Ambulance Transport of Noncritical Children
Emergency Medical Service Providers' Knowledge, Opinions and Practice

Lifesavers
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Acknowledgements

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• Indiana’s Emergency Medical Service (EMS) Providers

Objectives

• Briefly review safe transportation of noncritical children

• Describe our methods of observations and surveys

• Present results of our observations and surveys

• Discuss issues regarding safe transportation of noncritical children
Introduction

• Annual estimated number of ambulance crashes is approximately 6,500 (Zagaroli, 2003)

• Patient compartment of an ambulance presents multiple challenges to safe transportation
  – Traditional stretcher restraints not designed for children
  – Under-secured equipment may become projectiles in a crash
  – Emergency Medical Service providers must be able to provide care during transport

Transport Guidelines

• National Highway Traffic Safety Administration
• Centers for Disease Control and Prevention
• Emergency Medical Services for Children
• American Academy of Pediatrics

General guidelines for securing child on a cot

Correct harness placement for child on cot

- Adult cot-mouted harnesses do NOT provide effective restraint.
  - Harness system design recommendations:
    - Fixed shoulder belt attachment on top
      - Lumbar belt routed over thighs with fixed anchorage to cot
      - Belt perpendicular to lap belt with fixed anchorage
      - Soft, sliding, or breakaway chest clip
      - Lightweight one-handed strap adjustment

(Sources: American Academy of Pediatrics, AAPM)
Guidelines for child on ambulance cot

Convertible car safety seat attached to cot

- Best practice recommendations:
  - Convertible child restraint (9 to 40 pounds)
  - Install with rear-facing & forward-facing seatbelts
  - Chest strap with 5-point harness
  - Position seat facing rear of ambulance
  - Elevate cot headrest to fully upright position
  - Adjust cot brackets to fit snugly against the cot seat

Driver’s compartment
Direction of travel

Figure 1: Correct placement of convertible safety seat on ambulance cot
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Car bed on ambulance cot

Correct placement of car bed on cot

- Best practice recommendations:
  - Car bed restraint (5 to 20 pounds)
  - Remove seat belt, 4 to 30 pounds must be flat
  - Only contact back with low belt systems
  - Elevate car bed restraint to fully upright position
  - Position head away from side with sliding equipment
  - Attach belts to cot where sliding equipment

Driver’s compartment
Direction of travel

Figure 2: Correct placement of car bed on ambulance cot
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Methods

- Observational study using a convenience sample of noncritical children (newborns to 15 years) transported to Riley Hospital for Children’s (outpatient clinic and Emergency Department)
- Informed consent obtained from EMS provider
- Observation of infant or child on ambulance cot
- Survey of EMS provider’s knowledge, opinions and use of child restraint devices for transport
Results

• Sample of 63 EMS transporting 40 infants and children
  – Demographics of EMS providers
    • Age—majority (76%) 20-39 years
    • Male—55%
    • Years of experience 0-4 years (63%)
    • Private ambulance company (87%)
    • Provided both urban and rural service (70%)
    • Duration of transport less than 60 minutes (>50%)
    • Greater than 20 pediatric transports per year (83%)
  – Child demographics
    • Newborn-3 years—25%, 4 to 6 years—12%, 7 to 15 years—63%
    • 40lbs or less—26%, 41 to 99lbs—61%, 100lbs & greater—13%

EMS selection of child restraint device and its observed use

<table>
<thead>
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<th>Appropriate*</th>
<th>Correct*</th>
<th>Frequency</th>
<th>Percentage</th>
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<td>12</td>
<td>30</td>
</tr>
<tr>
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<td>No</td>
<td>11</td>
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<td>Yes</td>
<td>3</td>
<td>7.5</td>
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<tr>
<td>No</td>
<td>No</td>
<td>13</td>
<td>32.5</td>
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<tr>
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<td>2.5</td>
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<tr>
<td>Total</td>
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Description of observed transport among children suboptimally transported

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<thead>
<tr>
<th>Transport Method</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Unrestrained On Mothers Lap</td>
<td>5</td>
<td>38.5%</td>
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<tr>
<td>On Cot</td>
<td>4</td>
<td>30.8%</td>
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<td>In An Infant Car Seat</td>
<td>3</td>
<td>23.0%</td>
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<tr>
<td>In A Convertible Car Seat</td>
<td>1</td>
<td>7.7%</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

No child in the birth to 3y age group was transported correctly
EMS provider resources and knowledge

- Majority reported some knowledge of use of car seats
- Greater than 80% knew of their agencies guidelines for transporting children
- Most reported mother’s lap is NOT the appropriate for transport

Those who transported children correctly

- Younger, female, and had established pediatric protocols, and frequently transported children
- Knew approximate weight and length for car seats
- Familiar with and approved of the child restraint device provided

Those who transported children incorrectly

- Less likely to have an appropriate CSS on board
- Opined that a mother’s lap was an appropriate place to transport child
- CSS took too long to secure to cot
- Were unfamiliar with or did not approve of the CSS provided
Conclusions

- Significant number of non-critically sick or injured children are incorrectly transported by ambulance
- Easier and readily available CSS improve use of these child restraint devices in an ambulance
- Written protocols and training using CRDs improve the safe transportation of children by ambulance