EMS Focus

A Collaborative Federal Webinar Series

NHTSA's Office of EMS

Post-Crash Care - Innovations in Managing Patient Entrapment and Extrication

EMS FOCUS WEBINAR

VARIETY OF TOPICS

Provides the EMS community with a unique opportunity to learn more about Federal EMS efforts and programs.

EXPERIENCE

Brings Federal, State and local leaders to you!

REGISTER

Held every other month with opportunity for Q&A.
Closed captioning is available.

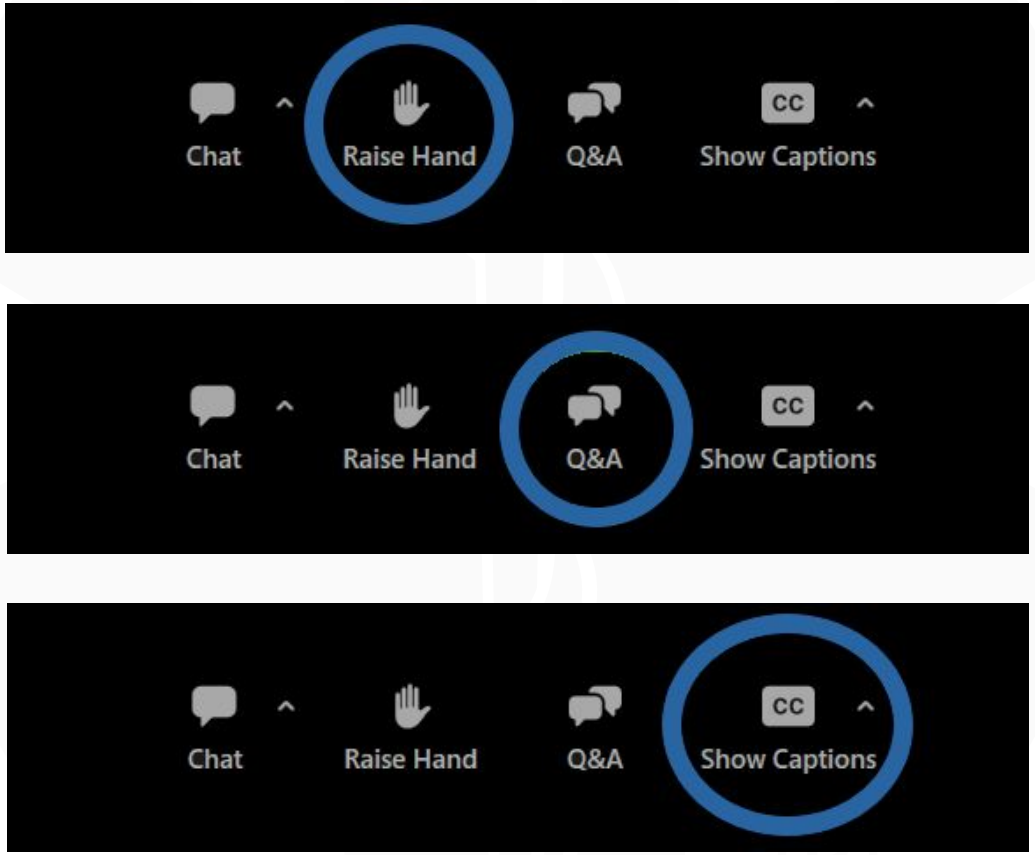
FEEDBACK & QUESTIONS

nhtsa.ems@dot.gov

ZOOM FUNCTIONS

This webinar will utilize three features in the Zoom Meeting controls.

- “Raise Hand” - Use this feature to ask your question live. You will be called upon and unmuted
- “Q&A” - Use this feature to submit your question virtually in a pop-up window/chat box
- “Show Captions” - Use this feature to turn on closed captions at any point during the webinar



NHTSA Office of EMS

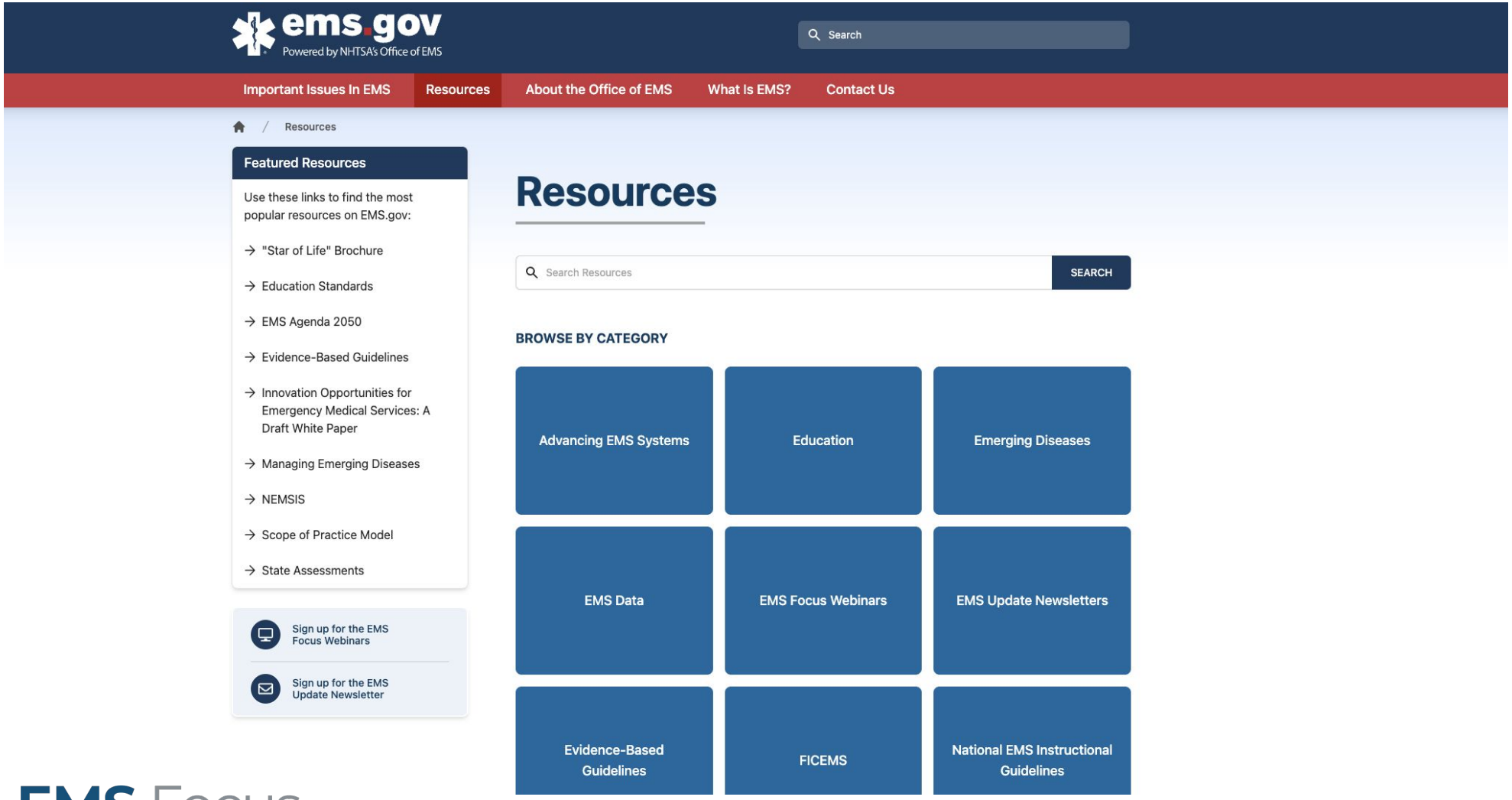
Mission

Reduce death & disability

Provide leadership & coordination to the EMS community

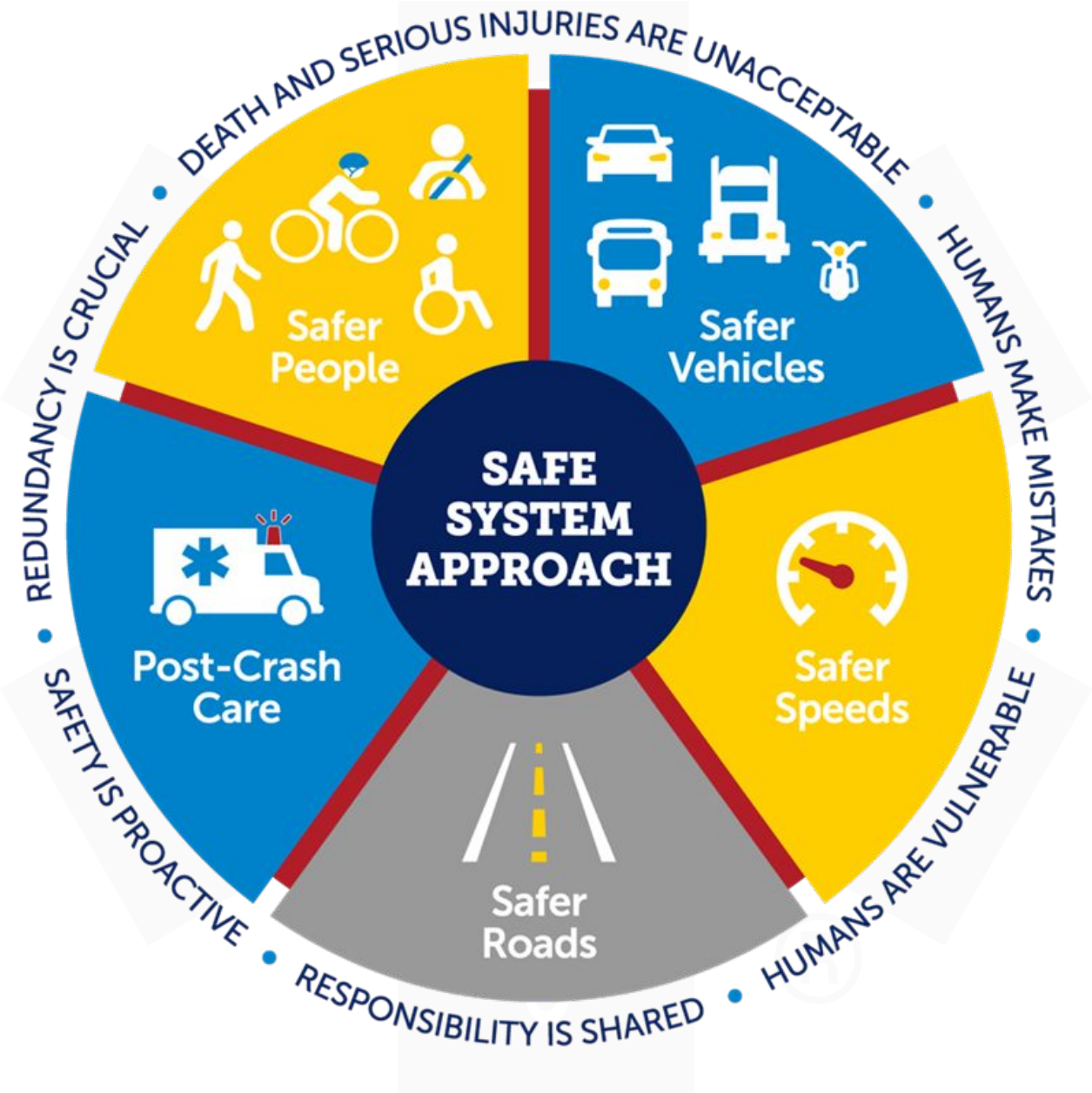
Assess, plan, develop, & promote comprehensive, evidence-based emergency medical services & 911 systems

EMS.gov Resources



Safe System Approach

- Safer People
- Safer Roads
- Safer Vehicles
- Safer Speeds
- Post-Crash Care



Today's Topic

Post-Crash Care - Innovations in Managing Patient Entrapment and Extrication

- **Clary Mole**, Emergency Medical Services Specialist, Office of EMS, NHTSA (moderator)
- **Nichole Bosson,** MD, MPH, NRP, FAEMS, medical director, Los Angeles County Emergency Medical Services Agency, associate professor of clinical emergency medicine at the David Geffen School of Medicine at UCLA; faculty member and EMS fellowship director in the Department of Emergency Medicine at Harbor-UCLA.
- **Tim Nutbeam,** MB, ChB, Medicine, professor of emergency medicine and post-collision care, Peninsula Medical School, University of Plymouth, Great Britain; consultant in emergency medicine and prehospital emergency medicine.

Nichole Bosson, MD, MPH, NRP, FAEMS, medical director, Los Angeles County Emergency Medical Services Agency, associate professor of clinical emergency medicine at the David Geffen School of Medicine at UCLA; faculty member and EMS fellowship director in the Department of Emergency Medicine at Harbor-UCLA.

PREHOSPITAL TRAUMA COMPENDIUM: MANAGEMENT OF THE ENTRAPPED PATIENT

A POSITION STATEMENT AND RESOURCE DOCUMENT OF NAEMSP

Nichole Bosson, Ben Abo, Troy Litchfield, Zaffer Qasim, Matthew Steenberg, Jake Toy, Antonia Asuna-Garcia, John Lyng

NAEMSP TRAUMA COMPENDIUM

- 16 topics related to prehospital trauma management
- Population, Intervention, Comparison, Outcome (PICO) framework
- Systematic reviews of the literature to inform recommendations

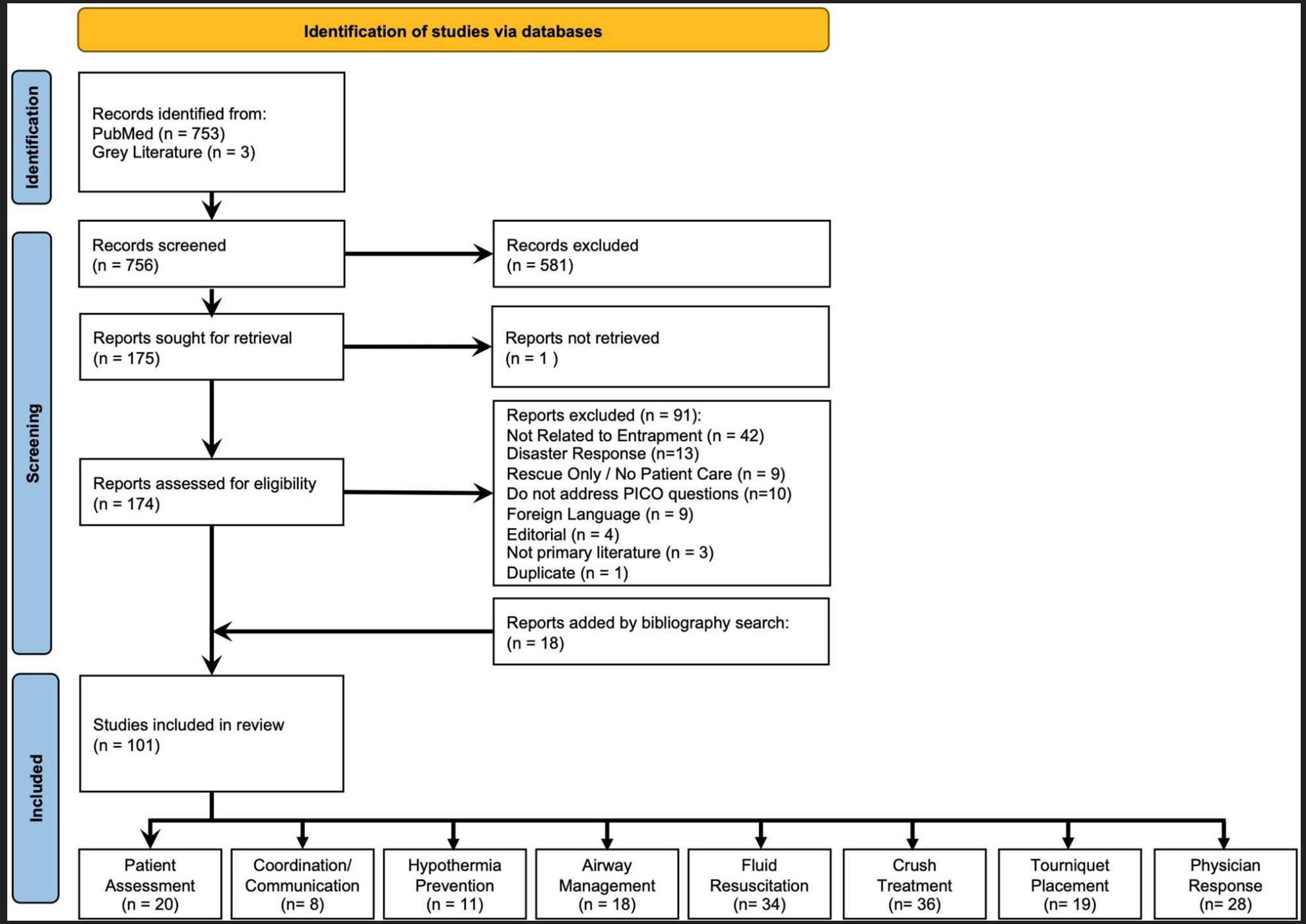
ENTRAPPED PATIENTS - BACKGROUND

- Entrapped patients are at higher risk of injury and death
- Limited access and prolonged scene time makes management of these patients different from routine trauma care
- All EMS clinicians must have the knowledge and skills to manage entrapped patients

PICO QUESTIONS

- What initial assessment should be performed on the entrapped patient?
- What is the optimal fluid management for the entrapped patient?
- What is the optimal type, timing, and frequency of medications to administer for crush syndrome?
- Should tourniquets be applied to crushed limbs?
- Does physician care at the scene improve outcomes for entrapped patients?

- How does the medical care integrate with rescue for the extrication of the entrapped victim? What additional interventions are essential for the entrapped patient with prolonged field time?
- What is the best approach to airway management for the entrapped patient?


Identification of studies via databases
Identification
Records identified from:
PubMed (n = 753)
Grey Literature (n = 3)
Screening
Records screened
(n = 756)
Records excluded
(n = 581)
Reports sought for retrieval
(n = 175)
Reports not retrieved
(n = 1)
Reports assessed for eligibility
(n = 174)
Reports excluded (n = 91):
Not Related to Entrapment (n = 42)
Disaster Response (n=13)
Rescue Only / No Patient Care (n = 9)
Do not address PICO questions (n=10)
Foreign Language (n = 9)
Editorial (n = 4)
Not primary literature (n = 3)
Duplicate (n = 1)
Reports added by bibliography search:
(n = 18)
Included
Studies included in review
(n = 101)
Patient Assessment (n = 20)
Coordination/ Communication (n= 8)
Hypothermia Prevention (n = 11)
Airway Management (n = 18)
Fluid Resuscitation (n= 34)
Crush Treatment (n= 36)
Tourniquet Placement (n= 19)
Physician Response (n= 28)

EMS clinicians must perform a timely and thorough primary and secondary assessment and reassessments in parallel with dynamic extrication planning; the environment may require adaption of standard assessment techniques and devices.

PATIENT ASSESSMENT

EMS clinicians should establish early, clear, and ongoing communications with rescue personnel to ensure a coordinated patient-centered medically directed approach to extrication. Communication with the patient should be frequent, clear, and reassuring.

COORDINATION AND COMMUNICATION

EMS clinicians should immediately take measures to effectively prevent and manage hypothermia.

HYPOTHERMIA PREVENTION

EMS clinicians should recognize airway management in the entrapped patient is always challenging. When required, advanced airway placement should be performed by the most experienced operator with proficiency in multiple modalities and alternative techniques in limited access situations.

AIRWAY MANAGEMENT

In entrapped patients who are experiencing or are at risk for crush syndrome, EMS clinicians should initiate large-volume fluid resuscitation (i.e., 1-1.5 L/h in adults and 20mL/kg/hr in pediatrics for the initial 3-4 hours) with crystalloid, preferably normal saline, as early as possible and prior to extrication.

FLUID RESUSCITATION

CRUSH TREATMENT

In entrapped patients who are experiencing or are at risk for crush syndrome, EMS clinicians should administer medications to mitigate risks of hyperkalemia, infection, and renal failure, early and prior to extrication.

Medication	Recommendation
Sodium Bicarbonate 8.4%, 50mEq slow IV push	**Always administer when feasible prior to release of crushed body part* and/or for signs of hyperkalemia**
Calcium Gluconate 10%, 10mL or Calcium Chloride 10%, 5mL slow IV push	
Albuterol Sulfate 2.5mg/3mL, 10mg or Albuterol Sulfate 90mcg MDI, 16 puffs inhaled	
Insulin Regular 10 units IV AND	Administer if available prior to release of crushed body part* and/or for signs of hyperkalemia
50% Dextrose, 50mL or 10% Dextrose, 250mL IV	
Mannitol 20%, 1-2g/kg IV every 4 hours	Not routinely recommended; consider for prolonged field care and only if adequate urine output is established and monitored
Polystyrene sulfonate 25-50 grams PO or PR	Not routinely recommended; consider for prolonged field care only
Ertapenem 1g IV or Cefazolin 1g IV AND gentamycin 1.5mg/kg IV	Administer if available, recommended for prolonged field care
Adult dosing provided; weight-based dosing recommended for pediatric patients per local protocols.	
Redosing may be necessary based on duration of action and field care duration. *The crushed body part should be entrapped for at least 1 or more hours and contain significant muscle mass (typically thigh, pelvis, shoulder girdle) for empiric treatment.	

Tourniquet application should be considered in the setting of the crushed extremity as a potential adjunct to medical optimization before extrication of some patients.

TOURNIQUET PLACEMENT

Patients with prolonged entrapment with the potential for severe injuries require complex resuscitation and may benefit from EMS physician management on scene. EMS systems should consider an early EMS physician response to entrapped patients.

PHYSICIAN RESPONSE

ENTRAPPED PATIENTS - KEY PRINCIPLES

- Perform a timely **assessment**
- Establish clear **communications**, patient-centered approach
- Prevent **hypothermia**
- **Airway management is challenging**, optimize when advanced airway is needed
- Initiate early **fluid resuscitation** for patients at risk for **crush syndrome**
- **Treat** crush syndrome when indicated **prior to release**
- Apply **tourniquets in select cases**
- Consider **physician scene response**

QUESTIONS?

Nichole Bosson, MD, MPH, NRP, FAEMS

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Tim Nutbeam, MB, ChB, Medicine, professor of emergency medicine and post-collision care, Peninsula Medical School, University of Plymouth, Great Britain; consultant in emergency medicine and prehospital emergency medicine.

Q&A

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THANK YOU!

Feedback & Questions

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