Modified Delivery of Critical Care Services
In Scarce Resource Situations

Overview of an strategy to be implemented by the DC Emergency Healthcare Coalition and its Member Organizations

Executive Summary

Organizations providing direct healthcare services recognize that emergency situations may arise that a range of circumstances can greatly stress the organization's day-to-day operations. One of the greatest concerns, however, is the situation where *critical healthcare needs exceed the current resource capacity and/or specialized capability to provide the necessary critical care services through the usual delivery systems*. Situations where this may be encountered include: 1) mass casualties with a very large number of patients, 2) specialty casualties that may stress healthcare resources due to the specialized critical care needs of the patients (e.g., burn casualties) or the threat to staff and other patients (e.g., contaminated or highly contagious), and/or 3) mass effect (impacted healthcare resources compromising the usual resources for critical care services).

Attention to this issue in the past focused primarily on stockpiling resources (e.g. additional ventilators and medications) and on additional resources (e.g., fuel for generators) to maintain continuity of healthcare operations. More recently, the focus has shifted to decisions o how resources will be allocated in scarce resource situation. The current national approach, advanced by the Institute of Medicine (IOM) of the National Academies of Science, supported by the US Department of Health and Human Services funding, is an operational approach that was originally titled “Altered Standards of Care” and then transitioned to “Crisis Standards of Care.” While the Altered and Crisis Standards publications emphasize the importance of using an evidence basis for establishing protocols, there is scant evidence that this approach will be implemented by Federal and State health officials and be supported by political leadership during a crisis situation. Other issues of concern with this approach are also detailed in the full document.

The District of Columbia Emergency Healthcare Coalition (DC EHC) has established a strategic approach to the "patient needs versus available resources" mismatch that contrasts with the CSC approach. "Modified Delivery of Critical Care Services in Scarce Resource Situations" recognizes that in highly dynamic situations with variable resource constraints across the incident area, a single set of protocols cannot be applied at all healthcare locations. It also recognizes 1) that the most appropriate decision-making is usually at the locations where the care is delivered, 2) that the decision process be as much as feasible an extension of day-to-day decision-making, and 3) that the decisions be based upon both *medical* and *management science*.

For the purpose of illustration, this document distinguishes healthcare delivery situations into "conventional" (everyday healthcare delivery), "contingency" (the usual "go-to" approach when patient care needs stress the available resource limits, and examples such as postponing elective surgery are

common in hospital emergency plans) and "extreme" (situations requiring modification in how services are delivered so that critical needs are met and adverse outcomes are minimized). Modified delivery of critical care services focuses primarily on the contingency and extreme situations as a continuum that requires timely situation awareness and anticipatory healthcare adaptation. It is defined in this document as *Changes in how healthcare services are delivered, driven by consistent application of specific management strategies, when the usual delivery of medical care is insufficient for the medical needs (e.g., a mass casualty situation) or when usual healthcare delivery is compromised (e.g., mass effect situation).*[1] The underlying principle is defined as managed or engineered degradation of services and is explained in Textbox in Chapter 2. The document discusses how managed degradation of services may be consistently and ethically applied, using Clinical Care Task Force and pre-developed plans for extreme situations, with triage protocols and processes to best match patient care needs with available resources using the concept of managed or engineered degradation (see Textbox in the full document).

Where healthcare modifications transgress healthcare regulations, a process is proposed for requesting and receiving temporary relief from the relevant governmental department/agency during the emergency period.

For optimal healthcare delivery capacity and specialized capability in scarce resource situations, all tiers of the overarching healthcare system (see Medical Surge Capacity and Capability handbooks[2] must be integrated and operating in full support of the impacted population and healthcare facilities. Roles and responsibilities of each tier are described in this report, with a bulleted summary provided in Textbox A. Critical care services are the current focus in this DC EHC development period. Follow-on initiatives will address modified delivery of healthcare in scarce resource situations across healthcare and public health services and for all DC EHC organizations that deliver healthcare services.

Guidance formatted for use in both preparedness and emergency response is provided in the appendices.

[1] Work conducted by J Barbera, MD for the Pennsylvania Department of Health

[2] Barbera JA, Macintyre AG,.(Knebel A, Trabert E, eds). Medical Surge Capacity and Capability: A management system for integrating medical and health resources during large-scale emergencies, Second edition (September 2007). The CNA Corporation. Published under Contract Number 233-03-0028 for DHHS, December 2007; available at http://www.phe.gov/Preparedness/planning/mscc/handbook/Documents/mscc080626.pdf

Text Box A: Th Tiered Approach to Modified Healthcare Delivery in Scarce Resource Situations

Impacted Healthcare organization(s):

Clinical Care Areas: Modify healthcare delivery following guidance, using ethical triage, temporizing and substitution that maximizes patient care and minimizes adverse outcomes; reported to and supervised by facility 's incident management leadership.

Healthcare Facility Leadership: Support the resource scarce situations using facility Emergency Operations Plan processes, and obtain additional resource support through direct mutual aid, DC EHC facilitated mutual aid, and DC government.

DC EHC Healthcare Coalition Response Team (HCRT):

Healthcare Coalition Response Team (HCRT):Support the impacted coalition organizations by facilitating situation awareness, mutual aid, and requests for regulatory modifications.

Assisting Healthcare Organizations: Provide assistance through staffing the DC EHC HCRT and contributing available resources through the established mutual aid and cooperative assistance process.

District of Columbia (DC) Agencies: Provide appropriate assistance and obtain additional resources through multi-state and federal mechanisms; receive requests and, when appropriate, provide temporary regulatory modification or convey the requests for modification of regulations and reimbursement requirements to the appropriate federal agency.

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Acronym List

ASPR	Office of the Assistant Secretary for Preparedness and Response (DHHS)
CSC	Crisis Standards of Care
DC DoH	District of Columbia Department of Health Services
DC EHC	District of Columbia Emergency Healthcare Coalition
DHHS	United States Department of Health and Human Services
EMAC	Emergency Management Assistance Compact
EOP	Emergency Operations Plan
HCRT	DC EHC Healthcare Coalition Response Team
HECC	Health Emergency Coordination Center (DC HEPRA)
HEPRA	Health Emergency Preparedness and Response Administration(DC DoH)
HPP	Hospital Preparedness Program (DHHS/ASPR)
ICU	Intensive Care Unit
IMT	Incident Management Team
IOM	Institute of Medicine/National Academies of Science
MPD	District of Columbia Police Department
MSCC	Medical Surge Capacity and Capability
SME	Subject Matter Expert

Preface

This guidance document is one element in the preparedness program conducted by the District of Columbia (DC) Emergency Healthcare Coalition (EHC) o behalf of its member organizations and in partnership with DC Department of Health and other relevant DC agencies. Funding for this initiative is provided through the US Department of Health and Human Services (DHHS) Hospital Preparedness Program (HPP), and HPP guidance for the current fiscal year is conveyed through the document *Healthcare Preparedness Capabilities: National Guidance for Healthcare System Preparedness (January 2012)*.[3] Within this guidance, *Capability 10: Medical Surge* describes requirements for mass casualty care and includes *Function 4: Develop Crisis Standards of Care Guidance* This Function directs each State to provide "guidance and protocols on crisis standards of care to enable a substantial change in routine healthcare operations...". The guidance in this *Modified Delivery of Critical Care Services in Scarce Resource Situations* is in response to this directive, but the approach developed for DC EHC member organizations differs significantly from Crisis Standards of Care as explained in the Background Chapter.

Extensive work was performed in another State jurisdiction in developing these modified healthcare delivery concepts, with concomitant multi-disciplinary peer-review from clinicians, managers, public health officials and ethicists. The 2011 DC EHC development program initiated a similar project, focused specifically on modified delivery of *critical care services* in scarce resource situations, for the District of Columbia Emergency Healthcare Coalition member organizations in partnership with the District of Columbia Department of Health. The resultant 201 concept document has now undergone detailed examination by wide range of emergency management and critical care professionals from a number of DC EHC member organizations during this fiscal year's program work. The feedback they generated incorporated into this 201 document.

The guidance is intended to promote a consistent approach to emergency preparedness and response among DC emergency healthcare organizations when scarce resource situations arise related to critical care patient needs. The 201 guidance extends the concepts of modified delivery of critical care services developed in the 2011 fiscal year DC EHC program and proposes methods and processes for implementation. Additional details are developed, an understanding of the multi-tiered roles necessary for successful management of scarce critical care resource situations is presented, and recommendations are conveyed that assist in "operationalizing" the concepts at the task level.

The eventual intent is for this modified healthcare delivery strategy to be widely applied within DC EHC healthcare organizations beyond just critical care services, and to other healthcare sectors including non-critical care Skilled Nursing Facilities (SNF) and Community Health Centers (CHC).

[3]US Department of Health and Human services. Healthcare Preparedness Capabilities: National Guidance for Healthcare System Preparedness (January 2012). Office of the Assistant Secretary for Preparedness and Response Hospital Preparedness Program. Washington DC.

How to Use this Document

This section provides brief description of this document's sections so that the reader can rapidly decide what they wish to read first, based upo their interest and their possible role in healthcare emergency response.

A "Executive Summary" presents an overview of this much larger document and describes the major concepts of *Modified Delivery of Critical Care Services in Scarce Resource Situations*.

The chapters "Background" and "Modified Delivery of Healthcare Services: General Description" provide deeper understanding of this strategy and how/why it differs from the Crisis Standards of Care approach.

The chapter "'Operationalizing' Modified Delivery of Critical Care Services in Scarce Resource Situations in Washington DC" provides more detail on how this methodology may be implemented going forward. It also demonstrates how the Modified Critical Care Delivery strategies are extensions of and integrated with the already established structure and processes for public health and healthcare emergency response and recovery in Washington DC. This section is of particular interest to professionals with critical roles and responsibilities in one of the healthcare emergency response "tiers" as described in the Medical Surge Capacity and Capabilities handbooks.[4,5] general Concept of Operations is described, followed by a more specific Concept of Operations focused on contingency and extreme scarce resource situations.

Finally, the reader that is primarily interested in the detailed specific guidance at the clinical service level may go directly to the appendices, which provide DC EHC form for requesting regulatory modification (Appendix 1) or for guidance developed for specific scarce resource situations with considerations delineated for modifying healthcare delivery (Appendix 2).

It is important to emphasize that the guidance in this document should be processed through each organization's emergency management committee, its subject matter experts, an the organization's executive and clinical care leadership prior to actual use in an emergency or disaster.

[4] Barbera JA, Macintyre AG,.(Knebel A, Trabert E, eds). Medical Surge Capacity and Capability: A management system for integrating medical and health resources during large-scale emergencies, Second edition (September 2007). The CNA Corporation. Published under Contract Number 233-03-0028 for DHHS, December 2007; available at http://www.phe.gov/Preparedness/planning/mscc/handbook/Documents/mscc080626.pdf

[5] Barbera JA, Macintyre AG. (Knebel A, Trabert E, eds). Medical Surge Capacity and Capability: The MSCC Healthcare Coalition in Emergency Response and Recovery (May 2009). The CNA Corporation under Contract Number HHSP23320064154EB for DHHS; available at http://www.phe.gov/Preparedness/planning/mscc/Documents/mscctier2jan2010.pdf

Chapter 1: Background

In 2004, the US Department of Health and Human Services (DHHS) funded an initiative that studied the problem of inadequate healthcare capacity for an extreme number of casualties from pandemic influenza or other etiology. This produced a concept paper in 2005 titled Altered Standards of Care in a Mass Casualty Event.[6] A extensive list of issues surrounding these situations was captured, but the recommendations focused upon the development of medical standards to guide resource allocation. Multiple publications have been funded by DHHS since then.

The current approach advanced by the Institute of Medicine (IOM), supported by the Department of Health and Human Services funding, remains the same conceptual direction with a change in the title phrase from "Altered Standards of Care" to "Crisis Standards of Care." This method continues to rely upo State-level authorities developing and promulgating new "standards" upo which clinicians will change from their usual practice to that established by the disaster standards declared by State authorities. The latest iteration published by an IOM committee (March 2012) advocate the establishment of crisis standards of care (CSC) as the approach for addressing extreme scarce resource medical situations, and provides action guidance primarily focused upon preparing the standards and gaining buy-in.[7] This approach continues to expect State or other Authorities Having Jurisdiction (AHJ) to develop Crisis Standards that they will issue at the time of the emergency to guide health care services. Guidance during emergencies is therefore expected to be driven by health authorities announcing and directing altered/crisis standards.

The Altered and Crisis Standards documents precipitated extensive discussions among academics, ethicists and legal scholars, with ***little widely accepted actionable guidance*** for clinicians and clinical managers who could face these extreme situations under no-notice, uncertain, highly dynamic, and very trying conditions. A range of issues, both ethical and practical, suggest that this approach is problematic:

1. Publicly changing from every day standards to "crisis standards of care", especially through an announced State-level declaration, is intuitively pejorative and implies that inferior care is now acceptable;
2. Crisis Standards of Care (CSC) actions, as described to date, are primarily based upo announced guidelines for *limiting services to selected patients* rather than guidance for "doing more with less" in striving to meet all *critical* patient needs.

[6] Altered Standards of Care in Mass Casualty Events (April 2005). Health Systems Research Inc. under Contract No. 290-04-0010.AHRQ Publication No. 05-0043. Rockville, MD: Agency for Healthcare Research and Quality.
[7] Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response (March 21, 2012). National Academies of Science - Institute of Medicine, Board on Health Science Policy; accessed April 24, 2012 at http://www.iom.edu/Reports/2012/Crisis-Standards-of-Care-A-Systems-Framework-for-Catastrophic-Disaster-Response.aspx

3. Crisis Standards of Care generally describe guidance for the most extreme situations, without first addressing the many earlier potential actions that may avoid the extreme situation or that may adapt healthcare delivery before actual “withholding” of resources needs to occur.
4. Healthcare "standards" are normally set through a number of wide-ranging factors, including 1) tradition, 2) regulations at Federal, State and local levels across a range of regulatory agencies, 3) accreditation requirements, 4) licensing requirements, and 5) case law. It is therefore not clear what "declaring" a new standard means in terms of liability or legal protections. It is also important to recognize that everyday standards of care inherently apply to normal healthcare situations; they are not automatically applicable or controlling in the unusual emergency scarce resource situation.,
5. Critical resource shortages are dynamic and variable across any emergency, so any single "standard" protocol or strict guidance may not be fairly or ethically applied across a variable and dynamic healthcare situation.
6. Experienced medical decision-makers d not usually start with "what is the standard" in their everyday decision-making regarding patients in front of them; it is unlikely they will easily adapt to this approach under the duress of a sudden onset disaster with extreme scarce resource situations.
7. Crisis Standards of Care requires State level authorities to develop "crisis standards" to address severe scarce resource situations; the DC Department of Health is unlikely to develop "crisis standards" and promulgate them during a rapidly evolving emergency.
8. Because of the public proclamation requirement by government authorities issuing crisis standards, the CSC developers have emphasized the need for express public buy-in when developing the crisis standards, and also buy-in by the senior authorities. Government involvement and endorsement during modified delivery of healthcare services is accomplished by temporary changes to regulations and other relevant governmental stipulations, and provided directly to the requesting healthcare organizations. This is a much more low-keyed and specifically objective approach and an extension of current practice. Express public buy-in is far less relevant.

Chapter 2: Modified Delivery of Healthcare Services: General Description

Definition and history

Rather than addressing this scarce resource situation through top-down declarations of new "standards," more practical approach is based upo both *medical* and *management science* and implemented as an extension of the triage and decision-making common in everyday healthcare practice as resources constraints are encountered. This *modified healthcare delivery in scarce resource situations* is described as:

> *Changes in how healthcare services are delivered, driven by consistent application of specific management strategies, when the usual delivery of medical care is insufficient for the medical needs (e.g., a mass casualty situation) or when usual healthcare delivery is compromised (e.g., mass effect situation).*[8]

This approach differs from the CSC focus of "announcing changed standards" to "modifying healthcare service delivery and requesting/receiving temporary modifications in regulations, licensure criteria, and reimbursement requirements for the duration of the scarce resource emergency only". These modifications are intended to maintain the spirit of relevant standards (i.e., good patient care with expected outcomes) and are based upon medical and management science rather than political and other influences. The focus is on specifically modifying care in a way that benefits the patients, supported by regulatory modifications, rather than a focus on changing standards that then drive how healthcare is delivered. It retains responsible decision making, with guidance, for clinicians, clinical managers and administrators, and is logical and defensible extension of everyday decision-making related to resource constraints and patient needs.

Extensive work was performed in another State jurisdiction in developing these concepts, with concomitant multi-disciplinary peer-review from clinicians, managers, public health officials and ethicists. The currently funded DC EHC development program has extended the concepts into a similar project, but focused specifically on modified delivery of *critical care services* in scarce resource situations, for the District of Columbia Emergency Healthcare Coalition member organizations in partnership with the District of Columbia Department of Health (DOH). The 201 deliverable was developed with feedback from various DC EHC participants, and consensus on moving forward with this conceptual approach was obtained through DC EHC emergency management committee meetings and acceptance of the 2011-2012. The 2012-2013 DC EHC working group consisted of multi-disciplinary subject matter experts from DC EHC organizations, including a clinical ethicist, and DC DOH personnel.

[8] Work conducted by JA Barbera, MD for the Pennsylvania Department of Health

Strategic Guidance

Given the many varied and complex situations in which scarce medical resources may be encountered, decision-making must be driven by consistent strategy rather than specific inflexible protocols. Consistency in clinical decision-making is therefore promoted.

The following strategic concepts are established to guide DC Emergency Healthcare Coalition member organizations in their response to incidents in which critical care resources are constrained. These strategic concepts informed the development of the more specific operational guidance provided later in this document. They may also be considered by DC Emergency Healthcare Coalition member organizations as they implement their own specific planning for resource constrained situations.

The pre-defined goal statement for resource scarce response guided system development. For the purposes of these DC EHC project *the goal of modified healthcare delivery in scarce resource situations is to maintain a physically and medically safe environment an to maintain continuity of operations while providing the best available care for incoming victims during disasters and major emergencies.*

The following response objectives were described to support this goal of best possible medical outcomes:

Objective 1: Maintain a physically and medically safe environment for staff, current patients, and visitors, and protect the functional integrity of the healthcare organization.

Objective 2: Achieve and maintain optimal critical care surge capacity and capability, within the day-to-day healthcare delivery context, using available conventional or contingency resources and processes/procedures.

Objective 3: Modify direct healthcare delivery (patient evaluations and interventions), through managed change, to maintain a safe environment and achieve the best possible medical outcomes.

Objective 4: Return to normal operations as rapidly as possible (recovery) and return response resources to "ready" status.

The following supporting strategic concepts were developed to accomplish the above objectives in modified healthcare delivery. These strategies informed development of the more specific operational guidance provided later in this document.

- To address the variable and dynamic nature of the "needs versus resources" mismatch, decision support procedures and tools should be developed which promote a *consistent* approach when modifying healthcare delivery.

- Decision consistency is attained by developing modified alternatives, following the strategy guidelines, and using triage guidance to assign patients to those alternatives in a manner that provides the greatest good to the greatest number by addressing critical needs through the best available resources. These alternatives are ideally developed during preparedness planning and can be incorporated into an organization's Emergency Operations Plan (EOP).

- The underlying principle for preparing modified delivery of healthcare resources is described in Textbox 1.

Text Box 1: Managed or engineered degradation

In a system under extreme stress, the identification and selection of priority activities that should be preserved, while allowing less critical services to degrade.[9] This management strategy is designed to avoid catastrophic or random failure of emergency response systems when system capacity or capability is exceeded. The guiding principle is the preservation of the functions most important to achieving organizational goals. It may also be referred to as "engineered system failure" or "managed degradation of system functions."

- Degradation cascades are best developed for application across different organizations within a regional area in a consistent fashion; use of the healthcare coalitions as an already-in-place function for this purpose is ideal.

- Ethical issues related to the modified delivery of healthcare are of the highest importance and require the involvement of relevant subject matter experts (SMEs) in the preparedness phase to ensure fair and comprehensive approaches to managed degradation of healthcare services.

- During response, decisions about degradation of healthcare systems and modified healthcare delivery should be driven by clinical experts and healthcare emergency managers using medical science and management science and the developed guidance. Other experts, such as legal and ethics SMEs, are incorporated into the decision making processes as required.

- For the purposes of planning and training, the situational context in which Critical Care Services in this initiative are rendered in emergencies is categorized according to *conventional* *contingency*, and crisis or "*extreme* situations.[10] These terms are described to denote regular healthcare practice (conventional) and changes from that state, with moderate changes (contingency) and more marked changes (extreme). *These terms d not necessarily indicate a expectation of changed*

[9] ICDRM/GWU Emergency Management Glossary of Terms (June 30, 2010); accessed May 8, 2012 at: http://www.gwu.edu/~icdrm/publications/PDF/GLOSSARY%20-%20Emergency%20Management%20ICDRM%2030%20JUNE%2010.pdf

[10] Hick JL, Barbera JA, Kelen GD. Refining Surge Capacity: Conventional, Contingency, and Crisis Capacity. Disaster Med Public Health Preparedness. 2009;3(Suppl 1):S1-9.

patient outcomes even extreme variances in healthcare delivery may be conducted in a controlled manner to achieve patient results similar to those under conventional situations. *It must be recognized, however, that extreme situations may produce less than optimal outcomes.*

- ✓ Conventional resource situations: the usual healthcare delivery setting (i.e., normal operations) that provide staff safety and expected patient outcomes. Conventional critical care services are generally provided in everyday "intensive care units ("ICUs") with their standard equipment, supplies, and personnel that follow common, widely accepted policy, practice, and procedures. Settings include the following sites:
  - ❑ Medical ICUs
  - ❑ Trauma ICUs
  - ❑ Burn ICUs
  - ❑ Neurosurgical ICUs
  - ❑ Other specialty adult care ICUs
  - ❑ Pediatric ICUs[11]-
  - ❑ Neonatal ICUs.
- ✓ Contingency resource situations: the back-up or overflow situations often delineated in a healthcare facility's Emergency Operations Plans that describes how the organization will expand services (surge situations) or maintain healthcare services (i.e., continuity of healthcare services) when usual delivery is constrained (mass effect situations) with the expectation of usual health outcomes. "Contingency critical care services" are therefore rendered in planned critical care "overflow" or "surge" facilities, with equipment, supplies and personnel that generally approximate the usual policy, practice and procedures widely accepted in day-to-day critical care services. Contingency critical care facilities may include:
  - ❑ Other ICUs not generally used for the type of incident critical care cases.
  - ❑ Step-down units.
  - ❑ Post-Anesthesia Care Units (PACUs) or pre-anesthesia induction areas if these have similar monitoring and medical gas/suction capabilities.
  - ❑ Procedural suites (endoscopy, cardiology, operating rooms and other procedure areas).
  - ❑ Emergency department treatment areas that are not usually used as critical care holding areas.
- ✓ Extreme resource situations[12] truly scarce resource situations in relation to critical patient needs, such that a less than optimal outcome for some patients may be realistically expected; the "patient needs versus available resources" mismatch may result from mass casualties or unusual casualties requiring specialized resources that significantly exceed available conventional and contingency resources (i.e., extreme surge situations), and/or significant compromise of day-to-day critical care resources and services (mass effect situations). "Extreme situation critical care services" may be rendered in:

[11] Modified delivery of critical care services in pediatric and neonatal ICUs has unique parameters; description and recommendations are deferred in this phase of the development project.

[12] Note: The term "extreme situation" is used instead of the Hick et al term "crisis" to denote the severe nature of this resource constrained situation.

- ❑ Healthcare facility areas commonly used for very basic patient care services, requiring just-in-time adaptation with portable equipment to provide the indicated critical care resources and services.
- ❑ Areas of the healthcare facility not usually used for patient care services (e.g., conversion of the cafeteria dining area, emergency department waiting area or similar space).
- ❑ Austere out-of-hospital alternate care sites rendering critical care services.

The extreme critical care resource situation involves changed environment and personnel/equipment and supply adaptations, which are likely to expose the patient to more risks (e.g., infection, delayed recognition of clinical status change, delayed interventions, etc.) and, while procedures are put in place to monitor the patient progress (similar to safety officer) patient outcomes may be adversely affected. Methods to reduce this risk are discussed in the next section.

Specific Approaches to Delineating Modified Healthcare Delivery

"Modification" of healthcare delivery during response is best achieved through two targeted interventions: 1 *temporizing* and/or 2) *substituting*. Using this approach, response managers can consider a wide range of options before having to direct actions which have the potential to materially affect safety and patient outcomes. These interventions are not unfamiliar to healthcare organizations as they are already utilized to achieve objectives and 2 above. They may also be utilized to make more drastic decisions to achieve objective 3.

Temporizing and substituting are best achieved within the greater construct of "managed degradation" or "engineered degradation" (also referred to as "engineered" or "pre-engineered" failure). This is, in fact, the underlying but unrecognized principle in many current emergency operations plans within healthcare organizations. Two very basic, widely used hospital based temporizing examples include:

- ✓ Delaying elective surgeries if mass surgical casualties may be arriving from an incident.
- ✓ Designating during triage a cohort of patients as "minor" or "green" and having them wait for further evaluation and treatment.

While the intent of these healthcare modifications is to provide adequate care to more patients than can be accomplished under everyday conditions, with no impact on expected outcomes, *some adverse effects may occur It is therefore important that in any system that is modifying healthcare delivery under emergency conditions has a effective process in place to monitor patients' progress an any early il effects be addressed at both the individual patient level and in re-evaluating and adapting the modified care.*

Temporization and substitution are implemented through specific changes that can be monitored for their effects on the safe environment and on patients' clinical progress, and then further modified as indicated. Each specific interventions should be transitioned to normal operations individually as indicated when a "patient needs to resource mismatch" is addressed through meeting needs or arrival

of additional resources. Brief explanations with examples of temporizing and substituting are presented below.

Temporize

- ✓ Temporize patient evaluation: initiate rapid evaluation of the critical issues and then postponing completion of the remaining patient evaluation (e.g., rapid assessment of the upper airway in patients with potential inhalation injury, those without significant findings are triaged to a "delayed while being monitored for deterioration" category).
- ✓ Temporize patient interventions: initiate critical treatments (e.g., stopping wound bleeding) and then temporizing less critical interventions (e.g., full exploration and repair of the wound).
- ✓ Temporize resource use with re-purposing (i.e. redirecting) conserved resources to more mission critical functions

Substitute

- ✓ Substitute facility resources: when capacity in the critical care unit, isolation rooms, or other types of critical care facilities is projected to be stressed or exceeded, use of different facilities where care can still be carried out with adaptations to achieve similar outcomes should be planned. These are best re-titled so they can be easily designated for their emergency use. For example, designating step-down unit as a "limited critical care area" or even more specific, the ventilatory support area if patient from a mass inhalation incident requires cohorting of patients with compromised airways but not otherwise requiring critical care services (see below for further detail on this approach).
- ✓ Substitute personnel resources: Whenever the situation requires more than the available, fully qualified critical care or similar personnel, change to normal operations (i.e., using different personnel or less qualified personnel) may be approached to augment personnel resources with less risk to expected outcomes than if critical needs are turned away. Examples are cited in Appendix 2, including use of personnel qualified to perform basic tasks in critical care areas and so freeing critical care staff to focus only on critical care tasks requiring their expertise and credentials. Performed carefully, this temporary modification may provide the surge capacity needed with little impact o long-term outcomes.
- ✓ Substitute equipment resources: use of available but not usually first-line equipment (e.g., older or with limited advanced capabilities, such as less sophisticated ventilators, transport ventilators as first line, etc.) as a substitute for the most desirable equipment. Ideally, the substitutions are matched to patients with conditions that can be adequately treated with the substitute equipment, while assigning the usual first-line equipment to the more critical patients (e.g. use of transport ventilator for a patient that needs intubated but doesn't need the sophisticated ventilator settings to maintain oxygenation and ventilation to achieve the expected outcome, or use of personnel to conduct frequent manual vital sign checks as a substitute for continuous monitors).
- ✓ Substitute supply resources: use of available but not usually first-line supplies (e.g., second line medications, reduced dosing, or extension of expiration dates, less sophisticated immobilization devices, etc) as a substitute for the most desirable supply, in many cases this may be accomplished without significant risk to the usual patient outcome, especially if the clinical courses are monitored for adverse effects(e.g. use of two available antibiotics to treat a

widespread bacterial infection as a substitute for the indicated single antibiotic that has become scarce resource).

- ✓ Substitute procedures: time efficiency or available resource efficiency may drive substitute procedures when everyday procedures are insufficient to provide adequate care across the cohort of critical care needs; these may be 1) clinical procedures (e.g., using a head lamp and mirror laryngoscopy rather than the time-intensive fiberoptic laryngoscopy for quick look evaluation of upper airways in mass inhalation situation), 2) resource-related procedures (e.g. shortening the turn-around time for scarce equipment resource such as ventilator by expediting the biomedical rehabilitation procedure), or 3) organizational management procedures, which is already done using incident management structure and process in the facility's emergency operations plan (e.g., establishing small multi-disciplinary patient care teams in the emergency department for reception of mass critical casualties).

Specific Clinical Considerations in Assessing Critical Care Needs

To better understand the patient triage and resource assignment decisions related to scarce critical care resources, the decision factors for assigning critical care services were analyzed. The decision basis was decomposed into clinical indications that commonly trigger admission to a critical care unit. The findings from this decomposition of day-to-day indications for critical care admission (see text box 2 below) can be helpful in establishing patient triage protocols and critical care assignment procedures utilized when resources are scarce. For example, incident patients with a single similar indication for Critical Care Unit admission, such as potential airway compromise, may be "cohorted" in a usually non-critical care area that has portable equipment and staffing to closely monitor that parameter and intervene if necessary (i.e., a temporary "limited" critical care treatment area). This may maintain conventional Critical Care Unit beds for patients with multi-system failure and need for wider range of critical care services.

Text Box 2: Indications for Critical Care Unit Admission during Day-to-Day Healthcare Delivery

1. Potential or actual clinical instability requiring frequent and/or specialty monitoring & critical care provider interaction (e.g. frequent neuro checks, medical monitoring, surgical, trauma, burn, etc.)
2. Significant actual or potential airway compromise requiring airway monitoring or interventions (e.g. upper airway edema, copious secretions, etc.)
3. Oxygenation/ventilation concerns requiring sophisticated interventions (e.g. intubation, ventilation, non-invasive ventilation, etc.)
4. Electrolyte and other metabolic factors (e.g. renal failure, metabolic toxins, etc.) creating life threatening risk & requiring frequent assessment and potentially rapid interventions.
5. Hemodynamic instability (e.g. cardiac ischemia, septic shock, etc.) potentially or actually requiring sophisticated interventions.
6. Specialized interventions usually provided only in the critical care setting (e.g. certain medications, emergency dialysis, specific monitors, balloon pumps, etc.)
7. Trauma – single or multi-system injury requiring sophisticated interventions (includes burns, neurosurgical, etc.)
8. Multi-system illness affecting more than one of the above categories.

Critical Care Scarce Resource Situations: Achieving Situation Awareness

Appropriate and timely modification of critical care services across impacted facilities requires a robust support system that includes robust information systems as well as mutual aid and cooperative assistance. The importance of optimal situation awareness cannot be overstated. Managers in the impacted healthcare facilities will only be able to conduct effective modified healthcare delivery if they are able to achieve and maintain accurate and timely situation awareness regarding the expected critical care needs and the available resources to meet those needs. This requires that they rapidly:

- ✓ Understand the current and projected healthcare needs.
- ✓ Understand the current and projected availability of indicated resources (personnel, facilities, equipment and supplies).
- ✓ Develop an accurate projection of the “needs versus resources” mismatch.

Managers must then rapidly project modifications in care delivery that will achieve the stated objectives until the “needs vs. resources” situation is resolved, mobilize the additional resources, direct the resource and procedural modifications, establish the patient triage protocols used to assign patients to the resource options, and finally, establish a specific monitoring capability to assure, as much as is feasible, the safety of staff and patients when contingency and extreme resource situations are occurring.

To accomplish these capabilities, an effective incident management system must be incorporated into each facility's Emergency Operations Plan. The DC Emergency Healthcare Coalition (DC EHC) also provide essential capabilities that support adequate situation awareness, including:

- ✓ Use of the coalition's Healthcare Information System (HIS) for notification and for sharing situation information among healthcare organizations and with DC government agencies.
- ✓ The mutual aid instruments *an processes* to determine the availability & timing of needed resources.
- ✓ Use of the resource request facilitation process to request additional assistance beyond Coalition mutual aid (i.e., from nearby coalitions and from DC governments) to shorten the modified healthcare interval.
- ✓ Use of the request facilitation process to assist in submitting requests for regulatory and other modifications to support the decisions for modifying critical care services in the scarce resource situations. These may be straightforward requests to DC government such as temporarily raising the licensed bed counts (or temporarily waiving the limits) to much more complex regulatory modification requests.

Modified Delivery of Critical Care Services: Preparedness Considerations

For contingency and extreme scarce resource situations to be adequately addressed, certain activities are encouraged during preparedness planning. The following should be addressed

- The healthcare organization should create and establish procedures for an operational entity which can provide guidance during response on modified delivery of healthcare services in scarce resource situations. flexible Clinical Care (or Scarce Resource) Task Force can be developed and designed to be staffed by a multi-disciplinary group (clinicians, ethicist, engineer, others as indicated). Qualified personnel are identified, trained, and rostered so that they can be rapidly activated.[13,14] To promote participation in the Task Force, liability for decision-making should be explicitly carried by the healthcare organization for decisions made by the Task Force in preparedness and during response operations.[15] The Task Force is assigned to an appropriate supervisory position within the organization's Incident Management Team (IMT) that is managing the clinical care elements of the emergency, and Task Force activities are governed by incident command system principles, incorporated into the emergency operations plan (EOP), rather than by "committee" methods. The EOP guidance, however, also recognizes that *during the initial reactive stages of no-notice, rapidly evolving incident, scarce resource decisions may have to be made by the organization's IMT prior to*

[13]Clinical Care Task Force personnel should be selected based upon their clinical and management competencies and completion of Task Force training (see next footnote), not on their seniority positions in the organization.

[14] The Task Force duties require that the members of this group receive advanced training in the preparedness phase and they should be assigned specifically and exclusively to serving their roles as part of this group while the Clinical Care Task Force is activated.

[15] Transfer of liability may be generally protective of personnel acting on behalf of the healthcare organization, since plaintiff lawyers generally prefer that the institution assumes liability (the institution always has deeper pockets than the practitioner) and the practitioners are no longer an obstacle to settlement (since malpractice rates are unaffected and reporting to the National Practitioner Data Bank does not occur).

activation an mobilization of this Task Force This necessitates the development of checklists and triage algorithms for likely emergency situations.

- During the preparedness phase, triage protocol templates are also developed, circulated for input (particularly by clinical managers and personnel rostered for the Clinical Care Task Force), and feedback incorporated. The protocol guidance is then approved for use in the designated context(s) by the organization's senior leadership, and archived in a readily accessible format within the appropriate EOP situation-specific annexes. The attached tables (see Appendix 2) provide examples of how this information could be categorized in relevant annex guidance to facilitate implementation during response.

- Contingency and extreme situation facilities should be identified and designated during preparedness planning, with an analysis of the necessary resources for these facilities to provide a safe and medically effective critical care capability. Straightforward mobilization guidance may then be developed so the facilities can be rapidly set up; this preparedness activity promotes better adequacy of even extreme situation facilities, and therefore minimizing the risk of adverse effects
  - o patients triaged to these areas.

- Guidance is developed for modifying critical care service delivery for contingency and extreme situations (i.e., temporizing and substituting and procedural changes). Decision-support tools are developed (see examples in Appendix 2) to assist decision-making during scarce resource situations.

Chapter 3: "Operationalizing" Modified Delivery of Critical Care Services in Scarce Resource Situations in Washington DC

The Multi-Level Structure Required for Effective Operation During Emergencies

The US Department of Health and Human Services (DHHS), in highlighting the Medical Surge capacity and Capability (MSCC) handbooks' "tier" structure for healthcare surge capacity and capability through its Hospital Preparedness Program, emphasizes the multi-layered approach necessary for effective surge to meet patient needs. [16,17] This same approach is critically important in meeting the requirements for safe, ethical and effective modification of healthcare delivery when medical needs exceed healthcare resources operating under the day-to-day context.

To maximize modified delivery of critical care services in scarce resource situations, all "tiers" of healthcare and public health, as defined in MSCC, must function in an integrated and supportive manner. The following bullets summarize their projected roles and interfaces in Washington DC; more extensive detail is presented in the next section.

Summary of the tiers and their roles/responsibilities

To maximize modified delivery of critical care services in scarce resource situations, all "tiers" of healthcare and public health, as defined in the MSCC handbook, must function in an integrated and supportive manner. The following bullets summarize their roles and interfaces; more extensive detail is presented in the next section.

- Tier 1: The Impacted Healthcare Organization(s)
  - ✓ *Clinical care areas* Clinicians and clinical managers assigned to patient care areas maximize healthcare delivery as much as possible within the conventional healthcare delivery situation, with support of the facility incident management team (IMT) and the healthcare coalition and local agencies. If scarce resources compel actions beyond conventional and contingency situations, the modifications are reported through, and supervised by, the organization's incident management processes under the facility's incident leadership.
  - ✓ *Healthcare facility leadership* Incident management processes are activated (using the facility's Emergency Operations Plan) to obtain additional resources as available through the facility and its individual healthcare network (such as its sister facilities), through its own mutual aid and contingency contracting, through the Healthcare Coalition and through requests (usually

[16] Barbera JA, Macintyre AG,.(Knebel A, Trabert E, eds). Medical Surge Capacity and Capability: A management system for integrating medical and health resources during large-scale emergencies, Second edition (September 2007). The CNA Corporation. Published under Contract Number 233-03-0028 for DHHS, December 2007; available at http://www.phe.gov/Preparedness/planning/mscc/handbook/Documents/mscc080626.pdf

[17] US Department of Health and Human services. Healthcare Preparedness Capabilities: National Guidance for Healthcare System Preparedness (January 2012). Office of the Assistant Secretary for Preparedness and Response Hospital Preparedness Program. Washington DC.

through DC Emergency Healthcare Coalition - DC EHC) for regional and federal assistance. For contingency and extreme situation healthcare delivery where regulatory, legislated or licensing modifications are indicated, the healthcare facility requests that modification through the procedural route detailed below, with assistance if requested from the DC EHC Healthcare Coalition Response Team.

- Tier 2: DC EHC Healthcare Coalition:
  - ✓ *Healthcare Coalition Response Team (HCRT)*: The HCRT is usually activated in any situation where a coalition member facility has been stressed to the point where modified healthcare delivery is indicated. The HCRT functions in its usual capacity of processing situation information and facilitating assistance to impacted member organizations. This is well described in the DC EHC EOP. Assistance is likely to also include facilitating requests for regulatory modification from the impacted facility(ies) and conveyance to the relevant DC government agencies. Regional assistance from nearby coalitions may also be facilitated by the HCRT.
  - ✓ *Assisting Healthcare Organizations* Coalition organizations not experiencing the scarce resource situation are committed to assisting through staffing the DC EHC HCRT as requested by the HCRT Leader and for mutual aid and other cooperative assistance per the DC EHC Emergency Operations Plan.

- Tiers 3/4/5[18] District of Columbia (DC) Agencies Per established emergency response procedures, DC agencies provide appropriate support to DC healthcare facilities during emergency situations. This is requested, often with DC EHC facilitation, directly to DC Fire and EMS for fire and EMS services (including evacuation), Metropolitan Police Department for security issues, DC Department of Health for healthcare support, either directly through Health Emergency Preparedness and Response Administration (HEPRA) or the Health Emergency Coordination Center (HECC) if activated, or to DC Homeland Security and Emergency Management Agency (HSEMA) or more broadly through the DC Emergency Operations Center when activated. In addition to this customary assistance, the healthcare organizations may request temporary regulatory, licensure, or other modification in order to provide appropriately modified critical care services in response to an urgent or emergency situation. These requests will generally be routed through HEPRA with DC EHC facilitation.

  DC Agencies may also convey resource requests and/or regulatory modification requests to the appropriate federal agency(ies) through their usual emergency mechanisms. Modification requests may be for temporary changes in Federal regulations or in paperwork requirements for reimbursement for services under emergency conditions. These will also be routed by the requesting organization through HEPRA, usually with DC EHC facilitation.

  Examples of regulatory modifications in another State level jurisdiction have been executed in Massachusetts, where the Commonwealth's Department of Public Health temporarily modified

[18] The Washington DC government functions as both a local and State level government and so is responsible for each of the MSCC "tiers" 3,4, and 5.

regulations related to hospitals dispensing full prescriptions for discharge medications during a 2013 winter blizzard and during the 2013 Boston Marathon bombing manhunt (in both situations, when many or most regular pharmacies were closed or discharged patients had restricted access to them). They also provide temporary modified regulatory requirements for patient screening facilities during the 2009 H1N1 pandemic[19] and during more recent flu seasons.

This temporary modification practice currently occurs o a limited basis with waivers of hospital licensed bed capacity upon request for special circumstances. An example of a potentially valuable future modification is having the appropriate health authorities, upo request by the impacted healthcare facility, designate pre-planned and prepared area of the facility as a "hospitality area" or "medical shelter", so that care rendered in that area is not held to the regulatory and other requirements of an inpatient healthcare facility. This allows families with homecare patients to use the healthcare facility as a safe haven and voluntarily select this location, with minimal impact on already strained critical care and other services. Then, even as non-credentialed personnel such as parent/family caregivers that are qualified to provide sophisticated homecare can render that same level of care to family member in the so-designated area of the hospital facility. This may also be extended to long term care patients and their staff when long term care facilities are evacuated under duress and their patients are temporarily housed in another healthcare facility.

General Concept of Operation: Healthcare Services in the Impacted Facility

The four general objectives for modified healthcare delivery in emergencies and disasters (described in Chapter 2) are re-presented here with application examples for impacted healthcare facilities. The strategy concepts listed above (e.g. temporizing and substituting) are used to address Objectives 1 and 2 but become even more relevant for achieving Objective 3, where increasingly severe resource constraints compel decision-making with potentially difficult choices in how critical care patients services are delivered. The objectives and strategy guidance is designed to be incorporated into the facility's emergency operations plan (EOP), if not already there, to provide consistent guidance across the range of emergency situations that the facility may face.

Objective 1 Maintain a physically and medically safe environment for staff, current patients, and visitors, and protect the functional integrity of the healthcare organization and sustain critical care services.

This objective and its strategies are commonly found in the EOP for hospitals and other healthcare organizations. *This objective is important to emphasize even in extreme incidents, since sustainment of critical care services is the foundation for developing adequate surge and effective modification of healthcare services to meet patient needs. Many of the required actions for this objective are directed by*

[19]Auerbach J, Pontikas J. Circular Letter: DHCQ 09-09-522 Guidelines for Use of Alternate Space for Treatment of Ambulatory Patients Presenting with Influenza-like Illness (ILI) (September 25, 2009). Commonwealth of Massachusetts Department of Public health. accessed May 29, 2013 at: http://www.mass.gov/eohhs/docs/dph/quality/hcq-circular-letters/2009/dhcq-0909522.pdf

the facility's incident management team (IMT) and carried out by non clinical personnel. The following high level strategies provide examples of how to achieve this objective:

Establish an maintain secure perimeter: The ability to perform critical healthcare functions under duress is contingent upo restricting unwarranted movement of people, both visitors and unassigned personnel. This is particularly important around critical care treatment areas and requires the maintenance of internal security. As an example, certain scarce resource situations might require non-critical care and non-security personnel to be recruited from established personnel pools to secure the entry doors to any contingency or extreme critical care treatment area.

Protect staff, visitors, and current patients from usual and incident-related hazard exposure using physical or functional measures Maintenance of healthcare functions also requires safe environment beyond just physical security. Personnel performance (and morale) can be affected by concern for exposure to hazards such as unusual chemicals or infectious biological disease. The performance of effective external decontamination of casualties can both prevent secondary contamination of staff and enhance their performance by avoiding the need for additional PPE. Adequate infection control measures should also be rapidly implemented as much as is feasible to protect critical care personnel. Informed volunteers should be sought for assignment to unusual, particularly hazardous care situations.

Maintain essential utilities required for critical care operations: Water, power, sewage, vacuum suction and medical gas distribution need to be maintained to some minimal level of function in order to continue critical care operations. Alternative methods for addressing compromise to each should be pre-established during preparedness, with response procedures defined in immediately available operational checklists.

Objective 2 Achieve and maintain optimal critical care surge capacity and capability, within the day-to-day healthcare delivery context, using available conventional or contingency resources and processes/procedures.

Like Objective 1, this is also a common objective for healthcare organizations' emergency response. It relies on the use of the facility's incident management team for effective resource management. Guidance for these actions should be incorporated into an effective EOP to maximize conventional and contingency healthcare service delivery and minimize the probability of extreme scarce resource situations.

The following strategies will *maximize available resources and resource output* to address healthcare surge requirements while conducting the usual healthcare delivery methods:

Maximize available resources This approach uses valid methods for increasing the available resources (personnel, facilities, equipment, and supplies) to address healthcare needs. Tactics to maximize available resources include:

1. Calling back off-duty personnel; this may be conducted using rotating basis so as to maintain an expanded pool of workers while not exhausting the work force within the first 24-48 hours of an emergency situation.

2. Mobilizing reserve critical care equipment and supplies.

3. Expediting the ordering process with suppliers, including vendors who supply appropriate nursing personnel (i.e., "temps"), ventilators, and other critical care resources.

4. Activating mutual aid instruments or cooperative agreements to obtain conventional critical care resources, or requesting additional assistance through government sources.

5. Conserving resources from other elements in the organization not directly involved with critical care and redirecting them for use in critical functional areas of emergency response (example: using a personnel pool drawn from billing and accounting for expedited patient, equipment, and supplies transport).

Maximize the output of existing resources. This approach focuses on the use of the available resources to maximize output in meeting extraordinary healthcare needs. Tactics include change in management of resources (using incident command system and other management tools from the EOP) to maximize efficiency of resources. Much of this is conducted by the incident management team's operations section clinical care branch. Example tactics include:

1. Reassess current patients and identify stable patients that can be *very safely transferred* from critical care areas to less intense treatment units.[20]

2. "cohort approach" places patients with like needs in close proximity so specialized staff can attend to larger number of patients (e.g., the "asthma room" for mass albuterol nebulizer treatments), or establishing teams that perform the same specialized procedures in an efficient manner for number of patients (e.g., burn dressing team), freeing up time for other staff.

3. Applying additional personnel to “bottleneck” activities, such as patient transport to and from specialized procedures, so that time between patients is minimized and maximum use of the otherwise scarce resource is achieved. Example: having patient at the CT scanner and prepped as soon as the prior patient is moved so as to maximize the output of the CT scanner resource.

4. Monitoring the use of supplies and assuring that additional medical supplies are delivered to patient care areas before they are needed is important, so that patient flow is unimpeded.

5. Increased supervision of appropriately credentialed personnel who are working outside their usual clinical setting may also increase efficiency by providing clear direction for obtaining supplies, ordering tests, and other standard operating procedures. For example, using operating room nurses and nurse anesthetists in critical care units to augment scarce critical care nursing staff may be most productive by assigning them to teams that are directly supervised by one or several experienced and credentialed critical care nurses who know the unit's procedures, supplies locations, specific charting methods, etc. This example may also

[20] Patients already be treated under day-to-day methods should ethically not be placed at risk to accommodate emergency or disaster patients.

apply to scarce physician resources: This example also applies to physicians – using hospitalists/internists in the critical care unit and having them supervised by one intensivist (critical care attending physician) per 5-10 patients, which is similar to the widely accepted resident physician model.

6. Modify resource-related procedures, such as moving equipment rehabilitation personnel to the site where the equipment is being used, so that cleaning and preparation for re-use is minimized and resource use is effectively increased.

7. Minimize localized surge needs. This approach attempts to decrease the actual healthcare needs presenting to an overstressed healthcare organization. Tactics may focus on:

    - Coalition efforts working with EMS to ensure appropriate distribution of patients (critical care cases) across all capable facilities.

    - Working with the Healthcare Coalition to develop public information announcements that may guide patients to underutilized healthcare facilities.

    - Appropriately postponing surgical and other procedures that normally use critical care resources in the post-procedure period, or may need them in common post-procedure scenarios.

Accomplishing this objective through the defined strategies will promote best match between critical care medical needs and healthcare resources available across an impacted region.

Objective 3: Modify direct healthcare delivery (patient evaluations and interventions), through managed change, to maintain a safe environment and achieve the *best possible* medical outcomes.

This objective comes into play when, despite achieving maximal critical care surge capacity and capability as described in Objective 2, resources remain scarce relative to patient critical care needs. The strategic considerations for achieving this objective focus on healthcare delivery modifications that are fair and unbiased, and therefore based upon expected patient benefit that is least likely to affect expected medical outcomes. *Progressively more uncommon substituting and temporizing in healthcare delivery measures are considered an implemented as the resource constrained situation becomes more extreme.*

Effective implementation of this strategy requires focus in two separate areas by personnel managing the clinical situations.

1. Personnel focused upon modifying the delivery of critical care services in ways that vary from everyday practice, but with the objective of meeting the critical patient needs. As the incident becomes more extreme, managers must consider the use of less optimal healthcare delivery methods and procedures, now with the objective of achieving the best possible medical outcomes given the difficult circumstances.

2. Personnel focused upon developing triage methods and conducting patient triage at each site where decisions must be made in assigning patients to increasingly scarce resources. The triage

methods must allow selection of patients who will have the least adverse outcome under modified healthcare delivery, and the triage must be responsive to the highly dynamic nature of the needs versus resources dilemma. As the incident becomes more extreme and healthcare delivery options become increasingly restricted, triage criteria must evolve accordingly.

The strategies defined to achieve Objective 3 are therefore sequential, in contrast to the concomitant strategies for the other objectives. They become successively more extreme as the needs versus resources mismatch becomes more severe:

1. Temporize and substitute evaluation and interventions that do not affect expected patient outcomes (this is in many ways an extension of Objective 2 and is included to provide a smooth transition).

2. Temporize and substitute evaluation and interventions with minimal compromise to expected long-term patient outcome.

3. Temporize and substitute evaluation and interventions that may significantly affect life safety and lifesaving outcomes.

These management approaches may be used alone or in combination to accomplish the objective. Evolving triage algorithms should be used to consistently select patients appropriate for modified healthcare delivery pathways such that they have the least effect on their eventual outcome. Specific examples of these sequential strategies, as applied to critical care, are provided in the attached tables: **1) n projected change in patient outcome, 2) potential or minimal projected change in patient outcome, or 3) potential significant change in patient outcome**.

In selecting these strategies, it is important to recognize that most contingency and extreme situations regarding resource constraints are "temporary" (i.e., established for a short period, subject to extension or cancellation as the situation and needs versus resources evolves). *The use of temporizing and substitute strategies, particularly those with potential significant changes in patient outcomes, are generally anticipated to be short-lived* The modified delivery of care procedures include monitoring effects on the patient's course, with frequent reassessment of the strategies as the incident evolves. Even if the situation becomes prolonged, "temporary" is still used with reassessment and renewal of modifications as indicated. Reassessment and probable revision of triage algorithms is also indicated as the projected ratio of patient needs to resource availability evolves.

Objective 4 Return to normal operations as rapidly as possible (recovery) and return response resources to "ready" status.

As the "needs versus critical care resources mismatch" resolves through additional resources and/or decreased patient needs, it is important to carefully manage the situation as "excess" resources become available. *The most immediate priority attention should be to upgrading or ending any ongoing temporizing or substitute medical interventions, from the most extreme modifications to the least.* When this has been accomplished, action planning should then address:

- ❑ Demobilizing resources.
- ❑ Rapidly returning emergency response capabilities to ready status.
- ❑ Rapidly returning recruited resources (personnel, facilities, equipment) to their everyday use.

- ❑ Addressing any backlogs in critical care or other important day-to-day services created by the re-direction of resources during the scarce resource situation.
- ❑ Ensuring that appropriate charges are submitted and finances recouped to allow the system to reset and prepare for future contingencies.

Specific Concept of Operation: Modified Healthcare Services in the Impacted Facility

This concept of operations assumes that the healthcare organization's Emergency operations Plan (EOP) has been activated, including the EOP annex(es) that provide guidance for scarce resource situations involving critical care services.

Using standard EOP process and procedures, Objective 1 in this Modified Delivery of Critical Care Services is addressed using current healthcare incident management team (IMT) methods. Objective 2 may also be met with standard IMT guidance (see preceding section). Objective 3 requires additional planning and development. Since the transition from modified care without expected change in patient outcome (Objective 2) to potentially adverse patient consequences (under Objective 3) may be incremental, both are considered in the attached example guidance.

During an emergency incident where critical care resources may be severely challenged or exceeded, the IMT initiates response utilizing pre-planned templates and triage algorithms. Simultaneously, it activates the Critical Care Task Force, which focused o conducting the following activities:

1. Rapidly assess the potential or actual scarce resource situation and inform the IMT leadership.

2. Assure that other IMT elements are addressing all relevant action items to achieve Objectives 1 and above.

3. Review and adapt relevant protocols for adapting and expanding resources to address the specific scarce resource situation, using the decision support tools developed for this purpose. Direct (for liability coverage purposes) the activation of critical care modifications to appropriately address the scarce resource situation(s).

4. Review and adapt the relevant patient triage protocols developed during preparedness to address the current scarce resource situation; develop new protocol using the common template if no relevant patient triage protocol exists.

5. Assign triage officer(s) from the Task Force to rapidly screen requests for scarce resources and determine, using the objectives and strategies above, the appropriate assignment of patients to available resources.

6. Monitor patients assigned to modified critical care services, reporting effects (positive, neutral, or negative) in a timely manner to the IMT supervisory position. Assure that all modifications

and the results as compiled by monitoring are reported through the appropriate incident management routes to facility leadership.

7. Address any significant adverse effects immediately, then review and potentially revise the relevant patient triage and decision-support resource protocols.

8. "planning" position should be staffed o the Task Force to conduct intermediate and long-range planning using projected patient needs and available resources beyond the immediate operational period, and then informing the direct decision makers o the Task Force about projected needs and current/projected resources.

9. Monitor resource availability and modify patient triage and assignment protocols to reflect the improving resources-to-needs ratio, addressing the patients receiving the most extreme modifications first.

10. Facility incident management team (IMT) leadership analyzes the modifications and reports to DC DOH with any indicated requests for modifications of regulatory and/or financial reimbursement requirements.

11. *Throughout the incident response, work with DC Emergency Healthcare Coalition resources to ensure that triage protocols and other modifications to care are consistent with those being conducted at other healthcare organizations where indicated*.

The DC Emergency Healthcare Coalition's Role in Modified Healthcare Delivery in Scarce Resource Situations

The DC Emergency Healthcare Coalition's Emergency Operations Plan (EOP) has established structure and process/procedures for the activation and operation of Healthcare Coalition Response Team (HCRT). The additional role of assisting with modified delivery of healthcare services is only an extension of the HCRT's currently planned emergency response mission, including the facilitation of mutual aid and cooperative assistance through the DC EHC Mutual Aid Memorandum of Understanding and the EOP processes, facilitating situation awareness through information processing, etc. Instead of only facilitating requests for resource assistance, the HCRT will also facilitate requests from impacted Coalition organizations for regulatory modifications, and will promote commonality and consistency across the similarly impacted Coalition organizations. This can be generally accomplished through currently establish operating procedures. For example, a Planning Meeting format may be used by the HCRT Operations Section Chief to conference with all similarly impacted Coalition facilities and rapidly ascertain the regulatory modifications that may be sought. The HCRT Planning Section Chief may capture the consensus and enter this into the *Impacted Facility Regulatory Modification Request and Relevant Situation Information* form (see Appendix 1). The template can then be sent to each of the impacted facilities to develop consensus, so that each facility can add their identifying information, have

the form signed, and then submit consistent requests that may be considered at one time by the relevant agencies that grant waivers or modifications.[21]

Similarly, the assisting Coalition healthcare organizations (i.e., those not as severely impacted and so can offer mutual aid and cooperative assistance) interact using the standard DC EHC EOP processes and procedures.

The District of Columbia's Government Roles in Modified Healthcare Delivery in Scarce Resource Situations

The roles and responsibilities below are general concepts that may be informed by DC government agencies to allow more detail in future editions.

- ✓ DC Department of Health and DC Fire and EMS directly assist impacted healthcare facilities using their standard operating procedures for emergencies and disasters.
- ✓ Facilitate local mutual aid assistance to impacted organizations (Resource requests are submitted through DC EHC Healthcare Coalition Response Team per usual process).
- ✓ Facilitate interstate mutual aid and federal assistance using their current operating procedures.
- ✓ Request and receive resources for application at the healthcare facility level (mutual aid, Emergency Management Assistance Compact [EMAC], direct federal resources, etc.), using DC EHC-informed strategy for deploying federal and EMAC assets.
- ✓ Receive and process requests (see *Request for Modification of Regulatory or Reimbursement Requirements* in Appendix 1) for regulatory/legal/reimbursement variances. The process to be formally established will cover request reception, required information, rapid processing, replying with conditional modifications, terminating the modifications and follow-up for performance evaluation and improvement planning; this formal process is for regulatory relief in high-risk situations, using the formatted form to assure that all required information is submitted; *this process does not supplant the current informal methods used for low-risk regulatory modifications such as the licensed bed waiver*.
- ✓ DoH HEPRA transmits modification requests to the DC government agencies with relevant authorities (example: DCRA and other agencies and departments with regulatory oversight for facility operations) (example: use of temporary outside patient screening facility to prevent contagious flu or other illness from entering facility except through a controlled manner).
- ✓ Interface with the federal government for modification of Federal regulatory and reimbursement requirements.

[21] See the DC Emergency Healthcare Coalition Emergency Operations Plan for clarification of the structure, processes, procedures and terminology used by the Coalition during emergency operations.

Chapter 4: Future directions

The eventual intent of modified healthcare delivery in scarce resource situations is for this approach to be widely applied across all DC EHC healthcare organizations, extending beyond critical care situations to other acute care resource constrained areas, and even to important non-medical resources such as security, facility engineering, and business continuity disciplines. These situations beyond critical care services are relevant to all healthcare sectors including Skilled Nursing Facilities (SNF), Community Health Centers (CHC) and specialty care centers such as outpatient dialysis facilities.

To achieve full implementation of the modified healthcare delivery in scarce resource situations strategy, the ad hoc work group proposed the following tasks (below) to be considered for the next and future Hospital Preparedness Program funding cycle. In the final work group meeting, the group suggested for the next funding cycle the proposals that are ***bolded/italicized*** below.

- ***Table top exercise or scenario walk-through discussion with DC DOH/HEPRA, other relevant agencies, and DC EHC member organizations to illustrate the process, to examine the full spectrum of activity in each tier and to promote understanding and buy-in*** specifically focused o the request process and types of regulatory modifications that may be important This should prompt the discussion to produce refined methods for requesting and receiving regulatory modifications, including transmitting requests to Federal agencies as indicated.
- Using the ad hoc Working Group and the findings from the table top exercise/scenario walk-through, ***identify the likely extreme scarce resources situations that could be encountered by DC EHC organizations. The indicated regulatory modifications and the agency with authority to modify them can then be determined. The requests for those potential situations can then b developed in template form, citing the regulations and reimbursement requirements so that the agencies can anticipate the requests and have responses pre-developed***. Current experience, such as receiving temporary increases in licensed bed capacity from DC agencies, may be used to inform this development.
- If agreed upon by DC EHC member organizations (through the DC EHC emergency management committee), ***convene a one-day working conference of multi-disciplinary experts from coalition organizations (medical, nursing, respiratory, clinical managers, administrators, ethicist) to review the modified critical care considerations and edit, revise, extend as may be achieved through a consensus process during and following the conference***. This would provide the peer-review process and fully establish the community approach to the relevant critical care scarce resource situations; it may also promote full implementation by each healthcare organization.
- The duties of an activated Clinical Care Task Force may be complex and stressful, so advanced training for Task Force personnel is indicated. ***common training program for all Coalition member organizations may be considered as a cost-effective way to conduct this training and as method to promote consistency across member organizations, particularly related to the Clinical Care Task Force concept***.

- Analyze the DC EHC Emergency Operations Plan and its concept of operations to identify areas in which it may be improved for optimal support to impacted healthcare facilities that are conducting modified healthcare delivery in scarce resource situations.
- Plan for detailed implementation of modified critical care services guidance and for modified healthcare delivery to be extended beyond critical care and to all DC EHC member organizations for future funding cycles.
- Other suggested actions to consider include:
  - ❑ Expansion of specific resource-constrained situation guidance if time permits.
  - ❑ Developing more detailed modification options, categorized by:
    - Personnel-related modifications: template for assessing competencies of home care provider providing services to their admitted patient
    - Facility-related modifications: template for fire watch and other services that may be required in austere settings
    - Equipment-related modifications: Adapt the Joint Commission process for biomedical inspection and sticker applied to approve use of homecare equipment in hospital for that specific patient admitted only for safe haven purposes (e.g., Non-invasive positive pressure ventilation (NPPV), implanted pain pumps, and other devices)
    - Supplies (including pharmaceuticals) related modifications
    - Procedure-related modifications.
  - ❑ Also address finance-reimbursement-related modifications: Establish means to appropriately track and consistently charge patients under these modified conditions so as to recoup the cost of providing care during a disaster and as it abates.
  - ❑ ***Explore opportunities to develop formal research on proposed modifications to see what has been done nationally and internationally***
    - Consider linkage for joint project with The Association for Professionals in Infection Control and Epidemiology (APIC) to discuss sterilization issues.
    - Consider developing a research agenda and performing research with partners in areas such as expedited turn-around of equipment and other areas.

Appendix 1: Request for Modification of Regulatory or Reimbursement Requirements

<table>
<tr><td colspan="3">Impacted Facility Regulatory Modification Request and Relevant Situation Information</td><td>DCEHC Reg Mod 1
PAGE of 2
0 21 13</td></tr>
<tr><td colspan="3" rowspan="2">This form is used to request temporary modification of day-to-day regulations, legislative mandates, licensure requirements and other government directives to support healthcare delivery in extreme scarce resource situations, and to convey the situation information necessary for the request to be considered and acted upon by the appropriate authorities. It is intended for use by the supported facility but may also be utilized by the HCRT in facilitating requests from multiple DC EHC member organizations.</td><td>Impacted Facility</td></tr>
<tr><td>Facility Executive or Designee</td></tr>
<tr><td colspan="2">1. REQUESTING FACILITY:</td><td colspan="2">2. DATE TIME of MODIFICATION REQUEST:</td></tr>
<tr><td rowspan="3">3. REQUESTING FACILITY POINT OF CONTACT (POC):</td><td colspan="3">4. POC INFORMATION</td></tr>
<tr><td>TELEPHONE</td><td colspan="2">FAX</td></tr>
<tr><td>CELL PHONE</td><td colspan="2">EMAIL</td></tr>
<tr><td colspan="4">INITIAL/IMMEDIATE INFORMATION TO CONVEY TO DC DoH</td></tr>
<tr><td colspan="4">5. INCIDENT TYPE</td></tr>
<tr><td colspan="4">6. SCARCE RESOURCE SITUATION DESCRIPTION
GENERAL SITUATION

PATIENT NUMBERS & SPECIFIC NEEDS

TYPE OF INADEQUATE DAY-TO-DAY RESOURCES FOR THESE PATENTS' NEEDS

MODIFIED METHODS FOR ADDRESSING PATIENTS' NEEDS

SPECIFIC "SUBSTITUTE" PROCEDURES TO BE USED TO MONITOR/MAINTAIN QUALITY/SAFETY DURING THE MODIFICATION PERIOD</td></tr>
<tr><td colspan="4">7. SPECIFIC MODIFICATIONS REQUESTED</td></tr>
<tr><td colspan="4">8. TIME FRAME REQUESTED FOR MODIFICATION DECISION:
EMERGENT (MINUTES)
URGENT (HOURS)
SEMI-URGENT (DAYS)</td></tr>
<tr><td colspan="4">9. PROJECTED TIME INTERVAL FOR REGULAT0RY & OTHER MODIFICATIONS TO APPLY</td></tr>
<tr><td colspan="4">10. OTHER IMMEDIATE NEEDS</td></tr>
<tr><td colspan="2">11. HCF TITLE AND NAME OF AUTHORIZED FACILITY OFFICIAL</td><td>12. SIGNATURE OF AUTHORIZED FACILITY OFFICIAL</td><td>13. DATE/TIME PREPARED:</td></tr>
</table>

GUIDELINES FOR COMPLETING THE "IMPACTED FACILITY REGULATORY MODIFICATION REQUEST AND RELEVANT SITUATION INFORMATION" (DC EHC REG MOD 1)[22]

By submitting this request to DC government, the healthcare facility acknowledges that it is experiencing significant scarce resource situation and will provide best available resource allocation and modified healthcare delivery while awaiting response from the relevant government agencies.

Section 1: List the name of the facility experiencing the scarce resource situation.
Section 2: List the date and time of the modification request.
Section 3: List the individual who is the point of contact (POC) at the facility for queries and responses regarding this request.
Section 4: List the indicated contact information for the POC.
Section 5: Provide short description of the type of incident that created the scarce resource situations (examples include: "electrical power failure and compromise to back-up generator" or "mass casualty burn situation secondary to the train explosion").
Section 6: Provide the situation details requests in each line to assure that the authorized agency understands the situation and has a factual basis upo which to consider the modification request. Additional information may be appended to the request form.
Section 7: Specify the modifications that are being requested. Ideally, this should include citation of the specific regulation, legislation, or other government document (the DC EHC Healthcare Coalition Response Team may be able to assist with these details).
Section 8: The urgency of the request should be described in this section
Section 9: The projected time interval for the waiver or regulatory modification to be in effect; an end point should always be listed - this can be extended at a later date (through a follow-on request) if the situation warrants.
Section 10: List any other expected needs regarding regulatory modifications, or cost reimbursement issues.
Section 11: List the name and organization title of the individual from the requesting organization that authorized the submission of this particular *Impacted Facility Regulatory Modification Request An Relevant Situation Information*.
Section 12: Provide the signature of the individual listed in Section 11.
Section 13: List the date and time that the form was completed.

The specific process for submitting this completed and signed form can be obtained from the activated HCRT Leader or Operations Section Chief.

[22] This form may be modified at the request of DC Department of Health if further information is required. An example of a currently in use form (Massachusetts Department of public Health) is available (accessed May 29, 2013) at http://www.mass.gov/eohhs/docs/dph/quality/boards/waiver-request-form.pdf