Disaster Alternate Care Facilities: Selection and Operation

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Contents

Executive Summary

Purpose. The primary objective of this task order is to review, revise, and enhance the alternate care site selection tool that was developed under AHRQ Contract No. 290-00-0014 Task Order No. 5, titled "The Rocky Mountain Regional Model for Bioterrorist Events" (available at: www.ahrq.gov/research/altsites.htm). Additional objectives were to:

- Develop a template for an operations manual for an alternate care facility (ACF); the intent is to use this template as a starting point in developing a "concept of operations" manual for a specific iteration of any ACF.
- Develop staffing guidelines for an ACF.
- Develop an algorithm to assist health care providers in selecting hospital inpatients who might be eligible for transfer to an ACF to augment hospital surge capacity.
- Present lists of supplies and equipment that may serve as a starting point for equipping and supplying an ACF based on expert advice and the experiences of those who have operated ACFs.

Background. In a mass casualty event of any significant magnitude, hospitals and other traditional venues for health care will most likely be overwhelmed with patients (or rendered inoperative), making it necessary to establish ACFs: alternate locations for providing care that usually would be provided in an inpatient facility, including acute, subacute, and chronic care. The work presented here builds on previous efforts that have been refined and enhanced based on recent experience gained from dealing with significant mass casualty events.

Methods. The revision of the ACF Site Selection tool involved a multi-step effort. A thorough literature review of recent experiences with ACFs was undertaken. This knowledge was augmented through the development of an extensive questionnaire concerning the establishment and operation of ACFs during recent multi-casualty events in the United States. This questionnaire was sent to and completed by a select group of experts with significant experience in the operation or development of ACFs. An Advisory Panel of experts in the field of surge capacity and ACFs guided the activities related to this Task Order.

Results. The results of the literature review and the responses to the questionnaire were used in the development of the following, which are fully described in this report:

- ACF selection tool;
- ACF operations template;
- ACF staffing recommendations;
- Hospital patient selection tool to assist in determining those patients who may be eligible for transfer to an ACF to increase hospital surge capacity; and
- ACF equipment and supply options.

Chapter 1. Objectives

The primary objective of this task order was to review, revise, and enhance the alternate care site selection tool that was developed under AHRQ Contract No. 290-00-0014 Task Order No. 5, titled "The Rocky Mountain Regional Model for Bioterrorist Events".[1] During a mass casualty surge event, current hospital capacity will not meet immediate resource demand. This facility selection tool has important implications for health, disaster response, and public health emergency planners in that it allows a straightforward approach to pre-selecting potential ACFs. This facility selection tool provides a quantitative, customized, and simple methodology for identifying the "best" facility based on a relative ranking process. The refinement of this tool is of particular interest based on lessons learned during hurricanes Katrina and Rita at the Louisiana Superdome, the New Orleans Convention Center, and other locations, including Federal Medical Stations and other mobile assets. This enhanced tool will be of use to States and local communities as they work to identify potential mass care sites.

An additional objective was the development of a template for an operations manual for an ACF. This template is intended to be used as a starting point in the development of a concept of operations manual for a specific iteration of any ACF.

We have also attempted to develop some general guidelines on staffing requirements for an ACF. Creating the optimum plan for staffing is challenging because a one-size-fits-all recommendation for ACF staffing is not possible. The potential scenarios requiring the use of an ACF can vary dramatically; consequently, the function that a given ACF will perform and the physical form that it takes will vary greatly, which will have a significant impact on the staffing needs for the ACF under consideration.

In certain situations, a community may choose to use an ACF to decompress one or more nearby hospitals. In this case, less ill patients who are not yet ready for discharge to home may be selected for transfer to an ACF, providing additional surge capacity for that hospital. To assist in the patient selection process, an initial algorithm ("Patient Selection Tool") has been developed to assist health care providers in deciding which patients may be appropriate for either early discharge or transfer to an ACF for continuation of their care.

Equipping and supplying an ACF is an additional major challenge, especially since the scope of care provided may vary widely from ACF to ACF. It is therefore not possible to provide a definitive list of equipment and supplies. Instead, based on expert advice and the experiences of those who have operated alternate care facilities, lists of supplies and equipment were developed that may serve as a starting point.

Section Reference

1. Rocky Mountain Regional Care Model for Bioterrorist Events: Locate Alternate Care Sites During an Emergency. December 2004. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/research/altsites.htm.

Chapter 2. Background

In a mass casualty event of any significant magnitude, hospitals and other traditional venues for health care will most likely be overwhelmed with patients or rendered inoperative, making it necessary to establish ACFs, defined as alternate locations for the provision of care that would usually be provided in an inpatient facility, including acute, subacute, and chronic care. The concept of providing medical care at a non-hospital ACF was demonstrated during the Civil War, the San Francisco earthquake of 1906, the influenza pandemic of 1918-1919, and, more recently, Hurricanes Katrina and Rita. During the Cold War in the 1950s and 1960s, this concept was developed and formalized by the U.S. Civil Defense Agency in cooperation with the U.S. Department of Health, Education, and Welfare as "Packaged Disaster Hospitals" (PDH). These PDHs consisted of modularized, pre-deployed units for 50, 100, or 200 beds. In 1972, funding for the PDH concept and the 2,500 deployed units was discontinued by Congress, and these units were declared surplus and disposed of over the next decade. We are now rediscovering, resurrecting, and refining this concept.

The focus on catastrophic bioterrorism over the past decade has resulted in some key efforts in the development of the concept of ACFs. The most widely recognized effort was the development of the Acute Care Center (ACC) and the Neighborhood Emergency Health Center (NEHC) by the U.S. Army Soldier and Biological Chemical Command.[2, 3] This innovative body of work addressed key concepts related to the delivery of care outside of established hospitals and focused on the following important issues:

- Level and scope of care to be delivered.
- Physical plant required for the establishment of such facilities.
- Staffing requirements for delivery of such care.
- Incident management structure required to integrate such facilities with the overall delivery of health care in the setting of a mass casualty event.

The ACC was described as having been "designed and equipped to treat patients who need inpatient treatment but do not require mechanical ventilation and those who are likely to die from an illness resulting from an agent of bioterrorism." This foundational planning guidance further defined the level of care that could reasonably be delivered in such a setting. The ACC was designated to "provide biologic agent-specific therapy and supportive care while hospitals focused on the treatment of critically ill patients."

In the aftermath of the 9/11 attacks, a more concerted focus was placed on the definition and development of health and medical surge capacity. A distinction was drawn between "health care facility" surge capacity and "community" surge capacity, with the understanding that community surge capacity strategies were focused on creation of out-of-hospital solutions for the delivery of health care, closely mirroring the ACC concept.[4]

Further conceptual development on the subject of surge capacity was conducted by the Joint Commission on Accreditation of Healthcare Organizations (now the Joint Commission) and focused on the establishment of "surge hospitals." A number of important concepts were explored including the use of "facilities of opportunity," which

were defined as “non-medical buildings that, because of their size or proximity to a medical center, can be adapted into surge hospitals.”[5] The use of “mobile medical facilities,” mobile surge hospitals placed on tractor-trailer platforms, with surgical and intensive care capabilities, was also described. Also described was the importance of “portable facilities,” transportable medical facilities that can be set up quickly and that are fully equipped, self contained, turnkey systems usually stored in a container system and based on military medical contingency planning.[5] Indeed, all three types of contingencies were deployed during the augmentation of the health care disaster response in the aftermath of Hurricanes Katrina and Rita.

In the setting of this limited but important body of work on this subject, “alternate care facility” has been defined as a location for the delivery of medical care that occurs outside the acute hospital setting for patients who would, under normal circumstances, be treated as inpatients. It also may be identified as a site to provide event-specific management of unique considerations that might arise in the context of catastrophic mass casualty events, including the delivery of chronic care, the distribution of vaccines or medical countermeasures, or the quarantine/cohorting/sequestration of potentially infected patients in the setting of an easily transmissible infectious disease. The broad interpretation of the concept of alternative care sites must also include home care. This would be most appropriate for individuals requiring quarantine, patients who are mildly ill, or those requiring palliative care.

The identification and use of an ACF for the management and treatment of patients resulting from a mass casualty event represents a response to a scarce medical resource: hospital beds. This can only be done in the context of pre-event planning that delineates those medical functions and treatment objectives to be accomplished by implementing such a facility. Community planners, comprised of participants from municipal agencies including public safety, public health, and emergency management as well as representatives from local health care organizations or institutions, must conceive of, develop and implement a plan in which ACFs serve in concert with existing health care facilities including hospitals, outpatient clinics, and multi-specialty group offices, as well as home care, in order to deliver a wide-ranging level of medical services to the population in need. This assumes that the requirement is met for an organized mechanism for triage of patients into high acuity, moderate acuity, low acuity and expectant/expired categories, focusing on matching patient needs with available medical resources. This division of patients must also identify those for whom no manner of medical intervention is likely to result in a positive outcome and who are therefore candidates for palliative care. Such planning also assumes that the most severely ill or injured high acuity patients can only receive medical care commensurate with what would be expected within the setting of a hospital facility or an ACF that is outfitted to serve as an acute care hospital, which is unlikely.

Most communities will not be able to procure the quantity and complexity of resources or the level of staffing that would provide for the outward extension of hospital facilities into designated ACFs, which will often be located in “buildings of convenience.” Therefore, it is imperative for planners to establish clear operational definitions of what can and cannot be accomplished in the setting of an ACF. The principle of managing

patients under relatively austere conditions, with only limited supplies, equipment, pharmaceuticals, and staffing, must be the starting point for such plans.

Such facilities may ultimately be developed to serve different purposes depending on the circumstances. For example, an ACF might serve as a primary triage point, helping to decide which patients require hospitalization, which patients can be managed at home, which patients might benefit from observational care and minimal interventions available at the ACF, or which patients might be appropriate for palliative care that might also be available at an ACF. Such a facility might also be reasonably expected to cohort a group of patients who have been exposed to certain infectious agents who may only need continued observation and minimal, if any, medical intervention. Such facilities also may be designated as community-focused ambulatory care clinics that serve as points of distribution for medications, vaccinations, or other medical interventions that must be delivered to a wide population. Finally, such facilities could be designed to serve as low-acuity patient care sites to permit the off-loading of stable patients from hospitals in order to enhance the hospitals' internal patient care surge capability or as primary sites for the care of stable low-acuity patients.

The development of ACFs will not be accomplished in a vacuum of planning. Such facilities will necessarily be inextricably linked to local health care and emergency management systems, all of which should be involved in the planning process, including the commitment of financial support. ACFs should be integrated into the concept of operations of any regional health care alliance that is drawn together to plan for response to disasters. As such, these facilities must fit within the broader spectrum of medical and health care incident management .[6,7] Community planners must identify the logistical support necessary for establishing and operating such ACFs. Planners should also attempt to identify and create protocol-driven patient management objectives based on assumptions about the types of patients that would be managed in such facilities.

A note on terminology: As the concept of the ACF has been developed and refined, multiple terms have evolved to describe this basic concept. Some of these terms include: alternative care facilities (or sites), acute care centers, alternate treatment facilities, alternate medical treatment sites, alternate treatment centers, alternate care centers, and temporary alternative health care facilities. Unless otherwise noted, the concepts discussed here apply to all of these different terms. Basically, ACF encompasses all non-hospital-based locations where organized non-ambulatory or ambulatory care can be provided at a time of markedly increased need during a naturally occurring or man-made disaster.

* Many of the concepts presented here are enhancements of work originally presented in: Cantrill SV, Bonnett C, Hanfling D, Pons R: Alternative Care Sites in *Mass Medical Care with Scarce Resources: A Community Planning Guide*. AHRQ Publication No. 07-0001. Rockville, MD, Agency for Healthcare Research and Quality, February 2007. http://www.ahrq.gov/research/mce/ Accessed August 12, 2009, and in:
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Chapter 3. Methods

Literature Review

In the aftermath of Hurricanes Katrina and Rita and other natural disasters, the United States has gained more experience with the concept of ACFs than in the previous several decades. In an attempt to synthesize the collective knowledge learned from these experiences, an extensive literature review was undertaken. More than 60 articles from peer-reviewed and other literature were reviewed (Appendix A). These articles were used as a guide for the development of our questionnaire to further elucidate issues not discussed or incompletely covered by these articles.

Establishment of Advisory Panel

To guide this project, an advisory panel was established consisting of subject matter experts in the field of surge capacity and ACFs (Appendix B-1). This panel included members from the private, public, and government sectors. Three meetings were held with the advisory panel to provide input and direction. The participation and guidance provided by the panel members are gratefully acknowledged.

Questionnaire Development and Administration

In an attempt to acquire a standardized data set regarding experience with ACFs, the decision was made to develop a questionnaire that would be circulated to a limited number of groups who had either extensive real world experience with setting up, operating, or planning for ACFs. Due to limitations from the Federal Office of Management and Budget, a maximum of only nine groups could be queried without incurring a lengthy Federal approval process that was inconsistent with the time frame of our task (Paperwork Reduction Act - 44 U.S.C. Chapter 35). Eight of the groups selected had established and operated ACFs during Hurricanes Katrina and Rita and one group had extensive experience planning for the establishment of ACFs. The groups with experience operating an ACF included Baylor College of Medicine (Houston, TX), University of Texas Southwestern Medical Center (Dallas, TX), Illinois Medical Emergency Response Team (Baton Rouge, LA), Texas Disaster Medical Assistance Team (New Orleans, LA), Carolinas MED-1 (Waveland, MS), Federal Medical Stations (multiple sites), Earl K. Long Medical Center (Baton Rouge, LA), and University of Texas Health Center (Tyler, TX). The State of Florida also was included because of its extensive work in planning for and operating ACFs.

Based on our literature review and input from the advisory panel, a 28-page questionnaire was developed (Appendix C). The questionnaire had seven sections:

- Descriptive data (ACF use, dates of service, structure utilized, etc.),
- Command structure used,
- ACF advance planning,
- ACF logistics,
- ACF operations,

- ACF finance, and
- ACF facility selection tool comments.

The survey instrument was designed to allow respondents to use fill-in-the-blank answers. In many cases this allowed people to expand on their answers and give much more detail than would have been possible with yes/no questions or a "bubble sheet" type questionnaire.

This instrument was approved by our institutional review board (IRB) and submitted to representatives of the groups listed above. The responses were compiled. These data were used in developing the tools and conclusions presented in this report.

Because of the restrictions placed by the IRB, the individuals who were surveyed were assured that neither they nor the site that they operated would be specifically identified in the final manuscript. As a result, the data presented in this report lists "Site 1" through "Site 9" instead of the name of the actual site.

Patient Selection Tool Development

As discussed previously, one of the potential uses for an ACF is as a hospital decompression site. In this scenario, less ill patients who cannot be discharged from a hospital to home potentially could be transferred to an ACF, freeing up their hospital bed and resources to augment that institution's surge capacity. As an addendum to our initial task order, we were charged with attempting to develop a tool to assist in this patient selection process. After a review of the applicable literature, we convened a sub-panel of subject matter experts to address this task (Appendix B-2). This panel met multiple times via conference call to develop and refine the Patient Selection Tool.

Chapter 4. Results

Questionnaire Results

Nine questionnaires were sent out, all were returned. The responses to our questionnaire were used extensively to develop the tools and conclusions presented here. A summary of the important themes in the responses includes:

- Planning is best done in advance and should involve all potential participants including care providers, emergency managers, emergency medical services, law enforcement, and others.
- Ideally, the role of the ACF should be decided in advance of an incident. This will guide staffing, supply and equipment decisions, and procurement. Possible roles for the ACF include:
    - Ward-level care to decompress a hospital and provide surge.
    - Ambulatory acute care – i.e., triage and minor wound care.
    - Chronic care.
- The ACF will usually have to care for the full age range of patients: children, adolescents, adults, and the elderly. This should be taken into account in all planning.
- Even with the best of plans, overall flexibility is mandatory and should be maintained.
- If possible, a college campus would make an excellent ACF because of the availability of appropriate space, human resources, food service, security, bathrooms, and showers.
- Proximity to a hospital is desired if diagnostic tests will be needed that cannot be administered at the ACF.
- Point of care clinical laboratory testing should be considered. At a minimum, glucometers for measuring blood glucose should be available.
- Adequate toilet and shower facilities are very important.
- The nature of the disaster may dictate that nursing home patients are cared for en masse at an ACF.
- Lighting control and noise control are issues that may be difficult to solve if the ACF is housed in a single large area (such as a gymnasium).
- It is usually best to try to keep families together.
- If palliative care will be necessary, those patients should be cohorted, preferably in a separate area or unit.
- Caring for patients' pets should be considered.
- Security is extremely important. Individuals in uniforms (even if not true security) can assist with this. Law enforcement should be included in any advance planning with a commitment to provide security for any ACF.
- Incident command of an ACF is probably best done by a physician or nurse who understands both incident command and patient care issues.
- In most situations, pediatric patients made up about 10% of patients.
- Chronic-care medications (e.g., for hypertension, diabetes mellitus, etc) are extremely important as are pain medications and antibiotics.
- Replenishing narcotics at an ACF may be an issue due to Drug Enforcement Administration regulations. This should be investigated as part of the planning process.
- Most medical providers worked 12 hour shifts with decreased staff during the night.

- Chronic dialysis may become a significant chronic-care issue.
- Although ACF incident command usually works well, there are sometimes issues interfacing with local area command.
- Early establishment of rules of behavior for the ACF ("House Rules") is mandatory for smooth operation.

A more complete enumeration of the (de-identified) questionnaire results is provided in Appendix D.

Alternate Care Facility Selection Tool

The original version of the ACF selection tool was developed under an earlier AHRQ contract in 2004.[1] That tool is a simple spreadsheet with the potential site specific factors listed on the vertical axis and the different potential sites listed on the horizontal axis. Each factor is scored on a scale of 0 to 5 for each site representing how closely each factor at the site in question approximates that of a hospital. These values were then summed for each site. Since the release of the initial site selection tool, many States and communities have used the tool as a starting point for ACF site selection including California, Illinois, Florida and Washington with several additions and improvements.

Based on responses to the questionnaire as well as information provided from several States, no deletions of ACF factors were made in the new facility selection tool and several additions were made. The new tool is offered in both an Excel version and a Web-based version. The tool was reformatted for the inclusion of general demographic information for each potential facility and better visual grouping of the evaluation factors in the five categories of site infrastructure, total space and layout, utilities, communication, and other services (Figure 1 shows the Web version of this page.). The factor rating system was also simplified to a three-level scoring range in which 0=factor not present, 1=factor not present but easily provided for, and 2=factor present. For certain types of disasters, for certain populations or in certain situations, some factors are not necessary while others may be of extreme importance. To address this issue, a factor "Necessity Level" was established to indicate the importance of the factor in the evaluation of a candidate site for a specific incident or specific use. The Necessity Level can be a value from 0 to 5, with 5 being the highest/most important and 0 being not necessary. In this schema, a value of 3 could represent a factor that is desired but not absolutely required. For each factor evaluated, the selection tool produces a product of the rating value and the Necessity Level resulting in a weighted score that can be a value from 0 to 10. These weighted scores are then totaled for each category and for the facility overall. A 'Site Summary' section provides an automatically generated facility evaluation summary which allows easy comparison of the summary data for however many potential facilities the user has entered (Figure 2 shows the Web version of the summary). Step-by-step user instructions for the tool are at the "Instructions" tab on the tool.

Figure 1 – Facility Selection Tool for a Single Potential ACF (Web version)

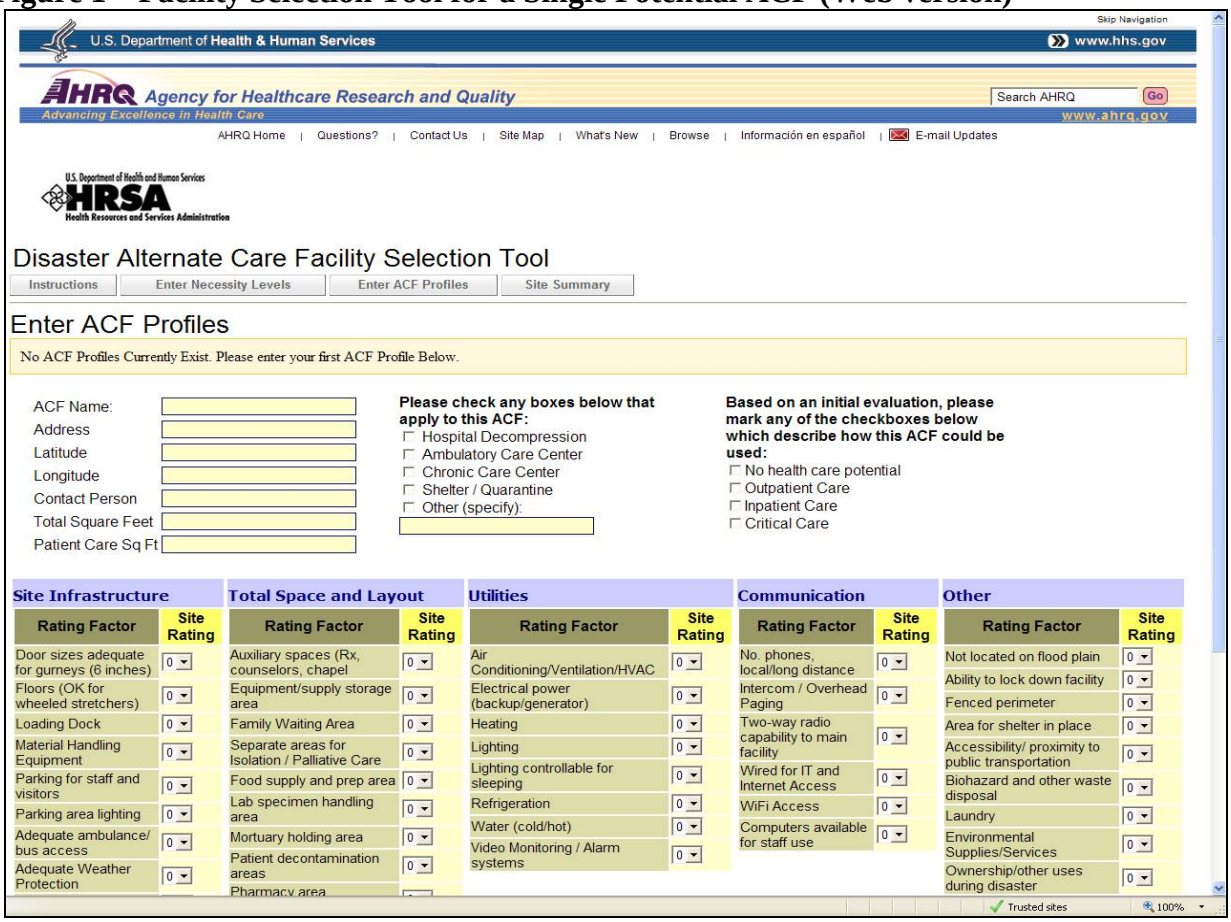
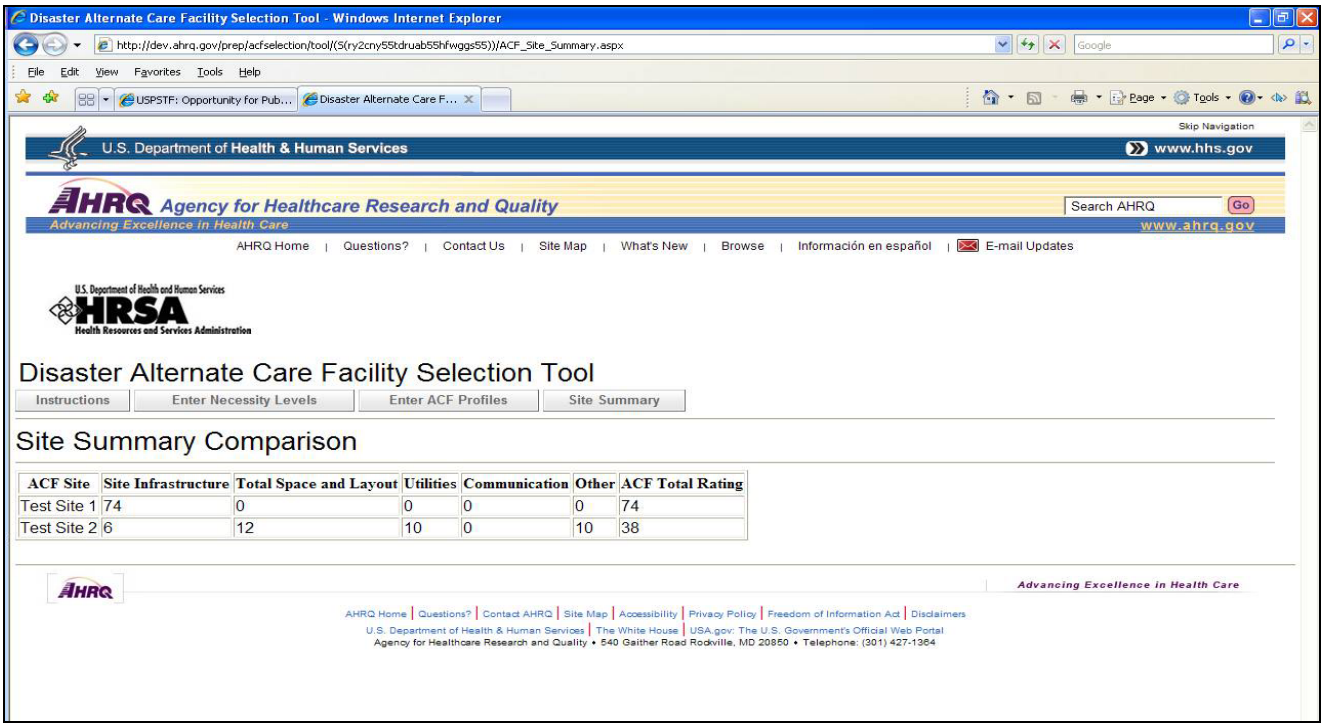


Figure 2: Site Summary Comparison (Web Version)



Alternate Care Facility Operations Template

A major aspect of successful operation of an ACF is the preparation and use of an operations guide (referred to as a "concept of operations" or "ConOps"). Each implementation of an ACF is unique and dependent on the population served, the nature of the disaster, the duration of operation, and other factors. Thus, it is not possible to provide a "one-size-fits-all" operations guide; however, we have attempted to develop a template for such a document, which is provided below. This template should be altered during the planning phase to reflect local variables and the planned use of the ACF.

Introduction

A catastrophic man-made or natural event that produces a large number of ill or injured victims could cause a deficit in the bed capacity of health care facilities and organizations. In order to meet the surge of patients and provide for the medical care needed in such an event, emergency preparedness and response authorities, including hospitals and health care organizations, must develop response capabilities that include the development, implementation, and operation of ACFs that will augment the existing health care delivery services. This section serves as an initial template for the description and operation of such a facility.

ACF Concept Overview

An ACF is a temporary health care delivery site that usually is set up either in a non-traditional patient care location within a health care organization or in an existing structure ("building of opportunity") that may or may not be directly on the campus of existing health care facilities, that has adequate utilities or where adequate utilities can be provided, and that serves to either augment existing health care services that have been overwhelmed with a surge of patients or to replace health care delivery facilities that have been damaged or destroyed in the incident.

An ACF can help provide a focused, timely medical response to a mass casualty catastrophe by expanding the surge capabilities and assets of local health care providers and agencies. When integrated with acute care and public health preparedness, the ACF can aid in mitigating the effects of a mass casualty event by easing the patient burden on local medical facilities, enhancing the capability to provide quarantine, caring for large numbers of low acuity patients, and relieving the medical care infrastructure so it can focus care on more critical patient medical needs.

Assumptions

A number of basic assumptions can be made in the event of a mass casualty event:

- A large-scale natural or man-made disaster or attack is likely to produce casualty numbers that overwhelm routine medical response resources.
- Surge bed capacity in hospitals is limited.
- Hospital resources will need to be redirected to care for the more seriously ill
- Assistance from outside of the impacted area, if available, may be needed to care for lower acuity patients.

- A system to rapidly expand health care delivery services is necessary to treat a large affected population.
- This expanded health care delivery system is developed and used in conjunction with local emergency management, emergency medical services, and public health agencies.

ACF Basic Functions

The ACF may serve any one of several health care delivery functions during a mass casualty event, including provision of:

- Bed capacity and surge relief by offering non-acute (ward) inpatient services to allow for decompression of existing hospitals or to augment in-patient ward care capacity.
- Primary medical care and behavioral/mental health services for persons and residents with pre-existing chronic diseases who, as a result of the event, are unable to access their routine sources of health care, including supportive care for family members and pets.
- Primary medical care and behavioral/mental health services for displaced or sheltered special needs persons with chronic diseases, limited mobility, or other impairments making them unqualified for general population shelters, including supportive care for family members and pets.
- Pre-hospital evaluation and triage services to determine the need for hospital care.
- Evaluation and support to isolation and quarantine operations.
- Provide a site for mass immunization and prophylaxis and point of dispensing services for mass medication distribution.
- Bed capacity and surge relief by offering acute, intensive care level services to allow for decompression or existing hospitals or to augment in-patient intensive care unit capacity.
- Community outreach to, and assessment of, affected populations.

Description of an ACF

Mission

An ACF will provide health and medical care to those patients who have medical, behavioral/mental health, or other health-related needs that cannot be accommodated or provided for with the existing medical care capabilities or in the general shelter population. An ACF is designed to provide health and medical care for patients with needs such as:

- Conditions that require observation, assessment, or maintenance;
- Chronic conditions that require assistance with the activities of daily living and do not require hospitalization;
- Medications and vital sign monitoring that cannot be provided at home; and
- Conditions that require the level of care provided by the ACF.

An ACF is not, in most cases, a substitute for an acute care hospital or emergency department.

Scope of Care

Non-Critical Care Capability. The ACF can be used to assist in providing bed capacity for hospital relief and may offer non-ambulatory care, ambulatory care, inpatient ward-level care,

outpatient care, or some combination thereof. The staffing, supplies and equipment of an ACS result in a limited scope of care for hospital relief. The scope of care includes:

- nursing care for stabilized internal medicine, trauma, orthopedic, and obstetric patients;
- medical workups and examinations required during recovery or preoperative cases;
- nursing care for special needs patients;
- administration of treatments;
- administration of vaccines or other countermeasures; and
- preparation for transport for patients who require transfer to hospitals.

The ACF does not provide surgical or intensive/critical care. If provided, the equipment and supplies may allow for resuscitative intervention if needed in individual cases.

Intensive Care Capability. The ACF may be used to assist in providing acute or intensive care level of services for hospital relief. The staffing, supplies, and equipment of an ACS must be appropriately increased to provide such intensity of care. In rare instances when staffing, supplies, and infrastructure permit, the ACF may be configured to provide surgical intervention. The scope of care for such a configuration includes:

- Administration of intravenous medications and drips;
- Cardiac monitoring; and
- Ventilator support.

Quarantine Capability. The ACF may provide support to quarantine operations with the capability to evaluate and hold persons suspected of being either exposed to or affected by a quarantine disease. The ACF, when located in an appropriate building of opportunity, equipped with staff, and provided with service support facilities enables:

- Holding and segregation of persons;
- Taking of biological samples for submission to local, State or Federal laboratories;
- Short-term isolation of patients pending transfer to a hospital isolation ward;
- Personal respiratory protection to ACF staff and quarantine subjects;
- Vaccination or administration of other countermeasures; health communications;
- Security and safety of subjects and staff;
- Reasonable comfort of subjects;
- Containment and security of luggage while in quarantine, with reasonable owner access.

Since the ACF's capability is finite and relatively small in terms of numbers of beds, its utility in a large-scale pandemic response would be limited.

Staffing Framework

Personnel Requirements

Enormous numbers of patients seeking treatment during a disaster will cause hospitals to fill to capacity. Available staff will be fully engaged. Planning efforts for implementing an ACF will need to specify where additional staff may be obtained for ACF staffing. An affected community may not have the staffing resources to activate an ACF independently, so staffing may have to come from outside the affected area. The staffing plan needs to identify projected health and medical staffing shortfalls.

ACF Staff Skill Mix

The ACF is staffed to maximize the use of limited staffing resources, not only to provide for an expected large quantity of patients, but also to ensure sustainability while providing the highest quality care possible given the limited resources. The staff skill mix should be appropriate to serve patients admitted to the ACF facility within the scope of care planned for the ACF. The issue of personnel requirement and staff skill mix are discussed in further detail elsewhere in this report.

ACF Staff Activation

ACF staff members will, in most cases, be activated by the agency or organization responsible for implementation of the ACF. Ideally, notification of staff will be accomplished by contacting each team member via cell phone, work phone, home phone, or e-mail to provide activation information or by using other agency-specific internal procedures to activate the team. On activation, ACF staff members should report to the specified location for assignment.

Risk Analysis

All ACF staff activities involve variables and unknowns which may have a substantial impact on the health and welfare of staff members. These potential risks require frequent identification, assessment, analysis, and planning to minimize their impact. Risks should be assessed based on the likelihood of occurrence and potential severity. A mitigation plan for each risk should be developed to reduce the likelihood or severity of each risk.

ACF Command and Control

Overview

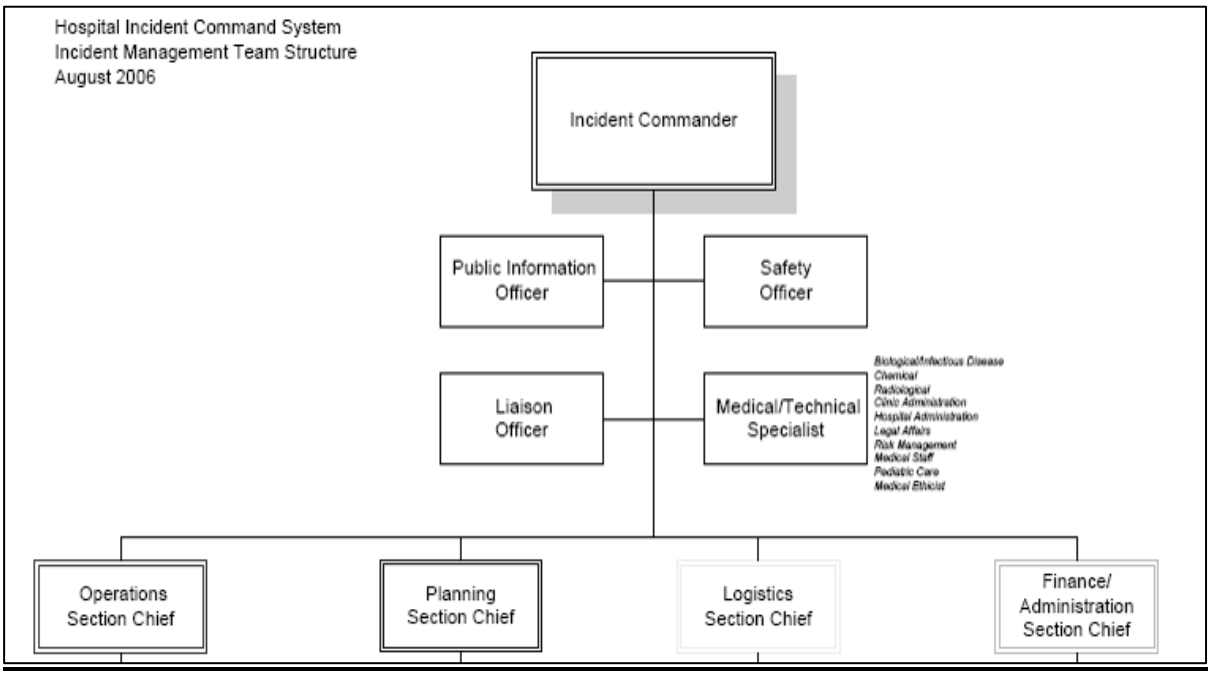
Homeland Security Presidential Directive-5 (HSPD-5) provides a National Incident Management System (NIMS) through which all incident response agencies and assets are to be integrated and coordinated.

Operating under NIMS principles, each ACF will be integrated into the Incident Command System (ICS) structure implemented in the local community for response to the incident.

Internally, each ACF will follow an ICS structure for a public health or medical emergency and provide necessary operations as stated in the incident action plans (IAPs) for the specific event. The Hospital Incident Command System (HICS) provides a template for applying the Incident Command System to the health care setting at. http://www.hicscenter.org/pages/index.php.

Each ACF using HICS is organized into an ICS structure that includes command staff with public information, safety, and liaison officers; general staff assigned to operations, planning, logistics, and finance/administration sections; and a medical technical specialist as needed.

Figure 3. Command Staff and General Staff



Details of the General Staff positions are given in Figures 4-7, below.

All ICS positions describe functional considerations that may be needed during a particular event or incident. These positions do not necessarily require that one individual be assigned to each functional role. An individual may be assigned to and perform one or more of these functional roles. The decision about how many functional roles an individual may perform will be based on the magnitude of the event and the performance demands on that person. In the case of small incidents, one person may be able to perform multiple functions. In the case of large events, it is likely that a separate individual will have to be assigned to each specific functional role.

Consistent with the ICS, each staff position should receive a job action sheet (JAS), which is a simple checklist that describes the role, responsibility, and reporting structure of each position within the ICS structure. These forms should be prepared in advance of the incident for rapid distribution to participating staff on their arrival to the ACF. HICS job action sheets that can be downloaded and modified for use in an ACF are available at: http://www.hicscenter.org/pages/index.php. Detailed information and training programs for HICS can be found at the same address.

Command Staff

The Incident Commander (Figure 3) is responsible for oversight of the entire response to the incident. This individual will determine the response priorities for the IAP.

The Safety Officer will monitor safety conditions and develop measures for assuring the safety of all team personnel and any ACF patients.

The Incident Commander or Safety Officer may halt operations at any time based on a safety or security risk.

Security is critically important to assure the safety of both staff and patients. The type and number of security personnel will depend on the situation.

The Liaison Officer's role is to serve as the point of contact between the Incident Commander and various agencies and groups assisting in the response. The Liaison Officer's responsibilities include the following:

- Serving as a point of contact for any agency representatives supporting the incident.
- Briefing incoming agencies and answer any questions they may have about the operation.
- Responding to requests from incident personnel for interorganizational contacts.
- Monitoring incident operations for current or potential interorganizational problems.
- Participating in planning meetings to provide the current resource status, limitations, and capabilities of other agency resources.

The Public Information Officer's role is to develop and release information about the incident to the news media, incident personnel, and other appropriate agencies and organizations. The Public Information Officer's responsibilities include the following:

- Advising the Incident Commander on issues related to information sharing and media relations.
- Serving as the primary contact for anyone needing information about the incident and the response.
- Serving the interests of both an external audience (through the media) and an internal audience (incident staff and agency personnel).
- Coordinating with other public information staff to ensure that confusing or conflicting information is not released.
- Obtaining information from the Planning Section, which is responsible for gathering intelligence and other information pertinent to the incident.
- Providing information to the community, the media, and others, and then share that information with the Planning Section Chief and the Incident Commander.

The Medical/Technical Specialist role is dictated by the needs of the specific incident and is meant to provide expert advice to the Incident Commander about issues that require technical expertise. For example, an incident involving a biologic agent might require the involvement of an infectious disease or public health specialist whereas a cyber attack incident would require an information technology expert.

General Staff

The Operations Section (Figure 4) conducts tactical medical operations to carry out the IAP. Activities will include basic medical services, behavioral/mental health support, ancillary medical services and preventive medicine. The Operations Section is responsible for the following:

- Developing and managing the Operations Section to accomplish the incident objectives and strategies set by the Incident Commander;
- Developing and implementing tactics to achieve the incident objectives, including organizing, assigning, and supervising all of the resources assigned to an incident;

- Working closely with other members of the Command and General Staff to coordinate tactical activities;
- Working with the Planning Section Chief and the Safety Officer to develop the Operational Planning Worksheet, and Incident Safety Analysis portions of the IAP; and
- Assuring the health and well-being of the ACF staff and the affected population following a medical crisis.

The Operations Section includes the following functional Branches: Staging Manager, Medical Care, Infrastructure, HazMat, Security, and Business Continuity. Each branch may have one or more units activated (as described in the HICS Guidebook, referenced above) based on the nature of the event and the type of ACF. The Medical Care Branch will typically be the focal point of the Operations Section.

The Planning Section (Figure 5) prepares and documents the IAP by collecting and evaluating information and maintaining resource status and documentation for incident records. The Planning Section (Figure 3) is organized according to ICS principles into the following units: Resources, Situation, Documentation, and Demobilization. A full description of this section can be found in the HICS Guidebook..

The Logistics Section (Figure 6) provides support, resources, and other services, including personnel, needed to meet operational objectives. The Logistics Section is is organized according to ICS principles and divided into the Service and Support Branches. The Service Branch includes the following units: Communications, Information Technology/Information Services, and Staff Food and Water. The Support Branch includes the following Units: Employee Health and Well-Being, Family Care, Supply, Facilities, Transportation, and Labor Pool and Credentialing. These branches are further described in the HICS Guidebook.

The Finance/Administration Section (Figure 7) provides time recording, procurement, accounting, and cost analysis. Within these units, functions such as team member and patient tracking, award processing and management, medical records management, and other administrative tasks may be carried out. The Finance/Administration Section works in conjunction with the Logistics Section to monitor costs incurred.

Figure 4. Operations Section

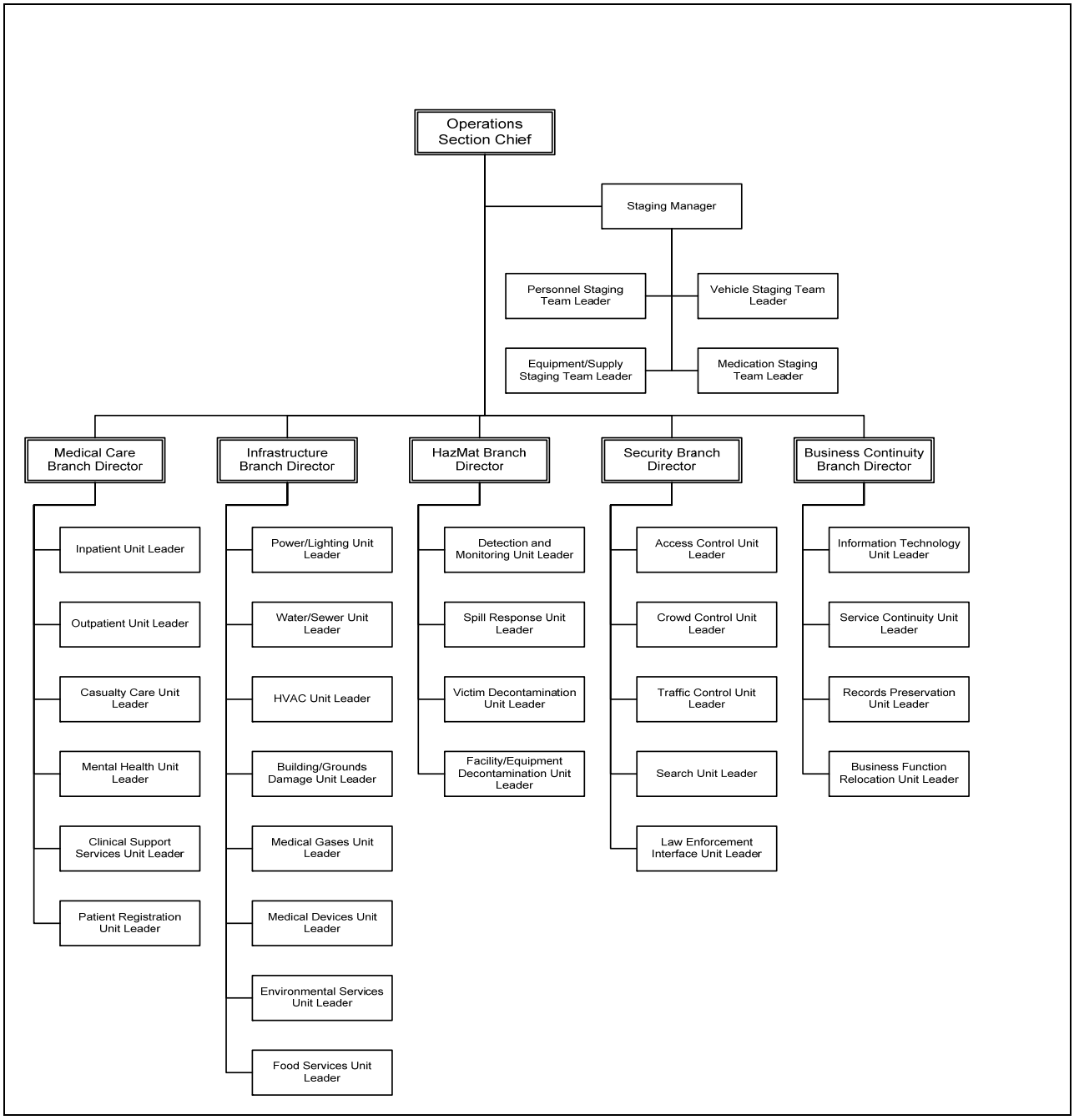


Figure 5. Planning Section

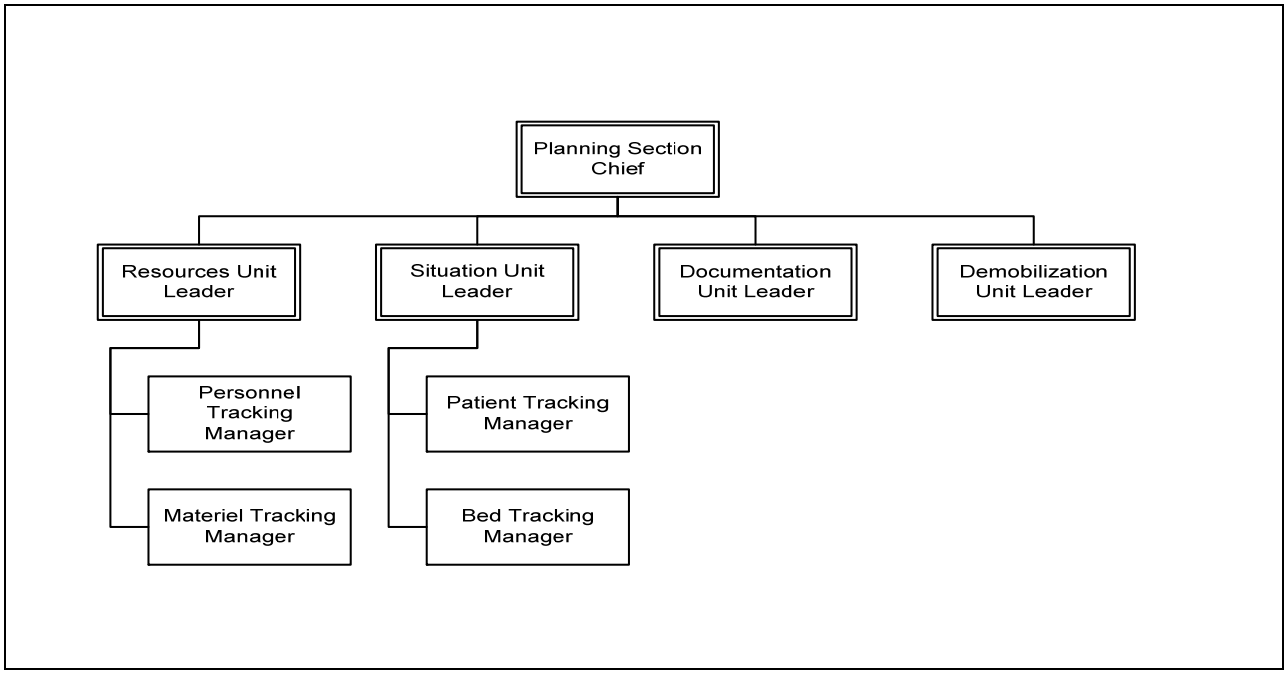


Figure 6. Logistics Section

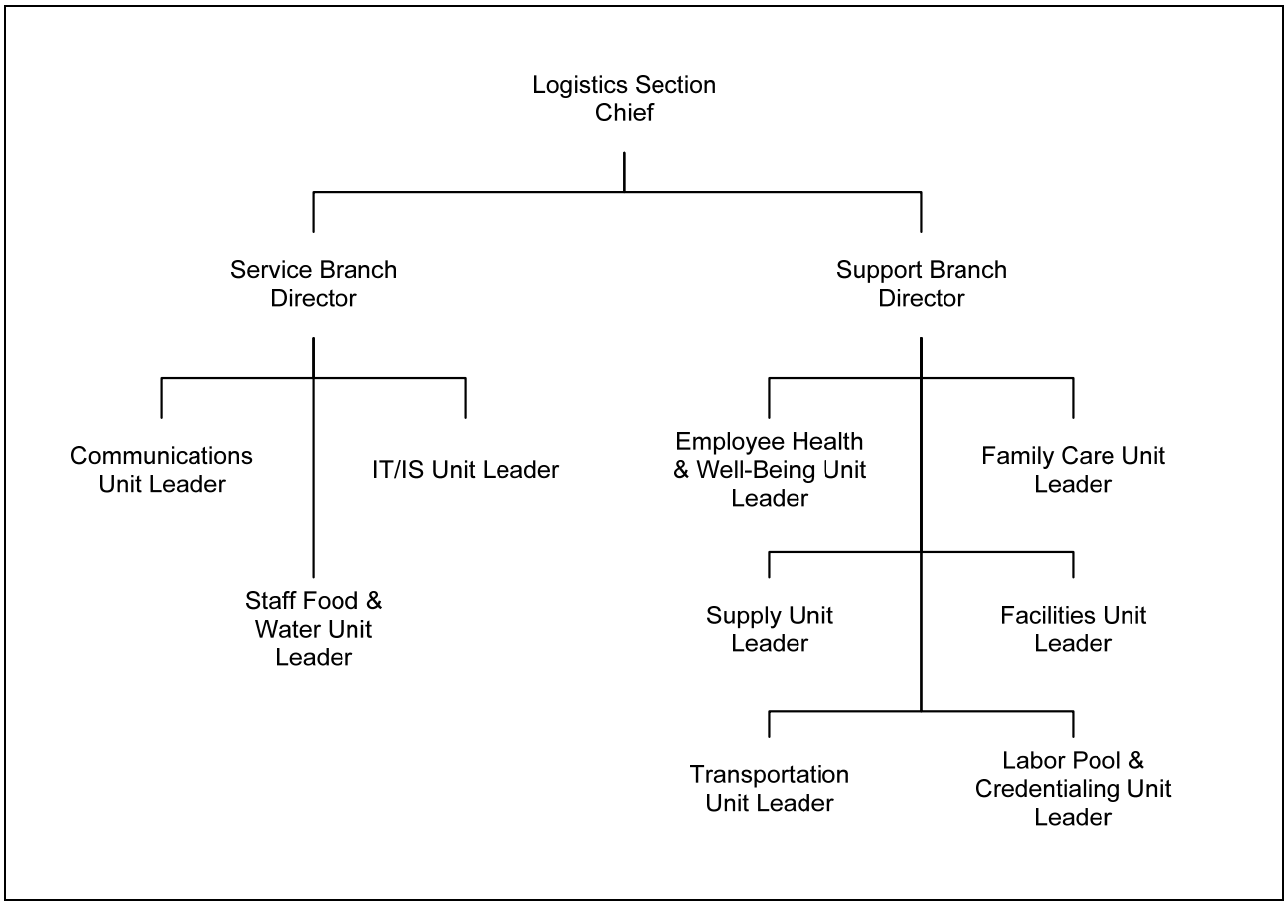
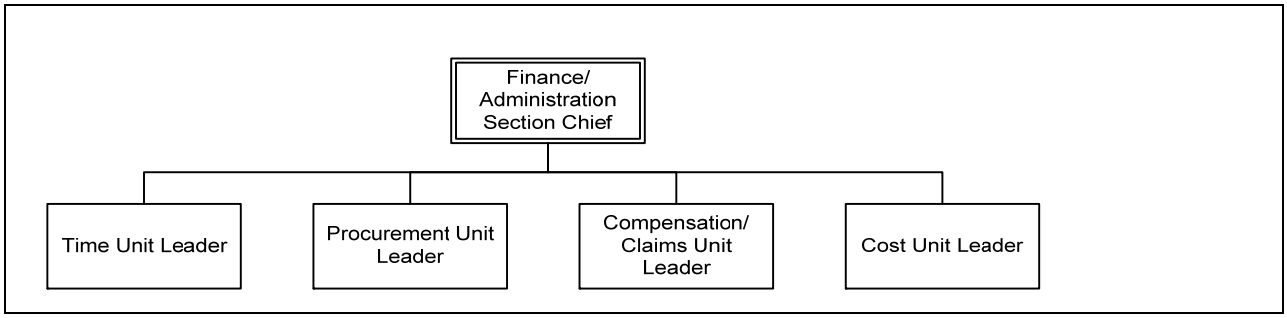


Figure 7. Finance Section



ACF Facility Selection

Selection Criteria

Health care agencies and facilities, in coordination with State and local officials, will locate and determine the suitability of an existing facility that can be used to support an ACF, consistent with its intended purpose for specific incidents. Pre-identification of possible ACFs should be included in emergency medical plans. The identified existing structure should be as close as practical to a supporting hospital for ease of transferring patients and sharing resources such as laboratories and diagnostic capabilities. Facilities that may be suitable for use as an ACF include National Guard armories, college campuses, gymnasiums, schools, convention centers, hotel conference rooms, health clubs, community centers, and climate-controlled warehouses.

Infrastructure Requirements

- Climate controlled enclosed space
- Perimeter security
- Wwaste removal (to include biomedical waste)
- Electrical power source and distribution
- Potable water
- Ice
- Ffork lift for off-loading/set-up
- Local transportation
- Latrines/showers for staff and patients

Additional Requirements for Each Facility

- Communications support
- Food service for staff and patients
- Medical oxygen
- Laundry services
- Mortuary support
- Refrigeration

The Agency for Healthcare Research and Quality (AHRQ) funded an initial site selection tool to assist planners in choosing the most appropriate available structure in which to place an ACF (http://www.ahrq.gov/research/altsites.htm). This tool has since been updated and revised to reflect experiences of ACF implementation since the original publication and is being published in conjunction with this report. The new Disaster Alternate Care Facility Selection Tool is available on the AHRQ Web site at www.ahrq.gov/prep.

ACF Operations and Logistics

Decision to Open

The need to open an ACF is normally made as a coordinated decision with health care provider organizations and local and State Government representatives.

The person responsible for making the decision to open an ACF should be identified as part of the planning process. The person may be a hospital administrator or chief executive officer if the ACF is opened by a health care organization, the local or regional public health director, or the designated emergency manager. Once the decision to open an ACF is made, the capabilities and capacity of the ACF must be described. In coordination with hospitals, State and local officials will determine site location, suitability of an existing facility, and the day-to-day operations of the ACF, consistent with its intended purpose for the specific incident.

Supplies and Equipment

The initial supplies and equipment will come from pre-positioned materiel delivered to the ACF from local or State caches or from participating hospitals. A medical resupply system to continue operations for prolonged periods of time must be established.

Generally, all medical and surgical supplies should be stored in a secure, climate-controlled area in close proximity to the patient treatment area.

Most pharmaceuticals are labeled with storage temperatures. The United States Pharmacopeia (USP) defines the various temperatures as:

- Controlled Room Temperatures: 59-86° F or 15-30° C.
- Refrigerator: 36-46° F, or 2-8° C.
- Freezer: 32° F and lower or 0° C and lower.

Pharmaceuticals that are stored at other than USP standard temperatures, are considered to be "adulterated" and therefore unfit for human use.

Communications

Internal Communications. Mechanisms for internal communication between ACF functional areas and associated staff must be determined. In many cases portable two-way radios may be available and used.

External Communications. When normal communications are not disrupted and the ACF facility is equipped with phone service, the primary means of communication will be via existing phone lines. The ACF may also be equipped with portable radios, which augment external communications with ambulance transports and support services and serve as the primary option for backup external communications when normal communications are disrupted. Options for alternate backup communications include satellite phones, Internet connections, and fax

machines, along with disconnected or wireless methods of communication such as pagers, Blackberries, personal digital assistants, and cellular telephones. Ideally, a standardized electronic information system is employed at the State, local, or regional level that supports clinical management, patient tracking, and command and control.

Operational Support

The ACF requires the following external support services:

- **Refrigeration.** Onsite refrigeration should be provided or there should be an adequate electrical supply to handle the demand of temporary refrigeration containers, which can be leased.
- **Waste disposal.** Waste removal should be available, but if not available during the disaster, planners should have arrangements already in place to haul waste products, including biological hazardous waste, away from the site.
- **Laundry.** Laundry service needs may be minimized through the use of disposable supplies, except for the blankets, sheets, and pillowcases. Laundry capability should be available at the facility. If laundry support is not available, planners must arrange a contingency contract for this service.
- **Food.** Planners should arrange for food support.
- **Security.** Security plans should be in place prior to activation of the ACF.
- **Water.** Basic daily water support, such as showers, toilets, and sinks, should be available. If water is available for hand washing, basins should be available in every patient care area in readily accessible locations at a ratio of 1 to every 10–25 beds, depending on layout of the facility. Waterless, alcohol-based hand cleaners can also be used in lieu of the basin setup. Although the structure's water supply could be purified by chemical means, bottled water is more convenient and palatable for daily drinking.
- **Transportation**. Transport for both ambulatory and non-ambulatory patients to and from the associated hospital will be necessary.
- **Fuel.** Fuel may be needed for external power generation systems.
- **Latrines and showers.** Latrine and shower availability depends on the specific selection and use of the ACF building.
- **Mortuary.** The ACF may be required to manage human remains during a catastrophic event.

Security

Physical security of the ACF staff, equipment and the facility is essential. Physical security points include the following:

- Entry and exit points to the area (e.g., the city block), if practicable.
- Access and egress to the building.
- High-risk or high-value areas within the building, such as the temporary morgue and pharmacy.

Patient Management

Based on the predetermined role of the ACF, patients will arrive either by private transportation or by ambulance. A reception area for initial evaluation and registration should be in place and easily accessible for arriving patients.

A medical record system must be planned for and put in place on activation of the ACF. Every patient encounter should be documented using the medical record system planned for the ACF.

Preprinted order sheets and care plans will facilitate the management of patients, consistent with the planned role of the ACF. A system for tracking patient location within the ACF or disposition after completion of treatment at the ACF must be put in place.

Family Management and Support

Consideration for housing patient family members and potentially their pets must be part of the operational plan. Rules and regulations for the operation of the facility ("house rules") must be put into place and include number of visitors, noise management, "lights out," weapons rules, rules about drug or alcohol use.

Staff Management and Support

Ideally, private space for staff should be available to include incident briefing and medical report areas as well as eating, sleeping, toilet, showering, and rest facilities apart from the general patient population.

Demobilization

A strategy for demobilization of the ACF should be developed at the time of mobilization. Criteria for making the determination that the ACF is no longer necessary should be determined in advance.

Facility Operations Template Glossary

Finance/Administration: The Section responsible for all incident costs and financial considerations. Includes the Time Unit, Procurement Unit, Compensation/Claims Unit, and Cost Unit.

Base: The location at which primary logistics functions for an incident are coordinated and administered. There is only one base per incident. (Incident name or other designator will be added to the term base.) The Incident Command Post may be collocated with the base.

Branch: The organizational level having functional or geographic responsibility for major parts of the Operations or Logistics functions. The Branch level is organizationally between Section and Division/Group in the Operations Section and between Section and Units in the Logistics Section. Branches are identified by functional name (e.g., medical, security).

Cache: A pre-determined complement of tools, equipment, and/or supplies stored in a designated location, available for incident use.

Camp: A geographical site, within the general incident area separate from the Incident Base, equipped and staffed to provide sleeping, food, water, and sanitary services to incident personnel.

Chain of Command: A series of management positions in order of authority.

Check-In: The process whereby resources first report to an incident. Check-in locations include: Incident Command Post (Resources Unit), Incident Base, Camps, Staging Areas, Helibases, Helispots, and Division Supervisors (for direct line assignments).

Chief: The ICS title for individuals responsible for functional sections: Operations, Planning, Logistics, and Finance/Administration.

Command: The act of directing and/or controlling resources by virtue of explicit legal, agency, or delegated authority. May also refer to the Incident or Team Commander.

Command Post: See Incident Command Post.

Command Staff: The Command Staff consists of the Public Information Officer, Safety Officer, Liaison Officer, Deputy Incident or Team Commander, and Medical Technical Specialist as needed. They report directly to the Incident or Team Commander. They may have assistants as needed.

Communications Unit: An organizational Unit in the Logistics Section responsible for providing communication services at an incident. A Communications Unit may also be a facility (e.g., a trailer or mobile van) used to provide the major part of an Incident Communications Center.

Delegation of Authority: A statement provided to the Incident Commander by the agency executive delegating authority and assigning responsibility. The Delegation of Authority can include objectives, priorities, expectations, constraints, and other considerations or guidelines as needed. Many agencies require written Delegation of Authority to be given to Incident Commanders prior to their assuming command on larger incidents.

Demobilization Unit: A functional unit within the Planning Section responsible for assuring orderly, safe, and efficient demobilization of incident resources.

Deputy: A fully qualified individual who, in the absence of a superior, could be delegated the authority to manage a functional operation or perform a specific task. In some cases, a Deputy could act as relief for a superior and therefore must be fully qualified in the position. Deputies can be assigned to the Team Commander, General Staff, and Branch Directors.

Director: The ICS title for individuals responsible for supervision of a Branch.

Division: Divisions are used to divide an incident into geographical areas of operation. A Division is located within the ICS organization between the Branch and the Task Force/Strike Team. (See Group.) Divisions are identified by alphabetic characters for horizontal applications and, often, by floor numbers when used in buildings.

Documentation Unit: A functional unit within the Planning Section responsible for collecting, recording, and safeguarding all documents relevant to the incident.

Emergency: Absent a Presidential declared emergency, any incident(s), human-caused or natural, that requires responsive action to protect life or property. Under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, an emergency means any occasion or instance for which, in the determination of the President, Federal assistance is needed to supplement State and local efforts and capabilities to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe in any part of the United States.

Emergency Operations Centers (EOCs): The physical location at which the coordination of information and resources to support domestic incident management activities normally takes place. An EOC may be a temporary facility or may be located in a more central or permanently established facility, perhaps at a higher level of organization within a jurisdiction. EOCs may be organized by major functional disciplines (e.g., fire, law enforcement, and medical services), by jurisdiction (e.g., Federal, State, regional, county, city, tribal), or some combination thereof.

Emergency Operations Plan (EOP): The plan that each jurisdiction has and maintains for responding to appropriate hazards.

Event: A planned, non-emergency activity. ICS can be used as the management system for a wide range of events (e.g., parades, concerts, or sporting events).

Facilities Unit: A functional unit within the Support Branch of the Logistics Section that provides fixed facilities for the incident. These facilities may include the Incident Base, feeding areas, sleeping areas, and sanitary facilities.

Federal: Of or pertaining to the Federal Government of the United States of America.

Function: Function refers to the five major activities in ICS: Command, Operations, Planning, Logistics, and Finance/Administration. The term function is also used when describing the activity involved (e.g., the planning function). A sixth function, Intelligence, may be established, if required, to meet incident management needs.

General Staff: A group of incident management personnel organized according to function and reporting to the Incident Commander. The General Staff normally consists of the Operations Section Chief, Planning Section Chief, Logistics Section Chief, and Finance/Administration Section Chief.

Ground Support Unit: A functional unit within the Support Branch of the Logistics Section responsible for the fueling, maintaining, and repairing of vehicles and the transportation of personnel and supplies.

Group: Groups are established to divide the incident into functional areas of operation. Groups are composed of resources assembled to perform a special function not necessarily within a single geographic division. (See Division.) Groups are located between Branches (when activated) and Resources in the Operations Section.

Incident: An occurrence or event, natural or human-caused, that requires an emergency response to protect life or property. Incidents can, for example, include major disasters, emergencies,

terrorist attacks, terrorist threats, wildland and urban fires, floods, hazardous materials spills, nuclear accidents, aircraft accidents, earthquakes, hurricanes, tornadoes, tropical storms, war-related disasters, public health and medical emergencies, and other occurrences requiring an emergency response.

Incident Action Plan (IAP): An oral or written plan containing general objectives reflecting the overall strategy for managing an incident. It may include the identification of operational resources and assignments. It may also include attachments that provide direction and important information for management of the incident during one or more operational periods.

Incident Base: Location at the incident where the primary Logistics functions are coordinated and administered. (Incident name or other designator will be added to the term Base.) The Incident Command Post may be collocated with the Base. There is only one Base per incident.

Incident Commander (IC): The individual responsible for all incident activities, including the development of strategies and tactics and ordering and the release of resources. The IC has overall authority and responsibility for conducting incident operations and is responsible for the management of all incident operations at the incident site.

Incident Command Post (ICP): The field location at which the primary tactical-level, on-scene incident command functions are performed. The ICP may be collocated with the incident base or other incident facilities and is normally identified by a green rotating or flashing light.

Incident Command System (ICS): A standardized on-scene emergency management construct specifically designed to provide for the adoption of an integrated organizational structure that reflects the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries. ICS is the combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, designed to aid in the management of resources during incidents. It is used for all kinds of emergencies and is applicable to small as well as large and complex incidents. ICS is used by various jurisdictions and functional agencies, both public and private, to organize field-level incident management operations.

Incident Objectives: Statements of guidance and direction necessary for the selection of appropriate strategies and tactical direction of resources. Incident objectives are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed. Incident objectives must be achievable and measurable, yet flexible enough to allow for strategic and tactical alternatives.

Intelligence Officer: The Intelligence Officer is responsible for managing internal information, intelligence, and operational security requirements supporting incident management activities. These may include information security and operational security activities, as well as the complex task of ensuring that sensitive information of all types (e.g., classified information, law enforcement sensitive information, proprietary information, or export-controlled information) is handled in a way that not only safeguards the information, but also ensures that it gets to those who need access to it to perform their missions effectively and safely.

Liaison Officer: A member of the Command Staff responsible for coordinating with representatives from cooperating and assisting agencies. The Liaison Officer may have assistants.

Logistics: Providing resources and other services to support incident management.

Logistics Section: The Section responsible for providing facilities, services, and materials for the incident.

Mitigation: The activities designed to reduce or eliminate risks to people or property or to lessen the actual or potential effects or consequences of an incident. Mitigation measures may be implemented prior to, during, or after an incident. Mitigation measures are often informed by lessons learned from prior incidents. Mitigation involves ongoing actions to reduce exposure to, probability of, or potential loss from hazards. Measures may include zoning and building codes, floodplain buyouts, and analysis of hazard- related data to determine where it is safe to build or locate temporary facilities. Mitigation can include efforts to educate governments, businesses, and the public on measures they can take to reduce loss and injury.

Mobilization: The process and procedures used by all organizations (Federal, State, and local) for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

Mobilization Center: An off-incident location at which emergency service personnel and equipment are temporarily located pending assignment, release, or reassignment.

National Incident Management System (NIMS): A system mandated by HSPD-5 that provides a consistent nationwide approach for Federal, State, local, and tribal governments; the private sector; and nongovernmental organizations to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. To provide for interoperability and compatibility among Federal, State, local, and tribal capabilities, the NIMS includes a core set of concepts, principles, and terminology. HSPD-5 identifies these as the ICS; multi-agency coordination systems; training; identification and management of resources (including systems for classifying types of resources); qualification and certification; and the collection, tracking, and reporting of incident information and incident resources.

National Response Framework: A plan mandated by HSPD-5 that integrates Federal domestic prevention, preparedness, response, and recovery plans into one all-discipline, all-hazards plan.

Officer: The ICS title for the personnel responsible for the Command Staff positions of Safety, Liaison, and Public Information.

Operations Section: The section responsible for all tactical operations at the incident. Includes Medical Care, Infrastructure, HazMat, Security and Business Continuity Branches as well as Staging Area, Task Forces, Strike Teams and Single Resources.

Planning Section: Responsible for the collection, evaluation, and dissemination of information related to the incident, and for the preparation and documentation of the Incident Action Plan. The section also maintains information on the current and forecasted situation and on the status

of resources assigned to the incident. Includes the Resources, Situation, Documentation, and Demobilization Units.

Procurement Unit: functional unit within the Finance/Administration Section responsible for financial matters involving vendor contracts.

Public Information Officer: A member of the Command Staff responsible for interfacing with the public and media or with other agencies with incident-related information requirements.

Resources Unit: A functional unit within the Planning Section responsible for recording the status of resources committed to the incident. The Unit also evaluates resources currently committed to the incident, the impact that additional responding resources will have on the incident, and anticipated resource needs.

Safety Officer: A member of the Command Staff responsible for monitoring and assessing safety hazards or unsafe situations and for developing measures for ensuring personnel safety. The Safety Officer may have assistants.

Section: The organizational level having responsibility for a major functional area of incident management, such as Operations, Planning, Logistics, Finance/Administration, and Intelligence (if established). The Section is organizationally situated between the Branch and the Incident Command.

Service Branch: A Branch within the Logistics Section responsible for service activities at the incident. Includes the Communications, Information Technology/Information Services and Staff Food and Water Units.

Situation Unit: A functional unit within the Planning Section responsible for the collection, organization, and analysis of incident status information and for analysis of the situation as it progresses. Includes the Patient Tracking and Bed Tracking Managers and reports to the Planning Section Chief.

Staff Food and Water Unit: A functional unit within the Service Branch of the Logistics Section responsible for providing meals for incident personnel.

Staging Area: Location established where resources can be placed while awaiting a tactical assignment. The Operations Section manages Staging Areas.

Supply Unit: A functional unit within the Support Branch of the Logistics Section responsible for ordering equipment and supplies required for incident operations.

Support Branch: A Branch within the Logistics Section responsible for providing personnel, equipment, and supplies to support incident operations. Includes the Employee Health and Well-Being, Family Care, Supply, Facilities, Transportation, and Labor Pool and Credentialing Units.

Technical Specialists: Personnel with special skills that can be used anywhere within the ICS organization.

Unit: The organizational element having functional responsibility for a specific incident Operations, Planning, Logistics, or Finance/Administration activity.

Staffing Recommendations

Staffing an ACF is key to its successful operation and may be one of the largest challenges, depending on the nature of the incident. A review of the literature reveals that relatively few proposals have been put forth for staffing an ACF. One important work that has been used as the basis for some surge capacity plans is the *Modular Emergency Medical System* (MEMS) and two of its components, the *Acute Care Center* (ACC) and the *Neighborhood Emergency Help Center* (NEHC).[1] MEMS was developed by the U.S. Army Soldier and Biological Chemical Command (SBCCOM) to create a concept of operations for a medical response package that could be created to increase the capacity of States and municipalities to handle a large influx of patients after a biological attack.

While MEMS was originally created to respond to bioterrorism, its principles can be applied to a variety of mass casualty scenarios. The key aspects of MEMS are:

- Integrates all local medical aspects.
- Allows a flexible and timely response through its modular design.
- Serves as a framework to support a massive medical response.
- Augments the existing medical system.
- Is consistent with the Incident Command System.

The ability to develop and deploy these two expandable patient care modules is the foundation of MEMS. Both modules have application to the current concept of an ACF. The NEHC is designed to serve as a primary triage and evaluation facility capable of screening up to 1000 patients per day. At the NEHC, patients who are potentially exposed to an infectious agent can be screened and prophylactically treated and/or immunized. At the same time, information regarding the incident can be disseminated. The NEHC has limited treatment and holding facilities, so symptomatic patients would be directed to an appropriate health care facility or ACC. The NEHC staffing protocol calls for the following level of staffing:

Position	Number
Facility Manager	1
Medical Section Operations Chief	1
Records/Planning Section Chief	1
Logistics Section Chief	1
Transportation Officer	1
Communications Officer	1
Maintenance Officer	1
Physician	3

Physician Assistant (PA)	1
Family Nurse Practitioner (NP)	1
Nurse	7
Paramedics	3
EMT	6
Clerks	14
Security Personnel	4
Housekeeping Personnel	2
Volunteers	32
TOTAL	**80**

The ACC on the other hand is a true ACF that has both treatment and patient holding capability. It is built around 50-bed subunits with staffing recommendations for the appropriate number of health care providers per subunit. The ACC model suggests the following staffing for a 12-hour shift per 50-bed subunit.

Position	Number
Physician	1
Physician Assistant (PA) or Nurse Practitioner (NP)	1
Registered nurses (RN) and/or Licensed Practical Nurses (LPN)	6
Nursing Assistants and/or Nursing Support Technicians	4
Medical Clerks (Unit Secretaries)	2
Respiratory Therapist	1
Case Manager	1
Social Worker	1
Housekeeping Personnel	2
Patient Transporters	2
TOTAL	**21**

It should be remembered, however, that the ACC was, and is, a theoretical proposal that was originally designed to respond to a biological threat but has never actually been implemented. It is not unreasonable to assume, however, that it would also have applicability to other mass casualty situations. It is also interesting to note the omission of pharmacists from both the NEHC and ACC staffing guidelines, a staffing group that has proven to be invaluable in actual operation of ACFs.

Incorporating Real World Experience

After Hurricanes Katrina and Rita struck the Gulf Coast of the United States in the fall of 2005, both the health care system and municipal infrastructure of New Orleans and adjacent coastal areas were nearly destroyed, leaving thousands of people homeless with many requiring medical care. The medical care they needed was no longer available at local health care facilities that had been incapacitated by the storms. What followed was the largest disaster response operation in American history to date. Large shelters were set up in Louisiana and surrounding States for the evacuees and numerous ACFs were created to replace the collapsed health care system. This tragic event has served as a valuable learning opportunity to study how ACFs should operate.

ACF Staffing: The Katrina and Rita Experience

Table 1 compares data points on ACF staffing as reported from eight different ACFs that operated after Hurricanes Katrina and Rita in 2005. The first three rows describe the structure and function of each ACF. The following rows show the duration of operations and give available patient census numbers. Due to the difficulty of recordkeeping in a disaster, the numbers are estimates. Also, the daily patient load varied significantly. Most patients arrived in the early days of the operation and then the numbers of patients gradually tapered off leading to decommissioning of the ACF. Respondents were not able to provide exact daily patient census numbers that would allow for a precise statistical analysis of patient volumes and staffing requirements. Instead, the total number of patients seen is documented. In some cases a daily average and peak census were given.

The remaining rows document how many of each type of health care provider were on duty at a given time. Again, there was a great deal of flux in the post-disaster environment with day-to-day variability of the exact number of providers. The respondents were asked to give a number that represents an average of how many of each type of provider were present on any given day of the ACF operation.

Table 1: Hurricanes Katrina and Rita 2005 ACF Staffing Matrix

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8
Function	Pediatric shelter support	General shelter support	Ambulatory and inpatient health care replace-ment	Ambulatory health care replace-ment	Ambulatory and surgical health care replacement	Special-needs in-patient care	Ambulatory health care replace-ment	Inpatient special-needs care
Structure	Fixed facility	Fixed facility	Fixed facility	Fixed facility	Mobile	Fixed facility	Fixed facility	Fixed facility
Inpatient Capability	Y	N	Y	N	Y	Y	N	Y
Days of Operation	13	16	NDA	NDA	10	NDA	NDA	NDA
Total Patients	>3,500	>10,000	>6,000	>20,000	7400	200	400	340
Daily Average Census	NDA	619 (+/- 301)	NDA	NDA	25-300	NDA	NDA	NDA
Peak Daily Census	400	1,125	NDA	NDA	500	NDA	NDA	NDA

Shift Length (hours)	8, 12, or 24	4,8, or 12	8 for most, 12 for nurse managers	12	12	12	NDA	8
Day/Night Staffing Difference	Y	Y	Y	N	Y	Y	NDA	Y
Total Staff	NDA	7 common staff / 1000 volunteers	"several hundred"	50	60-100	100	300 at various times; daily total not listed	200
Physicians	6	16 AM / 4 PM	25	NDA	11	4	7	2-3
Midlevel Providers (PA/NP)	Present but number not recorded	N	20	NDA	1-2	5	3	2-3
Nurses	5	20	50+	NDA	8-10	20	10	20-30
LPN/EMT	N	N	50+	NDA	8-10	NDA	1-2	10
Pharmacists	1	2/1	6+	2-3	2-3	2	1-2	1-2
Clerks/ Administrative	1	5 AM /1 PM	50+	1-2	1-2	NDA	6	20

Y=yes or present but number unknown
N=no
NDA = No Data Available
Fields that have two numbers listed in a "x/y" format indicate a difference in staffing between day & night
Due to difficulties with record keeping and in light of day-to-day variations in staffing, all numbers should be viewed as estimates.

Table 2 provides a look at the ratio of patients to providers at each site. Only Sites 1, 2, and 5 indicated how many days their site was operational. Without that data point as the denominator for all sites, the total number of patients seen per day is difficult to determine. As all surveyed sites were responding to the same overall event, the average of the number of days of operations of Sites 1, 2, and 5 (13 days) was arbitrarily applied to Sites 3,4,6,7, and 8 (grayed columns). The total number of patients was then divided by the actual or calculated number of days of operation to yield the number of patients seen per day. As previously noted, the daily census varied greatly depending on the number of days after the event.

Table 2: Ratios of Health Care Providers to Patients on a Daily Basis

	Site 1	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**
Function	Pediatric shelter support	General shelter support	Ambulatory and inpatient health care replacement	Ambulatory health care replacement	Ambulatory and surgical health care replacement	Special-needs inpatinent care	Ambulatory health care replacement	Inpatient special-needs care
Structure	Fixed facility	Fixed facility	Fixed facility	Fixed facility	Mobile	Fixed facility	Fixed facility	Fixed facility
Days of Operation	13	16	13 *	13 *	10	13 *	13 *	13 *
Total Patients	3,500	10,000	6,000	20,000	7400	200	400	340
Daily Average Census	269*	625*	462*	1538*	740*	15*	31*	26*
Numbers below reflect the ratio of a given category of provider to the number of patients seen on an average day								
Physicians	1:45	1:39	1:18	NDA	1:67	1:4	1:4	1:9

Midlevel Providers (PA/NP)	NDA	NP	1:23	NDA	1:493	1:3	1:10	1:9
Nurses	1:54	1:31	1:9	NDA	1:82	1:1	1:3	1:1
LPN/EMT	NP	NP	1:9	NDA	1:82	NDA	1:16	1:3
Pharmacists	1:269	1:313	1:77	1:513	1:246	1:8	1:16	1:13
Clerks/ Administrative	1:269	1:125	1:9	1:1025	1:493	NDA	1:5	1:1

NP = Type of provider Not Present
NDA = No Data Available
*Estimated; see text for details.

The daily census was divided by the number of each type of provider to find the ratio of each type of provider to patients seen per day. For example, Site 1 had a calculated daily average patient census of 269 and had an average of 6 physicians on duty per day, so the ratio of physicians to patients is 1:45. As these final ratios are based on several averages and assumptions, they should be taken only as first order approximations.

The final issue to consider when examining this data presented is that the ratios are simply the ratios that existed in each ACF. The data does not indicate that they are the *correct* ratios. None of the respondents reported being limited by the number of available personnel. There were also no comments in our questionnaire about adverse patient outcomes because of health care provider shortages. That being said, however, the survey instrument did not specifically ask respondents to suggest an ideal staffing ratio, nor did it specifically ask how their staffing ratio differed from what they thought would be ideal.

It is interesting to note, however, that the overall numbers of physicians and nurses (registered nurses and licensed practical nurses) are, in fact, very similar to the recommendations made in the MEMS documents. Thus, a suggested staffing consideration of one physician and six nurses for a 50-bed patient unit may represent a reasonable starting point for an ACF. These numbers can then be increased or decreased depending on the nature of the event and the specific role to be performed by the ACF.

ACF Credentialing

Table 3 summarizes some credentialing issues that had to be addressed by the various sites. One of the themes that emerged was that credentialing was somewhat easier if the responders were part of a previously established disaster response team under the control of either the Federal Government or a State government. A review of the medical literature (see references section) shows that many responders were part of Federal disaster response teams such as Disaster Medical Assistance Teams and Urban Search and Rescue teams, State disaster response teams such as the Illinois Medical Response Team, or military units. These types of teams have an advantage in that they have already gone through a credentialing process, have a government-issued identification card, and work together within a predefined command structure. Some of the other facilities involved in the response were operated under the auspices of local health care institutions and/or county health agencies. Those providers who were already credentialed by the sponsoring institution were easy to verify but these facilities had greater difficulty with incorporating volunteer providers from outside of the sponsoring system. Several respondents

commented on the need for an improved system for credentialing providers ahead of time or credentialing them rapidly and efficiently after an event.

One system that has been developed is the Emergency Systems for Advance Registration of Volunteer Health Professionals (ESAR-VHP).[2] This program is currently administered by the Office of the Assistant Secretary for Preparedness and Response (ASPR) in the U.S. Department of Health and Human Services (HHS). The goal is to create an electronic database of health care providers who are willing to volunteer to serve after a disaster. The system is designed to be administered separately in each State. Its goals are to:

- Register health volunteers.
- Apply emergency credentialing standards to registered volunteers.
- Allow for the verification of the identification of the identity, credentials, and qualifications of registered volunteers in an emergency.

Table 3: Hurricane Katrina and Rita 2005 Alternate Care Facility Credentialing Matrix

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8
Method of credentials verification for health professionals	County Health Department Oversight	Inspection of identification badge from home institution.	Handled by U.S. Public Health Service	>90% were Federal so came credentialed.	Credentialed through sponsoring health care system.	All Federal employees; arrived credentialed.	Credentials not verified due to rapid need for response.	Combination of local hospitals, local medical society, State medical board
Were identification cards created?	Sponsoring hospital ID cards used. Others tried for outside staff with little success	Yes, with a make-shift badge maker	Special wrist bands provided by local University.	No; most had Federal identification cards.	Home State office of EMS ID cards.	Federal ID card.	N	N
If so, was a commercially available product used?	NA	NA	NA	NA	NA	NA	NA	N/A
Suggested future changes in the credentialing process?	Early credentialing; ideally prior to the event	N	N	NA	N	Develop a standardized credentialing system.	NA	Credential providers prior to an event
Did anyone impersonate a provider to gain access?	One individual tried to impersonate a physician.	N	Impersonator from the media to gain access. No one falsified credentials to provide care.	N	N	N	N	Y
Steps taken at the State level to facilitate out-of-state providers?	State allowed instant licensure with sponsorship of the primary hospital.	State was not involved.	NA	NA	EMAC	NA	EMAC	Out-of-state nurses screened through State RN association

Were providers from different health care systems working side by side?	Y	Y	Y	Y	Y	Y	Y	Y
If so, did this create any command and control(C2) issues?	No significant issues. Sponsoring hospital retained control.	N	No, too busy to have any turf battles.	No; used clear command system.	N	Minor issues while establishing C2 system.	N	N (Public health authority maintained control)
Were there any challenges dealing with out-of-state licensing issues?	Y	N	No, handled through U.S. Public Health Service.	Difficulty writing prescriptions for controlled substances.	Y	Y	N	N

Y=Yes or present but number unknown; N=No; NA=Not Applicable; U=Unknown; no data available.

None of the survey respondents reported any significant contribution of the ESAR-VHP system to credentialing at their respective ACFs, possibly because the system was still in its early stages of State-based development. Several respondents did report that a system like ESAR-VHP could be valuable if it could be further developed and effectively implemented

Another resource that assisted with incorporating out-of-Sate health care providers into the local response was the Emergency Management Assistance Compact (EMAC) (Public Law 104-321).[3] All personnel who respond to an event as part of a State's formal response to another State's formal request for aid theoretically are covered under the EMAC. Congress ratified EMAC in 1996 to allow more expeditious response of emergency medical resources and National Guard units from other States to the site of a disaster. EMAC gives four privileges and protections to responders. First, it promises that responders' licenses or certificates from their home State will be honored in the State to which that person is responding. However, the person must be part of the official response element; freelancers are not protected. Second, responders are likely to receive protection from malpractice claims that may arise from their service in the affected area. Third, responders are promised death and disability benefits, although this applies more to civilian responders. Finally, in theory, States that respond through EMAC should be reimbursed for any expenses they incur during response operations.

The sudden nature of the two hurricanes that struck the Gulf Coast in 2005 and the overwhelming number of displaced persons after New Orleans flooded necessitated a very rapid medical response and allowed little time for many ACFs to establish credentialing systems. There were reports of people impersonating health care providers to gain access to facilities. The impersonation cases in our survey represent members of the media or other individuals who wanted to gain access in order to "see what's going on." However, the medical literature reports a woman falsifying her credentials to a National Guard medical unit operating in St. Bernard Parish in order to gain access to the Parish. She did not provide any direct patient care but did manage to insert herself into several high-level planning meetings and even shook hands with President Bush when he met with medical providers in the Parish.[3] Clearly, credentialing during disasters can be somewhat difficult; however, it is also critical in order to avoid patients being harmed by imposters.

Section References

1. The Concept of Operations for the MEMS, ACC, and NECC are available on the Northern New England Metropolitan Medical Response System Web site at: http://nnemmrs.org/resources/surge_capacity_guidance/index.html
2. Information on the Emergency Systems for Advance Registration of Volunteer Health Professionals is available at: http://www.medicalreservecorps.gov/File/ESAR_VHP/ESAR-VHPMRCIntegrationFactSheet.pdf .
3. Information on the Emergency Management Assistance Compact is available at: http://www.emacweb.org/.

Patient Selection Tool

As mentioned previously, one potential use of an ACF is for off-loading from hospitals less ill hospital patients who are not yet ready for early discharge from the hospital. The challenge, however, is how to quickly determine which inpatients are eligible for transfer to a designated ACF. To assist in the decision process, a Patient Selection Tool was developed, which is available at www.ahrq.gov/prep. The Patient Selection Tool may be used manually by printing out copies of the tool. Detailed user instructions are included with the tool.

Equipment and Supply Options

Providing an ACF with the necessary equipment and supplies requires significant advance planning. In most situations, supplies will not be available in large quantities from nearby health care institutions or from normal supply chains. Therefore, supplies must be "cached" in advance for use at the time of the establishment of an ACF. Different levels of supply support have been proposed and implemented.[1,2] The following three levels of supply caches are based on their robustness (excluding pharmaceuticals because of their special storage requirements).

Level I: Hospital Augmentation/Limited ACF Cache -- approximately $20,000 (Table 4)

Table 4 is a list of supplies that represents a most basic unit of supply support for increased surge capacity of 50 patients, consisting only of items that have very extended shelf life, such as: cots, linens, masks, gowns, gloves, and IV poles. No pharmaceuticals are included. This material is packed in a trailer for mobility. This cache could be used as additional stocking for an existing hospital (i.e. to set up a medical ward in a cafeteria, using other items as necessary from the hospital) or could offer supplies for a limited level care at an ACF.

Level II: Regional ACF Cache -- approximately $100,000 (Table 5)

Table 5 represents a more complete list of material to supply a regional ACF for 500 patients. This implementation of the cache, or medical armory, concept was developed by the Colorado Department of Public Health and Environment and approved by its Hospital Preparedness Advisory Committee. The approximate price for a single cache for 500 patients is less than $100,000. Note that, as with the Level I cache, pharmaceuticals are excluded and only items with extremely long shelf life are included.

Level III: Comprehensive ACF Cache -- no cost estimate currently available (Tables 6-9)

Tables 6-9 provide comprehensive lists of equipment and consumables that were adapted from work done by the U.S. military and published in *The Concept of Operations for the Acute Care Center* by the U.S. Army Soldier and Biological Chemical Command (SBCCOM).[3] These lists represent a specification for a completely supplied 50-bed ACF consisting of items with both long and short shelf-life. This represents a more complete level of cache than levels 1 and 2. The initial specifications also included pharmaceuticals, but they are not included here as separate national, regional and local planning efforts are addressing this issue.

This extensive list has been separated into: Equipment Considerations, Patient Care Related Consumables, Administrative Consumables and Oxygen and Respiratory-Related Equipment Considerations (Tables 6-9). Note that this equipment and the consumables can be pre-acquired and stored in a "medical cache" as well. Consumable items may represent one of the greatest challenges for establishing an ACF due to the number and quantity of items. This comprehensive list also includes oxygen and respiratory-related supplies that should be considered for providing limited respiratory support.

Table 4. Level I: Hospital Augmentation/Limited ACF Cache (50 Patients)

Item	Number	Cost Each Item	Total
Disaster/surge capacity trailer	1	10,000	10,000
Patient cots	45	50	2250
Patient cots, with wheels, collapsible	10	250	2500
Linens			0
Sheets (2 per patient + extras)	150	4.56	684
Blankets	75	13.5	1012.50
Pillows (disposable – case of 15)	4	43.2	172.80
Pillow cases	100	1.14	114
N95 masks (case of 210)	1	98	98
Gloves			
Latex Free Exam – small (case of 1000)	1	36	36
Latex Free Exam – medium (case of 1000)	1	36	36
Latex Free Exam – large (case of 1000)	1	38.34	38.34
Powder Free Exam – small (case of 1000)	1	37.55	37.55
Powder Free Exam – medium (case of 1000)	1	37.55	37.55
Powder Free Exam – large (case of 1000)	1	39	39
Gowns (for staff – splash resistant – case of 12)	10	39	390
Bag-valve-mask respirators	10	11	110
Blood pressure cuffs (manual)	5	40	200
Stethoscopes	10	35	350
IV Poles	25	60	1500
TOTAL EQUIPMENT COSTS			**$19,605.74**

Table 5. Level II Regional ACF Cache (500 Patients)

Product Name [a, b]	Description[c]
Applicator, cotton tipped	sterile, cotton-tipped, wood shaft; 5 yr shelf life
Bag Holder	rectangular aluminum
Bag Valve-Mask (adult)	Disposable
Bag Valve-Mask (infant)	Disposable
Bag, Disposable	Plastic, drawstring, 33 gal.
Bag, Disposable, Biohazard	disposable, 2 ml, red, 33 gallon
Batteries, AA	for flashlights
Bedpan	pontoon type, plastic
Bedpan, Fracture	Plastic, female, mauve
Blanket, Flannel	
Blanket, infant	white, cotton
Blanket, thermal	WHI2.2 lb 48
Blood Pressure Unit	Aneroid, Adult, L/F
Blood Pressure Unit	Aneroid, Child, L/F
Brief, Adult	Trimline, Medium, 8/12's
Bungy Cords	20 piece assortment
Chair, Folding	Poly
Clip Boards	brown clipboard
Cots, Portable	Collapsible deluxe aluminum military cot
Cots, Portable 500 lb rated	600 Denier nylon PVC-back poly on aluminum frame
Crib, Peds, Portable	single drop rail
Diapers, disposable	Baby, Cloth-Like CVR
Disinfectants/detergent	Meritz Plus, 32 oz.
Emesis Basin	
Form, General Medicine	
Form, Laboratory, Diagnostic	
Form, Registration, English	
Form, Registration, Spanish	
Gate, Child	Superyard XT Gate by Northgate Industries
Gloves	Medium, powder free, chloroprene
Gloves	Large, powder free, chloroprene
Gown, Patient, disposable	Adult, tissue/poly-tissue, blue; 2 yr shelf life
Gown, Patient, disposable	Pediatric, poly, white
Gown, Provider	MEDIUM, DuPont ProVent, Open back
Gown, Provider	LARGE, DuPont ProVent, Open back
Hamper Bag	drawcord, p/c natural
Hamper, Linen (soiled)	Rectangular stnd w/o lid
Hand Cleaner (waterless)	Epi-Clenz, 4 oz 70% ethyl
ID Band, Insert	Adult, vinyl, Blue
ID Band, pediatric	vinyl, snap, pink
IV Set	15DR/ML, LL,NO
Light, Flashlight	VersaBrite II, 8000 cp
Light, Headlamp	Trident halogen w/cloth strap
Mask, N-95 particulate respirators	Resp, 8211 N95, Cool Flw
Mask, Oxygen, Adult	Medium concent w/7'
Mask, Oxygen, Pediatric	Medium concen, 7'TB

Mat, Child	Mahar flat rest mat/2" foam (10 yr warranty)
Mattress, Portable Crib	Kolcraft, 2.5" thick, nonallergenic
Mattress Underpad, Crib	Polymer, Deluxe
Name Badge & Holder, plastic clip-on	inkjet/laserjet, 100/box
Notepads	White, 100 pages
Pack, Ice	Cold Compress
Pack, Warm	Solar-Pack
Penlight, disposable	6 /pk
Pens, Standard	Bic Clic Stick
Pillowcase, disposable	Tissue/Poly, White
Pillows, disposable	Protect a Med Cot Pillow, blue
Pole, IV	4 caster, 2 hook
Scissors, Lister bandage	5 1/2"
Screen, Privacy, 3-panel	folding, w/casters, flame retardant
Sharps Containers, Biohazard	2 gal. Red
Sheets, Stretcher	Tissue/Poly, Blue
Soap, Liquid	Protection Plus Antimicrobial
Spectacles, Eye Protective	clear, wraparound, poly
Stethoscope, dual head	black, 5 yr shelf life
Storage container	clear plastic, attached top
Stretcher, Folding	Ferno Model 12
Stretcher, w/Wheels	Ferno Model 11
Table, Folding	Gray
Tape, Cloth	Cloth
Tape, Duct	
Thermometer, Disposable Strips	Nextemp 1 use thermometer; 5 yr shelf life
Tongue depressor	
Tourniquet	latex free
Urinal, male	w/Hill-Rom Compatible Handle

[a] The inclusion of product brand names is for identification and illustrative purposes only and does not imply any type of endorsement or specific recommendation.
[b] Quantities must take into consideration both the length of time the site will be in use (before re-supply can occur) and the purpose of the site.
[c] For storage purposes, calculate the overall space needed based on the size of boxes or containers the items will be stored in.

Table 6. Equipment Considerations for Level III Comprehensive ACF Medical Cache (50 Bed Unit)

Equipment	Infectious	Non-Infectious	Quarantine
Beds/Cots (with extra)	52	52	52
Chairs correlation with staffing level	12	12	4
Desks correlation with staffing level	6	6	2
Fax Machine	1	1	?
Housekeeping Cart with supplies	1	1	1
Internet email Access	1	1	1
IV Poles	50	50	0
Linens (sheets/pillows/pillow cases/hand towels/ bath towels)	100	100	100
Patient Commodes	4	4	1
Pharmacy Carts	2	2	1

Privacy Dividers	25	25	25
Refrigerators (food/meds)	3	3	1
Stretchers	2	2	0
Supply Carts	3	3	1
Telephones	5	5	5
Treatment Carts	2	2	0
Washing Machine	1	1	1
Wheelchairs	2	2	1

Table 7. Patient Care-Related Consumables for Level III Comprehensive ACF Medical Cache (50 Bed Unit)

Item Description	Calculations of Quantities	Total Item Count	Unit of Issue	Total UoIs Required
Alcohol pads (multiple widespread use)	2-4 Boxes per 24 hours	14-28	Box	1 Box
Catheters, intraosseous module blue (pediatric use)	May use 1/day max.	6-7/wk of 1 standard size	Each	7 Each
Intermittent IV access device (lock)	50 pts initially (first day) then 10%	250/wk	50/Box	5 Boxes
IV catheters, 18g with protectocath guard	40% of pts req IVs	150/wk	50/Box	3 Boxes
IV catheters, 20g with protectocath guard	40% of pts req IVs	150/wk	50/Box	3 Boxes
IV catheters, 22g with protectocath guard	10% of pts req IVs	25/wk	50/Box	0.5 Boxes
IV catheters, 24g with protectocath guard	10% of pts req	25/wk	50/Box	0.5 Boxes
IV fluid bags, NS, 1000cc (required by 60% of patients)	(50% of pts(25)/day x 3L/pt)x	315 L/wk	12/Case	18 Cases
IV fluid bags, D5 1/2NS, 1000cc (required by 40% of patients)l	(50% of pts(25)/day x 3L/9t)x	210 L/wk	12/Case	18 Cases
IV start kits	Same # as intermittent access device	60	25/Box	2.5 Boxes
IV tubing w/ Buretrol drip set for peds	10% peds/wk	25/wk	20/Case	1.25 Cases
IV tubing w/ standard macrodrip for adults	Same # as intermittent	250/wk	48/Case	5 Cases
Needles, Butterfly, 23g	10% peds/wk	25/wk	50/Box	0.5 Boxes
Needles, Butterfly, 25g	10% ped/wk	25/wk	50/Box	0.5 Boxes
Needles, sterile 18g	1 box/day	7 boxes/wk	100/Box	7 Boxes
Needles, sterile 21g	1 box/day	7 boxes/wk	100/Box	7 Boxes
Needles, sterile 25g	1 box/day	7 boxes/wk	100/Box	7 Boxes
Saline for injection 10cc bottle	50 bottles/day	350 bottles/wk	24 /Box	14.5 Boxes
ABD bandage pads, sterile	10% pts/day = 5 pads/day+35 pads/wk	7 boxes/wk	50/Box	7 Boxes
BandAids	1 box/day	7 boxes/wk	50/Box	7 Boxes
Basins, bath	20 pts/day	140/wk	100/Case	1.5 Cases
Bathing supply, prepackaged (e.g.Bath in a Bag (TM))	50 pts every day	350/wk		350
Bedpans – regular	40 pts/day initially then10%	65/wk	50/Case	1.25 Cases

Toilet Paper	25 rolls/day	175 rolls/wk		175 Rolls
Blankets	50 pts/day; changed daily	50/day or 350/wk		350/Week
Carafes - 1 liter (for variety of uses)	30/day	210/wk		210/Week
Cart, supply	3/unit (1 for IV's;1 for Pt	3/unit		
Chux protective pads (many uses)	3/pt q3hrs = 24 chux/pt/day x 50 pts + 1200/day	8400/wk	50/Box	168 Boxes
Cots (have extras available to replace broken equipment)	50/unit plus 2 extra	52/unit		52/Unit
Curtains, privacy (wheeled)	25 (every other bed)	25/unit		25/Unit
Diapers – adult	10/day	70/wk	72/Case	1 Case
Diapers – infant	8/day/infant x 5 infants/day	280/wk	144/Case	3 Cases
Diapers – pediatric	5/day/ped x 5 peds/day = 25/day	175/wk	144/Case	1.25 Cases
Emesis basins	100/wk	100/wk	250/Case	0.5 Case
Facial tissue, individual patient box	1 box/pt/day	350 boxes/wk	200 Boxes	1.75 Cases
Feeding tubes, pediatric				
- 5 French	10/wk	10/wk	10/Box	1 Box
-8 French	10/wk	10/wk	10/Box	1 Box
Foley Catheters - 16F Kits (includes drainage bag)	>50% of pts wk	100/wk	10/Case	10 Cases
Gloves non-sterile, small/medium/large (latex and non latex)	6 boxes/day	42 boxes/wk	100/Box	42 Boxes
Goggles / face shields, splash resistant, disposable	6 boxes/day	42 boxes/wk	100/Box	42 Boxes
Gown, splash resistant, disposable	3/staff/shift = 36/day	252/wk	Box	42 Boxes
Mask, N95, for staff (particulate respirator)	36/day	252/wk	210/Case	1.2 Cases
Gown, patient	75/day	525/wk		
Mask, 3M 1800 for patient	150/day	1050/wk		
Gauze pads, non-sterile, 4x4 size,	400/day	2800/wk		
Hand cleaner, waterless alcohol-based	1 per handwash station/day x	28/wk	25 Bottles/Case	1 Case
Paper Towels	25 rolls/day	175 rolls/wk		175 Rolls
Lubricant, Water soluble		1-2 boxes wk	25 Boxes	0.5 Boxes
Medicine cups, 30ml, plastic	2/pt/day = 100/day	700/wk		700/Week
Morgue Kits	Tularemia: 15pt/day mortality	300/wk		300/Week
Nasogastric tubes - 18F		25/wk	50/Case	0.5 Cases
OB Kits		1/wk		1/Week
Pen lights		12/unit	6/Box	2 Boxes
Povidone-iodine bottles, 12 oz	2/day	14/wk	48 Bottles	0.25 Cases
Restraints, Extremity, soft - adult		25/wk	48/Case	0.5 Cases
Sanitary pads (OB pads)	2 women/wk; 10 pads/day	20 pads/wk	12 Pads	2 Boxes
Sharps disposal containers - 2 gallon	2-4/wk/unit	2-4/wk	20/Case	0.25 Cases
Sheets, disposable, paper, for stretchers & cots	100/day	700/wk		700/Week
Syringes, 10cc, luer lock	4 boxes/wk (100 ct box)	400 wk	100/Box	4 Boxes
Syringes, 3cc, luer lock, w/ 21g 1.5" needle	200/day	1400/wk	100/Box	14 Boxes

Syringes, catheter tip 60cc		25/wk	50/Box	0.5 Boxes
Syringes, Insulin	4/day	28/wk	100/Box	0.25 Boxes
Syringes, TB	2/day	14/day	100/Box	0.4 Boxes
Tape, silk - 1 inch	12/day	96/wk	12 Rolls/Box	8 Boxes
Tape, silk - 2 inch	6/day	42/wk	12 Bolls/Box	3.5 Boxes
Toilet tissue	25 rolls/day	175 rolls/wk		175 Rolls
Tongue depressors		2 boxes/wk	500/Box	2 Boxes
Tubex [TM] pre-filled syringe holders	1 per staff member plus	12/sub-unit	50/Case	0.25 Cases
Urinals		50/wk	50/Case	1 Case
Washcloths, disposable		10/pt/day	3500/Wk	3500/Week
Water, bottled 1 liter (for mixing ORT)	1/patient	200/wk		200/Week
Water container, 1 gallon potable		125/wk		125/Week
Drinking cups				
Diagnostic Supplies				
Glucometer		1 per unit	Each	
Glucometer test strips		2 bottles/wk	50 Strips/Viles	2 Viles
Probe covers for thermometers	4 boxes/day	28 boxes/wk	20/Box	28 Boxes
Protocol unit (or other brand), 02 sat monitor, thermometer, BP, HR		4 per unit	Each	
Protocol unit, disposable plastic BP covers	200/day	1400/wk		
Single Use Shielded Lancets	25/day	175/wk		1 Box
Stethoscopes		12/unit	Each	12

Table 8. Administrative Consumables for Level III Comprehensive ACF Medical Cache (50 Bed Unit)

Item Description
Pens – Black ballpoint
Pens – Red ballpoint
Stapler
Staples
Tape
Tape dispenser
Paper clips
Paper punch (3- or 5-hole based on chart holders)
Chartholders/Clip boards
File Folders - letter size, variety of colors
Namebands for Identification and Allergies
Batteries – 9V
Batteries – AA
Batteries – C
Batteries – D
Clipboards
Chalk or white boards
Dry-erase markers
Chalk
Trashcans and liners
Flashlights
Plastic bags for patient valuables

Floor lamps
Table lamps
Lightbulbs
Plain paper
Filing cabinets – rolling
Black permanent markers
Yellow highlighter markers
Time cards
Generic sign-in, sign-out forms
Pre-printed admission Order forms
Blank physician order forms
Multidisciplinary progress notes
Nursing flowsheets
Admission history & physical forms (include area for Nrsg Hx)
Death certificates/Death packets

Table 9. Oxygen and Respiratory-Related Equipment Considerations for Level III Comprehensive Medical Cache (50 Bed Unit)

Item Description	Quantity
Bag-Valve-Mask w/adult and peds masks – adult 1600 ml reservoir	1
Cascade gauge for oxygen cylinders	14
Catheters, suction	20
Connector, 5 in 1	8
Cylinder holders for E Cylinder oxygen tanks	4
Mask, oxygen – nonrebreather, pediatric	10
Mask, oxygen – nonrebreather, adult	20
Nasal cannula, adult	40
Nasal cannula, pediatric	10
Regulator, Oxygen (Flow meter)	14
Suction unit – Collection System	2
Suction unit – Portable	1
Suction unit Battery	1
Tank, Oxygen "E" cylinder (700 L O_2)	4
Tank, Oxygen "H" cylinder (7000 L O_2)	10
Tubing, oxygen – with connector	40
Tubing – suction, connector	10
Tubing, suction, 10F	10
Wrench, Oxygen tank	2
Yankaur Suction Catheter	10
Intubation equipment with oral airways/ET tubes; adult & peds	1 set
Ventilators	1

Section References

1. Rocky Mountain Regional Care Model for Bioterrorist Events: Locate Alternate Care Sites During an Emergency. December 2004. Agency for Healthcare Research and Quality, Rockville, MD.Available at http://www.ahrq.gov/research/altsites.htm.
2. Hick JL, Hanfling D, Burstein JL, DeAtely C, Barbisch D, Bogdan G, Cantrill S. Healthcare Facility and Community Strategies for Patient Care Surge Capacity. Ann Emerg Med 44:253-61;2004.

3. Skidmore S, Wall W, Church J. Modular Emergency Medical System Concept of Operation for the Acute Care Center: Mass Casualty Strategy for a Biological Terror Incident, May 2003.

Appendixes

Appendix A: References and Available Abstracts

Peer-Reviewed Literature Search Results

Adini, B., A. Goldberg, et al. (2006). "Assessing levels of hospital emergency preparedness." Prehosp Disaster Med **21**(6): 451-7.

INTRODUCTION: Emergency preparedness can be defined by the preparedness pyramid, which identifies planning, infrastructure, knowledge and capabilities, and training as the major components of maintaining a high level of preparedness. The aim of this article is to review the characteristics of contingency plans for mass-casualty incidents (MCIs) and models for assessing the emergency preparedness of hospitals. CHARACTERISTICS OF CONTINGENCY PLANS: Emergency preparedness should focus on community preparedness, a personnel augmentation plan, and communications and public policies for funding the emergency preparedness. The capability to cope with a MCI serves as a basis for preparedness for non-conventional events. Coping with chemical casualties necessitates decontamination of casualties, treating victims with acute stress reactions, expanding surge capacities of hospitals, and integrating knowledge through drills. Risk communication also is important. ASSESSMENT OF EMERGENCY PREPAREDNESS: An annual assessment of the emergency plan is required in order to assure emergency preparedness. Preparedness assessments should include: (1) elements of disaster planning; (2) emergency coordination; (3) communication; (4) training; (5) expansion of hospital surge capacity; (6) personnel; (7) availability of equipment; (8) stockpiles of medical supplies; and (9) expansion of laboratory capacities. The assessment program must be based on valid criteria that are measurable, reliable, and enable conclusions to be drawn. There are several assessment tools that can be used, including surveys, parameters, capabilities evaluation, and self-assessment tools. SUMMARY: Health care systems are required to prepare an effective response model to cope with MCIs. Planning should be envisioned as a process rather than a production of a tangible product. Assuring emergency preparedness requires a structured methodology that will enable an objective assessment of the level of readiness.

Aylwin, C. J., T. C. Konig, et al. (2006). "Reduction in critical mortality in urban mass casualty incidents: analysis of triage, surge, and resource use after the London bombings on July 7, 2005." Lancet **368**(9554): 2219-25.

BACKGROUND: The terrorist bombings in London on July 7, 2005, produced the largest mass casualty event in the UK since World War 2. The aim of this study was to analyse the prehospital and in-hospital response to the incident and identify system processes that optimise resource use and reduce critical mortality. METHODS: This study was a retrospective analysis of the London-wide prehospital response and the in-hospital response of one academic trauma centre. Data for injuries, outcome, triage, patient flow, and resource use were obtained by the review of emergency services and hospital records. FINDINGS: There were 775 casualties and 56 deaths, 53 at scene. 55 patients were triaged to priority dispatch and 20 patients were critically injured. Critical mortality was low at 15% and not due to poor availability of resources. Over-triage rates were reduced where advanced prehospital teams did initial scene triage. The Royal London Hospital received 194 casualties, 27 arrived as seriously injured. Maximum surge rate was 18 seriously injured patients per hour and resuscitation room capacity was reached within 15 min. 17 patients needed surgery and 264 units of blood products were used in the first 15 h, close to the hospital's routine daily blood use. INTERPRETATION:

Critical mortality was reduced by rapid advanced major incident management and seems unrelated to over-triage. Hospital surge capacity can be maintained by repeated effective triage and implementing a hospital-wide damage control philosophy, keeping investigations to a minimum, and transferring patients rapidly to definitive care.

Bennett, R. L. (2006). "Chemical or biological terrorist attacks: an analysis of the preparedness of hospitals for managing victims affected by chemical or biological weapons of mass destruction." Int J Environ Res Public Health **3**(1): 67-75.

The possibility of a terrorist attack employing the use of chemical or biological weapons of mass destruction (WMD) on American soil is no longer an empty threat, it has become a reality. A WMD is defined as any weapon with the capacity to inflict death and destruction on such a massive scale that its very presence in the hands of hostile forces is a grievous threat. Events of the past few years including the bombing of the World Trade Center in 1993, the Murrah Federal Building in Oklahoma City in 1995 and the use of planes as guided missiles directed into the Pentagon and New York's Twin Towers in 2001 (9/11) and the tragic incidents involving twenty-three people who were infected and five who died as a result of contact with anthrax-laced mail in the Fall of 2001, have well established that the United States can be attacked by both domestic and international terrorists without warning or provocation. In light of these actions, hospitals have been working vigorously to ensure that they would be "ready" in the event of another terrorist attack to provide appropriate medical care to victims. However, according to a recent United States General Accounting Office (GAO) nationwide survey, our nation's hospitals still are not prepared to manage mass causalities resulting from chemical or biological WMD. Therefore, there is a clear need for information about current hospital preparedness in order to provide a foundation for systematic planning and broader discussions about relative cost, probable effectiveness, environmental impact and overall societal priorities. Hence, the aim of this research was to examine the current preparedness of hospitals in the State of Mississippi to manage victims of terrorist attacks involving chemical or biological WMD. All acute care hospitals in the State were selected for inclusion in this study. Both quantitative and qualitative methods were utilized for data collection and analysis. Six hypotheses were tested. Using a questionnaire survey, the availability of functional preparedness plans, specific preparedness education/training, decontamination facilities, surge capacity, pharmaceutical supplies, and laboratory diagnostic capabilities of hospitals were examined. The findings revealed that a majority (89.2%) of hospitals in the State of Mississippi have documented preparedness plans, provided specific preparedness education/training (89.2%), have dedicated facilities for decontamination (75.7%), and pharmaceutical plans and supplies (56.8%) for the treatment of victims in the event of a disaster involving chemical or biological WMD. However, over half (59.5%) of the hospitals could not increase surge capacity (supplies, equipment, staff, patient beds, etc.) and lack appropriate laboratory diagnostic services (91.9%) capable of analyzing and identifying WMD. In general, hospitals in the State of Mississippi, like a number of hospitals throughout the United States, are still not adequately prepared to manage victims of terrorist attacks involving chemical or biological WMD which consequently may result in the loss of hundreds or even thousands of lives. Therefore, hospitals continue to require substantial resources at the local, State, and national levels in order to be truly prepared.

Blackwell, T. and M. Bosse (2007). "Use of an innovative design mobile hospital in the medical response to Hurricane Katrina." Ann Emerg Med **49**(5): 580-8.

On August 29, 2005, Hurricane Katrina caused widespread devastation to the Gulf Coast region of the United States. Although New Orleans had extensive damage from flooding, many communities in Mississippi had equal damage from storm surge and wind. Because the medical resources in many of these areas were incapacitated, resources from North Carolina were deployed to assist in the medical mission. This response included the initial use of Carolinas MED-1, a mobile hospital that incorporates an emergency department, surgical suite, critical care beds, and general treatment and admitting area. This asset, along with additional State resources, provided comprehensive diagnostic and definitive patient care until the local medical infrastructure was rebuilt and functional. The use of a mobile hospital may be advantageous for future deployments to large-scale disasters, especially when integrated with specialty teams.

Bolster, C. J. (2006). "Mobile hospital provides care when disaster strikes." Healthc Financ Manage **60**(2): 114-6, 118.

When planning resources for disaster response, hospitals should: Understand the mission of the equipment to be used. Be able to provide training. Learn how to use the resources most efficiently.

Bonnett, C. J., B. N. Peery, et al. (2007). "Surge capacity: a proposed conceptual framework." Am J Emerg Med **25**(3): 297-306.

There is a need for emergency planners to accurately plan for and accommodate a potentially significant increase in patient volume in response to a disaster. In addition, an equally large political demand exists for leaders in government and the health care sector to develop these capabilities in a financially feasible and evidence-based manner. However, it is important to begin with a clear understanding of this concept on a theoretical level to create this capacity. Intuitively, it is easy to understand that surge capacity describes the ability of a health care facility or system to expand beyond its regular operations and accommodate a greater number of patients in response to a multiple casualty-producing event. The way a response to this need is implemented will, of course, vary dramatically depending on numerous issues, including the type of event that has transpired, the planning that has occurred before its occurrence, and the resources that are available. Much has been written on strategies for developing and implementing surge capacity. However, despite the frequency with which the term is used in the medical literature and by the lay press, a clear description of surge capacity as a concept is lacking. The following article will provide this foundation. A conceptual framework of surge capacity will be described, and some new nomenclature will be proposed. This is done to provide the reader with a comprehensive yet simplified view of the various elements that make up the concept of surge capacity. This framework will cover the types of events that can cause a surge of patients, the general ways in which health care facilities respond to these events, and the categories of people who would make up the population of affected victims.

Brandenburg, M. A., M. B. Ogle, et al. (2006). ""Operation Child-Safe": a strategy for preventing unintentional pediatric injuries at a Hurricane Katrina evacuee shelter." Prehosp Disaster Med **21**(5): 359-65.

INTRODUCTION: Children represent a vulnerable population, and special

considerations are necessary to care for them properly during disasters. Comprehensive disaster responses include addressing the unique needs of children during mass-casualty incidents, such as the prevention of unintentional injuries. Early in the morning of 04 September 2005, approximately 1,600 Hurricane Katrina and/or flood survivors from New Orleans, including approximately 300 children, arrived at Camp Gruber, an Oklahoma National Guard base in Eastern Oklahoma. PROBLEM: The primary function of Camp Gruber to train support personnel for the Oklahoma National Guard. This is not a child-safe environment. It was hypothesized that the camp contained numerous child injury hazards and that these hazards could be removed systematically using local child injury prevention experts, thereby preventing unintentional injuries to the displaced children. METHODS: On 08 September, "Operation Child-Safe" was launched by the Pediatric Injury Response Team to identify and remove pediatric injury hazards from Camp Gruber. Injury prevention experts from the Safe Kids Tulsa Area (SKTA) Chapter, the closest pediatric injury prevention group in the region, spearheaded the operation. Several visits were required to remove all of the injury hazards that were identified. RESULTS: Many hazards were identified and removed immediately, while others were addressed in a formal letter to the Camp Gruber Commander for required consent to implement changes. Hazards identified in the camp included, but were not limited to: (1) dangerous chemicals; (2) choking hazards; (3) open electrical outlets; and (4) missing smoke detectors. Bicycle helmets, car seats, strollers, portable cribs, and other safety-related items were passed out to families in need. A licensed daycare facility also was established in order to give the adult guardians a break from constant supervision. Over the course of one month, only one preventable injury (minor head injury) was reported during camp operations, and this particular injury occurred two days before "Operation Child-Safe" was initiated (Day 3 of camp operations). CONCLUSIONS: In the aftermath of an event that displaces large numbers of people, it is likely that children will be exposed to numerous injury hazards. Volunteers with expertise in child injury prevention are needed to make an evacuee shelter safer for children.

Bridgewater, F. H., E. T. Aspinall, et al. (2006). "Team Echo: observations and lessons learned in the recovery phase of the 2004 Asian tsunami." Prehosp Disaster Med **21**(1): s20-5.

The 26 December 2004 Tsunami resulted in a death toll of >270,000 persons, making it the most lethal tsunami in recorded history. This article presents performance data observations and the lessons learned by a civilian team dispatched by the Australian government to "provide clinical and surgical functions and to make public health assessments". The team, prepared and equipped for deployment four days after the event, arrived at its destination 13 days after the Tsunami. Aspiration pneumonia, tetanus, and extensive soft tissue wounds of the lower extremities were the prominent injuries encountered. Surgical techniques had to be adapted to work in the austere environment. The lessons learned included: (1) the importance of team member selection; (2) strategies for self-sufficiency; (3) personnel readiness and health considerations; (4) face-to-face handover; (5) coordination and liaison; (6) the characteristics of injuries; (7) the importance of protocols for patient discharge and hospital staffing; and (8) requirements for interpreter services. Whereas disaster medical relief teams will be required in the future, the composition and equipment needs will differ according to the nature of the disaster. National teams should be on standby for international response.

Burkle, F. M., Jr., E. B. Hsu, et al. (2007). "Definition and functions of health unified command

and emergency operations centers for large-scale bioevent disasters within the existing ICS." Disaster Med Public Health Prep **1**(2): 135-41.

The incident command system provides an organizational structure at the agency, discipline, or jurisdiction level for effectively coordinating response and recovery efforts during most conventional disasters. This structure does not have the capacity or capability to manage the complexities of a large-scale health-related disaster, especially a pandemic, in which unprecedented decisions at every level (eg, surveillance, triage protocols, surge capacity, isolation, quarantine, health care staffing, deployment) are necessary to investigate, control, and prevent transmission of disease. Emerging concepts supporting a unified decision-making, coordination, and resource management system through a health-specific emergency operations center are addressed and the potential structure, function, roles, and responsibilities are described, including comparisons across countries with similar incident command systems.

Burkle, F. M., Jr. (2006). "Population-based triage management in response to surge-capacity requirements during a large-scale bioevent disaster." Acad Emerg Med **13**(11): 1118-29.

Both the naturally occurring and deliberate release of a biological agent in a population can bring catastrophic consequences. Although these bioevents have similarities with other disasters, there also are major differences, especially in the approach to triage management of surge capacity resources. Conventional mass-casualty events use uniform methods for triage on the basis of severity of presentation and do not consider exposure, duration, or infectiousness, thereby impeding control of transmission and delaying recognition of victims requiring immediate care. Bioevent triage management must be population based, with the goal of preventing secondary transmission, beginning at the point of contact, to control the epidemic outbreak. Whatever triage system is used, it must first recognize the requirements of those Susceptible but not exposed, those Exposed but not yet infectious, those Infectious, those Removed by death or recovery, and those protected by Vaccination or prophylactic medication (SEIRV methodology). Everyone in the population falls into one of these five categories. This article addresses a population approach to SEIRV-based triage in which decision making falls under a two-phase system with specific measures of effectiveness to increase likelihood of medical success, epidemic control, and conservation of scarce resources.

Burstein, J. L. (2007). "Walls of canvas, walls of steel." Ann Emerg Med **49**(5): 589.

Burstein, J. L. (2007). "You shall not stand by." Ann Emerg Med **49**(5): 610-1.

Buttross, S. (2006). "Responding creatively to family needs of hospital staff: caring for children of caretakers during a disaster." Pediatrics **117**(5 Pt 3): S446-7.

DeLia, D. (2006). "Annual bed statistics give a misleading picture of hospital surge capacity." Ann Emerg Med **48**(4): 384-8, 388 e1-2.

STUDY OBJECTIVE: I describe how annual hospital surge capacity is affected by within-year variation in patient volume and bed supply. METHODS: Surge capacity was measured as the percentage and total number of hospital beds that are not occupied by patients. Administrative data were used to calculate these bed statistics for 78 hospitals in New Jersey--statewide and by emergency planning regions--in 2003. Annual bed statistics were compared to more refined calculations for each day of the year. Calculated

numbers of empty beds were compared to Federal disaster planning benchmarks. RESULTS: Annual bed statistics showed no major limitations on surge capacity. Statewide occupancy rates were well below 80% (ie, more than 20% of beds were empty), and the number of empty beds that were set up and staffed (ie, maintained) was well above Federal disaster planning benchmarks. In contrast, daily bed statistics reveal long periods in 2003 when regional and statewide surge capacity was severely strained. Strained capacity was most likely to occur on Tuesdays through Fridays and least likely to occur on weekends. On 212 days, statewide occupancy of maintained beds met or exceeded 85%. This occupancy rate met or exceeded 90% and 95% on 88 and 4 days, respectively. On 288 days, the statewide number of empty maintained beds fell below the Federal planning benchmark. CONCLUSION: Annual bed statistics give a misleading picture of hospital surge capacity. Analysis of surge capacity should account for daily variation in patient volume and within-year variation in bed supply.

Eastman, A. L., K. J. Rinnert, et al. (2007). "Alternate Site Surge Capacity in Times of Public Health Disaster Maintains Trauma Center and Emergency Department Integrity: Hurricane Katrina." J Trauma **63**(2): 253-257.

Erich, J. (2007). "As good as advertised: mobile hospital shines in Katrina response." Emerg Med Serv **36**(2): 38-9.

Farmer, J. C. and P. K. Carlton, Jr. (2005). "Hospital disaster medical response: aligning everyday requirements with emergency casualty care." World Hosp Health Serv **41**(2): 21-4, 41, 43.

In this essay, we would like to pragmatically and realistically introduce three topics: (a) Within the hospital, critical care is acknowledged as an enormous cost driver that becomes even less manageable during a disaster response scenario. It is widely recognised that hospital critical care capabilities for large scale disaster response require significant increases, but an overarching plan to accomplish this goal is lacking. This plan necessarily includes equipment, personnel, training, and space expansion. Lesser degrees of illness and injury will likely be cared for in other venues. What is required to provide 'large scale' critical care? (b) During a true large scale disaster with a large casualty stream, the mandate is not to provide 'standard of care,' but rather 'sufficiency of care.' What is that, what does that mean to critical care and the hospital, and how is that determined? (c) Are there other mandated in-hospital requirements that can be appropriately and successfully leveraged for disaster medical response?

Fernald, J. P. and E. A. Clawson (2007). "The mobile army surgical hospital humanitarian assistance mission in Pakistan: the primary care experience." Mil Med **172**(5): 471-7.

Military surgical field hospitals are frequently deployed for humanitarian missions. Current Department of Defense doctrine and World Health Organization policy question the appropriateness of their use, because the majority of patients require nonsurgical care. We describe our experiences during the deployment of a mobile army surgical hospital in response to the October 8, 2005, earthquake in Pakistan. More than 20,000 patients received care during a 4-month period. An initially high surgical workload quickly decreased while the volume of primary care patients increased, eventually accounting for 90% of patient visits. Our experience supports deploying primary care-oriented units for humanitarian missions.

Franco, C., E. Toner, et al. (2006). "Systemic collapse: Medical care in the aftermath of Hurricane Katrina." Biosecur Bioterror **4**(2): 135-46.

This article describes and analyzes key aspects of the medical response to Hurricane Katrina in New Orleans. It is based on interviews with individuals involved in the response and on analysis of published reports and news articles. Findings include: (1) Federal, State, and local disaster plans did not include provisions for keeping hospitals functioning during a large-scale emergency; (2) the National Disaster Medical System (NDMS) was ill-prepared for providing medical care to patients who needed it; (3) there was no coordinated system for recruiting, deploying, and managing volunteers; and (4) many Gulf Coast residents were separated from their medical records. The article makes recommendations for improvement.

Gavagan, T. F., K. Smart, et al. (2006). "Hurricane Katrina: medical response at the Houston Astrodome/Reliant Center Complex." South Med J **99**(9): 933-9.

On September 1, 2005, with only 12 hours notice, various collaborators established a medical facility--the Katrina Clinic--at the Astrodome/Reliant Center Complex in Houston. By the time the facility closed roughly two weeks later, the Katrina Clinic medical staff had seen over 11,000 of the estimated 27,000 Hurricane Katrina evacuees who sought shelter in the Complex. Herein, we describe the scope of this medical response, citing our major challenges, successes, and recommendations for conducting similar efforts in the future.

Grantham, H. (2006). "Tsunami ECHO Team response." Prehosp Disaster Med **21**(5): 366-7.

Hanfling, D. (2006). "Equipment, supplies, and pharmaceuticals: how much might it cost to achieve basic surge capacity?" Acad Emerg Med **13**(11): 1232-7.

The ability to deliver optimal medical care in the setting of a disaster event, regardless of its cause, will in large part be contingent on an immediately available supply of key medical equipment, supplies, and pharmaceuticals. Although the Department of Health and Human Services Strategic National Stockpile program makes these available through its 12-hour "push packs" and vendor-managed inventory, every local community should be funded to create a local cache for these items. This report explores the funding requirements for this suggested approach. Furthermore, the response to a surge in demand for care will be contingent on keeping available staff close to the hospitals for a sustained period. A proposal for accomplishing this, with associated costs, is discussed as well.

Hick, J. L., D. Hanfling, et al. (2004). "Health care facility and community strategies for patient care surge capacity." Ann Emerg Med **44**(3): 253-61.

Recent terrorist and epidemic events have underscored the potential for disasters to generate large numbers of casualties. Few surplus resources to accommodate these casualties exist in our current health care system. Plans for "surge capacity" must thus be made to accommodate a large number of patients. Surge planning should allow activation of multiple levels of capacity from the health care facility level to the Federal level. Plans should be scalable and flexible to cope with the many types and varied timelines of disasters. Incident management systems and cooperative planning processes will facilitate maximal use of available resources. However, resource limitations may require implementation of triage strategies. Facility-based or "surge in place" solutions maximize

health care facility capacity for patients during a disaster. When these resources are exceeded, community-based solutions, including the establishment of off-site hospital facilities, may be implemented. Selection criteria, logistics, and staffing of off-site care facilities is complex, and sample solutions from the United States, including use of local convention centers, prepackaged trailers, and State mental health and detention facilities, are reviewed. Proper pre-event planning and mechanisms for resource coordination are critical to the success of a response.

Kaji, A., K. L. Koenig, et al. (2006). "Surge capacity for healthcare systems: a conceptual framework." Acad Emerg Med **13**(11): 1157-9.

This report reflects the proceedings of a breakout session, "Surge Capacity: Defining Concepts," at the 2006 Academic Emergency Medicine Consensus Conference, "Science of Surge Capacity." Although there are several general descriptions of surge capacity in the literature, there is no universally accepted standard definition specifying the various components. Thus, the objectives of this breakout session were to better delineate the components of surge capacity and to outline the key considerations when planning for surge capacity. Participants were from diverse backgrounds and included academic and community emergency physicians, economists, hospital administrators, and experts in mathematical modeling. Three essential components of surge capacity were identified: staff, stuff, and structure. The focus on enhancing surge capacity during a catastrophic event will be to increase patient-care capacity, rather than on increasing things, such as beds and medical supplies. Although there are similarities between daily surge and disaster surge, during a disaster, the goal shifts from the day-to-day operational focus on optimizing outcomes for the individual patient to optimizing those for a population. Other key considerations in defining surge capacity include psychosocial behavioral issues, convergent volunteerism, the need for special expertise and supplies, development of a standard of care appropriate for a specific situation, and standardization of a universal metric for surge capacity.

Kanter, R. K. and J. R. Moran (2006). "Hospital Emergency Surge Capacity: An Empiric New York Statewide Study." Ann Emerg Med.

STUDY OBJECTIVE: National policy for emergency preparedness calls for hospitals to accommodate surges of 500 new patients per million population in a disaster, but published studies have not evaluated the ability of existing resources to meet these goals. We describe typical statewide and regional hospital occupancy and patterns of variation in occupancy and estimate the ability of hospitals to accommodate new inpatients. METHODS: Daily hospital occupancy for each hospital was calculated according to admission date and length of stay for each patient during the study period. Occupancy was expressed as the count of occupied beds. Peak hospital capacity was defined as the 95th percentile highest occupancy at each facility. Data obtained from the New York Statewide Planning and Research Cooperative System were analyzed for 1996 to 2002. Patients were classified as children (0 to 14 years, excluding newborns) or adults. Vacant hospital beds per million age-specific population were determined as the difference between peak capacity and average occupancy. RESULTS: In New York State, 242 hospitals cared for a peak capacity of 2,707 children and 46,613 adults. Occupancy averaged 60% of the peak for children and 82% for adults, allowing an average statewide capacity for a surge of 268 new pediatric and 555 adult patients for each million age-specific population. After the September 11, 2001, attacks, in the New York City region,

a discretionary modification of admissions and discharges resulted in an 11% reduction from the expected occupancy for children and adults. CONCLUSION: Typically, there are not enough vacant hospital beds available to serve 500 children per million population. Modified standards of hospital care to expand capacity may be necessary to serve children in a mass-casualty event.

Kanter, R. K. and J. R. Moran (2007). "Pediatric hospital and intensive care unit capacity in regional disasters: expanding capacity by altering standards of care." Pediatrics **119**(1): 94-100.

BACKGROUND: Federal planners have suggested that one strategy to accommodate disaster surges of 500 inpatients per million population would involve altering standards of care. No data are available indicating the extent of alterations necessary to meet disaster surge targets. OBJECTIVE: Our goal was to, in a Monte Carlo simulation study, determine the probability that specified numbers of children could be accommodated for PICU and non-ICU hospital care in a disaster by a set of strategies involving altered standards of care. METHODS: Simulated daily vacancies at each hospital in New York City were generated as the difference between peak capacity and daily occupancy (generated randomly from a normal distribution on the basis of empirical data for each hospital). Simulations were repeated 1000 times. Capacity for new patients was explored for normal standards of care, for expansion of capacity by a discretionary 20% increase in vacancies by altering admission and discharge criteria, and for more strictly reduced standards of care to double or quadruple admissions for each vacancy. Resources were considered to reliably serve specified numbers of patients if that number could be accommodated with a probability of 90%. RESULTS: Providing normal standards of care, hospitals in New York City would reliably accommodate 250 children per million age-specific population. Hypothetical strict reductions in standards of care would reliably permit hospital care of 500 children per million, even if the disaster reduced hospital resources by 40%. On the basis of historical experience that as many as 30% of disaster casualties may be critically ill or injured, existing pediatric intensive care beds will typically be insufficient, even with modified standards of care. CONCLUSIONS: Extending resources by hypothetical alterations of standards of care would usually satisfy targets for hospital surge capacity, but ICU capacity would remain inadequate for large disasters.

Kelen, G. D., C. K. Kraus, et al. (2006). "Inpatient disposition classification for the creation of hospital surge capacity: a multiphase study." Lancet **368**(9551): 1984-90.

BACKGROUND: The ability to provide medical care during sudden increases in patient volume during a disaster or other high-consequence event is a serious concern for health-care systems. Identification of inpatients for safe early discharge (ie, reverse triage) could create additional hospital surge capacity. We sought to develop a disposition classification system that categorises inpatients according to suitability for immediate discharge on the basis of risk tolerance for a subsequent consequential medical event. METHODS: We did a warfare analysis laboratory exercise using evidence-based techniques, combined with a consensus process of 39 expert panelists. These panelists were asked to define the categories of a disposition classification system, assign risk tolerance of a consequential medical event to each category, identify critical interventions, and rank each (using a scale of 1-10) according to the likelihood of a resultant consequential medical event if a critical intervention is withdrawn or withheld because of discharge. FINDINGS: The panelists unanimously agreed on a five-category

disposition classification system. The upper limit of risk tolerance for a consequential medical event in the lowest risk group if discharged early was less than 4%. The next categories had upper limits of risk tolerance of about 12% (IQR 8-15%), 33% (25-50%), 60% (45-80%) and 100% (95-100%), respectively. The expert panelists identified 28 critical interventions with a likelihood of association with a consequential medical event if withdrawn, ranging from 3 to 10 on the 10-point scale. INTERPRETATION: The disposition classification system allows conceptual classification of patients for suitable disposition, including those deemed safe for early discharge home during surges in demand. Clinical criteria allowing real-time categorisation of patients are awaited.

Klein, K. R. and N. E. Nagel (2007). "Mass medical evacuation: Hurricane Katrina and nursing experiences at the New Orleans airport." Disaster Manag Response **5**(2): 56-61.

Hurricane Katrina, a category 4 storm, struck the U.S. Gulf States in late August, 2005, resulting in the most costly and second most deadly natural disaster in recent United States history. The storm and subsequent flooding due to levee failure necessitated the evacuation of 80% of the city of New Orleans' 484,674 residents. Most of the city's hospitals and other health care resources were destroyed or inoperable. The hurricane devastated many communities, stranding people in hospitals, shelters, homes, and nursing homes. Nurses and other health care providers deployed to New Orleans to provide medical assistance experienced substantial challenges in making triage and treatment decisions for patients whose numbers far exceeded supplies and personnel. This article describes the experiences and solutions of nurses and other personnel from 3 Disaster Medical Assistance Teams assigned to the New Orleans airport responsible for perhaps the most massive patient assessment, stabilization, and evacuation operation in U.S. history. As the frequency of disasters continues to rise, it is imperative that the nursing profession realize its value in the disaster arena and continually take leadership roles.

Kost, G. J., N. K. Tran, et al. (2006). "Katrina, the tsunami, and point-of-care testing: optimizing rapid response diagnosis in disasters." Am J Clin Pathol **126**(4): 513-20.

We assessed how point-of-care testing (POCT), diagnostic testing at or near the site of patient care, can optimize diagnosis, triage, and patient monitoring during disasters. We surveyed 4 primary care units (PCUs) and 10 hospitals in provinces hit hardest by the tsunami in Thailand and 22 hospitals in Katrina-affected areas. We assessed POCT, critical care testing, critical values notification, demographics, and disaster responses. Limited availability and poor organization severely limited POCT use. The tsunami impacted 48 PCUs plus island and province hospitals, which lacked adequate diagnostic instruments. Sudden overload of critical victims and transportation failures caused excessive mortality. In New Orleans, LA, flooding hindered rescue teams that could have been POCT-equipped. US sea, land, and airborne rescue brought POCT instruments closer to flooded areas. Katrina demonstrated POCT value in disaster responses. We recommend handheld POCT, airborne critical care testing, and disaster-specific mobile medical units in small-world networks worldwide.

Krol, D. M., M. Redlener, et al. (2007). "A mobile medical care approach targeting underserved populations in post-Hurricane Katrina Mississippi." J Health Care Poor Underserved **18**(2): 331-40.

On August 29, 2005, Hurricane Katrina devastated the Gulf Coast Mississippi region, damaging health care infrastructure and adversely affecting the health of populations left

behind. Operation Assist, a project of the Children's Health Fund and the Columbia University Mailman School of Public Health, operated mobile medical units to provide health services to underserved populations in the affected areas. Data collected from all patient encounters from September 5-20, 2005 demonstrate that in addition to common respiratory illnesses, skin conditions, and minor injuries, a high proportion of visits were for vaccine administration and chronic medical problems including hypertension, diabetes, and asthma. Mobile medical units staffed by primary care clinicians experienced in dealing with the clinical and social needs of the underserved and comfortable working in a resource-poor environment can make a positive contribution to post-disaster care.

Lafuente, C. R., V. Eichaker, et al. (2007). "Post-Katrina provision of health care to veterans in a mobile clinic: Providers' perspectives." J Am Acad Nurse Pract **19**(8): 383-91.

Purpose: To describe the challenges faced by health care providers in the aftermath of one of the worst natural disasters in the United States. Data sources: Eight health care providers describe their perceptions of the care they provided to veterans at a mobile clinic in the aftermath of Hurricane Katrina. This informal report used Giorgi's phenomenological approach to gathering and analyzing information provided in written response to eight specific questions. Conclusions: Four broad categories of challenges and concerns are discussed in this article: (a) What was important in the provision of care for the veterans, (b) the hindrances encountered, (c) factors that facilitated the care given, and (d) the perceived effects of the care they provided. Three key themes characterized the lived experience of the eight participants: uncertainty, deprivation, and stabilization. Although this was not a formal research study, the authors and participants were able to use their research backgrounds and understandings to organize and make sense of their experiences during this chaotic period. Implications for practice: As hurricane season in the United States and the anniversary of Hurricane Katrina (August 2005) approach, it is hoped that this report on the experiences and recommendations of health care providers will benefit other providers in similar situations.

Leder, H. A. and P. Rivera (2006). "Six days in Charity Hospital: two doctors' ordeal in Hurricane Katrina." Ann Ophthalmol (Skokie) **38**(1): 13-9.

Hurricane Katrina devastated the city of New Orleans as well as a large section of the Gulf Coastal region of the United States. Herein, we present a first-hand view of physicians who were actually running the hospital of a major medical center during this natural disaster. This event demonstrates the vulnerability of basic human services, including health care even in industrialized, wealthy countries.

Manley, W. G., P. M. Furbee, et al. (2006). "Realities of disaster preparedness in rural hospitals." Disaster Manag Response **4**(3): 80-7.

Disaster preparedness has always been an area of major concern for the medical community, but recent world events have prompted an increased interest. The health care system must respond to disasters of all types, whether the incidents occur in urban or rural settings. Although the barriers and challenges are different in the rural setting, common areas of preparedness must be explored. This study examines the experiences of rural hospital emergency departments with threat preparedness. Data were gathered through a nationwide survey to describe emergency department experience with specific incidents, as well as the frequency of occurrence of these events. Expanding surge

capacity of hospitals and developing a community-wide response to natural or human-made incidents is crucial in mitigating long-term effects on the health care system. Analysis of preparedness activities will help identify common themes to better prioritize preparedness activities and maximize a hospital's response capabilities.

Millin, M. G., J. L. Jenkins, et al. (2006). "A comparative analysis of two external health care disaster responses following Hurricane Katrina." Prehosp Emerg Care **10**(4): 451-6.
OBJECTIVE: Hurricane Katrina severely disrupted the health services in the U.S. Gulf Coast, necessitating an external health care response. The types and needs of patients following such an extensive event have not been well described. The objective of this study was to analyze the types of patients treated in two temporary clinics and to identify differences between them. METHODS: Two temporary sites were established: a disaster medical assistance team-based site in Mississippi and a volunteer-based site near New Orleans. Data were abstracted from patient charts for the two days of simultaneous operation: September 11 and 12, 2005. Each patient's age group, disposition, and primary discharge diagnosis was categorized and analyzed with descriptive and comparative statistics. RESULTS: There were a total of 501 patient encounters. The most common presentation overall was for chronic health conditions such as medication refills (20.6%), immunizations (11.0%), obtaining community resources (6.0%). and management of acute exacerbation of chronic hypertension (4.6%). There were important differences; the Mississippi site treated more acute conditions than the Louisiana site, including lacerations (13.7% vs. 0%; $p < 0.001$), musculoskeletal injuries (9.4% vs. 2.6%; $p < 0.001$), and other nonspecified injuries (3.0% vs. 0.4%; $p = 0.020$). CONCLUSIONS: With extensive damage to a health care system, these temporary clinics staffed by out-of-State volunteers provided needed health care. The most common health problems were related to chronic disease, primary health care, and routine emergency care, not to the direct impact of the hurricane. In addition to treating minor injuries, disaster planners should prepare to provide primary health care, administer vaccinations, and provide missing long-term medications.

Nieburg, P., R. J. Waldman, et al. (2005). "Hurricane Katrina. Evacuated populations--lessons from foreign refugee crises." N Engl J Med **353**(15): 1547-9.

Phillips, S. (2006). "Current status of surge research." Acad Emerg Med **13**(11): 1103-8.
The dramatic escalation of bioterrorism and public health emergencies in the United States in recent years unfortunately has coincided with an equally dramatic decline in the institutions and services we rely on for emergency preparedness. Hospitals in nearly every metropolitan area in the country have closed; those that remain open have reduced the number of available beds. "Just in time" supplies and health professional shortages have further compromised the nation's overall surge capacity. Emergency departments routinely operate at capacity. These circumstances make evidence-based research on emergency preparedness and surge capacity both more urgently needed and more complex. The Agency for Healthcare Research and Quality and other government and private agencies have been rapidly widening the field of knowledge in this area in recent months and years. This report focuses primarily on the work of the Agency for Healthcare Research and Quality.

Plotinsky, R. N. (2006). "Handwashing in a Texas evacuation center after Hurricane Katrina,

2005." Am J Infect Control **34**(5): 327.

Policy, C. f. H. (2007). Adapting Standards of Care Under Altered Conditions (DRAFT), Columbia University School of Nursing.

Rivara, F. P., A. B. Nathens, et al. (2006). "Do trauma centers have the capacity to respond to disasters?" J Trauma **61**(4): 949-53.

BACKGROUND: Concern has been raised about the capacity of trauma centers to absorb large numbers of additional patients from mass casualty events. Our objective was to examine the capacity of current centers to handle an increased load from a mass casualty disaster. METHODS: This was a cross-sectional study of Level I and II trauma centers. They were contacted by mail and asked to respond to questions about their surge capacity as of July 4, 2005. RESULTS: Data were obtained from 133 centers. On July 4, 2005 there were a median of 77 beds available in Level I and 84 in Level II trauma centers. Fifteen percent of the Level I and 12.2% of the Level II centers had a census at 95% capacity or greater. In the first 6 hours, each Level I center would be able to operate on 38 patients, while each Level II center would be able to operate on 22 patients. Based on available data, there are 10 trauma centers available to an average American within 60 minutes. Given the available bed capacity, a total of 812 beds would be available within a 60-minute transport distance in a mass casualty event. CONCLUSIONS: There is capacity to care for the number of serious non-fatally injured patients resulting from the types of mass casualties recently experienced. If there is a further continued shift of uninsured patients to and fiscally driven closure of trauma centers, the surge capacity could be severely compromised.

Romano, M. (2007). "Emergency preparedness. Texas system scores first with inflatable surge hospital." Mod Healthc **37**(1): 16.

Sanford, C., J. Jui, et al. (2007). "Medical treatment at Louis Armstrong New Orleans International Airport after hurricane Katrina: The experience of disaster medical assistance teams WA-1 and OR-2." Travel Med Infect Dis **5**(4): 230-5.

In the week following Hurricane Katrina, over 3000 patients were evacuated by air from a triage and medical treatment station at the Louis Armstrong New Orleans International Airport. This represents the largest air evacuation in history. Over 24,000 additional evacuees were transported from the airport to shelters. Disaster Medical Assistance Teams (DMATs) from several US States were deployed to the Louis Armstrong New Orleans International Airport to provide medical care to those evacuated from New Orleans. Despite warning from the US National Weather Service of catastrophic damage to New Orleans, adequate medical staffing was not attained at the airport triage station until 6 days after the hurricane struck. Organizational lapses, including inadequate medical and operational planning, understaffing of medical personnel, and failure to utilize Incident Command System, diminished the effectiveness of the Hurricane Katrina New Orleans Medical Operation.

Sariego, J. (2006). "CCATT: a military model for civilian disaster management." Disaster Manag Response **4**(4): 114-7.

When major disasters incapacitate hospitals and definitive care facilities-as Hurricane Katrina did in 2005-a crisis point is rapidly reached. Critical care services are often the

first to be overwhelmed. Personal experiences and regional disaster plans were examined in the wake of Hurricane Katrina to uncover shortfalls in delivery of care and resources. A search was undertaken for a viable model for delivering critical care services in the immediate post-disaster period. Such a model already exists in the US Air Force's (USAF) Critical Care Air Transport Teams (CCATT). These teams have functioned well during recent military conflicts by providing both ground critical care and transport of high-risk, severely injured patients. The need for augmented critical care and transport resources in the face of overwhelming casualties in the civilian environment does not require a de novo construct. The USAF's CCATT model should be easily adaptable to the civilian disaster scenario.

Saunders, J. M. (2007). "Vulnerable populations in an American Red Cross shelter after Hurricane Katrina." Perspect Psychiatr Care **43**(1): 30-7.

TOPIC: During Katrina, people suddenly encountered multiple losses, including homes, finances, medications, and death of loved ones. The Model of Vulnerable Populations illustrates how reduced resources placed individuals at greater risk for harm. PURPOSE: Using vignettes and the Model of Vulnerable Populations, a psychiatric nurse discusses her experiences as an American Red Cross psychiatric/mental health nurse volunteer after the Katrina disaster at a Mississippi shelter. CONCLUSIONS: The role of the mental health nurse volunteer was demonstrated by assessment and interventions of advocacy, referral, crisis intervention, and general support and education. PRACTICE IMPLICATIONS: Using the Model of Vulnerable Populations, psychiatric nurses can improve mental health assessment and services by counseling, advocacy, triage, and teaching disease prevention strategies such as hand washing.

Schultz, C. H. and K. L. Koenig (2006). "State of research in high-consequence hospital surge capacity." Acad Emerg Med **13**(11): 1153-6.

High-consequence surge research involves a systems approach that includes elements such as health care facilities, out-of-hospital systems, mortuary services, public health, and sheltering. This article focuses on one aspect of this research, hospital surge capacity, and discusses a definition for such capacity, its components, and future considerations. While conceptual definitions of surge capacity exist, evidence-based practical guidelines for hospitals require enhancement. The Health Resources and Services Administration's (HRSA) definition and benchmarks are extrapolated from those of other countries and rely mainly on trauma data. The most significant part of the HRSA target, the need to care for 500 victims stricken with an infectious disease per one million population in 24 hours, was not developed using a biological model. If HRSA's recommendation is applied to a sample metropolitan area such as Orange County, California, this translates to a goal of expanding hospital capacity by 20%-25% in the first 24 hours. Literature supporting this target is largely consensus based or anecdotal. There are no current objective measures defining hospital surge capacity. The literature identifying the components of surge capacity is fairly consistent and lists them as personnel, supplies and equipment, facilities, and a management system. Studies identifying strategies for hospitals to enhance these components and estimates of how long it will take are lacking. One system for augmenting hospital staff, the Emergency System for Advance Registration of Volunteer Health Professionals, is a consensus-derived plan that has never been tested. Future challenges include developing strategies to handle the two different types of high-consequence surge events: 1) a focal, time-limited event (such as an

earthquake) where outside resources exist and can be mobilized to assist those in need and 2) a widespread, prolonged event (such as pandemic influenza) where all resources will be in use and rationing or triage is needed.

Schultz, C. H., J. L. Mothershead, et al. (2002). "Bioterrorism preparedness. I: The emergency department and hospital." Emerg Med Clin North Am **20**(2): 437-55.

Fundamental precepts in hospital-based planning for bioterrorist events include having a comprehensive well-rehearsed disaster plan that is based on a threat and vulnerability analysis. JCAHO Environment of Care Standards and an "all-hazards" approach to disaster planning and management form the basis for a solid bioterrorism response plan. During preparation, education and training are imperative. Clinicians must maintain a high index of suspicion for use of bioterrorism agents, be able to make a rapid diagnosis, and promptly initiate empiric treatment. Other personnel from administration, security, public relations, laboratory, pharmacy, and facilities management should be familiar with the plan, know when and how to activate it, and understand their roles in the response. A recognized incident command system should be used. Hospital leadership must be aware of the facility's capabilities and capacities, and should have plans for expansion of services to meet the surge in demand. The command center should coordinate emergency personnel teams, decontamination, security, acquisition of supplies, and notification of public health and other authorities and the media. If the plan is ever implemented, stress management with psychologic support will play an important role in recovery.

Schultz, C. H. and S. J. Stratton (2007). "Improving hospital surge capacity: a new concept for emergency credentialing of volunteers." Ann Emerg Med **49**(5): 602-9.

In the event of a large-scale terrorist attack, natural disaster, or other public health emergency, hospitals could not absorb the thousands of victims generated by the catastrophe. Even if hospitals can increase bed capacity by 20% to 30%, as some suggest, the problem of staffing these beds remains unresolved. One possibility is to rapidly increase hospital staff by providing emergency credentialing to volunteer health care professionals. Several organizations and systems currently exist that can deliver medical providers to a stricken area. Unfortunately, all of these have serious limitations that would make it difficult for hospitals to use the health care workers provided by such entities. We propose a unique concept that will allow hospitals to rapidly expand their staff with practitioners that meet their credentialing requirements. The concept is a database created by each hospital in a community that includes credentialed physicians, nurses, behavioral health professionals, and ancillary staff. The database will be limited to physicians with full privileges and all licensed hospital employees in good standing not currently facing disciplinary issues or practice restrictions. The individual databases would then be combined and stored on a single computer system housed at the county health care agency or other mutually acceptable organization, with copies sent back to participating hospitals and the State. After a large disaster, health care workers from unaffected areas, including other States, can approach affected hospitals and volunteer their services. Practitioners listed on the database could be given privileges in their specialties for 72 hours. This process is accurate, inexpensive, efficient, sustainable, and Joint Commission on Accreditation of Healthcare Organizations compliant and permits the immediate credentialing of large numbers of medical volunteers.

Sirbaugh, P. E., K. D. Gurwitch, et al. (2006). "Caring for evacuated children housed in the

Astrodome: creation and implementation of a mobile pediatric emergency response team: regionalized caring for displaced children after a disaster." Pediatrics **117**(5 Pt 3): S428-38.

Sobieraj, J. A., J. Reyes, et al. (2007). "Modeling hospital response to mild and severe influenza pandemic scenarios under normal and expanded capacities." Mil Med **172**(5): 486-90.

William Beaumont Army Medical Center conducted quantitative modeling with FluSurge 2.0 (Centers for Disease Control and Prevention) to determine hospital capabilities in responding to patient arrival surges of the Fort Bliss population in mild 1968-type and severe 1918-type influenza pandemics. Model predictions showed that William Beaumont Army Medical Center could adequately care for all intensive care unit (ICU) and non-ICU patients during a mild pandemic, particularly if hospital capacity was expanded using the emergency management plan, excess surge plan, or activation of a contagious disease outbreak facility. For a severe influenza pandemic, model predictions showed that hospital beds, ventilators, and other resources would be exceeded within 2 or 3 weeks. Even at maximal hospital expansion, for a 12-week severe pandemic with a 35% attack rate there would be peak demand for 214% of available non-ICU beds, 785% of ICU beds, and 392% of ventilators. Health care planners and decision-makers should prepare for resource challenges when developing plans for the next influenza pandemic.

Velazquez, L., S. Dallas, et al. (2006). "A PHS pharmacist team's response to Hurricane Katrina." Am J Health Syst Pharm **63**(14): 1332-5.

PURPOSE: The challenges and victories that a team of Public Health Service (PHS) pharmacists experienced in establishing pharmacy operations at a Federal medical station and conducting outreach missions are described. SUMMARY: The Gulf coast of Mississippi and southeast Louisiana were struck on August 29, 2005, by Hurricane Katrina, which caused widespread infrastructure damage, flooding, and loss of life. A team of 70 officers, which included 8 pharmacists, arrived on September 3 and 4 to establish a 480-bed Federal medical station in an aircraft hangar at the naval air station (NAS) in Meridian, Mississippi. Numerous challenges were encountered, including identifying a secure space for a pharmacy, determining how to manage the immediate shortage of medications, devising a dispensing system specific to controlled medications, handling personal medications brought in by patients, and maintaining adequate pharmacy staffing to provide for hospital needs. Two outreach efforts were also undertaken. The first was to assist the NAS pharmacy department, which was overwhelmed with nearly 800 Navy and Coast Guard personnel who were displaced to the Meridian NAS. The second outreach effort was to augment the staff at a local free clinic in Meridian, which needed help to set up their clinic so they could handle the influx of hurricane victims who were arriving daily. CONCLUSION: A team of PHS pharmacists established a pharmacy, provided pharmaceutical care, and conducted outreach programs to aid victims of Hurricane Katrina.

Vest, J. R. and A. M. Valadez (2006). "Health conditions and risk factors of sheltered persons displaced by Hurricane Katrina." Prehosp Disaster Med **21**(2 Suppl 2): 55-8.

INTRODUCTION: During disasters, public health departments assume the role of maintaining the health of displaced persons. Displaced persons arrive with acute and chronic conditions as well as other risk factors. Descriptions of these conditions may aid future shelter planning efforts. METHODS: Approximately 4000 individuals from New Orleans, displaced by Hurricane Katrina, were sheltered in Austin, Texas. A stratified

random sample of the population was selected using individual beds as the primary sampling unit. Adults were interviewed about their acute symptoms, chronic diseases, and other risk factors. RESULTS: The results indicate a substantial proportion of adults arrived with some symptoms of acute illness (49.8%). A majority of the adults reported living with a chronic condition (59.0%), and the prevalence of some chronic conditions was higher than that of the general population. Also, several factors that could complicate service delivery were prevalent. DISCUSSION: Acute illnesses present transmission risks within the shelter. Furthermore, chronic diseases must be managed and may complicate care of acute illnesses. Risks like activity limitation or substance abuse may complicate shelter operations. Defining the potential scope of the illness burden may be used to help public health departments better plan the services they must deliver to displaced populations.

Voelker, R. (2006). "Mobile hospital raises questions about hospital surge capacity." JAMA **295**(13): 1499-503.

Appendix B. 1. Executive Advisory Panel Members

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Appendix B. 2. Patient Selection Tool Advisory Panel Members

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Appendix C: Alternate Care Facilities for Disasters—Questionnaire

As part of a previous task order for the Agency for Healthcare Research and Quality (AHRQ), we developed a site selection matrix for use in the selection of Alternative Care Sites (a.k.a. Alternate Care Facilities, ACF) for use in providing health care during mass casualty events and disasters[1]. We have been asked to revise this tool based on the experience gained during Hurricanes Katrina and Rita and as the result of other planning. We have also been asked to develop protocols for staffing and supplying an ACF, again with input from those who have participated in their use or have done extensive planning for their use.

You have been identified as an individual who can make a significant contribution to this area of knowledge. Therefore, we kindly ask if you, with input from those you work with (or worked with at your ACF), would be willing to spend a few minutes to assist us with this task. We have developed a questionnaire to facilitate this process (attached). It has two parts; the first asks for information about your actual or planned ACF. The second component asks for your thoughts concerning the usefulness of the different categories of information used in the facility selection tool and for any suggested additions or deletions. Because of the sensitive nature of some of these data, information supplied will be treated confidentially and will not be identified as to any source.

Thank you in advance for your assistance with this project, which we feel has the potential to help all of us in providing the best possible care for patients during mass casualty events and disasters when we may need to use non-traditional sites of care. The summary results of this effort will be submitted to AHRQ and will subsequently be released to the medical community.

Please feel free to call or email me if I can be of any help with your participation in this project, or if you feel you are unable to assist us with this project.

Most sincerely,

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AHRQ Contract No. HHSA290200600020, Task Order No. 4
Title: Disaster Alternate Care Facilities

[1] *Rocky Mountain Regional Care Model for Bioterrorist Events: Locate Alternate Care Sites During an Emergency*. December 2004. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/research/altsites.htm

Part One
Information about your past or planned Alternate Care Facility

I. Initial Data.

Please check all that apply to your Alternate Care Facility (ACF), whether actually used or planned:

These responses are based upon:

☐ A planned ACF (if so, please consider all questions to be in the future tense)

☐ An actual ACF

If an actual ACF, please supply:

Location/Name: _____

Dates of operation: _____

Total number of patients cared for: _____

Total number of staff utilized: _____

Structure utilized:

☐ Structure of opportunity (a pre-existing building that is, in lieu of its primary purpose, used as a medical facility)

If so, please specify the structure used (e.g. hotel, retail store, etc):

_____

☐ Portable (a structure, such as a tent, that can be transported to a location for use as a medical facility)

☐ Mobile (a wheeled structure, such as a trailer, that can be moved or driven to a location for use as a medical facility)

Function:

Inpatient Level Care:

Health Care Augmentation (augmentation of existing in-patient health care delivery systems, either on site at the traditional health care delivery location or at a more distant site)

☐ Adult

☐ Pediatric

☐ Special Populations (e.g. prisoners)

Please specify: _____

_____

☐ Special Medical Needs Populations (e.g. hemodialysis, chronic ventilator)
Please specify: _____

_____

Health Care Replacement (replacement of existing in-patient health care systems that have been directly affected by the incident)

☐ Adult

☐ Pediatric

☐ Special Populations (e.g. prisoners)

Please specify: _____

_____

☐ Special Medical Needs Populations (e.g. hemodialysis, chronic ventilator)

Please specify: _____

_____

Ambulatory/Primary Care:

Health Care Augmentation (augmentation of existing out-patient health care delivery systems, either on site at the traditional health care delivery location or at a more distant site)

☐ Adult

☐ Pediatric

☐ Public Health Support (vaccinations, prophylaxis, triage)

Health Care Replacement (replacement of existing in-patient health care systems that have been directly affected by the incident)

☐ Adult

☐ Pediatric

☐ Special Populations (e.g. prisoners)

Please specify: _____

_____

☐ Special Medical Needs Populations (e.g. hemodialysis, chronic ventilator)

Please specify: _____

_____

☐ Shelter Support (routine ambulatory medical support necessary for shelter operations for a displaced population)

Governance: (the organization responsible for the oversight, command, and operation of the ACF)

☐ Institutional/Health care system (Hospital or hospital system based)

- ☐ Nonprofit/Volunteer/Faith-Based (e.g. Red Cross, Salvation Army)
- ☐ Local (Local government/Municipal/County)
  - ☐ Office of Emergency Management
  - ☐ Public Health
  - ☐ Other: Please specify: _____
- ☐ State
- ☐ Federal
  - ☐ DHHS
    - ☐ PHS (FMS)
    - ☐ NDMS (DMAT, NMRT)
    - ☐ Other: Please specify: _____
  - ☐ Department of Defense

II. ACF Command Structure

A. General

1. Did you set up an incident command system at your ACF?

   ☐ Yes ☐ No

   1a. If so, what was it modeled on (e.g. HICS)? _____

2. Was an Incident Action Plan (IAP) prepared?

   ☐ Yes ☐ No

   2a. If yes, was it done:

   ☐ Once ☐ Daily ☐ Other frequency: _____

   2b. Was the IAP a:

   ☐ Previously prepared form ☐ A form we created

3. Were there any problems with the command structure?

☐ Yes ☐ No

3a. If yes, please elaborate: _____

_____

4. How was the transfer of command facilitated at change of shift:

☐ Verbal report ☐ Written report

☐ Both ☐ Other (Please specify): _____

5. How did you decide to open your ACF: _____

_____

_____

6. Who made the decision (by job title, not name): _____

_____

7. How did you decide to close it:_____

_____

_____

8. What, if any, were the predetermined requirements to be met before closing it: _

_____

_____

9. Did you have a concept of operations (or operational plan) which you adhered to?

☐ Yes ☐ No

10. Did your command staff have National Incident Management System and/or Hospital Incident Command System Training?

☐ Yes ☐ No

10a. If yes, what percentage of the staff were trained: _____%

11. Did you have any issues related to the Emergency Medical Treatment & Active Labor Act (EMTALA) during the operation of your ACF?

☐ Yes ☐ No

11a. If so, what were the issues and how did you handle them: _____

_____

_____

12. Were there any issues related to public information management?

☐ Yes ☐ No

12a. If so, please specify: _____

_____

_____

13. How did you coordinate the dispatch of EMS resources to the ACF with the everyday dispatch operations of the local community: _____

_____

_____

_____

14. Did you have rules of behavior for the patients (e.g. curfew, no weapons, lights out time)?

☐ Yes ☐ No

14a. If yes, please list or include with the returned questionnaire: _____

_____

_____

_____

15. Are there any other issues with regards to the command of an ACF which you would like to share? _____

_____

_____

_____

_____

B. Security

1. Did you have uniformed security personnel at your ACF?

   ☐ Yes ☐ No

2. If so, were any of them armed?

   ☐ Yes ☐ No

3. Did you have any issues with violence at your ACF?

   ☐ Yes ☐ No

4. Are there any other issues related to the security of an ACF that you believe are important and wish to share? _____

   _____

   _____

   _____

   _____

III. ACF Planning Component

A. General

1. Did you have a plan for an ACF before you were called upon to stand one up?

   ☐ Yes ☐ No

2. Did you select the site for your ACF after the need for it arose or had the site been determined in advance of the event?

   ☐ When need arose ☐ Determined in advance

3. Were you familiar with the Rocky Mountain Regional Care Model for Bioterrorist Events Alternative Care Site Selection Tool prior to setting up your ACF (see Appendix A)?

   ☐ Yes ☐ No

   3a. If yes, did you use this tool to help select the site of your ACF?

   ☐ Yes ☐ No

   3b. If not, do you think it would have been helpful?

   ☐ Yes ☐ No

4. What consideration, if any, was given to locating the ACF in proximity to the transportation network and/or evacuation routes? _____

_____

_____

5. Any other issues with regards to site selection which you would like to share: _____

_____

_____

_____

_____

6. Did you have plans for the following services?

- ☐ Social services
- ☐ Cleaning services
- ☐ Recreational services
- ☐ Warehousing services
- ☐ Contracting/purchasing services
- ☐ Other services:

  Please specify: _____

7. Are there any other issues with regards to additional services which you would like to share: _____

_____

_____

_____

B. Bed/Case Mix

1. What percentage of each of the following did you *expect/plan for* at your ACF?

☐ Acute care cases: _____ % ☐ Chronic care cases: _____ %

☐ Pediatric patients: _____ % ☐ Adult patients: _____ %

☐ No specific expectations

2. What percentage of each of the following did you *actually receive* at your ACF?

☐ Acute care cases: _____ % ☐ Chronic care cases: _____ %

☐ Pediatric patients: _____ % ☐ Adult patients: _____ %

☐ No specific expectations

3. Have you changed your bed/case mix plans for future ACFs as a result?

☐ Yes ☐ No

3a. If so, please specify: _____

C. Pediatrics

1. Was the care of children an integral part of your initial plan?

☐ Yes ☐ No

2. Was there a specific location within your ACF set aside for the care of children?

☐ Yes ☐ No

3. Which of the following types of individuals were involved in the planning for the care of children (please check all that apply)?

☐ Emergency nurses?

☐ Emergency physicians?

☐ Midlevel practitioners (e.g. nurse practitioners, physician assistants)?

☐ Pediatric emergency physicians?

☐ Pediatric nurses?

☐ Other?

Please specify: _____

4. Were any of the following consulted to help plan for pediatric patients (please check all that apply)?

☐ Pediatric tertiary care center?

☐ Pediatrics department at your local hospital?

☐ Other?

Please specify: _____

IV. ACF Logistics

A. General

1. Who provided the equipment to stand up your ACF? _____

_____

_____

2. Who provided you with re-supply? _____

_____

_____

3. Did you tap into any federally administered medical supply caches?

☐ Yes ☐ No

3a. If so, please specify which one(s): _____

_____

_____

4. Did you have any partnerships with private industry to help provide service or supplies at your ACF (e.g. commercial pharmacies)?

☐ Yes ☐ No

5. How did you feed the health care workers and patients at your ACF? _____

_____

_____

_____

6. Did you also provide food for the families of patients?

☐ Yes ☐ No

7. Was the dining area separate from the treatment area?

☐ Yes ☐ No

7. Did you have medications for children?

☐ Yes ☐ No

7a. If so, did you have appropriate type and quantity of medications for pediatric patients?

☐ Yes ☐ No

7b. Who supplied them? _____

_____

_____

8. Did you have other medical supplies for children?

☐ Yes ☐ No

8a. If yes, did you have adequate quantity?

☐ Yes ☐ No

8b. Who supplied them? _____

_____

_____

9. What supplies, equipment, and drugs were most important to the operation of your ACF? _____

_____

_____

_____

10. What supplies/equipment/drugs that you needed could not be obtained? _____

_____

_____

_____

11. Are there any other issues with regards to general logistics that you would like to share: _____

_____

_____

_____

B. Staffing & Credentialing

1. Did you have set shifts which were worked by health care providers?

☐ Yes ☐ No

1a. If yes, were they:

☐ 8 hour ☐ 12 hour ☐ Other: _____

2. Did you have different staffing patterns for day vs. night?

☐ Yes ☐ No

3. How many physicians did you have working at one time? _____

_____

4. How many midlevel practitioners did you have working at one time? _____

_____

5. How many nurses did you have working at one time? _____

_____

6. How many emergency medical technicians did you have working at one time? _

_____

7. How many pharmacists did you have working at one time? _____

_____

8. Did you have dedicated clerks and/or administrative support?

☐ Yes ☐ No

8a. If so, how many did you utilize? _____

_____

9. Did you have health care providers from different health care facilities/systems working in your ACF?

☐ Yes ☐ No

9a. If so, were there any command and control issues and how did you resolve them? _____

_____

_____

10. Were there any out-of-state licensing issues?

☐ Yes ☐ No

11. Did you have a need for interpreter services?

☐ Yes ☐ No

11a. If so, how did you meet that need?

☐ Trained interpreters

☐ Bilingual/multilingual care providers

☐ Family members

☐ Other

Please specify: _____

12. What types of volunteers were utilized?

☐ None ☐ Medical ☐ Non-medical

12a. Did you have a volunteer coordinator?

☐ Yes ☐ No

13. What lessons did you learn with regards to integrating non-health care provider volunteers into the operation of the ACF? _____

_____

_____

_____

14. How did you verify the credentials of health care providers who worked in your ACF? _____

_____

_____

15. Did you create identification cards for the workers?

☐ Yes ☐ No

15a. If so, what did you use (e.g. commercially available product)? _____

16. Is there anything you would do differently for worker identification in the future?

17. Did you have anyone impersonate a health care provider and try to gain access to your ACF?

☐ Yes ☐ No

18. What steps were taken at the State level to facilitate the use of out-of-state medical professionals? _____

19. Did your staff have any specialized pre-event training ?

☐ Yes ☐ No

If yes, please specify: _____

20. Are there any other issues with regards to staffing or credentialing which you would like to share (including what other staff you found helpful to have)?

V. ACF Operations

A. General

1. In retrospect, would you have preferred your ACF to have been administered by a different agency?

   ☐ Yes ☐ No

   1a. If yes, why?

   _____

   _____

   _____

2. Was your ACF part of a shelter for otherwise healthy evacuees or was it purely a medical treatment facility?

   ☐ Shelter care ☐ Medical treatment facility

3. Was your goal to serve as a place for hospitals to send their patients in order to "decompress" or were you a primary receiving facility?

   ☐ Hospital decompression ☐ Primary receiving facility

4. How did you provide for the daycare needs of workers with young children? ___

   _____

   _____

   _____

5. Did you provide child care for children of patients when there were no family members available?

   ☐ Yes ☐ No

6. Did you have any patients being cared for at the intensive care unit level?

   ☐ Yes ☐ No

7. Do you think it is reasonable for an ACF to be expected to do so?

   ☐ Yes ☐ No

8. If you provided inpatient care, did you have a formal rounds system?

   ☐ Yes ☐ No

9. Did you place a limit on the number of visitors/family members?

☐ Yes ☐ No

10 If you had an inpatient component, did you take for feed and shelter the family/visitors of patients?

☐ Yes ☐ No

11. Did you integrate any outside State or Federal teams such as Disaster Medical Assistance Teams into your operations?

☐ Yes ☐ No

12. Were there any lessons learned with regards to doing so?

☐ Yes ☐ No

12a. If yes, please elaborate: _____

_____

13. Did you allow pets in your facility?

☐ Yes ☐ No

14. Did you identify any issues with your facility that impaired operations (e.g. inability to control lighting, presence of noise, etc.)?

☐ Yes ☐ No

14a. If yes, please elaborate: _____

_____

_____

_____

15. Are there any other issues with regards to operations which you would like to share: _____

_____

_____

_____

B. Patient Care

1. Did patients self-present to your ACF?

☐ Yes ☐ No

2. In your opinion, should ambulances bring patients directly to the ACF or should they go to the hospital (if available) first?

☐ Directly to ACF ☐ Hospital first

3. Did you have mental health professionals at your facility?

☐ Yes ☐ No

4. Did your definition of futility of care change during your operations?

☐ Yes ☐ No

4a. If so, what guidelines did you use? _____

_____

_____

5. Which of the following did you have available to <u>provide care</u> for children?

☐ Emergency nurses?
☐ Emergency physicians?
☐ Family physicians?
☐ Pediatric emergency physicians?
☐ Pediatric midlevel practitioners?
☐ Pediatric nurses?
☐ Pediatricians?
☐ Other?

Please specify: _____

6. Did you provide immunizations at your ACF?

☐ Yes ☐ No

7. Did you conduct infectious disease surveillance at your ACF?

☐ Yes ☐ No

7a. If so, how? _____

_____

_____

8. Did you have a system for transferring patients who were beyond the capabilities of your ACF to a hospital?

☐ Yes ☐ No

9. Please indicate any of the following that were utilized in those hospitals to make room for patients transferred from the ACF:

☐ Early discharge home

☐ Transfer of hospital patients to the ACF

☐ Transfer of ICU patients to the ward

☐ Transfer of hospital patients to another hospital

9a. What criteria were used in selecting these patients, if known? _____

_____

_____

10. Did your ACF specifically take care of populations with special medical needs?

☐ Yes ☐ No

10a. If yes, please indicate those populations:

☐ Dialysis patients

☐ Mental health patients

☐ Ventilator patients

☐ Other (please specify): _____

11. Are there any groups of patients who should have their own ACF set up in order to concentrate resources and/or expertise?

☐ Yes ☐ No

11a. If yes, please specify: _____

_____

_____

11. Given your experience is it reasonable to expect an ACF to care for multiple ventilator-dependent patients?

☐ Yes ☐ No

12. Are there any other issues with regards to special medical needs populations or patient care in general that you would like to share? _____

_____

_____

_____

C. Patient Tracking

1. How did you know which patients were currently at your facility? _____

_____

_____

2. How did you know where in the facility they were located? _____

_____

3. How did you track the disposition of patients (discharge or transfer)? _____

_____

_____

_____

4. Had you developed a disaster patient tracking system prior to the event?

☐ Yes ☐ No

5. How did you keep medical records? _____

_____

_____

_____

6. Who became the custodian of those records after the event? _____

_____

_____

_____

7. Did you keep families together or were adult and pediatric patients separated?

☐ Families kept together ☐ Adult/peds separated

8. Did you separate spouses in order to maintain separation of the sexes?

☐ Yes ☐ No

9. In your opinion, is it better to keep families together throughout the care process?

☐ Yes ☐ No

9a. If yes, how do you maintain patient privacy? _____

_____

_____

_____

VI. ACF Finance

1. Did you have an active finance section?

☐ Yes ☐ No

2. What percentage of the operating costs were born by each of the following? (total should equal 100%):

____% Volunteer

____% Charitable donations

____% Institution/Health care system

____% Private corporations

____% Local/Municipal/County

____% State

____% Federal

____% Other (please specify): _____

3. Did you submit an invoice to the Federal Government in order to be reimbursed for expenses which you accrued during the operation of your ACF?

☐ Yes ☐ No

3a. If so, have you received any reimbursement from them yet?

☐ Yes ☐ No

4. Are there any "secrets" which you discovered to increase your chances of being reimbursed by the Federal Government: _____

_____

_____

_____

5. Did you have any issues of health care workers becoming ill or injured while working at the ACF?

☐ Yes ☐ No

6. Were there any accompanying workmen's compensation issues that accompanied this?

☐ Yes ☐ No

6a. If so, what were they and how did you handle them? _____

_____

_____

_____

_____

7. Are there any other issues with regards to finance which you would like to share?

_____

_____

_____

_____

_____

Any other comments that would benefit communities that would be setting up an Alternative Care Facility would be very much appreciated: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Part 2

Comments on the Alternate Care Facility Selection Tool

In the table below, you will find the complete list of the various factors that were originally selected for inclusion in the Alternate Care Facility (ACF) Selection Tool.

- The **first column** lists the specific factors as found in the tool.
- The **second column** provides an explanation of the intent/definition for that factor.
- In the **third column** we are asking that you please rate the importance of that factor in making a decision regarding the selection of a site for one of two types of ACF, the first being for providing "clinic" type ambulatory medical care at a shelter housing displaced persons and the second being at an ACF providing in-patient level care (as well as ambulatory care), using the following rating system:

  3 – this factor is an essential component for selecting a site for an ACF
  2 – this factor is of moderate importance for selecting a site for an ACF
  1 – this factor is of minor importance for selecting a site for an ACF
  0 – this factor is unnecessary for selection of a site for an ACF

ACF Selection Tool Factor	Explanation / Definition	Rating (please circle)	
Infrastructure		**Shelter Care**	**ACF In-Patient and Ambulatory Care**
Doors/corridors adequate size for gurneys	This factor evaluates the width of the doorways to allow for passage of gurneys and stretchers.	3 2 1 0	3 2 1 0
Floors	This factor evaluates the nature of the floor in the proposed site and whether or not it is acceptable for use for gurneys and stretchers.	3 2 1 0	3 2 1 0
Loading dock	This factor evaluates whether or not there is a loading dock available for use to deliver supplies, equipment and patients as well as pickup patients needing transfer away from the ACF.	3 2 1 0	3 2 1 0

ACF Selection Tool Factor	Explanation / Definition	Rating (please circle)	
Parking for staff and visitors	This factor evaluates whether or not there is adequate parking for staff personnel and visitors.	3 2 1 0	3 2 1 0
Roof	This factor evaluates whether or not there is a roof on the proposed ACF site and its' integrity to protect the housed staff and patients.	3 2 1 0	3 2 1 0
Toilet facilities/showers (#)	This factor evaluates if there is adequate toilet and shower capability and capacity.	3 2 1 0	3 2 1 0
Ventilation	This factor evaluates if there is adequate ventilation in the proposed ACF site.	3 2 1 0	3 2 1 0
Walls	This factor evaluates if there are adequate side walls for the protection of staff and patients.	3 2 1 0	3 2 1 0
Additional Infrastructure Factors:			
		3 2 1 0	3 2 1 0
		3 2 1 0	3 2 1 0
		3 2 1 0	3 2 1 0
Total Space and Layout			
Auxiliary spaces (Rx, counselors, chapel)	This factor evaluates if there is adequate space in the proposed site to permit designated area for patient treatment and procedures, counseling and chapel.	3 2 1 0	3 2 1 0
Equipment/supply storage area	This factor evaluates if there is adequate space in the proposed site for equipment/supply cache and storage.	3 2 1 0	3 2 1 0
Family area	This factor evaluates if there is adequate space for relatives/family/friends to gather.	3 2 1 0	3 2 1 0
Food supply and prep area	This factor evaluates if the proposed site has adequate food preparation capability and supply.	3 2 1 0	3 2 1 0
Lab specimen handling area	This factor evaluates if the proposed site has adequate space to provide a lab specimen handling area.	3 2 1 0	3 2 1 0
Mortuary holding area	This factor evaluates if the proposed site has an area that can be used as a mortuary holding area.	3 2 1 0	3 2 1 0
Patient decontamination areas	This factor evaluates if the proposed site has facilities that could be used for patient/victim decontamination.	3 2 1 0	3 2 1 0
Pharmacy area	This factor evaluates if there is adequate space that could be used as a pharmacy area.	3 2 1 0	3 2 1 0
Staff areas	This factor evaluates if there is adequate space that could be used for staff rest and rehab.	3 2 1 0	3 2 1 0
Additional Space/Layout Factors:			

ACF Selection Tool Factor	Explanation / Definition	Rating (please circle)	
		3 2 1 0	3 2 1 0
		3 2 1 0	3 2 1 0
		3 2 1 0	3 2 1 0
Utilities			
Air conditioning	This factor evaluates if the proposed ACF site has air conditioning capability (if needed).	3 2 1 0	3 2 1 0
Electrical power (backup?)	This factor evaluates if the proposed site has adequate electrical power as well as a backup electrical power source.	3 2 1 0	3 2 1 0
Heating	This factor evaluates if the proposed site has adequate heating capability (if needed).	3 2 1 0	3 2 1 0
Lighting	This factor evaluates if the proposed site has adequate lighting to provide for patient care needs and treatment.	3 2 1 0	3 2 1 0
Refrigeration	This factor evaluates if there is adequate refrigeration capability, both for food as well as lab specimen storage.	3 2 1 0	3 2 1 0
Water (hot?)	This factor evaluates if there is adequate water supply (in general) as well as hot water.	3 2 1 0	3 2 1 0
Additional Utility Factors:			
		3 2 1 0	3 2 1 0
		3 2 1 0	3 2 1 0
		3 2 1 0	3 2 1 0
Communication			
Communication(# phones, local/long distance, intercom)	This factor evaluates if there is adequate telephone communications capability (in terms of numbers of phones, phone lines, and both local and long distance) as well as internal site communication such as intercom capability.	3 2 1 0	3 2 1 0
Two-way radio capability to main hospital	This factor evaluates if the proposed site can accommodate radio communication from the site to receiving hospitals.	3 2 1 0	3 2 1 0
Wired for IT and internet access	This factor evaluates if the proposed site is wired for IT and internet access.	3 2 1 0	3 2 1 0
Additional Communication Factors:			
		3 2 1 0	3 2 1 0

ACF Selection Tool Factor	Explanation / Definition	Rating (please circle)	
		3 2 1 0	3 2 1 0
		3 2 1 0	3 2 1 0
Other Services			
Ability to lock down facility	This factor evaluates the ability for the proposed ACF site to be secured and locked down (if necessary).	3 2 1 0	3 2 1 0
Accessibility/proximity to public transportation	This factor evaluates the accessibility of and proximity to public transportation of the proposed ACF site.	3 2 1 0	3 2 1 0
Biohazard and other waste disposal	This factor evaluates the capacity of the proposed site for appropriate management of biohazard and other medical waste disposal.	3 2 1 0	3 2 1 0
Laundry	This factor evaluates the capacity and capability of the proposed site to launder dirty linens.	3 2 1 0	3 2 1 0
Ownership/other uses during disaster	This factor evaluates the ownership of the proposed facility, the ease with which the facility can be obtained for use as an ACF and whether or not the site is slated for other uses in the event of a mass casualty incident.	3 2 1 0	3 2 1 0
Oxygen delivery capability	This factor evaluates the capability of the proposed site to provide oxygen to patients.	3 2 1 0	3 2 1 0
Proximity to main hospital	This factor evaluates the proximity of the proposed site to referral hospitals.	3 2 1 0	3 2 1 0
Additional "Other Services" Factors:			
		3 2 1 0	3 2 1 0
		3 2 1 0	3 2 1 0
		3 2 1 0	3 2 1 0

Appendix D: Alternate Care Facility Questionnaire --- Summary of Results

Notes: Remarks in brackets [example] have been edited by the reviewing investigator to preserve confidentiality. No other changes have been made to survey data. The use of a period (.) in any field indicates no data was received from the survey respondent for that item.

Survey Question/Topic	Site 1	Site 1 '	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
ACF Planned?	.	.	.	.	.	.	.	.	.	Yes
ACF Actual?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	.
ACF Location?	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	.
ACF Dates?	Sept 1, 2005 - Sept 15, 2005	August 31-September 20, 2005	Sept 1-16, 2006	Immediate post-Katrina	.	Sept. 2 – Oct. 14, 2005	September 2005	August 05	September/ October 2005	.
Number of ACF patients?	>4500	over 27,000 shelter evacuees with over 10,000 patients seen in clinic and over 13,000 immunizations given	> 10,000	> 6000 / 800 beds	> 20,000	7500	200	700	340	.
Number of ACF staff?	There were several sources of staff - for practical purposes I will only represent the outlay that [we] provided	unknown	7 common staff/1,000 workers	several hundred	400 pt 4-2 rest of the number 50	60-100 at any one time	100	Volunteers - several hundred Medical staff, in total given ~300 (some were transiently involved)	plus or minus 200	.
Structure of Opportunity ACF?	Yes	Yes	Yes	Yes	Yes	.	Yes	Yes	Yes	Yes

Survey Question/Topic	Site 1	Site 1 '	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Structure of Opportunity Detail	[Clinic housed in convention center structure]	Convention center structure used for operations	Convention center, parking garage level	Gymnasium	.	.	Closed VA hospital	Former [redacted] box store	College gymnasium.	.
Portable ACF?	.	.	.	.	.	.	.	.	.	Yes
Mobile ACF?	.	.	.	.	.	Yes	.	.	.	.
Inpatient Augmentation: Adult?	.	Yes	.	.	.	.	Yes	Yes	Yes	Yes
Inpatient Augmentation: Pediatric?	.	Yes	.	.	.	.	Yes	Yes	.	Yes
Inpatient Augmentation: Special Populations?	.	Yes	.	.	.	.	Yes	.	.	.
Inpatient Augmentation: Special Populations: Detail	.	.	.	.	.	.	Special needs population that required routine medical support. The acuity was similar to a nursing home.	.	COPD, asthma, diabetes	.
Inpatient Augmentation: Special Medical Needs?	.	.	.	.	.	.	.	.	.	.
Inpatient Augmentation: Special Medical Needs: Detail	.	.	.	Reserved nursing home - did not receive/treat evacuated in-patients.	.	.	.	.	COPD, asthma, diabetes	.
Inpatient Replacement: Adult?	.	.	.	Yes	Yes	Yes	.	.	.	Yes
Inpatient Replacement: Pediatric?	.	.	.	Yes	Yes	Yes	.	.	.	Yes

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Inpatient Replacement: Special Populations?	.	.	.	.	Yes	Yes	.	.	.	Yes
Inpatient Replacement: Special Populations: Detail	.	.	.	.	VA pt., nursing home pt, ICU patients	Chronic disease - patients without meds or care for 1 week post-storm	.	.	.	If an incident such as pan flu or a hurricane strike necessitates it we would utilize an ACF for possible temporary replacement.
Inpatient Replacement: Special Medical Needs?	.	.	.	Yes	Yes	.	.	.	.	.
Inpatient Replacement: Special Medical Needs: Detail	.	.	.	Hemodialysis, rescued nursing home pts, amputees	Ventilator pt	.	.	.	.	.
Ambulatory Augmentation: Adult?	.	Yes	Yes	Yes	.	.	Yes	.	.	Yes

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Ambulatory Augmentation: Pediatric?	Yes – ([Location] sent its Emergency Center (EC) for all practical purposes – it was an effort to prevent [Location] from exceeding its surge capacity)	Yes	Yes	Yes	.	.	Yes	.	.	Yes
Ambulatory Augmentation: Public Health?	.	Yes	Yes	Yes	.	.	.	.	.	Yes
Ambulatory Replacement: Adult?	.	.	.	Yes	Yes	Yes	Yes	.	.	Yes
Ambulatory Replacement: Pediatric?	.	.	.	Very minimal	Yes	Yes	Yes	.	.	Yes
Ambulatory Replacement: Special Populations?	.	.	.	.	Yes	Yes	.	.	.	.
Ambulatory Replacement: Special Populations: Detail	.	.	.	.	VA, nursing home, ICU	Chronic disease - patients without meds or care for 1 week post-storm	.	.	.	.
Ambulatory Replacement: Special Medical Needs?	.	.	.	Yes	Yes	.	.	.	.	.
Ambulatory Replacement: Special Medical Needs: Detail	.	.	.	.	Ventilator patient	.	.	.	.	.
Ambulatory Replacement: Shelter Support?	.	.	.	Yes	Yes	Yes	Yes	.	Yes	.

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Governance: Institutional/HC System?	Yes - With permission from [health dept] [Location] provided oversight of its staff, equipment, supplies, and pharmacy	.	.	.	.	Yes	.	.	.	Yes
Governance: Nonprofit/Volunteer?	.	.	.	.	.	.	.	.	.	.
Governance: Local?	Yes	Yes	Yes	.	.	.	.	.	Yes	Yes
Governance: Local: OEM?	Yes - provided the entire response including the ACF (both the [City] and [County])	Yes	Yes (provided admin support only)	.	.	.	.	.	.	Yes
Governance: Local: Public Health?	Yes - County Health Dept was large part of the governance of the [site] and therefore they were incident command for the [clinic]	Yes – [County] Public Health & Environmental Services	Yes (medical oversight)	.	.	.	.	.	Yes	Yes

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Governance: Local: Other?	.	Yes – [hospital district]	Yes (County hospital system; [system name])	.	.	.	.	.	.	Shared responsibility between the hospitals, Emergency Management and Public Health with the use of State Medical Response Teams (similar to Federal DMAT) serving in a command role.
Governance: State?	.	Yes	.	Yes	.	.	.	Yes	.	Yes
Governance: Federal?	.	Yes	.	.	Yes	.	.	.	.	.
Governance: Federal: DHHS?	.	.	.	.	.	.	.	.	.	.
Governance: Federal: PHS?	.	.	.	.	.	.	Yes	.	.	.
Governance: Federal: NDMS?	.	Yes	.	.	Yes	.	.	.	.	.
Governance: Federal: DoD?	.	.	.	.	.	.	.	.	.	.
Governance: Federal: Other?	.	.	.	.	.	.	Yes - and VA staff managed & support.	.	.	.
ICS?	Yes	Yes	Yes	No - One already existed	Yes	Yes	No	Yes	Yes	Yes

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ICS Model	[name redacted] did not set up an IC – [name redacted] did have their IC at the [site] and it was based on HICS	NIMS	Generic ICS	.	No - standard ICS for a DMAT	HICS & NIMS	.	Not a formal one. [respondent identifying information redacted] Responsibility was divided with a "deputy" in charge of nursing, medicine, facility setup/management	NEMS	NIMS
IAP?	Don't know - we were not involved at that level of IC	Yes	No - medical operation provided intel and data to local emergency management agency.	No - not formally	No	Yes	No	Do not know what this is but if it involved a form, no.	Yes	Yes
IAP Frequency	.	Daily	.	.	.	.	.	.	.	Daily
IAP Frequency - Other	.	.	.	Not formally though a per 12 hours shift plan was produced, as well as daily OPS briefings	.	.	.	.	.	If needed one would be established for each 12 hour operational period (12 hours).
IAP Type	.	Previously prepared form	.	.	.	Previously prepared form	.	.	A form we created	Previously prepared form
Command Problems	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No

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Command Problem Detail	We were not invited to play initially - we just showed up - initially we were not noticed because of the chaos of the moment - the [name redacted] version of the medical director showed up on night one and began to move pedi pts through the system – [name] noticed us and felt like we knew what we were doing and gave us more space – we filled that … – when things calmed down [name] began to see us as a rogue clinic and made it clear that we had to operate	Local government command & control integrating with private partners (e.g. NGO's, CBO's, private partners, etc.)	.	Internal issues of authority and command. Did not impact us as responders from other State but caused issues between local, county, and State players	Above the commanders that came with the teams there was no one above there to give direction.	1st time tested; learning curve	No problem internal to the shelter - confusing command structure outside of the shelter	.	.	.

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Transfer of Command	Verbal report Other	Verbal report Written report	Verbal report	Verbal report	Verbal report	Verbal report	Verbal report Written report	Verbal report	Verbal report Written report	Verbal report
Transfer of Command Detail	[Clinic] Medical Directors came from [location] so we formally checked out. [name] IC meetings were held twice daily and our main medical director was eventually invited and made the official [name] IC medical director for the [clinic]	.	.	.	.	.	N/A	.	.	.

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How Open?	Two of our faculty showed up at the request of the news media to help with the response and noticed that there were only 2 pediatricians on site - hours later we were coordinating the pediatric response	State & county elected officials made decision	Joint decision between OEM (city Office of Emergency Management), city EMS medical directors, and county public health authority.	Was already open. Local & regional health care providers had staffed it for about 48 hours prior to our arrival	Federal deployment	Request via EMAC	N/A	Ask to do so by the State	E.O.C. contacted the M.O.C who contacted the Public Health Department	Assessment of surge impact.
Who Decides?	The physician who showed up and took command of the pedi clinic contacted the admin for [location] who then agreed to full out resource support of the effort.	Governor & County Judge	Medical director of county public health dept (health authority)	Unknown	NDMS/DHS	State of [State Redacted]	N/A	An assistant to the Governor	Health Authority. After being asked by the fire chief.	Collective decision between the Incident Commander, the Emergency Manager, the Medical Director and the Health Department Director with hospital input.

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How Close?	When it was clear that patient volume had dropped significantly, the med director from [Location] worked with [Locations] to relinquish control over the [clinic] to the [Location] and they sent a pedi medical director to take over (transitioned over one weekend).	Another impending Category 5 Hurricane was set to strike community - so shelter was closed & residents evacuated.	Declined in shelter population as evacuees were placed in more permanent housing locations	After about 8-9 days patients were no longer arriving for care - and the patients we had were able to be shipped out	NDMS/DHS - all the patients had been evacuated	Demobilization plan prepared between [State] Office of EMS & [State] Dept. of Health	N/A	The expected surge was directed elsewhere.	Once all evacuees had a safe place to be transferred to.	Collective decision between the ACF Commander, the Emergency Manager, the Medical Director, the Health Department Director and the hospitals.
Pre-Close Check?	Lack of patients	Ensuring all evacuees were relocated safely to other shelter facilities elsewhere	None	Local and regional health care facilities were decompressed enough to receive patients directly. Transfer of PMAC patients were completed	No more patients	Rebuilding and increased service delivery of the affected community hospital.	Patient load, discharge philosophy, shelter occupants desire to go home ASAP	There were no predetermined requirements	All evacuees had to have a safe home.	N/A

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CONOPS?	Yes - remember that we were separate for the [site redacted] plan – we used our own concept of operations – 50 years in the business of taking care of [patients]	Yes	No - we made it up as we went along	Yes and no; our initial ops plan did not entail such a large number of patients with so many needs	No	Yes	Yes	Yes - although not written	Yes	Yes
NIMS/HICS Training?	No	Yes	Yes	Yes - our own team did	Yes	No	Yes	No	Yes	Yes
Training %?	.	60	25	75	100	.	20	.	20	UND
EMTALA?	No	Unknown	No	No	No	No	No	No	No	Yes

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EMTALA Detail	.	.	.	.	It was an evacuation - patients came from high centers which had nothing to us (aid station)	.	.	.	.	We anticipate there will be issues related to the use of non-hospital facilities and issues if hospitals send people to an ACF without a full assessment first.
Info Issues?	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes

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Info Issue Detail	This response was under [name] so all PI management had to come through them - they had a very organized and orchestrated effort but other than [respondent identifying information redacted] was not privy to the process.	Provision of credible, timely, and accurate information for such a large-scale response was challenging.	Difficult to control media and VIP access to ACF causing issues regarding privacy.	The information we received was erroneous - constantly	The news media was all over the place	Multiple news agencies conducting stories/interviews. We had our own PIO which facilitated this.	.	Volunteers were carelessly photographing patients. We stopped this.	.	Since in almost every major incident there are public information issues we anticipate there will be when an ACF is open and operational.

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Dispatch?	[Site] did this - basically the EMS provider who normally provided EMS services for the [convention center] continued to provide transport on the complex proper, with the help of dozens of agencies nationwide. Local 911 services remained under the control of the [city] EMS	EMS resources were coordinated through the regional medical operations center.	We had 2 EMS strategies: (1) 24/7 ALS ground ambulance for emergency transports (2) 24/7 BLS/ALS ground ambulance for routine/ scheduled transports	Local EMS reps were at the ACF	We didn't that was a huge issue EMS did not stand up and take a role. This is a huge issue I think.	AMR was the local provider. We became part of their receiving facility network. They provided communi-cations to us.	N/A	.	Local EMS was coordinated through the incident command	Through the Incident Commander and appropriate ESFs at the EOC.
Behavior Rules?	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No

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Behavior Rule Detail	you'll have to ask [name] this question	Curfew at 11pm, no weapons allowed, lights were dimmed at night, no loud music, wrist-band identification for shelter evacuees	.	It really wasn't an issue. we had National Guard and campus police nightly	.	8:00 PM community curfew. No alcohol sold.	.	No weapons. Lights out.	1) No weapons 2) lights out at 22:00 3) No alcohol 4) No drugs - except for home meds. All medicines dispensed by onsite nurses & pharm.	These will be developed with enhancement of the CONOPS for ACFs.

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Other Command Issues?	Yes I believe that true IC has to come from local municipalities but medical command of a specific clinic should come from the resource supplying the service. Most importantly the resource must be knowledgeable experienced, and capable of handling the response – the response should NEVER be recreated by another resource that has no knowledge or experience in the response [redacted]	Command & control was key with necessity to consider extending NIMS/ICS to anticipated partners; credentialing of medical personnel; restricting access to shelters and ACF for appropriate persons.	1) Command staff were not relieved of their daily job function to perform oversight/command functions. These docs worked virtually 24-7 for the entire duration including working their scheduled ED shifts. 2) Use of ICS structure for running the ACF was a significant help in organizing the medical response	Seems the biggest question is who "owns" it - who is responsible in the end - is it the ranking physician or local health or State health depts?	There needs to be not only a command structure but also a continued hierarchy above - this is so questions can be answered and decisions made to help facilitate. Ex: ops need guidance or they will [indecipherable] too much and be overwhelmed. [redacted]	Should be a physician (IC) - not hospital administrator.	The structure was similar to the management structure @ VA hospital	Need adaptability. Need "connectors" who can marshal resources and/or know where to seek them. Suspend rules and take risks. Never say no to a disaster related need if no one else can address that need.	Ensure before the shelter is established that there is a clear organizational structure & that this information is available to the evacuees & local community. All command staff should wear ID clothing to identify them.	There will have to be accords reached between the command of the ACF and the medical operations decision making portion of the ACF.

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Security Personnel?	.	Yes	Yes	Yes - eventually	Yes	Yes	Yes	Yes	Yes	Yes
Armed Security?	.	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Violence Issues?	.	No	No	No	No	No	No	No	No	Do not anticipate any but that is why armed security from law enforcement is part of the plan.
Other Security Issues?	.	Planning for more security personnel at the beginning of the event, education of security personnel for restricted access to sensitive areas, badging/ identification of ACF staff so security could easily determine who required access and who did not.	The ACF was co-located within a large city shelter. The security element provided for the shelter then was easily shared between the two operations (shelter and ACF)	Initially only had campus security - so male students were enlisted to "look like" security. Once National Guard arrived they set a perimeter and actually placed a temporary fence around entire area	.	We used our own local police - they travel with us. All on SWAT team and all sworn as US Marshals (allows jurisdiction over county lines).	We anticipated the need of visible security presence and requested additional support. The enforcement staff came slowly and with much confusion. We also gave staff sensitivity training before they were deployed.	Have a metal detector.	Local State guard, campus police & city police very helpful.	There needs to be a commitment from law enforcement to support ACF operations. Oftentimes they State that they will be too busy to assist with security issues but it will be key for them to provide resources during an ACF activation.

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ACF Advance Plan?	No	No	No	No	No - I had been a part of others so I had input in the beginning	Yes	No	No	Yes	Yes - State guidelines have been written and work is being done to get counties to develop their own local plans for ACF operation.
ACF Site Selection?	[name] question	When need arose	When need arose	Determined in advance	When need arose	When need arose	When need arose	When need arose	Determined in advance	When need arose Determined in advance Some local sites have been identified but the plan is open for sites to also be selected as the need arises.
RMBT Tool?	No	No	No	Yes	No (and I had been a part of this for a while)	No	No	No	No	Yes
RMBT Tool Use?	.	.	.	No	.	.	.	.	.	Yes
RMBT Tool Help?	Not sure	No	.	Yes - we have utilized in our State ([name redacted])	.	.	May be.	.	.	.

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ACF Transport Location?	[name] question	Minimal at most.	The ACF was purposely co-located within a shelter to bring care to the evacuees. No consideration was given to transportation or evac routes	Don't know situation, it was established in [location] - one of the primary evacuation routes	In the Katrina situation a good choice - many mtg I have been in do not address this	Located at intersection of 2 main highways - 1 mile from local hospital (which was closed due to damage).	N/A	Extreme consideration.	Very important	Consideration was given to this aspect since it will be important to have quick ingress and egress along with traffic routes that are not bottled up.

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ACF Site Selection Issues?	[name] question	Multiple multi-use facilities on one large property was very helpful and allowed expansion of service provision as the need dictated.	.	Proximity to a operating health care facility particularly if capable of running labs and other diagnostic tests	1. Easy bus routes for the elderly	Did not set-up on hospital grounds. This was to allow access of building crews, logistics, etc. so facility could be rebuilt.	[Location] is in rural [State], there was a lack of medical support as well as social support.	What was available.	Caution with gymnasiums: college is very protective of their floors & equipment.	We are planning to use one of four different locations for ACFs. First would be near the scene, such as near a stadium that may have been hit to avoid having to transport large numbers of people. Second would be sites midway between the scene and hospital
Social Svc Plan?	.	Yes	Yes - planned jointly between ACF and pub health authority	.	.	Yes	Yes	No	Yes	.

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Cleaning Plan?	.	.	Yes - planned jointly between ACF and pub health authority	.	.	Yes	Yes	No	Yes	Yes
Recreation Plan?	.	.	Yes - planned by OEM due to shelter operations	.	.	.	Yes	No	Yes	.
Warehouse Plan?	.	Yes	Yes - planned by OEM due to shelter operations	.	.	Yes	Yes	No	Yes	Yes
Purchasing Plan?	.	Yes	Yes - planned by OEM due to shelter operations	.	.	Yes	Yes	No	Yes	Yes
Other Service Plan?	.	.	Yes - planned by ACF/pub health	.	.	Yes	.	No	Yes	Yes

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Other Service Detail	[clinic] provided physicians, nurses, clerks, runners, environmental services (janitors), social workers, pharmacy, central supply, and pediatric subspecialty services	.	Evacuee transport to city clinics, dialysis, etc. done by ACF/pub hlth; independent pharmaceutical svc	All managed by locals - we were asked for input	.	Clinical engineering (biomed equip) and security as mentioned.	.	.	.	Food service, Linen service
Other Service Issues?	.	Above services not checked in question 6 [cleaning, recreational, other] were provided but not planned for in advance - provision as the need identified.	Rehabilitation workers, pharmaceutical svc for drug prescriptions, mental health svc, phone internet-deaf svcs all aided us in bringing svc to our patients	.	.	.	Pet service, schooling for children, meals	Make up rules/solutions on the fly.	.	.
Case Mix Plan: Acute	[name] question	.	75	.	.	20	.	50	.	.
Case Mix Plan: Chronic	[name] question	.	25	.	.	40	.	50	.	.
Case Mix Plan: Pediatric	Approx 30	.	20	.	.	5	.	20	.	.
Case Mix Plan: Adult	[name] question	.	80	.	.	80+	.	80	.	.

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Case Mix Plan: Nonspecific	[name] question	Unknown as had no information on types of medical needs of population to be sheltered from [location]	.	Entire population	Yes	.	.	.	Yes	Yes
Case Mix Received: Acute	[name] question	.	10	30	5	10	.	0	20	.
Case Mix Received: Chronic	[name] question	.	90	40	95	60	30	100	80	.
Case Mix Received: Pediatric	[name] question	.	10	10	10	10	.	5	25	.
Case Mix Received: Adult	[name] question	.	90	20	90	90	.	95	75	.
Case Mix Received: Nonspecific	[name] question	Data unavailable at this time.	.	.	Rough estimates	.	.	.	.	Yes
Case Mix Plan Changed?	[name] question	.	Yes	Yes	N/A	No	Yes	.	Yes	.
Case Mix Plan Change Detail	[name] question	N/A	Significant emphasis more along the lies of chronic care issues.	If medical infrastructure is destroyed, chronic care becomes acute care fairly quickly	.	.	.	I am not involved with ACF planning	Recognized that cute care should be handled at regional hospitals.	.

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Pediatric Care Plan?	provided these services but was not invited to help with the planning - we are invited to participate in the planning for future disasters; [name] question but I will tell you that yes they thought about kids but did not consult [name] for help – they provided 2 beds to the response both of which had adults in them when we arrived	Not specified differently than other types of patients	No	Yes	Yes	Yes	No	Yes	Yes	Yes

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Pediatric Care Location?	Yes – [name redacted] – initially there was 2 beds, both with adults in them. After the arrival of [name] docs – they took over 4 chairs then within 6-8 hours [name] medical command on site agreed that more was needed and provide a much larger space. [redacted]	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Pediatric Care Plan: ED Nurse?	[name] question	.	.	Yes	.	.	Yes	.	Yes	.
Pediatric Care Plan: ED Doc?	[name] question	.	.	Yes	.	Yes	Yes	.	Yes	Yes
Pediatric Care Plan: Midlevel?	[name] question	.	.	Yes	.	.	.	.	Yes	.
Pediatric Care Plan: Ped ED Doc?	[name] question	.	Yes - pediatric physician	Yes	.	.	Yes	Yes	.	.
Pediatric Care Plan: Ped Nurse?	[name] question	.	Yes	Yes	.	.	.	Yes	.	.

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Pediatric Care Plan: Other?	[name] question	.	Yes	Yes	Yes	.	.	.	Yes	.
Pediatric Care Plan: Other Detail	[name] question	Via coordination with community (private) provider for pediatrics services. Please note, pediatrics was considered in general as an important area to be addressed but no in-advance specific plans were in place.	ACF medical command staff, EM physicians, EMS fellows	Pediatricians	Feds plan and on the fly	.	.	.	Family medicine residents from [location]. PharmD residents.	.
Pediatric Care Consult: Care Center?	[name] question - but basically NO	.	Yes	.	.	.	.	No	.	.
Pediatric Care Consult: Peds Dept?	[name] question - but basically NO	.	No	.	.	.	.	No	Yes	.

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Pediatric Care Consult: Other?	[name] question - but basically NO	.	Yes	.	.	.	.	No	Yes	.
Pediatric Care Consult: Other Detail	.	Yes, as above in question 3.	county public health dept	.	.	None	.	.	Family medicine doctors.	.
Equip Provider?	[name] question	Under [name] Medical Branch Operations, with ACF primarily equipped by [hospital].	Majority from the six [garbled] hospitals in town, some from private vendor and/or clinicians	Was standing when we arrived. [College] provided much - SNS eventually arrived	We brought it - Feds. DMAT	Self	Public health service and VA	Donation from hospitals and a purchased "kit"	Health department.	State regional ACF caches.
Resupply Provider?	[name] question	As above - with additional supplies by private donors, community agencies/ groups, and volunteers.	Majority from the six hospitals in town, some from private vendor and/or clinicians, plus county health dept.	Locals, State of [State] & State of [State], FEMA, HHS	Feds & national stockpile	ESF-8 (FEMA) and donations	VA	N/A	Health department. Local direct medical equipment.	Additional State resources as well as community and possibly Federal resources.
Federal Cache?	[name] question	No	No	Yes	Yes	Yes	Yes	No	No	Yes

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Cache Detail	.	.	.	Don't know specifics	SNS	ESF-8 (FEMA) as above. We were the first to deploy the SNS-VMI!!!	.	.	.	Plan to make use of NDMS resources and Federal Medical Stations as well as Strategic National Stockpile resources.
Private Partners?	[name] question - I know that CVS was consulted - and [name] was eventually tapped	Yes	Yes - partnerships developed during the event	Yes – [name] EMS/Health Dept. had MOU's with local suppliers	No - donations came in	No	Yes - Wal-Mart	Yes	Yes	Yes
Food Supply?	[name] question	Via a contract food supply service at [site].	Patients fed by shelter operations (American Red Cross); workers fed by private vendor on contract to city OEM	Initially local restaurants and then [college] food service all pitched in	We initially had nothing but then used MRE (meals ready to eat). Hard for the elderly.	Local faith-based group on-site, then FEMA logistics	Contract	Restaurants /catering services supplied food	Local restaurant provided food. Food bank. College cafeteria.	Plan involves using ESF - Mass Care resources to accomplish this.

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Family Food Supply?	Yes – [name] question	Yes	No - patients and family members were fed by ARC as a result of residing in the co-located shelter	No	Yes	No	Yes	Yes	Yes	No
Separate Dining?	[name] question	Yes	Yes - dining in shelter, treatment in ACF	Yes for staff; No for patients	Yes for us; No for patients	Yes	Yes	Yes	Yes	Yes
Pediatrics Meds?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enough Pediatrics Meds?	No	Yes	Yes	.	Whatever was donated	Yes	Yes	Yes	Yes	.

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Pediatrics Meds Supplier?	Initially the [hospital] provided pharmacy services - the supplies were dramatically under stocked so [name] moved in and opened and resupplied its own pharmacy and central supply	All medications were initially filled by off-site [hospital] pharmacies and eventually transitioned (a few days into the response) to CVS Pharmacy, which provided two mobile pharmacy units at no cost.	Same as for other supplies	Local resources in [location]	.	SNS-VMI	Wal-Mart	Industry, hospital, NGO. (pharma)	Local pharmacies . Samples from doctors.	.
Other Pediatrics Supplies?	[name] question - same answer as the pharmacy question	Yes	Yes	.	Yes	Yes	.	Yes	Yes	Yes
Enough Other Pediatrics Supplies?	.	Yes - unknown but likely so	Yes	.	No	Yes	.	Yes	Yes	.
Other Pediatrics Supplier?	.	If so, via clinical providers and likely donated by them as well.	Same as for other supplies	Minimal supplies initially - after 72 hours or so received quantities from Fed.	We brought them in the Fed cache	ESF-8 (FEMA)	.	Industry, hospital, NGO. (pharma)	Local hospitals.	.

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Most Important Supplies?	See attached document [article]	Medications for chronic medical conditions (such as HTN, DM, etc.) were critical as were a constant re-supply of necessary equipment to run an ACF (such as wheelchairs, lab supplies, needles, gloves, gowns, masks, etc.).	Wound care supplies, point-of-care laboratory capabilities, and free standing pharmacy which stood up within the first 3-4 days of our operation. A local pharmacy chain built, de novo, a full service operation just outside the ACF site	Point of care testing: only had 2 glucometers when we arrived, EKG & other diagnostic tools. IV fluids and starter kits. Patient gowns, sheets, blankets etc.	1. Sheets - stretchers bed pans hand sanitizer diapers (young and old) chronic antiHTN and DM meds	Chronic meds (insulin, anti-hypertensives, pain mgt.) and antibiotics	.	Cots, chronic disease meds such as insulin	1) beds & cots with special mattresses. 2) dispensary run by pharmacist - antibiotics, nebulizations. 3) nebulizers & O2 supplies. 4) glucose monitoring equipment. 5) crash carts. 6) radios for communication	.
Supplies Unavailable?	We had everything we needed once [name] took over	Eventually everything was provided for - the issue was time and determining how to get the supplies in need.	.	After 48 hours desperately needed capability for dialysis - local resources were brought in.	Oxygen was difficult	None	Difficulty time with narcotics. Lack of DEA # for the shelter.	0	None.	.

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General Logistics Issues?	let the regional resource do what it does every day - don't recreate the wheel	.	We offered on-site general dentistry and refraction for eyeglasses which was a great value to our patients. Also working narcotic addicted and dialysis patients into pre-existing care patterns within the community.	Once the Federal supplies arrived a forklift was needed to move pallets, break them down, and repackage for use. A strong, young non-medical labor pool was essential.	.	We were self-supporting for 72 hours.	.	Need portable shower/toilet facilities	Identify before the disaster who will provide logistics.	.
Set Provider Shifts?		.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shift Type	8 hour 12 hour 24 hour	.	8 hour 12 hour 4 hour	12 hour	12 hour	12 hour	12 hour	Other	8 hour	12 hour

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Shift Type Detail	This is for the [Clinic] only - housed within the much larger [name] response ACF residing in the [site] - [name] will have to answer the questions from their perspective	.	All scheduling based upon volunteer availability	.	Eventually we had shifts	.	.	As available	As per availability of community resources	.
Different Day/Night Staffing?	Yes	.	Yes	It varied by number of volunteers	No	Yes	Yes	Yes	Yes	.
Docs on Shift?	Varied from day one to day 14 – [identifying details redacted: summary: 4 trained medical directors, 4 scheduled specialist physicians], lots of extra volunteers	.	16 am/4 pm	Varied - generally 25/more in the beginning but specialists who really were not comfortable with general medicine.	Unable to answer	4-5	4	4	2-3	Use military recommended guidelines.
Midlevel on Shift?	Not sure - were not scheduled but many came	.	None	20	Unable to answer	1-2	5	3	2-3	.

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Nurses on Shift?	Same as docs above	.	20 am/6 pm	50+	Unable to answer	8-10	20	10	20-30	.
EMT on Shift?	[name] did not supply any EMTs	.	8 am/6 pm	50+	Unable to answer.	8-10	.	1-2	10	.
Pharmacy on Shift?	One around the clock (12 hour shifts)	.	2 am/1 pm	6+ (all from USHPS)	2-3	2-3	2	1-2	1-2	.
Additional Staffing Detail	.	.	.	.	Initially we had ~ 90 people 2/3 direct patient care so they had MD/nurse/ ML/EMT; 1/3 transport & holding (3 nurses 1 MD >700 pt) and 20 people offloading helicopters. Eventually increased the number of MDs/nurses (mostly) and EMT when support arrived	.	.	.	.	.

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Clerks/Admins?	Yes	.	Yes - medical records, mental health	Yes	Yes	Yes	No	Yes	Yes	Yes
Clerk/Admin Detail	One around the clock (8hour shifts)	.	5 am/1 pm - much admin work done by medical command staff due to limited admin support	Well over 50, they were college students & staff	Each team has 1-2 admin folks plus there is support from NDMS	1-2	.	~6	[name] State guard medical rangers 20.	.
Outside Providers?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outside Provider Issues?	Most pediatrician s came from [name] or its referral source ([identifying detail redacted])- so they were credentiale d through our hospital - did have some issues at time with [name] IC - most were resolved without incident	Communi-cation was continual issue so daily briefings/ updates were important.	No	Very few problems - there was so much to do no time for turn battles. We always held change of shift reports within nursing - including numbers of pts., etc.	Each team has its own. In another situation we had Marines, VA nurses & public health - they stayed together but were under a command system and understood that	None	Initially with staff from DHS. Minimal command control issue	No	No - the shelter manager & health authority kept command over the shelter.	.

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Licensing Issues?	Yes	.	No - credentialling consisted of a visual check of providers professional ID badge to verify identity and job function (RN, MD, EMT, etc)	USPHS managed these issues	Yes - for narcotic refills	Yes	Yes	No	No	.
Interpreter Services?	Yes	.	Yes	No	No	No	No	No	No	Yes
How Interpreted?	Trained interpreters Bilingual/ multilingual care providers Family members Other	.	Bilingual/ multilingual care providers Family members Other	.	.	.	.	.	.	.
Interpreter Detail	.	.	Deaf video phone system	.	.	.	.	.	If we did, we would use volunteers.	.
Volunteer Types?	Medical Non-medical	Medical Non-medical	Medical Non-medical	Medical Non-medical	Non-medical	None	Non-medical	Medical Non-medical	Medical Non-medical	Medical Non-medical
Volunteer Coordinator?	Yes – [name] used its own coordinator but [name] had its own also	Yes	Yes	Yes - college professors from campus	Not initially	No	No	Yes	Yes	Yes

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Volunteer Lessons?	They were essential	.	Pre-plan their job function (role), teach them the role, and always direct oversight of their activities	We would've failed without them. Convene a meeting, explain the prioritized issues/problems & let volunteers choose what they can help with.	They need to be given tasks as well as coordinated as a group - in [location] we had yellow shirts and if I remember correctly orange shirt folks - all faith based.	N/A	good support.	They are invaluable. Running an ACF requires acquisition of supplies, communi-cations, plant management, security, etc. Non-medical people may be expert in those fields	Their availability is haphazard.	.
Credentials Verified?	[name] used its own credentially process – [name] used its own system	.	We did not	USPHS did this	90% were all Federal	EMAC took care of that	not done, however they all came from VA with proper credentials	We did not	Local hospitals. Medical society. [name] State guard.	State is about to implement a credentialing system.
Worker ID?	Yes	.	Yes	Yes	No	Yes	No	No	Yes	Yes
Worker ID Detail	[name] used its IDs but [name] also tried numerous cards - none were successful	.	A make-shift badge maker	Actually used wrist bands the university had thousands for special events	Already had some	Yes (owned by [State] office of EMS)	US VA ID card	.	.	.

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Worker ID Lessons?	Yes - early identification - prior to the response	.	Nothing different	.	.	No	Yes, a standardized system	We had 48 hours to become operational. Worker ID's was a nicety	Identify credentials of workers prior to any event.	.
Imposters?	Yes	.	No - not that we are aware of	No - but we had a person from the media impersonate a priest to get in	Not that I was aware	No	No	No	Yes	.
Out-of-State Profs?	They allowed instant licensure with sponsorship - our section at [name] provided that sponsorship	.	The State of [State] did not assist in this issue.	Don't know. But as part of a pre-existing State team sent via EMAC we came with verified credentials	Ask [name] [email] - he coordinated with the State	Again - EMAC handled everything	None, no need.	To give blanket reciprocity and malpractice coverage to MDs and RNs from other States	Volunteer nurses were screened through the [State] nursing association.	.
Pre-Event Training?	Yes	Yes	No	.	Yes	Yes	Yes	No	Yes	Yes

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Pre-Event Training Detail	only a few	Mass medication dispensing (for health department staff).	.	Nothing could have prepared us and we only prepared for field response - and only for 72 hours	Drills	2 years of team training on [clinic]	Some has emergency disaster training and HICS training	.	Health department trained in disaster management. [State] State guard medical brigade trained in disaster management.	.
Other Staff Issues?	Credentialing must occur but a balance between rapid recruitment to meet rapid enormous need must be reached	.	Logistic/supply officer and medical records personnel very important. Pharmacists very important. We want to have a record of who (which providers) were present at given times. No easy way to credential, even now	Labor pool essential - college students particularly well suited. They all have IDs, can be verified by college. Professors & staff also extremely useful (counselors admin asst., etc.) A number of MDs with unique specialties found themselves out of the [redacted]	MDs are not the best people to have in charge - nurses are better at shifts - jobs - and people coordination	Emergency medicine, trauma surgery, orthopedic surgery, anesthesiology at first (2-3 weeks), then more primary care (FP, IM, Peds, etc.)	.	.	After action report - established a list of local physicians available in time of disaster. Established a medical reserve corp of volunteers. Utilize State guard.	.

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ACF Admin Agency?	[name] question	No	No	Yes and no	No	No	No	No	No	.
ACF Admin Agency Detail	.	.	.	Initially locals have to get things going but as other assistance arrives a collaborative approach (like Unified Commerce) developed and was very effective	.	.	.	.	.	.
ACF Purpose?	[name] question Shelter care Medical treatment facility	Shelter care	Shelter care (ACF colocated within a shelter); Medical treatment facility (operated as a standalone facility)	Shelter care Medical treatment facility Both at first then became strictly medical	Shelter care Medical treatment facility	Medical treatment facility	Medical treatment facility	Shelter care Medical treatment facility	Shelter care	Medical treatment facility
ACF Goal?	Primary receiving facility	Primary receiving facility	Primary receiving facility	Primary receiving facility	Hospital decompression Primary receiving facility	Primary receiving facility	Primary receiving facility	Hospital decompression	Hospital decompression Primary receiving facility	Hospital decompression Primary receiving facility May serve as both

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Daycare?	[name] question	Don't think we addressed via Medical Branch Operations.	No service provided. Volunteers were responsible for arranging this themselves.	N/A	N/A	N/A	N/a	N/A	Community resources. Church groups.	.
Patient Childcare?	[name] question	No	No - the shelter provided this service	Yes – [college] students	No	No - other than our staff assisting when needed	No	No	Yes	Yes
ICU Patients?	No	No	No	Yes	Yes	Yes	No	No	No	No
ICU Reasonable?	Yes – [name] question	No	No	No	Yes - with supplies skilled people and ability to place in comfort care if necessary	Yes	No	Depends	No - this would have to be a fully operational field hospital.	No
Rounds System?	.	No - of note, no inpatient care was provided at the ACF / although an observation / isolation unit was set-up	Not applicable	Nursing did; medicine did not - formally	Yes	Yes	Yes	.	Yes	.

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Visitor Limit?	[name] Question - in the [clinic] we did not limit	No	Not applicable	No - family were also evacuees, though they were provided different space	Unknown	No	No	No	No	Yes
Auxiliary Care?	.	N/A	Not applicable	Yes	Yes	Yes	Yes	Yes	Yes	No
Outside Integration?	[name] question	Yes	Yes – [State] State guard (medical branch) provided security and lab technicians and logistical support	Yes	We were a DMAT but other ACS did use DMATS	No	No	Yes	Yes – [State] medical rangers	Yes
Integration Lessons?	.	Yes	Yes	Yes	N/A	.	.	Yes	Yes	.

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Integration Detail	.	Federal response agencies worked best when they integrated into the already set-up local incident command structure.	Assisted us in understanding their capabilities	We split up teams/ integrated shifts with folks from all groups which resulted in a wonderful collaborative consciousness. Included student leaders as well.	.	N/A	.	Be flexible. Learn. Respect, adapt	Need strong incident command to manage multiple levels of outside input.	.
Pets Allowed?	[name] question	No - pets were housed outside the facility in a separate shelter	No	No - but there was a place on campus for them	Yes	Yes - limited	Yes	No	No	No
Facility Issues?	Yes – [name] question	Yes	No	Yes	Yes	No	Yes	Yes	No	.
Issue Detail	lack of ample plumbing	Environmental issues related to exhaust fumes, noise, etc. due to vehicular traffic and leaving vehicles on.	.	Gymnasiums are large and noisy - it really never was quiet. Other treatment areas as well were loud & light.	Lighting (not NO but other shelters) and noise control - also bathroom access	Cell communi-cations at first. Then satellite delivered with phones.	Drinking water, meds preparation, lack of phones	No toilets, inadequate electrical support, no air condition	(Used a gymnasium - required reassurance to college administrators that we would not damage floors)	.

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Any Other Issues?	See attached file. [redacted]	.	.	.	There needs to be a troubleshooting expert group who can be called to come in and help with problems esp. when the operations people become overwhelmed and unable to make good decisions	.	The nearby VA support was a major reason for our success.	.	Bed triage & labeling helpful. Use dieticians/ licensed diabetic educators to arrange diabetic management teams. Needlesticks are hazardous.	.
Self-Presenting?	Yes - But [name] tried to prevent this	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Ambulance Route?	Directly to ACF	N/A	Hospital first	Hospital first - not possible in this circumstance, though EMS did manage to take true criticals to hospitals	Directly to ACF	Directly to ACF	.	Depends on patient acuity	Hospital first	Directly to ACF
Mental Health?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

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Futility of Care?	[name] question	.	No	No	Yes	No	.	No	No	.
Futility of Care Details	.	Do not understand question.	Not applicable to our operation since we performed no in-patient or ICU care	It didn't come up	0 guidelines it had to do with logistics and transportation and staffing	.	.	.	.	.
Pediatrics Care: ED Nurses?	Yes	.	.	Yes	Yes	Yes	.	.	Yes	.
Pediatrics Care: ED Docs?	Yes	.	Yes	Yes	Yes	Yes	.	.	Yes	Yes
Pediatrics Care: Family Docs?	Yes	.	.	Yes	Yes	.	.	.	Yes	.
Pediatrics Care: Pediatrics ED Docs?	Yes	.	.	Yes	Yes	Yes - limited	.	.	.	.
Pediatrics Care: Pediatrics Midlevel?	Yes	.	.	Yes	Yes	.	Yes	.	.	.
Pediatrics Care: Pediatrics Nurses?	Yes	.	Yes	Yes	Yes	.	.	Yes	.	.
Pediatrics Care: Pediatricians?	Yes	Yes	Yes	Yes	Yes	.	Yes	Yes	Yes	.
Pediatrics Care: Other?	Yes	Yes - handled by another agency so cannot speak fully to this question	.	.	Yes	.	.	.	.	.

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Pediatrics Care Other Detail	Answer pertains to the [clinic] only - almost every combination	Via coordination with community (private) provider for pediatrics services.	.	.	Paramedics	.	.	.	.	.
Immunizations?	Yes	Yes	Yes	Yes - but only for fire service and law enforcement coming from various parts of the country on the way to [location]	Yes - tetanus	Yes	Yes	Yes	Yes - tetanus	No
Infectious Disease Surveillance?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Infectious Disease Surveillance Detail	Both the [name] public health and [name] provided this surveillance - in fact [name] was the first to identify and DNA type the organism responsible for the GE outbreak	Cot-to-cot surveys in shelter areas by Epidemiology Task Force was conducted nightly to assess for symptoms that may correlate with certain disease patterns.	County public health epidemiologist reviewed cases	Monitored trends	Walk rounds. & informal look arounds. Other facilities I know had a stronger PH component.	[State] Public Health rotated teams that interacted with [State] Epidemiology.	.	.	Minimal disease surveillance - diarrhea, respiratory tract infections were monitored	.

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Hospital Transfer System?	Yes	Yes	Yes - only 2-3% of ACF patients were transferred to hospital ED's (out of >10,000 patient encounters)	Yes	Initially no! After a while yes but limited. In other ACFs I have had an ambulance on standby for transfer	Yes	Yes	Yes	Yes	Yes
Surge: Early Discharge?	Yes	.	No local hospitals used these strategies	Yes	Unknown	Yes	.	.	Yes	Yes
Surge: Hospital Transfer?	.	.	No local hospitals used these strategies	.	Unknown	Yes	.	.	Yes	Yes
Surge: ICU to Ward?	Yes	.	No local hospitals used these strategies	.	Unknown	.	.	.	.	.
Surge: Interhospital Transfer?	.	.	No local hospitals used these strategies	Yes	Unknown	.	.	.	.	Yes
Surge Criteria Detail	.	Unknown	None of these strategies were employed	We were informed by local health that beds were becoming available especially after NDMS kicked in	Unknown	Guesstimations only	.	.	If patients met minimal criteria for discharge they were discharged home or back to the shelter.	.
Special Medical Needs (SMN)?	Yes	Yes	Yes	Yes	In NO all comers	Yes	No	Yes	Yes	No

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SMN: Dialysis?	Yes	.	Yes	Yes	.	.	.	Yes	.	.
SMN: Mental Health?	Yes	.	Yes	Yes	.	Yes	.	.	.	.
SMN: Ventilator?	.	.	.	.	.	.	.	.	.	.
SMN: Other?	Yes	Expanded definition for what was considered MSN population - so a diabetic without insulin for few days with need to store insulin, dispose of sharps, ADA diet, etc. became a patient with MSN.	.	.	.	Yes	.	.	Yes	.
SMN Other Detail	hemonc/ transplant/ CF/ shunts/ etc	Other such patients included those morbidly obese, mental health needs, patients on chronic dialysis, etc.	.	.	.	Chronic health prob.	.	.	COPD, diabetes patients, Alzheimer/ geriatric patients	.
Special ACF Group?	Yes	No	No	Yes	Yes	No	.	.	Yes	No

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Special ACF Group Detail	Ventilator dependent	In operation such as ours, integrated services worked best esp. due to fact that patient characteristics were unknown in advance of operation initiation.	.	Infectious - it wasn't an issue for us, but if we were dealing with flu etc, should have separate ACF. Also hospice/palliative care	Chronic ventilator patients with respiratory therapists	.	.	.	Ventilator patients	.
Multiple Ventilators?	Yes	No	No	No - not without extraordinary resources - which are better left in the hospital	Yes	Yes	No	Depends on staffing and resources	No - unless the personnel (nurses/ respiratory technicians) are available.	No

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Other SMN/Patient Care Issues	With Hurricane RITA which came at the heels of Katrina we had appx 30 ventilator dependent children arrive at our EC - we had to open a floor just for these patients - as a result, we are working with the [State] o create a regional location [redacted]	.	Avoid segmenting patients according to medical diagnoses	We did not have many deaths - but hospice/ palliative care patients that were evacuated did come through and sent to a different facility	Morbidly obese/mobility issues are huge problems for hygiene and skin breakdown	Dialysis was not an issue, but could have been. Also we had 8 obstetric patients that we transferred out (luckily).	.	.	.	.
Patients In ACF?	[name] question	Very limited information known.	Visual head count only	We counted every 2 hours / kept track on a grease board	Walking around	Electronic system tracking tool	paper proccess	Database	Daily patient census recorded on Excel program. All patients signed in & out of facility.	Patient recording and tracking.

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Patient Location?	[name] question	Very limited information known.	Medical record form indicated the location within the ACF where care was rendered (adult, ped, mental lhth, dental, OB, ... etc.)	Had charge nurses & team leads at each treatment area keeping track	Walking around	Computer board	a room roster started when they admit.	Generally	XY grid coordinates for bed placement.	.
Patient Disposition?	[name] question	Discharge/ transfer information was limited except for perhaps those who were transferred via the regional medical operations center	Handwritten medical record	Local EMS & social workers took care of this	Initially too many patients to too few staff	Same computer tracking system	daily count and discharge proccess include informing patient administration	Database	Developed an Excel program. College students assisted.	.
Patient Tracking System?	[name] question	No	No	No – [college] students went bedside to bedside with laptops to develop database	Yes	Yes	No	No	No	Yes

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Medical Records?	EMR - took 2 days to perfect but it was quite good once it overcame the sudden rush of patients - [name] question	Not handled by our agency.	Developed de-novo a paper medical record - all completed records were scanned and stored. Data entry clerk created database (name and chief complaint) which was searchable.	Initially - just one sheet of paper taped to the cot	Couldn't initially then ran out of supplies	Paper/file cabinets	Electronic VA record	Paper	(Electronic for monitoring patient status.) In clinic & shelter used a paper record. Patient chart created & attached to bed.	.
Records Ownership?	[name] question	Not handled by our agency.	County public health dept.	Records were sent with the patient when transferred and/or given to them with a discharge summary. Local EMS kept copies of discharge/transfers	Feds	[State] Public Health	VA?	State	Public health department.	Have not given thought to this issue. Good point.

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Adult/Peds Together?	Families kept together Adult/peds separated	Families kept together	Adult/peds separated - moms typically took children needing care to the pediatric section	Families kept together - as much as possible	Families kept together	Families kept together	Families kept together	Families kept together	Families kept together	Families kept together
Spouses Separated?	[name] question	No	No	No	No	No	No	No	No	Yes
Families Together?	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Patient Privacy?	.	Depends on emergency scenario but in general the preference due to the high anxiety of such scenarios is to keep families together as much as possible.	.	Tough to do in a gymnasium. We used sheets & other barriers when possible. Far more important to allow access to patients as most families were also evacuees and separating families at the time would have just made things worse.	Family takes precedence over privacy in a disaster	Limited	Each family unit had private room	Did not	.	.

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Active Finance Section?	Yes – [name] financed its own efforts in the hope that it would be reimbursed - I don't think it was reimbursed	Yes - handled through overall County Government, not our agency specifically.	No	No - all done by locals/I do not have the info	No	Yes	No	No	Yes	Yes
Volunteer %?	not sure	Unknown	20	.	.	.	.	25	Not sure.	.
Charitable Donation %?	not sure	Unknown	10	.	.	.	.	15	Not sure.	.
Institution/System %?	not sure	Unknown	40	.	.	.	.	10	Not sure.	.
Private Corporation %?	not sure	Unknown	10	.	.	.	.	.	Not sure.	.
Local Gov %?	not sure	Unknown	10	.	.	.	.	.	Not sure.	.
State %?	not sure	Unknown	.	.	.	.	.	25	Not sure.	.
Federal %?	not sure	Unknown	10	.	.	100	.	25	Not sure.	.
Other %?	not sure	Unknown	.	.	.	.	.	.	Not sure.	.
Other % Detail	not sure	Unknown	.	.	.	.	.	.	Not sure.	.
Federal Invoice?	Yes	Yes - County Government did.	No	.	.	Yes	.	Yes	Yes	Yes
Federal Reimbursement?	No	Yes	.	.	.	Yes	.	Yes	No - uncertain	.
Reimbursement Secrets?	yes - create an agreement before the response	.	Not applicable	.	.	None	.	No	No	.
Worker Illness/Injury?	Yes	Unable to quantify.	No - not that we were aware of	No	Yes	Yes	No	No	Yes - 1 needlestick injury	.
Workers' Comp Issues?	[name] question	N/A	No - not that we were aware of	No	Yes	Yes	No	No	No	.

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Workers' Comp Detail	.	.	.	.	Their commander dealt with it through the Federal Governmen t	Handled by parent hospital	.	.	.	.
Other Finance Issues?	Pay the resource if you want them to return	.	ACF financing will now go through the finance section of the city entity which has requested a medical support function.	.	.	.	.	Buy on credit, keep receipts, if it is reasonable, it will eventually be reimbursed	Health Department was not reimbursed at the State or local level. Most work was voluntary. [Name] State Guard was paid a daily stipend.	.

Survey Question/Topic	Site 1	Site 1 '	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
General Comments		Advanced planning and development of relationships with partners in advance is critical to the success of any large-scale operation.	See two documents [attached] describing our ACF operations	[from included cover letter] ... I am an advocate of college campuses as ACF for many reasons. This is a short list: 1. handicapped accessible; 2. large crowds can generally be accommodated; 3. there is already a security presence, and a perimeter can be	Can not be rigid - flexibility important. Red Cross volunteers. Family together. Palliative care areas. Animals need to be considered. Uniforms very helpful. Understand limitations in your mission.	.	Any plan that developed needs to be flexible. A cook book approach would not work well in a disaster situation. VA being a national system has enough resources to sustain a shelter for a "period" of time (no more than 3 months).	Have good leadership. Tap into churches for volunteers. Help others and they will accommodate/assist you.	Plan in advance of disaster. We have subsequently identified a university campus with a nursing school to be a ACF for 240 people. We have run [illegible] exercises & call down events to ensure that we can stand up the facility.	We have had to approach planning from a couple of different angles. Our most likely scenario would be a situation whereby the ACF is used for a short fused-short duration event. On the other hand, we are also approaching the issue with the thought in mind

Facility Selection Tool Questionnaire Results: Alternate Care Facility Factors

The table below summarizes the responses, by site, of the evaluation of the importance of the factors in the original RMBT site selection tool in the selection of an alternate care facility.

Factor	Site 1	Site 1'	Site 2	Site 3	Site 4	Site 5	Site 7	Site 8	Site 9
Doors/corridors: ACF	3	.	2	3	3	2	3	3	3
Floors: ACF	3	.	3	3	3	3	3	3	3
Loading dock: ACF	3	.	1	3	3	1	3	2	2
Parking: ACF	3	.	2	1	3	2	3	1	2
Roof: ACF	3	.	3	3	3	3	3	3	3
Toilet/showers: ACF	3	.	3	3	3	3	2	3	3
Ventilation: ACF	3	.	3	3	3	3	3	3	3
Walls: ACF	1	.	3	3	3	3	3	3	3
Infrastructure Other: ACF	.	.	.	Helipad and/or landing area	.	Air conditioning	.	.	.
Infrastructure Other: ACF Rating	.	.	.	2	.	3	.	.	.
Infrastructure Other2: ACF	.	.	.	Ramps vs. stairs	.	HEPA filtration for OR	.	.	.
Infrastructure Other2: ACF Rating	.	.	.	3	.	3	.	.	.
Auxiliary space: ACF	2	.	2	3	2	1	2	3	3
Equipment/supply: ACF	2	.	2	3	3	2	3	3	3
Family area: ACF	3	.	2	2	2	2	2	2	1
Food supply/prep: ACF	2	.	3	3	3	3	3	3	2
Lab area: ACF	3	.	3	3	1	3	2	2	1
Mortuary: ACF	2	.	3	2	1	3	2	3	0
Patient decontamination: ACF	3	.	2	3	0	3	2	3	3
Pharmacy: ACF	3	.	3	3	3	3	3	3	1
Staff area: ACF	2	.	3	3	3	2	2	2	2
Space/Layout Other: ACF	.	.	.	.	Comfort care	.	.	.	.
Space/Layout Other: ACF Rating	.	.	.	.	3	.	.	.	.
Air conditioning: ACF	3	.	3	3	3	3	3	2	3
Electrical power: ACF	3	.	3	3	3	3	3	3	3
Heating: ACF	3	.	3	3	3	3	2	3	3
Lighting: ACF	3	.	3	3	3	3	2	3	2
Refrigeration: ACF	3	.	3	3	1	2	2	3	1
Water (hot?): ACF	3	.	3	3	2	3	3	3	2
Utility Other: ACF	.	.	.	.	.	.	.	.	.
Utility Other: ACF Rating	.	.	.	.	.	.	.	.	.
Communication: ACF	2	.	3	3	3	3	2	3	2
Two-way radio: ACF	3	.	3	3	3	3	2	3	1
IT/Internet: ACF	3	.	3	3	2	2	0	2	2
Communications Other: ACF	.	.	.	.	.	.	.	.	.
Communications Other: ACF Rating	.	.	.	.	.	.	.	.	.
Lockdown: ACF	3	.	3	3	2	3	3	3	3
Public transport: ACF	3	.	2	2	3	3	1	2	1
Biohazard/waste: ACF	3	.	3	3	3	3	3	3	1
Laundry: ACF	3	.	3	2	1	3	1	3	0
Ownership: ACF	3	.	3	3	3	3	3	3	3
Oxygen: ACF	3	.	3	1	3	3	2	3	1
Hospital proximity: ACF	3	.	3	3	3	2	2	3	2
Misc Services Other1: ACF	.	.	.	.	.	.	On main thoroughfares	.	.
Misc Services Other1: ACF Rating	.	.	.	.	.	.	2	.	.
Misc Services Other2: ACF	.	.	.	.	.	.	Easily found	.	.
Misc Services Other2: ACF Rating	.	.	.	.	.	.	2	.	.

Facility Selection Tool Questionnaire Results: Shelter Factors

The table below summarizes the responses, by site, of the evaluation of the importance of the factors in the original RMBT site selection tool in the selection of a shelter site.

Factor	Site 1	Site 1'	Site 2	Site 3	Site 4	Site 5	Site 7	Site 8	Site 9
Doors/corridors: shelter	3	.	0	3	3	3	1	3	.
Floors: shelter	3	.	2	3	3	3	1	3	.
Loading dock: shelter	3	.	1	2	3	1	2	2	.
Parking: shelter	3	.	2	1	3	2	3	1	.
Roof: shelter	3	.	3	3	3	3	3	3	.
Toilet/showers: shelter	3	.	3	3	3	3	1	3	.
Ventilation: shelter	3	.	3	3	3	3	3	3	.
Walls: shelter	1	.	3	3	3	3	3	3	.
Infrastructure Other: Shelter	.	.	.	Helipad and/or landing area	Generators	Air conditioning	.	.	.
Infrastructure Other: Shelter Rating	.	.	.	1	3	3	.	.	.
Infrastructure Other2: Shelter	.	.	.	Ramps vs. stairs	Communication	HEPA filtration for OR	.	.	.
Infrastructure Other2: Shelter Rating	.	.	.	3	3	1	.	.	.
Auxiliary space: shelter	2	.	2	2	2 (hard to do because not all religions are the same - reference OK bombing)	2	2	1	.
Equipment/supply: shelter	2	.	2	2	3	2	3	2	.
Family area: shelter	3	.	1	2	2	2	2	2	.
Food supply/prep: shelter	2	.	0	3	3	3	3	2	.
Lab area: shelter	0	.	2	2	1	2	2	2	.
Mortuary: shelter	0	.	1	1	1	3	0	1	.
Patient decontamination: shelter	3	.	1	1	0	3	2	1	.
Pharmacy: shelter	0	.	3	2	3	3	2	1	.
Staff area: shelter	0	.	1	3	3	2	2	1	.
Space/Layout Other: Shelter	.	.	.	.	Comfort care	.	.	.	.
Space/Layout Other: Shelter Rating	.	.	.	.	3	.	.	.	.
Air conditioning: shelter	3	.	2	3	3	3	3	2	.
Electrical power: shelter	3	.	3	3	3	3	3	2	.
Heating: shelter	3	.	3	3	3	3	2	2	.
Lighting: shelter	3	.	3	3	3	3	2	2	.
Refrigeration: shelter	3	.	2	3	1	2	2	2	.
Water (hot?): shelter	3	.	3	3	2	3	3	2	.
Utility Other: shelter	.	.	.	.	.	.	.	.	.
Utility Other: Shelter Rating	.	.	.	.	.	.	.	.	.
Communication: shelter	1	.	3	3	3	3	2	2	.
Two-way radio: shelter	2	.	3	3	3	3	2	2	.
IT/Internet: shelter	1	.	3	3	2	3	0	2	.
Communications Other: shelter	.	.	.	.	.	.	.	.	.
Communications Other: Shelter Rating	.	.	.	.	.	.	.	.	.
Lockdown: shelter	3	.	0	3	2	3	3	3	.
Public transport: shelter	3	.	2	2	3	3	1	2	.
Biohazard/waste: shelter	3	.	3	3	3	3	3	2	.
Laundry: shelter	3	.	3	3	1	3	1	2	.
Ownership: shelter	3	.	3	3	3	2	3	2	.
Oxygen: shelter	3	.	1	1	3	3	1	1	.
Hospital proximity: shelter	3	.	1	2	3	2	1	2	.
Misc Services Other1: shelter	.	.	.	.	.	.	On main thoroughfares	.	.
Misc Services Other1: Shelter Rating	.	.	.	.	.	.	2	.	.
Misc Services Other2: shelter	.	.	.	.	.	.	Easily found	.	.
Misc Services Other2: Shelter Rating	.	.	.	.	.	.	2	.	.