

# Improving Occupant Protection for Non-Critical Pediatric Patients in Ambulances:

*A Training Curriculum  
for EMS Personnel*

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# Challenges to Transporting Children in Ambulances

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- No safety standards for pediatric transport
- Child safety seats only crash tested for use in passenger vehicles
- Child safety seats may not be able to be used properly, according to instructions, in an ambulance
- Restraints designed and marketed for ambulance use may not ever have been crash tested or not crash tested according to injury criteria in the passenger vehicle standards
- Limited research and recommendations

# Basic Guidelines for Ambulance Transport

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- Children should never be held or ride on someone's lap
  - Restraining force roughly equals weight of occupant X speed of vehicle.
- Uninjured children should ride in a **passenger vehicle** in a car seat or booster seat appropriate for their height, weight, and age whenever possible!



# Car Seats and Booster Seats: Potential Locations for Use in Ambulances

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# Side-Facing Seat in Patient Compartment

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- NEVER install a car seat or booster on a side-facing bench seat or captain's chair.
- Remember: per manufacturers' instructions, car seats and boosters should only be used on vehicle seats that face forward.

# Ambulance Cots

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**CANNOT use:**

**Rear-facing only seats**

Only one belt path; cannot be adequately secured to the cot.

**Combination seats with harness**

Only one belt path; cannot be adequately secured to the cot.

**Boosters:**

Require lap/shoulder belt



# Ambulance Cots

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**CAN** use:

**Convertible car seat 5-40 lbs.**

Install facing the rear of the ambulance

Cot straps through rear-facing and forward –facing belt paths

**Dream Ride car bed**

Install perpendicular on cot

Cot straps through loops on both sides of the car bed



Source: [www.carseatblog.com](http://www.carseatblog.com)





## Convertible CSS on Cot

- Good restraint performance during impact and rebound





# Recommendations: Convertible CSS

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## For children 5-40 pounds:

- Choose seat with 5-point internal harness.
- Position seat facing rear of ambulance.
- Elevate cot backrest to fully upright position.
- Adjust restraint recline mechanism to fit snugly against cot backrest.
- Install with rear-facing and forward-facing belt paths.

# Contraindications: Convertible CSS on Cot

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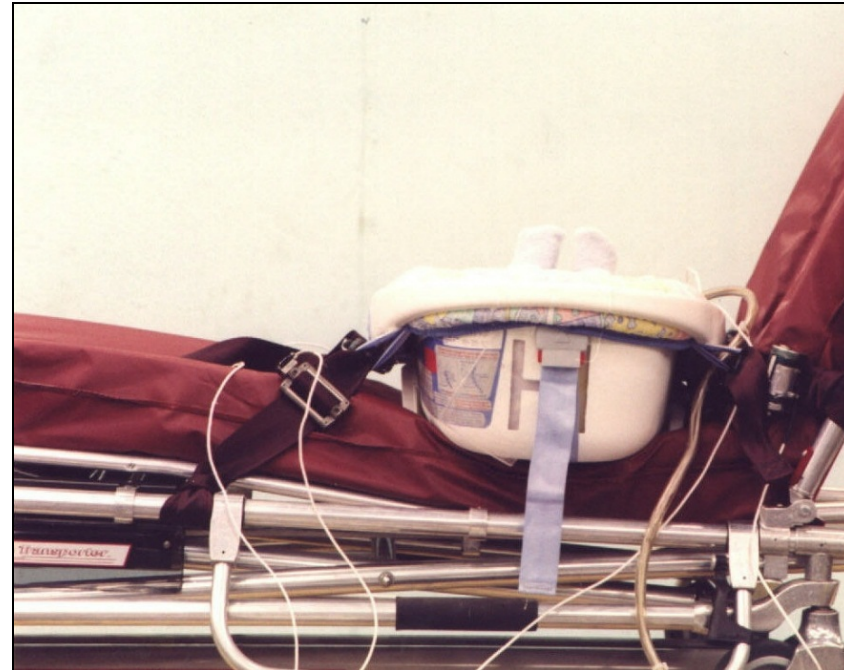
**Not** appropriate if:

- Child acutely ill or unable to maintain a normal body temperature
- Child's injuries cannot be treated in a semi-reclined position.
- Child may have a spinal cord injury.
- Child requires intubation.
- Child does not meet or exceeds wt./ht. limits of CSS.

# Car Bed

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- Dream Ride car bed with extra belt loops
- Head and torso were fully contained



# Recommendations: Car Bed

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## **For Children 5-20 pounds:**

- Designed for infants who must lie flat.
- Only use car bed with two belt systems.
  - Second set of loops must be purchased from the manufacturer.
- Elevate cot backrest to fully upright position.
- Attach belts to cot where sliding minimized.
- Position head away from side of vehicle.

## Contraindications: Car Bed on Cot

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**Not** appropriate if:

- Child acutely ill or unable to maintain a normal body temperature
- Child's injuries cannot be treated within car bed
- Child may have a spinal cord injury
- Child requires intubation
- Child does not meet or exceeds wt./ht. limits of car bed

## Part Four:


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# Restraints Specifically Designed for Ambulance Use



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**The sampling of products in this presentation is not intended to be all inclusive or imply endorsement or crashworthiness of restraints.**



# Child Restraints Designed for Ambulance Use

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- Cot Mounted Child Restraints
- Integrated Child Restraints Located Inside Ambulance Vehicle Seats

# Safe Guard Transport by IMMI

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- Cot-mounted restraint for patients over 1 year of age from 22 to 100 lbs.
- Color-coded installation system for ease of use.
- Restraint weighs 22 pounds.
- 5-point harness system with one-handed adjustment for harness height and tightness.



Source: [www.immi.net](http://www.immi.net)

- Children 22-40 pounds can use with cot back angle at 70 and 45 degrees.
- Children 40-100 pounds can use with cot back angle at 70 degrees and completely flat.
- **Not** intended for use with potential spinal cord injuries.
- Recently discontinued, crash test footage removed from website
- Contact IMMI about bulk orders
- [www.imminet.com](http://www.imminet.com), 317-896-9531



Source: [www.immi.net](http://www.immi.net)

# Neo Mate by Ferno

- For children from 7-14 lb.
- For use on specific Ferno ambulance cots.
- “Halo” pad keeps infant’s head stable
- Fully-adjustable, five-point harness system fits children firmly, and provides safe restraint during transport
- Three restraint straps easily attach to any cot
- Rolls up compactly for efficient storage and deployment
- Contact manufacturer for crash test information, [www.fernoems.com](http://www.fernoems.com), 1-877-733-0911.



# Pedi-Mate by Ferno

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- For infants and toddlers 10-40 pounds.
- For use on specific Ferno ambulance cots.
- 3 black straps attach to cot.
  - 1 top strap around back
  - 2 bottom straps, each attached to the frame
- 5-point harness system.
- Lightweight vinyl, rolls up for storage.
- Contact manufacturer for crash test information, [www.fernoems.com](http://www.fernoems.com), 1-877-733-0911.





# Pedi Mate Plus by Ferno

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- For children 10-80 pounds.
- For use on specific Ferno ambulance cots.
- 3 straps attach to cot.
- 5-point harness system.
- Made of lightweight vinyl, rolls up for storage.
- Contact manufacturer for crash test information, [www.fernoems.com](http://www.fernoems.com), 1-877-733-0911.



# EP-96 The Rescu-Air

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- Air filled child transport seat
- For children 20-40 pounds and less than 40" tall
- Stores in 21"x 14" x 6" padded carrying case
- Weighs 12 pounds



## EP-96 The Rescu-Air

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- Heavy duty cot anchoring system built into lower cushion. This enables installation on any cot
- Cot anchoring system (EP-75) consists of three straps. These straps are color coded making for easy identification and placement
- Contact manufacturer for crash test information, [www.epandr.com](http://www.epandr.com), 800-322-5725

# Quantum Q-ACR4

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Weight range 4lbs - 99lbs

Universally compatible  
with any cot

4 color-coded sizes

Machine washable

Quick release chest strap  
for medical intervention



# Quantum Q-ACR4

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- Breathable fabric maximizes airflow and meets infection control standards
- Can be used sitting or supine
- Crash-tested to BS EN (British) ambulance standards
- Contact manufacturer for specific crash test information, 516.321.9494, [www.quantumems.com](http://www.quantumems.com)



# Baby Pod II by Ferno

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- Accommodates infants
- Features include:
  - a shock absorbent inner layer
  - transparent shield for viewing infant
  - safety straps to secure infant inside the device
  - straps to secure the device to the ambulance cot
  - disposable warmer mattress





# Baby Pod II by Ferno

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- Temp. control may not be precise enough for very LBW or sick infants.
- Manufacturer approved for helicopter and ground transport use, crash test information available from Ferno Aviation, [www.fernoaviation.com](http://www.fernoaviation.com), 1-770-521-1005.



# Integrated Child Restraints in Ambulances

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- May provide solution for transporting uninjured children who must ride in the rear compartment.
- May improve ease of child restraint use for EMS personnel.
- Some models may provide EMS occupant protection when integrated restraint not in use.

## Hi-Bac Seat by E.V.S. Ltd.

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- Designed for uninjured children who must be transported in the ambulance with the patient.
- Accommodates children 20-50 pounds.
- 5-point harness, folds down from seat back.
- Child restraint cannot be used side-facing.



# Hi-Bac Seat by E.V.S. Ltd.

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- Can be equipped with lap-and-shoulder belt for staff use.
- Contact manufacturer for crash test information at 1-800-364-3218 or on the web at [www.evsltd.com](http://www.evsltd.com)



Seamless



# Guardian Safety Seat by Serenity Safety Products

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- 3 in 1 attendant seat with built-in rear-facing only seat, toddler restraint, and 4-point restraint for attendant.
- Contact manufacturer for crash test information by calling 1-800-536-0676 or on the web at [www.SerenitySafetyProducts.com](http://www.SerenitySafetyProducts.com)



# Guardian Safety Seat

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- Rear-facing only seat 5-22 lbs
- Faces rear of ambulance



- Stores in back compartment of the ambulance seat



# Guardian Safety Seat

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- Toddler and larger child integrated seat folds down
- For children 22-85 pounds

# Which Child Restraint Is Best for Your Ambulance Service?

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Consider:

- Characteristics of pediatric population served for scheduled or non-scheduled transport
- Ease of use during installation and harness procedures when securing a child in the restraint.
- Ease of cleaning and storage inside the ambulance.
- Clarity of instructions
- Availability of crash test reports
- Cost