

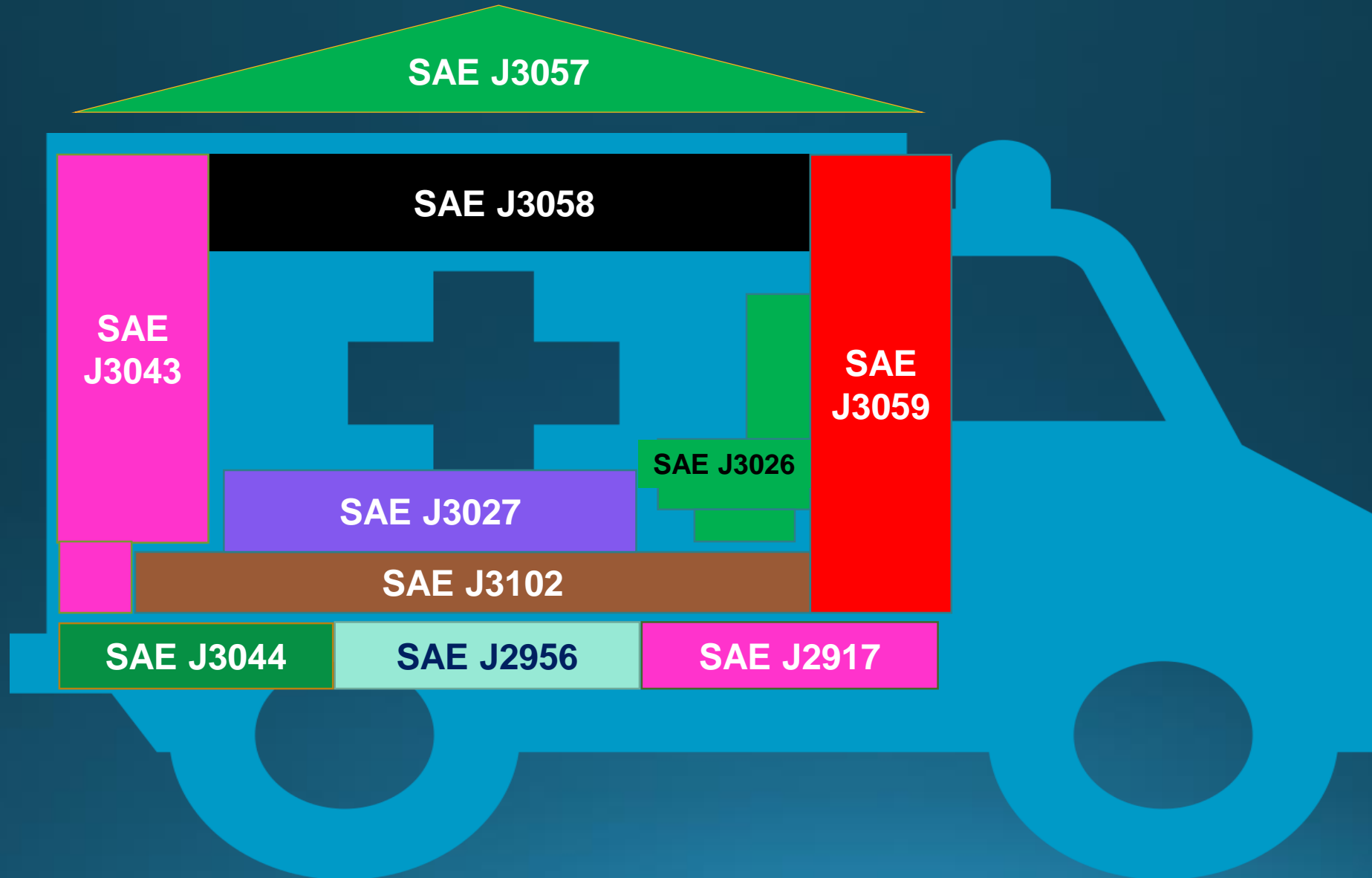
# Safely Transporting Kids: The Journey Ahead



Jim Green  
NASEMSO – Safe Transport of Children Committee Meeting  
Bethesda, Maryland, April 6, 2016



# Improving EMS Safety So Far



# The key steps in the proposed process?



# Building a Team – Potential Members

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- One or two representatives with a medical background
- Manufacturing partners
  - Seating, Cots, Child Safety Seats
- Ambulance Builders
- Government Representatives
  - NHTSA, GSA, DHHS, NIST and DHS
- Working EMS providers
- Additional Subject Matter Experts

# Identifying our goals?

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- Who are we trying to protect?
  - Neonates?
  - Infants?
  - Toddlers?
  - Preteens?
- Where are we trying to protect these children?
  - In a Captain's chair – forward or rear facing?
  - On a bench seat?
  - On a patient cot?
  - In a traditional, production car seat?

# Bounding the Problem

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When we frame this type of problem we have to know:

- The energy to be managed by the child transport system
  - Energy is defined by the crash pulse used (it defines the magnitude of the impact)
- What constitutes a “passing” or “failing” test
  - We can’t simply say we want the system to be safe – that means different things to different people

# How do we define the input energy?

- The number of crash test pulses or “input energy” sources are limited, but all are based on the same idea of a 30 mph crash into a rigid barrier:
  - Federal Motor Vehicle Safety Standards provide one pulse for frontal impact crash testing of an automobile front seat for an adult (FMVSS 208)
  - FMVSS 213 differs slightly for a child safety seat
  - The Industry-government team has already published an ambulance specific crash pulse that takes into account the stiffer frame (SAE J2917)
- \* SAE stands for the Society of Automotive Engineer – This organization publishes consensus documents – most often as test methods – based on industry best practices. The ambulance work is managed by the SAE Truck Crashworthiness Committee.



# How do we describe pass/fail criteria?

- We should think in terms of the physical structure's ability to handle the chosen crash loading.
  - Is any material fracture allowed? If so, how much?
  - How do we look at the restraint of the child on the structure?
  - Do we limit patient travel as was done with the adult cot test?
- We should also determine whether or not the loading imparted on the selected child is considered acceptable
  - FMVSS standards provide us with these limits already. Do we accept them in whole, in part or not at all?

# Child Dummy Options per FMVSS 213

## From FMVSS 213

Table to S5(f)—Average Weight of Child Represented by Various Test Dummies

Test dummy (specified in S7 of this standard)	Avg weight of child represented by test dummy (pounds)
CRABI 12-month-old infant dummy (49 CFR Part 572, Subpart R)	22
Hybrid III 3-year-old dummy (49 CFR Part 572, Subpart P)	31
Hybrid III 6-year-old dummy (49 CFR Part 572, Subpart N)	45
Hybrid III 6-year-old weighted child test dummy (49 CFR Part 572 Subpart S)	62

# Creating a true test procedure

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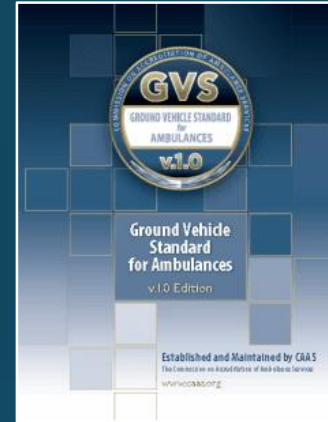
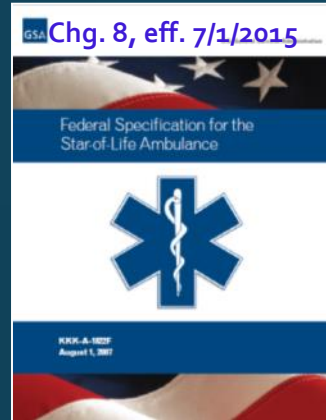
- We have to create a repeatable test method – almost like a recipe
- The test method:
  - defines terms used throughout the document,
  - creates a step-by-step process for running the test itself, and
  - Can include the pass/fail criteria
- Should be validated through full-scale testing of production child transport devices if possible

# Benefits of Validation Testing

- Validation testing provides the publisher with confidence the procedures are well understood and repeatable – **a real selling point!!**
- Testing should include manufacturers as partners
  - Manufacturers could share costs of effort by designing and manufacturing products for test
  - Non-manufacturing partners would provide funding for testing without bearing the cost of product development directly – a win-win!!
- Validating the procedures and hopefully testing redesigned products that can meet the new test method(s) hastens adoption by bumper-to-bumper standards like NFPA, GVS, and GSA

# The Final Step – Acceptance In Standards

**NFPA 1917  
Standard for  
Automotive  
Ambulances  
Effective 2016  
2nd Edition**



**Society of Automotive Engineers (SAE)  
Test Methods:**

**New Test Method(s) Covering the Safe  
Transport of Children**

- **GSA Purchase Specification revised annually**
- **CAAS revision cycle TBD**
- **NFPA revisions occur on a 3 – 5 year cycle**

# How long will this entire process take?

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Starting from the time funding is identified we should plan on the following timeline:

- 18 -24 months to develop and validate the test procedures
- 6-9 months to get the test procedures through the AMD membership review process
- 6-9 months to complete the SAE review and publication process
- 1-5 years to get the test methods adopted by GVS, NFPA, and GSA

# How do we get started?

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- A lead organization needs to be identified
- Problem needs to be bounded
- Partnerships need to be explored
- A funding needs assessment needs to be completed
- Funding will need to be identified

# Identifying a Lead Organization

- NIOSH will not participate in this effort – they are specifically a worker focused research institute
- Another federal partner potentially from DHHS or DHS may consider accepting this research task
- Industry is unlikely to tackle this alone
- Best bet is to find a champion that is independent of the federal government but can accept federal and state funding
- NASEMSO might be the perfect fit !



# Identifying funding – what are the costs

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- **Must define the scope of this effort first to understand whether or not:**
  - One or two tests methods will be required (seats and cots)
  - Partnering is an option– can costs be shared?
  - Validation testing is required – if so, it will need to be contracted
  - Committee meeting locations and costs will need to be included
  - Support for a project lead is needed

# Past Experience Can Offer Us Clues

- Government funding for testing cots totaled nearly \$200K
- Government funding for testing seating approached \$225K
  - This covered all contracted test facilities and limited test support pieces (e.g., construction of test floor)
  - This Did Not cover NIOSH engineering support or project leadership
  - This Did Not cover the costs associated with Committee meeting room rental or related travel costs
  - This Did Not include costs shared by industry

# Disseminating the results of this work

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- Strongly recommend a 5-10 minute video be created to explain new test methods, pass/fail criteria, and use of equipment in an ambulance
- Video content should be created throughout the process
- Video should be planned as web-based only to manage costs

Wrap up

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Discussion & Questions?

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