

## Regional Cardiac – STEMI Plan

A system of ST Segment Elevated Myocardial Infarction (STEMI) patient care incorporating non-Percutaneous Coronary Intervention (PCI)-capable and primary PCI-capable hospitals that encompasses multidisciplinary teams to ensure that optimal care according to ACC/AHA guidelines is delivered on first system access, in the hospital, at discharge, and over the long term, within the patient's local system after discharge. The goal of this region is to provide the best possible care reduce, mortality, maximize recovery, and prevent recurrent cardiovascular events.

The BorderRAC STEMI System of Care includes:

1. Leadership teams of EMS, emergency medicine, cardiology, nursing, and administration.
2. Ensure effective interaction and collaboration among the agencies, services, and people involved in providing prevention and the timely identification, transport, treatment, and rehabilitation of individual STEMI patients in a locality or region.
3. Promote the use of an organized, standardized approach in each facility and component of the system to include standardized communication (i.e., STEMI alert system), data collection, and feedback.
4. Identify performance measures (both process and outcome measures) and include a mechanism for evaluating effectiveness through which the entire system and its individual components continue to evolve and improve.

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

### **Dispatch**

Early access to the emergency system is critical for patients experiencing a STEMI. Dispatchers operate under standardized, written (often computerized – Computer Assisted Dispatch) protocols. Such protocols are developed nationally and then modified locally or nationally. The ideal system has intense quality improvement programs to ensure that dispatchers follow protocols and procedures correctly and consistently. This is particularly true for the pre-arrival instructions that are given to cardiac arrest bystanders to instruct them on how to perform cardiopulmonary resuscitation (CPR) while awaiting the arrival of emergency personnel. Emergency medical dispatchers can also prompt patients with symptoms suggestive of an acute STEMI to follow simple instructions such as taking aspirin while awaiting the arrival of EMS personnel and *Hands Only CPR*. (See **Addendum A**). Bystanders that have Pulse Point AED may send someone to obtain the nearest AED.

### **Regional STEMI Treatment Guidelines**

All care will be facilitated by hospital and EMS evidence-based treatment protocols. All hospitals will utilize recognized clinical practice guidelines such as those published by the American Heart Association.

### **Pre-hospital Triage**

Patients will be identified, rapidly and accurately assessed, and transported to the nearest appropriate TSA-I PCI facility based on the primary impression of their actual or suspected onset of symptoms.

To ensure the prompt availability of medical resources needed for optimal patient care, each patient will be assessed for the presence of abnormal vital signs and concurrent disease/predisposing factors.

### **BLS/First Responder**

1. ABC's
2. Vital Signs
  - a. HR, BP, SpO<sub>2</sub>
  - b. Take VS every 15 minutes
3. Administer O<sub>2</sub> only if SPO<sub>2</sub> < 92% on room air
4. Place the patient in a position of comfort
5. Ensure there is no allergy to aspirin or active GI bleeding.
6. ASA 324mg PO (4 baby aspirins). If not taken already.
7. *Complete Prehospital Thrombolytic Checklist (See Addendum B)*

### **ALS:**

1. Place patient on cardiac monitor and obtain ECG (to be read by paramedic, transmitted to ED, or delivered to ED physician at arrival)
2. Establish IV of NS to run TKO (*approximately 60cc/hr.*)
  - a. If systolic BP <90 mm/hg run IV at or greater than 120cc/hr. to maintain a systolic of 90 mm/hg
  - b. If two unsuccessful IV attempts in patients who may be candidates for thrombolytics contact your Medical Control for further attempts
3. Nitroglycerin 0.4mg SL (**hold if it is an Inferior MI especially if blood pressure is low**)
  - a. Has the patient taken erectile dysfunction meds (*ex: Viagra, Cialis, Levitra*) in the past 48 hours? - If yes, DO NOT give Nitro!
  - b. May repeat q 3-5 minutes to total of 3 doses if:
    - Chest pain symptoms do not improve
    - Systolic BP remains above 100 mm/Hg
    - Follow your agency protocol
4. Pain Management  
Administer pain control medications as noted in your agency protocol
5. Take VS after administration of medications (*if BP drops below 90 mm/hg systolic administer fluid bolus*)

### **Paramedic:**

1. Obtain ECG within 10 minutes
2. Interpret 12-lead ECG
3. Transmit ECG (if available) or send via Pulsara

Identify "Code Heart" in the report to the receiving facility to facilitate internal activation response teams. Be prepared to relay pertinent patient information including results of ECG.

### **Note:**

For arrhythmias, follow ACLS protocols

Patients should be transported without delay to a designated PCI Center. For rural/frontier areas, consideration should be given to air evacuation for these patients. Ensure that all pertinent findings are relayed to the receiving facility.

## **STEMI Facility Definitions**

### Percutaneous coronary intervention (PCI)

The family of medical procedures that uses a "mechanical" means to treat patients with partially or completely restricted blood flow through an artery of the heart. Examples include balloon angioplasty and stents. There are two types of PCI:

- Primary PCI: The use of percutaneous coronary intervention to open an occluded coronary artery in the setting of an ST-elevation myocardial infarction
- Rescue PCI: PCI that is performed after fibrinolysis/thrombolytic has been performed

### STEMI-Receiving Hospital

A hospital that has the equipment, expertise, and facilities to administer percutaneous coronary intervention (PCI), a mechanical means of treating heart attack patients.

### STEMI Referring Hospital (Non PCI Capable)

A hospital that does not have the ability to provide PCI services. These facilities transfer STEMI patients to a STEMI-Receiving Hospital.

## **Facility Triage and Bypass**

Suspected STEMI patients will be safely and rapidly transported to the nearest appropriate STEMI-Receiving Hospital within TSA I. STEMI-Receiving Hospitals do not divert STEMI patients.

## **Capability Limitations**

TSA-I PCI facilities will communicate capability limitations promptly to regional EMS and other facilities by identifying Cath Lab capability in EMResource. This will ensure that STEMI patients are transported to the nearest appropriate PCI facility.

## **Helicopter Activation**

TSA-I regional air transport resources will be appropriately utilized in order to reduce delays in providing optimal STEMI care.

- Helicopter activation/scene response should be considered when it could reduce transportation time for patients demonstrating signs and symptoms of heart attack. Identify "Code Heart" in the report to the receiving facility to facilitate internal activation response teams. Be prepared to relay pertinent patient information including results of ECG.
- Patients transported via helicopter should be taken to the nearest appropriate PCI Center.

## **Inter-Hospital Transfers**

STEMI patients with special needs may be transferred within the region to a PCI center for assessment and treatment. If resource needs exceed current regional capabilities, transfer to another PCI center outside the region should be expedited.

STEMI patients in TSA-I are transported according to patient needs, available resources, and environmental conditions. Transport via BLS, ALS, or MICU ground ambulance is available throughout the region. Air Medical transport (fixed and rotor wing) is also available in this region.

Door-In-Door-Out (DIDO) of the referring hospital should be completed within 30 minutes.

If the length of time from patient arrival at the Referring Hospital to door-to-balloon time at the STEMI-Receiving Hospital is anticipated to NOT meet a door-to-balloon time of  $\leq 120$  minutes, lytic therapy should be administered prior to transfer unless contraindicated.

### **Cardiac Patient Rehabilitation**

Referral to an outpatient cardiac rehabilitation program will be a coordinated effort involving but not limited to the patient, the patient's family, physicians, outpatient cardiac rehabilitation facility, and referring facility.

### **Prevention Education**

Public education will be developed and provided to high-risk populations for acute myocardial infarctions and their immediate support system. Provided instruction will focus on signs and symptoms of heart attack, risk factors as well as the need to rapidly access the emergency healthcare system by calling (9-1-1).

### **System Performance Improvement**

A regional system performance improvement program will identify opportunities for treatment efficiencies within the system and allow targeted education. Steps will be taken to create a regional registry of STEMI patients.

In order to demonstrate active participation in the Regional STEMI System, all regional partners will participate in data collection and submission. The goals of data collection will be to identify:

- Numbers of patients
- Demographic propensities
- Types of treatment provided
- Timelines for providing treatment
- Measurement of outcomes
- Time of initiation of the transfer process and receipt at the receiving hospital
- Over/under/correct triage and activations

The committee will determine data elements to be reviewed for system performance. Consolidated data will be provided to the Cardiac Sub-Committee and to System Performance Improvement Committee to further advance the Regional Cardiac STEMI System of Care.

### **Special Populations**

#### **Maternal**

Pregnancy induces changes in the cardiovascular system to meet the increased metabolic demands of the mother and fetus. These changes include increases in blood volume and cardiac output and reductions in systemic vascular resistance and blood pressure. Considerations include the risk of a cardiovascular complication in pregnancy, labor, or delivery; the long-term impact of pregnancy on the progression of underlying cardiac disease; and the possible effect of a cardiac lesion on maternal life expectancy.

Pregnancy-Associated Myocardial Infarction (PAMI) is defined as myocardial infarction (MI) during pregnancy or the postpartum period. The incidence PAMI is increasing and may relate to improved case detection and greater numbers of older women with underlying cardiovascular risk factors becoming pregnant.

Spontaneous coronary artery dissection (SCAD) is one of the most common causes of acute coronary syndrome in pregnant patients and defined as a non-iatrogenic and non-traumatic separation of the coronary arterial walls, creating a false lumen

Pregnancy-related cardiovascular disease, pulmonary arterial hypertension, and arrhythmias are complications that can affect adult CHD patients. Women with high-risk conditions such as pulmonary hypertension and cardiomyopathy may not be aware of all their risks and the care required through a complex pregnancy.

### **Pediatric and Congenital Heart Disease (CHD) Populations**

Heart conditions in children can be congenital or acquired and range from asymptomatic to life threatening.

The management of MI in children with Kawasaki disease and giant coronary artery aneurysms is a special challenge for pediatric cardiologists and emergency medicine physicians who are less familiar than their adult counterparts are with the acute management of MI. The treatment of STEMI is a true medical emergency that requires rapid restoration of antegrade flow through the occluded coronary artery.

A congenital heart defect is an abnormality of with the structure of the heart that a child is born with. Significant advances in the treatment of young patients with congenital heart defects have enabled many to survive into old age. There are many types of Congenital Heart Defects but patients with Congenital Heart Disease (CHD) have a higher risk of coronary artery disease (CAD), and cardiovascular hospitalization, including myocardial infarction (MI) and heart failure, which can be more difficult to treat. Most Adult Congenital Heart Disease (ACHD) patients are not cured (even if was repaired in childhood) and many continue to suffer from hemodynamic abnormalities which can cause problems as patients age and the disease progresses.

Some risk factors for CAD in patients with CHD include:

- Coarctation of the aorta,
- Operated coronary arteries in infancy,
- Cyanotic heart disease

### **Bariatric or Expanded Capacity Population.**

Obesity adversely affects cardiac function, increases the risk factors for coronary heart disease, and is an independent risk factor for cardiovascular disease. People living with overweight/obesity are at greater risk for cardiovascular morbidity and mortality.

CT scans are available for imaging for persons with obesity and/or morbid obesity with a max load weight of 675 pounds (308 Kg). A list of local CT scans and weight capability for bariatric outpatient imaging is available. **See Addendum C- CT Outpatient Imaging**

### **Addendums**

- A) Hands-Only CPR American Red Cross
- B) Prehospital Fibrinolytic Checklist
- C) CT Outpatient Imaging

## References

ACC/AHA Clinical Practice Guidelines for Cardiac Patient Care

### **1. AMI (STEMI/NSTEMI) Guidelines**

2021 AHA Systems of Care for STEMI

[Systems of Care for ST-Segment–Elevation Myocardial Infarction: A Policy Statement From the American Heart Association \(ahajournals.org\)](https://www.ahajournals.org/doi/10.1161/STROKE.119.491111)

Fourth Universal Definition of Myocardial Infarction (2018)

[thygesen-et-al-2018-fourth-universal-definition-of-myocardial-infarction-\(2018\).pdf](https://www.ahajournals.org/doi/10.1161/STROKE.119.491111)

2017 AHA/ACC Clinical Performance and Quality Measures for Adults with ST-Elevation and Non–ST-Elevation Myocardial Infarction

[https://www.ncdr.com/WebNCDR/docs/default-source/action---quality-tools-and-reference-documents/2017amiperformancemeasures.pdf? sfvrsn=dbd4de9f\\_3](https://www.ncdr.com/WebNCDR/docs/default-source/action---quality-tools-and-reference-documents/2017amiperformancemeasures.pdf?sfvrsn=dbd4de9f_3)

2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction

[https://www.ncdr.com/WebNCDR/docs/default-source/action---quality-tools-and-reference-documents/2013-accf\\_aha-stemi-guidelines.pdf?sfvrsn=958600ea\\_2](https://www.ncdr.com/WebNCDR/docs/default-source/action---quality-tools-and-reference-documents/2013-accf_aha-stemi-guidelines.pdf?sfvrsn=958600ea_2)

### **2. Chest Pain**

2021 AHA/ACC/ASE/CHEST/SAEM/SCCT/SCMR Guideline for the Evaluation and Diagnosis of Chest Pain

<https://www.jacc.org/doi/pdf/10.1016/j.jacc.2021.07.053>

### **3. Cardiac Cath Lab (PCI)**

2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

[lawton-et-al-2021-2021-acc-aha-scai-guideline-for-coronary-artery-revascularization-a-report-of-the-American-college-of \(1\).pdf](https://www.ahajournals.org/doi/10.1161/STROKE.119.491111)

SCAI expert consensus update on best practices in the cardiac catheterization laboratory

[Cathet Cardio Intervent - 2021 - Naidu - SCAI expert consensus update on best practices in the cardiac catheterization \(1\).pdf](https://www.ahajournals.org/doi/10.1161/STROKE.119.491111)

### **4. Pediatric Populations**

2017 Diagnosis, Treatment, and Long Term Management of Kawasaki Disease

<https://doi.org/10.1161/CIR.0000000000000484> Circulation. 2017;135:e927–e999

2020 Management of Myocardial Infarction in Children with Giant Coronary Artery Aneurysms after Kawasaki Disease

<https://doi.org/10.1016/j.jpeds.2020.02.033>

## **5. Maternal/Pregnant Patients**

Pregnancy-Associated Myocardial Infarction | Circulation: Cardiovascular Interventions  
<https://doi.org/10.1161/CIRCINTERVENTIONS.120.008687>

## **6. Heart Failure**

2023 ACC Expert Consensus Decision Pathway on Management of Heart Failure with Preserved Ejection Fraction: A Report of the American College of Cardiology Solution Set Oversight Committee  
<https://www.jacc.org/doi/10.1016/j.jacc.2023.03.393>

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines  
<https://www.ahajournals.org/doi/abs/10.1161/CIR.0000000000001063>

2019 ACC Expert Consensus Decision Pathway on Risk Assessment, Management, and Clinical Trajectory of Patients Hospitalized With Heart Failure  
<https://www.jacc.org/doi/epdf/10.1016/j.jacc.2019.08.001>

# HANDS-ONLY CPR

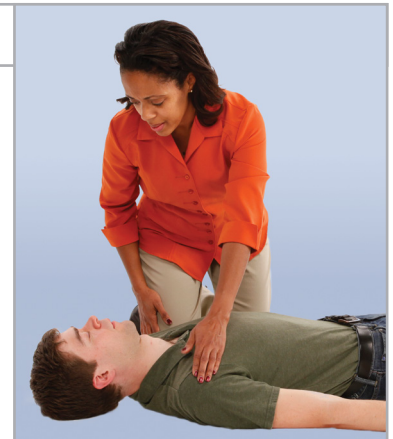
## FOR WITNESSED SUDDEN COLLAPSE



### 1. CHECK and CALL

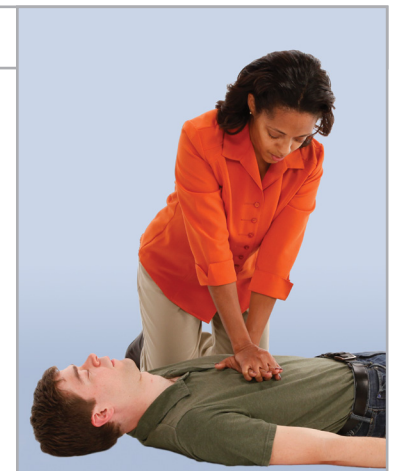
1. **CHECK** the scene, then **CHECK** the person.
2. Tap on the shoulder and shout, "Are you okay?" and quickly look for breathing.
3. **CALL** 9-1-1 if no response.
4. If unresponsive and not breathing, **BEGIN CHEST COMPRESSIONS.**

- TIPS:**
- Whenever possible use disposable gloves when giving care.
  - Occasional gasps are not breathing.



### 2. GIVE CHEST COMPRESSIONS

1. Place the heel of one hand on the center of the chest.
2. Place the heel of the other hand on top of the first hand, lacing your fingers together.
3. Keep your arms straight, position your shoulders directly over your hands.
4. Push hard, push fast.
  - Compress the chest at least 2 inches.
  - Compress at least 100 times per minute.
  - Let the chest rise completely before pushing down again.
5. Continue chest compressions.



### 3. DO NOT STOP

Except in one of these situations:

- You see an obvious sign of life (breathing).
- Another trained responder arrives and takes over.
- EMS personnel arrive and take over.
- You are too exhausted to continue.
- An AED is ready to use.
- The scene becomes unsafe.

### AED AUTOMATED EXTERNAL DEFIBRILLATOR

If an AED is available:

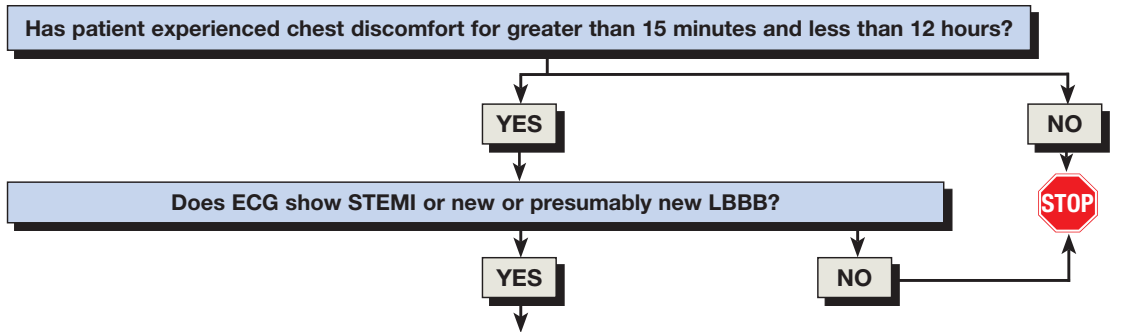
1. Turn on AED.
2. Wipe chest dry.
3. Attach the pads.
4. Plug in connector, if necessary.
5. Make sure no one is touching the individual.
6. Push the "Analyze" button, if necessary.
7. If a shock is advised, push the "Shock" button.
8. Perform compressions and follow AED prompts.

Go to [redcross.org](http://redcross.org) or call your chapter to sign up for training in full CPR, First Aid, Babysitter's Training, Pet First Aid and much more.



# Prehospital Thrombolytic Checklist\*

**Step 1**



**Step 2**

**Are there contraindications to fibrinolysis?**  
**If ANY of the following is CHECKED YES, fibrinolysis MAY be contraindicated.**

- |  |                           |                          |
|--|---------------------------|--------------------------|
| Systolic BP >180 to 200 mm Hg or diastolic BP >100 to 110 mm Hg                            | <input type="radio"/> YES | <input type="radio"/> NO |
| Right vs left arm systolic BP difference >15 mm Hg   | <input type="radio"/> YES | <input type="radio"/> NO |
| Significant closed head/facial trauma within the previous 3 months                         | <input type="radio"/> YES | <input type="radio"/> NO |
| Stroke >3 hours or <3 months   | <input type="radio"/> YES | <input type="radio"/> NO |
| Recent (within 2-4 weeks) major trauma, surgery (including laser eye surgery), GI/GU bleed | <input type="radio"/> YES | <input type="radio"/> NO |
| Any history of intracranial hemorrhage   | <input type="radio"/> YES | <input type="radio"/> NO |
| Bleeding, clotting problem, or blood thinners  | <input type="radio"/> YES | <input type="radio"/> NO |
| Pregnant female  | <input type="radio"/> YES | <input type="radio"/> NO |
| Serious systemic disease (eg, advanced cancer, severe liver or kidney disease)             | <input type="radio"/> YES | <input type="radio"/> NO |

**Step 3**

**Is patient at high risk?**  
**If ANY of the following is CHECKED YES, consider transfer to PCI facility.**

- |  |  |                          |
|--|--|--------------------------|
| Heart rate ≥100/min AND systolic BP <100 mm Hg | <input type="radio"/> YES              | <input type="radio"/> NO |
| Pulmonary edema (rales)                        | <input type="radio"/> YES              | <input type="radio"/> NO |
| Signs of shock (cool, clammy)                  | <input type="radio"/> YES              | <input type="radio"/> NO |
| Contraindications to fibrinolytic therapy      | <input type="radio"/> YES <sup>†</sup> | <input type="radio"/> NO |
| Required CPR                                   | <input type="radio"/> YES              | <input type="radio"/> NO |

\*Contraindications for fibrinolytic use in STEMI are viewed as advisory for clinical decision making and may not be all-inclusive or definitive. These contraindications are consistent with the 2004 ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction.

<sup>†</sup>Consider transport to primary PCI facility as destination hospital.

# Imaging CT Girth

	A	B	C	D	E
1	<b><u>Outpatient Imaging</u></b>	<b><u>Address:</u></b>	<b><u>Phone Numbers</u></b>	<b><u>Bariatric CT (weight lbs/kg)</u></b>	<b><u>Girth-width</u></b>
2	Akumin (West)	10501 Gateway Blvd West Ste 140	(915) 544-7300	650 lbs 294.83kg	States only weight based
3	Akumin (Osborne)	4930 Osborne Ste H El Paso TX 79922	(915) 544-7300	550 lbs 249.47kg	States only weight based
4	Akumin (Northeast)	9870 Gateway Blvd North El Paso TX 79924	(915) 544-7300	500 lbs 226.79kg	States only weight based
5	Akumin (Joe Battle)	2204 Joe Battle Blvs Ste 107	(915) 544-7300	500 lbs 226.79kg	States only weight based
6	Akumin (Cliff Drive)	1700 E. Cliff Dr El Paso TX 79902	(915) 544-7300	400 lbs 181.43kg	States only weight based
7	Desert Imaging (West)	122 West Castellano	(915) 577-0100	350 lbs 158.75kg	States only weight based
8	Desert Imaging (East)	1727 Lee Trevino El Paso TX	(915) 577-0100	350 lbs 158.75kg	States only weight based
9	Diagnostic Outpatient Imaging (EAST)	1426 George Dieter El Paso TX 79936	(915) 881-1900	550 lbs 226.79kg	72 cm
10	Sun City Emergency Room (East)	3281 Joe Battle Blvd, El Paso, TX 79936	(915) 308-4218	450 lbs 204.11kg	States only weight based
11	Sun City Emergency Room (West)	351 Redd Rd, El Paso, TX 79932	(915) 209-4699	450 lbs 204.11kg	States only weight based
12	THOP Emergency Room-Montwood	1890 George Dieter Dr, El Paso TX 79936	(915) 225-7100	350 lbs 158.75kg	25-27 inches
13	THOP Emergency Room-Edgemere	12101 Edgemere Blvd, El Paso, TX 79938	(915) 832-2490	500 lbs 226.79kg	63-65 cm
14	Total Care West -(THOP)	601 Sunland Park Dr, El Paso, TX 79912	(915) 577-8400	350 lbs 158.75kg	States only weight based
15	<b><u>Hospital</u></b>	<b><u>Address:</u></b>		<b><u>Bariatric CT(weight lbs/kg)</u></b>	<b><u>Girth-width</u></b>
16	Del Sol Medical Center	10301 Gateway Blvd W, El Paso, TX 79925	(915) 595-9000	400 lbs 181.43kg	66 cm
17	El Paso Childrens Hospital	4845 Alameda Ave, El Paso, TX 79905	(915) 298-5444	675 lbs 306.17kg	States only weight based
18	Las Palmas Medical Center	1801 N Oregon St, El Paso, TX 79902	(915) 521-1200	350-400 lbs 158.75kg- 181.43kg	27 inches
19	THOP East Campus	3280 Joe Battle Blvd, El Paso, TX 79938	(915) 832-2000	600 lbs 272.15kg	72 cm
20	THOP Memorial Campus	2001 N Oregon St, El Paso, TX 79902	(915) 577-6011	600 lbs 272.15kg	29 inches
21	THOP Sierra Campus	1625 Medical Center St Drive, El Paso, TX 79902	(915) 747-4000	Room 1: 600 lbs 272.15kg	72 cm
22	THOP Sierra Campus	1625 Medical Center St Drive, El Paso, TX 79902	(915) 747-4000	Room 2: 420 lbs 190.50kg	72 cm
23	THOP Trans Mtn Campus	2000 Woodrow Bean Transmountain Dr, El Paso, TX 79911	(915) 877-8136	500 lbs 226.79kg	55 cm
24	UMC Hospital	4815 Alameda Ave El Paso TX 79905	(915) 544-1200	600 lbs 272.15kg	States only weight based
25	UMC Northeast	9839 Kentworthy St El Paso TX 79924	(915) 231-2300	500 lbs 226.79kg	States only weight based
26	UMC East	1521 Joe Battle Blvd El Paso TX 79936	(915) 790-5700	500 lbs 226.79kg	States only weight based
27	Mobile Stroke Unit				15.7 inches (40cm) strictly head CT's
28	William Beamount Army Medical Center	18511 Highlander Medics St, Fort Bliss TX 79936	(915) 742-2273	500 lbs 226.79kg	2.6 Ft (78 cm)