

# **PREVENTING SUDDEN AMBULANCE DEATH SYNDROME**

**HIGH-PERFORMANCE RESUSCITATION BEYOND CARDIAC ARREST**

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***\*No disclosures***



**Dispatched to 71-year-old man AMS.**

**Unable to obtain BP.**

**Then pt went completely unconscious, GCS of 3.**

**No intervention while on scene.**

**Pt was moved to the ambulance.**

**During transport, recognized pt was pulseless.**

**CPR initiated, transport continued.**

**Pt pronounced dead at the hospital.**



# OBJECTIVES

- Define Sudden Ambulance Death Syndrome (SADS)
- Review literature regarding SADS
- Discuss implementation of EMS protocols to prevent SADS



# WHAT IS SADS?



# WHAT IS SADS?



Photo credit: Scott L/Wikipedia. <https://flickr.com/photos/41802269@N03/20885690376>



**WHAT DOES THE EXISTING  
RESEARCH SAY?**

# EXISTING RESEARCH



- **Pittsburgh Crashing patient bundle:**  
**12.1% rate of SADS→5.8%**
- **MedStar: SADS occurs due to respiratory causes**
- **PARCA abstract: PARCA (SADS) incidence**  
**5.7%→4.0%**
- **Buffalo: PARCA survival is time-dependent**  
**17.8% vs 8.7%**
- **Clemency et al 2022: eMEWS predicts EMS-witnessed arrest**



# EMEWS

EMEWS value (count of abnormal vital signs)	Patients, N	EMS-witnessed arrest, N	EMS-witnessed arrests per 1,000 patients
0	63,886	211	3.3
1	133,281	657	4.9
2	99,621	1,147	11.5
3	51,713	1,497	29.0
4	20,563	1,139	55.4

Clemency BM, Murk W, Moore A, Brown LH.

The EMS Modified Early Warning Score (EMEWS): A Simple Count of Vital Signs as a Predictor of Out-of-Hospital Cardiac Arrests. *Prehosp Emerg Care*. 2022 May-Jun;26(3):391-399.

PMID: 33794729.





# Preventing Sudden Ambulance Death Syndrome: Analysis of Initial Vital Signs and Time to First Intervention

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## 8,340,148 calls in 2019 ESO dataset

- 911 calls
  - $\geq 18$  yo
  - Paramedic response
  - Critical vitals signs
- 
- X trauma
  - X pregnancy
  - X coded prior to EMS at patient



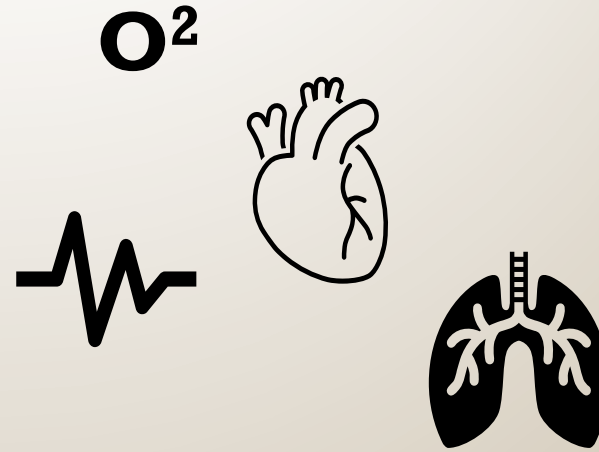
## Critical vitals

SpO<sub>2</sub> < 90

SBP < 90

HR < 50 or ≥ 180

RR 4-8 bpm or ≥ 28 bpm



## Excluded

SBP < 40, RR < 4, SpO<sub>2</sub> < 20, HR < 25

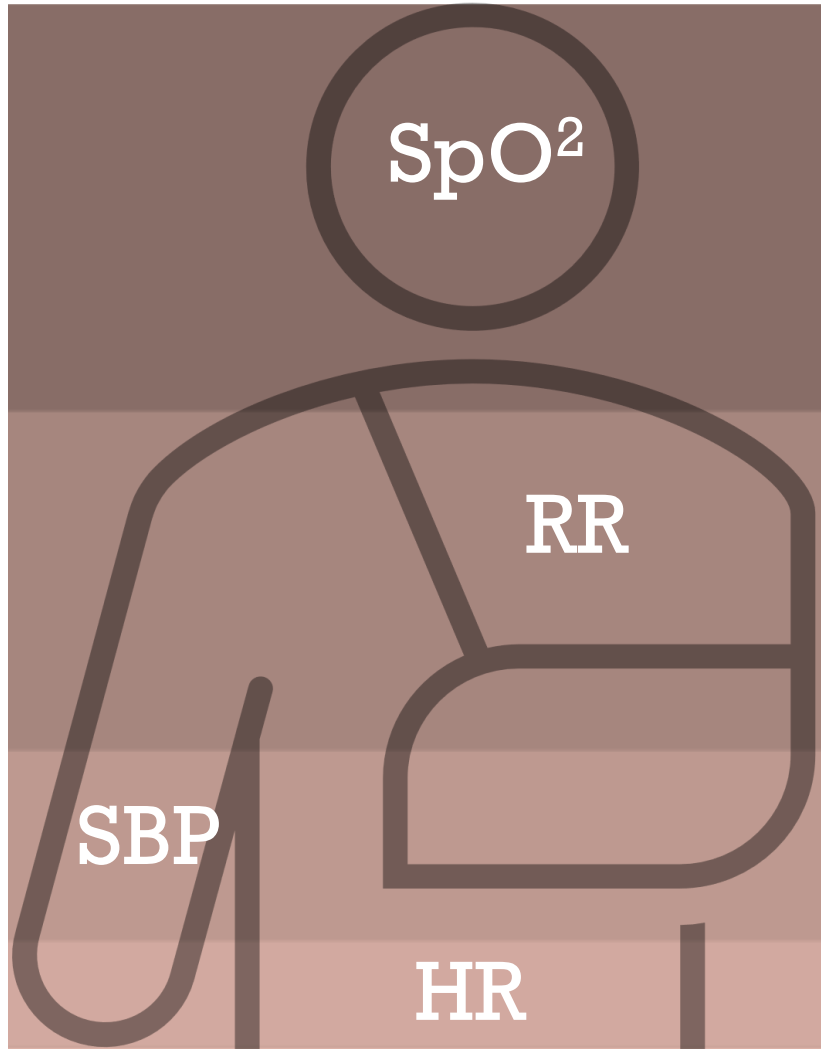
Cardiac arrests < 2 min after EMS arrival



## **Time to first treatments:**

- Airway interventions- including O2 administration, BVM, NIPPV, nebs, SGA, ETT, OPA/NPA
- Cardioversion
- Pacing
- IV/IO access
- Epinephrine administration





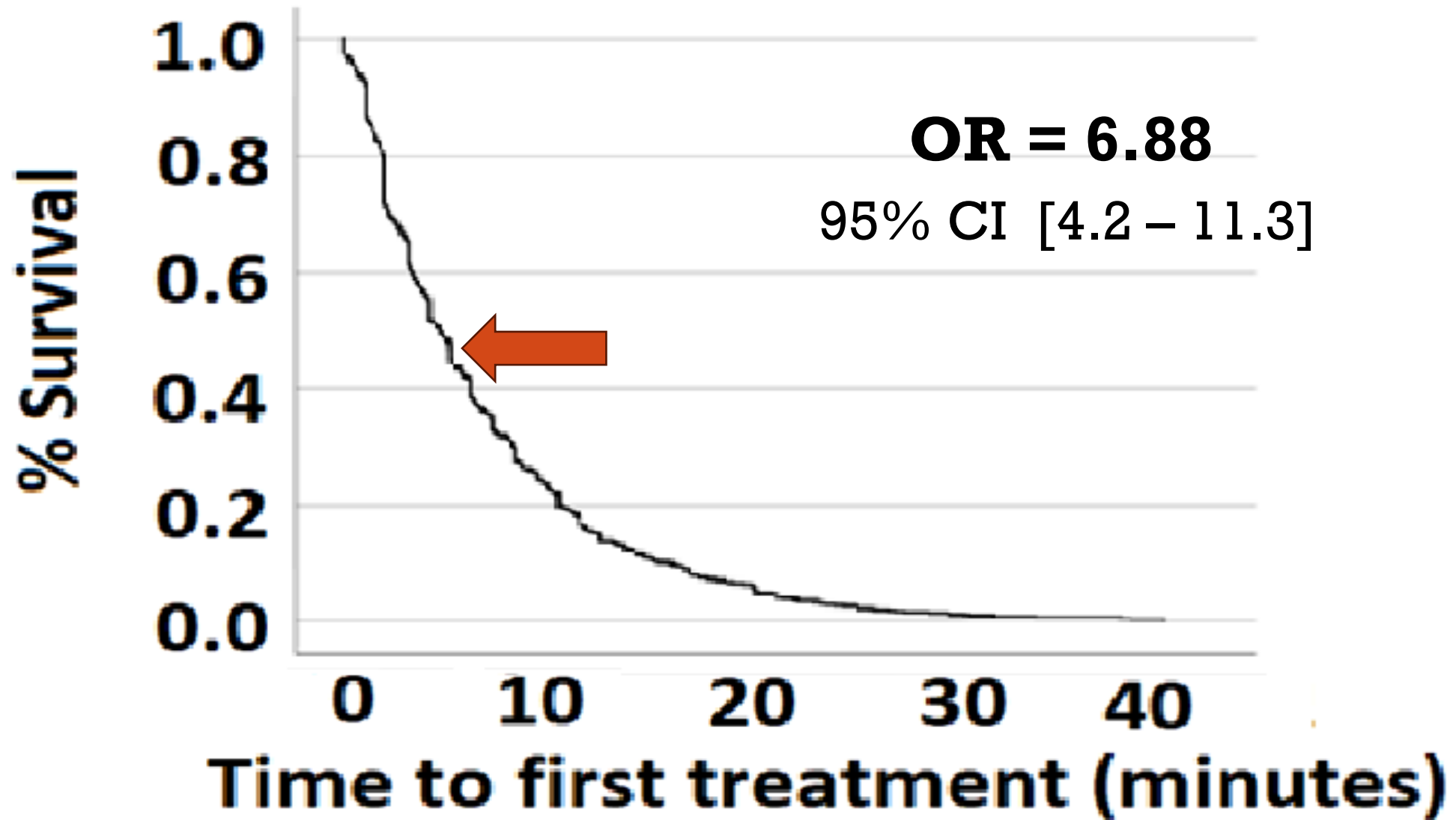
# 291,797 patients

## “Critical” VS values

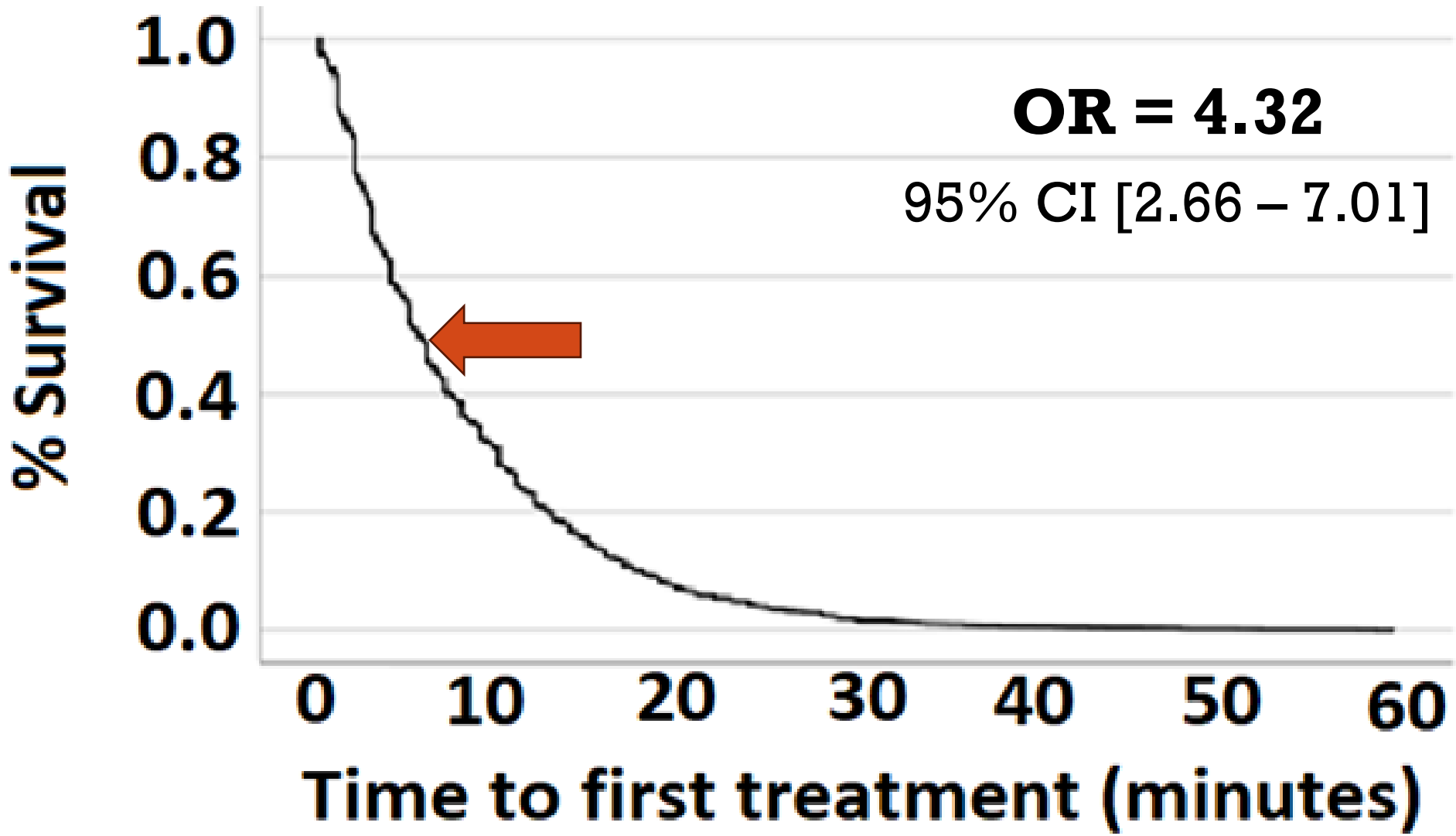
- SpO<sub>2</sub> – 138,878
- RR – 115,310
- SBP – 64,707
- HR – 36,103



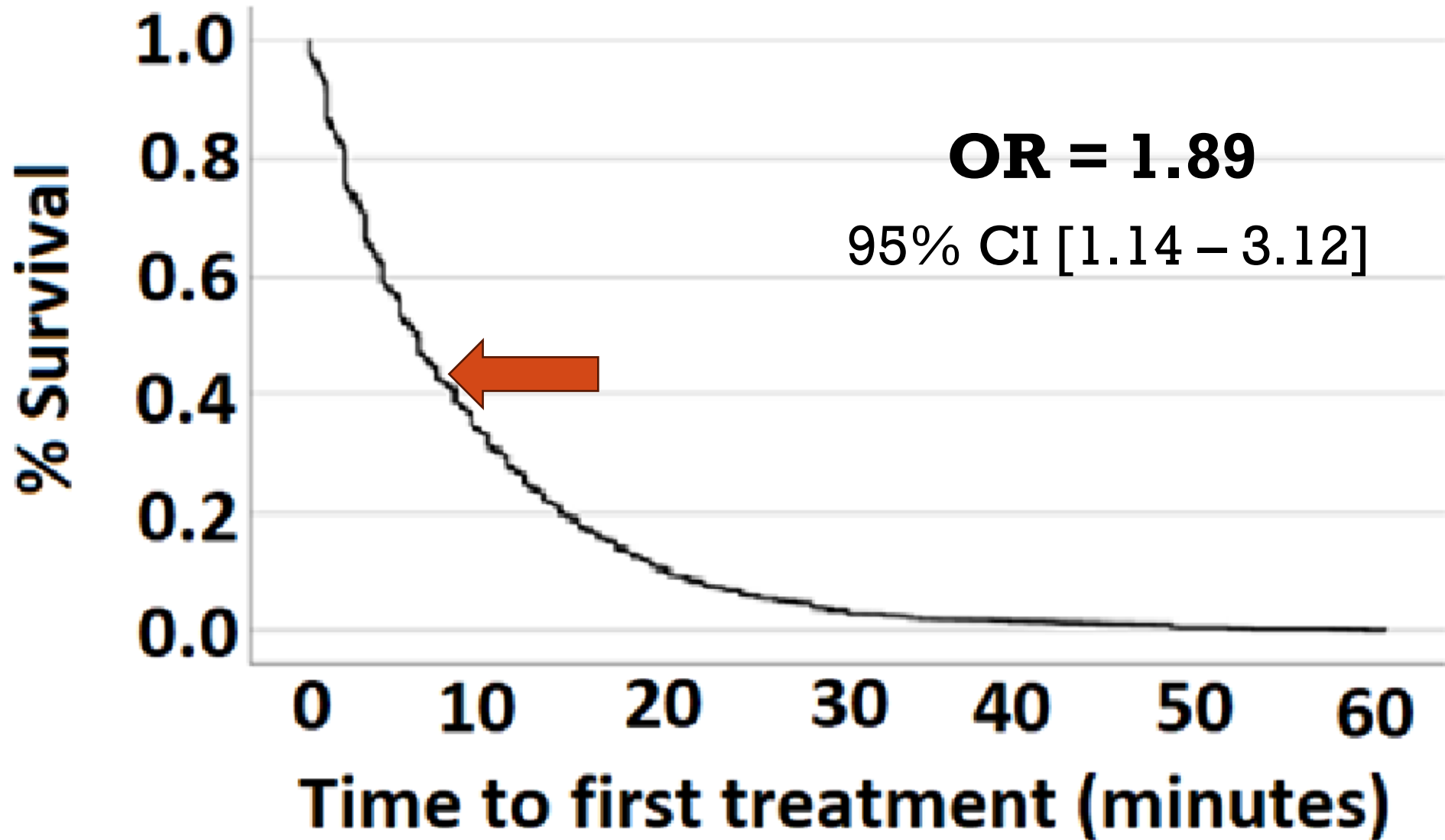
**HR < 50**



**SPO2 < 90**

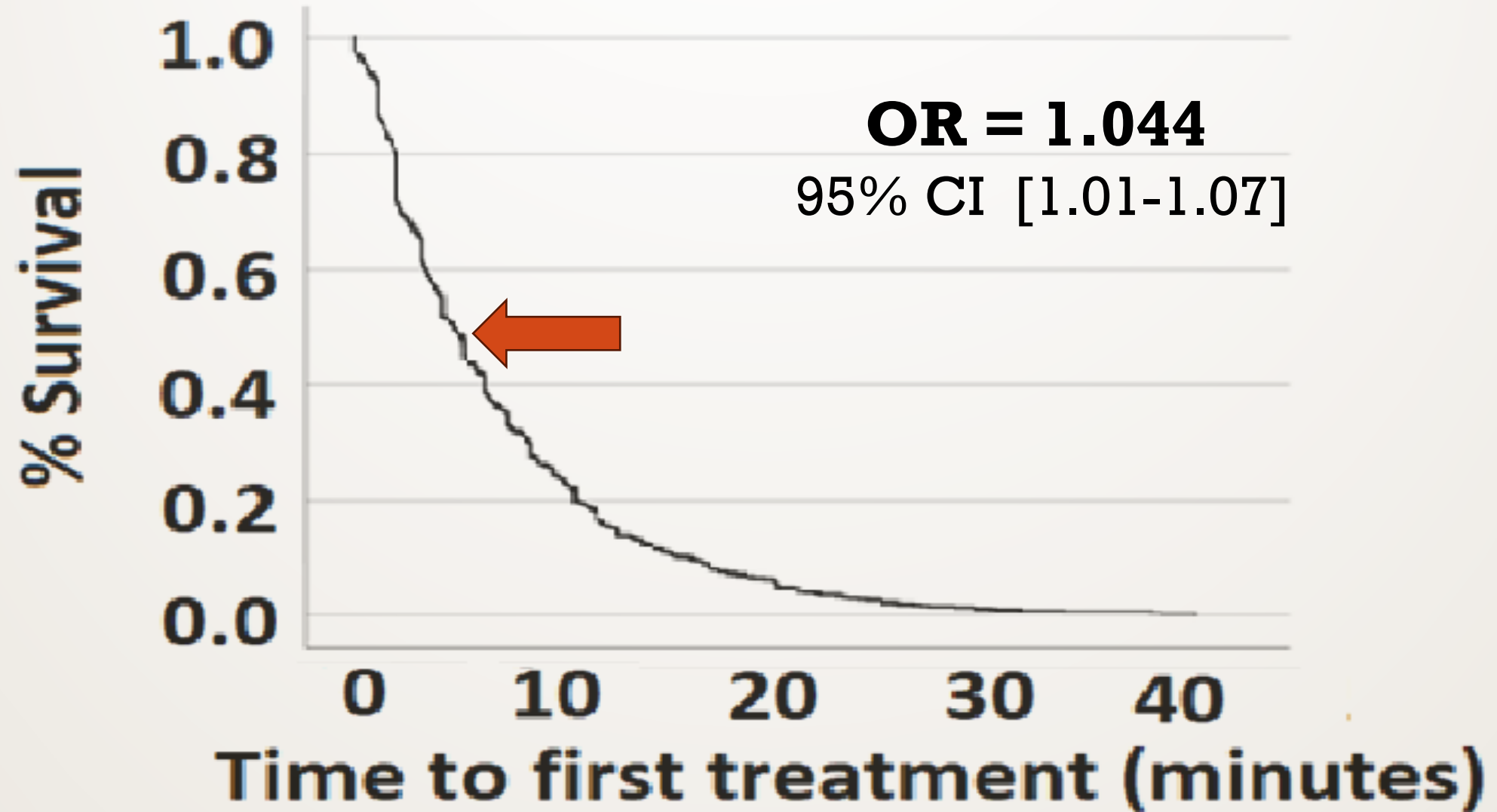


# RR 4 - 8



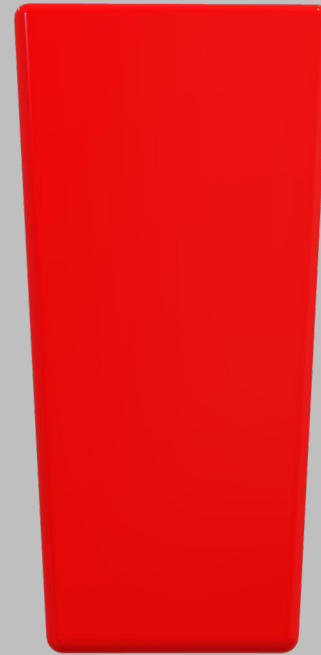


# COMBINED CRITICAL VS



**4.4%**

**PER MINUTE**



Mean time to intervention = 7 minutes!

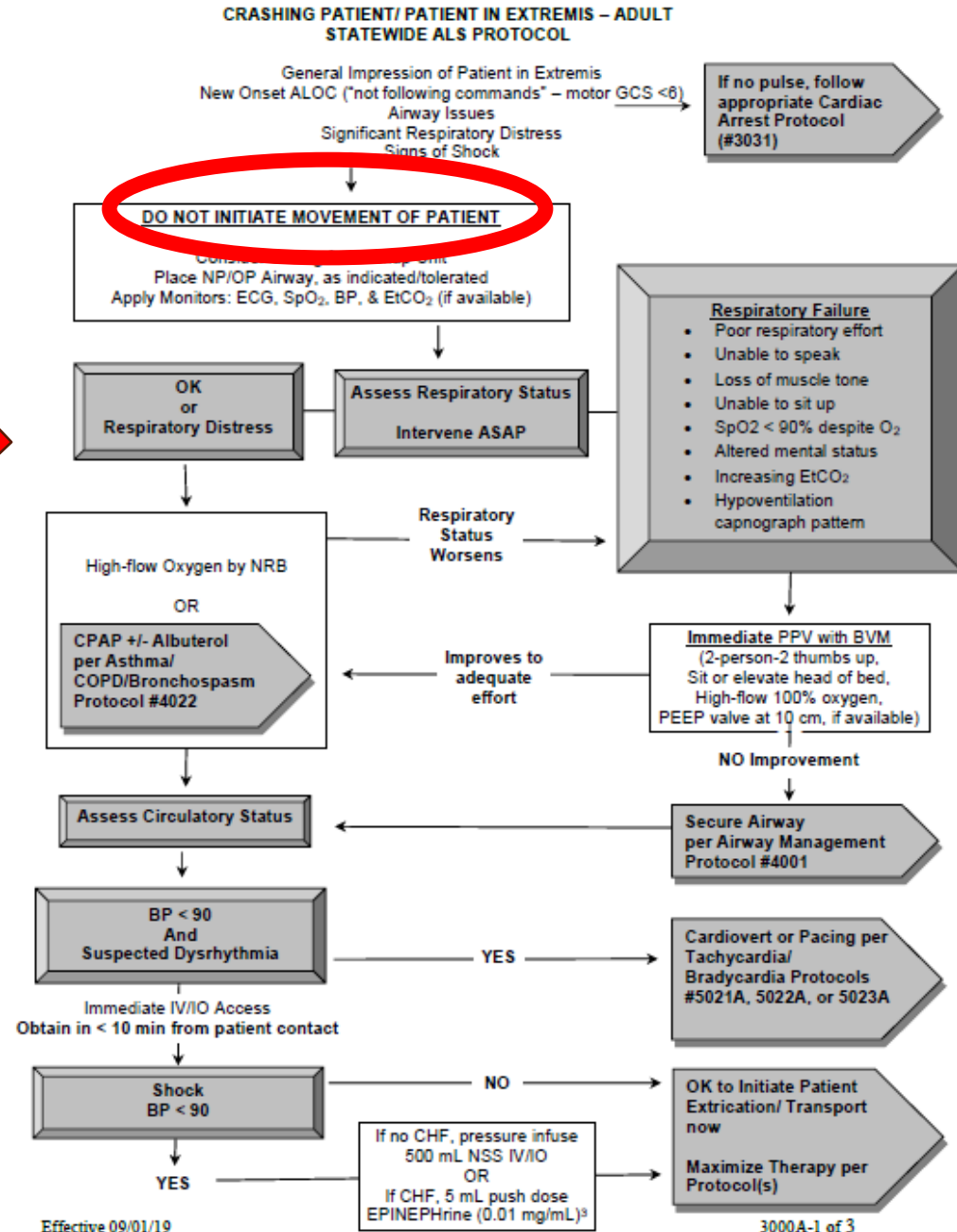
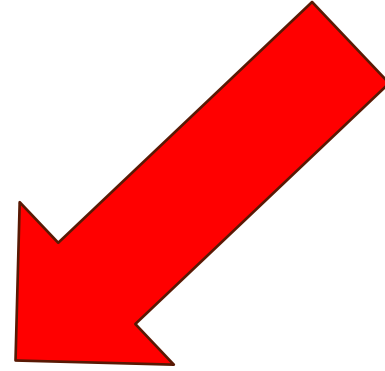


# HOW DO WE USE THIS INFORMATION?





**DO NOT INITIATE  
MOVEMENT OF PATIENT**



### **All PL Levels\*\*\***

Appropriate PPE

BVM with appropriate masks

O2 with delivery devices

Oral glucose

Kerlix

Defibrillator

Suction

OPA & NPA

Tape

Mucosal Atomization Device

Stethoscopes

B/P cuffs

Naloxone (IN)

4x4 dressings

Clinical Operating Guidelines

### **PL2 and Higher**

CPAP

Albuterol & nebulizer kit

Appropriate iGel airway

EPI (1mg/mL) & IM Supplies

### **PL3 and Higher**

Saline lock equipment

250mL D10W for Infusion

Naloxone (IM/IV)

### **PL4 and Higher**

Laryngoscope & blades for FBAO

Magill forceps for FBAO

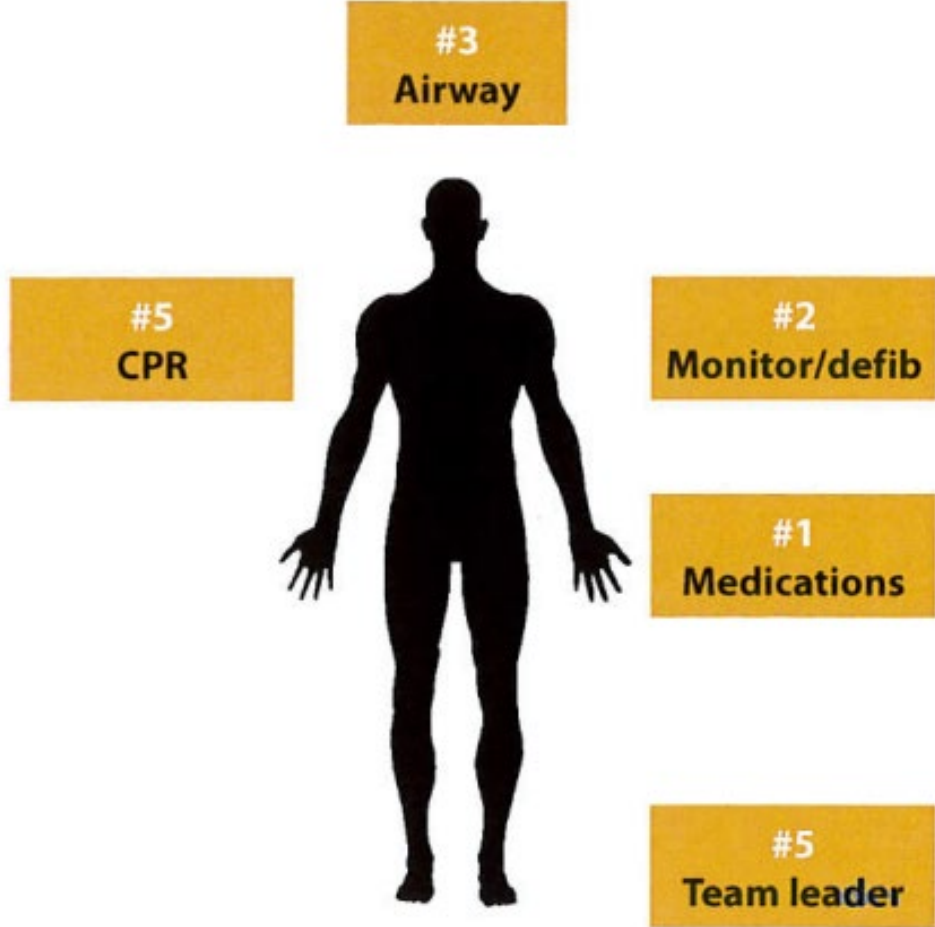
### **PL5 and Higher**

Thoracostomy needles

Kelly forceps for thoracostomy

Scalpels



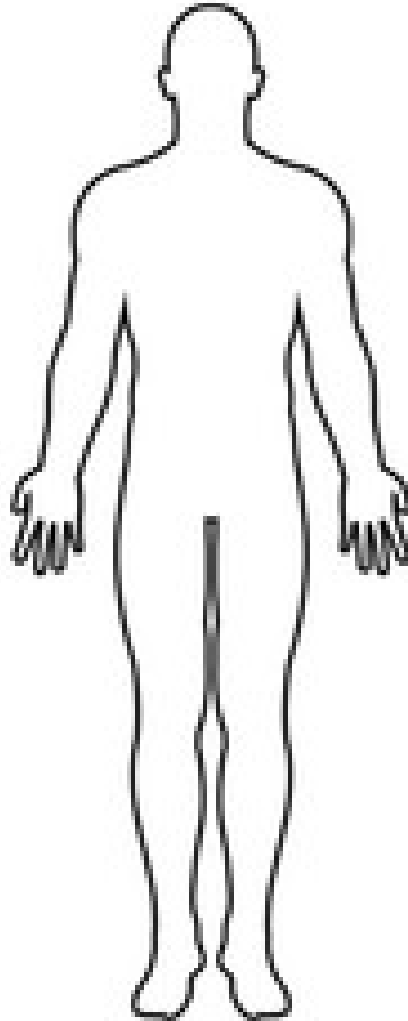


### **Clinician 1:**

1. Pulse check (if applicable)
2. Obtain VS- Spo2/BP
3. Apply oxygen/etco2 (if applicable)
4. Apply monitor
5. Place pads/initiate electrical therapy w/Clinician 2 (if applicable)
6. Initiate CPAP, assess lung sounds and initiate respiratory therapy ie nebs (if applicable)
7. Reassess VS
8. Prepare meds/spike bags

### **Clinician 3:**

1. Prepare meds/spike bags
2. Obtain secondary access



### **Clinician 2:**

1. Obtain meaningful access
2. Assess monitor once applied and perform electrical therapy with Clinician 1 (if indicated)
3. Initiate medical therapy

### **Clinician 4:**

1. Obtain PMHx/HPI
2. Assist with meds/spiking bags

### **Clinician 5:**

1. Prepare for extrication
2. Review SADS prevention checklist

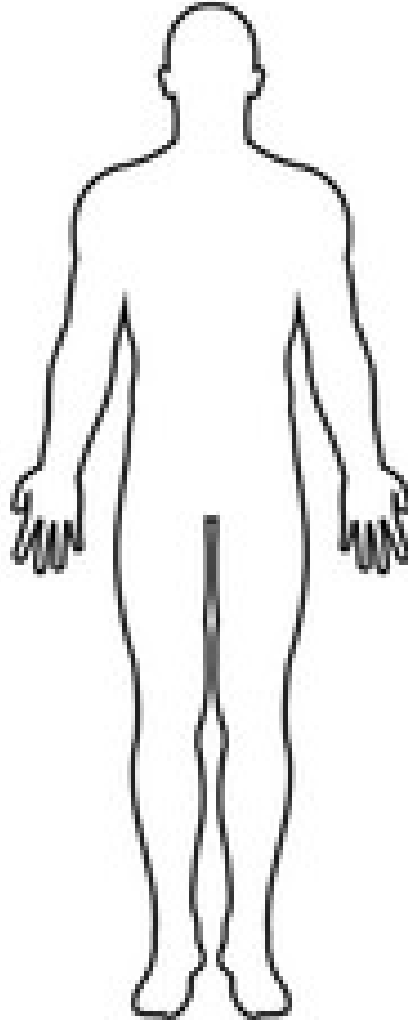


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### Clinician 5:

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2. Review SADS prevention checklist





# SADS PREVENTION CHECKLIST

Applies to the following *medical* patients

1. **Hypotensive** at any time
2. **Hypoxic** at any time
3. Requiring NIPPV, BVM, or advanced airway management
4. Arrhythmia requiring treatment at anytime



# SADS PREVENTION CHECKLIST

1. Full Set of VS has been obtained.
2. Additional resources have been summoned.
3. Minimum 10 minutes on scene
4. SBP at least 80 and up trending
5. Hypoxia addressed
6. NIPPV/BVM/advanced airway initiated (if applicable)
7. Multiple *meaningful* points of access obtained and **SECURED**
8. Pads applied (A/P position) and pacing/cardioversion completed and successful (if applicable)
9. If pt was hypotensive at any point, pressors prepared (if not already initiated)
10. Arrhythmias have been addressed
11. Pressors maintained at current rate at least 5 minutes
12. Equipment pre-positioned and stopping points pre-determined for reassessment of VS/pulse check/further stabilization, no further apart than q2 min
13. Demographic information has been obtained and turned over to transporting personnel.
14. VS have been reassessed.



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12. **Equipment pre-positioned and stopping points pre-determined for reassessment of VS/pulse check/further stabilization, no further apart than q2 min**
13. Demographic information has been obtained and turned over to transporting personnel.
14. VS have been reassessed.



**“THERE IS NO WORSE FEELING IN THE WORLD  
THAN HAVING A PATIENT CODE ON YOU  
KNOWING YOU DID NOTHING TO PREVENT THE  
PATIENT FROM DYING!”**





**LOAD AND GO**



# THANK YOU

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