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National EMS Quality Alliance

Precious Cargo: Enhancing Safety of Pediatric Patient Transport

Safety-04: Pediatric Restraint Device Used During Transport

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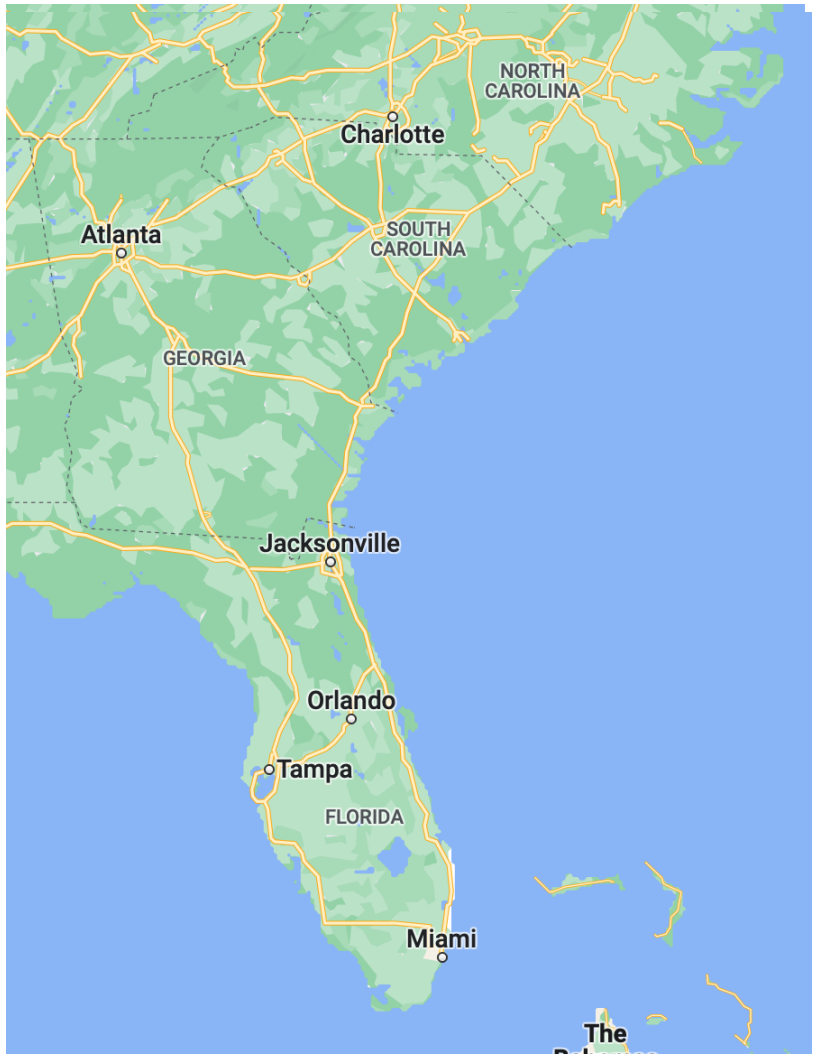
NEMSQA Measure Description

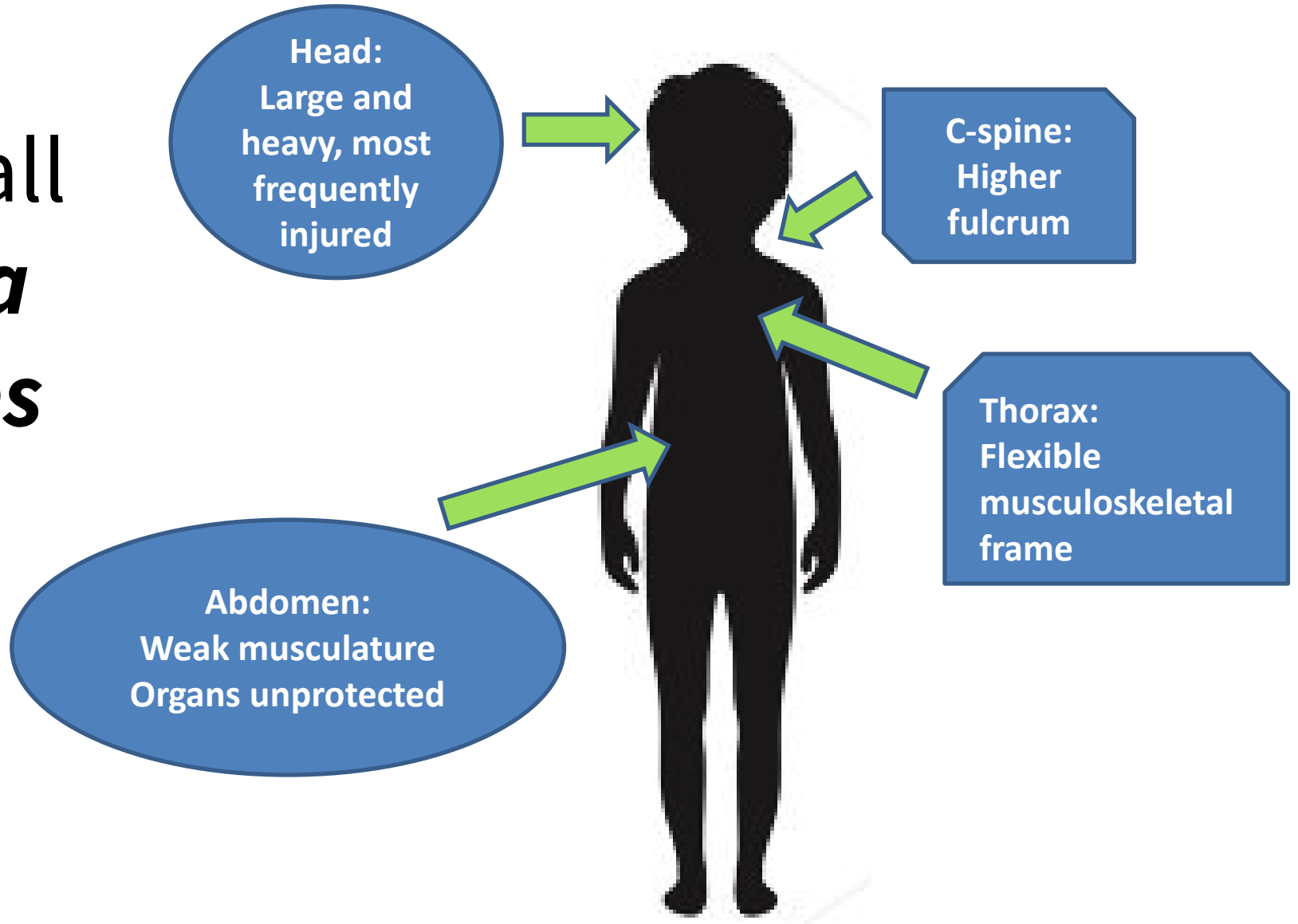
Percentage of EMS transports originating from a 911 request or interfacility request for patients ***less than 8 years of age*** during which patients are transported using a ***pediatric restraint device***.

Background



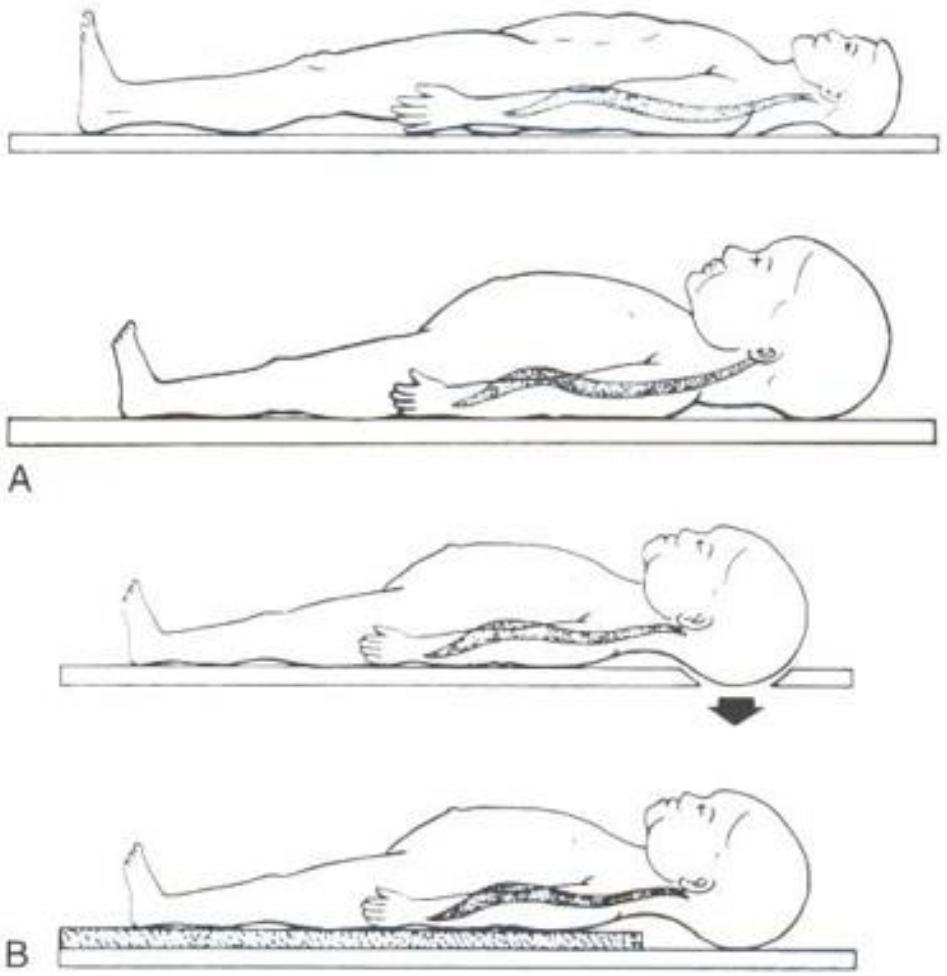
Family Vacation

Children ARE small adults…***with a few differences***



Pediatric Considerations in Transport

- Enlarged cranium creates a natural forward flexion of neck
- Car seats result in axial loading of the neck
- Abdominal breathers-cannot compress abdomen with straps
- Head to body proportions equalize to adult anatomy around age 8 years



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NHTSA Safe Transport of Children

U.S. Department of Transportation
National Highway Traffic Safety Administration

NHTSA
www.nhtsa.gov

DOT HS 811 677

September 2012

Working Group Best-Practice Recommendations for the Safe Transportation of Children in Emergency Ground Ambulances

NHTSA Safe Transport of Children

- Strategized on 5 different scenarios involving the transportation of children

The ultimate goal of the recommendations:

"Prevent forward motion/ejection, secure the torso, and protect the head, neck, and spine of all children transported in emergency ground ambulances"

NHTSA Guidelines on Pediatric Transport

Situation 1	**For a child who is uninjured/not ill**
Situation 2	For a child who is ill and/or injured and whose condition **does not require continuous and/or intensive medical monitoring** and/or interventions
Situation 3	For a child whose **requires continuous and/or intensive medical monitoring** and/or interventions
Situation 4	For a child whose condition **requires spinal motion restriction** and/or lying flat
Situation 5	For a child or children who require transport as **part of a multiple patient transport** (newborn with mother, multiple children, etc.)

NHTSA Guidelines on Pediatric Transport

Situation 1	**Uninjured/Not ill**	**Transport the child using a size-appropriate child restraint system**
Situation 2	**No continuous and/or intensive medical monitoring**	**Transport the child in a size-appropriate child restraint system**
Situation 3	**Continuous and/or intensive medical monitoring**	**Secure head first with three horizontal restraints across chest, waist, and knees and one vertical restraint across each shoulder.**
Situation 4	**Spinal motion restriction or lying flat**	**Secure the child to a size-appropriate spine board with horizontal restraints across chest, waist, and knees and a vertical restraint across each shoulder.**
Situation 5	**Multiple patient transport**	**Transport the child using a size-appropriate child restraint system**

Evidence and Rationale

Rationale from Measure Description

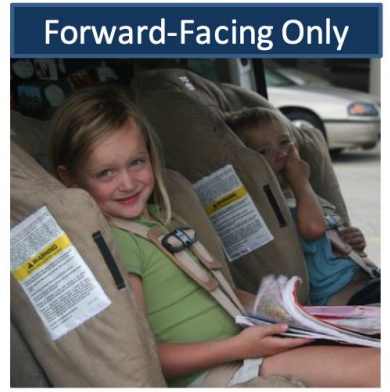
- Ambulances are at-risk for crashes and passenger injuries: Approximately 4,500 ambulance crashes happen each year with 1/3 resulting in injuries.
- Safety standards for child restraint for standard passenger vehicles exist → guidelines for transporting pediatric patients in ambulances
- EMS clinicians are not familiar with safe transport practices:
  - 2014 observational study: Majority of 40 patients were transported in an unsafe manner. ***All children aged 0-3 years were transported incorrectly.***
  - 2006 survey of EMS clinicians: 50% of respondents reported to have “a lot” or “very much” knowledge about securing a critically ill child for transport, but majority were unable to identify and/or did not always follow proper restraint protocols.

Additional Information Source

American Academy of Pediatrics: Council on Injury, Violence, and Poison Prevention

Child Passenger Safety Technical Report:

- All infants and toddlers should ride in a ***rear-facing Child Safety Seat (CSS)*** as long as possible
- All children who have outgrown their CSS should use a ***Forward-Facing Child Safety Seat (FFCSS) with a harness for as long as possible***
- All children whose weight or height is above the forward-facing limit for their CSS ***should use a belt-positioning booster seat*** until the vehicle lap and shoulder seat belt fits properly, typically when they have reached 4 ft 9 inches in height and are between 8 and 12 years of age.



Special Needs

Things not covered by NHTSA…

- Evaluate the efficacy of one child restraint system over another
- Address the unique transportation challenges of children with special health care needs
- Conduct any field tests of solutions or equipment
- Evaluate the crashworthiness of emergency ground ambulances
- Assess ambulance design

Safe Transport of Children: Interim Guidance

- EMS agencies should develop policies that include:
  - Methods, training, and equipment to secure children to reduce forward motion and possible ejection.
  - Considerations for the 5 scenarios that a child who needs transport
  - Prohibits children from being transported unrestrained (lap, arms)
  - Provision for securing all equipment during a transport
  - Use devices in the position for which they are designed and tested
- Have appropriately-sized child restraint system **readily available on all ambulances** that may transport children

Crash testing is coming soon….

- Development of ***crash test methodology*** to evaluate the safety of commercially available devices for securement of children
- Test methods for three unique transport situations:
  - supine pediatric patients (i.e., laying on their back on an adult sized cot
  - seated pediatric patients or child passengers
  - supine neonatal patients
- Testing methodology will be available to commercial vendors to test their equipment and provide verification that their device is safe for use

Practical Implementation strategies/tips/getting started

Resources for Agencies

- NASEMSO Resources:
  - Safe Transport of Children by EMS: Interim Guidance
  - Pediatric Transport Products for Ground Ambulances
- Prehospital Pediatric Readiness Project
- Review the NHTSA guidelines-do you have protocols for all 5 situations?
  - What policies, protocols do you need to develop
  - Review your patient transports for children < 8 years how many fall into each situation

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Measure Technical Details

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NEMSQA MEASURE SET

SAFETY-04

TBD

Higher= Better Quality

Individual EMS Professional
EMS Agency

Patient Safety

SCORE

SCORE INTERPRETATION

LEVEL OF MEASUREMENT

NATIONAL QUALITY
STRATEGY DOMAIN

MEASURE PURPOSE

QUALITY
IMPROVEMENT

MEASURE TYPE

PROCESS

@QUALITYEMS

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Safety-04

Who's in?
(Inclusion Criteria)

All EMS **transports** originating from a
911 request or interfacility
request for patients **less than 8 years of age**.

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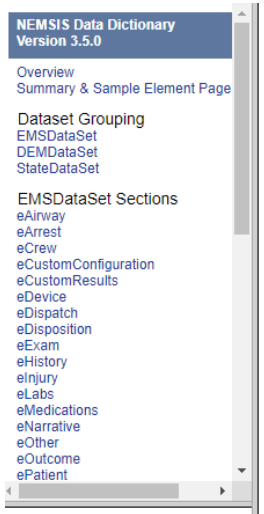

NEMSIS
Powered by NHTSA's Office of EMS

NEMSIS
Data Dictionary

NHTSA v3.5.0
Build 230317 Critical Patch 4

EMS Data Standard

Version Date: March 17, 2023

Funded by
National Highway Traffic Safety Administration (NHTSA)
Office of Emergency Medical Services

Safety-04

Who's in?
(Inclusion Criteria)

eDisposition.30

All EMS **transports** originating from a

eResponse.05 ← **911 request or interfacility** ★

request for patients **less than 8 years of age**.

ePatient.15 & 16

Initial Population **Peds <8 years Only**	ePatient.15 Age is less than 8 AND ePatient.16 Age Units is 2516009 ("Years")) OR ePatient.15 Age is not null AND ePatient.16 Age Units is in (2516001 (“Days”) 2516003 (“Hours”) 2516005 (“Minutes”), 2516007 (“Months”))))

Initial Population	eDisposition.30 Transport Disposition is in (4230001 ("Transport by This EMS Unit (This Crew Only)"), 4230003 (“Transport by This EMS Unit, with a Member of Another Crew”), 4230007 (“Transport by Another EMS Unit, with a Member of this Crew”))) Or eResponse.05 (Type of Service Requested) is 2205005 (“Interfacility Transport”)))

Measure Denominator Exclusion Criteria

- EMS responses for patients:
  - In cardiac arrest
  - With severe trauma
  - Who are immobilized
  - With active airway management

Denominator Exclusion Criteria	eArrest.01 Cardiac Arrest is in (3001003 (“Yes, Prior to Any EMS Arrival (includes Transport EMS & Medical First Responders)”), 3001005 (“Yes, After Any EMS Arrival (includes Transport EMS & Medical First Responders)”)) eInjury.03 Trauma Triage Criteria (Steps 1 and 2) is in (2903001 (“Amputation proximal to wrist or ankle”), 2903003 (“Crushed, degloved, mangled, or pulseless extremity”), 2903005 (“Chest wall instability or deformity (e.g., flail chest)”), 2903007 (“Glasgow Coma Score <=13”), 2903009 (“Open or depressed skull fracture”), 2903011 (“Paralysis”), 2903013 (“Pelvic fractures”), 2903015 (“All penetrating injuries to head, neck, torso, and extremities proximal to elbow or knee”), 2903017 (“Respiratory Rate <10 or >29 breaths per minute (<20 in infants aged <1 year) or need for ventilatory support”), 3903019 (“Systolic Blood Pressure <90 mmHg”), 2903021 (“Two or more long-bone fractures”)) eProcedures.03 Procedure is in (450591000124106 “Immobilization using long board…”) (112798008 Insertion of endotracheal tube (procedure); 16883004 Endotracheal intubation, emergency procedure (procedure); 182682004 Emergency laryngeal intubation (procedure); 232674004 Orotracheal intubation (procedure); 232678001 Orotracheal fiberoptic intubation (procedure); 232682004 Nasotracheal fiberoptic intubation (procedure); 232685002 Insertion of tracheostomy tube (procedure); 304341005 Awake intubation (procedure); 418613003 Tracheal intubation through a laryngeal mask airway (procedure); 424979004 Laryngeal mask airway insertion (procedure); 427753009 Insertion of esophageal tracheal double lumen supraglottic airway (procedure); 429161001 Insertion of endotracheal tube using laryngoscope (procedure) 450611000124 Insertion of Single Lumen Supraglottic Airway Device (procedure)))

Safety-04

What counts?
(Numerator)

eDisposition.14

EMS **transports** during which patients are **restrained** in a car seat during transport

Car seat can include any pediatric restraint device manufactured for pediatric transport

Numerator	**eDisposition.14 Position of Patient During Transport** is 4214001 (“Car Seat”)

Resources

www.nemsqa.org/nemsqa-measure-technical-documents

Users are required to create a FREE user profile to access the technical specifications in order to facilitate communication of updates to the measures.

NEMSIS Pseudocode: Measure worksheets with guidance for mapping measures/data to the National Emergency Medical Services Information System (NEMSIS) registry.

2022 NEMSQA Psuedocode Interim Update.pdf
2021 NEMSQA Psuedocode Update.pdf

Measure ID	Description	Type	National Quality Strategy Domain
Hypoglycemia-01	NEMSQA-Hypoglycemia-01_Updated_2021	Process	Clinical Process – Effectiveness
Respiratory-01 previously Pediatrics-01	NEMSQA- Respiratory-01_Updated_2021	Process	Clinical Process – Effectiveness
Asthma-01 previously Pediatrics-02	NEMSQA - Asthma-01_Updated_2021	Process	Clinical Process – Effectiveness
Pediatrics-03b	NEMSQA - Pediatrics-03b_Updated_2021	Process	Patient Safety
Seizure-02	NEMSQA - Seizure-02_Updated_2021	Process	Clinical Process – Effectiveness
Stroke-01	NEMSQA - Stroke-01_Updated_2021	Process	Clinical Process – Effectiveness
Trauma-01	NEMSQA - Trauma-01_Updated_2021	Process	Patient Experience
Trauma-03	NEMSQA-Trauma-03_Updated_2021	Outcome	Patient Experience

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Vendor Software Demos

Q&A

Referenced Studies/Guidelines

i. Durbin DR, Hoffman BD, Council on Injury, Violence, and Poison Prevention (2018) Child Passenger Safety. Pediatrics; 142(5):e20182461.

ii. Smith, N (2015) A national perspective on Ambulance Crashes and Safety. EMS World, 44(9): 91-94.

iii. National Highway Traffic Safety Administration (2012) Working group best-practice recommendations for the safe transportation of children in emergency ground ambulances. National Traffic Highway Safety Administration, DOT HS 811 677, Washington, D.C.: Department of Transportation.

iv. Fidacaro Jr GA, Jones CW, Drago LA (2018) Pediatric transport practices among prehospital providers. [Published online ahead of print 2018 Aug 13] *Pediatr Emerg Care*.

v. Woods RH, Shah M, Doughty C, Gilchrest A (2018) A survey of restraint methods for the safe transport of children in ground ambulances. *Pediatr Emerg Care*; 34(3):149-53.

vi. O'Neil J, Steele GK, Wienstein E, Collins R, Talty J, Bull MJ (2014) Ambulance transport of noncritical children: emergency medical service providers' knowledge, opinions, and practice. *Clin Pediatr (Phila);* 53(3):250-55.

vii. Johnson TD, Lindholm D, Dowd MD (2006) Child and provider restraints in ambulances: knowledge, opinions, and behaviors of emergency medical services providers. *Acad Emerg Med*; 13(8):886-92.