Incident command system and National Incident Management System

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Introduction

The operational effectiveness as well as the safety, or even survival, of all components of the local, regional, and state medical infrastructure confronted with a large-magnitude natural, manmade, or terrorism-related disaster will largely depend on the quality of the overall incident management. Public safety, public health, emergency management, and health care system officials should be familiar with the rudiments of emergency incident management theory and practice. Nowhere is this more important than in EMS, where the system must interface seamlessly with public safety entities that use the incident command system (ICS) for daily operations, and hospitals, where the administration typically alters its organizational management scheme to an ICS during major emergencies.

It is easy to understand why it is necessary to organize the management of emergency incidents differently than normal business or public administration plans. For example, a bureaucracy is, by definition, the wrong structure through which to manage a low-frequency, high-hazard incident. According to Webster's Dictionary [1], a bureaucracy is a "government marked by diffusion of authority among numerous offices and adherence to inflexible rules of operation … [or] an administrative system in which the need to follow complex procedures impedes effective action." In organizational theory, the core features of bureaucratic management include formalization (i.e. enforcement of rigid rules and procedures), specialization, and hierarchy [2]. This form of administration is most effective at handling large-volume, variably complex but routine tasks, in stable environments [3].

Management of unstable situations with potentially catastrophic outcomes requires establishment of high-reliability organizations [4]. Roberts et al. [5] observed that reliability is directly related to flexibility of the organizational structure. Temporary organizations assembled in response to specific challenges may provide such flexibility, and offer an attractive alternative to conventional structures that have not performed well in high-risk, high-hazard environments. Virtual organization represents an increasingly common temporary administrative architecture for corporate and public safety entities operating in crisis mode.

One distinguishing characteristic of virtual organizations is the time-limited assembly of diverse agencies, corporations, or other specialized teams into a task-determined architecture for the purpose of accomplishing an immediate goal. Linkage within the virtual organization is through information pathways. When constituent units are not colocated, they are electronically networked [6]. The relationships among the units can be evanescent, as structural changes are dictated by the demands of the mission. Virtual organizations make good high-reliability organizations, as units having diverse expertise or resources can share previously inculcated health and safety priorities as well as the joint vision of the mission at hand [6]. Their innate adaptability to rapidly changing conditions as well as some intrinsic redundancy also favor the use of virtual organizations for management of complex, high-hazard, or high-consequence incidents.

Several investigators have studied the ICS employed by local emergency responders as a model high-reliability, virtual organization [6,7]. As required by presidential directive [8], state and federal agencies have nominally incorporated ICS into their emergency response plans because of its simple design, and to facilitate integration of their assets into local emergency operations. The National Incident Management System (NIMS) [9] was designed to coordinate multiagency, multijurisdictional responses to large-scale emergencies. For ICS and NIMS to function effectively, the basic premises of ICS must be understood by those implementing it. These principles cannot be compromised without losing the effectiveness and performance for which ICS and NIMS have become so highly regarded.

Incident command systems were first designed for use by civilian emergency responders in the United States in the

mid-1970s. An interagency representative group, Firefighting Resources of California Organized for Potential Emergencies (FIRESCOPE), developed the best-known prototype ICS in response to critical management deficiencies associated with the state's wildland firefighting [10]. Foremost among the problems encountered were ineffective communications, unclear jurisdictional and tactical command authority, inability to account for the geographic location or task assignments of personnel, and difficulty responding effectively and expeditiously to challenges of the dynamic, high-hazard environment. Although FIRESCOPE was originally conceived for wildland settings, the Phoenix Fire Department and others recognized similar deficiencies in structural firefighting and formulated the Fireground Command System (FCS), for use in all fire department emergency incidents involving more than a single-company response [11].

The US Fire Administration and its National Fire Academy endorsed the FIRESCOPE ICS as the preferred management model for application throughout the fire service, and widely disseminated it through published documents and curricular offerings. Throughout the last two decades, a consortium of fire and emergency services representatives has collaborated on a single incident management system (IMS) incorporating the best features of ICS and the FCS [12]. In the following discussion, the terms *ICS* and *IMS* will be used interchangeably, as they are in the emergency response communities.

ICS standardization

The use of ICS by civilian emergency responders became standardized through its incorporation into a number of consensus standards issued by government and non-government agencies, including the federal Occupational Safety and Health Administration (OSHA) and the National Fire Protection Association (NFPA) [13]. Both required incident management through an ICS during emergency operations that are considered dangerous to response personnel, including hazardous materials incidents, confined space rescues, and structural fires [14,15]. Full implementation of ICS is also a cornerstone of the integrated emergency management system, which is taught to emergency managers by the Federal Emergency Management Agency (FEMA). Health care systems, including EMS [16,17] and hospitals [18,19], have adopted customized versions of ICS for use during mass casualty incidents and other threat- or hazard-associated operations.

It can be argued that public health emergencies also represent incidents that require multiagency, multijurisdictional responses in that they pose substantial threats to both the population and the response community. The same management deficiencies that launched ICS in the fire service have been cited in after-action analyses of responses to public health emergency incidents [20–22]. Health and medical emergency incidents are similar to those encountered in the fire service, as they share the elements of operating in a hazardous environment and the urgency with which tasks must be accomplished. The need to accomplish a complex mission in the face of proximate threat or hazard distinguishes the ICS management methodology from other business or public administration practice. The tasks integral to mission completion require authority, reporting relationships, and personnel that are not intrinsic to the public health and emergency management structures maintained in local, state, and federal jurisdictions.

The essential characteristics of ICS must be understood in order to adapt it for use in the all-hazards environment. ICS is a modular management system that can be expanded or contracted to match the size and complexity of an incident and the availability of resources to manage it. The overall priorities of an incident commander (IC) are predetermined, regardless of whether the incident is a structure fire, wildland fire, passenger train derailment, or toxic hazard release. In order of priority, they are life safety, incident stabilization, and property conservation. Strategies and tactics employed by the IC, as well as intermediate goals and objectives, are designed to address those priorities. This facet of the ICS is an important determinant of its success as a high-reliability organization.

The basic design and staff assignments that typically comprise an ICS also reflect these priorities, and help distinguish ICS from other military command structures, business administration methodologies, and standing bureaucracies. All responsibility for every aspect of response to the incident belongs to the IC until it is specifically delegated. Tasks that are delegated may be assigned to an individual or an individual heading a group (Figure 26.1). The organization of personnel into assignments and the designation of reporting relationships are guided by certain constraints. One of the most important is referred to as "unity of command." This ensures that each member of the response team, regardless of assigned position in the organizational chart, is responsible to, or reports to, only one person. Similarly, "span of control" dictates that no leader anywhere in the organizational structure is directly responsible for more than 3–7 (optimally five) personnel or functions. These two features should override the complex reporting relationships characteristic of the mix of elected, appointed, hired, and voluntary personnel that participate in large-scale emergency responses. Those appointed to command role should be trained for that role, and when active, wear easily seen garb (e.g. colored vests) identifying the positions they hold. A job action sheet should be available for each command role to be used as a decision-making reference guide and documentation tool.

In most circumstances, one individual is designated and recognized as the IC. It is clearly acknowledged, however, that there are instances in which multiple agencies (e.g. fire, EMS, law enforcement, public health) or multiple jurisdictions (e.g. adjacent towns, counties, states, federal government) have legitimate claims on command authority. Under these circumstances,
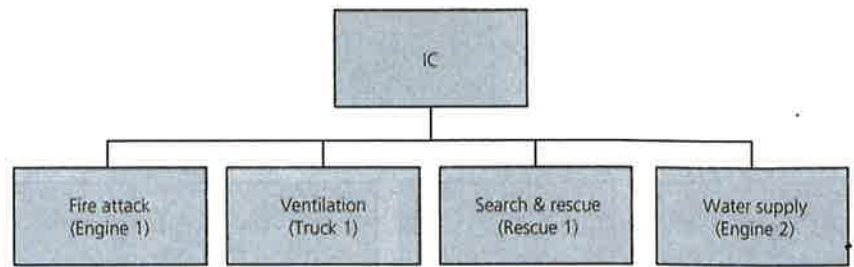
Figure 26.1 Small structure ICS. ICS for small structure fire requiring only four working crews.

a "unified command" is instituted with senior representatives of each stakeholder agency or government present in the command post who serve as the IC for their jurisdiction or agency. The unified command speaks with one voice as the IC for the situation, and any differences in priorities or tactics are worked out among the individual ICs that make up the unified command. This maintains unity of command, because each responder reports to a single supervisor, but it also maintains a pathway of expertise. For example, a fire department IC in a unified command structure does not tell the police responders how best to accomplish pure law enforcement functions. Instead, the fire IC discusses the best course of action with the police IC, and after agreeing on overall priorities and strategies, the police IC issues orders to the police responders that help fulfill the priorities and objectives set forth by the unified command. In complex, multijurisdictional incidents, the unified command not only generates the incident action plan (IAP), but also must agree on a single operations section chief who will be responsible for executing the IAP. When feasible, the component members of a unified command should be colocated in a single command post in order to facilitate this collaboration and to ensure that the various ICs involved are not duplicating or contradicting each other's efforts in the response to the incident.

In its simplest form, the ICS may comprise only an IC directly supervising a handful of personnel assigned to diverse tasks. For example, the IC at a structure fire involving a single-family dwelling would initially need crews for fire attack, search and rescue, water supply, and ventilation. The most expedient way to assign personnel to these tasks is by designating the appropriate fire apparatus crews to those functions. The ICS organizational chart would then be described by Figure 26.1, where the IC delineates four tasks, and one "resource" representing an identifiable crew is assigned to each task.

As shown in Figure 26.2, in emergency management practice, there should be an orderly transfer of command when discrete phases of a response are completed. In some cases, this may involve termination of response activities and transition to recovery, and/or law enforcement investigations. Additionally, extended responses occurring over long periods of time, such as a public health response to a pandemic, require orderly change of command at periodic intervals to allow for responder rest and recovery.

Methods for orderly transfer of command are prescribed in ICS, and are routinely used in fire control operations when command is passed from a company-level officer to a staff officer as the incident grows in size or complexity. It is important to point out that purely administrative fire chiefs or commissioners rarely assume command of an incident, as they frequently are not the most experienced operational personnel available. This separation of normal civil authority and incident command is another hallmark of ICS.

Returning to the example of the response to a structure fire, multiple fire attack crews and a water shuttle system may be necessary to extinguish the blaze. In that case, fire attack and water supply officers might be appointed. As shown in Figure 26.3, the officers of Engines 1, 5, 7, and 9 would report to the fire attack officer, while Engine 2 and the two tankers, one from an adjacent town providing mutual aid, would report to the water supply officer.

Without this new layer, the IC would exceed the prescribed span of control limits by having direct responsibility for the crews of the seven additional services. The IC retains the prerogative of further expanding the incident management team using the following options.

- **Sections** are organizational levels with responsibility for a major functional area of the incident (e.g. operations, planning, logistics, finance/administration). The person in charge is called a chief (i.e. logistics section chief, etc.).
- **Branches** are used when the number of divisions or groups exceeds the recommended span of control (e.g. EMS branch, rescue branch, etc.). A branch is led by a director.
- **Divisions** are used to divide an incident or facility geographically (e.g. first floor). A division is led by a supervisor.
- **Groups** are established to divide the incident management structure into functional areas of operation. They are composed of resources that have been assembled to perform a special function, not necessarily within a single geographic division. A group is led by a supervisor.
- **Units** are organizational elements that each have functional responsibility for a specific incident planning, operations, logistics, or finance/administration activity (e.g. situation unit, supply unit).
- **Single resources** are defined as an individual or piece or equipment with its personnel complement (e.g. engine company or police officer) or a crew or team of individuals with an identified supervisor.
- **A task force** is a combination of mixed resources (e.g. four engine companies, four police officers, and a public health
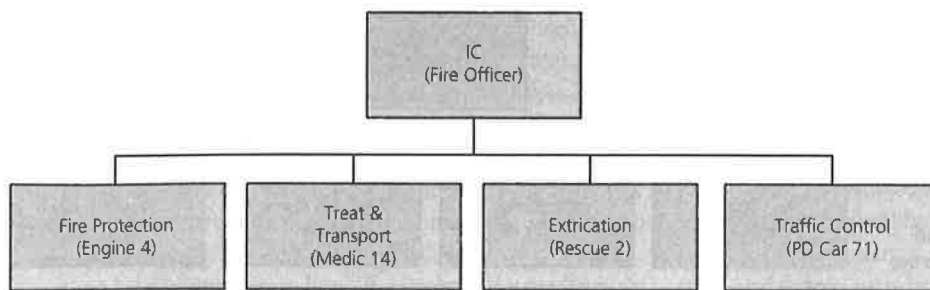
A. ICS for the rescue phase of a motor vehicle crash
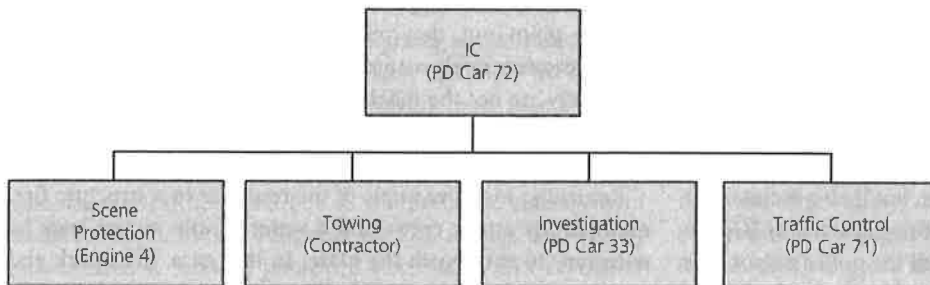
B. ICS for the same incident after completion of rescue and EMS tasks

Figure 26.2 Incident command transition. Transition of incident command during phases (A and B) of a single incident.
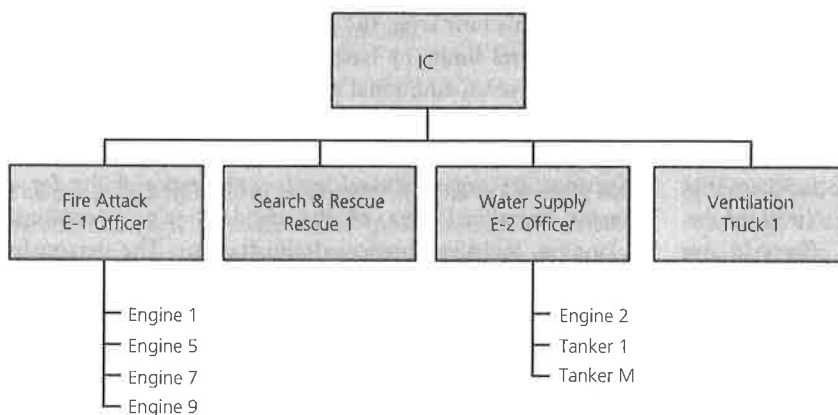

Figure 26.3 Control and unity. Maintaining span of control and unity of command through appointment of group or division officers.

epidemiologist) with a common communications capability and headed by a task force leader.

- **A strike team** is a set number of similar resources (e.g. four engine companies) with a common communications capability who operate under the command of a strike team leader.

Adoption of a standardized lexicon that distinguishes assignment-specific working groups from task-oriented supervisory groups and personnel locations in horizontal versus vertical planes facilitates effective communication among people who do not work together on a daily basis. Hence, terms such as *unit*, *group*, *crew*, *division*, *branch*, or *sector* may be roughly synonymous in ordinary usage, but are unambiguous in an ICS (Figure 26.4). For example, while the "medical branch" and the "medical unit" seem like they would serve similar functions based on terminology, in the regimented vocabulary of ICS, they denote vastly different functions. The medical branch would be subordinate to the operations section, and would manage the operational medical resources responding to and mitigating the situation (e.g. EMS group, treatment group), while the medical unit would have specific responsibility for providing medical support to the responders themselves, and would fall under the logistics section. Likewise, standardized conventions are observed in diagramming organizational charts outlining the supervisory levels between the individual company assigned to a discrete task and the IC. These conventions allow for interoperability and clarity of roles in an incident spanning agencies and jurisdictions. These include conforming to the
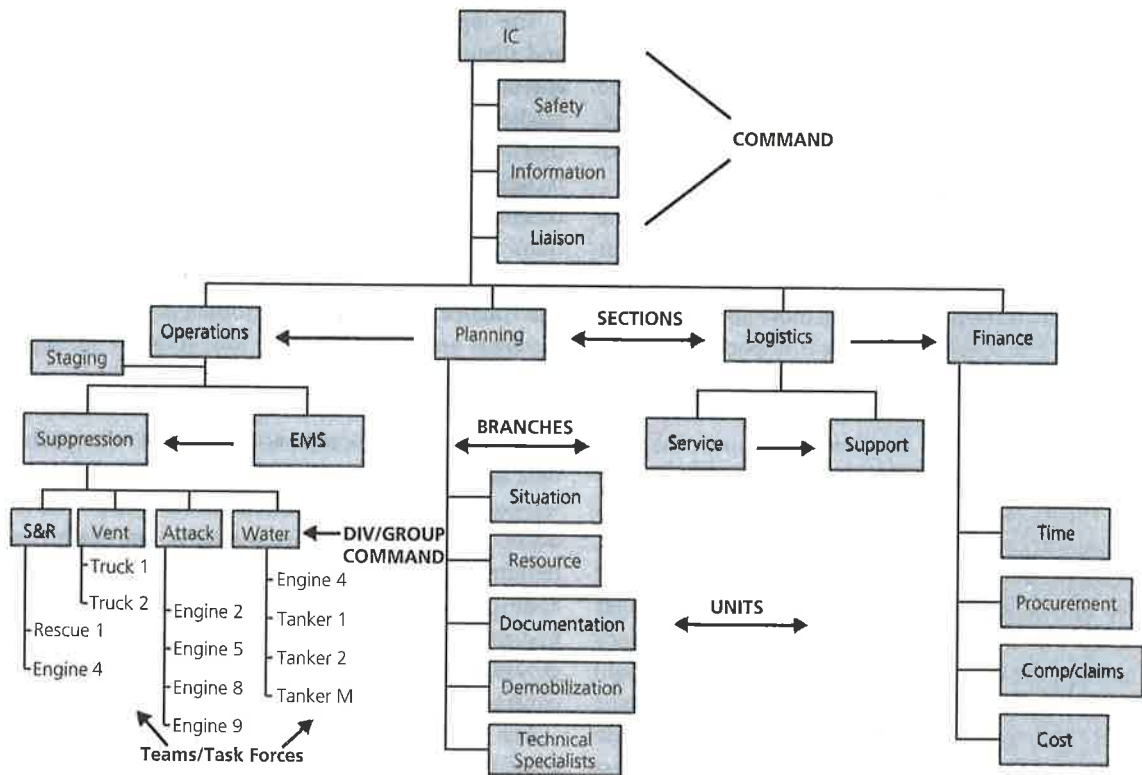
Figure 26.4 Large-scale event chart. Organizational chart for a large-scale event involving fire suppression, rescue, and medical care of civilian casualties. Standard terms for levels of management are shown in bold.

principles of unity of command and span of control as described above. Intermediate supervisors are not inserted into the scheme unless the working resources exceed an IC's or other supervisor's span of control.

Situational awareness information passed from the working crews though the chain of command and instructions from the IC and supervisors to the crews are tightly circumscribed according to the principles of unity of command and span of control. This eliminates supervisor information overload and ambiguity or reporting relationships for working crews. It is important to understand that these constraints apply only to vertical transmission of information, and not to horizontal communications. Clearly, information sharing among crews and among supervisory staff at the same level within a branch or section may be critical to safe and effective field operations.

Three staff positions generally assigned to individuals at large or complex emergency incidents are considered to be an inherent part of the command function, and are not included in the IC's span of control constraints: safety officer, pubic information officer (PIO), and liaison officer. As the titles imply, the three are responsible, respectively, for scene and overall safety for both responders and civilians threatened by the incident, interacting with media personnel, and providing a conduit for two-way information between the IC and representatives of other responding agencies. These positions make up the IC's

"command staff." One of the key advantages of establishing an incident command center and having individuals designated to these tasks has been better control and better quality of information released to the public. Another has been improved interagency communications, which were previously stymied by incompatible radio frequencies, inconsistent terminology, and turf skirmishes if not overt wars.

The safety officer is responsible for the overall safety of everyone at the scene of the incident, including responders, civilians and victims already involved with the incident, and bystanders and others at risk of being affected as the incident and response progress. The safety officer works within the chain of command (reporting to the IC) to keep all responders to an incident safe. At the same time, the safety officer maintains an important emergency authority to instantly issue orders to cease any activity that is deemed unsafe. This emergency authority is the only allowable exception to the unity of command concept, in that it allows someone other than a direct supervisor to issue orders to a responder, though it only allows a "stop" order in cases of a potential hazard.

A joint information center may be created to address the broad range of risk communications and public education issues. The center is usually housed at a suitable location near the incident or the local emergency operations center (LEOC), and is composed of PIOs from all responding partners. The PIOs use the operating procedures defined in a joint information

system plan to draft information for IC approval that is given to the media and public in a timely and effective manner.

Liaison officers serve as links between the incident command post and other external partners such as the LEOC. In their role, they share information with various parties and also make requests for various types of assistance as needed.

To manage large, complex, or protracted emergencies, the working resources under an IC are typically organized into four sections: operations, planning, logistics, and finance/administration. The officers assigned to those sections report directly to the IC. The operations officer is responsible for tactical decisions and for maintaining situational awareness through reports from the work crews. In an incident involving fire in an occupied commercial structure with known chemical hazards on site, the operations chief might need to staff branch positions to supervise multiple EMS crews, fire suppression crews, evacuation crews, and hazardous materials crews. Meanwhile, the fire suppression branch might resemble the full ICS depicted in Figures 26.1 or 26.2, with multiple crew chiefs reporting to the branch officer. In any public health emergency incident, much of the operations section's responsibility would involve identification of a broad spectrum of medical tasks to be accomplished, and assigning personnel or units to these functions. If the emergency has resulted from a weapon of mass destruction or occurs under a threat situation, the operations section will have both law enforcement and medical components. The staging manager who is responsible for coordinating resources awaiting an assignment also reports to the operations section chief.

The remaining three ICS sections would operate in a public health emergency in the same general way as in any complex, multiagency, public threat incident. The planning section continually assesses the situational aspects of the incident and provides predictions of likely scenarios. Similarly, this section monitors resources as they are committed to the incident and estimates both immediate and long-term requirements. The planning section has the primary responsibility of drafting an IAP for IC approval. The IAP outlines the control and strategic objectives as well as the anticipated resource requirements for each operational period. It is also used as part of the initial briefing given to each oncoming shift of command personnel. The planning section typically includes all technical specialists who may be needed to advise command personnel. Examples might be structural engineers at a structure collapse or toxicologists at hazardous materials incidents. Responsibility for recording and maintaining documents related to incident operations rests within the planning section, as does planning for logical, sequential demobilization of resources once the incident is under control. The documents used during a response include the appropriate FEMA forms as well as agency- or institution-specific records being completed manually or using computers. The planning section may, at the direction of the IC, play a leading role in drafting the after-action report once the incident response is complete.

The logistics section frequently comprises separate service and support branches. The service branch provides interoperable communications capabilities as well as food, hydration, and medical support for emergency responders. Equipment, including repair capabilities and fuel, supplies, access to fixed facilities, sanitary requirements, and maintenance of the command post are all under the purview of the logistics section's support branch. Resources are acquired using existing mutual aid agreements as well as routine or emergency vendor agreements. The LEOC will normally be activated for major incidents and may also assist with resource management and other response-related issues in support of the IC.

The finance section is staffed when significant procurement capabilities are required to accomplish mission goals. This section also keeps records on personnel involved and periods worked. Such records are essential when responder injuries or death may result in future compensation claims, as well as remuneration of salaried personnel working at an incident. In addition, a cost unit is frequently established for managing budgets and projecting cost estimates. It should be headed by a government official with authority to spend funds and sign contracts.

For an incident to be managed effectively, those in charge must be familiar with and have ready access to their agency and/or community emergency operations plan and have taken requisite ICS training. In 2004, the NIMS Integration Center (now called the NIMS Integration Division, part of the Department of Homeland Security) outlined a series of required educational programs for local, state, and federal officials. Similar requirements were outlined for health care facilities in 2006. The four primary courses (IS 100 and 200, Incident Command Principles; IS 700, NIMS; and IS 800, National Response Plan, now called National Response Framework) are available online and in classrooms from the Emergency Management Institute; we recommend that all EMS physicians complete this training. Additionally, the NIMS Integration Division has established a process of precredentialing and "resource typing" to set a national standard in order to streamline and standardize the request for and application of resources in an incident in which the NIMS is applied. Precredentialing is a process by which certain assets are screened and their qualifications verified ahead of time in order to avoid the process of issuing emergency credentials upon activation of a resource, delaying their actual response to the incident. This allows much more rapid interoperability of a variety of assets across jurisdictional, geographical, or agency boundaries. Resource typing creates a standardized catalogue of resources from which an IC can choose, and ensures that the responding unit or resource is capable of the task intended for it. All resources, from fixed-wing air ambulances to swiftwater search and rescue teams to emergency floodlights, are broken into four "types" based on capability, staffing, and level of support required. This allows an IC to request the unit that will be best suited to the mission at hand.

Conclusion

Experience has repeatedly shown the importance of an ICS being successfully applied to meet the response challenges posed by any type of emergency incident regardless of type or size. The NIMS is the ICS now in use throughout the United States. The principles it contains were taken from the best management practices from public safety institutions, the military, and business world.

The NIMS contains principles that recognize emergencies will generate essential tasks that do not exist in the routine job description of any one office, and decisive authority must be given to key personnel, who in some cases may not be the highest-ranking officials within an organization. In ICS, experience and expertise should take precedence over rank.

Specific positions may be filled by the IC based on situational assessments of the need and availability of qualified people to assume such roles. These positions have standard titles, responsibilities, and reporting relationships.

For command personnel to be successful, prior training and planning and regular participation in exercises or responses are required. In an effort to promote standardization, improved performance, and readiness, the federal government has outlined a number of NIMS courses for those who will be assigned to command roles at the local, state, and federal level. Some can be completed online, while others are offered only in a classroom setting.

Craig DeAtley was a co-author of the first edition of this chapter; many of his contributions remain in this revision, and are acknowledged.

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CHAPTER 28

Disaster preparedness and management

Alexander P. Isakov

Introduction

Disasters are natural or man-made events which cause such an overwhelming loss of life, injury, destruction of property, or loss of infrastructure as to prevent a community's ability to respond without outside assistance. Emergency medical services are vital for disaster management, and the administrative and medical leadership of EMS should be actively involved in all of its phases: planning, mitigation, response, and recovery [1].

While all disasters are local, a national framework for disaster management has been defined by the Federal Emergency Management Agency to coordinate federal assets and to assist local communities to develop disaster management strategies that are effective and allow for cross-jurisdictional communication.

The national framework is risk based, referencing the findings of the Strategic National Risk Assessment [2], which identifies the greatest threats facing the nation's homeland security, in three categories.

- **Natural hazards.** This category includes floods, earthquakes, hurricanes, wildfires, human pandemic outbreak, animal disease outbreak, volcanic eruption, and space weather (solar flares with electromagnetic disruption).
- **Technological/accidental hazards.** This category includes biological food contamination, chemical substance spill or release, dam failure, and radiological substance release.
- **Adversarial/human-caused threats.** This category includes aircraft as a weapon, armed assault, bioterrorism, chemical terrorism, cyber attack, explosive terrorism attack, nuclear terrorism attack, and radiological terrorism attack.

The list of risks considered on a national level is not comprehensive yet it helped to identify core capability requirements and contributed to the development of the federal framework for disaster management. Local and regional jurisdictions will conduct assessments that will identify other threats and hazards (drought, heat wave, tornado, etc.) that are appropriate for their preparedness planning and will largely be served by the core capabilities required to respond to all hazards.

Federal framework for disaster management

The federal framework for disaster management is based on Presidential Policy Directive 8 (PPD-8) [3]. Presidential directives are a form of executive order issued by the President of the United States that address the policy of the executive branch in relation to matters of national security, and carry the full force and effect of the law. PPD-8 aimed to strengthen the security and resilience of the United States through systematic preparation for all hazards. It established that preparedness is a shared responsibility of all levels of government, the private and non-profit sector, and individuals. PPD-8 defined a National Preparedness Goal: "A secure and resilient nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to and recover from the threats and hazards that pose the greatest risk." It established a National Response System, which outlines the approach, resources, and tools for achieving the goal. It also defined National Planning Frameworks which define how to best meet the needs of individuals, families, communities, and states in their ongoing efforts to prevent, protect, mitigate, respond to and recover from any disaster event.

- Prevention – avoid, prevent, or stop imminent threats
- Protection – secure the community against man-made or natural disaster
- Mitigation – reduce loss of life and property by curtailing the impact of disaster
- Response – save lives, protect property and the environment, and meet basic needs
- Recovery – return the community to a state of normality after disaster

The frameworks address how the whole community works toward achieving the National Preparedness Goal across the five defined mission areas. Among these, the National Response Framework (NRF) defines the doctrine by which the nation *responds* to any type of disaster or emergency. The term *response* is defined to include actions which "save lives, protect property

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and the environment, stabilize communities, and meet basic human needs following an incident." This includes the execution of emergency response plans to support short-term recovery. The core capabilities for response defined by the NRF are as follows [4].

- **Planning.** A systematic process which will engage all community partners in the development of strategies for disaster response
- **Public information and warning.** Delivery of timely, credible, and actionable information relaying the nature of the threat, actions being taken, and available assistance
- **Operational coordination.** Organize and maintain a unified command structure which involves all stakeholders
- **Critical transportation.** Provide transportation to meet mission objectives including evacuation of people and animals, and delivery of vital goods
- **Environmental response/health and safety.** Provide guidance and resources to address all hazards in support of the responder and community
- **Fatality management services.** Provide for body recovery, victim identification, victim processing, and counseling for the bereaved
- **Infrastructure systems.** Stabilize critical infrastructure functions
- **Mass care services.** Provide hydration, feeding, and sheltering to those most in need
- **Mass search and rescue operations.** Provide search and rescue resources with the goal of saving the greatest number in the shortest time
- **On-scene security and protection.** Ensure a safe and secure environment through law enforcement and security measures
- **Operational communications.** Ensure communications in support of security, situational awareness, and operations
- **Public and private services and resources.** Ensure essential services such as emergency power, fuel support for responders, and access to community staples
- **Public health and medical services.** Provide life-saving medical treatment via EMS; prevent injury and disease through public health and medical support
- **Situational assessment.** Provide leaders with decision-relevant information

The NRF also describes "emergency support functions" which serve as a means to organize response resources and capabilities. These are used by the federal government and many states, and have been adopted locally to build, sustain, and deliver the core response capabilities. For more information on ESF 8, see Volume 2, Chapter 29.

Response operations involve many partners and stakeholders. The NRF is aligned with the National Incident Management System (NIMS) [5], which defines the command and management structures that allow for scalable, multijurisdictional response to any type of disaster. The NIMS provides templates for the management of incidents, while the NRF
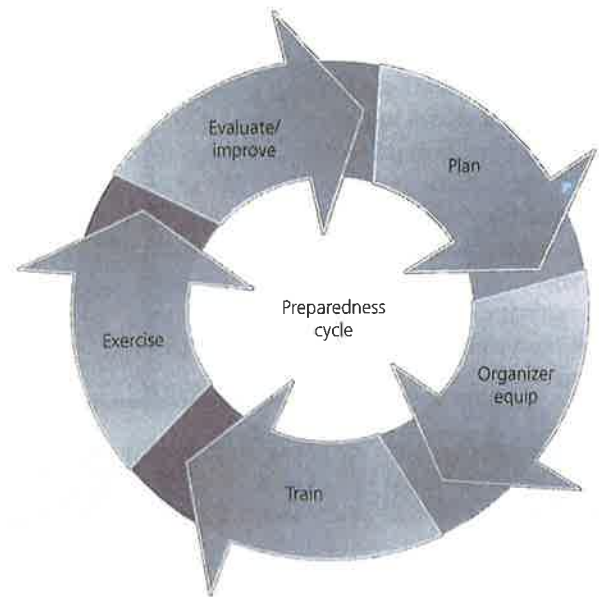

Figure 28.1 The preparedness cycle – actions taken to build preparedness for catastrophic events. Source: http://www.fema.gov/national-preparedness-cycle

provides the structure and mechanisms for incident management policy development. The NIMS is based on the principle that use of a common incident management framework will give response personnel a flexible but standardized system for incident response and disaster management. The NIMS has five major components.

1 **Preparedness.** Assessment, planning, procedures and protocols, training and exercises, licensure and certification, evaluation and revision (Figure 28.1).
2 **Communications and information management.** A standardized framework for communications that provides a common operating picture for all stakeholders. Communications should be interoperable, reliable, scalable, and portable. The system should be resilient and redundant.
3 **Resource management.** Personnel, equipment, and supply flow must be fluid and adaptable to the requirements of the incident.
4 **Command and management.** Efficient and effective management through flexible standardized incident command structures.
5 **Ongoing management and maintenance** – of the NIMS via the federal government.

The incident command system (ICS), well recognized by emergency responders and adopted by federal, state, and local governments as well as the private sector for incident management, is a component of this system. The ICS is structured to facilitate activity in five functional areas: command, operations, planning, logistics, and finance/administration (Figure 28.2).

The ICS organizational structure develops in a modular fashion based on the size and complexity of the incident as well
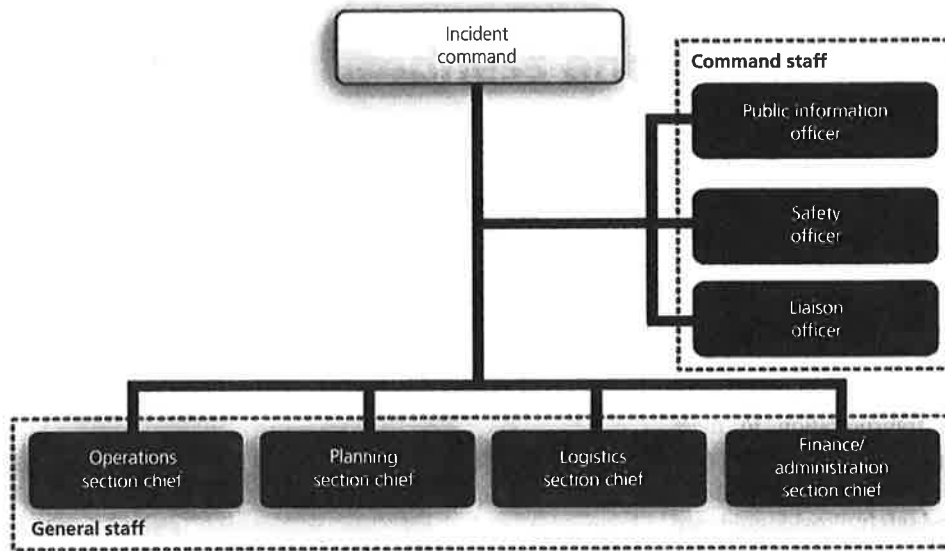
Figure 28.2 Incident command system: command and general staffs. Source: http://www.fema.gov/pdf/emergency/nims/NIMS_core.pdf, pp 53.

as the specifics of the hazard. As the magnitude and complexity of the incident increase, the organization expands as functional responsibilities are delegated.

The Federal Emergency Management Agency (FEMA) provides an independent study program through its Emergency Management Institute that allows those with emergency management responsibilities and the general public to obtain training and education through distance learning, free of charge. The training supports the mission areas identified by the National Preparedness Goal. Over 125 training courses are available. NIMS introductory courses include the following [6].

- **NIMS 100 – Introduction to Incident Command System.** This course describes the history, features, principles, and organizational structure of the ICS. It also describes the relationship between the ICS and NIMS. It serves as the foundation for higher-level ICS training. It is targeted at persons who are involved in emergency planning, response, or recovery efforts.
- **NIMS 200 – ICS for Single Resources and Initial Action Incidents.** This course is designed to enable personnel to operate efficiently during an incident or event within the ICS. It is targeted at persons who are involved in emergency planning, response, or recovery efforts, particularly those who are likely to assume supervisory positions in the ICS.
- **NIMS 700 – National Incident Management System (NIMS): An Introduction.** This course provides a basic description of the NIMS, the national framework that enables government, private, and non-governmental agencies to work together.
- **NIMS 800 – National Response Framework: An Introduction.** This course provides an introduction to the NRF, specifically the national response doctrine, and the roles, responsibilities, and actions taken by the entities described.

Catastrophic events

All disasters are local. Police, fire, and EMS agencies, in concert with local government, non-governmental organizations (NGOs), and the private sector, manage most incidents locally. Incident command is established and emergency operations plans are implemented. The event's ICS is expanded as necessary to manage the event. If the incident commander determines the resources of the responding agencies are overwhelmed, he or she will communicate with the local emergency operations center (EOC) and emergency manager who may request aid from neighboring communities. If the local unified command, in concert with the local EOC, deems it necessary, state assistance will be requested, and when the state's resources are overwhelmed, a request can be made for federal assistance.

The effectiveness of the local response depends not only on the preparedness of government pubic safety and public health officials, but on the integration of partners from the private sector, NGOs, and the preparedness of individuals.

Non-governmental organizations

Non-governmental organizations are organized corporate entities, separate from government and most often not for profit. These organizations are typically oriented to a particular purpose and type of activity, and can operate on a local, regional, national, or international basis. NGOs are important partners in disaster management. They assist the government and the whole community in planning for, response to, and recovery from disasters. They can make substantial contributions such as training and management of volunteers, provision of shelter, food, and water, transportation and logistics, identification of displaced survivors, interpreter services, and disability-related assistance. NGOs are a source of response core capabilities and as such should be included in community planning for disasters.

Some NGOs are officially designated as support elements to national response capabilities [7]. For example, the American Red Cross is chartered by Congress and has a legally defined and special relationship with the federal government for the provision of relief to survivors (ESF 6) and to help citizens prepare for and respond to emergencies. The National Voluntary Organizations Active in Disaster (VOAD) is a member organization composed of 55 state and territory VOADs and other NGOs committed to exchange of knowledge and resources in planning for, response to, and recovery from disasters. It is a combination of faith-based, community-based, and other nonprofit NGOs representing thousands of professional staff and volunteers oriented to whole-community collaborative relationships and practices throughout the disaster cycle [8].

Medical Reserve Corps

The Medical Reserve Corps (MRC) is a national network of local groups of volunteers that include medical and public health professionals and others who are identified, screened, trained, and organized to improve the preparedness and response capabilities of their local jurisdictions by supporting routine public health activities and augmenting preparedness and response efforts. Activities of the local groups include training for emergencies, assisting to improve public health in the community, and participating in emergency response events. A local MRC unit coordinator leads the unit. MRCs work closely with the local health department, emergency management agency, hospitals, and other partner organizations. The MRC is a Citizen Corps partner program, federally funded to help build capacity for first responders through the use of volunteers. The Department of Health and Human Services administers the MRC, specifically the Office of the US Surgeon General, which serves as the clearing house for information and best practices for MRC units nationwide.

Community emergency response teams

The Community Emergency Response Team (CERT) program prepares people for disasters through education about the hazards that may affect their community, and trains them in basic disaster response skills. Through didactic and practical exercises, CERT members learn about fire safety, light search and rescue, team organization, and disaster medical operations, which allows them to assist others following an event when professional responders are not yet on scene. CERT members take a more active role in emergency preparedness projects in their community [9]. CERT is another Citizen Corps partner program, and is administered by the Federal Emergency Management Agency.

State response and assistance

State governments support local efforts to respond by using in-state resources as coordinated by the governor, the state emergency management agency, department of public health, and others. The governor may activate elements of the National Guard with expertise in emergency medical response, communications, logistics, search and rescue, or chemical, biological, radiological, nuclear, and high yield explosives (CBRNE) incidents. Volunteers may be solicited from established registries. The Emergency System for Advanced Registration of Volunteer Health Professionals (ESAR-VHP) is a national network of state-based registries established to standardize volunteer registration programs and verify health professionals' licenses and credentials in advance of a disaster. Established by Congress in 2002, The ESAR-VHP is a state-managed health volunteer registration program administered by the Department of Health and Human Services, specifically the Assistant Secretary for Preparedness and Response (ASPR), which develops guidelines, policy, and requirements for the states to use in the development and implementation of their programs. The personal information collected is maintained and used in a manner consistent with all federal, state, and local laws governing security and confidentiality. State law and regulation guide workmen's compensation and liability coverage for registrants who actively volunteer.

When the state's resources are strained, the governor may request assistance through the Emergency Management Assistance Compact (EMAC), which functions as a mutual aid agreement between states and territories. Congress ratified the compact in 1996, and states and territories may join by passing legislation that adopts the standard language of the Compact. All states are currently members of the EMAC. Upon a governor-declared state of emergency, the Compact allows states to send personnel, equipment, and supplies to help respond to disasters in other states. Through the legal foundation of the Compact, licenses, certificates, and permits are recognized as valid in the requesting state. The agreement also manages liability and responsibilities of cost. Personnel who are deployed are protected under the workmen's compensation and liability provisions of the affected state. The affected state also bears the cost of reimbursement for services.

Requests for assistance through the EMAC have grown substantially since its inception. In response to the World Trade Center bombing in 2001, only 26 emergency management personnel were requested through the EMAC, while an estimated 40,000 people responded to the attack. In 2005, the Gulf states requested a much greater variety of resources through the EMAC, including 46,503 National Guard personnel, 6,882 law enforcement responders, 2,825 fire and hazardous materials responders, and 9,719 other responders, many of whom were local government assets deployed directly to the affected areas [10]. The deployment of these resources is coordinated with local, state, and federal authorities.

Federal response and assistance

The governor of a state may request federal assistance when a disaster exceeds the ability of the state to manage with its available resources, or special capabilities held by the federal government are needed to manage the crisis. The federal

government can respond to the request by providing funding or by directly providing resources and services in coordination with the local, state, tribal, or territorial jurisdiction in need. The federal response is provided in a manner that respects the sovereignty of the local jurisdiction and its responsibility to manage the consequences of the disaster.

The Robert T. Stafford Disaster Relief and Emergency Assistance Act was signed into law on November 23, 1988. This law created the system in place today in which a presidential declaration of an emergency or major disaster triggers assistance from the federal government to the states. It affords two types of declaration: an Emergency Declaration and a Major Disaster Declaration. The Major Disaster Declaration affords access to a comprehensive range of resources for response and recovery, which exceeds those available through an Emergency Declaration, but unlike an Emergency Declaration, can only be issued in the wake of a disaster. The Emergency Declaration, while more limited in scope, can be issued in *advance* of a disaster, with the goal of mitigating the impact of the event or avoiding the catastrophe altogether.

States will mobilize their resources and implement their emergency response plans in response to an incident. When the resources of the state are overwhelmed, the governor may then request federal resources after jointly assessing the affected areas with FEMA to determine the extent of damage and estimate the federal resources required for an effective response. The state typically must also guarantee its share of the cost. The governor's request for a Stafford Act Declaration is addressed to the President, and considered by FEMA Administrator in conjunction with the Secretary of Homeland Security, who then makes a recommendation to the President.

Federal agencies may also respond using funding sources other than those made available by the Stafford Act. In this case an agency's operating budget or funds designated by a trust or special appropriation may facilitate immediate life-saving assistance to states, such as firefighting support or support for a communicable disease outbreak or a cyber security event.

Health and medical resources

National Disaster Medical System

The National Disaster Medical System (NDMS) is a federal system coordinated by the Department of Health and Human Services (DHHS), in partnership with the Department of Homeland Security, the Department of Defense, and the Department of Veterans Affairs to provide disaster medical care to the nation. NDMS works with states and other local partners to augment their medical capabilities and capacity for response to disaster. The capabilities broadly include deployable response teams, patient movement, and definitive medical care. NDMS also supports the military and Department of Veterans Affairs medical systems by maintaining its network of

civilian hospitals to receive and care for casualties that might be evacuated back to the United States in time of conflict or other type of military health emergency.

National Disaster Medical System operations entail a highly coordinated, multiagency local, state, and federal effort. The federal partners are coordinated by DHHS, which has overall authority and responsibility for NDMS.

- DHHS provides funding for training, exercising, and equipping all deployable teams. It coordinates the activities of NDMS with other public health and medical response activities (ESF 8) as well as the activities of the other ESFs. It also coordinates NDMS activity with the local and state entities.
- The Department of Homeland Security, through FEMA, develops NDMS mission assignments in the context of the NRF, and funds NDMS operations supporting emergencies under predeclaration periods and those declared under the Stafford Act.
- The Department of Defense (DoD) is responsible for patient movement using the US Transportation Command (USTRANSCOM). It also provides deployable health and medical resources required for the movement of those patients. The DoD funds NDMS operations supporting military contingencies and provides the necessary resources for receipt and distribution of patients for definitive care under those circumstances.
- The Department of Veterans Affairs (VA) alerts and activates designated VA Federal Coordinating Centers for receipt of patients and coordinates definitive medical care in the designated receiving areas across the US.

NDMS has medical, mortuary, and veterinary capabilities. Nearly 6,500 deployable personnel are organized into 90 teams [11]. Team members are volunteers and maintain their readiness, education, and training without pay. They are required to maintain the certifications and licensure appropriate for their discipline. Personnel can be activated as intermittent federal employees, which affords them pay, workmen's compensation coverage, and protection under the Federal Tort Claims Act in which any civil complaints are defended by the federal government. Certifications and licensure are recognized in all states when members are federalized.

National Disaster Medical System response team assets include the following.

- **Disaster medical assistance teams (DMAT).** DMATs are composed of professional and paraprofessional staff organized and resourced to provide medical triage, treatment, and preparation for transport when needed. The teams are composed of 35–50 personnel, including physicians, nurses, mid-level practitioners, paramedics, behavioral health specialists, logistical support personnel, and others. The team is designed to be self-sufficient for 72 hours, with personnel typically deploying for 14 days.
- **National medical response teams (NMRT).** NMRTs are trained and equipped to respond to weapons of mass

destruction incidents. They are designed to provide patient decontamination and specialized treatment and care for survivors of CBRNE events. One team is dedicated to response within the National Capital Region. The typical team consists of approximately 50 people.

- **International medical/surgical response teams (IMSURT).** IMSURTs deploy at the request of the Department of State to treat survivors of disasters outside the borders of the continental United States. The IMSURTs have also been deployed in support of domestic missions such as the World Trade Center bombings and Hurricane Katrina. The team configuration is flexible and may have 30 personnel including trauma surgeons, general surgeons, orthopedic surgeons, anesthesiologists, emergency physicians, midlevel providers, nurses, paramedics, logistical support personnel, and others. The teams can supplement or temporarily replace surgical and critical care capability, and stabilize and prepare patients for evacuation when needed. Personnel are typically deployed for 14 days or until local medical resources are supplemented or recovered.
- **Disaster mortuary response teams (DMORT).** DMORTs are composed of individuals from a variety of disciplines who are deployed to provide technical assistance and personnel to identify and process deceased victims, under the guidance of local authorities. Disciplines represented include funeral directors, medical examiners, pathologists, fingerprint specialists, forensic odontologists, mental health specialists, and others. The federal government also maintains three deployable disaster portable morgue units (DPMUs), each of which contains a complete morgue with prepackaged equipment and supplies. DMORTs have deployed to mass fatality events such as the 2011 Joplin, MO, tornado (161 deaths), Hurricanes Katrina and Rita (~2500 deaths), and the 2010 Haiti earthquake (~212,000 deaths).
- **National veterinary response teams (NVRT).** NVRTs provide veterinary care to ill and injured animals housed in federally supported facilities after a disaster. This also includes lab animal support, working animals such as US&R dogs, and assistance with USDA-led outbreaks among livestock and poultry. The 22–26 member team is composed of clinical veterinarians, veterinarian pathologists, microbiologists, epidemiologists, toxicologists, and others.

When local medical systems become overwhelmed, NDMS provides the means to evacuate patients to the nearest participating hospital capable of supporting the needs of the patient. Local and state officials in coordination with federal authorities will identify patients requiring evacuation and initiate their movement. DoD has primary responsibility for coordinating the patient evacuation function of NDMS in conjunction with DHHS and FEMA. Various means of transportation can be used, including the resources at USTRANSCOM. Patients evacuated from a disaster area will arrive at a federal coordinating center patient reception area (PRA), where they will be triaged and staged for transport to a local NDMS participating hospital. PRA teams are often composed of local EMS personnel, local federal resources (such as VA Medical Center assets), local public health and health system personnel, and others. A local or deployed DMAT may also be assigned to PRA functions. The Federal Coordinating Center will track the location and status of all patients. Return movements home are coordinated by DHHS on a case-by-case basis, with those requiring continuing medical care returned when appropriate care is available at their point of origin.

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