke patients.

C. **EMS Receiving Hospital** – An acute care hospital authorized by S-SV EMS to receive ambulance transported patients, which is not designated for stroke critical care services but is able to provide a minimum level of care for stroke patients in the emergency department.

D. **Primary Stroke Center** – An acute care hospital that treats acute stroke patients and identifies patients who may benefit from transfer to a higher level of care when clinically warranted.

E. **Stroke** – A condition of impaired blood flow to a patient's brain resulting in brain dysfunction, most commonly through vascular occlusion or hemorrhage.

F. **Stroke Critical Care System** – A subspecialty care component of the EMS system developed by a local EMS agency (LEMSA). This critical care system links prehospital and hospital care to deliver optimal treatment to the population of stroke patients.

G. **Stroke Receiving Center** – An acute care hospital which meets all requirements contained in California Code of Regulations (Title 22, Division 9, Chapter 7.2) for the applicable level of stroke receiving center designation, obtains/maintains Joint Commission Accreditation as a 'Primary Stroke Center', 'Thrombectomy Capable Stroke Center', or 'Comprehensive Stroke Center' (unless waived by S-SV EMS for valid reasons), and enters into a written agreement with S-SV EMS designating them as a stroke receiving center.

H. **Thrombectomy-Capable Stroke Center** – A primary stroke center with the ability to perform mechanical thrombectomy for the ischemic stroke patient when clinically warranted.

POLICY:

A. Criteria for assessment, identification, treatment, and transport of EMS suspected acute stroke patients shall be based on S-SV EMS Suspected Stroke Protocol (N-3).

B. No health care facility located in the S-SV EMS jurisdictional region shall advertise in any manner or otherwise hold itself out to be affiliated with a stroke critical care system or a stroke center unless they have been designated as such by S-SV EMS in accordance with this policy and California Code of Regulations, Title 22, Division 9, Chapter 7.2.

C. The following shall be met for a hospital to be designated as a stroke receiving center by S-SV EMS:

1. Be licensed by the California Department of Public Health Services as a general acute care hospital.

2. Have a special permit for basic or comprehensive emergency medical service pursuant to the provisions of California Code of Regulations Title 22, Division 5.

3. Be accredited by a Centers for Medicare and Medicaid Services approved deeming authority.

4. Meet all requirements contained in California Code of Regulations (Title 22, Division 9, Chapter 7.2) for the applicable level of stroke receiving center designation.

5. Be available for treatment of acute stroke patients twenty-four (24) hours per day, seven (7) days per week, three hundred and sixty-five (365) days per year.

6. Have a communication system for notification of an EMS suspected stroke patient.

7. Have established protocols for triage and diagnosis following notification of an EMS suspected acute stroke patient.

8. Agree to accept all EMS suspected acute stroke patients according to applicable S-SV EMS policies/protocols.

9. Agree to accept the transfer of all acute stroke patients whose clinical condition requires a higher level of care than can be provided at the sending facility, unless the stroke receiving center is on diversion or internal disaster.

10. Submit all required stroke patient data to the S-SV EMS selected stroke registry.

    - The hospital stroke patient care elements shall be consistent with the U.S. Centers for Disease Control and Prevention, Paul Coverdell National Acute Stroke Program Resource Guide, dated October 24, 2016: https://emsa.ca.gov/wp-content/uploads/sites/71/2019/02/USCDCP-Paul-Coverdell-Nation-Acute-Stroke-Prog-Resource-Guide-10-24-16.pdf

11. Actively participate in the S-SV EMS regional stroke critical care system quality improvement (QI) process which shall include, at a minimum:

    - Evaluation of program structure, process, and outcome.
    - Review of stroke-related deaths, major complications, and transfers.
    - A multidisciplinary Stroke Quality Improvement Committee, including both prehospital and hospital members.
    - Participation in the QI process by all designated stroke centers and prehospital providers involved in the stroke critical care system.
    - Evaluation of regional integration of stroke patient movement.
    - Participation in the stroke data management system.
    - Compliance with the California Evidence Code, Section 1157.7 to ensure confidentiality, and a disclosure-protected review of selected stroke cases.

12. Provide CE opportunities, minimum of four (4) hours per year, for EMS personnel in areas of assessment and management of acute stroke patients.

13. Provide public education about stroke warning signs and the importance of early utilization of the 9-1-1 system.

14. Pay the initial/annual S-SV EMS stroke receiving center designation fees.

D. Diversion of EMS suspected acute stroke patients shall only occur during times of an incapacitating internal disaster or when the CT scanner is otherwise unavailable.

1. Notification shall be made to the following entities at least 24 hours prior to any planned event resulting in the CT scanner being unavailable:

   - Stroke receiving center emergency department – to include a status posting on EMResource indicating that the CT scanner is unavailable.
   - Appropriate adjacent stroke receiving center(s).
   - Appropriate prehospital provider agencies.

2. All entities listed in this section shall also be notified as soon as possible in the case of an unplanned event causing the CT scanner to be unavailable as well as when the CT scanner is subsequently available.

3. An S-SV EMS ambulance patient diversion form describing such events shall be submitted to S-SV EMS by the end of the next business day.

PROCEDURE:

A. The stroke receiving center applicant shall be designated after satisfactory review conducted by S-SV EMS representatives or designees and completion of a written agreement between the hospital and S-SV EMS.

B. Designated stroke receiving centers shall have verification reviews by S-SV EMS representatives or designees conducted every three (3) years.

C. Failure to comply with the criteria and performance standards outlined in this policy and/or individual stroke receiving center written agreements may result in probation, suspension or rescission of stroke receiving center designation. Compliance will be solely determined by S-SV EMS.

Sierra – Sacramento Valley EMS Agency Program Policy			
Rapid Re-Triage & Interfacility Transport Of STEMI, Stroke & Trauma Patients			
	Effective: 12/1/2023	Next Review: 7/2026	**510**
	Approval: Troy M. Falck, MD – Medical Director		SIGNATURE ON FILE
	Approval: John Poland – Executive Director		SIGNATURE ON FILE

PURPOSE:

To establish the procedures for rapid re-triage and interfacility transport (IFT) of acute STEMI, stroke, and trauma patients whose clinical condition requires a higher level of care than can be provided at the sending facility. This process involves direct ED to ED transfer of patients that have not been admitted to the hospital.

AUTHORITY:

A. HSC, Division 2.5, Chapter 2, § 1797.67 and 1797.88, Chapter 6 § 1798.102, 1798.150, 1798.170, and 1798.172.

B. CCR, Title 22, Division 9, Chapter 7, 7.1 & 7.2

DEFINITIONS:

A. **STEMI Patient Rapid Re-Triage –** The rapid evaluation, resuscitation, and transfer of a STEMI patient from a STEMI Referral Hospital (SRH) to a STEMI Receiving Center (SRC).

B. **Stroke Patient Rapid Re-Triage –** The rapid evaluation, resuscitation, and transfer of an acute stroke patient from a non-stroke facility to a stroke receiving center.

C. **Trauma Patient Rapid Re-Triage –** The rapid evaluation, resuscitation, and transfer of a seriously injured patient from a non-trauma facility, or a lower-level Trauma Center, to a Trauma Center that can provide a higher level of trauma care.

POLICY:

A. STEMI patients from a hospital within the S-SV EMS region shall be accepted for transfer by a SRC unless the SRC is on STEMI diversion or internal disaster.

B. Acute stroke patients requiring a higher level of care than can be provided at the sending facility, should be accepted for transfer by a stroke receiving center unless the stroke receiving center is on stroke diversion or internal disaster.

C. Trauma patients from a hospital within the S-SV EMS region meeting 'Emergency' ("Red Box") or 'Urgent' transfer re-triage criteria shall be accepted for transfer unless the Trauma Center is on trauma diversion or internal disaster.

RAPID RE-TRIAGE AND IFT PROCEDURES:

A. STEMI Patients:

1. A 12-lead EKG should be obtained within ten minutes of patient arrival at a SRH.

2. Immediately after a STEMI is identified, contact the SRC to arrange transfer. Contact the SRC interventional cardiologist as needed.

3. If SRH arrival to PCI at the SRC is anticipated to be >90 minutes, administration of lytic agents should be considered in patients that meet thrombolytic eligibility criteria. Contact the SRC early to discuss coordination of care. The goal for door to thrombolytics is <30 minutes.

4. Patients with an SRH identified STEMI should be transferred within 45 minutes utilizing the most appropriate transport resources based on patient condition and needs.

B. Acute Stroke Patients:

1. Evaluate patients with signs/symptoms of an acute stroke as soon as possible.

2. Acute stroke patients requiring a higher level of clinical care than can be provided at the sending facility should be transferred as soon as possible.

3. Contact the closest most appropriate stroke receiving center to discuss patient status and request transfer. If transfer is accepted, arrange for appropriate transport resources based on patient condition and needs.

C. Trauma Patients:

1. Rapid re-triage and transfer of trauma patients shall be based on the North Regional Trauma Coordinating Committee Guidelines for Transfer to a Trauma Center Criteria (incorporated into this policy for reference).

2. Emergency Transfer ("Red Box") Trauma Patients:

- The goal is to transfer patients meeting any 'Emergency Transfer' ("Red Box") Trauma Re-Triage Criteria within one (1) hour of arrival at the sending facility.

- Contact the closest appropriate Trauma Center as soon as possible and identify the patient as meeting "Red Box" criteria.

3. Urgent Transfer Trauma Patients:

   - The goal is to transfer patients meeting any 'Urgent Transfer' criteria within four (4) hours of arrival at the transferring facility.
   - Contact the closest most appropriate Trauma Center to discuss patient status and request transfer. If transfer is accepted, arrange for appropriate transport resources based on the patient's condition and needs.

D. IFT Procedures:

1. Unless medically necessary, avoid using medication drips that are not in the paramedic scope of practice to avoid transfer delays.

2. If patient care has been initiated that exceeds the paramedic scope of practice, the sending hospital may consider sending a nurse or other qualified medical staff with the ground ambulance. Air ambulances or nurse staffed ground critical care transport (CCT) units may also be utilized if necessary and their response time is appropriate.

3. The patient should be ready for transport and records/staff should be prepared and available for EMS transport personnel upon arrival at the sending facility. Availability of records should not delay the transport of patients in need of emergency transfer. If complete documentation is not sent with the ambulance, it should be faxed/electronically transmitted to the receiving hospital in sufficient time that it will arrive prior to the patient if possible.

4. For patients requiring emergency transfer, contracted advanced life support (ALS) transport providers should be utilized when agreements are in place and the transport unit is available within ten (10) minutes of the initial request. The jurisdictional ALS transport provider may be requested via 9-1-1 when the contracted ALS provider is not readily available.

Guidelines for Transfer to a Trauma Center

North Regional Trauma Coordinating Committee

Emergency Transfer: *Call the Trauma Center for immediate consult and/or acceptance. Avoid unnecessary studies that would delay the transfer. The goal is transfer within 1 hour of arrival.*

- Systolic blood pressure <90 mm Hg
- Labile blood pressure despite 2L of IV fluids or requiring blood products to maintain blood pressure
- GCS ≤8 or lateralizing signs
- Penetrating injuries to head, neck, chest or abdomen
- Fracture/dislocation with loss of distal pulses &/or ischemia
- Pelvic ring disruption or unstable pelvic fracture
- Vascular injuries with active arterial bleeding

URGENT TRANSFER: *Call the Trauma Center and initiate transfer as soon as any of the following are identified. Avoid unnecessary studies. The goal is transfer within 4 hours of arrival.*

Physiologic

- For a child, labile blood pressure despite 20 ml/kg of fluid resuscitation
- Patients requiring blood products to maintain their blood pressure

Note:

1. For pediatric patients, systolic blood pressure <70 plus 2 times the age should suggest hypotension
2. Systolic blood pressure <110 may represent shock in patients >65 years of age

Extremity Injuries

- Amputation of extremity proximal to wrist or ankle
- Open long-bone fractures
- Two or more long-bone fracture sites*
- Crush injury/mangled extremity

*A radius/ulna fracture or tibia/fibula fracture are considered one site

Neck & Thoracic Injuries

- Tracheobronchial injury
- Esophageal trauma
- Great vessel injury
- Major chest wall injury with ≥3 rib fractures &/or pulmonary contusion
- Pneumothorax or hemothorax with respiratory failure
- Radiographic evidence of aortic injury
- Known or suspected cardiac injury

Neurological Injuries

- GCS deteriorating by 2 points during observation
- Open or depressed skull fracture
- Acute spinal cord injury
- Spinal fractures, unstable or potentially unstable
- Neurologic deficit

Abdominal Injuries

- Evisceration
- Free air, fluid or solid organ injury on diagnostic testing

Pelvic/Urogenital

- Bladder rupture

Burn Injuries

- Second or third-degree thermal or chemical burns involving >10% of total body surface area in patients <15 years or >55 years of age
- Second or third-degree thermal or chemical burns involving the face, eyes, ears, hands, feet, genitalia, perineum, and major joints
- Third-degree burns >5% of the body surface area in any age group
- Electrical burns, including lightning injury
- Burn injury with inhalation injury

Co-Morbid Factors

- Adults >55 years of age with significant trauma
- Significant torso injury with advanced co-morbid disease (cardiac or respiratory disease, insulin-dependent diabetes, morbid obesity, immunosuppression or End Stage Renal Disease requiring dialysis)
- Patients taking anti-coagulant medication or platelet inhibitors
- Children <14 years of age with significant trauma
- Traumatic injury and pregnancy >20 weeks gestation

Note: All transfers must be in accordance with both state and federal EMTALA laws

Reference: American College of Surgeons, Committee on Trauma, Interfacility Transfer of Injured Patients: Guidelines for Rural Communities, 2002