# National Emergency Medical Services Information System (NEMSIS)

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Abstract

The absence of emergency medical services (EMS) patient care data has hindered development and evaluation of EMS systems. The National Highway Traffic Safety Administration (NHTSA), in cooperation with the Health Resources and Services Administration (HRSA), has provided funding to the National Association of State EMS Directors to develop a National EMS Information System (NEMSIS). NEMSIS is being designed to provide a uniform national EMS dataset, with standard terms, definitions, and values, as well as a national EMS database, with aggregated data from all states on a limited number of data elements. Forty-eight of the states, the District of Columbia, and three territories signed a memorandum of agreement documenting support for the NEMSIS project and expressing a desire for full implementation of the NEMSIS dataset. NHTSA has agreed to house the National EMS Database at its National Center for Statistics and Analysis. NHTSA, in cooperation with HRSA and the Centers for Disease Control and Prevention, recently entered into a cooperative agreement with the University of Utah School of Medicine to operate a NEMSIS Technical Assistance Center that will provide related assistance to official EMS agencies and to commercial software vendors. The Technical Assistance Center will also biannually assess state and territorial capabilities to provide data to the national EMS database. NEMSIS will provide a uniform national EMS dataset, with standard terms, definitions, and values, as well as a national EMS database, with aggregated data from all states on a limited number of data elements. Many of the potential benefits of implementation of NEMSIS are enumerated in this report. **Key words:** emergency medical services; information systems; dataset.

PREHOSPITAL EMERGENCY CARE 2006;10:314–316



## History and Background

Since the publication of *Accidental Death and Disability: The Neglected Disease of Modern Society*[1] in 1966, the absence of prehospital patient care data has plagued development of emergency medical services (EMS) systems. The program guidelines of the EMS Program from the Department of Health, Education and Welfare stressed the importance of "standardized patient record keeping" as one of the 15 components of an EMS system[2].

In *Emergency Medical Services for Children*,[3] the Institute of Medicine stressed the need for reliable information as a basis for determining 1) the extent to which systems are providing appropriate, timely care or 2) what they should be doing to improve performance and patient outcome.

In 1993, the National Highway Traffic Safety Administration (NHTSA) supported the development of the Uniform Prehospital Dataset.[4] While this dataset served for years as a guide for the essential elements that should be included in a patient care report, it was not intended to be comprehensive or to result in the collection of national EMS data.

The *Emergency Medical Services Agenda for the Future*[5] made five recommendations for EMS information systems: 1) EMS must adopt a uniform set of data elements and definitions to facilitate multisystem evaluations and collaborative research; 2) EMS must develop mechanisms to generate and transmit data that are valid, reliable, and accurate; 3) EMS must develop and refine information systems that describe the entire EMS event so that patient outcomes and cost-effectiveness issues can be determined; 4) EMS should collaborate with other health care providers and community resources to develop integrated information systems; and 5) EMS information system users must provide feedback to those who generate data in the form of research results, quality improvement programs, and evaluations.

In October 2001, the General Accounting Office[6] indicated the importance of consistent information to 1) improve performance at a local level, 2) set and monitor national level policy, and 3) improve researchers' ability to assess EMS outcomes.

Mears et al.[7] tracked the history of EMS and EMS-related data systems, discussed general principles of designing EMS information systems, and emphasized the importance of developing a national EMS database.

### Revision of the National EMS Dataset

Since fiscal year 2001, NHTSA, in cooperation with the Health Resources and Services Administration (HRSA), has provided funding to the National Association of State EMS Directors to develop a National EMS Information System (NEMSIS). Guided by principal investigator Greg Mears, MD, and a multidisciplinary national taskforce, the following have been completed: 1) a new national EMS dataset intended to capture the entire EMS event, from activation of the EMS system through

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doi:10.1080/10903120600724200

the release of the patient from EMS care; 2) a physical database scheme mapped to the NEMSIS dataset with XML linkage; 3) definition of a national EMS system dataset (a much smaller subset of the full dataset); and 4) a business plan for the implementation of a national EMS information system.

Forty-eight of the states, the District of Columbia, and three territories have signed a memorandum of agreement documenting their support for the NEMSIS project and expressing their desire for full implementation of the NEMSIS dataset. The NEMSIS project team has met regularly with EMS data software developers and vendors to help assure their systems are NEMSIS compliant.

Before the completion of the developmental phase of NEMSIS, Dr. Mears conducted a "proof of concept" for the national EMS database, using sample NEMSIS-compliant data from four states and generating preliminary reports. This effort was successful.

## Establishment of a National EMS Database

> The absence of good EMS information has thwarted the development of data-driven national standard EMS training curricula and provided enormous challenges for an EMS outcomes project that was intended to develop tools to help standardize measurement of EMS outcomes. The dearth of reliable and valid EMS data also continues to plague researchers. Thus, a national EMS database is needed for several reasons. With data being gathered by various agencies and in various forms, they cannot be linked in a way that would provide useful information to EMS systems and to the patients they treat. A national EMS data registry would prove invaluable for EMS education, outcomes research, and reimbursement.[8]

NHTSA has agreed to house the national EMS database at its National Center for Statistics and Analysis.

In September 2005, NHTSA, in cooperation with HRSA and the Centers for Disease Control and Prevention, entered into a cooperative agreement with the University of Utah School of Medicine to operate the NEMSIS Technical Assistance Center, with N. Clay Mann, PhD, serving as the Principal Investigator and Dr. Greg Mears serving as Coinvestigator, through a subcontract between the University of Utah and University of North Carolina, Chapel Hill. The NEMSIS Technical Assistance Center provides assistance to state, territory, and local EMS agencies and to commercial software vendors. They will biannually assess the capabilities of each state and territory to provide data to the national EMS database. The Technical Assistance Center will collect EMS data from five states (first-year goal) to populate the national EMS database. In addition, they will create reference documents, maintain the dataset and XML schemas, and create compliance policies and software to assess the capabilities of software applications.

## Potential Benefits of NEMSIS

NEMSIS will provide a uniform national EMS dataset, with standard terms, definitions, and values, as well as a national EMS database, with aggregated data from all states on a limited number of data elements. The potential benefits of the NEMSIS include the following.

### At All Levels

- Patient care will be documented and feedback will be provided to medical directors in guiding patient care improvements.
- There will be improved identification of education needs for EMS providers by identifying the types of EMS calls that are seen regularly and those that are seldom seen.
- EMS system management can be monitored, opportunities for improvement in EMS system management identified, and better decisions made regarding allocation of limited resources.
- Feedback can be provided to stakeholders.
- Improved payment/funding of EMS can be facilitated, thus enhancing system stability.
- Data-driven reports can help public officials and the general public better understand EMS.
- Data will drive policy and funding decisions.
- National trends in patient care and policy can be identified.
- National benchmarking will be facilitated, while recognizing individual state and local variations.
- The data will assist in identifying and decreasing errors in clinical management.
- The standardization of EMS data will promote and support EMS research.
- National EMS outcomes measures are more likely to be established.

### Local Level

- Areas needed for continuing medical education of EMS providers will be identified.
- Identification of types and locations of EMS calls will be improved, thus allowing more improved EMS response planning and resource allocation.
- EMS service management will be improved.
- Billing information required by public payers will be easier to complete.
- Identification of local community risk factors will assist with prevention programs.
- There will be improvement in allocation of resources/identification of needs.

- Specific feedback will be available to EMS providers.
- Good data will support local quality improvement efforts.
- Local system performance can be compared with like systems.

### Regional Level

- Patient flow to the trauma center can be monitored.
- Level of activity for stocking/use of medications can be better monitored.
- Regional medical protocols can be developed and revised based on real data.
- Utilization of resources in disaster/terrorism response surveillance can be enhanced.

### State Level

- Documentation of unmet need will be possible, based on analyses of variations among urban/rural areas, specific license categories, managed care patterns, and so on.
- Statewide medical direction can be enhanced through determination of compliance with medical protocols.
- Needs for statewide continuing education programs can be identified and the need for the design of new education programs for EMS personnel can be assessed.
- Areas of the state that may need special technical assistance can be identified.
- Compliance with statewide system performance standards can be evaluated.
- Allocation of limited resources can be enhanced.
- State/federal funding requests can be better supported.

### National Level

- Development of national educational standards can be improved for use by all state EMS offices.
- Priorities for program development by the federal partners can be identified.
- Identification of problem areas requiring federal funding for studies and/or program development will be easier.
- Essential system information can be provided for federal health care "payers."
- The EMS system nationwide and the scope of service provided can be better described.
- Improved descriptive information can be provided to Congress and other policy makers about EMS and EMS needs.

## References

1. National Academy of Science. National Research Center: Accidental Death and Disability: The Neglected Disease of Modern Society. Washington, DC: National Academy Press, 1966.
2. Emergency Medical Services Systems. Program Guidelines. US Department of Health Education and Welfare. Publication no. 75-2013, February 1975:18.
3. Institute of Medicine. Emergency Medical Services for Children. Washington, DC: National Academy Press, 1993.
4. Uniform Prehospital Emergency Medical Services Data Conference: Final Report. Washington, DC: National Highway Traffic Safety Administration, 1994.
5. Emergency Medical Services Agenda for the Future. Washington, DC: National Highway Traffic Safety Administration, 1996.
6. Emergency Medical Services—Reported Needs Are Wide-Ranging, With a Growing Focus on Lack of Data. GAO-02-28.
7. Mears G, Ornato JP, Dawson DE. Emergency medical services information systems and a future EMS national database. Prehosp Emerg Care 2002;6:123–130.
8. Mears G, Ornato JP, Dawson DE. Emergency medical services information systems and a future EMS national database. Prehosp Emerg Care 2002;6:123–130.