SCARCE RESOURCE MANAGEMENT & CRISIS STANDARDS OF CARE

OVERVIEW & MATERIALS
CRITICAL CARE ALGORITHMS | SCARCE RESOURCE CARDS | TRIAGE TEAM GUIDELINES & WORKSHEETS
SCARCE RESOURCE MANAGEMENT and CRISIS STANDARDS OF CARE

I. INTRODUCTION

In the event of a large-scale disaster, either a no-notice event such as a natural disaster or a prolonged situation such as a pandemic, there is the potential for an overwhelming number of critically ill or injured patients. In these situations, certain medical resources may become scarce and prioritization of care may need to be considered.

Medical surge is a complex multifactorial event, the response to which is equally complex. In an effort to better understand, measure, discuss best practices and manage medical surge, it is essential to have an overall guiding framework.

In 2009, the Institute of Medicine (currently the National Academy of Medicine) published a landmark report, Guidance for Establishing Crisis Standards of Care for Use in Disaster Situation: A Letter Report. In this report the authors defined Crisis Standards of Care as follows:

“A substantial change in usual healthcare operations and the level of care it is possible to deliver, which is made necessary by a pervasive (e.g. pandemic influenza) or catastrophic (e.g. earthquake, hurricane) disaster. This change in the level of care delivered is justified by specific circumstances and is formally declared by a state government in recognition that crisis operations will be in effect for a sustained period. The formal declaration that crisis standards of care are in operation enables specific legal/regulatory power and protections for healthcare providers in the necessary task of allocating and using scarce medical resources and implementing alternate care facility operations.”

They outlined a framework for the discussion of surge capacity defining it as a continuum from conventional to contingency, and finally crisis. They defined this “Continuum of Care” as follows:

**Conventional Capacity:** The spaces, staff, and supplies used are consistent with daily practices within the institution. These spaces and practices are used during a major mass casualty incident that triggers activation of the facility emergency operations plan.

**Contingency Capacity:** The spaces, staff, and supplies used are not consistent with daily practices but provide care that is functionally equivalent to usual patient care. These spaces or practices may be used temporarily during a major mass casualty incident or on a more sustained basis during a disaster (when the demands of the incident exceed community resources).

**Crisis Capacity:** Adaptive spaces, staff, and supplies are not consistent with usual standards of care, but provide sufficiency of care in the context of a catastrophic disaster (i.e., provide the best possible care to patients given the circumstances and resources available). Crisis capacity activation constitutes a significant adjustment to standards of care.

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The Institute of Medicine also stresses the importance of an ethically grounded system to guide decision making in crisis to ensure the most appropriate use of resources. They define these ethical principles as:

- **Fairness** – standards that are, to the highest degree possible, recognized as fair by all those affected by them – including the members of affected communities, practitioners, and provider organizations, evidence-based and responsive to specific needs of individuals and the population.
- **Duty to care** – standards are focused on the duty of healthcare professionals to care for patients in need of medical care.
- **Duty to steward resources** – healthcare institutions and public health officials have a duty to steward scarce resources, reflecting the utilitarian goal of saving the greatest possible number of lives.
- **Transparency** – in design and decision making.
- **Consistency** – in application across populations and among individuals regardless of their human condition (e.g. race, age disability, ethnicity, ability to pay, socioeconomic status, preexisting health conditions, social worth, perceived obstacles to treatment, pass use of resources).
- **Proportionality** – public and individual requirements must be commensurate with the scale of the emergency and degree of scarce resources.
- **Accountability** – if individual decisions and implementation standards, and of governments for ensuring appropriate protections and just allocation of available resources.

This framework has been nationally accepted and adopted, and has been used by King and Pierce counties in the development of the products contained in this document.

**II. King and Pierce counties Disaster Clinical Advisory Committee**

The King and Pierce counties Disaster Clinical Advisory Committee (DCAC) is sponsored by the Northwest Healthcare Response Network (NWHRN) and first convened in February of 2011. It consists of Core Members and Subject Matter Experts (SME’s) who represent a wide range of clinical expertise from our regional healthcare partners in both King and Pierce County including representatives from Public Health Seattle & King County and the Tacoma-Pierce County Health Department. DCAC members complete an application process, attend quarterly meetings in person, and agree to serve in both planning and response roles for our community. All the documents contained in this binder have gone through a systematic and rigorous process of draft, review, revision, and discussion, and must be approved by the voting Core Membership of DCAC before they can be distributed. They have been reviewed, discussed and supported by both Local Health Officers and Public Health departments.

**III. Binder Contents:**

All documents contained in this binder are continually under review and open for comments as outlined below under Section D.
A. Scarce Resource Cards

The Scarce Resource Cards (SRC) are based on work done by Minnesota Public Health\(^2\). Each card represents a specific resource, critical to patient care which may become scarce during times of medical surge. The card outlines recommendations which can be used throughout the continuum of care (i.e. Conventional, Contingency and Crisis).

The content and composition between cards varies. Some cards are designed to provide specific clinical treatment strategies (e.g. Mass Casualty Burn Treatment Card). Others outline specific patient populations for which the recommendations are made (e.g. in-patient vs out-patient dialysis patients).

B. Scarce Resource Triage Algorithms and Worksheets

This section includes Adult and Pediatric Critical Care Triage Algorithms which should be used when Critical Care resources are overwhelmed. The Algorithms are designed to be used side-by-side with the respective Worksheet which provides more in-depth clinical considerations and information needed to move through each step in the Algorithm. Decisions made using these algorithms need to be managed by a Triage Team.

Guidelines for the composition, roles and responsibilities of Triage Teams and their oversight are included in Section C.

C. Triage Team Guidelines

Allocation of a scarce resource is a complex task and, in order to maintain the ethical framework outlined above, it is crucial that the decision making process be consistent and that oversight and review mechanisms be established. The Triage Team Guidelines provide institutional and regional recommendations for this process.

D. Update and Input Procedures

1. All documents contained in this binder are maintained by NWHRN.
2. Each document is reviewed every 3 years during scheduled plan review. During a specific response, it is recognized that the clinical situation may change based on numerous incident-dependent factors. Therefore, in response, documents are reviewed as outlined in the Triage Team Guidelines Sections D and E.
3. At any time, input is welcomed and can be discussed at the institutional level with specific institutional DCAC members. Input can also be made directly to the Chair or Vice-Chair of the DCAC or to the Senior Medical Advisor of NWHRN. A full list of DCAC members, Chair and Vice-Chair and the Senior Medical Advisor is available from NWHRN.

\(^2\) [http://www.health.state.mn.us/oep/healthcare/crisis/standards.pdf](http://www.health.state.mn.us/oep/healthcare/crisis/standards.pdf)
IV. Institutional Distribution

The institutional distribution of the contents of this binder will be determined by each institution’s Emergency Manager, DCAC member(s) and appropriate administrative leaders. The DCAC welcomes feedback and input regarding any of these documents. If your Emergency Manager cannot be reached or your institution does not have an active DCAC member please see Contacts below.

V. Regional Scarce Resource Management and Crisis Standards of Care Concept of Operations

In any medical surge, the primary goal is to prevent or limit the time in “Crisis” (as defined above by the IOM). It is understood that movement within the continuum of care is a fluid process and can vary depending on the resource in question or the situation at hand.

It is also paramount, when faced with potential scarce resources that the response is coordinated and communications among all of healthcare is maintained to provide accurate and up-to-date situational awareness. A draft of an overall Regional Scarce Resource Management and Crisis Standards of Care Concept of Operations has been developed and is currently under review and revision. This document will outline regional roles and responsibilities, provide a regional decision-making framework and implementation process, and outline the coordination of healthcare, Local Health Jurisdictions (LHJs), and other regional and state partners during scarce resource management.

C. Contacts:

For any questions about this document or contents of this binder please contact:

- Your institution’s DCAC member
- Senior Medical Advisor, NWHRN:
  Vicki L. Sakata, MD
  Clinical Associate Professor, University of Washington
  vicki.sakata@nwhrn.org

- DCAC Chair:
  Tona McGuire, MD
  Clinical Associate Professor, UW Dept of Psychiatry and Behavioral Sciences
  tlmcg01@gmail.com

- DCAC Vice-Chair:
  Brianne Enriquez, MD
  Medical Director Emergency Management
  Seattle Children’s Hospital
  Brianna.Enriquez@seattlechildrens.org

- Northwest Healthcare Response Network
  7100 Fort Dent Way, Suite 210, Tukwila, WA 98188
  425-988-2898
  www.nwhrn.org
  info@nwhrn.org
### STRATEGIES FOR SCARCE RESOURCE SITUATIONS

<table>
<thead>
<tr>
<th>Conventional Capacity</th>
<th>Contingency Capacity</th>
<th>Crisis Capacity</th>
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<tbody>
<tr>
<td>The spaces, staff, and supplies used are consistent with daily practices within the institution. These spaces and practices are used during a major mass casualty incident that triggers activation of the facility emergency operations plan.</td>
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<td>Adaptive spaces, staff, and supplies are not consistent with usual standards of care, but provide sufficiency of care in the setting of a catastrophic disaster (i.e., provide the best possible care to patients given the circumstances and resources available). Crisis capacity activation constitutes a significant and adjustment to standards of care (Hick et al, 2009).</td>
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</table>

### RECOMMENDATIONS

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<tr>
<th>Strategy</th>
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<th>Contingency</th>
<th>Crisis</th>
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</thead>
<tbody>
<tr>
<td><strong>PLANNING</strong></td>
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<tr>
<td><strong>General</strong></td>
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<tr>
<td>1. Encourage patients to assemble and maintain a disaster kit, to include an extra month worth of their medications, in addition to food, water, sanitation, and first aid supplies, should they need to shelter in place.</td>
<td>Prepare</td>
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<tr>
<td>2. Encourage patients to discuss planning for disruption in their care with their current healthcare providers, including primary care providers as well as behavioral health providers.</td>
<td>Prepare</td>
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<tr>
<td>3. Encourage Behavioral Health Providers to develop a disaster plan with the patient as part of treatment planning.</td>
<td>Prepare</td>
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<tr>
<td><strong>Gathering Resources</strong></td>
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<tr>
<td>4. Encourage patients to identify tools and strategies they have found helpful in symptom relief and write down what works. Include a copy of this document in their disaster kit.</td>
<td>Prepare</td>
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<tr>
<td>5. Encourage patients to explore other avenues for self-help, such as apps to assist with medication and symptom management, and to practice these prior to a disaster. Examples:</td>
<td>Prepare</td>
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<tr>
<td>o 5a) Headspace (meditation and mindfulness) <a href="https://www.headspace.com">https://www.headspace.com</a></td>
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<tr>
<td>o 5b) Virtual Hopebox (distraction, coping exercises, relaxation) <a href="https://psyberguide.org/apps/virtual-hope-box/">https://psyberguide.org/apps/virtual-hope-box/</a></td>
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<tr>
<td>6. Encourage patients to identify family members or friends who are helpful to them and include them as part of their resources.</td>
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<tr>
<td><strong>Preparing a Team</strong></td>
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<tr>
<td>7. Encourage patients to reach out and identify a specific individual in their lives who can be a monitor and coach during disruptive/stressful events.</td>
<td>Prepare</td>
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<tr>
<td>8. Family and friends should be encouraged to take advantage of training through Red Cross, National Alliance on Mental Illness (NAMI), local community mental health clinics, to assist the patient during times of disaster.</td>
<td>Prepare</td>
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<tr>
<td><strong>Response</strong></td>
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<tr>
<td>9. Patients should be encouraged to locate their physical resources, such as food, water, and medications.</td>
<td>Prepare</td>
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<tr>
<td>10. Patients should reach out to their pre-identified support system (family, friends), and to their identified disaster monitor and coach.</td>
<td>Prepare</td>
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<tr>
<td>11. Patients should retrieve any written materials and plans to assist them in monitoring and managing symptoms.</td>
<td>Prepare</td>
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<tr>
<td>12. Patients may wish to reach out to community organizations (e.g. Red Cross, National Alliance on Mental Health and local community mental health clinics) for additional resources if available at the time of the disaster.</td>
<td>Prepare</td>
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</tbody>
</table>

Adapted From the Minnesota Department of Health, Office of Emergency Preparedness
## Strategies for Scarce Resource Situations

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### Recommendations

#### General (For all clinical settings: inpatient, outpatient, group homes, specialty care facilities, ACF)

1. Include Staff mental/behavioral health guidance/resources in all response plans and continue to maintain, test and update mental health surge plans.
2. Include Mental Health surge issues in trainings and exercises including De-escalation Training, Management of the aggressive patient and Staff Safety.

#### Planning for Patient Mental Health Surge

3. Identify all staff with mental health/behavioral health training and appoint key individuals to lead and organize disaster mental health preparedness and response
   - 3a) Recommend specific disaster mental health training for Behavioral Health providers currently embedded in general medical settings. These individuals will be key in providing Just-in-Time (JIT) training to others in times of mental health patient surge.
   - 3b) Store resources and JIT disaster mental health training materials. (e.g. Health Support Team Curriculum, or Skills for Psychological Recovery National Child Traumatic Stress Network). See references below for specific material recommendations.

#### Planning for Staff Mental Health Needs

4. Encourage psychological first aid training to all medical staff especially for key clinical leaders and administrators.
5. Identify and train willing behavioral health and non-behavioral health providers with more comprehensive curricula than PFA, to act as monitors and evaluators for their colleagues. Utilize evidence-based questionnaires as needed to determine current staff functioning. For example, ProQOL is one quick evaluation tool. ([https://proqol.org](https://proqol.org))
6. Provide psycho-education for staff on caregiver fatigue, including symptoms, and coping/support tools.
7. Teach appropriate debrief strategies recognizing:
   - Group debriefing may not be appropriate for all. Prepare and plan to do 1 on 1 debriefing
   - The pace of the debrief session should be responder driven not agenda driven
   - Individuals process traumatic situations at their own pace. Forcing graphic or stressful debriefing can cause increased trauma.

#### Planning for In-Patient Psychiatric Facilities

8. Encourage inpatient psychiatric facilities to develop connections with other inpatient psychiatric facilities to develop planning for potential patient transfers, evacuations and staffing.
9. All inpatient psychiatric facilities should develop general disaster planning to include basic care for patients e.g. adequate food/water/shelter, staffing shortfalls, medications, transport of patients, methods of transport, and management of patients who may represent a danger to themselves or others.
### RESPONSE

#### Patient Surge

- 10. Notify pre-trained providers to prepare for surge. Implement JIT training of other staff to help with patient surge.
- 11. Ensure Alternate Care Facilities have written educational materials to assist with patients, and access to mental health consultation as needed.
- 12. In preparation for possible loss of electronic medical records, have printed patient information to include diagnosis, allergies and current medications/dosages.
- 13. Modify individual treatment to shorter, symptom focused appointments.
- 15. Use Telehealth mental health providers as off-site resource.

- 16. Shift treatment to emphasize coping strategies, interventions to manage symptoms, and identifying and accessing personal resources.
- 17. Deploy multi-disciplinary response teams as needed to provide Just in Time training for healthcare providers/organizations, and to provide consultation on Behavioral Health interventions including medications and crisis management.
- 18. Shift from individual therapy to group intervention.

#### Staff Self Care

- 19. Consider “deliberate Coping and Calming” strategies or “Personal Reflective Debrief” techniques over mandated and prescribed CISD for staff during and after traumatic events.
- 20. Encourage and support staff self-care. When possible maintain schedules, routines and shifts.
- 21. During an event encourage personal “pauses” for reflection and self-evaluation.
- 22. Encourage utilization of organizational support systems, (e.g. employee assistance program, wellness programs, etc.).
- 23. Maintain consistent scheduled communication between administrators and providers during and after acute event. (e.g. huddles, check-ins, sign-outs, etc)

#### MEDICATIONS RECOMMENDATIONS:

- 24. Psychiatric medications may not be available due to supply chain disruptions during a major event. Encourage all facilities who care for mental health patients (outpatient, in-patient medical, long term care, group homes, or specialty care facilities) to develop psychiatric medication supply strategies. Consider increasing par levels, developing stockpiles, and/or planning with local retail pharmacies as potential psychiatric medication supply strategies.

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Adapted From the Minnesota Department of Health, Office of Emergency Preparedness


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## Blood Products

### STRATEGIES FOR SCARCE RESOURCE SITUATIONS

<table>
<thead>
<tr>
<th>Category</th>
<th>RECOMMENDATIONS</th>
<th>Healthcare Facility</th>
<th>Blood Center</th>
<th>Strategy</th>
<th>Conventional</th>
<th>Contingency</th>
<th>Crisis</th>
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<tbody>
<tr>
<td>All Blood Products</td>
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<tr>
<td>1.</td>
<td>Increase donations and consider local increase in frozen reserves P</td>
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<td></td>
<td>✓</td>
<td>Prepare</td>
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<td></td>
<td>Increase O positive levels P, W, MCI</td>
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<tr>
<td></td>
<td>Consider maintaining a frozen blood reserve if severe shortage P</td>
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<td>Increase recruitment for specific product needs</td>
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<td>2.</td>
<td>Consider adjustment to donor HGB/HCT eligibility/ explore FDA variance*</td>
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<td>✓</td>
<td>Adapt</td>
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<td>3.</td>
<td>Relax travel deferrals for possible malaria and BSE (bovine spongiform encephalitis)*</td>
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<td></td>
<td>✓</td>
<td>Prepare</td>
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<td>4.</td>
<td>Use cell-saver and auto transfusion to degree possible** P, W, +/− MCI</td>
<td>✓</td>
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<td>Re-use</td>
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<td>5.</td>
<td>Limit O negative use to women of child-bearing age P, W, MCI</td>
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<td>✓</td>
<td>Conserve</td>
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<td></td>
<td>Use O positive in emergent transfusion in males or females who are no longer child bearing, to conserve O negative** (Seattle Children’s and Mary Bridge Children’s currently uses O neg in males &lt; 18 yrs)</td>
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<td>6.</td>
<td>Change donations from whole blood to 2x RBC apheresis collection if specific shortage of PRBC’s (Cascade has current capability)</td>
<td></td>
<td>✓</td>
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<td>Adapt</td>
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<td>7.</td>
<td>Use aliquots from parent product for several children when possible P, W, MCI</td>
<td>✓</td>
<td>✓</td>
<td>Conserve</td>
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<tr>
<td>8.</td>
<td>Encourage use of blood sparing protocols for all patients P, W, MCI</td>
<td>✓</td>
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<td>Adapt</td>
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<tr>
<td>9.</td>
<td>Consider use of erythropoietin (EPO) for chronic anemia in appropriate patients</td>
<td>✓</td>
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<td>Adapt</td>
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<td>10.</td>
<td>Prioritize freshest blood for infants and small children</td>
<td>✓</td>
<td></td>
<td>Conserve</td>
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<tr>
<td>11.</td>
<td>More aggressive crystalloid resuscitation prior to transfusion in shortage situations (blood substitutes may play future role) Use RBC:Plasma in 1:1 ratio in Trauma cases. P, W, MCI</td>
<td>✓</td>
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<td>Conserve</td>
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<tr>
<td>12.</td>
<td>Long-term shortage, collect autologous blood pre-operatively and consider cross-over transfusion P</td>
<td>✓</td>
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<td>Conserve</td>
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<tr>
<td>13.</td>
<td>Implement lower hemoglobin triggers for transfusion P, W, MCI</td>
<td>✓</td>
<td>✓**</td>
<td>Conserve</td>
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<tr>
<td>14.</td>
<td>Consider limiting high-consumption elective surgeries (select cardiac, orthopedic, spinal, etc.)* (procedures likely to require blood transfusions) P, W, +/− MCI</td>
<td>✓</td>
<td>✓**</td>
<td>Conserve</td>
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<tr>
<td>15.</td>
<td>Consider use of EPO in patients with anticipated acute blood loss P, W, MCI</td>
<td>✓</td>
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<tr>
<td>16.</td>
<td>Further limit PRBC use, if needed, to active bleeding states, consider subsequent restrictions including transfusion for treatable shock states only** (modification of transfusion thresholds) W, P</td>
<td>✓</td>
<td>✓**</td>
<td>Re-allocate</td>
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<tr>
<td>17.</td>
<td>Consider Minimum Qualifications for Survival (MQS) limits on use of PRBCs (for example, only initiate for patients that will require &lt;6 units PRBCs and/or consider stopping transfusion when &gt;6 units utilized), specific MQS limits should reflect available resources at facility. ** P</td>
<td>✓</td>
<td>✓**</td>
<td>Re-allocate</td>
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</tbody>
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*FDA approval/variance required via American Association of Blood Banks (AABB)
**Education and/or experience is necessary in the setting of a community-wide critical shortage

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</thead>
<tbody>
<tr>
<td>Plasma</td>
<td>20. Consider increase in red cell: Plasma ratio (3:1) in massive transfusion protocols in consultation with blood bank medical staff ** W, P</td>
<td>✓</td>
<td>Conserve</td>
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<tr>
<td></td>
<td>21. Encourage early use of plasma in trauma with anticipated massive hemorrhaging and/or brain injury. Thaw early and use blood warmer.</td>
<td>✓</td>
<td>Conserve</td>
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<tr>
<td></td>
<td>22. Switch community inventory to liquid plasma P, W, MCI</td>
<td>✓**</td>
<td>Adapt</td>
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<tr>
<td></td>
<td>23. Consider using Group A Plasma P, W, MCI</td>
<td>✓**</td>
<td>Adapt</td>
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<td></td>
<td>24. Accept female donors without white cell antibody testing. P, W, MCI</td>
<td>✓**</td>
<td>Adapt</td>
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<tr>
<td></td>
<td>25. Though not true substitute, consider use of fibrinolysis inhibitors or other modalities to reverse coagulopathic states (tranexamic acid, aminocaproic acid, activated coagulation factor use, fibrinogen concentrate, prothrombin complex concentrate, or other appropriate therapies) MCI, P, W</td>
<td>✓</td>
<td>Substitute</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26. Obtain FDA variance to exceed 24 collections per year for critical types* P =/-W (e.g. Group AB) P</td>
<td>✓</td>
<td>Adapt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cryoprecipitate</td>
<td>27. Encourage early use of cryo in trauma with anticipated massive hemorrhaging and/or brain injury. Thaw early and use blood warmer.</td>
<td>✓</td>
<td>Conserve</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>28. Though not true substitute, consider use of fibrinolysis inhibitors or other modalities to reverse coagulopathic states (tranexamic acid, aminocaproic acid, activated coagulation factor use, fibrinogen concentrate, prothrombin complex concentrate, or other appropriate therapies). MCI, P, W</td>
<td>✓</td>
<td>Substitute</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelets</td>
<td>30. Though not true substitute, consider use of desmopressin (DDAVP) to stimulate improved platelet performance in renal and hepatic failure patients MCI, P, W</td>
<td>✓</td>
<td>Substitute</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>31. Consider aliquoting from apheresis platelets. For children, consider splitting whole blood platelets for more than one recipient. P, W</td>
<td>✓</td>
<td>Adapt</td>
<td>Leukoreduced</td>
<td></td>
<td>Non-leukoreduced</td>
<td></td>
</tr>
<tr>
<td></td>
<td>32. Convert whole blood donors to apheresis donors. Standard Practice. W, P</td>
<td>✓</td>
<td>Adapt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>33. Transfuse platelets only for active bleeding, further restrict to life-threatening bleeding if required by situation P</td>
<td>✓</td>
<td>Conserve</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>34. Consider no prophylactic use of platelets. P (per discussion with involved clinical provider)</td>
<td>✓</td>
<td>Adapt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>35. Accept female platelet donors regardless of HLA antibody, W, P</td>
<td>✓</td>
<td>Adapt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>36. Consider changing bacterial detection strategy. MCI. P. Potentially W</td>
<td>✓</td>
<td>Adapt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>37. Obtain approval to allow blood products to be received from across state lines**</td>
<td>✓</td>
<td>Adapt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>38. Apply for variance of 5 day outdate requirement * W, P</td>
<td>✓</td>
<td>Adapt</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Adapted From the Minnesota Department of Health, Office of Emergency Preparedness

Updated: December 10, 2015

*FDA approval/variance required via American Association of Blood Banks (AABB)  **Education and/or experience is necessary in the setting of a community-wide critical shortage

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**Initial Assessment**

**High risk features?**
- ≥ 10% TBSA partial thickness (2nd degree)
- ≥ 5% TBSA full thickness (3rd degree)
- Complicated by respiratory injury/inhalation or major trauma
- High-voltage electrical injury (1000V) or chemical injury
- High-risk patient (elderly, diabetic, etc.)

**Outpatient management**
- Elevate all extremity burns
- See supplies sections for dressings guidelines

**Primary Assessment**
- **Airway/Breathing** - Assess airway and provide oxygen. Administer 100% oxygen for suspected inhalation injury (enclosed space fire, carbonaceous sputum, COHgb ≥ 10%). Consider early intubation for >40% TBSA burns.
- **Circulation** - Assess vital signs and pulses. Hypovolemic shock and tachycardia are common >20% TBSA. Treat low blood pressure with IV fluids first. Goal = SBP 90mmHg, MAP 60mmHg.
- **Disability** - Assess neurologic status (including sensation and motor), cervical spine protection, if trauma / high-voltage (>1000V) injury. Check for corneal abrasions, tympanic membrane rupture.
- **Expose/Estimate Burn Size** - Remove clothing, jewelry, and contacts. Protect from heat loss; hypothermia is common. Estimate second/third degree burn area: (see diagram) — also 1% = roughly area of patient’s palm and fingers.

**Secondary assessment – critical burn features?**
- TBSA >25% partial thickness or >10% full-thickness burns
- Respiratory failure (mechanical ventilation)
- Limb-threatening and/or circumferential full-thickness burns
- Co-existing major trauma or other major complications
- Hemodynamic instability despite fluid resuscitation

**Critical**
- High priority for transfer to burn center: continue fluid resuscitation and arrange transfer. After consultation with the burn center, some victims in this category may be triaged to palliative care only, depending on prognosis and resources available.

**Serious**
- Secondary priority for transfer—may have to manage in place awaiting transfer (up to 72 hours)
  - Apply silver sulfadiazine or silver-impregnated gauze dressings to burns
  - Monitor urine output and provide IV fluids to maintain above parameters
  - Infection control—providers should gown, glove, and mask when wounds are exposed
  - Encourage PO intake, limit free H2O to avoid hyponatremia

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### Interventions

- **Decontamination** – Consider for chemical/radiologic – brush away loose material, then copious water. Consult Poison Control.
- **Fluids** – 2 large bore IV’s for access. 3 ml LR x kg x % TBSA is the estimated need over 24 hours, with 1/2 given over 1st 8h, rest over next 16h. Titrate IV fluids hourly to achieve urine output goals. Avoid crystalloid bolus unless SBP <90. Albumin can be useful adjunct after 1st 8h to help reduce IV fluid rate. For children (<30kg), also provide maintenance fluids using D5LR in addition to estimated resuscitation volume.
- **Foley** – Target urine output 30-50ml/h in adults and 1ml/kg/h in children (up to 30kg). Double u/o goal if suspected rhabdomyolysis.
- **History** – use AMPLE mnemonic (Allergies, Mechanism/time of injury, Past medical history including meds, Last meal, Events up to injury, Tetanus status)
- **Nasogastric or orogastric** – only for intubated patients
- **Pain control** – Give small incremental doses of opioids, may require high doses to control pain adequately.
- **Wound care** - cover with clean dry sheets. **Keep warm.** Elevate extremity burns.

#### 1st degree
- Red intact skin
- Erythema, blanches with pressure
- Intact; mild to moderate pain

#### 2nd degree
- Superficial
  - Epidermis and superficial dermis; skin appendages intact
  - Erythematous, moist, elastic; blanches with pressure
  - Intact; severe pain
  - 1-3 weeks; scarring unusual
- Deep
  - Epidermis and most dermis; most skin appendages destroyed
  - White appearing with erythematous areas dry, waxy; less elastic; reduced blanching to pressure
  - Decreased; edema; maybe le; less painful
  - >3 weeks; often with scarring and contractures

#### 3rd degree
- Epidermis and all or dermis; destruction or all skin appendages
- White charred; tan, thrombo; ed vessels; dry and leathery; does not blanch
- Anesthetic; not painful (although surrounding areas of second-degree burns are painful)
- Does not heal; severe scarring and contractures

---

## Command and Control, Communication, Coordination

**General Preparedness Information**
- Mass burn incidents are unusual but may occur. The ability of non-burn hospitals to triage and initially treat victims is critical to successful response and should be a planning goal of all hospitals with numbers of victims depending on the facility size and role in the community.
- In a major incident, victims may require care at the initial receiving hospital for up to 72 hours until transfer to definitive burn care.
- The role of the Disaster Medical Control Center (DMCC) in any major event is to distribute patients from the scene to area hospitals. There are different DMCC’s in the region. Harborview Medical Center (HMC) is the DMCC for King County. This patient distribution is often done by the DMCC with limited information from the field. In an event involving many burn patients it is highly probable that multiple ED’s will receive patients, and be responsible for their initial triage/stabilization.
- HMC will notify Public Health Seattle King County for the potential need to activate the King County Health and Medical Area Command (HMAC).
- UW Medicine Regional Burn Center at HMC is the only verified burn center in the region: 18 ICU and 23 acute care beds.
- HMC will contact HMAC if HMC is unable to accommodate casualties or require assistance with transportation/resource issues. HMAC will coordinate with the appropriate local city/county EOC, WA Department of Health and WA State Emergency Management Division as needed to coordinate transportation or other resource assistance.

### Capacity
- Each facility is encouraged to activate its own internal contingency/disaster plan.
- As part of altered standards of care in a crisis, some ICU patients may need to be cared for on acute care wards.
- In coordination with HMC Burn Center, forward movement to other burn centers in adjoining states may be recommended.
- National Disaster Medical System (NDMS) patient movement may be required.

### Space

<table>
<thead>
<tr>
<th>Category</th>
<th>Resource and Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space</td>
<td></td>
</tr>
</tbody>
</table>

### Supplies (for 72 hours)

<table>
<thead>
<tr>
<th>Center Type</th>
<th>HMC Burn Center</th>
<th>Level II Trauma Centers</th>
<th>Level III &amp; IV Trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Outpatients</td>
<td>100</td>
<td>35</td>
<td>20</td>
</tr>
</tbody>
</table>

Outpatient clinics and urgent care centers may also cache appropriate supplies for their location and patient population. Suggested supplies (per patient) (see information link)

### Inpatient Supplies Planning

*Institutions should prepare based on role in community. In contingency / crisis situation*

<table>
<thead>
<tr>
<th>Center Type</th>
<th>HMC Burn Center</th>
<th>Level II Trauma Centers</th>
<th>Level III &amp; IV Trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Inpatients</td>
<td>50</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

Suggested supplies (per patient) (see information link)
**Staffing**

- Strong consideration should be given to training physician and nursing staff on care of major burns pre-incident and having quick-reference cards/materials available for burn stabilization.
- Level II & III Centers should have a cohort of providers trained in Advanced Burn Life Support (ABLS) and Disaster Management Emergency Preparedness (DMEP).
- Identify staff with prior burn treatment experience (i.e. military).
- Staff should have access to just-in-time training provided to non-burn nursing and physician staff reinforcing key points of burn patient care (including importance of adequate fluid resuscitation, urine output parameters, principles of analgesia, dressing changes, wound care and monitoring – especially at non-burn centers.)
- In a Mass casualty event, HMC will have a ‘hotline’ to provide consultation to non-burn centers caring for burn patients awaiting transportation or referral.
- NDMS personnel and other supplemental staff may be required.

**Special Considerations**

Consider availability of resources for:

- Pediatric – age-and size appropriate equipment: intravenous, intraosseous access devices, medication dosing guides. Consider using color-coding pediatric guidelines.

**Critical Burns – transfer to burn center as soon as possible**

If large number of casualties and very severe burns, a reverse triage algorithm may have to be implemented based on percent burn, age and underlying health issues, combined trauma or other conditions (such as severe inhalational injury). Initially, full support should be provided to as many patients as possible. A triage table may contribute to decisions made by burn surgeons but should NOT substitute for a more global assessment of patient prognosis.(Saffle JR, et al. Defining the ratio of outcomes to resources for triage of burn patients in mass casualties. J Burn Care Rehabil. 2005)

### Likelihood of survival and triage algorithm by Age and Burn Size (% total body surface area)

<table>
<thead>
<tr>
<th>Age (yrs)</th>
<th>0-10%</th>
<th>11-20%</th>
<th>21-30%</th>
<th>31-40%</th>
<th>41-50%</th>
<th>51-60%</th>
<th>61-70%</th>
<th>81-90%</th>
<th>91%+</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1.9</td>
<td>Very High</td>
<td>Very High</td>
<td>Very High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low/Expectant</td>
</tr>
<tr>
<td>2.0-4.9</td>
<td>Outpatient</td>
<td>Very High</td>
<td>Very High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>5.0-19.9</td>
<td>Outpatient</td>
<td>Very High</td>
<td>Very High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>20.0-29.9</td>
<td>Outpatient</td>
<td>Very High</td>
<td>Very High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>30.0-39.9</td>
<td>Outpatient</td>
<td>Very High</td>
<td>Very High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>40.0-49.9</td>
<td>Outpatient</td>
<td>Very High</td>
<td>Very High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>50.0-59.9</td>
<td>Outpatient</td>
<td>Very High</td>
<td>Very High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low/Expectant</td>
</tr>
<tr>
<td>60.0-69.9</td>
<td>Very High</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>70.0+</td>
<td>Very High</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low/Expectant</td>
<td>Expectant</td>
</tr>
</tbody>
</table>


Last Updated: May 11, 2017
# Hemodynamic Support and IV Fluids

## Strategies for Scarce Resource Situations

### Conventional Capacity
- The spaces, staff, and supplies used are consistent with daily practices within the institution. These spaces and practices are used during a major mass casualty incident that triggers activation of the facility emergency operations plan.

### Contingency Capacity
- The spaces, staff, and supplies used are not consistent with daily practices, but provide care to a standard that is functionally equivalent to usual patient care practices. These spaces or practices may be used temporarily during a major mass casualty incident or on a more sustained basis during a disaster (when the demands of the incident exceed community resources).

### Crisis Capacity
- Adaptive spaces, staff, and supplies are not consistent with usual standards of care, but provide sufficiency of care in the setting of a catastrophic disaster (i.e., provide the best possible care to patients given the circumstances and resources available). Crisis capacity activation constitutes a significant adjustment to standards of care (Hick et al, 2009).

## Recommendations

### Equipment and Supplies and Training

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Conventional</th>
<th>Contingency</th>
<th>Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare</td>
<td></td>
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<td></td>
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</tbody>
</table>

- **1.** Cache intravenous (IV) cannulas, tubing, fluids, medications, and administration supplies, oral rehydration packets (ORS) and intraosseous (IO) equipment, including drill and manual placement needles.
- **2.** Conduct training and education re: oral and enteral hydration, IO and hypodermoclysis fluid administration options.
- **3.** Develop system wide scarce resource communication plans with clear lines of responsibility and accountability to keep staff aware of shortages and conservation strategies.
- **4.** Consider centralized inventory control of critical medications and fluids (e.g. procedural areas, ORs, day surgery areas may have separate inventory control of critical resources).

### IV Fluid Conservation Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Conventional</th>
<th>Contingency</th>
<th>Crisis</th>
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</thead>
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</tbody>
</table>

- **5.** Monitor CDC, FDA and ASHP updates on supply and conservation strategies.
- **6.** Switch to oral therapy whenever possible (e.g. antibiotics, anticoagulants, electrolyte replacements).
- **7.** Discontinue KVO (Keep vein open) orders.
- **8.** Adopt NPO strategies as recommended by the ASA (2 hours for liquids, 4 hours for breast milk, 6 hours for infant formula, light meal or nonhuman milk) to limit “maintenance IVF”.
- **9.** Review electronic medical record order sets to ensure conservation strategies are being enforced.
- **10.** If oral therapy is not feasible or indicated consider IM or SQ injection.
- **11.** If IV medications must be used, consider alternative compounding strategies to minimize IVF use such as syringe infusion pumps; IV push administration, following the “ISMP Safe Practice Guidelines for Adult IV Push Medications”.
- **12.** Consider using alternative fluids (e.g. dextrose or LR), or other volume expanders (e.g. colloids) depending on clinical situation.
- **13.** Repackage small bags from larger source following the “Repackaging of certain Human Drug Products by Pharmacies and Outsourcing Facilities” 2017, authored by FDA.

### Emphasize Enteral Hydration Instead of IV Hydration

### Provide oral hydration (ORT), when possible

- **14.** Provide guidelines for oral rehydration therapy, including indications for hospital referral, to outpatient providers.

### Utilize Appropriate Oral Rehydration Solution

- **15.** Oral rehydration solution: 1-liter water (5 cups) + 1 tsp salt + 8 tsp sugar, add flavor (e.g., ½ cup juice) as needed.
- **16.** Rehydration for moderate dehydration 50-100mL/kg over 2-4 hours.

### Pediatric Hydration

- **17.** Pediatric maintenance fluids:
  - **18.** Two mL/kg/h for second 10kg of body weight (20 mL/h for 2nd 10kg = 60 mL/h for 20kg child).
  - **19.** One mL/kg/h for each kg over 20kg (example - 40 kg child = 60 mL/h plus 20 mL/h = 80 mL/h).

### Substitute

- **20.** For fluid support, 8-12F (pediatric: infant 3.5F, < 2yrs 5F) tubes are better tolerated than standard size tubes.
- **21.** For additional equipment size guidelines, refer to a pediatric length-based resuscitation tape, e.g., the Broselow™ Tape.

### Provide nasogastric or gastrostomy (NG, G-tube) hydration for both adults and pediatric patients when applicable

- **22.** NOTE: Clinical (urine output, etc.) and laboratory (BUN, urine specific gravity) assessments and electrolyte correction are key components of fluid therapy and are not specifically addressed by these recommendations.
**IV and Syringe Pumps**
- 22. Ensure IV pumps are charged and battery life monitored.
- 23. Consider stocking alternate emergency equipment for IV administration such as buretrols and drip counters, other devices such as the Drip Assist designed for use in austere environments.
- 24. Reserve IV pumps, if limited, for use for critical medications such as sedatives, analgesics, certain antibiotics and hemodynamic support.

**Conserve**

**Substitute Epinephrine for Other Vasopressor Agents in Shortage**
- 25. For hemodynamically unstable patients > 18 yo who are adequately volume-resuscitated, consider adding 6mg epinephrine (6mL of 1mg/mL) to1000mL NS on mini-drip tubing and titrate to target blood pressure.
- 26. For children < 18 yrs. add 0.6 X weight(kg) to equal total mg of Epinephrine to add to a 100 mL bag of NS. Run on mini-drip tubing start at 1 mL/hr (= 60 drips/hr or 1 drip/minute). This starting epinephrine rate = 0.1 mcg/kg/min, a standard starting epinephrine dose, assuming that 1 mL=60 drips for mini-drip tubing; increase drip rate to target blood pressure.

**Substitute**

**Conserve**

**Re-use CVP, NG, and Other Supplies After Appropriate Sterilizations/Disinfection**
- 27. In crisis situations, when considering re-use of otherwise single use disposable equipment alternate sterilization techniques should be discussed using available expert opinions such as CDC, WHO, local public health and infection control specialists. When possible, consensus recommendation should be made. Possible sterilization options during crisis include:
  - 27a) High-level disinfection for at least twenty minutes for devices in contact with body surfaces (including mucous membranes); glutaraldehyde, hydrogen peroxide 6%, or bleach (5.25%) diluted 1:20 (2500 ppm) may be acceptable solutions.
  - NOTE: chlorine levels reduced if stored in polyethylene containers - double the bleach concentration to compensate.

**Re-use**

**Intraosseous and Subcutaneous (Hypodermoclysis) Replacement Fluids**
- 28. Consider “clysis” as an option when alternative routes of fluid administration are impossible/ unavailable.
- 29. Intraosseous administration should be considered before hypodermoclysis.
- 30. Intraosseous infusion is not generally recommended for hydration purposes, but may be used until alternative routes are available. Intraosseous infusion requires pump or pressure bag. Rate of fluid delivery is often limited by pain of pressure within the marrow cavity. This may be reduced by pre-medication with lidocaine (preservative-free) 0.5mg/kg slow IV push.
- 31. Cannot correct more than moderate dehydration via this technique.
- 32. Many medications cannot be administered subcutaneously.
- 34. Common fluids: normal saline (NS), D5NS, D5 1/2 NS (Can add up to 20-40 mEq potassium if needed.).
- 35. Insert 21/24 gauge needle into subcutaneous tissue at a 45 degree angle, adjust drip rate to 1-2 mL per minute (May use 2 sites simultaneously if needed.).
- 36. Maximal volume about 3 liters / day; requires site rotation.
- 37. Local swelling can be reduced with massage to area.
- 38. Hyaluronidase 150 units / liter facilitates fluid absorption but is not required; may not decrease occurrence of local edema.

**Substitute**

**Consider Use of Veterinary and Other Alternative Sources for Intravenous Fluids and Administration Sets**

**Adapt**

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6 Bruno, VG, Hypodermoclysis: a literature review to assist in clinical practice, Einstein (Sao Paulo) 2015;13(1):122-8
OXYGEN - 03/29/2019 DRAFT REVISION
STRATEGIES FOR SCARCE RESOURCE SITUATIONS

<table>
<thead>
<tr>
<th>Conventional Capacity – The spaces, staff, and supplies used are consistent with daily practices within the institution. These spaces and practices are used during a major mass casualty incident that triggers activation of the facility emergency operations plan.</th>
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</table>

**RECOMMENDATIONS**

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<th>Contingency</th>
<th>Crisis</th>
</tr>
</thead>
</table>

### Inhaled Medications
- 1. Use compressed or room air for administration of nebulized medications when clinically appropriate.
- 2. Restrict the use of Small Volume Nebulizers when inhaler substitutes are available.
- 3. Restrict continuous nebulization therapy.
- 4. Minimize frequency through medication substitution that results in fewer treatments (6h-12h instead of 4h-6h applications).
- 5. Change children from albuterol continuous nebulizers to Albuterol 8 puffs MDI Q2 hrs when they are ready to stop continuous treatments. Only use albuterol nebulizers in continuous form for truly acute status asthmaticus.

### High-Flow Applications
- 6. Assure all resuscitation oxygen bags have shut off valves and are shut off when not in use.
- 7. Restrict the use of high-flow adult cannula systems as these can demand 12 to 40 LPM flows.
- 8. Restrict the use of simple and partial rebreathing masks to 10 LPM maximum.
- 9. Consider intubation or non-invasive ventilation with a well-sealed mask over the use of high flow oxygen delivery systems for both adult and pediatric patients during critical shortages.

### Air-Oxygen Blenders
- 10. Eliminate the low-flow reference bleed occurring with any low-flow metered oxygen blender use. This can amount to an additional 12 LPM. Reserve air-oxygen blender use for mechanical ventilators using high-flow non-metered outlets. (These do not utilize reference bleeds).
- 11. Disconnect blenders when not in use.

### Oxygen Conservation Devices
- 12. Use reservoir cannulas if available at 1/2 the flow setting of standard cannulas.
- 13. Replace simple and partial rebreather mask use with reservoir cannulas or venti-masks at flow rates of 6-10 LPM
- 14. Use High Efficiency nebulizers and use air flow instead of oxygen when clinically possible.

### Augment Oxygen Supply
- 15. Use hospital-based or independent home medical equipment supplier oxygen concentrators if available to provide low-flow cannula oxygen for patients and preserve the primary oxygen supply for more critical applications.
- 16. Consider other source of oxygen such as dental or veterinary offices.
- 17. Obtain oxygen supply from industrial sources, such as supplied by welding companies and underwater diving operations.

### Monitor Use and Revise Clinical Targets
- 19. Employ oxygen titration protocols to optimize flow or % to match targets for SPO2 or PaO2.
- 20. Discontinue oxygen at earliest possible time.
• 21. Consider variable parameters for initiating and continuing oxygen therapy:

<table>
<thead>
<tr>
<th>Starting Example</th>
<th>Initiate O2</th>
<th>O2 Target</th>
<th>Note: These target ranges need to be continually re-evaluated depending on resources available, the patient’s clinical presentation, or measured PaO2 determination. If no pulse oximetry is available initiate oxygen therapy based on clinical assessment (e.g. cyanosis, increased work of breathing, valid respiratory scores etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Lung Adults</td>
<td>SPO2 &lt;88-90%</td>
<td>SPO2 90%</td>
<td></td>
</tr>
<tr>
<td>Pediatrics</td>
<td>SPO2 &lt;88-90%</td>
<td>SPO2 90%</td>
<td></td>
</tr>
<tr>
<td>Severe COPD History</td>
<td>SPO2 &lt;85%</td>
<td>SPO2 88-90%</td>
<td></td>
</tr>
</tbody>
</table>

**Expendable Oxygen Appliances**

• 22. All non-standard disinfection and sterilization procedures should be tested and assessed prior to widespread use. Possible options during crisis include: Use terminal sterilization or high-level disinfection procedures for oxygen appliances, small & large-bore tubing, and ventilator circuits. Bleach concentrations of 1:10, high-level chemical disinfection, or irradiation may be suitable. Ethylene oxide gas sterilization (if available) is optimal, but requires a 12-hour aeration cycle to prevent ethylene chlorohydrin formation with polyvinyl chloride plastics.

**Oxygen Re-Allocation Implementation**

• 23. For patient prioritization for oxygen administration or re-allocation during severe resource limitations please see Adult and Pediatric Critical Care Algorithms.

Adapted From the Minnesota Department of Health, Office of Emergency Preparedness

DRAFT REVISION As of March 29, 2019
## Renal Replacement Therapy Card
### STRATEGIES FOR SCARCE RESOURCE SITUATIONS

**Conventional Capacity** – The spaces, staff, and supplies used are consistent with daily practices within the institution. These spaces and practices are used during a major mass casualty incident that triggers activation of the facility emergency operations plan.

**Contingency Capacity** – The spaces, staff, and supplies used are not consistent with daily practices, but provide care to a standard that is functionally equivalent to usual patient care practices. These spaces or practices may be used temporarily during a major mass casualty incident or on a more sustained basis during a disaster (when the demands of the incident exceed community resources).

**Crisis Capacity** – Adaptive spaces, staff, and supplies are not consistent with usual standards of care, but provide sufficiency of care in the setting of a catastrophic disaster (i.e., provide the best possible care to patients given the circumstances and resources available). Crisis capacity activation constitutes a significant and adjustment to standards of care (Hick et al, 2009).

<table>
<thead>
<tr>
<th>Category</th>
<th>RECOMMENDATIONS</th>
<th>Inpatient</th>
<th>Outpatient</th>
<th>Strategy</th>
<th>Conventional</th>
<th>Contingency</th>
<th>Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. All organizations that provide dialysis need to maintain internal emergency plans to provide care for the special needs of dialysis patients during any external or internal emergency that may disrupt standard operations. These plans should address appropriate water and power supply, equipment and supply needs and staff/provider considerations. (See links to resources in #2 below)</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. All dialysis providers must advise their patients in developing their own preparedness plans including emergency and contingency plans for food, medications, transportation and emergency contact resources.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Prepare</td>
<td></td>
</tr>
<tr>
<td>• Dialysis patients need to be self-sufficient for up to 96hrs. Note that shelters are unlikely to have foods appropriate for renal dietary needs (low sodium, etc.). Personal planning guidance is available at:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Medical needs of re-located renal failure patients from outside our region are substantial; the medical leadership of Northwest Kidney Center, DaVita and NW Renal Network need to be made aware of such incoming patients in order to be able to plan for their medical needs.1</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Transportation Interruptions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Chronic dialysis patients should coordinate with their service providers/dialysis clinics first for transportation and other assistance during service/transportation interruptions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>Prepare</td>
<td></td>
</tr>
<tr>
<td>5. If individual providers/dialysis clinics are unable to meet emergent supplemental transportation needs, refer to the King County Winter Weather Medical Transport Plan and Pierce County Department of Emergency Management for their possible assistance 2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>Adapt</td>
<td></td>
</tr>
<tr>
<td><strong>B. Water</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Water Supply</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Identify and quantify water-purifying capabilities for dialysis</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>Prepare</td>
<td></td>
</tr>
<tr>
<td>7. Identify alternative water source if city water is unavailable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Identify limitations and special arrangements needed to use water tanker</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>Prepare</td>
<td></td>
</tr>
<tr>
<td>a) Availability of reverse osmosis (RO) machines with carbon tanks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Available means to generate adequate water pressure to units providing dialysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Water Contamination</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Consider alternate sources of highly purified water (e.g. Northwest Kidney Center water reserve tank, individual facility wells, etc.) keeping in mind that potable water alone is NOT sufficiently purified for dialysis.</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>Prepare</td>
<td></td>
</tr>
</tbody>
</table>

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10. Consider transferring stable inpatients to outpatient dialysis centers for dialysis treatments and vice versa depending on location of purified water source

11. Consider use of other regional assets for water reserves
   a) JBLM assets: well, tanker
   b) Navy assets: desalination and reverse osmosis capabilities (ship dependent)
   c) Commercial vessels

12. Consider transferring stable inpatients to outpatient dialysis centers for dialysis treatments and vice versa

13. Consider transferring inpatients or outpatients to other hospitals or facilities out of the affected region until issues have been resolved.

C. Power

Dialysis Catheters, Machines, Reverse Osmosis Machines, and/or Other Supply Shortages

14. Maintain adequate stock of dialysis tubing sets and venous/peritoneal access catheters (Quinton, etc.) and medications (e.g. Kayexalate)

15. Identify other sources of supplies and machines

16. Transfer machines/supplies between outpatient centers and hospitals, or between hospitals

D. Supplies

Dialysis Catheters, Machines, Reverse Osmosis Machines, and/or Other Supply Shortages

14. Maintain adequate stock of dialysis tubing sets and venous/peritoneal access catheters (Quinton, etc.) and medications (e.g. Kayexalate)

15. Identify other sources of supplies and machines

16. Transfer machines/supplies between outpatient centers and hospitals, or between hospitals

E. Staff

17. Consider alternative staffing assignments with the following recommendations:

| Alternative Staff Recommendations (listed in order of consideration) |
|--------------------------|------------------|------------------|
| Dialysis Techs | Dialysis Nurses | MDs (Nephrologist) |
| 1. Former Dialysis Techs who are now techs in other specialties | 1. General RN or Transplant RN with previous HD<sup>1</sup> or PD<sup>2</sup> experience | 1. Telemedicine nephrologist |
| 2. General Nurse with prior dialysis experience. | 2. Critical Care nurse with a dialysis training | 2. Retired nephrologist who has maintained medical license |
| | 3. Critical Care Nurse with no dialysis experience and JIT<sup>3</sup> | 3. ARNPs/PAs trained in dialysis |
| | | 5. Dialysis nurse with extensive inpatient dialysis experience |

<sup>1</sup>Hemodialysis
<sup>2</sup>Peritoneal Dialysis
<sup>3</sup>Just-in-time Training (i.e. video, written instructions, handbook, etc.)
### F. Treatment

**Crush Syndrome**
18. Initiate normal saline IV hydration and acidosis prevention protocols immediately either pre-hospital or as soon as possible upon arrival to a healthcare facility to prevent/treat rhabdomyolysis. Additional treatment recommendations:
   a) avoid nephrotoxic agents such as NSAIDS, aminoglycosides, ACE/ARB’s along with other drugs which may cause hyperkalemia
   b) aggressive monitoring and treatment of potential hyperkalemia
   c) close monitoring of fluid status.
   □

### Mode of Dialysis
19. Optimize the mode of dialysis to provide care for the most patients possible given resources available
   a) if water is scarce, consider PD and CRRT as modes of dialysis
   b) if water is readily available restrict to HD or PD and discontinue CRRT for staff considerations.
   □

### Increased Demand on Resources
20. Shorten duration of dialysis for patients that are more likely to tolerate it safely
21. Patients to utilize their home “kits” of medication (Kayexalate) and follow dietary plans to help increase time between treatments.
   □

### Insufficient Resources Available For All Patients Requiring Dialysis
22. Change dialysis from ‘scheduled’ to ‘as needed’ based on clinical and laboratory findings (particularly hyperkalemia and impaired pulmonary function) – parameters may change based on demand for resources
   □

23. Conceivable (but extraordinary) situations may occur where resources are insufficient to the point that some patients may not be able to receive dialysis (for example, pandemic when demand nationwide exceeds available resources). Prioritization should follow the Crisis RRT Triage Algorithm and Worksheet. In multi-organ system failure (MOSF) refer to the Adult/Pediatric Critical Care Triage Algorithm and Worksheet.
   □

### G. Triage

Adapted From the Minnesota Department of Health, Office of Emergency Preparedness

1 Medical Leadership Contact Information: DaVita (253-733-4602); Northwest Kidney Centers (206-720-8505); NW Renal Network (206-923-0714).
2 Contact Public Health Seattle King County Duty officer, Pierce County Emergency Management Duty Officer or the Northwest Healthcare Response Network Duty Officer for more information.
Patient Requires Hospitalization

**STEP 1**
Adequate staffing and resources available?

- **NO**
  - Reassess daily to determine continued priority for hospitalization

- **YES**
  - Admit to hospital

**STEP 2**
A. Does patient meet ICU inclusion criteria? and
B. Will patient benefit from ICU care?

- **NO**
  - Admit to floor

- **YES**
  - ICU Resource available?

**STEP 3**

- **NO**
  - Reassess daily to determine continued priority for hospitalization

- **YES**
  - Compelling reason for reallocation of resource?

**STEP 4**

- **NO**
  - Add patient to ICU waiting list

- **YES**
  - Admit to ICU waiting list

**STEP 5**

- **NO**
  - Data Collection
    - 1. MSOFa
    - 2. Expected duration of need
    - 3. Prognosis
    - 4. Response to treatment

- **YES**
  - Re-evaluate

**IMPROVING**
Consider continued ICU care. If extubated with no significant organ failure, transfer to floor and reassess daily to determine continued need for hospitalization.

**UNCHANGED**
Consider continued ICU care or consider moving to floor with oxygen or CPAP. Reassess daily to determine continued need for hospitalization.

**WORSENING**
Consider discharge from critical care, provide appropriate palliative care.

STEPS 1–6: Please see attached worksheet for detailed explanations

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ADULT Critical Care Triage Worksheet
Critical Care Guidelines During Crisis Capacity

This Worksheet along with the corresponding Adult Critical Care Algorithm are to be used by “Triage Teams” during a declared emergency event whereby an appropriate healthcare official has implemented crisis standards of care. It is recommended that a “Triage Team” be comprised of senior medical personnel, preferably not those primarily taking care of the individual patient under consideration. Please see “Triage Team Guidelines” for further information.

STEP 1: Screen Adult Patients Dependent on Resources Available

For the following conditions consider available staffing and resources. If resources are inadequate, consider transferring the following patients to out-patient or palliative care with appropriate resources and support as can be provided.

- 1. Pre-existing or Persistent coma or vegetative state
- 2. Severe acute trauma with a Revised Trauma Score <2 (see Table A)
- 3. Severe burns with Low or Low/Expectant burn scores based on the Triage Decision for Burn Victims table. (see Table B). Burns not requiring critical care resources may be cared for at the local facility.
- 4. Significant underlying disease process that predict poor short term survival*

STEP 2: Determine if patient meets ICU Inclusion Criteria.

STEP 2A: Patients must have at least one of the following INCLUSION CRITERIA:

- 1. Requires ventilatory support, either invasive or non-invasive
  - Clinical evidence of impending respiratory failure
    - Refractory hypoxemia (SpO2<90% on non-rebreather mask or FIO2>0.85)
    - Respiratory acidosis (pH<7.2)
  - Inability to protect or maintain airway
- 2. Requires vasopressor or inotrope support: Hypotension (SBP <90) with clinical evidence of shock (altered level off consciousness decreased urine output, or other evidence of end stage organ failure) refractory to volume resuscitation that cannot be managed in a ward setting.

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STEP 2B, 4: Assess for allocation or re-allocation of Critical Care Resource

To determine critical care resource allocation or re-allocation the following should be considered:

- Degree of Organ Dysfunction as measured by the MSOFA (Modified Sequential Organ Failure Assessment Score)
- Expected duration of need of critical care resource
- Prognosis with consideration to both current epidemiology and underlying illness*
- Response to current treatment

*Examples of underlying diseases that predict poor short-term survival, despite standard treatment, include (but are not limited to):

1. Severe congestive heart failure
2. Severe chronic lung disease
3. Central nervous system, solid organ or hematopoietic malignancy with poor prognosis for recovery
4. Severe cirrhotic liver disease with multi-organ dysfunction.

STEP 5: Critical Care Waiting List

If a patient meets ICU inclusion criteria and resources are not available, patient will be placed on an ICU priority list. As resources become available their clinical situation will be re-assessed beginning at Step 1 of this algorithm.

Step 6: Defining “Improving”, “Unchanged” and “Worsening” ICU Patients

Patient data collection outlined on Step 6 of the Algorithm will be continuous and ongoing. It is recommended that every 48-72 hours of a patient’s ICU stay, their clinical condition will be reviewed and they will be determined to be “Improving”, “Unchanged” or “Worsening”. This determination must not only take into account data points as outlined in Step 6 but must also include updated epidemiology, critical care resource availability and census demands.

Previous resources (Minnesota Healthcare Mechanical Ventilation Resource card) defined “Improving” as SOFA score <= 7, “Unchanged” as SOFA score 8-11, and “Worsening” as SOFA score >= 12. However, based on more recent data (2,3) it is current consensus that a specific SOFA or MSOFA score cannot accurately define clinical categories and therefore criteria based on current epidemiology must be taken into account when determining patient clinical parameters.
### Other Adult Considerations

All patients receiving critical care before the onset of crisis standards will be re-assessed based on the same criteria as all incoming critical care patients. The same data as outlined in Step 6 should be obtained and resources re-allocated if needed dependent on the Triage Team assessment and decisions.

(Endnotes)

1. Crisis Capacity: Adaptive spaces, staff and supplies are not consistent with usual standards of care, but provide sufficiency of care in the setting of a catastrophic disaster (i.e. provide the best possible care to patients given the circumstances and resources available). Crisis capacity activation constitutes a significant adjustment to standards of care. (Hick et al, 2009, IOM)


ADULT Critical Care Triage Worksheet

Table A:

<table>
<thead>
<tr>
<th>Glasgow coma scale</th>
<th>Systolic blood pressure</th>
<th>Respiratory rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>Points</td>
<td>Points</td>
</tr>
<tr>
<td>&lt;15-13</td>
<td>&gt;89</td>
<td>10-29</td>
</tr>
<tr>
<td>12-9</td>
<td>75-89</td>
<td>&gt;29</td>
</tr>
<tr>
<td>8-6</td>
<td>50-75</td>
<td>6-9</td>
</tr>
<tr>
<td>5-4</td>
<td>1-49</td>
<td>1-5</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

RTS variables used for scoring

Table B:

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Likelihood of survival and triage algorithm by Age and Burn Size (% total body surface area)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-10%</td>
</tr>
<tr>
<td>0-1.9</td>
<td>Very High</td>
</tr>
<tr>
<td>2.0-4.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>5.0-10.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>20.0-29.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>30.0-39.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>40.0-49.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>50.0-59.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>60.0-69.9</td>
<td>Very High</td>
</tr>
<tr>
<td>70.0+</td>
<td>Very High</td>
</tr>
</tbody>
</table>

Triage decision table for burn victims based on anticipated outcomes compared with resource allocation. 1 = OUTPATIENT: survival and good outcome expected without requiring initial admission; 2 = VERY HIGH: survival and good outcome expected (survival >=90%) with limited/short-term initial admission and resource allocation (straightforward resuscitation, LOS <=14–21 days, 1–2 surgical procedures); 3 = HIGH: survival and good outcome expected (survival >=90%) with aggressive care and comprehensive resource allocation, including aggressive fluid resuscitation, admission >=14–21 days, multiple surgeries, prolonged rehabilitation; 4 = MEDIUM: survival 50–90% and/or aggressive care and comprehensive resource allocation required, including aggressive resuscitation, initial admission >=14–21 days, multiple surgeries, prolonged rehabilitation; 5 = LOW: survival <50% even with long-term, aggressive treatment and resource allocation; 6 = EXPECTANT: predicted survival 10% or less even with unlimited, aggressive treatment.


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PEDIATRIC Critical Care Triage Algorithm
Version 1.0 Sept 2014

Patient Requires Hospitalization

Discharge to home or palliative care

STEP 1
Adequate staffing and resources available?

STEP 2
A. Does patient meet ICU inclusion criteria? and
B. Will patient benefit from ICU care?

STEP 3
ICU Resource available?

STEP 4
Compelling reason for reallocation of resource?

STEP 5
Add patient to ICU priority list

Admit to hospital

YES

NO

Reassess daily to determine continued priority for hospitalization

ADMIT TO ICU

STEP 6 Data Collection
1. Degree of Organ Dysfunction (PELOD, Table C)
2. Expected duration of need
3. Prognosis based on epidemiology and underlying illness
4. Response to current treatment

Re-evaluate every 48-72 hours

IMPROVING
Consider continued ICU care. If extubated with no significant organ failure, transfer to floor and reassess daily to determine continued need for hospitalization.

UNCHANGED
Consider continued ICU care or consider moving to floor with oxygen or CPAP. Reassess daily to determine continued need for hospitalization.

WORSENING
Consider discharge from critical care, provide appropriate palliative care.

STEPS 1–6: Please see attached worksheet for detailed explanations
PEDIATRIC Critical Care Triage Worksheet
Critical Care Guidelines During Crisis Capacity

This Worksheet along with the corresponding Pediatric Critical Care Algorithm are to be used by “Triage Teams” during a declared emergency event whereby an appropriate healthcare official has implemented crisis standards of care. It is recommended that a “Triage Team” be comprised of senior medical personnel, preferably not those primarily taking care of the individual patient under consideration. Please see “Triage Team Guidelines” for further information.

STEP 1: Screen Pediatric Patients Dependent on Resources Available

For the following conditions consider available staffing and resources. If resources are inadequate, consider transferring the following patients to out-patient or palliative care with appropriate resources and support as can be provided.

- 1. Pre-existing or Persistent coma or vegetative state
- 2. Severe acute trauma with a Revised Trauma Score <2 (see Table A)
- 3. Severe burns with Low or Low/Expectant burn scores based on the Triage Decision for Burn Victims table. (see Table B). Burns not requiring critical care resources may be cared for at the local facility.
- 4. Significant underlying disease process that predict poor short term survival*

STEP 2: Determine if patient meets PICU Inclusion Criteria.

A. Patients must have at least one of the following INCLUSION CRITERIA:

- 1. Requires ventilatory support, either invasive or non-invasive
  - Clinical evidence of impending respiratory failure
    - Refractory hypoxemia (SpO2<90% on non-rebreather mask or FIO2>0.85)
    - Respiratory acidosis (pH<7.2)
  - Inability to protect or maintain airway
- 2. Requires vasopressor or inotrope support: Hypotension\(^2\) with clinical evidence of shock\(^3\) refractory to volume resuscitation that cannot be managed in a ward setting.

<table>
<thead>
<tr>
<th>AGE</th>
<th>SBP (mmHG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-28 days</td>
<td>&lt;60</td>
</tr>
<tr>
<td>1 month – 1 year</td>
<td>&lt;70</td>
</tr>
<tr>
<td>1 year – 10 years</td>
<td>(age in years x 2) + 70</td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>&lt;90</td>
</tr>
</tbody>
</table>

\(^2\)Clinical evidence of shock = altered level off consciousness decreased urine output, or other evidence of end stage organ failure.

\(^3\)Clinical evidence of shock = altered level off consciousness decreased urine output, or other evidence of end stage organ failure.
STEP 2B, 4: Assess for allocation or re-allocation of Critical Care Resource

To determine critical care resource allocation or re-allocation the following should be considered:

- Degree of Organ Dysfunction as measured by the Pediatric Logistic Organ Dysfunction (PELOD) score.4
- Expected duration of need of critical care resource
- Prognosis with consideration to both current epidemiology and underlying illness*
- Response to current treatment

4Pediatric prognostic scoring systems currently available are unable to accurately predict patient outcomes and thus should not be used as a sole indicator of prognosis. When considering critical care resource allocation in a crisis, it is recommended that decisions be made by a Triage Team. This team should consist of a Pediatric or Adult ICU physician, Trauma Surgeon, PICU Nurse Manager, Respiratory Therapists, Ethicist and other pediatric specialists as required. Decisions should be made based on best clinical judgment with full knowledge of regional resource availability. (Ped Crit Care 2011)

*Examples of underlying diseases that predict poor short-term survival, despite standard treatment, include (but are not limited to):

1. Known severe chromosomal abnormalities with poor prognosis
2. Known severe metabolic, neuromuscular, congenital cardiac or pulmonary disease with poor prognosis.
3. Extreme prematurity:
   - Consider withholding resuscitation of extremely premature infants with anticipated mortality rates greater than 80% and/or with anticipated high resource utilization depending on resource availability.

STEP 5: Critical Care Waiting List

If a patient meets ICU inclusion criteria and resources are not available, patient will be placed on an ICU priority list. As resources become available their clinical situation will be re-assessed beginning at Step 1 of this algorithm.
Step 6: Data Collection and Reevaluation

Patient data collection outlined on Step 6 of the Algorithm will be continuous and ongoing. It is recommended that every 48-72 hours of a patient’s ICU stay, their clinical condition will be reviewed and they will be determined to be “Improving”, “Unchanged” or “Worsening”. This determination must not only take into account data points as outlined in Step 6 but must also include updated epidemiology, critical care resource availability and census demands.

Other Pediatric Considerations

All patients receiving critical care before the onset of crisis standards will be re-assessed based on the same criteria as all incoming critical care patients. The same Data as outlined in Step 2 should be obtained and resources re-allocated if needed dependent on the Triage Team assessment and decisions.

The use of ECMO should be decided on an individual basis by the PICU and/or NICU attending, nursing supervisor and ECMO representative based on prognosis, suspected duration of ECMO, availability of staff and other resources.

1 Crisis Capacity: Adaptive spaces, staff and supplies are not consistent with usual standards of care, but provide sufficiency of care in the setting of a catastrophic disaster (i.e. provide the best possible care to patients given the circumstances and resources available). Crisis capacity activation constitutes a significant adjustment to standards of care. (Hick et al, 2009)

1 ECC Guidelines 2010, Circulation 2010;122 Suppl3:S876-S908
### Table A:

<table>
<thead>
<tr>
<th>RTS variables used for scoring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glasgow coma scale</strong></td>
<td><strong>Systolic blood pressure</strong></td>
</tr>
<tr>
<td>GCS Points</td>
<td>Systolic BP Points</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>15-13</td>
<td>&gt;89</td>
</tr>
<tr>
<td>12-9</td>
<td>76-89</td>
</tr>
<tr>
<td>8-6</td>
<td>50-75</td>
</tr>
<tr>
<td>5-4</td>
<td>1-49</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table B:

<table>
<thead>
<tr>
<th>Age (yrs)</th>
<th>Likelihood of survival and triage algorithm by Age and Burn Size (% total body surface area)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1.9</td>
<td>Very High</td>
</tr>
<tr>
<td>2.0-4.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>5.0-19.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>20.0-29.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>30.0-39.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>40.0-49.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>50.0-59.9</td>
<td>Outpatient</td>
</tr>
<tr>
<td>60.0-69.9</td>
<td>Very High</td>
</tr>
<tr>
<td>70.0+</td>
<td>Very High</td>
</tr>
</tbody>
</table>

Triage decision table for burn victims based on anticipated outcomes compared with resource allocation. 1 = OUTPATIENT: survival and good outcome expected without requiring initial admission; 2 = VERY HIGH: survival and good outcome expected (survival >=90%) with limited/short-term initial admission and resource allocation (straightforward resuscitation, LOS <=14–21 days, 1–2 surgical procedures); 3 = HIGH: survival and good outcome expected (survival >=90%) with aggressive care and comprehensive resource allocation, including aggressive fluid resuscitation, admission >=14–21 days, multiple surgeries, prolonged rehabilitation; 4 = MEDIUM: survival 50–90% and/or aggressive care and comprehensive resource allocation required, including aggressive resuscitation, initial admission >=14–21 days, multiple surgeries, prolonged rehabilitation; 5 = LOW: survival <50% even with long-term, aggressive treatment and resource allocation; 6 = EXPECTANT: predicted survival 10% or less even with unlimited, aggressive treatment.

# PEDIATRIC Critical Care Triage Worksheet

## PELOD Scoring System

<table>
<thead>
<tr>
<th>Organ system and variable</th>
<th>0</th>
<th>1</th>
<th>10</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neurologic</strong>&lt;sup&gt;*&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glasgow coma score</td>
<td>12–15</td>
<td>7–11</td>
<td>4–6</td>
<td>3</td>
</tr>
<tr>
<td>Pupillary reaction</td>
<td>Both reactive</td>
<td>Both fixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cardiovascular</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart rate, beats/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 12 years</td>
<td>≤ 195</td>
<td>&gt; 195</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 12 years</td>
<td>≤ 150</td>
<td>&gt; 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic blood pressure, mm Hg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 1 mo</td>
<td>&gt; 65</td>
<td>35–65</td>
<td>&lt; 35</td>
<td></td>
</tr>
<tr>
<td>≥ 1 mo–&lt; 1 yr</td>
<td>&gt; 75</td>
<td>35–75</td>
<td>&lt; 35</td>
<td></td>
</tr>
<tr>
<td>≥ 1 yr–&lt; 12 yr</td>
<td>&gt; 85</td>
<td>45–85</td>
<td>&lt; 45</td>
<td></td>
</tr>
<tr>
<td>≥ 12 yr</td>
<td>&gt; 95</td>
<td>55–95</td>
<td>&lt; 55</td>
<td></td>
</tr>
<tr>
<td><strong>Renal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creatinine, μmol/L (mg/dL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 7 d</td>
<td>≤ 140 (&lt; 1.59)</td>
<td>≥ 140 (≥ 1.59)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 7 d–&lt; 1 yr</td>
<td>≤ 55 (&lt; 0.62)</td>
<td>≥ 55 (≥ 0.62)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 1 yr–&lt; 12 yr</td>
<td>≤ 100 (&lt; 1.13)</td>
<td>≥ 100 (≥ 1.13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 12 yr</td>
<td>≤ 140 (&lt; 1.59)</td>
<td>≥ 140 (≥ 1.59)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Respiratory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PaO&lt;sub&gt;2&lt;/sub&gt;:FiO&lt;sub&gt;2&lt;/sub&gt; ratio, mm Hg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 70</td>
<td></td>
<td>≤ 70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PaCO&lt;sub&gt;2&lt;/sub&gt;, mm Hg (kPa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 90 (&lt; 11.7)</td>
<td></td>
<td>≥ 90 (&gt; 11.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical ventilation†</td>
<td>No ventilation</td>
<td>Ventilation</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hematologic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leukocyte count, × 10&lt;sup&gt;9&lt;/sup&gt;/L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 4.5</td>
<td>1.5–4.4</td>
<td>&lt; 1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelet count, × 10&lt;sup&gt;9&lt;/sup&gt;/L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 35</td>
<td>&lt; 35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hepatic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glutamic oxaloacetic transaminase, IU/L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 950</td>
<td>≥ 950</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prothrombin time, % of standard (international normalized ratio)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 60 (&lt; 1.40)</td>
<td>≤ 60 (≥ 1.40)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: FiO<sub>2</sub> = fraction of inspired oxygen, PaCO<sub>2</sub> = partial pressure of carbon dioxide in arterial blood, PaO<sub>2</sub> = partial pressure of oxygen in arterial blood.

*For the Glasgow coma score, use the lowest value. If the patient is sedated, record the estimated coma score before sedation. Assess the patient only with known or suspected acute central nervous system disease. For pupillary reactions, nonreactive pupils must be > 3 mm; do not assess after iatrogenic pupillary dilatation.

†The use of mask ventilation is not considered to be mechanical ventilation.

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INTRODUCTION: In the event of a large scale disaster either a no notice event such as a natural disaster or a prolonged situation such as a pandemic, there is the potential for an overwhelming number of critically ill or injured patients. In these situations certain medical resources may become scarce and prioritization of care may need to be considered.

In 2009 the Institute of Medicine (currently the National Academy of Medicine) published a landmark report, *Guidance for Establishing Crisis Standards of Care for use in Disaster Situation: A Letter Report*. In this report the authors defined surge capacity as a continuum from conventional to contingency and finally crisis. This framework has been nationally accepted and adopted. The definition of “Crisis Capacity” as set by the IOM, is a situation where space, staff and supplies “are not consistent with usual standards of care, but provide sufficiency of care in the context of a catastrophic disaster (i.e., provide the best possible care to patients given the circumstances and resources available).”¹

The content of this document is based on a thorough review of the literature, guidelines published by leading national healthcare specialty colleges and societies, recommendations of the National Academy of Medicine and detailed discussion and deliberation by the Region 5/6 Disaster Clinical Advisory Committee.

This document is to be used in conjunction with the Region 5/6 Scarce Resource Triage Algorithms which were developed by regional workgroups of Subject Matter Experts (SME), and approved by the Disaster Clinical Advisory Committee (DCAC). Implementation of these algorithms depends upon the development of individual hospital, hospital system, and regional triage teams as outlined below.

PURPOSE: To provide a transparent, fair, equitable, and consistent approach to allocation of scarce resources during a declared emergency in which Crisis Standards of Care (CSC) has been implemented.

SCOPE: All healthcare organizations and providers within the affected region of the CSC declaration.

ASSUMPTIONS:
- Local Health Officer (LHO) has declared a crisis situation and the Regional Scarce Resource Management and Crisis Standard of Care Concept of Operations has been activated.
- All efforts at surge capacity and resource conservation management have been overwhelmed or will be shortly overwhelmed.
- Federal assets have been requested but may be delayed.

IMPLEMENTATION RECOMMENDATIONS:

A. GENERAL

All healthcare organizations within the affected region agree to implement a uniform triage process as outlined in this document to be used along with the Region 5/6 Scarce Resource Triage Algorithms.

B. TRIAGE TEAMS: IDENTIFICATION and COMPOSITION

1. HOSPITAL CLINICAL TRIAGE TEAM

It is recommended that every in-patient healthcare institution have a Hospital Clinical Triage Team which will report to the Medical Care Branch Director during activation of HICS.

   a) It is recommended the Hospital Clinical Triage Team consist of:
      - At least 2-3 senior clinicians with experience in tertiary triage (e.g. Critical Care, Emergency Medicine, Trauma Surgery, etc.), with one designated as Lead Triage Officer who oversees all Triage processes.
      - 1 medical ethicist
      - When possible clinicians on the Triage Team will not be primary providers of the patients under consideration.
      - When possible, if patients requiring scarce resource fall under a specific specialty such as burn, trauma, pediatrics, etc. then one of the senior clinicians on the Hospital Clinical Triage Team should be of that specialty, or attempts be made to contact specialty clinicians remotely.

   b) All patients presented to the Hospital Clinical Triage Team will be recorded in a Hospital Clinical Triage Team Log, which will include:
      - Date and time of referral.
      - Name of referring clinician and contact information.
      - Patient identifiers: These should include only date of birth and sex. Patient’s name and other demographic data should not be considered by the Triage Team. Hospital specific MRN should be notated to confirm patient identification but should not be made available to the Triage Team.
      - All clinical information presented to the Triage Team at the time of decision.
      - Triage Team decision, date and time of the decision, and all supporting documentation reviewed and produced for the decision.
      - If patient is referred, date and time of referral and contact information of receiving Clinical Triage Team.
      - Patient outcome (if known).

   c) If the patient requires referral outside an individual hospital and the hospital is part of a wider hospital system please see Section 2. If the hospital is not part of a larger hospital system then please refer to Section 3.
d) It is recommended the Hospital Clinical Triage Team follow the communication guidelines outlined in this document in order to maintain accurate and up to date situational awareness.

2. HOSPITAL SYSTEMS DURING CSC

It is recommended every Hospital System maintain good communications between individual hospitals in their system to assist in situational awareness. It is recommended that every hospital system have a mechanism by which a critical resource can be maximized and distributed throughout their system in accordance with guidelines established and agreed upon by DCAC and all relevant partners.

   a) All patients presented to the Hospital System Triage Team will be recorded in a Hospital System Triage Team Log, which will include:
      - Date and time of referral.
      - Name of referring clinician and contact information.
      - Patient identifiers: These should include only date of birth and sex. Patient’s name and other demographic data should not be considered by the Triage Team. Hospital specific MRN should be notated to confirm patient identification but should not be made available to Triage Team.
      - All clinical information presented to the Triage Team at the time of decision.
      - Triage Team decision, date and time of the decision, and all supporting documentation reviewed and produced for the decision.
      - If patient is referred to the Regional Triage Team, date and time of referral and contact information of receiving Regional Triage Team.
      - Patient outcome (if known).

b) Those patients who cannot be managed within their system will need to be presented to the Regional Clinical Triage Team for consideration and prioritization within a different hospital system.

3. REGIONAL CLINICAL TRIAGE TEAM

It is recommended a Regional Clinical Triage Team manage prioritization and placement of patients in need of a scarce resource in the affected geographic region who cannot be managed within a specific hospital system. It is recommended the Regional Clinical Triage Team fairly represent the local healthcare institutions. Members will be determined by the DCAC Chair and/or Vice Chair in conjunction with other relevant partners to include but not limited to LHO, other Public Health experts, outside SME’s, etc. and can consist of members from the DCAC, HERC or the community at large representing the following:

- Senior clinicians with experience in tertiary triage (e.g. Critical Care, Emergency Medicine, Trauma Surgery, etc.), with one designated as Lead Triage Officer who oversees all Triage processes.
- 1 medical ethicist
- When possible, clinicians on the Regional Clinical Triage Team will not be primary providers of the patients under consideration, nor members of the referring Clinical Triage Team.
• When possible, if patients requiring a scarce resource fall under a specific specialty such as burn, trauma, pediatrics, etc., then one of the senior clinicians on the Regional Clinical Triage Team should be of that specialty, or attempts will be made to contact specialty clinicians remotely.

a) All patients presented to the Regional Clinical Triage Team will be recorded in a Regional Clinical Triage Team Log, which will include:
   - Date and time of referral.
   - Name of referring clinician and contact information.
   - Patient identifiers: These should include only date of birth and sex. Patient’s name and other demographic data should not be considered by the Triage Team. Hospital specific MRN should be notated to confirm patient identification, but should not be made available to Triage Team.
   - All clinical information presented to the Triage Team at the time of decision.
   - Triage Team decision date and time and all supporting documentation.
   - Patient outcome (if known).

b) It is recommended the Regional Clinical Triage Team follow the communication guidelines below in order to maintain accurate and up to date situational awareness.

c) When a specialty resource is exceeded or soon to be exceeded within the locally affected area, a request should be made by the LHO and/or DCAC to the state DMAC (Disaster Medical Advisory Committee).

C. OVERSIGHT

In order to maintain transparency and ensure a fair, equitable and consistent approach to allocation of a scarce resource it is important that all participants have an oversight process for decisions made during an event.

1. HOSPITAL AND HOSPITAL SYSTEMS TRIAGE TEAMS OVERSIGHT

When an event occurs which requires activation of the Hospital or Hospital System Clinical Triage Team the following documentation will be required and should be reviewed by the Triage Team Oversight Committee designated by the Medical Operations Branch Director under HICS.

a) It is recommended the Triage Team Oversight Committee consist of the following:
   - Senior clinicians with experience in tertiary triage (e.g. Critical Care, Emergency Medicine, Trauma Surgery, etc.), with one designated as Chair who oversees all Oversight processes.
   - When possible clinicians on the Triage Team Oversight Committee will not be primary providers of the patients under consideration.
   - When possible, if patients under review fall under a specific specialty such as burn, trauma, pediatrics, etc. then one of the senior clinicians on the Oversight Committee should be of that specialty, or attempts will be made to contact specialty clinicians remotely.
b) All patients presented to the Hospital or Hospital System Triage Team will be reviewed by an Oversight Committee and will be recorded in an Oversight Triage Team Log, which will include:
   o All patient demographics.
   o Date and time of the case consideration.
   o All patient information presented to the Clinical Triage Team at the time of consideration.
   o Triage Team decision, date and time of the decision, and all supporting documentation reviewed and produced for the decision.
   o If patient was referred, date and time of referral and contact information of receiving Clinical Triage Team.
   o Patient outcome.

c) It is recommended that at agreed upon intervals the Oversight Committee will review all cases presented to the Triage Team to ensure the following:
   o All appropriate clinical information was considered.
   o Accurate documentation was recorded.
   o Significant variances be reviewed and addressed.

d) Depending on the nature of the incident oversight review may be in real time (e.g. in a prolonged event such as a pandemic). However in no notice, sudden or brief events, this review may be retrospective.

2. REGIONAL CLINICAL TRIAGE TEAM OVERSIGHT

When an event occurs which requires activation of the Regional Clinical Triage Team the following documentation will be required and will be reviewed by the Regional Clinical Triage Team Oversight Committee. Committee members will be determined by the DCAC Chair and/or Vice Chair in conjunction with other relevant partners to include but not limited to LHO, other Public Health experts, outside SME’s, etc. and can consist of members from the DCAC, HERC or the clinical community at large representing the following:

- Senior clinicians with experience in tertiary triage (e.g. Critical Care, Emergency Medicine, Trauma Surgery, etc.), with one designated as Chair who oversees all Oversight processes.
- When possible clinicians on the Regional Triage Team Oversight Committee will not be primary providers of the patients under consideration nor members of the Regional Triage Team.
- When possible, if patients under review fall under a specific specialty such as burn, trauma, pediatrics, etc. then one of the senior clinicians on the Oversight Committee should be of that specialty, or attempts will be made to contact specialty clinicians remotely.
- At least one medical ethicist.

a) All patients presented to the Regional Clinical Triage Oversight Committee will be recorded in a Regional Oversight Triage Team Log, which will include:
   o All patient demographics.
   o Date and time of the case consideration.
SCARCE RESOURCE TRIAGE TEAM GUIDELINES
REGION 5/6

- All patient information presented to the Regional Clinical Triage Team at the time of consideration.
- The Regional Clinical Triage Team decision date, time and supporting documentation reviewed and produced for the decision.
- Patient outcome.

b) It is recommended that at agreed upon intervals the Regional Clinical Triage Oversight Committee will review all cases presented to the Regional Triage Team to ensure the following:
- All appropriate clinical information was considered.
- Accurate documentation was recorded.
- Extreme variances be reviewed and addressed.

c) Depending on the nature of the incident oversight review may be in real time (i.e. in a prolonged event such as a pandemic). However in no notice, sudden or brief events, this review may be retrospective.

D. RE-EVALUATION PROCESS DURING RESPONSE

1. REQUEST TO CHANGE PROCESS

- During an event individual clinicians may request a specific change to the Scarce Resource Cards, Triage Algorithms or protocols based on new clinical information such as changes in prognostic indicators or outcome measure. These requests should be made in writing to the Chair and Vice Chair of the DCAC.
- DCAC will keep a log and record of every Reevaluation Process Request, date and time of request, and all the supporting documentation presented during the request and evaluation.
  - Each request will be reviewed by the DCAC Chair, Vice Chair along with all relevant partners including additional input from SME’s.
  - All request decisions will be made in a timely fashion and will be based on consensus of all relevant partners.
  - Final decisions for all Reevaluation Process Requests will be in writing, dated and timed, and include all supporting documentation.

2. REQUEST TO REEVALUATE SPECIFIC CASE

- Any clinician may bring a Request for Patient Reevaluation of a specific case to the respective Medical Care Branch Director and designated ethicist. The Medical Care Branch Director has authority over the respective Clinical Triage Team who made the decision which is under consideration (i.e. individual hospital, hospital system, or regional Clinical Triage Team).
  - At the individual hospital and hospital system, the Medical Branch Director will be determined by standards HICS designations within the organization
  - At the Regional level, the Medical Branch Director will be determined by the DCAC Chair and/or Vice Chair in conjunction with other relevant partners to include but not limited to LHO, other Public Health experts, outside SME’s, etc.
  - At all levels, a Request for Patient Reevaluation will be reviewed by the Medical Branch Director, a designated ethicist and any other relevant partners.
SCARCE RESOURCE TRIAGE TEAM GUIDELINES
REGION 5/6

• A log will be maintained of every Request for Reevaluation, date and time of request, and all supporting documentation presented during the request and reevaluation.
• Every case brought to the Medical Care Branch Director and designated ethicist will be reviewed in a timely fashion to ensure the Triage Team documentation was complete and the decision process was consistent with Scarce Resource Cards, Triage algorithms, protocols or any other event related clinical documentation that was available at the time the original decision was made.
• Depending on the event (i.e. no notice vs prolonged) it is understood that this process may be retrospective. However, if the event is more prolonged and the potential outcomes of the patient may be affected, then processes should be in place to allow a sufficiently rapid decision.
• Final decisions for Request for Patient Reevaluation of a specific case will be in writing, dated and timed, and include all supporting documentation.
• Decision made by the respective Medical Care Branch Director and designated ethicist will be final.

E. RESOURCE UPDATE PROTOCOLS

1. DURING RESPONSE

It is understood that during an event, the clinical situation may change depending on resource availability, new epidemiologic information, new treatment protocols and guidelines, etc. It will be the responsibility of the DCAC in conjunction with all relevant partners to maintain accurate situational awareness and consensus regarding local triage recommendations. DCAC will be responsible for updating all Scarce Resource Cards and Triage Algorithms to reflect current information and will follow the Communication guidelines below to ensure accurate and expedient dissemination of all changes.

2. DURING PREPAREDNESS

All Scarce Resource Cards and algorithms and any supporting documentation will be reviewed and updated every 3 years.

COMMUNICATIONS:

1. NWRHN in conjunction with DCAC will be responsible for identifying all pertinent partners during an activation of the Scarce Resource Triage Team Guidelines to include but not limited to: LHO, SME’s, DOH and Federal partners to include CDC.

2. Depending on the situation, clinical updates may be required at various frequencies, and will be determined by NWRHN in conjunction with DCAC Chair and Vice Chair and any other pertinent partners. NWRHN will inform the LHO who will be responsible for disseminating this information in a timely fashion to all appropriate clinical entities.

3. Communications will be electronically, but if circumstances are such that electronic communication is not possible, secondary communication processes will include FAX, phone and courier.