Progress on Evidence-Based Guidelines For Prehospital Emergency Care

Office of Emergency Medical Services, National Highway Traffic Safety Administration
Since 2008, the National Highway Traffic Safety Administration (NHTSA) Office of Emergency Medical Services and the Emergency Medical Services for Children (EMSC) Program (Health Resources and Services Administration), have been fortunate to work with EMS stakeholders to create and pilot test a model for developing and implementing evidence-based guidelines (EBGs) for prehospital emergency care. NHTSA is pleased to share the progress (Appendix A) of the project with the EMS community.

**INTRODUCTION**

In 2001, the National EMS Research Agenda recommended that EMS professionals apply the evidence from scientific research to improve patient care. Responding to this call to action, in 2006 the Institute of Medicine (IOM) released a report on the Future of Emergency Care in the United States, which called for several specific recommendations on improving prehospital emergency care, including that NHTSA:

- “…Convene a panel of individuals with multidisciplinary expertise to develop evidence-based model prehospital care protocols for the treatment, triage, and transport of patients, including children.”

A nationally accepted set of evidence-based model guidelines would allow state EMS officials and local EMS agencies to provide patient care based on the best available scientific knowledge of prehospital care practices. Such EBGs would be flexible and generic enough to allow state and local guidelines to take into account local population needs and available resources. While the evidence base for prehospital care is growing, there is considerable variation in the treatment interventions and response approaches used as well as timely implementation of new knowledge among EMS systems. Furthermore, there is frequently a lack of evidence on the impact of current practices on patient outcomes. Careful analysis of the available evidence can identify those interventions that have been proven to be effective and are optimal for application. EBGs are an important element in improving the quality of prehospital care, as they promote a consistent approach by prehospital providers for a given clinical scenario, and thus facilitate creation of standard for measures to evaluate the quality of prehospital emergency care.

**BACKGROUND**

In September 2008, NHTSA convened a National EMS Evidence-Based Guidelines meeting, sponsored by the Federal Interagency Committee on EMS (FICEMS) and the National EMS Advisory Council (NEMSac). The conference was attended by representatives of EMS stakeholder organizations who heard presentations by a panel of international experts with extensive, multidisciplinary expertise in EMS, research, and EBGs, and provided input for the National Model Process (the Model Process).

**ACTIVITIES TO-DATE**

- National Stakeholder Meeting
- Development of the Model Process

**National Stakeholder Meeting**

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**Development of the Model Process**

Input from conference attendees was used to draft the Model Process (Appendix B) for the development, implementation, and evaluation of EBGs guidelines. The Model Process emerging from this conference was subsequently approved by both FICEMS and NEMSac. One feature of this model is the reliance on an objective and transparent process for appraising the quality of clinical evidence, such as the process used in the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system. A manuscript describing the Model Process was published in Academic Emergency Medicine in 2012.

**FUTURE PLANS**

Manuscripts on EBGs for pain management, HEMS, pediatric seizure management, and pediatric respiratory distress are in development for submission to a peer-reviewed journal. Future plans also include examining the implementation process of EBGs at the state level through a cooperative agreement awarded by NHTSA to NAS-EMSS in September of 2012. Finally, based on the recommendations of the CNMC study and stakeholder input, the Model Process will likely be modified to enhance its adoption and implementation by local, state, and national EMS stakeholders.

**FOR MORE INFORMATION**

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**DECISION-MAKING CULTURE IN EMS**

The EMS National Research Agenda, IOM, and several national organizations have repeatedly voiced the need for more research in EMS. As the body of research grows, the importance and feasibility of making patient care decisions based on existing scientific evidence in the prehospital setting will also increase. The process for developing clinical guidelines, based on an unbiased, transparent, and rigorous appraisal of the scientific evidence, is substantially different from basing patient care decisions on historical consensus, local convention, individual opinion, or anecdote. This Model Process project will serve as a resource and model for national, state and local EMS organizations in a time of transitioning culture and growing research in EMS. Such a model brings together professionals on a multidisciplinary level to enhance and support guideline development from a comprehensive knowledge base around the scientific evidence that exists for EMS. The Model Process will serve to clearly and systematically identify knowledge gaps, focusing future prehospital research to promote more robust prehospital care guidelines. A nationally utilized set of guidelines will help to ensure more consistency in prehospital care, while accommodating varying EMS system resources and environments.

**The Model Process: Beta-Test**

- With funding provided by the Health Resources and Services Administration (HRSA) and the Public Health Service (PHS), NHTSA is currently working with a number of states and EMS agencies to implement the Model Process. The project includes the development of four EBGs:
  - Pain Management
  - Trauma
  - HEMS
  - Pediatric Seizures

- The Model Process is being used to develop EBGs for prehospital pediatric seizures at Children’s National Medical Center (CNMC) and in Alabama. The project is also being used to develop EBGs for pediatric respiratory distress by MIEMSS as part of their existing statewide protocol development process. One EBG being developed by MIEMSS is for all modes of transport, while another EBG focuses on pediatric respiratory distress in the helicopter setting. Both guidelines were reviewed by MIEMSS review committee and are optimal for application. EBGs are an important element in improving the quality of prehospital care, as they promote a consistent approach by prehospital providers for a given clinical scenario, and thus facilitate creation of standard for measures to evaluate the quality of prehospital emergency care.
APPENDIX A: PROJECT TIMELINE

PROJECT STAGES

- Development
- Completed phases
- Future plans

2001
- Publication of the NHTSA National EMS Research Agenda calling for evidence-based protocols for EMS

2006
- Release of the Institute of Medicine recommendation to develop evidence-based model prehospital care protocols
- Call for proposals for EBG development

2008
- Development and pilot-testing of pediatric seizure EBG by EMSC-NRC
- Presentation of the Model Process at SAEM annual meeting

2009
- NHTSA-convened panel of multidisciplinary expertise to develop an evidence-based model for prehospital care protocols
- NHTSA and EMSC competitively awarded the contract to CNMC
- Implementation of pilot test initiated
- Abstract presentation on use of GRADE methodology for prehospital care to Canadian Emergency Medicine annual meeting
- Award of EMSC target-issues grant to implement an EBG for pediatric respiratory emergencies
- Development and submission of manuscripts on each of the three EBGs to a peer-reviewed journal

2010
- Review and partial adoption by MIEMSS protocol and review committee
- Implementation of the prehospital pain management protocol in Maryland

2011
- Cooperative agreement awarded by NHTSA to NASEMSO for a statewide guideline implementation project
- The NEMSAC makes recommendations regarding EBG next steps

2012
- Call for proposals for EBG development
- Collaboration with stakeholders on developing the next steps for EBGs, including modifying the model as needed for broader use

2013
- Publication of manuscript describing the EBG development process in Academic Emergency Medicine

ABBREVIATIONS

- CNMC: Children’s National Medical Center
- EBG: Evidence-Based Guideline
- EMSC: Emergency Medical Services for Children
- EMSC-NRC: EMSC-National Resource Center
- GRADE: Grading of Recommendations, Assessment, Development, and Evaluation
- MIEMSS: Maryland Institute for Emergency Medical Services Systems
- NASEMSO: National Association of State EMS Officials
- NEMSAC: National EMS Advisory Council
- NHTSA: National Highway Traffic Safety Administration
- SAEM: Society for Academic Emergency Medicine
### System Inputs
- Prehospital components of externally developed guidelines, e.g., AHA, NAEMSP, BTF, NICE, NZGG
- Protocols from existing EMS systems, e.g., Nova Scotia
- External evidence synthesis processes, e.g., Cochrane systematic reviews
- Individual researchers, EMS organizations, medical directors, and EMS personnel

### Guideline Initiation: EMS Evidence Accumulation and Evaluation
- Review proposals for guideline adaptation or adoption
- Identify existing systematic reviews
- Recommend need for or conduct systematic review
- Assemble advisory panel with appropriate subject expertise in topic, guideline development, library science, etc.
- Document conflicts of interest for all participants

### Evaluation of Effectiveness, Outcomes, Clinical Research, QI Evaluations
- Guideline/protocol pilot testing and feasibility studies (may occur during development process)
- Monitor local quality improvement benchmarks and indicators, quality improvement processes at all levels Apply NEMSIS data to evaluation process
- Apply NEMSIS data to evaluation process
- Outcomes research: EMSOP – local, regional, statewide, national
- Clinical research of specific questions
- Systems research (See EMSOP II and IV)
- Cost effectiveness, cost-utility, cost-benefit analysis (See EMSCAP papers)
- Implementation research – analysis of barriers and facilitators to implementation

### Establish Priorities for Guideline Development
- Evaluate quality of evidence of guideline, e.g., GRADE, AGREE
- Recommend topics for further guideline development
- Archive material not selected for future use

### Guideline Development
- Document risks and benefits of intervention: first do no harm
- Develop strength of recommendation, e.g., GRADE
- Document and disseminate rationale for “no recommendation”
- EMS “contextualization”
- Write, adapt, or endorse guideline
- Provide feedback to originating institution or organization

### Implementation
- Link to national EMS provider certification and recertification
- Link to national EMS agency accreditation
- Develop guideline implementation “tool kits,” webinars, manuals, integration into local protocols
- Partner with national organizations to facilitate interpretation, application and medical direction
- Potentially link to funding and reimbursement, e.g., CMS, third-party
- Develop health informatics and clinical decision support software
- Develop quality improvement measures and tools in local, regional, state, and tribal areas

### Dissemination of Guidelines and Protocols
- Link to EMS Education Agenda for the Future → Core Content → Scope of Practice Model → National EMS Education Standards
- Link to National EMS Education Program Accreditation
- Publications: peer-reviewed journals, trade press, textbooks, government reports
- New products: education materials, quality improvement materials
- Target stakeholder organizations
- Multimedia approach: ems.gov, podcasts, etc.

### ABBREVIATIONS
- AGREE: Appraisal of Guidelines Research and Evaluation
- AHA: American Heart Association
- BTF: Brain Trauma Foundation
- CMS: Centers for Medicare and Medicaid Services
- EMSCAP: Emergency Medical Services Cost Evaluation Project
- EMSOP: Emergency Medical Services Outcomes Project
- EMSSP: Emergency Medical Services Outcomes Project
- NEMSIS: National EMS Information System
- NICE: National Institute for Health and Clinical Excellence
- NZGG: New Zealand Guidelines Group
- NAEMSP: National Association of EMS Physicians