

Transportation Research Board 90th Annual Meeting,
National Academies Washington, DC, January 24th, 2011
"Transportation, Livability, and Economic Development in a
Changing World"

**Emergency Medical Services Transport
Safety Subcommittee ANB 10 (5)
2011 January Meeting:
The next steps – What
ANB10(5) can do for EMS**

Nadine Levick, MD MPH
Chair Emergency Medical Services Subcommittee ANB10 (5), TRB
CEO, Research Director, EMS Safety Foundation
Eileen Frazer RN
TRB Executive Director of Commission on Accreditation of Medical
Transport Systems (CAMTS) – Co-Chair ANB10(5)

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**Emergency Medical Services Safety
Subcommittee ANB10(5)
of the Transportation Research Board
Monday January 24th, 2011
10.15 am – 12.00 pm
also via Webinar, Washington DC**

Chair – Nadine Levick MD, MPH
Co-Chair – Eileen Frazer RN

Sponsored by Transportation Safety
Management Committee (ANB10) –

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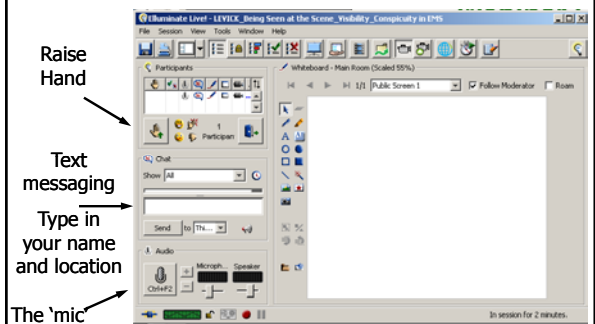
So what is a Webinar?

A Webinar is:

- Real time interactive web technology
- No other hardware is necessary aside from a computer connected to the internet and a microphone- if you choose to speak
- These interactive seminars can also be stored for later asynchronous use

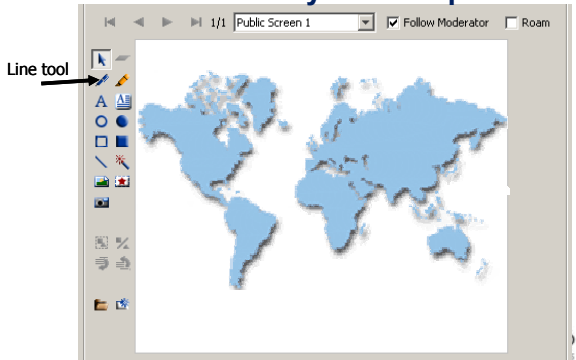
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Webinar Basics



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**..use white board tools to mark your
location..... Use your blue pen**



Today's Webinar is recorded!

The presentation
and
all comments typed in the text box



will be available for viewing via the
www.objectivesafety.net
web site within 72 hours

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This morning's Webinar

- Will cover:
 - Background on EMS Transport Safety
 - An overview of the TRB and opportunities for EMS
 - Research funding pathways via the TRB
 - Synopsis of TRB EMS Safety Subcommittee's activities
 - ACEP and NAEMT Safety project updates
 - Research and technology presentations

Today's AGENDA

1. Introductions
 2. Sub-committee work program updates:
 - a. Ambulance Transport Safety Summits – follow up
 - b. Research Needs Statements - Research Topics Database
 - c. Administrative issues:
 - i. Liaison organizations –
 - ii. Communications/Website –
 - iii. Membership/Recruitment
 - iv. 2012 TRB Session Topics and Calls for Papers
 3. Related Updates –
 - a. ACEP EMS Safety Culture Project – Rick Murray, ACEP
 - b. Montana Naturalistic EMS Transport Study -
 - c. NAEMT Safety Course development – Glen Ludkte
 4. Other business
- 10.55-11am Login break for Safety Presentations----
5. Safety Presentations
 6. Adjourn

Safety Presentations

- a. Safety Culture – Eileen Frazer
20min
- b. Fleet management technologies
 - i. Ferno/ACETECH/ASTR – Joe Bourgraf
20min
 - ii. Telematicus – Simon Ralphs
20min

What is EMS?

- Emergency Medical Services – (EMS)
- Emergency medical care, public health, public safety and patient transport
- Bridge between the community and the hospital
- Volunteer – professional
- Urban – rural
- Disaster response
- Majority of transports NOT critical or life threatening – (<3% are critical)



Transport related aspects of EMS

- dispatch of EMS vehicles
- transport policies and protocols
- vehicle fleets and vehicle design
- vehicle purchase standards
- Intelligent Transportation Systems technology
- driver training
- driver performance monitoring
- roadside and road design
- integrated traffic safety technologies
- scene safety and visibility
- safety data capture
- safety oversight

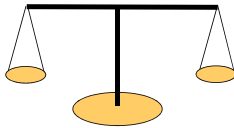
Some odd facts

- Ambulances are generally not built by the automotive industry
- Intelligent Transportation Systems (ITS), transportation safety engineering and transport systems engineering are not generally integrated into EMS systems
- Although all EMS systems have medical direction and oversight, it is rare for there to be transportation expertise oversight

Emergency Medical Service (EMS) transport

- What are the transport safety issues that pertain to this important public service and public safety industry?
- What do we know of the risks and hazards and how can we measure these ?
- How can the safety of this transport system be optimized?

Balance of concerns and risk during transport



- Response and transport time
- Clinical care provision
- Occupant safety/protection
- Public Safety

A serious problem...

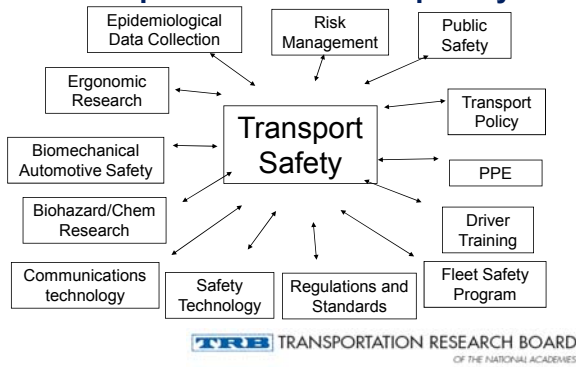
In the USA there are more safety standards for moving cattle than for moving patients



Negative impact on system performance...

- A medical error may kill a patient
BUT
- An EMS crash can kill all those involved AND wipe out a rural EMS system AND negatively impact a regions response capacity.....

Ambulance Transport Safety IS Complex AND Multidisciplinary



How bad is the problem

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USA EMS transport safety data estimates

- ~ 50,000 vehicles
- ~ 9,000 crashes a year
- ~ One fatality each week
 - ~ 2/3 pedestrians or occupants of other car
- ~10 serious injuries each day
- Cost estimates > \$500 million annually

^{*FARS/BTS 2007}
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Ambulance transport a serious USA transport safety problem...

- the most lethal vehicle on the road both per mile travelled and per vehicle
- is exempt from federal commercial fleet safety oversight (FMCSA)
- 2/3 fatalities not in the ambulance
- Exempt from most FMVSS standards

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The TRB and EMS

- **TRB Mission:**
To provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multi modal.
- Provides service to government, public, and scientific and engineering communities.
- **TRB Goals:**
 - Being prepared for challenges.
 - Conduct and promote knowledge.
 - Provide timely and informed advice.
 - Act as an effective and impartial forum.
 - Promote collaboration.
 - Contribute to the professional development
 - Conduct and promote communications efforts.
 - Contribute to public's understanding.
 - A resource to the nation and to the transportation community worldwide

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What is ANB 10 (5)?

- ▶ **Emergency Medical Services Safety Subcommittee, ANB 10 (5)**
 - Subcommittee of the Transportation Safety Management Committee ANB 10, of the Transportation Research Board of the National Academies

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EMS Safety Subcommittee ANB10(5)

- Subcommittee supported by Transportation Safety Management ANB10
- Established July 2007
- First Subcommittee meeting – Jan 2008
- Chair, Nadine Levick MD, MPH
- Co-Chair, Eileen Frazer, RN
- Scope – Medical Transport Safety

ANB10 (5) TRB EMS Subcommittee Mission

- 'Bridging the gap between what we do and what is known
- Enhancing ambulance transport safety through shared knowledge of technical data'.

Subcommittee structure

- Chair
- Co-Chair
- Administrator
- Secretary
- Project Manager
- Technical Sections
- Liaisons

Subcommittee Activities, Jan 2008-2010

- EMS Safety Summits 2008, 2009
- TRB Presentations:
 - Automotive safety perspectives - Prof Raphael Grzebieta, Chair of Road Safety UNSW
 - Achievements and milestones of aviation medical transport safety – Eileen Frazer, Executive Director of Commission on Accreditation of Medical Transport Systems (CAMTS) – Co-Chair ANB10(5)
 - Overview of EMS transport safety issues and research – Nadine Levick MD, MPH – Chair ANB10(5)
 - Safety perspectives from an EMS Medical Director – John Russell MD, CCPA
 - Ambulance Transportation Safety Summit: Analysis and Future Directions (P09-0625) Nadine Levick MD, MPH – Chair ANB10(5) and Eileen Frazer, Executive Director CAMTS – Co-Chair ANB10(5)
 - Knowledge Transfer in EMS Transportation Safety: How Does This Technical Information Translate at an Operational Level–Perspectives from Diverse Services (P09-0628) Kevin Peters, Carilion Clinic Patient Transport, Roanoke, Virginia and Jim Swartz, Careflite, Rapid Response Air & Ground Ambulance, Texas
- Policy perspectives
- Problem statement development
- Workshop on research perspectives and needs
- E-circular under development

Problem statement development in progress from 2008-2009

- Development and application of standardized definitions to capture EMS transport data across all agencies.
- Identifying ambulance fleet mix by state
- Determination of current state based emergency vehicle crash data capture and analysis; police, fire and EMS.
- Identifying the regional essential and optional equipment payload for ambulances
- Evidence for ambulance visibility and conspicuity
- Effectiveness and cost effectiveness of real time driver monitoring feedback devices for EMS services

DETERMINATION OF CURRENT STATE BASED EMERGENCY VEHICLE CRASH DATA CAPTURE AND ANALYSIS POLICY, FIRE AND EMS

- PROBLEM TITLE**
Determination of current state based emergency vehicle crash data capture and analysis; police, fire and EMS
- RESEARCH PROBLEM STATEMENT**
A significant proportion of those thousands of emergency vehicle crashes that are recorded each year in the United States...
The proposed study should be able to be accomplished in approximately 120 hours of professional time.
- OBJECTIVE**
To identify the safety issues (including potential for crash) that are associated with the current state of emergency vehicle crash data capture and analysis; police, fire and EMS.
- RESEARCH PROPOSED**
Provide a statement of the specific research proposed, how it relates to the general problem statement in Section II and, if possible, the research approach and the data to be used.
- ESTIMATE OF THE PROBLEM FINDING AND RESEARCH PERIOD**
Recommended Funding: Include an estimate of the total amount to accomplish the objectives stated in Section II. As a rough guide, the amount for the proposed study should be approximately 120,000 to 150,000 per professional and time.
Research Output: A report on the findings of the study, including a summary of the research findings, a list of recommendations, and a list of references.
- URGENCY AND PAYOFF POTENTIAL**
Include a statement regarding the urgency of the particular research. Identify and, if possible, quantify the potential and magnitude of possible benefits to the general problem, the transportation, medical, or environmental issues. The implementation of the anticipated research products should also be identified.
- RELATIONSHIP TO FTA STRATEGIC GOALS AND POLICY INITIATIVES AND NHTSA STRATEGIC PRIORITIES**
Compare the problem statement using the FTA strategic initiatives and the NHTSA Strategic Priorities.
- RELATED RESEARCH**
If available, provide information on other research completed in progress, or published that is directly related to the proposed research.
- PERSONS DEVELOPING THE PROBLEM**
Provide the specific (i.e., name, title, address, telephone, and fax number) for the person(s) who developed the problem.
- PROCESSES USED TO DEVELOP PROBLEM STATEMENT**
The FTA Safety Subcommittee team discussion and analysis.
- DATE AND ORIGINATED BY**
Provide the specific (see Section II) of the person(s) who submitted the problem and the date of submission.

How do TRB Subcommittees work?

Multidisciplinary research

- Encompassing all aspects of transportation
- The expertise that EMS needs to address its transportation safety challenges includes:
 - Systems design
 - Transport systems safety
 - Human factors
 - Vehicles
 - Vehicle operations
 - Air medical transport safety
 - Impaired operators
 - Road design and egress and access
 - Highway and operational hazards

The Transportation Research Board (TRB)

- History
TRB was established in 1920 as the National Advisory Board on Highway Research to provide a mechanism for the exchange of information and research results about highway technology.

TRB MISSION

- To provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal.

TRB divisions

- Technical Activities supports standing committees and task forces.
- Studies and Special Programs convenes specially appointed expert committees to conduct policy studies and program reviews, maintains the TRIS database, provides library services, prepares synthesis reports on behalf of the Cooperative Research Programs, and manages the Innovations Deserving Exploratory Analysis (IDEA) programs.

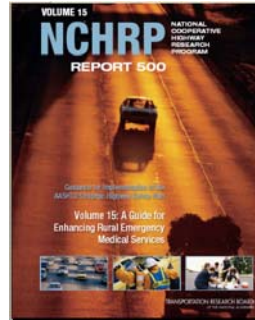
TRB research programs

- Cooperative Research Programs manages
 - National Cooperative Highway Research Program - NCHRP
 - Transit Cooperative Research Program - TCRP
 - Airport Cooperative Research Program - ACRP
 - National Cooperative Freight Research Program - NCFRP
 - Hazardous Materials Cooperative Research Program - HMCRP
- Strategic Highway Research Program 2 (SHRP-2)
 - manages a targeted, short-term, results-oriented program of contract research designed to advance highway performance and safety for U.S. highway users.
- Administration and Finance provides financial, information technology, and other administrative support, including financial oversight of the contracts and grants that support the work of TRB, administration of publications sales and distribution, and maintenance of benefits and services for sponsor and affiliate organizations.

Special role for EMS at TRB

- One of the Key 4 E's
 - Engineering
 - Education
 - Enforcement
 - Emergency Medical Services**

Transportation Research Board is an excellent resource... we should be using it!!



In Summary TRB Services

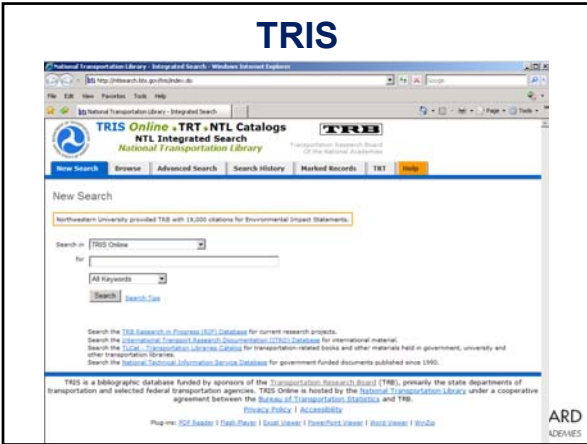
- A resource to the nation and to the transportation community worldwide
 - Opportunities for information exchange on current transportation research and practice
 - Management of cooperative research and other research programs
 - Analyses of national transportation policy issues and guidance on federal and other research programs
 - Publications and access to research information from around the world.

TRB Annual Symposium

Who is attending the general TRB meeting

TRB Structured Transportation Research Programs, Agendas and Resources

TRIS



ARD
ADMMES

Transportation Research Information Services (TRIS)

- Online Research Information
- TRB produces and maintains the Transportation Research Information Services (TRIS), the world's largest and most comprehensive online bibliographic database of published and ongoing transportation research.
- Through a cooperative agreement with the Bureau of Transportation Statistics, the TRIS Database is available on the Internet through the website of the National Transportation Library. This service, TRIS Online, can be accessed through the TRB homepage at www.TRB.org. TRIS is also available through two fee-based services, Dialog and Silverplatter's TRANSPORT CD-ROM.

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Other TRB Online Resources

- Research in Progress (RiP) Database
- RiP provides access to more than 9,500 descriptions of current or recently completed transportation research projects from federal and state transportation agencies, universities, and international organizations
- The TRB Publications Index is a searchable index of the Board's papers and reports.

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Synthesis Program

- Reports on current knowledge and practice
- Synthesize fragmented, scattered, and unevaluated existing information
- Initiation of ~ 12 syntheses per year
- Selection process for synthesis topics:
 - widespread enough to generate broad interest
 - timely and critical for expediting delivery, improving the quality, or lowering the cost of transportation programs
 - current practice is non-uniform or inconsistent from agency to agency, or if the validity of some practices appears to be questionable
 - a need to organize and compress that which has already been learned and written on the topic
 - ongoing research or other activities in progress should not render the synthesis obsolete shortly after completion

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<http://www.trb.org/Studies/Synthesis/SynthesesNCHRP.asp>
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National Cooperative Highway Research Program (NCHRP) Synthesis

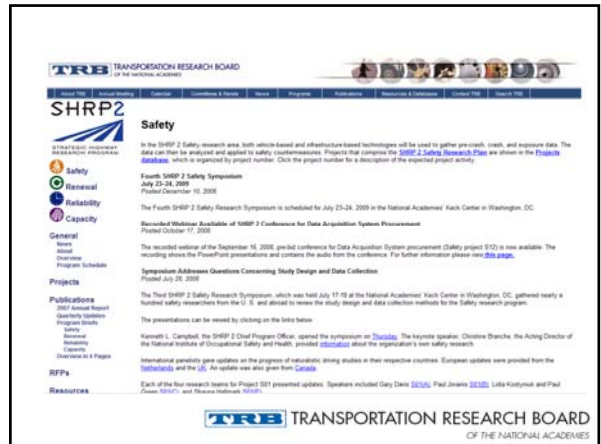
- New NCHRP Synthesis topics submissions due February, 2011

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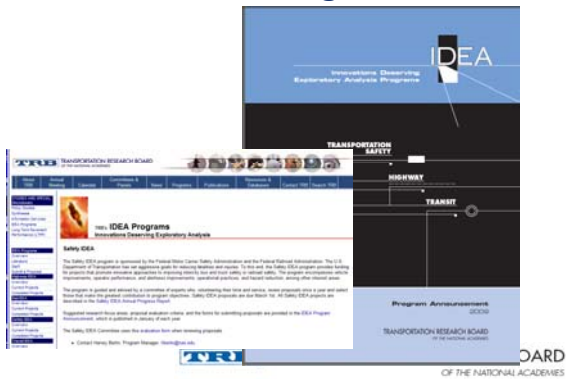
Strategic Highway Research Program (SHRP 2)

- Congress established the second strategic highway research program (SHRP 2) in 2006 to investigate the underlying causes of highway crashes and congestion in a short-term program of focused research. Focus areas:
 - Safety:** Significantly improve highway safety by understanding driving behavior in a study of unprecedented scale
 - Renewal:** Develop design and construction methods that cause minimal disruption and produce long-lived facilities to renew the aging highway infrastructure
 - Reliability:** Reduce congestion and improve travel time reliability through incident management, response, and mitigation
 - Capacity:** Integrate mobility, economic, environmental, and community needs into the planning and design of new transportation capacity



The screenshot shows the TRB website for SHRP 2 Safety. It features a navigation menu with links for Home, About, Publications, and more. The main content area is titled 'Safety' and includes a brief overview of the research area, a list of publications with dates, and a section for projects. The TRB logo and name are at the bottom.

IDEA Program



The screenshot shows the IDEA Program website. It features a navigation menu with links for Home, About, Publications, and more. The main content area is titled 'IDEA Programs' and includes a brief overview of the program, a list of publications with dates, and a section for program announcements. The TRB logo and name are at the bottom.

Research Approaches

- Submission avenues:
 - Synthesis topic - NCHRP
 - SHARP 2 – Safety
 - Research questions/Problem statements

Sample Research Question

TEMPLATE AND EXAMPLE

Title

The purpose of the study is to explore roadway engineering improvements that can be implemented to reduce drunk driving crashes. It is generally accepted that most DWI crashes are behavioral in nature, one or more drivers being intoxicated with alcohol or other drugs. Yet, studies on the locations of DWI crashes do find specific locations where a disproportionate number of such crashes occur. The purpose of the study will be to identify potential roadway engineering improvements that could reduce DWI crashes, including changes in roadway geometry, signage, signage, creation of obstacles to slow drivers, automated detection systems for erratic driving, adaptive signals to slow vehicles, and other roadway technologies.

The research study will accomplish three tasks. First, the researcher will review the literature on engineering features to identify possible improvements and roadway technologies that could reduce DWI crashes. Second, the researcher will conduct interviews with knowledgeable individuals about each of the technologies to explore benefits, problems and potential costs. Third, the researcher will produce a report comparing the technologies and will estimate the likely benefits and costs of each of the technologies, and will produce a prioritization.

Objective

The objective is to increase the range of tools available for departments of transportation and public works and local police to reduce DWI crashes.

Key Words

Safety engineering, DWI, Behavior modification

Related Work

Studies have been conducted that demonstrate concentrations of DWI crashes (hot spots).

There is a long history on mitigating crash hot spots

Implementing improvements could reduce DWI and other behavioral-induced crashes

Very important. This study is very important because drunk driving is the major cause of motor vehicle fatalities in the United States which, in turn, places a huge cost on our society, both monetary and in terms of the public good.

Cost

\$75,000 - \$125,000

User Community

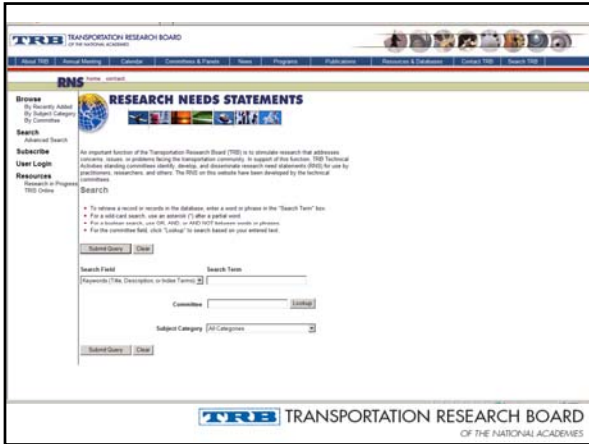
FHWA, NHTSA, ITE, AASHTO, AMPO, NARC, IACP, USDOT, NIJ

Implementation

The study will involve a literature review, interviews with experts, and a conceptual evaluation.

Effectiveness

This would be a first step in identifying new or overlooked technologies that could reduce DWI crashes



Who is here in this EMS Subcommittee meeting this year

TRB EMS Safety Subcommittee Summits 2008 and 2009

TRB Ambulance Transport Safety Summit Conceptual Outline

- Systems Safety Engineering
- Transport safety, Biomechanics, Ergonomics, Clinical care and Outcomes
- Patient, Provider and Public safety focus
- Low hanging fruit
- Transfer knowledge into practice
- Path forwards

Path Forwards

- Disseminate technical information
- Enhance understanding of technical transportation issues
- Facilitate sharing of information as standards are developed
- Interdisciplinary Collaboration
- Support the formulation of a transportation focused research agenda

National Academies Transportation Research Board Ambulance Transport Safety Summit – October 29, 2009

- Bridging the gap between what we do and what is known
- Enhancing ambulance transport safety through shared knowledge of technical data
- Open access, outreach to all EMS related organizations, and beamed to EMS Expo!

2009 Summit Scope

- The realm of burden and benefit
 - measuring the safety of the system
 - determining the economic, ethical and risk benefit challenges
- Transport System Management
 - fleet safety and oversight technologies and policies
 - operations management – dispatch, congestion routing, deployment of resources, benchmarking
- Vehicle safety
 - occupant protection design and testing
 - Vehicle performance safety
 - vehicle and personnel human factors issues
- Dissemination and Policy
 - Knowledge transfer
 - Standards, specifications and policy

2009 TRB Summit Participants

<http://www.objectivesafety.net/TRBSummit2009.htm>

- Technical experts
 - Automotive safety engineering, occupant protection
 - Automotive and EMS operational ergonomics and human factors
 - Transportation systems safety engineering
- Government agencies
 - National Highway Traffic Safety Administration (NHTSA)
 - Department of Transportation ITS (DOT)
 - National Transportation Safety Board (NTSB)
 - Federal Highways Administration (FHWA)
 - Federal Motor Carrier Safety Administration (FMCSA)
 - Bureau of Labor and Statistics (BLS)
 - Department of Homeland Security (DHS)
- EMS State Directors
- EMS Services
 - private and municipal from across North America
 - Fire/EMS
 - Volunteer EMS
- Industry partners
 - EMS Equipment
 - Vehicles, both OEM and aftermarket
- Academics

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Please do go and access this information, it comes from technical and operational experts and it is gratis



Its out there NOW

- TRB 2009 Summit – addressed the key and interdisciplinary issues, in one day – please seek that information out.
- TRB Summits held, 2008, 2009 and both with vehicle engineering and transportation systems technical expertise
- For the Summit archives:
 - www.objectivesafety.net/TRBSummit2008.htm
 - www.objectivesafety.net/TRBSummit2009.htm

EMS Safety Summit Wrap Up Prof. Art Cooper

- Burden/Benefit
 - Safety Data
 - Multiple datasets – not interoperable, huge holes
 - Inconsistent definitions, incomplete collection
 - Economics
 - Vehicles: small fortune; crashes: many fortunes
 - Data-driven business and insurance case is strong
 - Ethics and Risk/Benefit
 - Decision rules ↓ crashes, but few use them
 - Technology also ↓ crashes, but few have it

EMS Safety Summit Wrap Up

- Transport System Management
 - Fleet/Vehicle Operations Safety
 - Safety program/culture – crashes ↓ 60%
 - “Trust, but verify” – in vehicle feedback device “telematics”
 - Align rewards with safety, not profit
 - Operations Management
 - EMD ↓ hot responses, hence crashes
 - ITS: great promise in ↓ crashes
 - Dynamic deployment, visual systems ↓ crashes

EMS Safety Summit Wrap Up

- Vehicle Safety – Assessment and Design
 - Vehicles
 - Our engineering colleagues are way ahead of us
 - Special Populations – Pediatric to Bariatric
 - Special populations → illustrative solutions
- Information Sharing and Research Priorities
 - Knowledge Transfer/Dissemination
 - The world is large...our “worlds” are small, and insular
 - Standards/Specifications/Policy
 - For vehicles, not patients or providers...*must* change!

Solutions?

- National Incident Management System
 - *Unified* ICS (potential partnership with DHS)
- **T**ogether **E**veryone **A**chieves **M**ore
 - TeamSTEPPS (AHRQ/TriCare) may help
- Government can't (and shouldn't) do it alone
 - Interdisciplinary professional collaboration needed
- We all know what needs to be done
 - TRB White Paper → interdisciplinary NAs panel

Thoughts To Ponder

- Public Health Answering Points
 - Health advice for patients at home
- No substitute for the human touch
 - Mid level providers/advanced practice medics
- PC based telemedicine in rural areas
 - Skype™ has shown us how to do it
- Fossil fuels will be prohibitively expensive
 - Medical transport only a last resort



EMS Safety: Turning Ideas Into Action

Jeffrey W. Runge, MD, FACEP
Biologue, Inc. and The Chertoff Group, LLC
January 5, 2010

Framework for Approaching Big Problems

- Understand the problem
 - ✓ Quantify
 - ✓ Identify root causes
 - ✓ Identify risk factors, susceptibility, consequences, and cost
- Understand and agree what “success” looks like
- Identify needed capabilities and potential actions
- Identify barriers and impediments
- Identify stakeholders and champions
- Identify roles and responsibilities for actions
- Specify timelines with accountability for results

Data...

- What is your transport safety record in your service?
- How can you improve if you don't have a meaningful measure of safety performance?
- Transport safety is not guesswork, it is a science

Science behind Policy

- “For successful technology, reality must take precedence over public relations, for Nature cannot be fooled.”

Richard P. Feynman 1988

State Strategic Highway Safety Plans

- Required as part of the SAFETEA-LU legislation
- Effective October 1st 2007
- Focus is the 4 ‘E’s
- EMS is a core theme

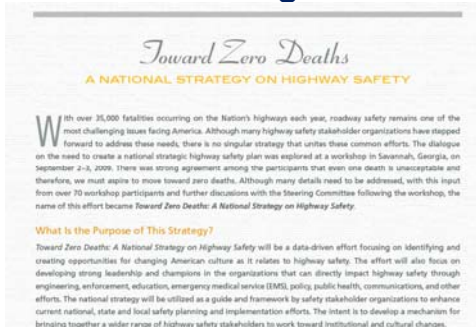
State SHSP EMS Focus*

STATE SHSP	AREA of EMS FOCUS
<u>New York</u> EMS Section 6 of 43 pages	<ol style="list-style-type: none"> 1. Emergency Medical Services Dispatch Services 2. Emergency Medical Services Partnerships 3. Pre-hospital Training Programs 4. Road Condition and Incident Response 5. EMS Responder Crash Prevention
<u>Montana</u> EMS Section 4 of 36 pages	<ol style="list-style-type: none"> 1. Establish EMS Legislation and Regulation 2. Provide EMS Funding 3. Enhance Capabilities for Medical Response to Disaster 4. Expand EMS Human Resources 5. Enhance EMS Education System 6. Expand EMS Services 7. Facilitate EMS Communications 8. Conduct EMS Public Education and Information Programs 9. Conduct Injury Prevention Public Awareness Efforts 10. Enhance Medical Direction 11. Provide Enhanced Trauma System and Facilities 12. Establish an EMS Information System 13. Evaluate and Monitor EMS Programs
<u>Alabama</u> EMS Section 8 of 47 pages	<ol style="list-style-type: none"> 1. Identify and Analyze Performance Data 2. First Responders 3. Identify Crash Location 4. Statewide assessment and Plan 5. Improve EMS Rural Access

*Cordi H, Levick N, Strategic Highway Safety Plans –Where is EMS?, Jan.2008.

TZD

EMS and TZD August 25-26th



Federal Highway Administration FHWA Toward Zero Deaths

- The 4 E’s
- EMS role advancements
 - NEMSIS
 - Transport Safety
 - EMS Z.15
 - Enhancement of Trauma Systems

Discussion