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# Public Health and Medical Crisis Management

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## ABSTRACT

While there are standard operational parameters and procedures that all incident managers follow to manage a crisis or incident, public health and medical responders use a modified incident command structure or system that is somewhat unique. In this review, we discuss the traditional Incident Command System, Unified Command System, and how the public health and medical incident response community has adapted the traditional systems for their use, and for use in a chemical, biological or radiological incident, as they coordinate with other responding agencies.

## **INTRODUCTION**

The United States has adopted the National Incident Management System (NIMS) as the management system for interagency coordination and collaboration during emergency response operations. There are core concepts, principles, components, and terminology that apply to NIMS. (Figure 1)

While there are standard operational parameters and procedures that all incident managers follow to manage a crisis or incident, public health and medical responders use a modified incident command structure or system that is somewhat unique. In this review, we discuss the traditional Incident Command System, Unified Command System, and how the public health and medical incident response community has adapted the traditional systems for their use as they coordinate with other responding agencies. These new adaptations are the communications and interrelationships that would be used in the response to a chemical, biological or radiological incident. Almost all emergencies or incidents have the potential to adversely affect a community. The role of public health and medical responders is two-fold:

- To respond to the immediate threat or incident and,
- To provide continued medical services to those in need.

## **INCIDENT COMMAND SYSTEM**

The Incident Command System (ICS) based on five functions: Command, Planning, Operations, Logistics, and Finance/Administration. ICS is part of the NIMS Command and Management component. It is a flexible and expandable emergency operations system developed for the management of a routine event or large-scale disaster. Each functional area could have multiple operating branches, divisions, and units within depending on the type and scale of the incident. (Figure 2)

Within the Command function, the Incident Commander is the lead official responsible for all aspects of the incident response. Assisting the Incident Commander is a Safety Officer, a Public Information Officer, and a Liaison Officer. The Incident Commander is responsible for the development of the Incident Action Plan. The Incident Action Plan contains the overall objectives and strategies for managing the response. The Incident Action Plan also addresses tactical objectives and support activities for one operational period, generally 12 – 24 hours. The Safety Officer monitors the response activities to

ensure safe operations and has the authority to stop operations to correct unsafe conditions. The Public Information Officer is responsible for the coordination of all news media activity and public information. The Liaison Officer is the liaison to all other organizations that do not become part of the Incident Command System structure.

**The Planning function is responsible for:**

- Collecting, evaluating, and disseminating situational information
- Documenting the Incident Action Plan, which contains provisions for continuous incorporation of “lessons learned” as identified by the Incident Safety Officer or incident management personnel as activities progress

**The Operations function is responsible for:**

- Managing the tactical aspects of the emergency operations
- Reducing the immediate threat
- Saving lives
- Protecting property
- Establishing situational control
- Restoring pre-incident conditions

**The Logistics function is responsible for:**

- Managing all resources and requirements related to the emergency operation
- Transportation
- Supplies
- Personnel
- Facilities
- Equipment
- Food services
- Medical services
- Information technology

The Finance and Administration function monitors all financial aspects of the emergency response, tracks actual costs, and forecasts needed funding.

## **UNIFIED COMMAND SYSTEM**

Unified Command is an important upgrade over straight incident command when the event occurs in a multi-jurisdictional/geo-political arena or if the incident involves/requires a multi-agency response. It provides guidelines to enable agencies with different legal, geographic, and functional responsibilities to coordinate, plan, and interact effectively. The Unified Command overcomes

much of the inefficiency and duplication of effort that can occur when agencies from different functional and geographic jurisdictions, or agencies at different levels of government, operate without a common system or organizational framework. The primary difference between the single command structure and the Unified Command structure is that in a single command structure, the Incident Commander is solely responsible for establishing incident management objectives and strategies. In a Unified Command structure, the individuals designated by their jurisdictional authorities jointly determine objectives, plans, and priorities and work together to execute them. In the case of Unified Command the Incident Action Plan must address the overall incident objectives, mission, operational assignments, and policy needs of each jurisdictional agency. This planning process is accomplished with and through candid, open interactions between jurisdictions, functional agencies, and private organizations.

Below is a depiction of a complex unified command focusing on Operations: (Figure 3)

## **PUBLIC HEALTH AND MEDICAL INCIDENT COMMAND SYSTEM**

Depending on the type and scale of the incident, a public health and medical incident command system model can be modified in various ways. Below are just a few examples of which units could be added for a public health and medical incident response.

Health and medical staff will clearly have a lead or chief. When one observes the interactions amongst the health and medical staff, one will undoubtedly see a great deal of latitude given by the chief to subordinate colleagues by way of debating the issues, providing input, criticism and in some cases outright aggravation expressed openly. This openness and debate may not ever work with a typical Incident Command structure such as a firefighting unit at the scene of a fire. However, this often works quite well for the chief of the public health and medical unit as she/he forms the decision or outlines the basis of the health/medical component of the overall Incident Action Plan. Most often, Medical and Technical Specialists are added to the Command Staff. These specialists are experts in areas such as infectious disease, medical legal affairs, risk management, and medical ethics.

In the Planning function, a Resources Unit, Situation Unit, Documentation Unit, and Demobilization Unit can be added. The Resources Unit tracks personnel and materiel – where and how personnel are being used and what and where the materiel is located. The Situation Unit is responsible for writing and maintaining incident updates based on internal and external events such as patient tracking and bed tracking. The Documentation Unit is solely responsible for tracking the event. The Demobilization Unit is responsible for planning, developing, and revising the demobilization or exit strategy or recovery strategy

(as versus “response” phase of the incident) as it affects the public health and/or the ongoing medical care of victims/patients.

Intelligence, a part of the Planning function, is a crucial part of any public health and/or medical response. The Intelligence Officer should collect, interpret, and synthesize data. Examples of intelligence activities under a public health and medical incident command would be analysis and projections regarding epidemiological data about a bioterrorist event, risk assessments based on information reported by law enforcement or determination of toxic contamination levels in an environmental incident.

The Operations function can be expanded to support the following areas: Staging, Medical Care, Infrastructure, HazMat, Security, Business Continuity, and Field Response. Issues to be considered within each of the sections:

**Staging:**

- Personnel
- Equipment
- Supply
- Vehicle (such as ambulance and/or medical evacuation transport assets)
- Medication Staging

**Medical Care:**

- Inpatient, Outpatient, and Casualty Care
- Mental Health
- Clinical Support Services
- Patient Registration

**Infrastructure:**

- Power/Lighting
- Water/Sewer
- HVAC
- Building/Grounds Damage
- Medical Gases
- Medical Devices
- Environmental Services
- Food Services

**Hazardous Materials (HazMat):**

- Detections and Monitoring
- Spill Response
- Victim Decontamination
- Facility/Equipment Decontamination

**Security:**

- Access Control

- Crowd Control
- Traffic Control
- Search
- Law Enforcement Interface
- In extreme situations, personal protection for public health and medical staff may be required.

**Business Continuity:**

- Service Continuity
- Records Preservation
- Business Function Relocation
- Service Continuity
- Information Technology
- Essential Public Health Services

**Field Response would oversee the:**

- Environmental Unit which has
  - Specimen Collectors
  - Environmental Field Technical Specialists and Liaisons
- Epidemiology Unit which has
  - Human Epidemiology Technical Liaisons
  - Epidemiology Investigation Site Coordinators
  - Case Investigators
  - Human Specimen Collectors
  - Diagnostic Testing Coordinators
- Mass Care Unit that
  - Monitors flow
  - Educates patients
  - Deals with victim and volunteer registration
  - Medical screening
  - Shelter nursing care
  - Triage nursing care
  - Vaccinations
- Health Information and Public Education that assists the Public Information Officer by providing
  - Hotline Unit
  - Multilingual Hotline
  - Information Distribution
  - Media Facilitator
  - Media Telephone Operator
  - Public Information Writer
  - Public Relations Communications Specialist and Webmaster to assist with medical fact sheets and translating medical terms and information into layman's terms.

The Logistics function would track shipments of pharmaceuticals, vaccines, equipment and other medical surgical items. Receiving and processing requests for supplies, tracking the movement of those supplies, ensuring proper temperature control and storage is the responsibility of the Logistics Branch. Transportation of epidemiologists, doctors, public health advisors, and other health professionals would be coordinated through the Logistics Branch. When personnel are deployed, ensuring the deployed individual or team has adequate supplies and resources to be self-contained are necessary. Information technology and communication devices, transportation, accommodations, family care, and other resources must be addressed. Although there are overarching public information, planning, operations, security, and finance and administration branches which coordinate emergency operations, it might be beneficial for the Logistics Branch to also have those functions internal to the branch. Supply chain management requires extensive planning and operational expertise. Technical experts and intelligence gatherers who are providing data and other information to the Logistics Lead are invaluable.

Along with the standard financial and administrative responsibilities, the Finance and Administration function would be responsible for public health and medical personnel recruitment – government personnel, volunteers, and contractors. In addition, the longer term financial implications of a damaged or destroyed hospital may affect decisions which must be made by the Incident Commander, by the community leaders and by the residents in that community.

The organizational chart is a depiction of an example of a hospital incident command: (Figure 4)

## **DISCUSSION**

There are several ways to expand the traditional Incident Command System in order to support a specific incident and or technical area. For incidents requiring public health and medical responders, saving lives and mitigating against the spread of illness and/or continuing injury is the top priority.

However, there often is tension amongst the various technical areas responding to an incident. For example, law enforcement entities are responsible for collecting data including specimens for evidence in the legal prosecution of a criminal event. Public health and medical responders also collect data and specimens but they do so for the purpose of diagnosing illness, investigating and establishing the epidemiology of the incident (establishing in space and time, the boundaries of the event) to decrease morbidity and mortality. At times public health/medical responders and criminal investigators may find themselves frustrated with one another; however, recent exercises and education efforts have shown both can accomplish their respective missions without interfering with one another.

Traditionally the public health and medical community desire dialogue and open communication with colleagues, preferring to share as much information with the public and one another as possible. In an emergency response environment, much of the information is not shared or released until all of the details are known. This may at times cause frustration for the public health and medical responders. In an emergency response environment information is often shared on a need to know basis. The more public health/medical staffs work with incident commanders and first responders, the more communications issues are ironed out and settled before an incident response is mounted.

The goal is to respond effectively and efficiently with minimal confusion and duplication of effort. Public health and medical incident command structures could benefit from having a liaison that has experience with and understands the various technical areas employed in the traditional incident and unified command structures; such a liaison can identify issues and communicate effectively with the first response/incident command group. Although the Incident Command System was designed to alleviate confusion and use common terminology, unless the public health and medical communities are regularly involved with full scale exercises and ongoing coordination with other emergency response entities it might be difficult to integrate them into an existing emergency management system.

## **EXAMPLE**

An example may prove illustrative of how the Incident Command System is applied in a public health emergency, specifically in a possible bioterror incident. Clearly, not all incidents are alike and public health professionals may recognize in this fictitious example applications they would change, the purpose of this section is to be illustrative not proscriptive. And while this example is based on several responses conducted by the Centers for Disease Control and Prevention from 2004-2006, it is an example, *only*.

Background for the Reader: On (date), the Emergency Operations Center at the Centers for Disease Control and Prevention (CDC) received a phone call from Fiction County Health Officer in which he described an unfolding incident involving a white powder in an envelope which had been opened by the mail clerk in the main lobby of the Official Best Sellers (OBS), Inc, building in downtown, Fiction City. The Health Officer had the Fiction County Fire Department Chief of HazMat Response and the President of the OBS on the telephone with him. The operator at CDC Emergency Operations Center (EOC) got the telephone number, and asked the caller to hold. The call was then transferred to the CDC's Operations Chief/Watch Officer who took down all the pertinent information such as described in who, what, when, where, why, how. The CDC Watch Officer asked if the callers could hold while CDC leadership was

informed and could join the call. During the time it took to get the CDC leaders on the line, the Department of Health and Human Services (HHS) was informed of the incident and began charting the incident at the HHS Command Center in Washington, DC; they also informed the Department of Homeland Security (DHS). Within 15 minutes, the appropriate Branches, Divisions and Centers as well as the Office of the Director, CDC, were on the line with the Fiction County Health Officer. Having been briefed by the Watch Officer, the public health physicians and epidemiologists and subject matter experts from CDC asked clarifying questions and began to form their recommendations to HHS for a response. Staff at the CDC EOC began an incident log in which all the information gathered on the telephone calls was logged. This log was available in real time to HHS and to all the subject matter experts involved in the incident at CDC, however, the log could only be altered or added to by the EOC staff or the Office of the Director CDC as further information became available. It must be noted that in such an incident, it is entirely possible that some or all of the incident may quickly become classified depending on the wishes of DHS or the National Command Authority who have access to information not available to the general public. Should that be the case, the access to incident information becomes much more restricted; however, the public health response continues to have the responsibility to mitigate quickly against injury, infection, morbidity and mortality as indicated within the National Incident Management System.

Fiction County officials were told that within 1 hour, they would be asked to join a larger conference call in which HHS, DHS and perhaps the National Command Authority were present. CDC convened a call with HHS Command, shared the information gained by both the Watch Officer and the subject matter experts and HHS called DHS with CDC on the line. A conference call between all Federal responders took place within 30 minutes of the initial call to CDC. All Federal callers were briefed by the CDC Director and the DHS operator connected in the Fiction County Health Officer and others on the scene. The local office of the FBI was on the scene by that time and they were following standard operating procedures established following the anthrax letter terrorist event in 2001. Under the supervision of the FBI on site commander, and while maintaining Federal chain of custody standards, samples of the powder were taken to the Fiction County public health lab (part of CDC's Public Health Laboratory Response Network or LRN) and there they underwent rapid PCR testing; samples were split and a specimen was also sent to CDC for confirmatory testing.

The mail clerk was placed on antibiotic treatment (his clothes had been bagged and he had showered at the OBS building before being released; he was placed on fever watch meaning he was told to stay on antibiotics, to be aware of specific signs and symptoms and to remain at home until test results were available; he posed no threat to his family or friends). The building was closed until test results were available, the heating and air conditioning systems had been turned off as soon as the Fiction County HazMat team arrived on the scene

and all personnel of OBS had been evacuated. Tests proved negative and the incident was closed without further follow up required. An after action report was written by CDC staff and sent to HHS for review.

This fictional incident depicts how the modified incident command system works in a potential public health emergency event.

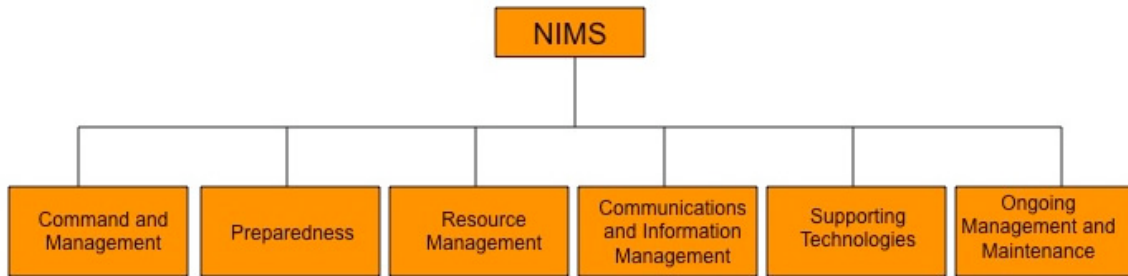
## CONCLUSION

In a public health and medical environment, public health and medical professionals rely on information sharing, hypothesis development and testing, data collection, discussion, and consensus, wherein all parties have an equal weight and share in the decision making process. During emergencies where the Incident Command structure consists of firefighters, military commanders or emergency response specialists, not all sections or functions necessarily have an equal weight in the decision making process and consensus is often not the immediate goal.

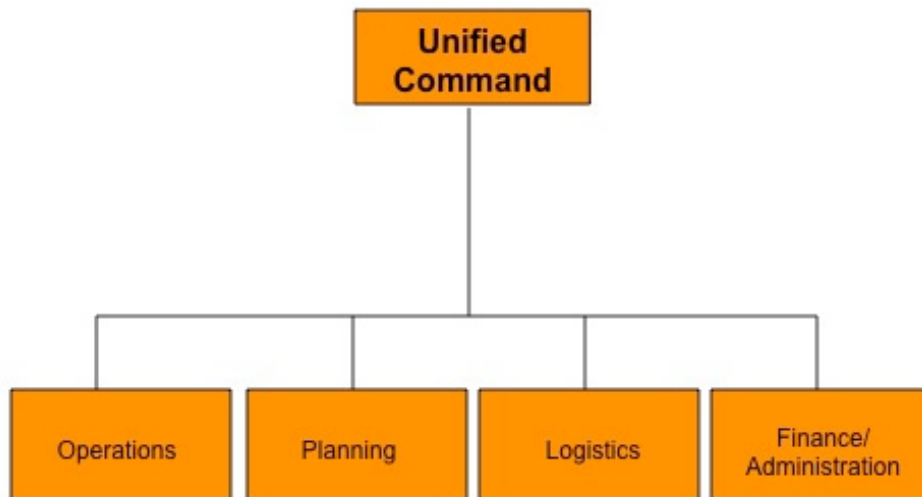
For public health and medical professionals, there can never be enough data which to base a plan of action. The drive to seek more tests, conduct more clinical observation, get more opinions on the subject, underlies most public health and medical decisions. Of course, decision makers in public health and medical settings are most often forced to make an operational decision in the absence of perfect data or information and they have made these decisions about the health and welfare of patients and the public for decades. Incident commanders and first responders who have worked with public health professionals know that their inclination is to deliberate, debate and ask “what if?” While there is clear value to this approach, often public health staff find during a crisis that there is almost always incomplete data available, there is little or no time to deliberate and there is an immediate need to react. The Incident Commander needs their input into his/her action plan immediately. Experienced public health responders find that their initial action plan will be modified almost daily as more data become available.

When public health and medical personnel are part of the incident command or unified command, they will accomplish their mission and the mission of the entire incident command team with a unique blend of consensus decision-making and data analysis/interpretation and information sharing among colleagues. The more traditional incident commanders and first responders plan, exercise and respond together, the better the incident will be handled.

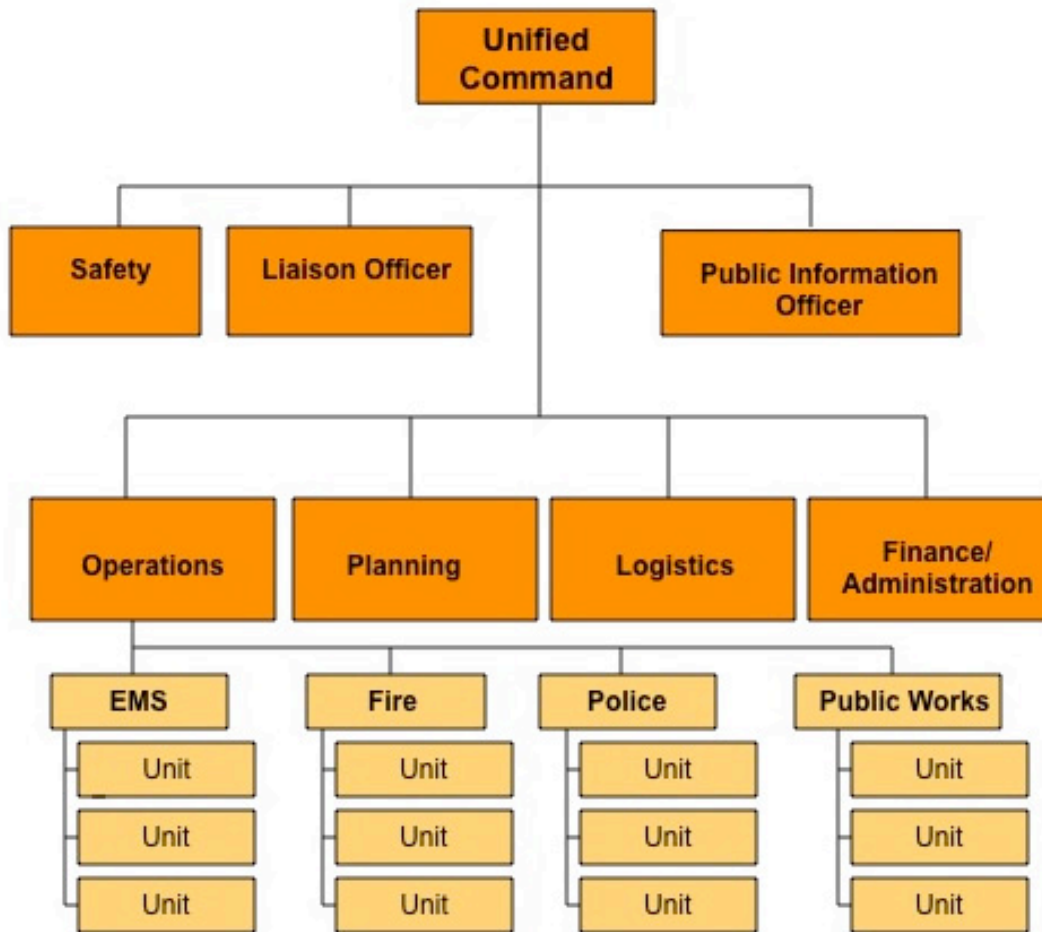
## FIGURES



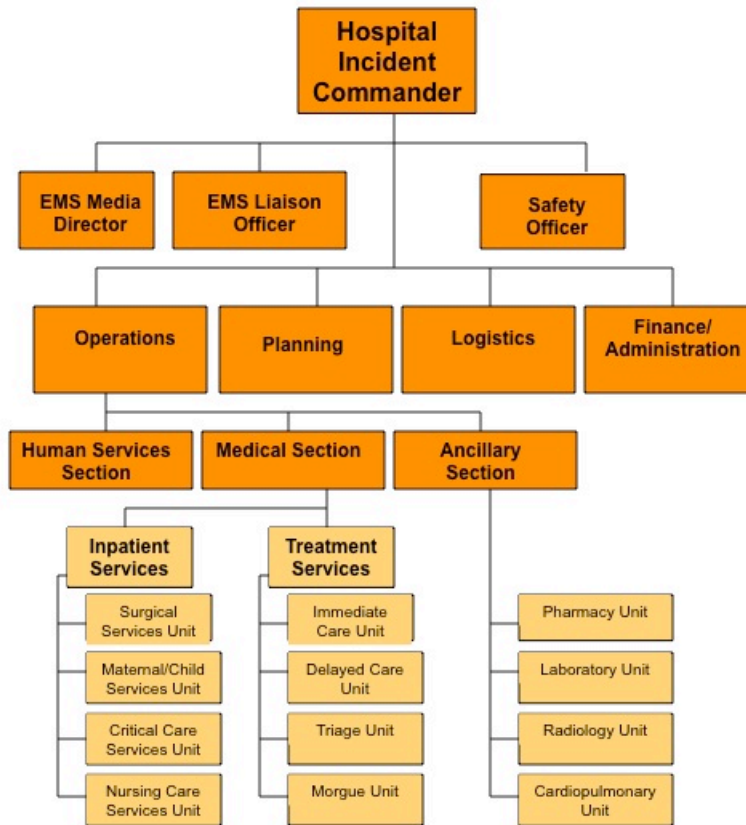
**Figure 1: NIMS Components**



**Figure 2: Simple ICS Structure**



**Figure 3: Complex Unified Command**



**Figure 4: Example of Hospital Incident Command**

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