ASTM
INTERNATIONAL

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Standard Guide for
Establishing Operating Emergency Medical Services and Management Information Systems, or Both[1]

This standard is issued under the fixed designation F1629; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 The Emergency Medical Services Management Information System (EMS-MIS) serves as a framework for the management and linkage of data documenting the complete emergency episode from onset through the pre-hospital, emergency department, and hospital phases to final discharge. This document establishes a standard guideline for the planning, development, and maintenance of an EMS-MIS framework, including linkage among pre-hospital, hospital, and other public safety or government agencies. The resultant EMS-MIS should be capable of monitoring the compliance of an EMS system with its established system standards, and provide an objective basis upon which different EMS systems can be comparatively evaluated.

1.2 *EMS-MIS Goals:*

1.2.1 To manage data regarding response to a medical emergency.

1.2.2 To provide a process for obtaining and documenting objective, reliable data.

1.2.3 To provide information that can be used to affect operational changes in an EMS system leading to the delivery of better quality emergency medical care.

1.2.4 To provide information to guide the rational investment of local, state, and national resources to improve and maintain EMS.

1.3 This guide will standardize data needed for decision making at various levels of the EMS system, and offer suggestions as to the appropriate use of this information.

1.4 This guide comments on several possible configurations for information flow and data processing, recognizing that no one configuration is best suited to all circumstances.

1.5 This guide focuses on pre-hospital medical activities, including emergency responses, scheduled transports, and all interinstitutional transfers.

1.6 This guide addresses EMS-MIS techniques applicable to the internal operations of outpatient and inpatient facilities as well as pre-hospital care providers.

1.7 This guide will not address specialized data systems and applications such as trauma registries, but will allow for interfacing with such applications.

1.8 This guide will not address computer-aided dispatch (CAD) systems, nor system status management (SSM) applications, but will allow for interfacing with such applications.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E622 Guide for Developing Computerized Systems (Discontinued 2000) (Withdrawn 2000)[3]

E623 Guide for Developing Functional Requirements for Computerized Systems (Withdrawn 1994)[3]

E624 Guide for Developing Implementation Designs for Computerized Systems (Withdrawn 1994)[3]

E625 Guide for Training Users of Computerized Systems (Discontinued 2000) (Withdrawn 2000)[3]

E627 Guide for Documenting Computerized Systems (Discontinued 2000) (Withdrawn 2000)[3]

E730 Guide for Developing Functional Designs for Computerized Systems (Withdrawn 1994)[3]

E1113 Guide for Project Definition for Computerized Systems (Withdrawn 1994)[3]

E1239 Practice for Description of Reservation/Registration-Admission, Discharge, Transfer (R-ADT) Systems for Electronic Health Record (EHR) Systems

E1384 Practice for Content and Structure of the Electronic Health Record (EHR)

F1177 Terminology Relating to Emergency Medical Services

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3. Terminology

3.1 Standard EMS terminology is referenced in Terminology F1177. Definition of individual data elements is given in 5.3 and 5.4.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *Continuing Medical Education (CME)*—refers to data that identify all continuing medical education activity completed by an EMT in the system.

3.2.2 *Data Flow Diagram (DFD)*—Diagram that partitions system business functions into a series of events that enhances analysis and clarifies the purpose, events, and functions that take place for each process.

3.2.3 *Emergency Medical Services Management Information System (EMS-MIS)*—a framework for the management and linkage of data documenting the complete emergency episode from onset through the pre-hospital, emergency department, and hospital phases to final discharge.

3.2.4 *Patient Care Record (PCR)*—refers to the data elements described in 5.3 which are to be completed by each PSO for every patient who is treated or transported, or both.

3.2.5 *Provider Service Organization (PSO)*—any public service or commercial organization that utilizes providers to deliver pre-hospital emergency medical care, and transports patients to healthcare facilities, on either an emergency or prescheduled, non-emergent basis.

3.2.6 *Public Safety Answering Point (PSAP)*—a dispatch center that receives incoming calls for help.

3.2.7 *Regional Emergency Medical Services Organization (REMSO)*—Political users of the EMS-MIS at the regional level. This could include an organizational entity such as a regional EMS council, a multi-county hospital consortium, and so forth, or a regional coordinating division within the prevailing EMS authority.

4. Summary of Guide

4.1 The ability to deliver high-quality, cost-effective pre-hospital care can be enhanced by analysis of information about the EMS system's structure, process, and outcomes. This guide defines a standardized terminology and recommends a conceptual design for a computerized EMS-MIS which can facilitate such analysis.

4.2 This guide is intended to serve as a blueprint for the initiation of such a system in geopolitical areas where computerized EMS-MIS is not available or is being updated and to provide a standard basis for data collection to allow for meaningful comparisons between EMS systems throughout the country. The EMS-MIS's already in operation should give serious consideration to restructuring their databases to be consistent with this guide.

4.3 Fig. 1 defines the major organizational entities involved in day-to-day EMS operations. This diagram is based upon the assumption that these organizations represent the potential sources of all data and policies needed for the EMS-MIS. It shows types of data and reports available from the various entities, and needed by them to optimize their operation.

4.4 Fig. 2 defines the political users of the EMS-MIS. It should be understood that such entities as LOCAL EMS-MIS, REMSO, EMS-MIS, and so forth, do not necessarily refer to distinct organizational entities, but may be coordinating divisions within the prevailing EMS authority.

4.5 The EMS-MIS defined herein recognizes a graduated process of data collection and analysis. This means that data elements collected at the provider and hospital levels may be useful only at the local levels. Emphasis has been given to the ability to capture information in an electromagnetic format as closely as possible to the time/source from which it was generated in order to enhance completeness, validity, reliability, and utilization of data. By observing the linkage parameters defined herein, it should be possible for higher levels of the pyramid to access detailed data through welldefined linkage mechanisms, when and if necessary, without resorting to costly duplication and centralization of all data elements.

4.6 The task group recommends that the data collected by the PSO be aggregated at the various levels that have responsibility for medical quality assurance, planning, and management activities. These levels include but are not limited to the emergency department, hospital(s), regional EMS, and statewide.

4.6.1 The emergency department is an important link between the pre-hospital and inpatient settings.

4.6.2 The medical direction for a PSO, on-line and frequently off-line as well, usually originates in an adjacent hospital emergency department. Analysis of pooled data at this level facilitates medical quality assurance activities and minimizes the necessity for uploading confidential and sensitive data to higher levels of the pyramid.

4.6.3 Access to hospital in-patient data may occur at the hospital or state level. More rapid feedback to medical care providers is possible when the in-patient data are accessed while the patient is hospitalized or shortly after discharge. Statewide hospital data are usually merged and available within six months after the year's end. These state data are useful for planning and for linkage to nonmedical data.

4.6.4 Laptop/palmtop and other computer technology that permits computerized data entry at the scene facilitates immediate and efficient access to the data by local EMS-MIS in addition to timely export to regional and statewide entities.

4.7 All data element definitions, formats, and data communications protocols herein will be coordinated with those of the ASTM E31.12 Subcommittee on the Computerized Patient Record, the Center for Disease Control Consensus Trauma Registry Minimum Data Set, the NHTSA uniform prehospital EMS data elements, and the Subcommittee on Ambulatory Care Statistics and the Interagency Task Forces of the National Committee on Vital and Health Statistics for the Uniform Ambulatory Care Data Set and the Uniform Hospital Discharge Data Set.

4.8 The EMS-MIS's may wish to include additional data elements in their databases for a variety of purposes. In addition to the sources listed in 4.7, some of the data elements
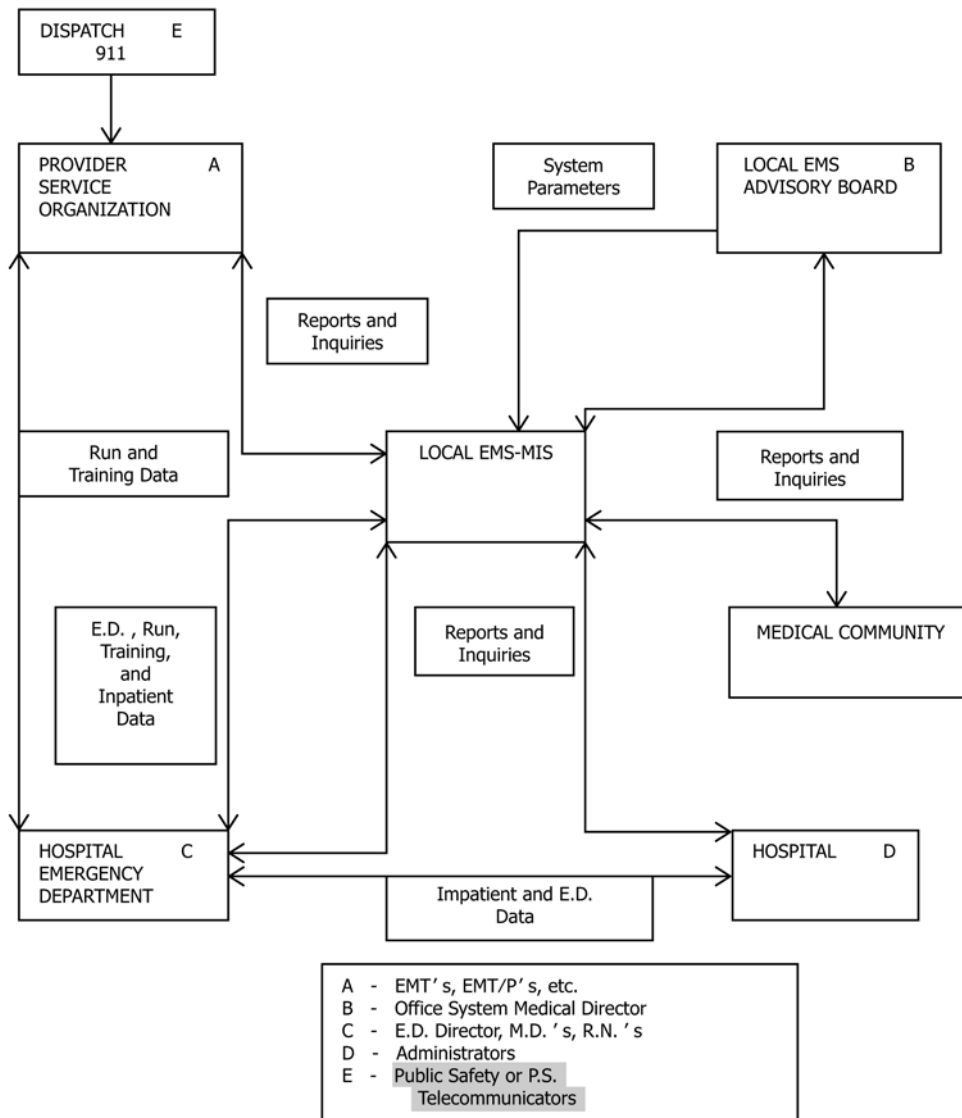
FIG. 1 EMS-MIS Context Diagram I

presented in 5.3 were chosen if they met either of the conditions listed as follows:

4.8.1 The data element is necessary for identification/documentation or recall/linkage of the event, or both.

4.8.2 The data element is needed for generation of a useful management report.

4.9 The data list was kept as small as feasible for reasons of practicality, cost, and a better chance of successful implementation of the system as a whole. It reflects the consensus of the Task Group and the 1994 national consensus conference sponsored by the National Highway Traffic Safety Administration. Additions to the standard data set herein will be made by the following procedure: Any person who proposes a data element for inclusion in the data set should submit the following information, in writing, to the F30.03.03 Task Group.

4.9.1 An explicit definition of the element.

4.9.2 The organization in the Level I Context Diagram (Fig. 1) responsible for recording the data element.

4.9.3 The logical database file the element should reside in. (See 5.8.6.7 for the list of database files.)

4.9.4 The organizations that should have possession of the element routinely and optionally.

4.9.5 Those who should have access to the element.

4.9.6 The purpose of the data element and its various uses.

4.10 After review of the information in 4.9.1 to 4.9.6, the task group will vote to include/exclude the element, and so advise Subcommittee F30.03.

4.11 Certain key identifiers must exist in a planned, coordinated manner in order for an EMS-MIS to function efficiently and without ambiguity. There should be a system in each state that allows for the assignment of unique identification or registration numbers to each of the following:

4.11.1 Individual providers.

4.11.2 Provider service organizations (PSO).

4.11.3 Individual vehicles owned or operated by PSO's, or both.