NFPA 450

Guide for Emergency Medical Services and Systems

2004 Edition

NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
An International Codes and Standards Organization

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS

Not for Resale

IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA DOCUMENTS

NOTICE AND DISCLAIMER OF LIABILITY CONCERNING THE USE OF NFPA DOCUMENTS

NFPA codes, standards, recommended practices, and guides, of which the document contained herein is one, are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on fire and other safety issues. While the NFPA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in its codes and standards.

The NFPA disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making this document available, the NFPA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the NFPA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of this document. Nor does the NFPA list, certify, test or inspect products, designs, or installations for compliance with this document. Any certification or other statement of compliance with the requirements of this document shall not be attributable to the NFPA and is solely the responsibility of the certifier or maker of the statement.

--`,,`,,`,,`,,`---

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS

Not for Resale

ADDITIONAL NOTICES AND DISCLAIMERS

Updating of NFPA Documents

Users of NFPA codes, standards, recommended practices, and guides should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of Tentative Interim Amendments. An official NFPA document at any point in time consists of the current edition of the document together with any Tentative Interim Amendments and any Errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of Tentative Interim Amendments or corrected through the issuance of Errata, consult appropriate NFPA publications such as the National Fire Codes® Subscription Service, visit the NFPA website at www.nfpa.org, or contact the NFPA at the address listed below.

Interpretations of NFPA Documents

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing Committee Projects shall not be considered the official position of NFPA or any of its Committees and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

Patents

The NFPA does not take any position with respect to the validity of any patent rights asserted in connection with any items which are mentioned in or are the subject of NFPA codes, standards, recommended practices, and guides, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on these documents. Users of these documents are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

NFPA adheres to applicable policies of the American National Standards Institute with respect to patents. For further information contact the NFPA at the address listed below.

Law and Regulations

Users of these documents should consult applicable federal, state, and local laws and regulations. NFPA does not, by the publication of its codes, standards, recommended practices, and guides, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

This document is copyrighted by the NFPA. It is made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of safe practices and methods. By making this document available for use and adoption by public authorities and private users, the NFPA does not waive any rights in copyright to this document.

Use of NFPA documents for regulatory purposes should be accomplished through adoption by reference. The term "adoption by reference" means the citing of title, edition, and publishing information only. Any deletions, additions, and changes desired by the adopting authority should be noted separately in the adopting instrument. In order to assist NFPA in following the uses made of its documents, adopting authorities are requested to notify the NFPA (Attention: Secretary, Standards Council) in writing of such use. For technical assistance and questions concerning adoption of NFPA documents, contact NFPA at the address below.

For Further Information

All questions or other communications relating to NFPA codes, standards, recommended practices, and guides and all requests for information on NFPA procedures governing its codes and standards development process, including information on the procedures for requesting Formal Interpretations, for proposing Tentative Interim Amendments, and for proposing revisions to NFPA documents during regular revision cycles, should be sent to NFPA headquarters, addressed to the attention of the Secretary, Standards Council, NFPA, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

For more information about NFPA, visit the NFPA website at www.nfpa.org.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Copyright © 2004, National Fire Protection Association, All Rights Reserved

NFPA 450

Guide for

Emergency Medical Services and Systems

2004 Edition

This edition of NFPA 450, *Guide for Emergency Medical Services and Systems*, was prepared by the Technical Committee on Emergency Medical Services and acted on by NFPA at its May Association Technical Meeting held May 23–26, 2004, in Salt Lake City, UT. It was issued by the Standards Council on July 16, 2004, with an effective date of August 5, 2004.

This edition of NFPA 450 was approved as an American National Standard on August 5, 2004.

Origin and Development of NFPA 450

In January 1999, the NFPA Standards Council considered NFPA's role in Emergency Medical Services (EMS). After a review of extensive information submitted on the need for such a project, the council voted to create a new EMS project to address EMS-related topics not presently covered by other existing NFPA projects. A forum on EMS was scheduled at the May 1999 Association meeting in Baltimore, MD. In June of 1999, NFPA held a focus group meeting to further discuss NFPA's role in EMS. A request for persons interested in being members of this new project was sent out, and a Technical Committee was formed. The first meeting of the Technical Committee was held in Tampa, FL, to discuss what specific projects the Technical Committee wanted to address. NFPA 450, *Guide for Emergency Medical Services and Systems*, was developed to assist individuals, agencies, organizations, or systems, as well as those interested or involved in Emergency Medical Service system design, by providing EMS guidelines and recommendations.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Technical Committee on Emergency Medical Services

Jack J. Krakeel, *Chair*
Fayette County Fire & Emergency Services, GA [E]

Gary Aleshire, Lakewood Fire District 2, WA [E]
Rep. Western Fire Chiefs Association
Michael Chiaramonte, Lynbrook Volunteer Fire Department, NY [E]
Rep. Volunteer & Combination Officers Section
Kyle R. Gorman, Clackamas County Fire District #1, OR [E]
Richard D. Grulich, U.S. Army Corps of Engineers, AL [C]
Barbara Klingensmith, Florida State Fire College, FL [SE]
Kenneth R. Knipper, Campbell County Office of Emergency Management, KY [U]
Rep. National Volunteer Fire Council
Kurt Krumperman, Rural/Metro Medical Services, AZ [E]
Rep. American Ambulance Association
Kevin J. McGee, Prince William County, VA [E]
Jonathan W. Moore, International Association of Fire Fighters, DC [L]
Rep. International Association of Fire Fighters
John Mike Myers, Las Vegas Fire Rescue, NV [U]
Richard W. Patrick, Volunteer Firemen's Insurance Services, Inc. (VFIS), PA [I]
Rep. Volunteer Firemen's Insurance Services, Inc.
Ronald G. Pirrallo, Medical College of Wisconsin, WI [U]
Rep. National Association of EMS Physicians
Franklin D. Pratt, Los Angeles County Fire Department, CA [U]
Rep. American College of Emergency Physicians
Lorraine Probert, U.S. Department of Labor, DC [E]
David O. Simmons, Firemen's Association of the State of New York, NY [U]
Robert A. Ungar, Robert A. Ungar, P.C., NY [L]
Rep. American Federation of State, County & Municipal Employees
Michael H. Vincent, Vincent Fire Equipment, DE [M]
Rep. NFPA Fire Service Section
Fred K. Walker, U.S. Department of the Air Force, FL [U]
Charles W. Wills, Potomac Heights Volunteer Fire Dept. & Rescue Squad, Inc., MD [U]
Rep. Maryland State Firemen's Association

Alternates

David A. Bradley, Volunteer Firemen's Insurance Services, Inc., PA [I]
(Alt. to R. W. Patrick)
Ben Hinson, Mid Georgia Ambulance Service, Inc., GA [E]
(Alt. to K. Krumperman)
Timothy A. Price, Wayne Township Fire Department, IN [E]
(Alt. to M. Chiaramonte)

Frank E. Florence, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on the training and education requirements for personnel, personal protective equipment, health and safety programs, and quality assurance programs which incorporate physicians and the community planning process. It shall also be responsible for documents relating to emergency medical services, except those covered by other NFPA committees that may have primary responsibility.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Contents

Chapter 1 Administration **450–** 5
1.1 Scope **450–** 5
1.2 Purpose **450–** 5

Chapter 2 Referenced Publications **450–** 5
2.1 General **450–** 5
2.2 NFPA Publications **450–** 5
2.3 Other Publications **450–** 5

Chapter 3 Definitions **450–** 5
3.1 General **450–** 5
3.2 NFPA Official Definitions **450–** 5
3.3 General Definitions **450–** 6

Chapter 4 System Regulation and Policy **450–** 8
4.1 General **450–** 8
4.2 Oversight **450–** 8
4.3 Authorization **450–** 8
4.4 Evaluation **450–** 8
4.5 Roles and Responsibilities **450–** 8
4.6 Service Levels **450–** 8
4.7 Management Structure **450–** 8
4.8 Planning **450–** 8
4.9 Authority to Implement Plans **450–** 8
4.10 Resources **450–** 8
4.11 Participation in Policy Development **450–** 8
4.12 Authority for Policy, Procedure, and Operation **450–** 8
4.13 Patient Information Protection **450–** 8

Chapter 5 EMS System Analysis and Planning **450–** 9
5.1 Introduction **450–** 9
5.2 Analysis of System Resources **450–** 9
5.3 Community Needs Analysis **450–**10
5.4 System Goals and Objectives Analysis **450–**10
5.5 System Design Analysis **450–**10
5.6 Essential System Analysis Components **450–**11
5.7 EMS System Planning **450–**12
5.8 Continual Risk Assessment and Planning **450–**12
5.9 System Assessment Cycle **450–**13
5.10 Current Conditions **450–**13
5.11 Data Element/Collection/Analysis/Reporting **450–**13
5.12 Feedback Loop **450–**13

Chapter 6 Finance **450–**13
6.1 Determining Cost of System **450–**13
6.2 Method for Anticipating System Funding Sources **450–**14
6.3 Use of Revenue and Cost Analysis **450–**14
6.4 Financial Plans **450–**14
6.5 Business Analysis **450–**14
6.6 Additional Financial Issues **450–**14

Chapter 7 Medical Oversight **450–**15
7.1 General **450–**15
7.2 Single Medical Authority **450–**15
7.3 System Support of Medical Authority **450–**15
7.4 Medical Authority Role **450–**15
7.5 Medical Director Responsibilities **450–**15
7.6 Direct and Indirect Medical Oversight **450–**15
7.7 Medical Director Qualifications **450–**15

Chapter 8 Quality Management, Clinical Quality, and Data Reliability **450–**16
8.1 Quality Management Program **450–**16
8.2 Performance Objectives **450–**16
8.3 Public Health Outcome Parameters **450–**16
8.4 Physician Participation **450–**16
8.5 Patient Confidentiality **450–**16
8.6 Injury/Illness Reduction and Prevention **450–**16
8.7 Complaints **450–**16
8.8 Participation in Studies and Research **450–**16
8.9 System Review **450–**17
8.10 Documentation **450–**17

Chapter 9 Public Information, Education, and Relations (PIER) **450–**17
9.1 Public Education **450–**17
9.2 Public Education System Goals **450–**17
9.3 Qualifications of Personnel for PIER Activities **450–**17
9.4 PIER Activities **450–**17
9.5 PIER Activities Related to Mass Gatherings **450–**17
9.6 PIER Activities **450–**17
9.7 EMS Agenda for the Future **450–**17
9.8 Disaster Education **450–**17
9.9 Collaborative Efforts **450–**17
9.10 Identification of Available Public Media Resources **450–**17
9.11 Identification of Funding Resources **450–**17

Chapter 10 Communications **450–**17
10.1 Introduction **450–**17
10.2 Access of Emergency Services **450–**17
10.3 Lead Agency **450–**18
10.4 Centralized Communication Plan **450–**18
10.5 Computer-Aided Dispatch **450–**18
10.6 Capture of Key Data Elements **450–**18
10.7 Quality Management **450–**18
10.8 Communications Equipment **450–**18
10.9 Operability **450–**18
10.10 Criteria-Based Dispatch **450–**19
10.11 Training **450–**19
10.12 Direct Medical Control **450–**19

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

10.13 Nonemergency Services 450–19

Chapter 11 Equipment and Facilities 450–19
11.1 Standard for First Response and Ambulance Transportation 450–19
11.2 Replacement Plan 450–19
11.3 Response Vehicles Licenses 450–19
11.4 Inspecting Emergency Equipment 450–19
11.5 Personnel Education and Training 450–19
11.6 Maintenance Plans 450–19
11.7 Maintenance Personnel for Emergency Equipment 450–19
11.8 Response Facilities 450–19

Chapter 12 Human Resources 450–20
12.1 Introduction 450–20
12.2 Recruitment 450–20
12.3 Education/Training/Certification 450–20
12.4 Retention 450–20
12.5 Personnel 450–20
12.6 Rules and Regulations 450–20
12.7 Health and Safety 450–20

Chapter 13 Operations 450–20
13.1 Implementation of System Design (Operations) 450–20
13.2 System Preparation 450–20
13.3 Communications Coordination 450–20
13.4 Response Coordination 450–20
13.5 Incident Management 450–21
13.6 Treatment Guidelines 450–21
13.7 Patient Destination (Transport) 450–21
13.8 Functional Capabilities of Health Care Facilities Are Specified 450–21
13.9 Coordinated Medical Oversight 450–21
13.10 Quality Management/Documentation ... 450–21
13.11 Logistics 450–21
13.12 Staff Management 450–21
13.13 Public Information, Education, and Relations 450–21
13.14 Regulatory Compliance 450–21
13.15 Automatic and Mutual Aid 450–21
13.16 Alternative Patient Transport 450–21
13.17 Training 450–21
13.18 Emergency Response Planning 450–21
13.19 Joint Coordination and Planning 450–21
13.20 Research and Development 450–21

Annex A Explanatory Material 450–22

Annex B Discussion of Time(s) Stamps, Function Intervals, and Process Intervals 450–22

Annex C Informational References 450–23

Index 450–28

--`,,`,,`-`-`,,`,,`,`,,`---

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

NFPA 450

Guide for

Emergency Medical Services and Systems

2004 Edition

IMPORTANT NOTE: This NFPA document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading "Important Notices and Disclaimers Concerning NFPA Documents." They can also be obtained on request from NFPA or viewed at www.nfpa.org/disclaimers.

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in advisory sections of this document are given in Chapter 2 and those for extracts in the informational sections are given in Annex C. Editorial changes to extracted material consist of revising references to an appropriate division in this document or the inclusion of the document number with the division number when the reference is to the original document. Requests for interpretations or revisions of extracted text should be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex C.

Chapter 1 Administration

1.1 Scope. This document is designed to assist individuals, agencies, organizations, or systems as well as those interested or involved in emergency medical services (EMS) system design.

1.2 Purpose. The purpose of this document is to provide guidelines and recommendations to assist those interested or involved in EMS system design. Provision of local prehospital care requires the coordination and cooperation of disparate elements. This document provides a template for local stakeholders to evaluate EMS systems and make improvements based on that evaluation. While other resources on this topic exist, this document provides a framework for designing and /or evaluating a comprehensive EMS system.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this guide and should be considered part of the recommendations of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1071, *Standard for Emergency Vehicle Technician Professional Qualifications,* 2000 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems,* 2002 edition.

NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments,* 2004 edition.

2.3 Other Publications.

2.3.1 AHA Publication. American Heart Association National Center, 7272 Greenville Avenue, Dallas TX 75231.

"Advanced Cardiovascular Life Support: Section 1: Introduction to ACLS 2000: Overview of Recommended Changes in ACLS From the Guidelines 2000 Conference," *Circulation 2000* 102(Suppl. I), p. I-89.

2.3.2 AMA Publication. American Medical Association, 515 N. State Street, Chicago, IL 60610.

"Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care. Emergency Cardiac Care Committee and Subcommittees, American Heart Association. Part I. Introduction,"*JAMA* 268:16;1992.

2.3.3 FEMA Publications. Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20402.

Civil Preparedness Guide (CPG).

National Fire Incident Reporting System (NFIRS).

2.3.4 NHTSA Publications. National Highway Traffic Safety Administration, 400 Seventh Street, S.W., Washington, DC 20590.

Delbridge, T. R., et al., "Emergency Medical Services: Agenda for the Future." August 1996. DOT HS 808-441, NTS-42.

National EMS Education and Practice Blueprint.

NHTSA Uniform Prehospital Data Set.

2.3.5 NIH Publication. National Institutes of Health, 9000 Rockville Pike, Bethesda, MD 20892.

Pub. No. 93-3304, *Staffing and Equipping EMS Systems: Rapid Identification and Treatment of Acute Myocardial Infarction,* National Heart, Lung, and Blood Institute, September 1993.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter apply to the terms used in this guide. Where terms are not included, common usage of the terms applies.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Guide. A document that is advisory or informative in nature and that contains only nonmandatory provisions. A guide may contain mandatory statements such as when a guide can be used, but the document as a whole is not suitable for adoption into law.

3.2.4 Should. Indicates a recommendation or that which is advised but not required.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

3.2.5 Standard. A document, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix or annex, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

3.3 General Definitions.

3.3.1 Address. A number or other code and the street name identifying a location.

3.3.2 Alarm. A signal or message from a person or device indicating the existence of an emergency or other situation that requires immediate action.

3.3.3 Ambulance. A vehicle designed, equipped, and operated for the treatment and transport of ill and injured persons.

3.3.4 Ambulance Service. An organization that exists to provide patient transportation by ambulance.

3.3.5 American College of Emergency Physicians (ACEP). A national organization of emergency medical physicians.

3.3.6 Arrival. The point at which a vehicle is stopped on the scene of a response destination or address.

3.3.7 Automated Vehicle Locator (AVL). A computerized mapping system used to track the location of vehicles.

3.3.8 Bloodborne Pathogens. Pathogenic microorganisms that are present in human blood and can cause diseases in humans. [**1581:**1.3]

3.3.9 Call. A request for assistance to which equipment and personnel are deployed.

3.3.10 Call Intake. The procedure for answering the phone or other device that is used to receive a signal or message from a person or device indicating the need for medical assistance, learning the nature of the emergency, and verifying the address of the emergency.

3.3.11 Call Processing. The interval from call intake by the unit-dispatching agency to the time of unit notification, including answering the phone (alarm), gathering vital information, and initiating a response by dispatching the appropriate unit(s).

3.3.12* Chain of Survival. A metaphor to communicate the interdependence of a community's emergency response to cardiac arrest.

3.3.13 Compliance. Adherence or conformance to laws, regulations, and standards.

3.3.14 Cross-Trained/Dual Role (CT/DR). An emergency service that allows personnel trained in two service functions, such as fire suppression and emergency medical care, to function in either role.

3.3.15 Defibrillation. The delivery of an electrical shock to the heart intended to reverse abnormal electrical activity.

3.3.16 Defibrillator.

3.3.16.1 ***Automated External Defibrillator (AED).*** A device that administers an electric shock through the chest wall to the heart using built-in computers to assess the patient's heart rhythm and defibrillate as needed.

3.3.16.2 ***Manual Defibrillator.*** A device that delivers an electric shock through the chest wall to the heart and that requires operation by trained medical personnel.

3.3.17 Deployment. The procedures by which resources are distributed throughout the service area.

3.3.18 Dispatch. To send out emergency response resources promptly to an address or incident location for a specific purpose.

3.3.18.1 ***Computer-Aided Dispatch (CAD).*** A dispatching method or process in which a computer and its associated terminal(s) are used to provide relative dispatch data to the concerned telecommunicator. [**1221:**3.3]

3.3.18.2 ***Emergency Medical Dispatch.*** The receipt and management of requests for emergency medical assistance in the emergency medical services (EMS) system.

3.3.19 Documentation. The process of gathering, classifying, and storing information. [**1915:**1.3]

3.3.20 Emergency. A condition or situation in which an individual perceives a need for immediate medical attention.

3.3.21 Emergency Medical Dispatcher (EMD). EMS personnel specifically trained and certified in interviewing techniques, pre-arrival instructions, and call prioritization.

3.3.22 Emergency Medical Services (EMS). Providing services to patients with medical emergencies.

3.3.23 Emergency Medical Services for Children (EMS-C). A national initiative to reduce child and youth disability and death from severe illness or injury.

3.3.24 Emergency Medical Technician (EMT). A term for any prehospital provider trained and certified at the EMT-Basic level or higher.

3.3.24.1 ***Emergency Medical Technician-Basic (EMT-B).*** A prehospital basic life support (BLS) provider with training based on the National Highway Traffic Safety Administration (NHTSA) National Standard Curriculum.

3.3.24.2 ***Emergency Medical Technician-Intermediate (EMT-I).*** A prehospital provider trained in some advanced life support (ALS) procedures such as IV therapy, in accordance with the National Highway Traffic Safety Administration (NHTSA) National Standard Curriculum.

3.3.24.3 ***Emergency Medical Technician-Paramedic (EMT-P).*** A prehospital provider trained according to National Highway Traffic Safety Administration (NHTSA) National Standard Curriculum to advanced levels.

3.3.25 Employee Illness and Injury. A work-related illness or injury requiring evaluation or medical follow-up.

3.3.26 Employee Turnover. Termination of employment with the organization for any reason.

3.3.27 Fire Suppression. The activities involved in controlling and extinguishing fires. [**1710:**3.3]

3.3.28 First Responder (EMS). The initial individual or medical team to provide emergency care at an emergency scene.

3.3.29 GSA KKK Specifications. A set of federal specifications relating to purchasing requirements for ambulance design and manufacture.

3.3.30 Hazard. A source of possible injury or damage to health. [**79:**3.3]

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

3.3.31 Hazardous Material. A substance that presents an unusual danger to persons due to toxicity, chemical reactivity, or decomposition, corrosivity, explosion or detonation, etiological hazards or similar properties.

3.3.32 Health Care Financing Administration (HCFA). The former name of the Center for Medicare and Medicaid Services (CMS).

3.3.33 Health Maintenance Organization (HMO). An organized system of health care that provides or arranges for a range of basic and supplemental health care services to a voluntarily enrolled group of persons under a prepayment plan.

3.3.34 Incident Location. The address or other identifiable area of an event.

3.3.35 In-Service Utilization Ratio. An efficiency ratio that divides the cumulative unit-elapsed intervals by the total time that the unit is on duty.

3.3.36 Interval.

3.3.36.1 ***Activation Interval.*** A measurement that begins when the response unit is first notified of an incident and ends at the time that unit begins movement toward the incident.

3.3.36.2 ***Call Processing Interval.*** A measurement that begins at the time the dispatch agency makes its first contact with a caller reporting a medical event, and the time that response resources are notified of the event.

3.3.36.3 ***Dispatch or Call Processing Interval.*** The interval between the time the dispatch agency makes its first contact with the caller and the time response resources are activated.

3.3.36.4 ***En Route Interval.*** A measurement that begins at the time a response unit starts to move toward an incident, and the time the unit comes to a complete stop at the location of the incident.

3.3.36.5 ***Fractile Response Interval.*** A method of describing response intervals that uses frequency distribution as its basis for reporting.

3.3.36.6 ***Patient Access Interval.*** A measurement that begins when the unit comes to a complete stop at the location of the incident and ends when personnel make contact with the patient.

3.3.36.7 ***Travel Interval.*** The elapsed time starting when the responding vehicle wheels begin rolling toward the address or incident and ending when the vehicle arrives on scene at the address or incident location.

3.3.36.8* ***Turnout Interval.*** The time beginning when units acknowledge notification of the emergency to the beginning point of response time. [**1710:**3.3]

3.3.37 Life Support.

3.3.37.1 ***Advanced Cardiac Life Support (ACLS).*** A nationally recognized curriculum to teach advanced methods of treatment for cardiac and other emergencies.

3.3.37.2 ***Advanced Life Support (ALS).*** Emergency medical treatment beyond basic life support level as defined by the medical authority having jurisdiction. [**1500:**3.3]

3.3.37.3 ***Basic Life Support (BLS).*** Emergency medical treatment at a level as defined by the medical authority having jurisdiction. [**1500:**3.3]

3.3.38 Management.

3.3.38.1 ***Critical Incident Stress Management (CISM).*** A program designed to reduce acute and chronic effects of stress related to job functions.

3.3.38.2 ***Total Quality Management (TQM).*** A management system fostering continuously improving performance at every level of function and focusing on customer satisfaction.

3.3.39 Medical Director. A physician trained in emergency medicine, designated as a medical director for the local EMS agency.

3.3.40* Medical Oversight. The authorization for treatment by medical directors in local, regional, or state EMS systems.

3.3.40.1 ***Direct or On-Line Medical Control or Oversight.*** The clinical advice or instructions given directly to emergency medical services (EMS) personnel by specially trained medical professionals.

3.3.40.2 ***Indirect Medical Oversight.*** The administrative medical direction that can be in the form of system design, protocols and procedures, training, and quality assessment.

3.3.41 Multiple Casualty. Injury or death of more than one individual in an incident.

3.3.42 Mutual Aid. Reciprocal assistance by emergency services under a prearranged plan. [**402:**3.3]

3.3.43 National Association of EMS Physicians (NAEMSP). A national organization of emergency medical physicians and other professionals.

3.3.44 National Highway Traffic Safety Administration (NHTSA). The agency under the Department of Transportation that is responsible for preventing motor vehicle injuries.

3.3.45 National Institutes of Health (NIH). An agency of the Public Health Service of the Department of Health and Human Services, responsible for promoting the nation's health.

3.3.46 Outcome. The result, effects, or consequences of an emergency system encounter on the health status of the patient.

3.3.47 Operations.

3.3.47.1 ***Emergency Operations.*** Activities of the emergency responders relating to rescue, fire suppression, emergency medical care, and special operations.

3.3.47.2 ***Special Operations.*** Those emergency incidents requiring specific and advanced training, and specialized tools and equipment.

3.3.48 Protocol. Protocols define the prehospital care management of specific patient problems.

3.3.49 Public Safety Answering Point (PSAP). A facility in which 9-1-1 or other emergency calls are answered, either directly or through rerouting.

3.3.50 Quality Assessment (QA). An assessment of the performance of structure, processes, and outcomes within the EMS system and their comparison against a standard.

3.3.51 Quality Assurance. The activities undertaken to establish confidence that the products or services available maintain the standard of excellence set for those products or services.

3.3.52 Quality Improvement. The activities undertaken to continuously examine and improve the products and services.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

3.3.53 Response. The deployment of an emergency service resource to an incident. [**901:**2.1]

3.3.54 Staffing. The number and level of training of personnel deployed on an emergency call.

3.3.55 Standard Operating Procedures (SOPs). An organizational directive that establishes standard courses of action.

3.3.56 Standing Orders. A direction or instruction for delivering patient care without on-line medical oversight backed by authority of the system medical director.

3.3.57 System.

3.3.57.1 ***EMS System.*** A comprehensive, coordinated arrangement of resources and functions that are organized to respond in a timely, staged manner to medical emergencies regardless of their cause.

3.3.57.2 ***Geographic Information System (GIS).*** A system of computer software, hardware, data, and personnel to describe information tied to a spatial location.

3.3.58 Time.

3.3.58.1 ***Dispatch Time.*** A discrete time stamp that represents unit notification.

3.3.58.2 ***Response Time.*** See Annex B.

3.3.59 Turnout Activation. Personnel preparation, boarding the vehicle, starting the vehicle, placing the vehicle in gear, and moving the vehicle towards the emergency scene.

3.3.60 Unit. A staffed and equipped emergency response vehicle.

Chapter 4 System Regulation and Policy

4.1 General. System regulation and policy is fundamental to providing emergency medical service and is the basis for effective system design. Consistent with this recognition is the core principle that a single entity has system oversight and responsibility for the effective coordination of system elements. This entity ensures that the EMS system components are clearly articulated and defined. Furthermore, appropriate mechanisms are instituted to ensure participation of system stakeholders in developing policies and regulations. This chapter of the guide outlines the core elements of an effective process for developing and implementing EMS system regulations and policies.

4.2 Oversight. Within the boundaries of the EMS system, the authority having jurisdiction (AHJ) should provide a process for overseeing all system elements.

4.2.1 EMS Oversight. EMS system oversight should be the responsibility of a single entity.

4.2.2 Designation of Lead Agencies. The AHJ should designate a lead agency to implement and enforce system policies.

4.3 Authorization. Provider agencies and personnel should be authorized to provide services. The AHJ should ensure that processes or mechanisms are in place to authorize personnel and agency(ies) to provide services consistent with determined levels of need *(see Chapter 5).*

4.4 Evaluation. The AHJ should ensure that mechanisms are in place to continually evaluate and re-evaluate the components of the EMS system. The lead agency should develop a process to identify components of the EMS system, establish requirements for those components, and develop an evaluation process to ensure that components meet established requirements.

4.5 Roles and Responsibilities. The lead agency should establish and articulate roles and responsibilities for EMS system participation. Establishing roles and responsibilities for EMS participants should be accomplished through a comprehensive system assessment as described in Chapter 5.

4.6 Service Levels. The lead agency should identify service levels and develop guidelines or performance standards for each service level in the community. Service levels, guidelines, and performance standards should be determined by considering factors consistent with local resources and needs, such as community expectations, measurable patient outcomes, resource availability, and financial capability.

4.7 Management Structure. The lead agency should have a clear management structure and lines of accountability. The management structure of the lead agency should be defined according to depth and breadth appropriate to the system. Each position within the lead agency should be defined according to its role(s), responsibility(ies), and reporting relationships. EMS system participants should know and understand the management structure and function of the lead agency.

4.8 Planning. The lead agency should provide planning for EMS system design. The lead agency should ensure that the EMS system design is based on a systematic planning process. While planning processes may vary significantly between EMS systems, the lead agency should ensure that the process occurs in a manner consistent with identified needs.

4.9 Authority to Implement Plans. The lead agency should be empowered to implement plans. Within the system, the AHJ should formally vest the lead agency with responsibility and authority to implement plans.

4.10 Resources. The lead agency should have the resources necessary to carry out its function. The AHJ should ensure that adequate fiscal and nonfiscal resources are available and accessible, thereby allowing the lead agency to function effectively.

4.11 Participation in Policy Development. Representatives of user groups and system stakeholders should be involved in designing expectations and developing system policy. The lead agency should identify appropriate participants for system design and policy development. For example, stakeholders may include consumers or users of EMS services, healthcare providers, hospitals, public health agencies, nursing homes, special populations, educators, governmental officials, and payors.

4.12 Authority for Policy, Procedure, and Operation. The lead agency should have the authority to convene EMS expertise to assist in designing and implementing policies, procedures, and operations. The lead agency should be vested with the authority to establish advisory bodies or committees for specific EMS system design elements.

4.13 Patient Information Protection. The lead agency should ensure that appropriate policies and procedures are in place to protect patient and quality assurance records. The lead agency and the AHJ should work closely with state legislative bodies to establish boundaries for disclosure.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Chapter 5 EMS System Analysis and Planning

5.1 Introduction.

5.1.1 Virtually all communities have some form of emergency medical service (EMS) system. For any one community, the *components* of the system and the *level of service* should be tailored to the needs and wants of that community. While an EMS system is unique to the jurisdiction, the industry recognizes a standard approach to assessing local needs and meeting those needs with specific service elements. This chapter of the guide outlines a systematic approach for evaluating and analyzing a jurisdiction's existing EMS system or for determining the system design for a jurisdiction without a dedicated EMS system in place.

5.1.2 As specified in "Emergency Medical Services: Agenda for the Future," "Before creating an EMS system or implementing any EMS system design changes a community should conduct a comprehensive community analysis that considers available resources, customers, geography, demographics, political conditions, and other unique and special needs of the system. This analysis should focus on these areas, identifying their potential impact on the effectiveness of EMS system components including human resources, medical direction, legislation and regulation, education systems, public education, training, communications, transportation, prevention, public access, communications systems, clinical care, information systems (data collection), and evaluation." (Delbridge, T.R., et al.)

5.2 Analysis of System Resources. The EMS system should analyze the resources available to serve the system, including financial resources, equipment and facilities, providers, and participants in the system.

5.2.1 Finances.

5.2.1.1 Comprehensive Financial Analysis. The financial status of the community and its capacity to support the EMS system should be evaluated. The analysis includes the financial status of all the entities within the EMS system based on generally accepted accounting principles. *(See Chapter 6.)*

5.2.1.2 Solvency. The provider(s) of each EMS system component should be financially solvent by maintaining the financial resources to allow the uninterrupted delivery of essential services.

5.2.1.3 Funding Stability. Funding for each component may be through a variety of sources, such as municipal budget/taxes, fee for services, subscription programs, grants, or private donations. Each component should be self-supporting, with adequate reserves to continue to function if the primary funding mechanism is temporarily interrupted or if operating costs exceed available funding.

5.2.1.4 Budget. The system should evaluate both an annual operating budget and a capital budget consistent with generally accepted accounting principles.

5.2.2 Providers. The system should identify the roles, responsibilities, staffing requirements, and training levels of each provider required for the EMS system to function.

5.2.2.1 Provider Resources. EMS systems are composed of the personnel, vehicles, equipment, and facilities used to deliver emergency and nonemergency care to individuals outside a hospital. Key services of EMS systems include public access through a coordinated communications system, public safety and EMS response, and patient transportation. Resources of other nonconventional agencies such as nonemergency ambulance and municipal mass transportation services should be considered.

5.2.2.2 Role Description. Each type of service within the system should be clearly defined and fully described in the system design (e.g., the response system may be different from the transportation system).

5.2.2.3 Role Definition. Based on the needs and wants of the community, several different types and levels of providers may be required. Roles and responsibilities for each type and level of provider should be identified in order to ensure that the desired level of care is delivered continually and effectively. Examples of provider types are described in 5.2.2.3(A) through 5.2.2.3(E).

(A) Enhanced 9-1-1 Operators. Basic operators are limited to verification of the incident address and notification of closest EMS system provider. Trained emergency medical dispatchers (EMDs) provide verification of the incident address; notification of the closest, most appropriate provider; and provision of pre-arrival patient care instructions.

(B) Medical First Responders. The roles of medical first responders as defined by the NHTSA EMS division.

(C) Basic Life Support. The roles of basic life support responders as defined by the NHTSA EMS division.

(D) Advanced Life Support. The roles of advanced life support responders as defined by the NHTSA EMS division.

(E) Patient Transportation Provider(s). Patient transportation providers may offer emergency, nonemergency, or prescheduled medical transportation. The role of each provider type should be clearly defined by the AHJ over the EMS system.

5.2.3 Participants. The system identifies the roles and responsibilities of each organization type needed for the EMS system to function.

5.2.3.1 Structure. The provider types listed in 5.2.2.3 may be supplied by a single organization, or through the combined efforts of multiple organizations, including but not limited to those described in 5.2.3.1(A) through 5.2.3.1(F).

(A) Fire Department-Based. The response and patient transportation system uses cross-trained/dual-role fire fighters.

(B) Fire Department-Based Oversight. Response and patient transportation system uses EMS personnel who are not cross-trained as fire suppression personnel.

(C) Public Single-Role EMS System. The response and patient transportation system utilizes single role public employees.

(D) Private Ambulance Provider System. The response and patient transportation system using nongovernmental staff.

(E) Combined System. Some other combination of public and private resources used to provide out of hospital care.

(F) Additional Provider Types. Additional provider types such as police-based, hospital-based, wilderness, public corporation, military, nonprofit, and others may provide services independently or in combination with other provider types.

5.2.3.2 Participant Roles. The roles and responsibilities for each participant should be organized in a manner that ensures that every component of the system contributes to the effectiveness of the system as a whole, without conflicts in roles and responsibilities.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

5.3 Community Needs Analysis. While an EMS system is unique to the jurisdiction, a standardized approach should be established for assessing local needs and meeting those needs with specific service elements. The system plan identifies the medical needs of the community for patient care and transport.

5.3.1 Retrospective Evaluation.

5.3.1.1 Existing Systems. For existing EMS systems, community need and system components should be established based on response data, patient care records, and other information, including the following:

(1) Demographic data
(2) Historical patient data and call history
(3) Unique geographical or environmental conditions
(4) Local hazards
(5) Call/incident severity
(6) Other local data resources as appropriate.

5.3.1.2 No Existing Systems. For areas without an existing EMS system, system design should be based on established industry standards.

5.3.2 Prevention Targets. The system plan should identify vulnerable population groups that would benefit from prevention programs. The community should include primary illness- and injury-prevention programs for age-related hazards, special needs, or special hazard groups, based on an analysis of the community's population.

5.4 System Goals and Objectives Analysis. System goals and objectives determine service levels as a function of community needs identified through EMS system evaluation and analysis and community needs assessments.

5.4.1 System Design. System design should be dynamic and based on continual evaluation of the EMS system according to defined indicators and performance measures.

5.4.2 Cost/Benefit. System design should consider both the costs and benefits of service delivery options.

5.4.3 Prevention Efforts. Illness and injury prevention and education efforts should be linked to community needs and resource availability.

5.4.4 Service Levels. Service levels should be linked to community needs and expectations.

5.5 System Design Analysis.

5.5.1 Data Collection and Evaluation. The EMS system should be examined in detail over time using indicators set forth in existing industry standards, guidelines, or specific performance measures.

5.5.2 Existing Industry Standards and Regulations.

5.5.2.1 Existing Regulatory Standards. Community EMS agencies should comply with local and state ordinances and rules and regulations. State and local regulations typically regulate local authority, ambulance services and equipment, EMTs, scopes of practice, training, and certification or licensing requirements.

5.5.2.2 NFPA 1710. NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, is an industry standard on which fire department–based EMS system design analysis may be based. This voluntary standard contains minimum requirements relating to the organization and deployment of emergency medical operations to the public by "substantially all career fire departments."

5.5.2.3 Existing EMS Guidelines.

5.5.2.3.1 First Response Unit Guidelines. The National Institutes of Health has recommended guidelines for first response units. *(See NIH 93-3304, Staffing and Equipping EMS Systems: Rapid Identification and Treatment of Acute Myocardial Infarction.)* These guidelines or others may be applied to local EMS systems.

5.5.2.3.2 Early Defibrillation Guidelines. The American Heart Association has recommended guidelines for early defibrillation. *(See Circulation 2000, American Heart Association.)* These guidelines or others may be applied to local EMS systems. For people in cardiac arrest, rapid defibrillation in less than 5 minutes is a high-priority goal.

5.5.2.3.3 Advanced Life Support (ALS) Unit Deployment Guidelines. The National Institutes of Health has recommended guidelines for ALS response units. *(See NIH No. 93-3304, Staffing and Equipping EMS Systems: Rapid Identification and Treatment of Acute Myocardial Infarction.)* These guidelines or others may be applied to local EMS systems.

5.5.2.3.4 Personnel Deployment Guidelines. The American Heart Association has recommendations for personnel deployment. These guidelines or others may be applied to local EMS systems. "In systems that have attained survival rates higher than 20 percent for patients with ventricular fibrillation, the response teams have a minimum of two ACLS providers plus a minimum of two BLS personnel at a scene. Most experts agree that four responders (at least two trained in ACLS and two trained in BLS) are the minimum required to provide ACLS to cardiac arrest victims." *(See American Heart Association's "Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care," JAMA 1992.)*

5.5.2.4 Chain of Survival. The American Heart Association uses the term *chain of survival* to describe the following four EMS system components critical to the survival of cardiac arrest victims:

(1) Early access to the EMS system, facilitated by the availability of a 9-1-1 system that allows callers to obtain police, fire, or EMS assistance by calling a single telephone number
(2) Early CPR by either bystanders or first-responder rescuers
(3) Early defibrillation by first responders, emergency medical technicians (EMTs), paramedics, or other on-scene trained personnel. In addition, public access defibrillation, using automatic or semiautomatic external defibrillators accessible to the lay public, can improve survival in cardiac arrest.
(4) Early advanced life support

5.5.3 Performance Measures as System Design Features.

5.5.3.1 EMS system performance measures are designed to function as a framework for a new system design or as a tool through which a community may monitor the performance of the existing EMS system. Several indicators serve as system design data collection points. Through the continuous measurement of a system's structure, processes, and outcomes using designated indicators and performance measures, EMS system planners may identify areas of the system design that require modification or enhancement.

5.5.3.2 If subsequent data show that the original goals and objectives of the EMS system are not being met, modification of the EMS system design should be made. Data collection and evaluation is required to assess the EMS system modification and ensure that the system continues to be effective.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

5.5.3.2.1 Performance Measures. One example of performance measures has been developed by the International Association of Fire Fighters (IAFF). The set of measurable EMS system indicators includes the following:

(1) Call processing measure: Total time from call intake by unit dispatching agency to response unit notification. This includes answering the phone, asking call intake questions (e.g., "What is your emergency?"), verifying addresses, asking primary EMD questions, and communicating the address and the nature of the call to the responding unit (dispatch).
(2) Turnout time measure: Total time from response unit notification to wheels rolling toward the incident location
(3) Travel time measure: Time elapsed from vehicle wheels turning to arrival of apparatus/vehicle at response address/incident location. This is one time component of overall response time.
(4) Staffing measure: The staffing pattern for ALS level responses
(5) Deployment measure: Percentage of calls in which units are available to respond immediately. This lack of available units may be due to excessive call volume or other resource-depleting situations and may cause a deviation from standard deployment procedures.
(6) Road structure coverage capability measure: This measure is intended to determine whether the department has optimized the location of fixed assets from which mobile assets are deployed. Measurement is done typically via a recognized computer software model, geographic information system (GIS) analysis/ARCVIEW. ARCVIEW is industry standard software from the Environmental Systems Research Institute (ESRI). This measurement model considers road type, impedance, and travel speed in its measure. Measurement may also be conducted via the hand-tracking of addresses on a standard road map. Departments may utilize addresses from historical responses to estimate road coverage capability.
(7) Patient care protocol compliance measure: Compliance with established patient care protocol. The data is to be collected through comparison of patient care documentation with established written (recognized) patient care protocol. This indicator is to be measured by the medical director, Quality Assurance, or similarly designated/assigned officer.
(8) Patient outcome measure: Measure the patient's status following EMS encounter relative to patient status upon initial contact by EMS personnel. Measure instrument may be located on patient care report or documentation form. Information reported by attending EMS professional considering patient feedback and signs and symptoms. Note: This measure excludes obvious death upon EMS scene arrival when no treatment is given.
(9) Defibrillation availability measure: Percentage of first shocks delivered within 5 minutes of collapse. "Defibrillator" includes automated external defibrillators (AEDs) as well as manual defibrillators.
(10) Extrication capability measure: Percentage of calls requiring an extrication tool having one delivered to the scene within 8 minutes of call dispatch
(11) Employee illness and injury measure: Percentage of employees acquiring an illness or injury as a result of participating in an EMS call
(12) Employee turnover measure: Percentage turnover of EMS-trained employees per year
(13) Quality program measure: Determination of whether an overall quality program, as described in (1) through (12) above, exists within the EMS system
(14) System user opinion measure: Mail/phone survey to assess the satisfaction of system users with the system's performance
(15) Multicasualty event response plan measure: An established plan to mitigate a multiple casualty disaster while maintaining sufficient resources to respond to the normal volume of emergency calls within the jurisdiction

5.5.3.2.2 NHTSA. The National Highway Traffic Safety Administration (NHTSA) is currently working on a consensus process to develop performance measures for EMS.

5.5.3.2.3 Other Measurement Methods. Accrediting bodies such as the Commission on Fire Accreditation International, the Commission on Accreditation of Ambulance Services, and others have published measurements and criteria for EMS systems.

5.6 Essential System Analysis Components.

5.6.1 Call Processing. System analysis considers call processing the manner in which calls are processed, as well as evaluation of the intervals required to complete the call and notify appropriate providers.

5.6.2 Call Processing Method. Community needs should dictate the way that resources are assigned and prioritized.

5.6.3 Call Processing Time Interval Standards. Call processing performance objectives should comply with existing standards. For example, NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, has established a standard that 95 percent of all emergency calls must be answered in 30 seconds. Dispatch of emergency response aid shall be made within 60 seconds of the completed receipt of an emergency alarm.

5.6.4 Turnout (Activation) Interval. Turnout interval performance objectives should comply with existing standards. System analysis should consider provider turnout interval, or the interval from response unit notification to movement of that unit to the location of the incident. For example, NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, establishes turnout interval objectives of no more than 1 minute (60 seconds).

5.6.5 Geography. System analysis should consider geography and the implications of local geography on service delivery.

5.6.5.1 Geographic Response Tools. A geographic information system (GIS) may be used as a tool to model existing service delivery for each EMS system component, such as first response, BLS or ALS care, or patient transportation services. Response capabilities for each mobile system component based on desired travel intervals can be modeled using a GIS system, identifying underserved areas of a jurisdiction, for either current or planned system designs.

5.6.5.2 Travel Interval. Travel interval objectives examined by a GIS analysis should parallel standards as established by the lead agency.

5.6.5.3 First Response. The community should establish response intervals for first responders that are appropriate for that community. The standards should be suitable for the local demographics, resources, medical needs, and geography. The intervals should be systematically monitored for compliance with the local standard.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

5.6.5.4 Advanced Life Support. The community should establish response intervals for advanced life support, where available, that are appropriate for the community. The standards should be suitable for the local demographics, resources, medical needs, and geography. The intervals should be systematically monitored for compliance with the local standard.

5.6.6 Geographic Barriers. A GIS model may also identify potential barriers to delivery of care (for example, interruption of the road network by construction, flooding, or railroad crossings).

5.6.7 Distribution of Demand. A GIS may also identify the distribution of calls in a community and areas undergoing development that would require the expansion of services in the future.

5.6.8 Demographics. The system analysis should consider local demographics and the implications of those demographics on service requirements for a range of constituency groups.

5.6.8.1 Age. Age-related injuries and illnesses (for example, pediatric, adolescent, geriatric) should be considered.

5.6.8.2 Socioeconomics. A community's socioeconomic structure and its associated injuries and illnesses (e.g., violent crime, lack of prenatal care, neglect) should be considered.

5.6.8.3 Gender. Gender-related injuries and illnesses (e.g., disease rates and treatment plans) should be considered.

5.6.8.4 Culture and Ethnicity. Language, cultural diversity, and ethno-specific disease processes should be considered.

5.6.8.5 Local Industry. Industrial area injuries and illnesses (e.g., exposure to hazardous materials, injuries from machinery) should be considered.

5.6.9 Regulatory Environment. The EMS system should monitor the political and regulatory environments to analyze impacts on operations, funding, and personnel.

5.6.10 Additional System Needs. The system analysis should consider other features unique to the system, such as special hazards, needs, and conditions that will affect service delivery.

5.6.11 Disasters. The potential for disasters as a function of unique jurisdictional features, characteristics, and risks should be considered.

5.6.12 Medical Center Resources. The system analysis should consider resources available through local hospitals (e.g., frequency of hospital "diversion" status, resource hospital training, resupply of disposables and medications, ALS quality assurance).

5.7 EMS System Planning. Based on the comprehensive system analysis and the identified system priorities, the system should develop a plan for ongoing system design and improvements. Plan development should include the components specified in 5.7.1 through 5.7.7.5.

5.7.1 Roles. Identification should be made of the roles and responsibilities of each position type needed for the EMS system to function, based on the needs and wants of the community.

5.7.2 Financing. Annual operating budgets and capital budgets consistent with generally accepted accounting principles should be established.

5.7.3 Resource Allotment. Resources should be allocated appropriately between agencies in the system.

5.7.4 Master Planning/Forecasting. A master plan should be available that ensures that the necessary resources are available to the system and will meet the needs of future system requirements.

5.7.5 Disaster/Catastrophe Planning. The system should ensure that a plan is available to manage overwhelming or catastrophic events, including coordinating activities between and among providers.

5.7.6 Public Education and Injury/Illness Prevention. The system plan should include components required to prevent the need for emergency responses.

5.7.6.1 Traditional Programs. Traditional illness and injury prevention programs such as CPR and "Stop, Drop, and Roll" should be available and regularly provided to citizens in the system.

5.7.6.2 Other Programs. The prevention and public education plan should include analysis of the environment and an analysis of the need for special prevention programs such as water/cold safety, immunization, and basic emergency care.

5.7.6.3 Disaster Preparedness. The system should coordinate with emergency management programs to ensure that citizens are prepared.

5.7.7 Provider Support. The system plan should address and consider methods to support individual providers in the system.

5.7.7.1 Provider Training. Provider training and support programs should ensure that providers receive training sufficient to meet local needs and support to ensure their continued participation.

5.7.7.2 Provider Safety. The following provider safety programs should be in place to reduce the amount and severity of injuries incurred by providers:

(1) Equipment
(2) Training
(3) Accountability systems

5.7.7.3 CISM. Critical incident stress management (CISM) programs designed to reduce acute and chronic effects of stress related to job functions should be established.

5.7.7.4 Wellness. Health and wellness programs should be in place to monitor and support the overall wellness of providers.

5.7.7.5 Emergency Management. Disaster preparedness programs should be in place to meet the unique needs of providers during catastrophic events.

5.8 Continual Risk Assessment and Planning. The system should have in place a comprehensive process, articulated in a risk assessment plan and overall system design that provides continual analysis and mitigation of risk. The primary risk management processes include risk assessment (internal and external), risk elimination, risk avoidance and prevention, risk control, and loss control.

5.8.1 Internal System Liabilities Risks. Internal system liabilities place individual agencies or the EMS system at risk. Examples of such risks include workplace violence, financial improprieties, discrimination, and harassment.

5.8.2 External-Community Risks. External system liabilities place community members at risk. Examples include risks to the community from provider negligence, inappropriate vehicle operation, lack of compliance with training standards, improper maintenance, and inadequate quality assurance processes.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

5.8.3 Risk Control. Measures should be taken to guard against and protect personnel from potential exposures to risks.

5.8.4 Loss Control. Measures should be taken to limit losses through processes such as early-return-to-work programs.

5.9 System Assessment Cycle. The system should have a process in place to continually review and analyze the EMS system using an assessment cycle that includes the following components:

(1) Data collection
(2) Evaluation
(3) Analysis
(4) Proposing
(5) Planning
(6) Implementation

5.10 Current Conditions. System data should be used to identify current conditions and trends.

5.10.1 Changing Needs. The data should consider the nature of a changing geography over time, population distribution, and the alteration of the transportation network.

5.10.1.1 Changes in Transportation. Transportation network changes should be monitored and considered.

5.10.1.2 Changing Political Boundaries. The plan should include new annexations and the effect of such annexations on service provision or system financing.

5.10.1.3 Regional Changes. Regional changes (e.g., changing regional disaster risk areas, financial trends affecting entire regions) should be monitored, evaluated, and planned for.

5.10.2 Changing Demographics. The regular review should, at a minimum, re-evaluate the changing demographic trends in the system.

5.10.2.1 Short-Term Changes. Individual events, such as concerts and sporting events, may cause short-term demographic shifts.

5.10.2.2 Long-Term Changes. Long-term changes (such as an aging population) should be considered when re-evaluating the plan.

5.10.3 Changing Public Health Conditions. The system should conduct external environmental scans to anticipate or identify new public health threats in order to prepare the EMS system to respond to such threats.

5.10.4 Unique Local Needs. Unique features and hazards should be monitored when the EMS system plan is updated.

5.11 Data Element/Collection/Analysis/Reporting. Regular analysis of system component data should be conducted to determine dynamic needs.

5.11.1 Regular Re-evaluation of Data. EMS system performance measure data should be reviewed at least annually to evaluate the specific components within the system. Each component should be evaluated more often based on the original intent of the system and established protocols.

5.11.2 Data Sharing. System data should be shared, as legally appropriate, among agencies and medical facilities in the system.

5.12 Feedback Loop. A feedback mechanism should be in place to ensure that proposed and implemented changes in the system result in the desired improvements and meet the goals and objectives identified by EMS system planners.

Chapter 6 Finance

6.1 Determining Cost of System. The system plan should include a method for determining costs. Methodologies have been specified to identify all costs associated with EMS elements or components. Different methods exist for determining costs for public and private organizations; costing of services may have different applications. Therefore, a number of national organizations have developed cost allocation methods, each with its own applications, benefits, and shortcomings.

6.1.1 Specification and Categorization of Direct Costs. The EMS system should be able to define the direct costs of each system element.

6.1.1.1 Direct operating costs should be established for each phase of operations. The direct costs are those that can be assigned directly to a particular component of the operation, and should include start-up and ongoing costs. The EMS system should be able to understand and recognize the nature of the costs required to start up a new phase of operations and perpetuate those operations.

6.1.1.2 The system should identify the start-up costs of the operation. At a minimum, the system should be able to identify and calculate the start-up costs for the following:

(1) Emergency medical and other equipment
(2) Vehicles
(3) Supplies and materials
(4) Facilities
(5) Primary personnel
(6) Direct labor
(7) Support personnel
(8) Training, including certification and licensing fees

6.1.1.3 The system should identify the ongoing or continuous costs of delivering EMS services. At a minimum, the system should be able to identify and calculate and, if appropriate, allocate the ongoing replacement and maintenance costs for the following:

(1) Emergency medical and other equipment
(2) Vehicles
(3) Fuel
(4) Supplies and materials
(5) Facilities
(6) Ongoing personnel
(7) Primary personnel costs, including salaries and all associated pay-related costs
(8) Personnel benefits
(9) Support personnel
(10) Ongoing communications system
(11) Ongoing training, including certification and licensing fees

6.1.2 Specification and Categorization of Indirect Costs. The EMS system should be able to identify the indirect cost of each system element. The indirect cost should be allocated based on the level of effort required to perform different types of work. Some examples of such costs include the following:

(1) Insurance noncovered expenses
(2) Legal services and consultation
(3) Medical oversight
(4) Contract services
(5) Regulatory compliance
(6) Billing services
(7) Information management

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

6.2 Method for Anticipating System Funding Sources. The EMS system should be able to identify and predict the revenue sources available to support a viable EMS system. Given the diversity of funding sources for EMS systems, the system should take into consideration the following potential funding sources:

(1) Fee-for-service resources such as the following:
  (a) Private pay
  (b) Third-party pay
  (c) Bad debt or contractual allowances based on uncollected revenues
(2) Government reimbursement, such as the following:
  (a) Medicare
  (b) Medicaid
  (c) Military/government and dependent care
(3) Contractual agreements such as the following:
  (a) Capitated agreement
  (b) Contract service
  (c) Special event
(4) Public and private grants
(5) Public funding, such as the following:
  (a) Taxes
  (b) EMS operating levies
  (c) Bond levies
(6) Statutory revenue
(7) Corporate funding, if available
(8) Civic group funding
(9) Public and private donations
(10) Subscription programs
(11) Investment revenues
(12) Other subsidies
(13) Foundations

6.3 Use of Revenue and Cost Analysis. System planning should use revenue and cost analyses to establish system priorities, goals, and objectives, and allow the system to predict future financial capabilities.

6.4 Financial Plans. A financial plan should be developed that reflects sound analysis and planning of short- and long-term operating need. While financial planning at the system level may not be achievable for all types of systems, all EMS systems should be concerned about the financial ability of agencies to ensure ongoing operations.

6.4.1 Short-Term Financial Plan. A short-term financial plan should be created for providing ongoing services. Short-term financial planning should be represented through annual operating and capital budgets.

6.4.1.1 An operating budget should be prepared, approved, and reviewed regularly.

6.4.1.2 A capital budget should be prepared, approved, and reviewed regularly.

6.4.2 Long-Term Plan. A long-term financial plan should be developed to forecast long-term capital needs, potential changes in revenue streams, and potentials for new or alternate methods of providing services. The following are considerations for long-term financial planning for EMS systems:

(1) The potential for new services
(2) The potential for changes in reimbursement structures
(3) Development of a contingency plan for unknown or unanticipated expenditures
(4) Justification for resources and requirements
(5) A cash flow forecast
(6) A revenue projection

6.5 Business Analysis. A business analysis should be conducted at regular intervals. A business analysis allows the EMS system to monitor its performance and compares its performance against contemporary benchmarks. The following are recognized elements that should be considered in a business analysis:

(1) Financial performance measures
(2) Market analysis, including prevailing rates
(3) Cost shifting, if present
(4) Maintenance of adequate reserves to ensure ongoing operations
(5) Matching resources to requirements to ensure that funding is adequate
(6) Development of a standardized cost analysis tool

6.6 Additional Financial Issues. The system should consider additional issues. Given the diversity of local EMS systems, local agencies should be able to identify or recognize fiscal considerations that are beyond the scope of standard financial practices.

6.6.1 The collection methodology should be appropriate and reviewed regularly. The EMS system should recognize the uniqueness, importance, and value of the financial reimbursement and collection process. The EMS system should regularly evaluate billing methodologies.

6.6.1.1 Regulatory restrictions should be considered with respect to the billing process. Collection methods should recognize and consider the following local, state, and federal requirements:

(1) Health Insurance Portability and Accountability Act (HIPAA)
(2) Medicare and Medicaid
(3) Employee Retirement Income Security Act
(4) State and federal insurance regulations

6.6.1.2 The collection process should be appropriate to the system. The EMS system should ensure that methods are in place to evaluate collection processes and should ensure that those processes are consistent with community expectations. The following are collection processes that should be considered by the EMS system:

(1) In-house collections
(2) Regular evaluation of collection rates
(3) Contracted collection
(4) Payor requirements
(5) Appropriate documentation for the system, and provision of training to ensure appropriate documentation

6.6.2 The system should be prepared to provide financial reporting information that articulates the financial health and performance of the system. At a minimum, the financial report should include the following:

(1) Gross billings
(2) Collection rate
(3) Billing mix (ALS, BLS, scheduled, unscheduled, miles per transport, and other billing codes according to local standards)
(4) Payor mix, including uninsured
(5) Accounts receivable turnover rate
(6) Bad debt expense
(7) Contractual allowances
(8) Write-offs
(9) Net revenues

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

6.6.3 Partnerships should be considered. The system should take steps to forge partnerships when appropriate. In an effort to reduce overall system expenditures, the EMS system should consider taking advantage of fiscal and operating synergies where opportunities exist for collaborative relationships within the system.

Chapter 7 Medical Oversight

7.1 General. Effective medical direction ensures that physician(s) have appropriate clinical oversight of the emergency medical system. This includes, for example, oversight of on- and off-line medical direction, protocol development, clinical quality assurance and improvement, understanding of emergency operations, and field observations.

7.2 Single Medical Authority. The system should have in place a single medical authority, or medical authority structure, responsible for patient care oversight and responsibility. Individual agencies in the system may have medical directors that provide agency-specific oversight.

7.3 System Support of Medical Authority. The system should provide the resources necessary to ensure that the medical authority can fulfill his or her obligations. Some examples may include physical infrastructure, staff support, communications, and liability coverage.

7.4 Medical Authority Role. The medical authority should provide oversight for the EMS system; however, the medical authority, in some cases, may be the same person as the medical director. The role of the medical authority for the system should be clearly defined and should include the following responsibilities:

(1) Recommending certification, recertification, and decertification of nonphysician prehospital personnel to the appropriate certifying agency
(2) Establishing an EMS advisory committee to review system medical issues
(3) Providing direction and authorization for the development and revision of systemwide protocols, policies, and procedures for all patient care activities from dispatch through triage, treatment, and transport
(4) Establishing criteria for the provider training level of initial emergency response
(5) Establishing criteria for determining the most appropriate patient destination
(6) Ensuring the competency of personnel who provide direct medical oversight to prehospital personnel including, but not limited to, physicians, EMTs, and nurses
(7) Establishing the procedures or protocols under which nontransport of patients is permitted
(8) Providing direction and authorization for the educating and testing to the level of proficiency approved for the different certification levels within the EMS system
(9) Providing direction for an effective systemwide quality improvement program
(10) Providing direction and authorization for personnel eligibility to provide patient care
(11) Removing authorization for personnel eligibility to provide patient care for due cause, using an approved review and appeals mechanism
(12) Establishing functional criteria for equipment used in patient care

7.5 Medical Director Responsibilities. The primary responsibility of the agency's medical director should be to ensure quality patient care from EMS system access to transfer to definitive care. In addition, the physician(s) should perform the following:

(1) Serve as patient advocate
(2) Set and ensure compliance with patient care standards, including communication standards and medical protocols
(3) Provide direction and authorization for the development and revision of systemwide protocols, policies, and procedures for all patient care activities from dispatch through triage, treatment, and transport
(4) Develop and implement the process for the provision of direct medical oversight
(5) Establish the appropriateness of initial qualifications of prehospital personnel involved in patient care and emergency medical dispatch
(6) Ensure that the qualifications of prehospital personnel involved in patient care and emergency medical dispatch are maintained
(7) Provide direction for effective quality improvement programs for continuous system and patient care improvement
(8) Promote EMS research
(9) Maintain liaison with the medical community including, but not limited to, hospitals, emergency departments, physicians, prehospital providers, and nurses
(10) Interact with regional, state, and local EMS authorities to ensure that standards, needs, and requirements are met and resources are optimized
(11) Participate in planning activities such as mutual aid, disaster planning and management, and hazardous materials response
(12) Promote public education consistent with system goals
(13) Maintain knowledge levels appropriate for an EMS medical director through continued education
(14) Actively participate in on-scene activities with appropriate training

7.6 Direct and Indirect Medical Oversight. Medical directors may provide direct and indirect (on-line and off-line) medical oversight.

7.6.1 During direct medical oversight, the medical director (or designee) should provide voice or other real-time communication to the practitioner.

7.6.2 Indirect medical oversight includes prospective medical oversight and retrospective medical evaluation.

7.6.2.1 Prospective methods may include participating in the training, testing, and certification of providers: protocol development, operational policy and procedures development, and legislative activities.

7.6.2.2 Retrospective activities should include participation in medical audit and review of care.

7.6.2.3 Various aspects of prospective and retrospective medical oversight can be handled by committees functioning under the medical director with representation from appropriate medical and EMS personnel.

7.6.3 Standards should be established for the certification, training, and monitoring of other system physicians.

7.7 Medical Director Qualifications. To optimize medical oversight of all prehospital emergency medical services, physicians should have the following qualifications as described by

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

the American College of Emergency Physicians (ACEP) and National Association of EMS Physicians (NAEMSP):

(1) License to practice medicine or osteopathy within the system's boundaries
(2) Familiarity with the design and operation of prehospital EMS systems
(3) Experience or training in prehospital emergency care
(4) Experience or training in medical oversight of prehospital emergency units
(5) Active participation in the emergency department management of the acutely ill or injured patient
(6) Experience or training in the instruction of prehospital personnel
(7) Experience or training in the EMS quality improvement process
(8) Knowledge of EMS laws and regulations
(9) Knowledge of EMS dispatch and communications
(10) Knowledge of local mass casualty and disaster plans
(11) Preferred board certified in emergency medicine: American Board of Emergency Medicine (ABEM); American Osteopathic Board of Emergency Medicine (AOBEM)
(12) Preferred completed fellowship training in EMS

Chapter 8 Quality Management, Clinical Quality, and Data Reliability

8.1 Quality Management Program. A defined quality management program should be developed. The program should identify areas for improvement, evaluate system performance, prioritize development, establish system controls, monitor performance indicators, and re-evaluate system impact.

8.2 Performance Objectives. A defined quality management program should establish performance objectives based on accepted industry standards and guidelines.

8.2.1 Patient care objectives should be developed systemwide based on community needs and expectations, desired patient outcomes, and local resources. Appropriate medical destinations should be incorporated as part of the patient care objectives. Compliance with established protocols should be monitored. Customer satisfaction and feedback should be incorporated into the system.

8.2.2 System evaluation should be integrated into the quality management program.

8.2.2.1 Performance measures should be established and data collected. *(See 5.5.3 through 5.5.3.2.3.)*

8.2.2.2 The system should measure both resources and availability for the following:

(1) Defibrillator
(2) Extrication tool(s)
(3) Ancillary resources
(4) Medical facilities for availability and diversion policies
(5) Unit availability

8.2.2.3 Staffing and deployment objectives should be monitored and appropriate for the system.

8.2.2.4 Standard operating procedures and guidelines should be established, periodically reviewed, and updated.

8.2.2.5 Training should be evaluated for continuity and content based on industry guidelines and desired system performance.

8.2.2.6 Staff turnover should be evaluated for causes and effects.

8.2.2.7 Equipment maintenance should be monitored and appropriate for the system.

8.2.2.8 System design and changes should be evaluated using a cost/benefit analysis.

8.2.2.9 The communications system should be evaluated based on industry performance guidelines.

8.2.2.10 Interagency relationships and agreements should be reviewed periodically for effectiveness and system needs.

8.2.3 The system should use uniform data element definitions. The system should identify and capture appropriate data points. A uniform prehospital patient care record should be used throughout the EMS system. A method should be in place to capture and review data at the system, agency, and individual provider level.

8.2.3.1 The system should use a uniform data set. Examples of data sets are available through NHTSA, National Fire Incident Reporting System, and others.

8.2.3.2 The data should be available for inclusion in a national EMS data clearinghouse.

8.3 Public Health Outcome Parameters. Public health outcome parameters should be developed for each performance objective through the use of benchmarking if possible.

8.3.1 Standardized outcome measures should be specified based on contemporary professional standards.

8.3.2 U.S. Public Health Service outcome models, which include the measurement of the reduction of discomfort, disability, death, destitution, dissatisfaction, and disease, should be referenced.

8.3.3 A system should be in place to share information between system participants, including patient care facilities, and to obtain information from outside databases, such as the following:

(1) Medical examiner reports
(2) Hospital records
(3) Trauma registry
(4) Cardiac registry
(5) Stroke registry
(6) Transport registry reports
(7) Discharge data
(8) Other appropriate databases

8.4 Physician Participation. A quality management program should include physician participation.

8.5 Patient Confidentiality. All data management programs should maintain patient confidentiality, at a minimum in accordance with federal, state, and local regulations.

8.6 Injury/Illness Reduction and Prevention. The quality management program should incorporate standards directed at reducing injuries and illnesses in the community based on the system data.

8.7 Complaints. A consistent process should be in place to address complaints.

8.8 Participation in Studies and Research. The system participants may develop relationships with academic institutions and/or researchers to take an active role in studies and research using system data as follows:

(1) Establish credible data collection process
(2) Identify research issues

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

(3) Provide linkage (to other studies)
(4) Identify research funding sources
(5) Publish study results in recognized peer-reviewed journals

8.9 System Review. All quality management systems should be reviewed on a regular basis for effectiveness.

8.10 Documentation. The EMS system should be able to provide documentation of its quality management program, including quality assessment and improvement methods, provider training programs, prevention strategies, and system performance measures.

Chapter 9 Public Information, Education, and Relations (PIER)

9.1 Public Education. The local EMS system should take steps to establish a coordinated program of public information and relations.

9.1.1 Education efforts should be coordinated to ensure public awareness of system access in the education efforts. The participants in the system should work collaboratively to ensure that the telephone number for appropriate system access is properly promoted.

9.1.2 Education efforts should ensure coordinated delivery systems for PIER activities. The education messages delivered by system providers should be coordinated to ensure consistency. Education messages should use appropriate methods of delivery (e.g., print media, electronic media, television, radio) that are consistent among providers.

9.1.3 Education efforts should be coordinated to ensure public awareness of injury and illness prevention programs. Education efforts should attempt to reduce the incidence of injuries and illness. Providers should work together to design programs that focus on preventing injuries and illnesses by analyzing local or regional data, researching methods of intervening, and implementing the most appropriate methods.

9.1.4 Messages should be delivered according to the diverse needs of constituent groups.

9.1.5 Community and bystander response principles should be included in education efforts. Education efforts should be designed to evaluate opportunities for bystander and community intervention.

9.2 Public Education System Goals. The participants in the system should evaluate the existing system and plan for improvements *(see 5.7.6 through 5.7.6.3)*. Such efforts should address public access, recognition, and intervention to improve patient outcomes.

9.3 Qualifications of Personnel for PIER Activities. Specialized skills are required to provide effective public communications. The EMS system should have one or more such personnel.

9.4 PIER Activities. The participants in the system should work together to develop a working group of public education specialists. The PIER group should include EMS personnel, educators, and public information specialists, as well as local or national experts on specialized topics.

9.5 PIER Activities Related to Mass Gatherings.

9.5.1 Methods for accessing EMS may differ during mass gatherings, and participants at mass gatherings may travel from other areas.

9.5.2 Planning for mass gatherings should be conducted uniformly throughout the system. The participants in the system should collaborate to effect planning for mass gatherings that could be different from EMS system planning. Planning methods should include providing information to patrons about locating and accessing emergency medical assistance.

9.5.2.1 Information should be provided during the event. Emergency medical resources should be easily identified and accessed by patrons, and known to all event workers.

9.5.2.2 After the event, PIER personnel should participate in evaluating the event, focusing on improving communication for future gatherings. That evaluation should consider the ability of patrons to locate and access medical resources.

9.6 PIER Activities. PIER activities should be directed at the general public, EMS personnel, and medical personnel. Public education personnel in the system should target activities to ensure the best outcomes. EMS and medical personnel should be included in the public education efforts so that messages are consistent.

9.7 EMS Agenda for the Future. Prevention activities should be targeted to parallel the EMS agenda for the future. Local EMS agencies should consider the agenda for the future as a fundamental building block of public information programs for EMS.

9.8 Disaster Education. Disaster education should be provided according to system goals. The local EMS PIER personnel, in cooperation with emergency management agencies, should provide plans for preparing for, responding to, and recovering from catastrophic events.

9.9 Collaborative Efforts. The EMS system should develop plans for mutual aid, cooperation, collaboration and coordination of PIER activities Not only should the system create those collaborative efforts, but also individual organizations such as prehospital providers, fire agencies, hospitals, public safety agencies, emergency management organizations, local governments, law enforcement agencies, and other public and private entities.

9.10 Identification of Available Public Media Resources. PIER planning personnel should identify the media resources that are available to the system and the appropriate information that may be provided. Resources may include print and electronic media and printed and audio/visual publications.

9.11 Identification of Funding Resources. The EMS system should identify funding sources and partners to ensure stable funding for PIER activities.

Chapter 10 Communications

10.1 Introduction. Communications serve as the entry point to access prehospital response. In addition, communications systems provide the infrastructure and operational support for responders to link resources for EMS activities. Policies and procedures should ensure that access and use of all components comprising communication system resources are in place and ensure efficient and effective delivery of service.

10.2 Access of Emergency Services. A single number (enhanced 9-1-1 is optimal) should be used to access emergency services. The 9-1-1 emergency number is the preferred access number because it is a nationally recognized emergency telephone number. The nature of 9-1-1 calls necessitates responding

--`,,`,,`-`-`,,`,,`,`,,`---

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

directly to the caller with minimal delay even when the caller cannot provide information to the public safety answering point (PSAP).

10.2.1 Policies and procedures should be established to differentiate the emergency access number (9-1-1) from advertised nonemergency access numbers.

10.2.2 Automatic Number Identification (ANI). ANI displays the phone number of the party calling E9-1-1. The data displayed should be verified with the caller.

10.2.3 Automatic Location Identification (ALI). ALI should be available and should display the phone number, name, address, and appropriate agencies for response for the telephone that was used to call 9-1-1. ALI serving a single-line, multiline, or wireless telephone system should associate a location with the caller's telephone number. Additional information such as apartment number, space number, building hazards, unique access requirements, phone location in the building, and pre-existing medical conditions should be displayed.

10.2.4 Access to Nonemergency Services. When other nonemergency help lines exist (such as 2-1-1, 3-1-1, and other numbers), policies and procedures should be in place to ensure that emergency calls received by alternative systems are immediately directed to the appropriate PSAP.

10.2.5 Multilanguage Interpretation. The system should provide multilingual interpretation for non-English-speaking people through established linguistic services.

10.2.6 Hearing Impaired Telephone Services. Services for the hearing impaired, such as telephone devices for the deaf (TDD), should be available and used in the system.

10.3 Lead Agency. A single lead agency should be responsible for coordinating EMS communications. The lead agency is the agency, usually a public agency, that has the principal responsibility, assigned by the AHJ.

10.3.1 Communication Center Coordination. The communication centers should incorporate EMS system goals and objectives into center operations. The communication centers should have a defined administrative structure.

10.3.2 User Agencies. A user agency is any agency other than the lead agency having a specific interest in EMS communication in the jurisdiction it serves. User agencies should be represented within the communication center governing structure.

10.4 Centralized Communication Plan. A systemwide communication plan should be in place that functionally consolidates dispatch centers.

10.4.1 Plan Outcomes. The EMS system should describe methods to optimize administrative costs, improve administrative services, lower economic costs of service, and improve service benefits from the communication infrastructure. The communication plan should articulate how these benefits will be achieved.

10.4.2 Communication Relationships. The EMS communication plan should describe and define the communications relationships between system agencies. Such relationships may include managing emergency information, providing a unified communication control system, transferring or handling (without duplicating) event information, and ensuring compatibility of communication devices.

10.5 Computer-Aided Dispatch. The system should include computer-aided dispatch (CAD), which allows for reference location information such as location of previous incidents, duplicate incidents, or premise/hazard information. The CAD system should provide a method of selecting appropriate response units.

10.5.1 Automatic vehicle locaters (AVL), when used, will assist the CAD system in selecting the closest appropriate unit.

10.5.2 Mobile data computers (MDCs) allow the CAD system to automatically gather and report appropriate response information.

10.6 Capture of Key Data Elements. The communications system should capture key data elements and report performance.

10.6.1 Data Capture and Reporting Elements. The communications system should, at a minimum, be able to capture and report on the following data elements:

(1) Response intervals
(2) E9-1-1 system access
(3) Call processing interval
(4) Dispatch time
(5) Turnout interval
(6) Travel interval
(7) Patient contact time
(8) En route to hospital (or other facility) time
(9) Arrival at hospital time
(10) Unit available for service

10.6.2 Additional Data and CAD Elements.

10.6.2.1 CAD Interface Capabilities. The CAD should be able to interface with other dispatch computers within the EMS system.

10.6.2.2 Data Retrieval. The CAD system should ensure ease of data input and retrieval.

10.6.2.3 National Fire Information Reporting System (NFIRS). The CAD system should be able to capture and report information according to the requirements of NFIRS.

10.6.2.4 National Highway Traffic Safety Administration (NHSTA). The CAD should be able to capture essential data elements recommended by NHTSA.

10.6.3 Data Integration. A system of integrating and reporting data should be available for all responders in the system.

10.7 Quality Management. A system should be in place to monitor the quality of the communications system. Communications improvements should be made based on quality evaluations and technological advancements.

10.8 Communications Equipment. The age and reliability of equipment should be monitored regularly.

10.8.1 Equipment Maintenance. An equipment maintenance plan should be developed and followed.

10.8.2 Financial Plans. Financial plans should anticipate repair and maintenance needs. Funding methodologies should be established that minimize the impacts of capital expenditures for new or replacement equipment.

10.9 Operability. The communications system should allow communications between all providers in all operating environments.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

10.9.1 Operating Security. The system should ensure that secured or dedicated frequencies are available that are not affected by private users (especially cellular telephone users), and should ensure the physical and electronic security of communication resources.

10.9.2 Tactical Frequencies. Tactical operating frequencies should be available to reduce high-traffic radio communications and to use during multiagency events.

10.9.3 Disaster Operations. Disaster communication frequencies should be available and used during disasters, mass casualty incidents, and other multiple-patient scenes according to the standards of the system.

10.9.3.1 The disaster communication process should be dependable to minimize loss of service.

10.9.3.2 Backup systems should be in place in case of the primary system's interruption.

10.9.3.3 High incident response levels (HIRL) should support major events and minimize dispatch volumes. Primary dispatch activities should be limited to emergent incidents; routine calls should be managed by local jurisdiction on an "as available" assignment.

10.10 Criteria-Based Dispatch. Criteria-based dispatch (CBD) protocols should be used to prioritize requests for service and dispatch resources according to pre-established criteria.

10.10.1 Pre-Arrival Instructions. The dispatch center should establish standards for providing medically approved pre-arrival instructions.

10.10.2 Quality Assurance. The system should use quality assurance measures, such as outcome, comparison, and validation information, to ensure continuous improvement.

10.11 Training. Call receivers/dispatchers should participate in and complete a nationally recognized and accepted emergency medical dispatch certification program, and receive on-the-job, site-specific training. Call receivers/dispatchers should regularly participate in continuing education.

10.12 Direct Medical Control. The EMS system should ensure that direct medical control is available for all field responders.

10.13 Nonemergency Services. Methods should be in place to provide alternative medical services for those requests that do not require emergency medical responses.

Chapter 11 Equipment and Facilities

11.1 Standard for First Response and Ambulance Transportation. The system should have a standard for first response and ambulance transportation equipment. The EMS system should have a standard or method to determine the equipment needed in the system and the specifications of the equipment for all patients. The method could permit individual agencies to make equipment determinations.

11.1.1 Vehicles. The EMS system should create specifications for first response and transport vehicles used within the system. A part of the vehicle standard may include allowing individual agencies to make purchase decisions within the restrictions established by the EMS specification or by state or national standards.

11.1.2 Biomedical Equipment. The EMS system should create specifications for first response and transport biomedical equipment used within the system.

11.1.3 Durable Equipment. The EMS system should create specifications for first response and transport durable equipment used within the system.

11.2 Replacement Plan. A replacement plan should be developed at the time the equipment is purchased, based the life expectancy of each equipment type.

11.3 Response Vehicles Licenses. EMS system equipment should be licensed according to local or statewide emergency medical regulations.

11.4 Inspecting Emergency Equipment. The EMS system should develop plans for inspecting equipment and inventory carried aboard emergency response vehicles. Regular inspections should be conducted every shift, every day, every week, and every month by on-duty personnel. EMS system regulators should conduct announced and unannounced inspections on a regular basis. Inspection lists should be developed based, at a minimum, on manufacturers' recommendations.

11.5 Personnel Education and Training. All personnel should receive the training necessary to ensure that they can effectively operate emergency vehicles. In addition to driver training, the training courses should include basic inspection requirements for ambulances and other emergency vehicles.

11.5.1 Maintenance of Driving Licenses. Periodic records checks should assure that licenses are in place and not suspended or revoked.

11.5.2 Operator Assessment. The system should have processes in place to identify at-risk vehicle operators and should develop measures to ensure safe vehicle operation.

11.6 Maintenance Plans. The maintenance program should have plans in place that provide a schedule for maintenance and carefully articulated maintenance plans for all major equipment used in the system, including vehicles, biomedical equipment, or other medical equipment. The plans should include replacement schedule and plans to provide reserve equipment or equipment "on loan" during repair periods.

11.7 Maintenance Personnel for Emergency Equipment. The maintenance program should provide vehicle, biomedical, and hardware maintenance using specially trained personnel. The EMS system should adopt policies to ensure that maintenance personnel are appropriately trained for that maintenance. *(See NFPA 1071, Standard for Emergency Vehicle Technician Professional Qualifications.)*

11.8 Response Facilities. Ambulance and other responders' facilities should be located based on analysis of demand and/or risk-hazard evaluation. Agencies should participate in joint efforts to cooperatively determine the best location for facilities.

11.8.1 EMS facilities may be available (designed) for other medical or clinical services. If appropriate to the local jurisdiction, the EMS participants should consider enhancing facilities for use in advanced medical services.

11.8.2 Ambulance and other response facilities should be designed consistent with system demands and community needs.

11.8.3 The EMS system should designate receiving facilities based on capability, capacity, and location.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Chapter 12 Human Resources

12.1 Introduction. Human resources are important to both individual agencies and to the broader EMS system. As such, while EMS system planners and regulators should ensure that minimum standards exist in the system for monitoring, managing, and ensuring appropriate staff performance, they also must ensure that individual agencies have appropriate personnel management structures in place.

12.2 Recruitment. The EMS system should recruit according to its needs, as determined by system analysis, design, and planning.

12.2.1 Selection. The system should have a process for candidate selection that includes procedures for hiring or membership.

12.2.2 Wages/Benefits. The plan for any compensation should be clearly spelled out in system documents.

12.3 Education/Training/Certification. The system should ensure that employees maintain required certification and/or licensure.

12.3.1 Training Program. The system should have a comprehensive training plan.

12.3.1.1 The training plan should provide uniform curricula based on established standards.

12.3.1.2 The training program and instructors should be regularly monitored and evaluated.

12.3.2 Certification. Certification standards should be appropriate and uniform throughout the system.

12.3.2.1 System requirements for recertification should be disseminated to employees.

12.3.2.2 The system should include the capability to track individual certification/licensure and the need for renewal thereof.

12.3.2.3 The system should ensure that the training programs necessary for certification and recertification are available in or to the system.

12.3.3 Educational Opportunities. Educational opportunities should be made available to employees in the system.

12.3.4 Training/Education Records. Personnel training and/or education records should be maintained by system administrators.

12.4 Retention. The system or region should take steps to encourage continued participation of personnel. Programs should be appropriate to the local area, but may include the following:

(1) Length of service award programs (LOSAP)
(2) Incentive plans
(3) Recognition plans
(4) Educational/training opportunities
(5) Job advancement/advancement opportunity programs
(6) Provider support

12.5 Personnel.

12.5.1 Processes. The system should have one or more processes in place to ensure effective working relationships between working groups and agencies.

12.5.2 Employee/Member.

12.5.2.1 The lead agency should ensure that a regularly scheduled, objective personnel evaluation process is in place.

12.5.2.2 Job specifications should be clearly defined.

12.5.2.3 Levels of training should be appropriate to meet service needs.

12.5.2.4 The agency should use the criteria in 12.5.2.4(A) and 12.5.2.4(B).

(A) Agencies in the system should have appropriate staffing and scheduling methods to ensure adequate delivery of services based upon the community needs assessment.

(B) Quality assurance and improvement programs should be in place for each agency participating in the system.

12.5.2.5 The system should ensure that employee/members have agency and provider level identification.

12.6 Rules and Regulations. Rules and regulations should be structured to provide for uniform management of personnel in the system.

12.6.1 The system should have established rules and regulations for acceptable behavior, activities, and actions.

12.6.2 The system should have established minimum operational policies and guidelines.

12.6.3 The system should have a process in place to manage discipline, appeals, grievances, and other personnel actions.

12.6.4 The system should have a process in place to ensure compliance with occupational safety regulations.

12.7 Health and Safety. The system should ensure that each agency has and implements a written comprehensive health and safety plan.

12.7.1 Personal protective equipment should be available to all personnel and should be used according to system standards and manufacturer recommendations.

12.7.2 Health and wellness programs should be in place to prevent participant illness and injury.

12.7.3 A critical incident stress management (CISM) process should be in place.

12.7.4 An employee assistance program should be in place.

Chapter 13 Operations

13.1 Implementation of System Design (Operations). The EMS system operations include the coordination of multiple system elements. That is why each component should be considered not only in the context of its operational application, but also in relationship to other factors within the system.

13.2 System Preparation. EMS operations should be implemented based on EMS system planning, analysis, and financial capability.

13.3 Communications Coordination. EMS communications should be coordinated based on EMS system design and available local resources.

13.4 Response Coordination. Plans for first or initial response, ambulance response and transport, and alternate methods of

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

transport should be in place as determined by EMS system analysis and planning, including the availability of additional resources as required by system demands.

13.5 Incident Management. The function of incident management is the overall management and coordination of, and accountability for, all responding personnel and resources.

13.5.1 The incident management system should be consistent throughout all agencies that can be expected to interact.

13.5.2 The system should be based on a strategy of efficient and effective utilization of resources. It should address chain of command, including transfer of authority of any officer or position. It should provide for delineation of responsibilities and authority for all involved response personnel and agencies.

13.6 Treatment Guidelines. Patient care should be consistent with AHJ guidelines, industry standards, medical oversight, established protocols, and desired patient outcomes.

13.7 Patient Destination (Transport). Patient destination guidelines should be consistent with AHJ guidelines, medical oversight, established protocols, and desired patient outcomes.

13.8 Functional Capabilities of Health Care Facilities Are Specified. The EMS system, in concert with the local medical community, should create standards for functional capabilities of health care facilities and determine the types of patients who should be delivered to those facilities.

13.8.1 The functional information should be disseminated to emergency care personnel. The system should have a plan in place to provide functional information to emergency personnel, and the plan should be monitored to ensure that patients are transported to the appropriate facility.

13.8.2 The system should define medical center capabilities for the following:

(1) Primary, secondary, and tertiary medical facilities
(2) Alternate health care facilities
(3) Hospice
(4) Specialized care facilities, such as trauma, burn, pediatric, cardiac, hyperbaric, psychiatric, obstetric, spinal cord, and sexual assault
(5) Other facilities appropriate to the local system

13.8.3 The prehospital triage program and destination policies should provide for transport to appropriate facilities and for backup plans for facilities that are on diversion.

13.9 Coordinated Medical Oversight. A plan should be implemented that allows for direct and indirect medical oversight, coordinating acute medical care, patient care protocol development, and additional components of the quality management program.

13.10 Quality Management/Documentation. All EMS activities including patient care, transport, training, and research documentation should be included in the implementation of a quality management program.

13.11 Logistics. Systemwide supply and equipment programs such as the following should be implemented to standardize equipment selection and to facilitate interagency supply and equipment use and sharing:

(1) Restocking of materials, disposables, and consumables
(2) Decontamination of equipment and vehicles
(3) Equipment repair and replacement
(4) Data collection and management
(5) Support for extended duration incident operations

13.12 Staff Management. Staff recruitment, development, evaluation, education, training, and retention programs should be in place to ensure that sufficient numbers and types of qualified providers are available based on EMS system design.

13.13 Public Information, Education, and Relations. A program should be in place to allow for an information interface with the community, including EMS access information, public education, system public relations, and incident information management.

13.14 Regulatory Compliance. The system should ensure that systemwide operations comply with local, state, and federal regulations and laws, including but not limited to, state-mandated reporting, federal health and safety regulations, certification requirements, financial reporting, communicable disease reporting, and communications component authorization.

13.15 Automatic and Mutual Aid. Automatic and mutual aid agreements should provide for system and for backup responses.

13.16 Alternative Patient Transport. A plan for alternative patient transport should be in place.

13.17 Training. EMS agencies within a region should jointly train and prepare for emergency responses.

13.17.1 Training Requirements. Each EMS agency and jurisdiction should establish training requirements and should develop and utilize a training program based on the needs assessment of the community.

13.17.2 Coordinated Training Plan. The plan should be a coordinated interagency effort. Appropriate agencies should have regular interaction.

13.17.3 Training for Disasters and Multicasualty Incidents. EMS personnel at all levels within their respective organizations should be trained to meet their responsibilities in the course of a multicasualty incident.

13.18 Emergency Response Planning.

13.18.1 Participants in the local EMS system should be familiar with local emergency management agencies' local annexes and emergency operation plans as defined in the Federal Emergency Management Agency (FEMA) publication, and Civil Preparedness Guide (CPG).

13.18.2 The system should ensure that each agency or jurisdiction has a plan to meet its own needs within its capabilities.

13.18.3 The system should encourage each EMS agency or jurisdiction to enter into mutual aid agreements with other local or regional jurisdictions.

13.19 Joint Coordination and Planning. Participants in the local EMS system should be involved in planning, needs assessment, training, integration, coordination, mutual aid, provision of resources, and evaluation of the response of a local EMS organization to a multiple-patient incident.

13.19.1 The EMS system's plan should conform to appropriate regional and state plans.

13.19.2 The plan should be a coordinated interagency effort. Responsible participants should have regular interaction in order to facilitate working relations during an incident.

13.20 Research and Development. The system should participate in research-based evaluation of all system components and should use objective criteria to evaluate, develop, and purchase equipment.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Annex A Explanatory Material

Annex A is not a part of the recommendations of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.3.12 Chain of Survival. The chain of survival is composed of four distinct links: early access, early CPR, early defibrillation, and early ACLS.

A.3.3.36.8 Turnout Interval. This includes personnel preparation for response, boarding the responding apparatus/vehicle, placing the apparatus/vehicle in gear for response, and wheels rolling toward the emergency scene.

A.3.3.40 Medical Oversight. Oversight is provided on-line, by direct communications or telecommunications, or off-line by standing orders and established protocols.

Annex B Discussion of Time(s) Stamps, Function Intervals, and Process Intervals

This annex is not a part of the recommendations of this NFPA document but is included for informational purposes only.

B.1 The nature of time presents a classic problem in semantics: the same term has different meanings to different people. Additionally, tradition and unique EMS system design has created a language of time incomparability. The NFPA 450 EMS time template, shown in Table B.1, is an attempt to solve this problem with consensus terms. The key to this time template is to differentiate clearly between discrete points versus intervals of time. Column A represents discrete points in time or time stamps that occur during an EMS call. Columns B and C label uniquely the elapsed time or intervals between the time stamps.

These lists are not exhaustive but represent typical core points in time and common operational situations. It is not expected that every time stamp be reported. Depending on

Table B.1 EMS Time Template

Column A Discrete Time Stamps	Column B Function Intervals	Column C Process Intervals
1. Event occurs	Recognition interval (1 to 2)	Call processing (4 to 11)
2. Discovery of event	System access interval (2 to 3)	System response (4 to 13)
3. Call for help	Switching interval (3 to 4)	Agency response (6 to 13)
4. Phone rings in 1st PSAP	Answer interval (4 to 5)	Unit response (11 to 13)
5. Phone "off-hook" answered in 1st PSAP	Routing interval (5 to 6)	Patient contact (14 to 17)
6. Secondary dispatch phone rings (if appropriate)	Answer interval (6 to 7)	Event to treatment (1 to 14)
7. Secondary dispatch phone "off-hook" answered (if appropriate)	Interrogation interval (7 to 8)	On-scene management (13 to 15)
a. Interview begins	Resource selection interval (8 to 9)	Citizen reaction (1 to 3)
b. Pre-arrival instructions begin	Alert interval (9 to 10)	Unit cycle (11 to 18)
c. Pre-arrival instructions end	Acknowledgment interval (10 to 11)	Event elapsed (1 to18)
8. Interview ends	Turn-out interval (11 to 12)	
9. Response resources are identified	Travel interval (12 to 13)	
10. Dispatch time	Patient access interval (13 to 14)	
11. Unit acknowledgment	Scene management interval (14 to 15)	
12. Wheels turning (en route to scene)	Transport interval (15 to 16)	
13. Wheels stopped (arrived at scene)	Care transfer interval (16 to 17)	
14. Patient contact	Unit-ready interval (17 to 18)	
15. Wheels turning (en route to hospital)		
16. Wheels stopped (arrived at hospital)		
17. Transfer of care		
18. Available for service		

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

the EMS system's complexity and level of technology, it is understood that a function interval may be long or instantaneous. However, when reporting EMS system performance, these consensus terms should be used.

B.1.1 Discrete Time Stamp. The term *time stamp* refers to the historical tradition in EMS during which call events were recorded by stamping a card that printed the hour and minute that was displayed at that moment on that clock. Today, times are often recorded automatically by computerized dispatch systems in hours, minutes and seconds and are synchronized using the U.S. Naval Observatory's atomic clock.

These time stamps define discrete moments at which certain events occur, recorded in hour:minute:second [hh:mm:ss] format. Discrete time stamps, collected in this way, allow the user to measure the interval between events.

B.1.2 Function Intervals. An interval is the elapsed time between two discrete time stamps. Function intervals are the intervals between consecutive time stamps. The function interval describes the activity occurring at the task level of a single call. Function intervals allow analysis of each function that is taking place throughout the continuum of the event. Certain groups of consecutive functions describe processes.

B.1.3 Process Intervals. A process interval is made up of multiple, consecutive function intervals. A process interval is used to describe the elapsed time required to complete the agency's or system's objective. The process interval allows decision makers to establish baselines, monitor changes, benchmark to other systems, and create long-term plans.

B.1.4 Reporting System Data. When decision makers compare systems to benchmark performance, they must use consistent language to describe the function and process intervals. For example, the term *response time* is commonly used, but not commonly defined. Therefore caution must be exercised to ensure that the term describes the identical functions or processes. Yet even when common definitions are used, times may not be accurately compared. For example, some systems report "average" response times, which fail to adequately describe performance. Comparisons therefore should be based on "fractile" reporting, which, for example, may describe time performance with 90 percent reliability.

B.1.5 Multiple Clocks Within a System. Most EMS systems use one clock to record certain events, while other clocks record time stamps for other events. When more than one clock is used, time discrepancies are much more likely. For example, a 9-1-1 center dispatch clock may not be synchronized with the clock used by a responding agency. Therefore, when multiple clocks are used in a system to record discrete time stamps, all efforts should be made to synchronize those clocks.

Annex C Informational References

C.1 Referenced Publications. (Reserved)

C.2 Informational References. The following documents or portions thereof are listed here as informational resources only. They are not directly referenced in this guide.

C.2.1 ASTM Publications. American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

F1031-00, *Standard Practice for Training the Emergency Medical Technician (Basic),* 2000.

F1086-94, *Standard Guide for Structures and Responsibilities of Emergency Medical Services Systems Organizations,* 2002.

F1118-91, *Standard Specification for National Air Medical Transport Units Resources Catalog,* 2003.

F1149-93, *Standard Practice for Qualifications, Responsibilities, and Authority of Individuals and Institutions Providing Medical Direction of Emergency Medical Services.*

F1177-02, *Standard Terminology Relating to Emergency Medical Services,* 2003.

F1219-00, *Standard Guide for Training the Emergency Medical Technician (Basic) to Perform Patient Initial and Detailed Assessment,* 2002.

F1220-95, *Standard Guide for Emergency Medical Services System (EMSS) Telecommunications,* 2001.

F1221-89, *Standard Guide for Interagency Information Exchange,* 2001.

F1224-89(1996)e1, *Standard Guide for Providing System Evaluation for Emergency Medical Services,* 1996.

F1229-01, *Standard Guide for the Qualification and Training of EMS Air-Medical Patient Care Providers,* 2001.

F1254-90, *Standard Practice for Performance of Prehospital Manual Defibrillation,* 2001.

F1255-90, *Standard Practice for Performance of Prehospital Automated Defibrillation,* 2002.

F1256-90, *Standard Guide for Selection and Practice of Emergency Medical Services Instructor for Basic Life Support/Emergency Medical Technician (BLS/EMT) Training Programs,* 2002.

F1257-90, *Standard Guide for Selection and Practice of Emergency Medical Services Instructor for Advanced Life Support/Emergency Medical Technician (ALS/EMT) Training Programs,* 2002.

F1258-95, *Standard Practice for Emergency Medical Dispatch,* 2001.

F1268-90, *Standard Guide for Establishing and Operating a Public Information, Education, and Relations Program for Emergency Medical Service Systems,* 2003.

F1285-90, *Standard Guide for Training the Emergency Medical Technician (Basic) to Perform Patient Examination Techniques,* 2003.

F1286-90, *Standard Guide for Development and Operation of Level 1 Pediatric Trauma Facilities,* 2002.

F1287-90, *Standard Guide for Scope of Performance of First Responders Who Provide Emergency Medical Care,* 2002.

F1288-90, *Standard Guide for Planning for and Response to a Multiple Casualty Incident,* 2003.

F1328-00, *Standard Guide for Training Emergency Medical Technician (Basic) to Prepare Patients for Medical Transportation,* 2000.

F1329-00, *Standard Guide for Training the Emergency Medical Technician (Basic) in Basic Anatomy and Physiology,* 2000.

F1339-92, *Standard Guide for Organization and Operation of Emergency Medical Services Systems,* 2003.

F1381-92, *Standard Guide for Planning and Developing 9-1-1 Enhanced Telephone Systems,* 2003.

F1418-01, *Standard Guide for Training the Emergency Medical Technician (Basic) in Roles and Responsibilities,* 2001.

F1419-00, *Standard Guide for Training the Emergency Medical Technician (Basic) to Manage Shock,* 2000.

F1420-01, *Standard Guide for Training the Emergency Medical Technician (Basic) to Perform Patient Management Techniques,* 2001.

F1421-01, *Standard Guide for Training the Emergency Medical Technician (Basic) to Manage Obstetrical Emergencies,* 2001.

F1453-92, *Standard Guide for Training and Evaluation of First Responders Who Provide Emergency Medical Care,* 2003.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

F1493-93, *Standard Guide for Financing and Financial Accountability of Medical Transportation Systems,* 2003.

F1517-94, *Standard Guide for Scope of Performance of Emergency Medical Services Ambulance Operations,* 2002.

F1552-94, *Standard Practice for Training Instructor Qualification and Certification Eligibility of Emergency Medical Dispatchers,* 2002.

F1555-94, *Standard Guide for Characteristics for Extremity Splints,* 2002.

F1556-94, *Standard Guide for Spinal Immobilization and Extrication (Spined) Device Characteristics,* 2002.

F1557-94, *Standard Guide for Full Body Spinal Immobilization Devices (FBSID) Characteristics,* 2002.

F1558-94, *Standard Guide for Characteristics for Adjunct Cervical Spine Immobilization Devices (ACSID),* 2002.

F1559-94, *Standard Guide for Characteristics for Cervical Spine Immobilization Collar(s) (CSIC),* 2002.

F1560-00, *Standard Practice for Emergency Medical Dispatch Management,* 2000.

F1616-95, *Standard Guide for Scope of Performance of First Responders Who Practice in the Wilderness or Delayed or Prolonged Transport Settings,* 2002.

F1629-95, *Standard Guide for Establishing Operating Emergency Medical Services and Management Information Systems, or Both,* 2002.

F1651-95, *Standard Guide for Training the Emergency Medical Technician (Paramedic),* 2002.

F1652-95, *Standard Guide for Providing Essential Data Needed in Advance for Prehospital Emergency Medical Services,* 2002.

F1653-95, *Standard Guide for Scope of Performance of Triage in Prehospital Environment,* 2002.

F1654-95, *Standard Guide for Training and Evaluation of Individuals Who are Responsible for or Perform Triage in Prehospital Environment,* 2002.

F1655-95, *Standard Guide for Training First Responders Who Practice in Wilderness, Delayed, or Prolonged Transport Settings,* 2002.

F1705-96, *Standard Guide for Training Emergency Medical Services Ambulance Operations,* 2002.

F1949-99, *Standard Specification for Medical Oxygen Delivery Systems for EMS Ground Vehicles,* 1999.

F2020-02a, *Standard Practice for Design, Construction, and Procurement of Emergency Medical Services Systems (EMSS) Ambulances,* 2002.

F2076-01, *Standard Practice for Communicating an EMS Patient Report to Receiving Medical Facilities,* 2001.

F2171-02, *Standard Guide for Defining the Performance of First Aid Providers in Occupational Settings,* 2002.

WK1254, *Standard Specification for Rotary Wing Basic Life Support, Advanced Life Support, and Specialized Medical Support Air Ambulances,* 2003. Formerly ASTM F 1119 v 91, F 1124-91, and F 1146-91.

WK1300, *Standard Specification for Fixed Wing Basic Life Support, Advanced Life Support, and Specialized Medical Support Air Ambulances,* 2003. Formerly ASTM F 1187-91, F 1274-91, and F 1283-9.1

C.2.2 U.S. Government Publications. "Accidental Death and Disability: The Neglected Disease of Modern Society," National Academy of Sciences/National Research Council, Washington, DC, September 1966.

Agency for Health Care Policy and Research, *CAHPS: Health Care Quality Information from the Consumer Perspective,* Pub. No. 97-0012, January 1998.

Balanced Budget Act of 1997 (P.L. 105-33), August 5, 1997.

Delbridge, T. R., et al., eds., *Emergency Medical Services: Agenda for the Future, Implementation Guide.* National Highway Traffic Safety Administration, Washington, DC, August 1996. DOT HS 808-711, NTS-42.

Department of Health and Human Services, Centers for Disease Control and Prevention. "Ryan White Comprehensive AIDS Resources Emergency Act; Emergency Response Employees; Notice," *Federal Register* March 21, 1994.

Department of Transportation/ National Highway Traffic Safety Administration Web Site <http://www.nhtsa/dot.gov> ; February 7, 1999.

Eastham, J., et al., *A Leadership Guide to Quality Improvement for Emergency Medical Services (EMS) Systems,* National Highway Traffic Safety Administration, Washington, DC, July 1997. Contract DTNH 22-95-C-05107.

Emergency Act of 1990, subtitle (b). Ryan White Comprehensive AIDS Resources.

Emergency Medical Services Systems Act of 1973. (P.L. 92-154). 93rd Congress, S.2410.

Federal Specifications for Ambulances – Emergency Medical Care Vehicle (Specification KKK – D – 1822), U.S. General Services Administration, Washington, DC, 1996.

Florida State Statute Section 401.265(2).

Governmental Accounting Standards Board (GASB) Statement 34, Basic Financial Statements - and Management's Discussion and Analysis - for State and Local Governments in June 1999.

Gustafson, D. H., et al., *Case Studies from the Quality Improvement Support Team,* Agency for Health Care Policy and Research, Rockville, MD, March 1997. Order Number 95RF00344901D.

HCFA Press Release: Medicare Announces New Ambulance Coverage Regulation. <hhspress@list.nih.gov>, January 22, 1999.

Hibbard, J. H., et al., "Condition-Specific Performance Information: Assessing Salience, Comprehension, and Approaches for Communicating Quality," *Health Care Financing Review* 18:1;1996.

National Association of State EMS Directors. *Emergency Medical Services Transportation Systems and Available Facilities,* National EMS Clearinghouse, Lexington, KY, 1988.

National Highway Traffic Safety Administration, August 1996. DOT HS 808-441, NTS-42.

NIH/NHLBI, No. 93-3304.

National Standard Curriculum: Emergency Medical Technicians, Department of Transportation/National Highway Traffic Safety Administration, Washington, DC, 1971.

National Standard Curriculum: Paramedics, Department of Transportation/National Highway Traffic Safety Administration, Washington, DC, 1985.

Santa Clara Fire Department, Report on Santa Clara Fire Department Defibrillation Project, 1997.

National Institutes of Health, National Heart, Lung, & Blood Institute, Staffing and Equipping EMS Systems: Rapid Identification of Treatment of Acute Myocardial Infarction, NIH Publication No. 93-3304, September 1993.

The President's Advisory Commission on Consumer Protection and Quality in the Health Care Industry, *Quality First: Better Health Care for All Americans; Final Report to the President of the United States,* U.S. Government Printing Office, Washington, DC, March 1998.

Title 29, Code of Federal Regulations, Subtitle B, "Regulations Relating to Labor."

U.S. Fire Administration, EMS Safety, FEMA, Washington, DC, 1994.

U.S. Department of Transportation, Injury Prevention Press Kit, 1994.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

United States General Accounting Office, *Health Care: States Assume Leadership Role in Providing Emergency Medical Services,* GAO/HRD-86-132.

United States General Accounting Office, Report to Chairman, Special Committee on Aging, U.S. Senate, *Health Care Access: Innovative Programs Using NonPhysicians,* GAO/HRD-93-128.

C.2.3 Other Publications. Alonso-Serra, H. M., and Blanton, D. M., *Medical Direction of an Emergency Medical Services System: The Medical Director's Job Description,* Presented at National Association of EMS Physicians Mid-Year Meeting and Scientific Assembly, July 15, 1996.

Altieri, M. F., et al., *A Leadership Guide to Quality Improvement for Emergency Medical Services (EMS) Systems,* National Highway Traffic Safety Administration, Washington, DC, July 1997. Contract DTNH 22-95-C-05107.

American Ambulance Association, *Contracting for Emergency Ambulance Services: Guide to Effective System Design,* AAA, McLean, VA.

American College of Emergency Physicians Policy Statement, October, 1997, www.acep.org/policy/PO400201.HTM.

American College of Emergency Physicians Policy Statement, "Medical Direction of Emergency Medical Services," September, 1997, www.acep.org/policy/PO400192.HTM

American College of Surgeons, *Essential Equipment for Ambulances Bulletin* (revised), Committee on Trauma, ACS, Chicago, IL, March 1994.

American College of Surgeons, *Resources for Optimal Care of the Injured Patient,* ACS, Chicago, IL, 1999.

American Heart Association, *Expanded Access to Defibrillation: Legislative Advocacy Guide,* AHA, Dallas, TX, 1996.

American Heart Association, "Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care. Emergency Cardiac Care Committee and Subcommittees, American Heart Association. Part I. Introduction," *JAMA* 268:16;1992.

American Medical Response, Press Release, January 1999.

American Red Cross, States With Health and Safety Regulations for Specific Occupations (Chart), December 1997.

Asplin, B. R., "Access, Quality, and Cost Control in Emergency Medicine: Can We Have All Three?" *Annals of Emergency Medicine* 30:6;1997.

Babbie, E., *The Practice of Social Research,* Wadsworth Publishing Company, Belmont, CA, 1992.

Bogucki, M. S., et al., "Medical Support for the Fire Service: Current Priorities and Roles of Physicians," *Prehospital Emergency Care* 1:2;1997.

Bourn, S. M., "Mother May I," *Journal of Emergency Medical Services* January 1994.

Boyd, D. R., "Emergency Medical Services Systems Development: A National Initiative," *IEEE Transactions on Vehicular Technology* 104-115, November 1976.

Brice, J., Garrison, H., and Evans, A., "Study Design and Outcomes of Hospital Emergency Medicine Research: A Ten Year Analysis," *Prehospital Emergency Care* 4(2):144-150;2000.

Bureau of National Affairs, Inc., *The Labor Relations Reference Manual,* vol. 88, BNA, Washington, DC, 1975.

Callaham, M., "Quantifying the Scanty Science of Prehospital Emergency Care," *Annals of Emergency Medicine* 30:785-790;1997.

Cleary, P. D., and Edgeman-Levitan, S., "Health Care Quality: Incorporating Consumer Perspectives," *JAMA* 278:1608-1612;1997.

Communications for Coordinated Assistance and Response to Emergencies (ComCARE Alliance), *ComCARE Principles,* ComCARE Alliance, Washington, DC, April 1998.

Curka, P., et al., "Emergency Medical Service Priority Dispatch," *Annals of Emergency Medicine* 22:11;1993.

Damelio, R., *The Basics of Benchmarking,* Quality Resources, New York, NY, 1995.

Donabedian, A., "The Quality of Care: How Can it be Assessed?" *JAMA* 260:1743-1748;1988.

Durch, J. S., et al., *Emergency Medical Services for Children,* National Academy Press, Washington, DC, 1993.

Durch, J. S., et al., *Improving Health in the Community: A Role for Performance Monitoring,* National Academy Press, Washington, DC, 1997.

Epstein, A. M., "Rolling Down the Runway: The Challenges Ahead for Quality Report Cards," *JAMA* 279:1691-1696;1998.

Federiuk, C., et al., "Sources of Disagreement Among Private and Public Agency Paramedics," *Prehospital Disaster Medicine* 10:2;1995.

Garza, A., "EMS Leaders Explore EMS Expansion: The Sand Key Conference," *EMS Insider* May 1994.

Goldstein, A., *EMS and the Law,* Brady, Bowie, MD, 1983.

Greenberg, M. D., et al., "Quality Indicators for Out-of-Hospital Emergency Medical Services: The Paramedics' Perspective," *Prehospital Emergency Care* 1:23–27;1997.

Gunderson, M., "Improving EMS Response Time Performance," *NAEMSP News* November 1998.

Harbour, J. L., *The Basics of Performance Measurement,* Quality Resources, New York, NY, 1997.

Hendryson, I. E., *Accidental Death and Disability: The Neglected Disease of Modern Society,* (Foreword), American Medical Association, Chicago, IL, 1970.

Horak, B., *Strategic Planning in Health Care: Building a Quality-Based Plan Step by Step,* Quality Resources, New York, NY, 1997.

IBI Group, Land Ambulance Service Review, Southwestern Ontario Municipalities, Toronto, ON, Canada, February 1999.

Ingraham, P., et al., *Government Performance: Why Management Matters,* Johns Hopkins University Press, Baltimore, MD, 2003.

Institute of Medicine, Lohr, K. N., *Medicare: A Strategy for Quality Assurance,* Vol. II, National Academy Press, Washington, DC, 1990.

International City/County Management Association, *Benchmarking: A Method for Achieving Superior Performance in Fire and Emergency Medical Services,* ICMA, Washington, DC, 1993.

International City/County Management Association, *Budgeting: A Guide For Local Governments,* ICMA, Washington, DC, 1997.

International City/County Management Association, *Management Policies in Local Government Finance,* 4th ed., ICMA, Washington, DC, 1996.

International City/County Management Association, *Managing Fire and Rescue Services,* ICMA, Washington, DC, 2002.

Jermyn, B. D., "Response Interval Comparison Between Urban Fire Departments and Ambulance Services," *Prehospital Emergency Care* 3:1;1999.

Joint Committee for Accreditation of Health Organizations (JCAHO), "Dimensions of Performance," October 5, 1998. Available from URL: <http://www.jcaho.org/pubedmul/publica/camhcn/8pi.htm>.

Karch, S. B. et al., "Response Times and Outcomes for Cardiac Arrests in Las Vegas Casinos," *American Journal of Emergency Medicine* 16:3;1998.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Kelly, J. M., and Rivenbank, W. C., *Performance Budgeting for State and Local Government,* M. E. Sharpe, Inc., Armonk, NY, 2003.

Kerber, R. E., "Statement on Early Defibrillation from the Emergency Cardiac Care Committee, AHA." *Circulation* 83:6;1991.

Kirkwood, H. A., "Before the Call Comes In. EMS and Injury Prevention," *JEMS* 20:6;1995.

Kuehl, A. *Prehospital Systems and Medical Oversight,* Third Edition. Kendall/Hunt Publishing Company, Dubuque, IA, 2003.

Laffel, G., and Blumenthal, D., "The Case for Using Industrial Quality Management Science in Health Care Organizations," *JAMA* 262:2869–2873;1989.

Larsen, M., et al., "Predicting Survival from Out-of-Hospital Cardiac Arrest: A Graphic Model," *Annals of Emergency Medicine* 22:1652-1658,1993.

Lerner, E. B., et al. (1998), "Ambulance, Fire, and Police Dispatch Center Times Compared with the Atomic Clock," *Annals of Emergency Medicine* 32:3;1998.

Lerner, E. B., et al., "The Value of Using Fire Engines as First Response Vehicles," *Annals of Emergency Medicine* 32:3;1998.

Lundenberg, G. D., and Wennberg, J. E., "A *JAMA* Theme Issue on Quality of Care: A New Proposal and a Call to Action," *JAMA* 278:1615-1616;1997.

Mackay, M., "The Challenge of Establishing National EMS Standards." *Canadian Emergency News* 20:2;1997.

Maio, R., and McHenry, S., Summary of the National EMS Research Agenda Planning Meeting, National Association of EMS Physicians Meeting, Lake Tahoe, NV, July 8, 1998.

Meade, D. M., "Expanded Scope: EMS The Crossroad of Care," *Emergency Medical Services* 27:5;1998.

Metcalf, W., "State and Regional EMS Systems," *Principles of EMS Systems,* 2nd Edition, American College of Emergency Physicians, Dallas, TX, 1994.

Moore, L., *Emergency Medical Services: A Guidebook for Fire-Based Systems.* IAFF, Washington, DC, 1995.

Moore, L., *IAFF/IAFC EMS System Performance Measures Tool Operations Manual,*, IAFF, Washington, DC, 2003.

National Committee on Quality Assurance (NCQA), "HEDIS/ Report Cards," October 23, 1998. Available from URL: <http://www.ncqa.org/hedis/30exsum.htm>.

National Registry of EMTs and Paramedics Web Site. <http://www.nationalregistry.org> February 7, 1999.

Neely, K.W., and Drake, M. E. R., "Multiple Options and Unique Pathways. A New Direction in EMS," *Annals of Emergency Medicine* 30:6;1997.

Newman, M., and Christenson, J., *Challenging Sudden Death: A Community Guide to Help Save Lives,* Catalyst Research and Communications, Inc., Carmel, IN, 1998.

Nichol, G., et al., "Cost Effectiveness Analysis of Potential Improvement to Emergency Medical Services for Victims of Out-of-Hospital Cardiac Arrest," *Annals of Emergency Medicine* 26:6;1996.

Nichol, G., et al., "Cost-Effectiveness Analysis of Potential Improvements to EMS for Victims of Out-of-Hospital Cardiac Arrest," *Annals of Emergency Medicine* 27:711-720;1996.

Nordberg, M., "Emergency Medical Dispatch. A Changing Profession," *Emergency Medical Services* 27:8;1998.

O'Leary, D. S., "Quality Assessment: Moving from Theory to Practice," *JAMA* 260:1760;1988.

Ornato, J. P., et al., "The Need for ALS in Urban and Suburban EMS Systems," *Annals of Emergency Medicine* 19;1990.

Ormsby, C., and Salafia, P., *9-1-1 Liability: A Call for Answers,* PowerPhone, Inc., Madison, CT, 1998.

Page, J. O., "Discipline with Due Process" Prehospital Systems and Medical Oversight, 2nd ed., Kuehl, A. E., ed., Mosby Publishing Co., New York, NY, 1994.

Page, J. O., *Paramedics,* Backdraft Publications, Morristown, NJ, 1979.

Pepe, P. E., and Stewart, R. D., "Role of the Physician in the Prehospital Setting," *Annals of Emergency Medicine,* 15;1996.

Pirrallo, R. G., "Establishing Biennial Paramedic Experience Benchmarks," *Prehospital Emergency Care* 2:335-336;1998.

Poister, T. H., *Measuring Performance in Public and Nonprofit Organizations,* John Wiley & Sons, 2003.

Polsky, S. S., et al., *Continuous Quality Improvement in EMS,* American College of Emergency Physicians, Dallas, TX, 1992.

Polsky, S., et al., "Guidelines for Medical Direction of Prehospital EMS," *Annals of Emergency Medicine* 22;1993.

Rouch, W. R., et al., *Principles of EMS Systems,* 2nd ed., American College of Emergency Physicians, Dallas, TX, 1994.

Shi, L., *Health Services Research Methods,* Delmar Publishers, New York, NY, 1997.

Shanaberger, C. J., "Determining Domain," *Journal of Emergency Medical Services* July 1991.

Spaite, D., W., and Criss, E. A., "Developing a Foundation for the Evaluation of Extended-Scope EMS: A Window of Opportunity that Can Not be Ignored," *Annals of Emergency Medicine* 30:6;1997.

Spaite, D. W., et al., "Emergency Medical Services Outcomes Project (EMSOP) II: Developing the Foundation and Conceptual Models for Out-of-Hospital Outcomes Research," *Annals of Emergency Medicine* 37, January-June 2001.

Spivak, M., "Direct Dial to Dispatch…Automated Vehicle Collision Systems," *Emergency Medical Services* 27:8;1998.

Spruill, W. N., "EMS Working With and Within the System," *Principles of EMS Systems,* 2nd edition. ACEP, Dallas, TX, 1994.

States with Mandated or Recommended School CPR Instruction Programs (Chart). Lexis-Nexis Search, October 1998.

Stewart, R. D., "Medical Direction in Emergency Medical Services: The Role of the Physician," *Emergency Medical Clinics of North America* 5:1;1987.

Stoto, M., George Washington University, School of Public Health and Health Services, Epidemiology Department, Chair. Interview, September 28, 1998.

Stout, J. L., "Capture the Competitive Edge: How Benchmarking Can Improve Your Ambulance Service," *JEMS* September 1997.

Stout, J. L., "Let Benchmarking Help You Capture the Competitive Edge," *JAMA* October 1997.

Streiner, D., and Norman, G., *Health Measurement Scales: A Practical Guide to Their Development and Use,* 2nd ed., Oxford University Press, New York, NY, 1995.

Swor, R. A., et al., *Quality Management in Prehospital Care,* Mosby, St. Louis, MO, 1993.

Tortella, B. J., and Laver, R. F., "Disabling Job Injuries Among Urban EMS Providers," *Prehospital Disaster Medicine* 9:4;1994.

Volz, M. M., and Goggin, E. P., *How Arbitration Works,* Committee on ADR in Labor and Employment Law, American Bar Association Section of Labor and Employment Law, Washington, DC, 1997.

Walton, M., *The Deming Management Method,* Putnam Publishing Group, New York, NY, 1986.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Wilson, B., et al., "Unexpected ALS Procedures on Non-Emergency Ambulance Calls: The Value of a Single-Tier System," *Prehospital and Disaster Medicine* 7:4;1992.

Zack, A. M., *Grievance Arbitration: Issues on the Merits in Discipline, Discharge, and Contract Interpretation,* Lexington Books, Lanham, MD.

C.3 References for Extracts. The following documents are listed here to provide reference information, including title and edition, for extracts given throughout the informational sections of this guide as indicated by a reference in brackets [ ] following a section or paragraph.

NFPA 79, *Electrical Standard for Industrial Machinery*, 2002 edition.

NFPA 402, *Guide for Aircraft Rescue and Fire Fighting Operations*, 2002 edition.

NFPA 901, *Standard Classifications for Incident Reporting and Fire Protection Data*, 2001 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2002 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2002 edition.

NFPA 1581, *Standard on Fire Department Infection Control Program*, 2000 edition.

NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, 2004 edition.

NFPA 1915, *Standard for Fire Apparatus Preventive Maintenance Program*, 2000 edition.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Index

© 2004 National Fire Protection Association. All Rights Reserved.

The copyright in this index is separate and distinct from the copyright in the document that it indexes. The licensing provisions set forth for the document are not applicable to this index. This index may not be reproduced in whole or in part by any means without the express written permission of NFPA.

-A-

Address ..... 5.2.2.3(A), 10.2.3
Definition 3.3.1
Advanced life support (ALS) ..... *see* Life support
Age-related injuries and illnesses 5.3.2, 5.6.8.1
Alarm 5.6.3
Definition 3.3.2
Ambulances 5.2.2.1
Definition 3.3.3
Facilities 11.8
Inspection 11.4, 11.5
Maintenance 11.6
Specifications for 11.1.1
Standard for equipment 11.1
Ambulance services 5.2.2.1
Definition 3.3.4
Provider types ..... 5.2.2.3(E), 5.2.3.1
American College of Emergency Physicians (ACEP) 7.7
Definition 3.3.5
Approved (definition) 3.2.1, A.3.2.1
Arrival (definition) 3.3.6
Authority having jurisdiction
Authorization of provider agencies and personnel 4.3
Definition 3.2.2, A.3.2.2
Evaluation of system 4.4
Patient information protection 4.13
Plan implementation 4.9
Provider roles defined ..... 5.2.2.3(E)
Resource availability 4.10
Authorization of provider agencies and personnel 4.3
Automated vehicle locators (AVL) 10.5.1
Definition 3.3.7
Automatic aid ..... *see* Mutual aid
Automatic location identification (ALI) 10.2.3
Automatic number identification (ANI) 10.2.2

-B-

Basic life support (BLS) ..... *see* Life support
Biomedical equipment 11.1.2, 11.6, 11.7
Bloodborne pathogens (definition) 3.3.8

-C-

Call intake (definition) ..... 3.3.10; *see also* 9-1-1 calls and enhanced 9-1-1 calls
Call processing ..... 5.5.3.2.1(1), 5.6.1
Definition 3.3.11
Intervals ..... *see* Intervals
Method 5.6.2
Performance objectives 5.6.3
Calls
Definition 3.3.9
Distribution of demand 5.6.7
Certification, personnel ..... 7.4(1), 7.4(8), 12.3.2
Chain of survival 5.5.2.4
Definition 3.3.12, A.3.3.12
Communications ..... Chap. 10; *see also* Dispatch; 9-1-1 calls and enhanced 9-1-1 calls
Coordination of 5.2.2.1, 10.3.1, 10.4, 13.3
Direct medical control 10.12
Equipment monitoring and maintenance 10.8
Evaluation of 8.2.2.9
Key data elements, capture and reporting of 10.6
Nonemergency services, access to 10.2.4, 10.13
Operability 10.9
Disaster operations 10.9.3
Security 10.9.1
Tactical frequencies 10.9.2
Plan, centralized 10.4
Quality management 10.7, 10.10.2
Structure
Communications center coordination 10.3.1
Lead agency 10.3
User agencies 10.3.2
Training 10.11
User agencies 10.3.2
Community needs analysis 5.1.2, 5.3, 5.8.2
Prevention programs, targets for 5.3.2
Retrospective evaluation 5.3.1
System goals and objective analysis 5.4
Complaints 8.7
Compliance ..... 5.5.2.1, 6.1.2(5), 13.14
Definition 3.3.13
Computer-aided dispatch ..... *see* Dispatch
Cost/benefit analysis, system design and changes 5.4.2, 8.2.2.8
Costs ..... *see* Finances
Critical incident stress management ..... *see* Management
Cross-trained/dual role (CT/DR) 5.2.3.1
Definition 3.3.14
Cultural diversity, community 5.6.8.4

-D-

Data collection, analysis, and reporting 5.5.1, 5.11, 8.2.3
Communications system 10.6
Patient confidentiality 4.13, 8.5
Performance measures 5.5.1, 5.5.3, 8.2.2.1
Re-evaluation of data 5.11.1
Sharing of data 5.11.2
Defibrillation
Definition 3.3.15
Early defibrillation guidelines ..... 5.5.2.3.2, 5.5.2.4(3)
Personnel deployment guidelines 5.5.2.3.4
Public access ..... 5.5.2.4(3)
Defibrillators
Automated external defibrillator (AED) .... 5.5.2.4(3), 5.5.3.2.1(9)
Definition 3.3.16.1
Availability ..... 5.5.3.2.1(9), 8.2.2.2(1)
Manual defibrillator ..... 5.5.3.2.1(9)
Definition 3.3.16.2
Definitions ..... Chap. 3
Demand for services, distribution of 5.6.7, 5.10.1
Demographics 5.6.8, 5.10.2
Deployment ..... 5.5.3.2.1(5)
Definition 3.3.17
Disasters 5.6.11
Communications 10.9.3
Planning for ..... 5.7.5, 7.5(11), 9.8
Preparedness for 5.7.6.3, 5.7.7.5
Public information, education, and relations (PIER) 9.8
Dispatch ..... *see also* Communications; Intervals
Computer-aided dispatch (CAD) 10.5, 10.6.2
Definition 3.3.18.1
Criteria-based dispatch (CBD) 10.10
Definition 3.3.18

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Emergency medical dispatch ..... 5.2.2.3(A), 7.4, 10.11
Definition 3.3.18.2
Personnel deployment guidelines 5.5.2.3.4
System-wide plan for 10.4
Time ..... 10.6.1(4)
Definition 3.3.58.1
Training for 10.11
Documentation .....*see also* Data collection, analysis, and reporting
Definition 3.3.19
Quality management program 8.10, 13.10

-E-

Education .....*See* Training
Emergency (definition) 3.3.20
Emergency management programs 5.7.6.3, 5.7.7.5, 13.18
Emergency medical dispatcher ..... 5.2.2.3(A), 10.11
Definition 3.3.21
Emergency medical services (EMS) (definition) 3.3.22
Emergency medical services for children (EMS-C) (definition) 3.3.23
Emergency medical technician (EMT) ..... 5.5.2.4(3), 7.4(1)
Definition 3.3.24
Emergency medical technician-basic (EMT-B) (definition) 3.3.24.1
Emergency medical technician-intermediate (EMT-I) (definition) 3.3.24.2
Emergency medical technician-paramedic (EMT-P) (definition) 3.3.24.3
Emergency response planning .....*see* System planning
Employees ..... Chap. 12, 13.12
Assistance program 12.7.4
Certification ..... 7.4(1), 7.4(8), 12.3.2
Illness and injury ..... 5.5.3.2.1(11)
Definition 3.3.25
Personnel deployment guidelines 5.5.2.3.4
Public information, education, and relations (PIER) activities, qualifications for 9.3
Recruitment of 12.2, 13.12
Retention of 12.4, 13.12
Rules and regulations 12.6
Training .....*see* Training
Turnover ..... 5.5.3.2.1(12)
Definition 3.3.26
Enhanced 9-1-1 .....*see* 9-1-1 calls and enhanced 9-1-1 calls
Equipment ... Chap. 11; *see also* Vehicles, first response and transport
Inspection 11.4
Logistics 13.11
Maintenance 11.6, 11.7, 13.11
Replacement plan 11.2
Standard for first response and ambulance transportation ... 11.1
Ethnicity, community 5.6.8.4
Evaluation of EMS system ..... 4.4, 5.1.1, 13.19; *see also* Community needs analysis; System analysis and design
Existing systems 5.3.1.1, 5.5.3.1, 5.5.3.2
Performance measures 5.5.3
Performance objectives 5.4, 8.2
Call processing time intervals 5.6.3
Public health outcome parameters 8.3
Public education system 9.2
Research based, of system components 13.20
Evaluation of personnel 12.5.2.1, 13.12
External systems liabilities risk 5.8.2
Extrication capability ..... 5.5.3.2.1(10)

-F-

Facilities 11.8, 13.8
Finances ..... 5.2.1, Chap. 6
Business analysis 5.2.1.1, 6.5
Collection and reimbursement methodology 6.6.1
Cost of system 6.1
Budget, operating and capital 5.2.1.4
Direct costs 6.1.1
Indirect costs 6.1.2
Ongoing costs 6.1.1.3
Start-up costs 6.1.1.2
Financial report 6.6.2
Funding sources
Lead agency 4.10
Method for anticipating 6.2
For public information, education, and relations (PIER) 9.11
Solvency of providers 5.2.1.2
Stability of 5.2.1.3
Partnerships 6.6.3
Plans 5.7.2, 6.4
Communications equipment 10.8.2
Long-term 6.4.2
Revenue and cost analysis, use of 6.3
Short-term 6.4.1
Fire department-based EMS
Cross-trained/dual role fire fighters, use of ..... 5.2.3.1(A)
Oversight role ..... 5.2.3.1(B)
Fire suppression ..... 5.2.3.1(B)
Definition 3.3.27
First responder (EMS) ..... 5.2.2.3(B), 5.5.2.4
Definition 3.3.28
First response .....*see also* Vehicles, first response and transport
Interval time 5.6.5.1, 5.6.5.3
Standard for equipment 11.1
Unit guidelines 5.5.2.3.1

-G-

Gender-related injuries and illnesses 5.6.8.3
Geography ..... 5.6.5 to 5.6.7, 5.10.1
GSA KKK specifications (definition) 3.3.29
Guide (definition) 3.2.3
Guidelines, existing EMS 5.5.2.3

-H-

Hazard (definition) 3.3.30
Hazardous material ..... 7.5(11)
Definition 3.3.31
Health and safety plan 12.7
Health and wellness programs 5.7.7.4, 12.7.2
Health Care Financing Administration (HCFA) (definition) ... 3.3.32
Health maintenance organization (HMO) (definition) 3.3.33
Human resources .....*see* Employees

-I-

Incident location (definition) ..... 3.3.34; *see also* Address; Automated vehicle locators (AVL); Automatic location identification (ALI)
Incident management .....*see* Management
Industrial area injuries and illnesses 5.6.8.5
Injury/illness
Employee ..... 5.5.3.2.1(11)
Definition 3.3.25
Public
Demographics 5.6.8
Reduction and prevention 5.3.2, 5.4.3, 5.7.6, 8.6
In-service utilization ratio (definition) 3.3.35
Inspection of equipment 11.4, 11.5
Internal systems liabilities risk 5.8.1
Intervals ..... Annex B
Activation interval (definition) 3.3.36.1
Call processing interval ..... 5.6.1, 5.6.3, 10.6.1(3), B.1
Definition 3.3.36.2
Dispatch or call processing interval (definition) 3.3.36.3
En route interval ..... 10.6.1(8)
Definition 3.3.36.4
Fractile response interval (definition) 3.3.36.5

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Patient access interval B.1
Definition 3.3.36.6
Travel interval ..... 5.5.3.2.1(3), 5.6.5.1 to 5.6.5.4, 10.6.1(6), B.1
Definition 3.3.36.7
Turnout interval ..... 5.5.3.2.1(2), 5.6.4, 10.6.1(5), B.1
Definition 3.3.36.8, A.3.3.36.8

-L-

Lead agencies 4.5
Authority to implement plans 4.9
Communications 10.3
Designation of 4.2.2
Evaluation role 4.4
Operations role 4.12
Patient information protection 4.13
Planning process role 4.8
Policy development role 4.11, 4.12
Resources of 4.10
Life support
Advanced cardiac life support (ACLS) 5.5.2.3.4
Definition 3.3.37.1
Advanced life support (ALS) ..... 5.2.2.3(D), 5.5.2.4(4), 5.5.3.2.1(4)
Definition 3.3.37.2
Travel interval 5.6.5.1, 5.6.5.4
Unit deployment guidelines 5.5.2.3.3
Basic life support (BLS) ..... 5.2.2.3(C), 5.5.2.3.4
Definition 3.3.37.3
Loss control 5.8.4

-M-

Maintenance, equipment 11.6, 11.7, 13.11
Management
Critical incident stress management (CISM) 5.7.7.3, 12.7.3
Definition 3.3.38.1
Emergency management programs 5.7.6.3, 5.7.7.5
Incident management 13.5
Structure 4.7
Total quality management (TQM) (definition) .... 3.3.38.2 *see also* Quality management program
Mass gatherings 9.5
Medical center resources 5.6.12
Medical director ..... 7.4; *see also* Medical oversight
Agency-specific oversight by 7.2
Definition 3.3.39
Qualifications 7.7
Responsibilities 7.5, 7.6
Medical oversight ..... Chap. 7
Coordinated 13.9
Definition 3.3.40, A.3.3.40
Direct or on-line medical control or oversight ..... 7.4(6), 7.5(4), 7.6, 10.12
Definition 3.3.40.1
Indirect medical oversight 7.6
Definition 3.3.40.2
Role of medical authority 7.4
Single medical authority 7.2
System support of medical authority 7.3
Mobile data computers (MDCs) 10.5.2
Multiple agencies, cooperation of ... 5.2.3.1(E), 6.6.3, 8.2.2.10; *see also* Mutual aid
Joint training, preparation, and planning 13.17, 13.19
Public information, education, and relations (PIER) 9.9
Multiple casualty
Communications 10.9.3
Definition 3.3.41
Event response plan ..... 5.5.3.2.1(15)
Mutual aid ..... 7.5(11), 8.2.2.10, 9.9, 13.15, 13.18.3; *see also* Multiple agencies, cooperation of
Definition 3.3.42

-N-

National Association of EMS Physicians (NAEMSP) 7.7
Definition 3.3.43
National Fire Information Reporting System (NFIRS) 8.2.3.1, 10.6.2.3
National Highway Traffic Safety Administration (NHTSA) ..... 5.2.2.3(B) to (D), 8.2.3.1, 10.6.2.4
Definition 3.3.44
Performance measures 5.5.3.2.2
National Institutes of Health (NIH) (definition) 3.3.45
9-1-1 calls and enhanced 9-1-1 calls ..... 5.2.2.3(A), 10.2, 10.6.1(2)
Access to nonemergency services 10.2.4
Automatic location identification (ALI) 10.2.3
Automatic number identification (ANI) 10.2.2
Hearing impaired telephone services 10.2.6
Multilanguage interpretation 10.2.5

-O-

Operations ..... Chap. 13
Authority for 4.12
Communications 10.9
Emergency operations (definition) 3.3.47.1
Special operations (definition) 3.3.47.2
Vehicle operation 11.5
Outcome
Patient ..... 5.5.3.2.1(8), 13.6, 13.7
Definition 3.3.46
Public health outcome parameters 8.3
Oversight ..... *see also* Medical oversight
By authority having jurisdiction 4.2
Fire department-based ..... 5.2.3.1(B)

-P-

Paramedics ..... 5.5.2.4(3)
Participant organizations, roles and responsibilities of 5.2.3
Partnerships ..... *see* Multiple agencies, cooperation of
Patient care objectives ..... 5.5.3.2.1(7), 5.5.3.2.1(8), 8.2.1, 13.6
Patient confidentiality 4.13, 8.5
Patient destination (transport) ..... 13.7; *see also* Ambulances
Alternative transport 13.16
Providers ..... 5.2.2.3(E) *see also* Ambulance services
Transportation network changes 5.10.1.1
Patient outcome ..... *see* Outcome
Patient treatment guidelines 13.6
Performance measures and objectives ..... *see* Evaluation
Personal protective equipment (PPE) 12.7.1
Personnel ..... *see* Employees
Policy ..... *see* System regulation and policy
Political boundaries, changing 5.10.1.2
Private ambulance provider system ..... 5.2.3.1(D)
Procedures ..... *see* Operations
Protocol (definition) 3.3.48
Providers
Analysis of 5.2.2
Authorization of 4.3
Health and wellness programs 5.7.7.4, 12.7.2
Resources 5.2.1.2, 5.2.2.1
Safety 5.7.7.2, 12.7
Support for 5.7.7
Training ..... 5.7.7.1, 5.7.7.2(2), 7.4(4), 7.6.2.1
Public health
Outcome parameters, development of 8.3
Threats to public health, response to 5.10.3
Public information, education, and relations (PIER) ..... Chap. 9, 13.13
Activities 9.6
Mass gatherings, related to 9.5
Participants in PIER group 9.4
Collaborative efforts 9.9
Disaster education 9.8

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Funding resources 9.11
Future, agenda for 9.7
Injury/illness reduction and prevention 5.3.2, 5.4.3, 5.7.6, 8.6
Personnel qualifications for PIER activities 9.3
Public media resources 9.10
System goals ..... 7.5(12), 9.2
Public safety answering point (PSAP) B.1
Definition 3.3.49
Purpose of document 1.2

-Q-

Quality assessment (QA) ..... 12.5.2.4(B)
Definition 3.3.50
Quality assurance 4.13
Communications system 10.10.2
Definition 3.3.51
Quality improvement ..... 7.4(9), 12.5.2.4(B)
Definition 3.3.52
Quality management program ..... 5.5.3.2.1(13), Chap. 8, 13.10
Communications system 10.7
Complaints, addressing 8.7
Documentation 8.10
Injury/illness reduction and prevention 8.6
Patient confidentiality 8.5
Performance objectives 8.2
Physician participation 8.4
Public health outcome parameters 8.3
Review of systems 8.9
Studies and research, participation in 8.8
Total quality management (TQM) (definition) 3.3.38.2

-R-

References ..... Chap. 2, Annex C
Regional changes 5.10.1.3
Regulations ..... *see also* System regulation and policy
Billing process 6.6.1.1
Compliance with ..... 5.5.2, 6.1.2(5), 13.14
Monitoring of regulatory environment 5.6.9
Personnel management 12.6
Research and development 13.20
Resources ..... 4.10; *see also* Employees; Finances, funding sources
Allotment of 5.7.3
Analysis of 5.1.2, 5.2
Public information, education, and relations (PIER) ... 9.10, 9.11
Response ..... *see also* First response
Coordination 13.4
Definition 3.3.53
Planning for ..... *see* System planning
Time ..... 5.5.3.2.1(3), 10.6.1(1), Annex B
Definition 3.3.58.2
Risk assessment and mitigation 5.8
Road structure coverage capability ..... 5.5.3.2.1(6)

-S-

Scope of document 1.1
Service levels 4.6, 5.4.4
Should (definition) 3.2.4
Single-role EMS system, public ..... 5.2.3.1(C)
Socioeconomic structure, community 5.6.8.2
Special hazards, needs, and conditions 5.3.2, 5.6.10
Staffing ..... 5.5.3.2.1(4); *see also* Employees
Definition 3.3.54
Standard (definition) 3.2.5
Standard operating procedures (SOPs) (definition) 3.3.55
Standards, existing 5.5.2
Standing orders (definition) 3.3.56
System
EMS system (definition) 3.3.57.1
Geographic information system (GIS) 5.6.5.1, 5.6.5.2, 5.6.6, 5.6.7
Definition 3.3.57.2
System analysis and design ..... Chap. 5; *see also* Community needs analysis; Data collection, analysis, and reporting; Evaluation; Evaluation of EMS system
Business analysis 6.5
Current conditions 5.10
Essential system analysis components 5.6
Feedback loop 5.12
Goals and objectives analysis 5.4
Industry standards and regulations, compliance with 5.5.2
Participant organizations 5.2.3
Risk assessment 5.8
System assessment cycle 5.9
System goals and objectives analysis 5.4
System resources, analysis of 5.1.2, 5.2
System planning 4.8, 5.7
Authority to implement plans 4.9
Communications plan 10.4
Disaster/catastrophe planning 5.7.5, 9.8
Emergency response planning 13.18
Feedback loop 5.12
Finances ..... *see* Finances
Mass gatherings 9.5.2
Master planning/forecasting 5.7.4
Public education system 5.7.6, 9.2
Resource allotment 5.7.3
Risk assessment 5.8
System assessment cycle ..... 5.9(5)
System regulation and policy ..... Chap. 4
Authority for policy, procedure, and operation 4.12
Authority to implement plans 4.9
Authorization 4.3
Evaluation 4.4
Management structure 4.7
Oversight 4.2
Participation in policy development 4.11
Patient information protection 4.13
Planning 4.8
Resources 4.10
Roles and responsibilities 4.5
Service levels 4.6

-T-

Time
Dispatch time ..... 10.6.1(4)
Definition 3.3.58.1
EMS time template ..... Annex B
Patient contact ..... 10.6.1(7)
Response time ..... 5.5.3.2.1(3), 10.6.1(1), Annex B
Definition 3.3.58.2
Time stamps ..... Annex B
Training ..... 7.4(8), 7.6.3, 12.3, 12.5.2.3, 13.12
Communications 10.11
Costs ..... 6.1.1.2(8)
Emergency vehicle operation, inspection, and maintenance 11.5, 11.7
Evaluation of 8.2.2.5
Joint 13.17, 13.19
Providers ..... 5.7.7.1, 5.7.7.2(2), 7.4(4), 7.4(8), 7.6.2.1
Transport ..... *see* Patient destination (transport)
Travel interval ..... *see* Intervals
Turnout (definition) 3.3.59
Turnout interval ..... *see* Intervals

-U-

Unit
Available for service ..... 10.6.1(10)
Definition 3.3.60

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Users
Communications 10.3.2
Opinion survey of ..... 5.5.3.2.1(14)
Policy development, participation in 4.11

-V-

Vehicles, first response and transport 5.2.2.1
Facilities 11.8
Inspection of equipment and inventory 11.4, 11.5
Licenses 11.3, 11.5.1
Logistics 13.11
Maintenance 11.6
Operator assessment 11.5.1
Specifications for 11.1.1

-W-

Wellness programs .....*see* Health and wellness programs

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

Sequence of Events Leading to Publication of an NFPA Committee Document

Call goes out for proposals to amend existing document or for recommendations on new document.

▼

Committee meets to act on proposals, to develop its own proposals, and to prepare its report.

▼

Committee votes on proposals by letter ballot. If two-thirds approve, report goes forward. Lacking two-thirds approval, report returns to committee.

▼

Report — *Report on Proposals* (ROP) — is published for public review and comment.

▼

Committee meets to act on each public comment received.

▼

Committee votes on comments by letter ballot. If two-thirds approve, supplementary report goes forward. Lacking two-thirds approval, supplementary report returns to committee.

▼

Supplementary report — *Report on Comments* (ROC) — is published for public review.

▼

NFPA membership meets (Annual or Fall Meeting) and acts on committee report (ROP or ROC).

▼

Committee votes on any amendments to report approved at NFPA Annual or Fall Meeting.

▼

Appeals to Standards Council on Association action must be filed within 20 days of the NFPA Annual or Fall Meeting.

▼

Standards Council decides, based on all evidence, whether or not to issue standard or to take other action, including upholding any appeals.

Committee Membership Classifications

The following classifications apply to Technical Committee members and represent their principal interest in the activity of the committee.

M *Manufacturer:* A representative of a maker or marketer of a product, assembly, or system, or portion thereof, that is affected by the standard.

U *User:* A representative of an entity that is subject to the provisions of the standard or that voluntarily uses the standard.

I/M *Installer/Maintainer:* A representative of an entity that is in the business of installing or maintaining a product, assembly, or system affected by the standard.

L *Labor:* A labor representative or employee concerned with safety in the workplace.

R/T *Applied Research/Testing Laboratory:* A representative of an independent testing laboratory or independent applied research organization that promulgates and/or enforces standards.

E *Enforcing Authority:* A representative of an agency or an organization that promulgates and/or enforces standards.

I *Insurance:* A representative of an insurance company, broker, agent, bureau, or inspection agency.

C *Consumer:* A person who is, or represents, the ultimate purchaser of a product, system, or service affected by the standard, but who is not included in the *User* classification.

SE *Special Expert:* A person not representing any of the previous classifications, but who has a special expertise in the scope of the standard or portion thereof.

NOTES:

1. "Standard" connotes code, standard, recommended practice, or guide.
2. A representative includes an employee.
3. While these classifications will be used by the Standards Council to achieve a balance for Technical Committees, the Standards Council may determine that new classifications of members or unique interests need representation in order to foster the best possible committee deliberations on any project. In this connection, the Standards Council may make such appointments as it seems appropriate in the public interest, such as the classification of "Utilities" in the National Electrical Code Committee.
4. Representatives of subsidiaries of any group are generally considered to have the same classification as the parent organization.

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

NFPA Technical Committee Document Proposal Form

Note: All proposals must be received by 5:00 p.m. EST/EDST on the published proposal closing date.

For further information on the standards-making process, please contact Codes and Standards Administration at 617-984-7249. For technical assistance, please call NFPA at 617-770-3000.

FOR OFFICE USE ONLY
Log #: _____
Date Rec'd: _____

Please indicate in which format you wish to receive your ROP/ROC: ☐ **CD ROM** ☐ **paper** ☐ **download**
(Note: In choosing the download option you intend to view the ROP/ROC from our Website. No copy will be sent to you.)

Date 12/18/02 **Name** John B. Smith **Telephone** 617-555-1212
Company _____
Address 9 Seattle St. **City** Seattle **State** WA **Zip** 02255
Please indicate organization represented (if any) Fire Marshals Assn. of North America

1. **a) NFPA Document Title** National Fire Alarm Code
   b) NFPA No. & Edition NFPA 72, 2002 ed. **c) Section/Paragraph** 4.4.7.1.1

2. **Proposal Recommends:** *(check one)* ☐ **new text** ☐ **revised text** ☒ **deleted text**

3. **Proposal.** *(Include proposed new or revised wording, or identification of wording to be deleted.)* Note: Proposed text should be in legislative format, that is, use underscore to denote wording to be inserted (inserted wording) and strike-through to denote wording to be deleted (~~deleted wording~~). Delete exception.

4. **Statement of Problem and Substantiation for Proposal.** Note: State the problem that will be resolved by your recommendation. Give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication. A properly installed and maintained system should be free of ground faults. The occurrence of one or more ground faults should be required to cause a "trouble" signal because it indicates a condition that could contribute to future malfunction of the system. Ground fault protection has been widely available on these systems for years and its cost is negligible. Requiring it on all systems will promote better installations, maintenance and reliability.

5. ☒ **This Proposal is Original Material.** Note: Original material is considered to be the submitter's own idea based on or as a result of his/her own experience, thought, or research and, to the best of his/her knowledge, is not copied from another source.

   ☐ **This Proposal is Not Original Material; Its Source** ***(if known)*** **is as Follows:** _____

Sample

I hereby grant the NFPA all and full rights in copyright to this proposal, and I understand that I acquire no rights in any publication of NFPA in which this proposal in this or another similar or analogous form is used.

Signature ***(Required)*** John B. Smith

PLEASE USE SEPARATE FORM FOR EACH PROPOSAL • NFPA FAX (617) 770-3500

Mail to: Secretary, Standards Council • NFPA • 1 Batterymarch Park • PO Box 9101 • Quincy, MA 02269-9101

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale

NFPA Technical Committee Document Proposal Form

Note: All proposals must be received by 5:00 p.m. EST/EDST on the published proposal closing date.

For further information on the standards-making process, please contact Codes and Standards Administration at 617-984-7249. For technical assistance, please call NFPA at 617-770-3000.

FOR OFFICE USE ONLY
Log #: _____
Date Rec'd: _____

Please indicate in which format you wish to receive your ROP/ROC: ☐ **CD ROM** ☐ **paper** ☐ **download**
(Note: In choosing the download option you intend to view the ROP/ROC from our Website. No copy will be sent to you.)

Date _____ **Name** _____ **Telephone** _____
Company _____
Address _____ **City** _____ **State** _____ **Zip** _____
Please indicate organization represented (if any) _____

1. **a) NFPA Document Title** _____
   b) NFPA No. & Edition _____ **c) Section/Paragraph** _____

2. **Proposal Recommends:** *(check one)* ☐ **new text** ☐ **revised text** ☐ **deleted text**

3. **Proposal.** *(Include proposed new or revised wording, or identification of wording to be deleted.)* Note: Proposed text should be in legislative format, that is, use underscore to denote wording to be inserted (inserted wording) and strike-through to denote wording to be deleted (~~deleted wording~~). _____

4. **Statement of Problem and Substantiation for Proposal.** Note: State the problem that will be resolved by your recommendation. Give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication. _____

5. ☐ **This Proposal is Original Material.** Note: Original material is considered to be the submitter's own idea based on or as a result of his/her own experience, thought, or research and, to the best of his/her knowledge, is not copied from another source.

   ☐ **This Proposal is Not Original Material; Its Source *(if known)* is as Follows:** _____

I hereby grant the NFPA all and full rights in copyright to this proposal, and I understand that I acquire no rights in any publication of NFPA in which this proposal in this or another similar or analogous form is used.

Signature *(Required)* _____

PLEASE USE SEPARATE FORM FOR EACH PROPOSAL • NFPA FAX (617) 770-3500

Mail to: Secretary, Standards Council • NFPA • 1 Batterymarch Park • PO Box 9101 • Quincy, MA 02269-9101

Copyright National Fire Protection Association
Provided by IHS under license with NFPA
No reproduction or networking permitted without license from IHS
Not for Resale