Scarce Resource Management & Crisis Care Guidance

Overview & Materials

Critical Care Algorithms | Scarce Resource Cards | Triage Team Guidelines & Worksheets

Drafted for use in Montana in response to the 2020-2021 COVID-19 pandemic emergency

SCARCE RESOURCE MANAGEMENT and CRISIS CARE GUIDANCE

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."[1]

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.[1]

[1] IOM (Institute of Medicine). 2012 *Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response*. Washington, DC: The National Academies Press.

The National Academy of Medicine (NAM) 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.[1]

This framework has been nationally accepted and adopted and has been used by King and Pierce Counties and adopted by the Washington State Department of Health Disaster Medical Advisory Committee. Montana elected to adopt and modify the Washington State Department of Health documents for their use during the 2020-2021 COVID-19 emergency, in the event the state ever had to invoke Crisis Care Guidance.

I. Background:

In 2012, consistent with recommendations from the Institute of Medicine (IOM), the Northwest Healthcare Response Network developed a Disaster Clinical Advisory Committee (DCAC), a group of more than 45 clinicians from healthcare organizations across King and Pierce counties, representing more than 15 clinical subspecialties, working in coordination with Public Health – Seattle & King County and Tacoma-Pierce County Health Department. Since that time, a WA State Disaster Medical Advisory Committee (DMAC) has been developed and along with DCAC have focused on the development of clinically focused tools and planning for medical surge, including strategies for the implementation of Crisis Standards of Care.

The content of Washington's document was 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 WA State Disaster Medical Advisory Committee (DMAC), the Disaster Clinical Advisory Committee (DCAC) Central District and included input from both local and state Community Engagement Reports.[2,3]

[1] IOM (Institute of Medicine). 2012 *Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response*. Washington, DC: The National Academies Press.

[2] Li-Vollmer, M. Health Care Decisions in Disasters: Engaging the Public On Medical Service Prioritization During a Severe Influenza Pandemic. Journal of Participatory Medicine. Vol 2. December 14, 2010.

[3] Washington State Crisis Standards of Care Community Engagement Report, June 2019, DOH

Although the rapidly evolving circumstances associated with the 2020-2021 COVID-19 pandemic precluded the ideal deliberative and participatory CCG planning with substantial involvement of local public and private entities, every effort was made to involve interested and expert stakeholders on an accelerated timeline. The source documents used here were created by the Minnesota Department of Health and the Washington State Department of Health and have been vetted by their respective stakeholders. Minnesota's ethical objectives demonstrate their ethical commitment to developing a sound Crisis Standard of Care plan and this informed Montana's decision to repurpose their plan as a Montana document for use during the timeframe of the COVID-19 emergency, in the event the state ever had to invoke Crisis Care Guidance. During that time frame, the guidance applies to all patient care (i.e. COVID-19 patient management and non-COVID-19 management). Upon resolution of the current COVID-19 emergency, hospital emergency planning teams may initiate a revision of the current document or create a new document, with incorporation of more extensive Montana-specific stakeholder engagement. Before adoption of the Washington plan, the Montana Department of Public Health and Human Services (DPHHS) and the Montana Hospital Association (MHA) convened a *Crisis Care Guidance Workgroup* to ensure that the document content and triage algorithms reflected Montana-specific resource and population matters. This workgroup included disability rights stakeholders and emphasized that only medically relevant patient data should be used in making treatment allocation and triage decisions. Persons with disabilities must receive equal treatment, and reasonable accommodations should be made to provide appropriate care regardless of disability status.

II. Contents:

All individual Scarce Resource Cards and Triage Algorithms are open for comments as outlined below.

A. Scarce Resource Cards

The Scarce Resource Cards (SRC) are based on work done by Minnesota Public Health.[1] They provide specific strategies which can be used in the conservation, adaptation, substitution, re-use, and re-allocation of a critical resource during an emergency. Additionally, the cards provide recommendations to be implemented in preparation as well as response thus covering the whole continuum of care (conventional, contingency, and crisis) as described above.

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).

Scarce resource cards have been created for the following potentially limited resources:

- Behavioral Health
- Blood products
- Burn
- Hemodynamic support and IV fluids
- Mechanical ventilation
- Medication administration
- Nutritional support
- Oxygen
- Renal replacement therapy
- Respirator and General PPE
- Staffing

[1]Minnesota Department of Health. Patient Care Strategies for Scare Resource Situations. Updated April 2019. https://www.health.state.mn.us/communities/ep/surge/crisis/standards.pdf

B. Scarce Resource Triage Algorithms and Worksheets

The Critical Care Triage Algorithms 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 the Triage Team Guidelines below.

C. Crisis Care Guidance Clinical 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 packet are maintained by Montana DPHHS. These documents are subject to change with periodic review and updates.
2. Upon resolution of the current COVID-19 emergency, hospital emergency planning teams will initiate a revision of the current document or create a new document, with incorporation of more extensive Montana-specific stakeholder engagement. 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.
3. At any time, input is welcome and can be discussed at the institutional level. Input can also be made directly to Montana DPHHS.

III. Institutional Distribution

The institutional distribution of the contents of this packet will be determined by each institution's Emergency Manager and appropriate administration.

IV. Montana Crisis Care Guidance Framework

In any medical surge, the primary goal is to prevent or limit the time in "Crisis" (as defined above by the NAM). 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. Montana DPHHS in conjunction with the MHA, have developed the Montana Crisis Care Guidance Framework. This document outlines regional roles and responsibilities, provides an ethical framework and other tools which will assist in coordinated planning and response.

C. Contact:

For any questions about this document or contents of this packet please contact:
Montana Department of Health and Human Services.

BEHAVIORAL HEALTH – PATIENT PLANNING and RESPONSE

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 (i.e. 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).

RECOMMENDATIONS	***Strategy***	***Conventional***	***Contingency***	***Crisis***
PLANNING **General** • 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 patients need to shelter in place. • 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. • 3. Encourage Behavioral Health Providers to develop a disaster plan with the patient as part of treatment planning.	*Prepare*			

Gathering Resources
• 4. Encourage patients to identify tools and strategies they have found helpful in symptom relief and write down what works. Include a copy of the document in their disaster kit.
• 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:
  ○ 5a) Headspace (meditation and mindfulness) https://www.headspace.com
  ○ 5b) Virtual Hopebox (distraction, coping exercises, relaxation) https://psyberguide.org/apps/virtual-hope-box/
• 6. Encourage patients to identify family, paid community support members, and friends who are helpful to them and include them as part of their resources. Family resources can be found at https://www.mentalhealth.gov/talk/friends-family-members
	Prepare			

Preparing a Team • 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. • 8. Family, paid community support members, and friends should be encouraged to take advantage of training through Red Cross, National Alliance on Mental Illness (NAMI), or local community mental health clinics, to assist the patient during times of disaster. https://www.namiwa.org/index.php/programs/education-training	*Prepare*			
Response • 9. Patients should be encouraged to locate their physical resources, such as food, water, and medications. • 10. Patients should reach out to their pre-identified support system (family, paid community support members, and friends), and to their identified disaster monitor and coach. • 11. Patients should retrieve any written materials and plans to assist them in monitoring and managing symptoms. • 12. Patients may wish to reach out to DPHHS and 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.				

Adapted From the Minnesota Department of Health, Office of Emergency Preparedness ***FINAL:*** May 9 ,2019

BEHAVIORAL HEALTH STAFF PLANNING and RESPONSE

STRATEGIES FOR SCARCE RESOURCE SITUATIONS

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RECOMMENDATIONS	***Strategy***	***Conventional***	***Contingency***	***Crisis***
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.[1,2]	*Prepare*			
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.[3,4,5]	*Prepare*			
PLANNING for STAFF Mental Health needs:				
• 4. Encourage psychological first aid training to all medical staff especially for key clinical leaders and administrators.[5,6]				
• 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)				
• 6. Provide psycho-education for staff on caregiver fatigue, including symptoms, and coping/support tools[4,5,7,8]	*Prepare*			
• 7. Teach appropriate debrief strategies recognizing[9,10,11]				
○ 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.	*Prepare*			
• 9. All inpatient psychiatric facilities should develop general disaster planning to include basic care for patients e.g. ADA accessibility, adequate food/water/shelter, staffing shortfalls, medications, methods/ 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. • 14. Utilize psycho-educational, and brief evidence-based interventions. • 15. Use Telehealth mental health providers as off-site resource.	*Substitute/ Adapt*			
• 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.	*Substitute/ Adapt*			
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.[9,10] • 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.)	*Substitute/ Adapt*			
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.	*Prepare*			

Adapted From the Minnesota Department of Health, Office of Emergency Preparedness ***FINAL:*** *May 9, 2019*

[1] *https://handlewithcare.com/wp-content/uploads/2010/08/hwc-mentalhealth.pdf*

[2] *https://www.crisisprevention.com*

[3] *https://learn.nctsn.org/course/index.php?categoryid=11*

[4] *Contact Health Support Team directly at http://healthsupportteam.org for curriculum.*

[5] *https://www.nctsn.org/resources/skills-psychological-recovery-spr-online. Requires free registration for materials.*

[6] *https://learn.nctsn.org/course/index.php?categoryid=11*

[7] *Killian, K. Helping Till It Hurts? A Multimethod Study of Compassion Fatigue, Burnout, and Self-Care in Clinicians Working with Trauma Survivors. Traumatology. 2008, Vol 14(2) June 32-44*

[8] *Mendenhall, T., Trauma-Response Teams: Inherent Challenges and Practical Strategies in Interdisciplinary Fieldwork. Families Systems, & Health, 2006, 24(3):357-362.*

[9] *Cicognani, E., Pietrantoni, L., Palestini, L., & Prati, G. (2009). Emergency workers quality of life: The protective role of sense of community, efficacy beliefs and coping strategies. Social Indicators Research, 94(3):449*

[10] *http://www.massey.ac.nz/~trauma/issues/2003-1/orner.htm*

[11] *Joint Commission: https://www.jointcommissionjournal.com/article/S1553-7250(08)34066-5/fulltext*

Blood Products – Last Updated 2/17/2020

STRATEGIES FOR SCARCE RESOURCE SITUATIONS Highest relevance: 1) P=pandemic 2) W=weather 3) MCI

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).

Category	***RECOMMENDATIONS***	***Healthcare Facility***	***Blood Center***	***Strategy***	***Conventional***	***Contingency***	***Crisis***
All Blood Products	1. • Increase donations and consider local increase in frozen reserves P • Increase O positive levels P, W, MCI • Consider maintaining a frozen blood reserve if severe shortage P • Increase recruitment for specific product needs		√	*Prepare*			
	2. • Consider adjustment to donor HGB/HCT eligibility/ explore FDA variance*		√	*Adapt*			
	3. • Relax travel deferrals for possible malaria and BSE (bovine spongiform encephalitis)*P, MCI		√	*Prepare*			
Whole Blood	○ 3a. Consider using ABO-type specific whole blood if components cannot be produced MCI, P, W						
Packed Red Blood Cells	4. • Use cell-saver and auto transfusion to degree possible** P, W, +/- MCI	√		*Re-use*			
	5. • Limit O negative use to women of child-bearing age P,W, MCI	√		*Conserve*			
	6.• Use O positive in emergent transfusion in males or females who are no longer childbearing, to conserve O negative** (Seattle Children's and Mary Bridge Children's currently uses O neg in males < 18 yrs)	√		*Conserve*			
	7. • Change donations from whole blood to 2x RBC apheresis collection if specific shortage of PRBC's (Cascade has current capability)	√	√	*Adapt*			
	8. • Use aliquots from parent product for several children when possible P, W, MCI	√		*Conserve*			
	9. • Encourage use of blood sparing protocols for all patients P,W,MCI	√		*Adapt*			
	10. • Consider use of erythropoietin (EPO) for chronic anemia in appropriate patients	√		*Adapt*			
	11. • Prioritize freshest blood for infants and small children	√		*Conserve*			
	12. • 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	√		*Conserve*			
	13. • Long-term shortage, collect autologous blood pre-operatively and consider crossover transfusion P	√		*Conserve*			
	14. • Implement lower hemoglobin triggers for transfusion P, W, MCI	√	√**	*Conserve*			

Packed Red Blood Cells	15. • Consider limiting high-consumption elective surgeries (select cardiac, orthopedic, spinal, etc.)** (procedures likely to require blood transfusions) P, W, +/- MCI	√	√**	*Conserve*			
	16. • Consider use of EPO in patients with anticipated acute blood loss P, W, MCI						
	17. • 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, MCI	√	√**	*Re-allocate*			
	18. • Consider Minimum Qualifications for Survival (MQS) limits on use of PRBCs (for example, only initiate for patients that will require <6 units PRBCs and/or consider stopping transfusion when >6 units utilized), specific MQS limits should reflect available resources at facility. ** P, W, MCI	√	√**	*Re-allocate*			
	19. • Reduce or waive usual 56 days inter-donation period * based upon pre-donation hemoglobin/ explore FDA variance* P, MCI		√	*Adapt*			
	20. • Reduce weight restrictions for 2x RBC apheresis donations according to instruments used and medical director guidance * W, P, MCI		√	*Adapt*			
Plasma	21. • Consider increase in red cell: Plasma ratio (3:1) in massive transfusion protocols in consultation with blood bank medical staff** W, P	√		*Conserve*			
	22. • Encourage early use of plasma in trauma with anticipated massive hemorrhaging and/or brain injury. Thaw early and use blood warmer.	√		*Conserve*			
	23. • Switch community inventory to liquid plasma P, W, MCI		√**	*Adapt*			
	24. • Consider using Group A Plasma P, W, MCI		√**	*Adapt*			
	25. • Accept female donors without white cell antibody testing. P, W, MCI		√**	*Adapt*			
	26. • 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	√		*Substitute*			
	27. • Obtain FDA variance to exceed 24 collections per year for critical types* P =/-W (e.g. Group AB) P, W, MCI		√	*Adapt*			
Cryoprecipitate	28. • Encourage early use of cryo in trauma with anticipated massive hemorrhaging and/or brain injury. Thaw early and use blood warmer.	√		*Conserve*			
	29. • 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	√		*Substitute*			
	30. • Obtain FDA variance to exceed 24 collections per year for critical types* P =/-W (e.g. Group AB). P		√	*Adapt*			
Platelets	31. • Though not true substitute, consider use of desmopressin (DDAVP) to stimulate improved platelet performance in renal and hepatic failure patients MCI, P, W	√		*Substitute*			
	32. • Consider aliquoting from apheresis platelets. For children, consider splitting whole blood platelets for more than one recipient. P, W, MCI		√	*Adapt* Leukoreduced		Nonleukoreduced	

Platelets	33. • Convert whole blood donors to apheresis donors. Standard Practice. W, P, MCI		√	*Adapt*
	34. • Transfuse platelets only for active bleeding, further restrict to life-threatening bleeding if required by situation P, W, MCI	√		*Conserve*
	35. • No prophylactic use of platelets. P, W, MCI	√		*Adapt*
	36. • Accept female platelet donors regardless of HLA antibody, W, P, MCI		√	*Adapt*
	37. • Consider changing bacterial detection strategy. MCI, P. Potentially W		√	*Adapt*
	38. • Obtain FDA variance to allow new Pool and Store sites to ship across state lines* P, W, MCI		√	*Adapt*
	39. • Apply for variance of 5 day outdate requirement *. W, P, MCI		√	*Adapt*

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

**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*

UPDATED: Feb 17, 2020

Next Revision Due: 2023

MASS CASUALTY BURN TREATMENT – 2/24/2020
REGIONAL RESOURCE CARD

INITIAL ASSESSMENT

Call UW Transfer Center to talk with a Burn Fellow/Attending, who can assist with triage, care of burn injured patients and transfer

Mass Casualty Burn Consultation Guide:

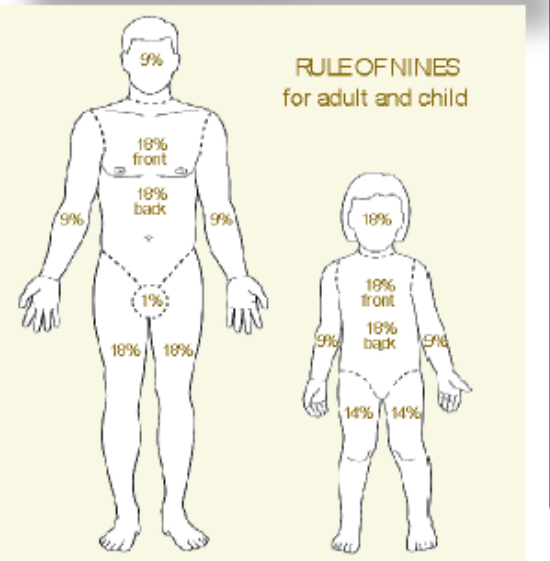
1. ≥ 20 % TBSA adults, ≥ 15% peds (2nd/3rd degree)
2. Circumferential 3rd degree burn
3. Respiratory injury/inhalation
4. Burn plus trauma or other comorbidities
5. High-voltage electrical (1000V) or chemical injury

YES

NO

OUTPATIENT MANAGEMENT
< 20% TBSA adults, < 15% TBSA pediatrics

- Oral fluid (sports drinks, electrolyte solution)
- PO pain management
- Refer to burn dressing guide and supply list
- Elevate extremity burns



DO NOT COUNT 1st DEGREE BURNS when calculating the Rule of Nines TBSA (Total Body Surface Area)

- 1st degree: red intact skin , no blisters
- 2nd degree: red/pink, moist, sensate, blisters, blanches
- 3rd degree: dry, leathery, insensate, non-blanching (see photos below for reference)

PRIMARY ASSESSMENT & INTERVENTIONS

6. Protect yourself using body substance isolation. Stop the burning process, cover with loose linen, keep warm
7. **Perform standard primary and secondary survey for any trauma patient.** Do not be distracted by burn tissue
8. Airway/Breathing - Assess for altered LOC, obstruction, respiratory compromise, burns to face or oropharynx
   - 8a. Administer 100% oxygen via non rebreather/ETT, if suspected inhalation injury (enclosed space, carbonaceous sputum, COHgb ≥ 10%)
   - 8b.Carbon monoxide (CO) exposure signs and symptoms:
     - HA and nausea (20%-30%)
     - Confusion (30%-40%)
     - Coma (40%-60%)
     - Death (>60%)
   - 8c. Consider intubation for GCS ≤ 8, ≥40% TBSA, direct upper airway injury, deep facial burns
9. Circulation - Assess vital signs. Hypovolemic shock signs including tachycardia are common >20% TBSA
   - 9a.2 large bore IV/IO's
   - 9b. Initial fluids LR/NS if estimated TBSA ≥ 20% adults and ≥15% pediatrics : (See secondary assessment for next steps in fluid resuscitation #12c)
     - ≤ 5 years: 125 mL/hr
     - 6-13 years: 250 mL/hr
     - ≥ 14 years : 500 mL/hr
   - 9c. Treat adult SBP <90 and pediatric SBP < [70 + (2x age in years)] with IV/IO fluid bolus. Avoid extra fluid when possible
10. Disability – Assess neurologic status: GCS/AVPU, check pupils, cervical spine protection, if trauma, high-voltage (>1000 V) injury
11. Expose/Estimate - Brush away loose material if concern for chemical exposure, remove clothing, jewelry, and contact lens. Protect from heat loss; hypothermia occurs quickly
    - 11a. Circumferential trunk or extremity burn: elevate extremities, check pulses. Full-thickness eschar may need surgical release

Additional Burn Center Consults

- **Cyanide Poisoning** – Consider if severe metabolic acidosis despite adequate fluid resuscitation as outlined in 12c.
- **Electrical**–If myoglobin in urine (red pigment) there is a risk of rhabdomyolysis
- **Chemical and radiologic** – consider need for antidote or specific therapies. Consult Poison Control

SECONDARY ASSESSMENT & INTERVENTIONS

YES

12. Adjuncts-
    - 12a. Nasogastric or orogastric – Intubated patients
    - 12b. Estimate TBSA using Rule of Nines chart
    - 12c. Consensus formula LR/NS: 3 mL x kg x % TBSA= fluids in 24 hrs. Give ½ in first 8 hrs and ½ in next 16 hrs. Increase/decrease fluids by 20% hourly to target UO
    - 12d. Pediatrics:<30kg, add maintenance fluid (below) using D5LR in addition to Consensus formula in #12c
      - 4 m x 1st 10 kg
      - 2 m x 2nd 10 kg
      - 1 mL x remaining kg = total mL/hr
    - 12e. Foley – Target urine output (uo) 30 mL/hr adults or 1mL/kg/hr in pediatrics < 30 kg.
    - 12f. Pain control –Use small doses of opioids
13. History – AMPLET or SAMPLE mnemonic
14. Head to Toe Assessment

YES

CRITICAL BURN FEATURES

15. TBSA >25% partial thickness or >10% full-thickness burns
16. Circumferential full thickness burns
17. Burn plus trauma or other comorbidities
18. Hemodynamic instability despite ongoing fluid resuscitation as outlined in 9b and 12c

CRITICAL: High priority for transfer to Burn Center.

YES

NO

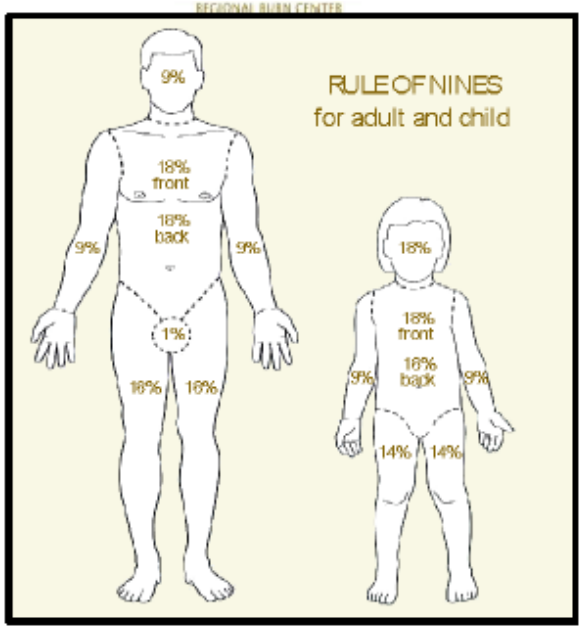
SERIOUS BURN FEATURES

19. Secondary priority for transfer-may have to manage in place awaiting transfer (up to 72 hours)
    - 20. Refer to burn dressing guide and supply list
    - 21. Infection control – provider gown, glove, and mask when wounds exposed. No prophylactic antibiotics
    - 22. Intubated: Consider tube feeds
      - 22a. Non-intubated: encourage high calorie PO

	Resource and Recommendations	*Strategy*	*Conventional*	*Contingency*	*Crisis*
Command and Control, Communication, Coordination	**General Preparedness Information** • 23. HMC Burn Center is an ABA/ACS verified burn center in the WAMI region with 18 ICU and 23 acute care beds. • 24. Mass burn incidents are unusual but do 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. • 25. In a major incident, victims may require care at the initial receiving hospital for up to 72 hours until transfer to definitive burn care. • 26. 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. HMC is the DMCC for King County. 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. • 27. Notification: In a major burn incident, HMC, DMCC, NWHRN, Public health and area EOC's will be notified. • 28. If HMC is unable to accommodate casualties or require assistance with transportation/resource issues, multiple levels of coordination and communication will need to occur between area hospitals, DMCC, Healthcare coalitions, Public Health, area EOC's and potentially other regional burn centers depending on the magnitude of the event and extent of injuries. *(See Burn Surge Annex, pending 2021)*	*Prepare*			
Space	**Capacity** • 29. Each facility is encouraged to activate its own internal contingency/disaster plan if needed to manage multiple burn patients. • 30. In a major event, some burn ICU patients may need to be cared for in non-burn center acute care units. • 31. In coordination with HMC Burn Center, forward movement to other burn centers in adjoining states may be needed.	*Adapt*			
	• 32. National Disaster Medical System (NDMS) patient movement may need to be utilized.	*Adapt*			

	Resource and Recommendations	Strategy	Conventional	Contingency	Crisis
Supplies (for 72 hours)	**Outpatient/ Supplies Planning** • 33. Institutions should prepare based on role in community. Outpatient clinics and urgent care centers may also cache appropriate supplies for their location and patient population. Suggested burn dressing supplies (per patient) (see below) **Inpatient Supplies Planning** • 34. Institutions should prepare based on role in community. In contingency or crisis situations non-burn centers may be asked to stabilize or potential provide extended care to burn patients. Suggested burn dressing supplies (per patient) (see below)	*Prepare* *Increase Supply*			
Staffing	**Staff** • 35. 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. • 36. Level II & III Trauma Centers should consider having a cohort of providers trained in the ABA Advanced Burn Life Support (ABLS) and ACS Disaster Management Emergency Preparedness (DMEP). • 37. Identify staff with prior burn treatment experience (i.e. military). • 38. See Staffing Scarce Resource Card for further staffing considerations. • 39. 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) • 40. In a Mass casualty event, call the HMC Transfer Center 1-888-731-4791 for consultation in caring for burn patients. • 41. NDMS personnel and other supplemental staff may be required.	*Adapt* *Adapt* *Conserve* *Adapt* *Subst* *Prepare*			
Special	**Special Considerations** Consider availability of resources for: • 42. Pediatrics: age-and size appropriate equipment: intravenous, intraosseous access devices, medication dosing guides. Consider using color-coding pediatric guides. • Patients with disabilities: ADA Access Boards Guidelines for Accessible Diagnostic Equipment				

	Resource and Recommendations	Strategy	Conventional	Contingency	Crisis
Triage	**Critical Burn Features : Survivability Grid** • 43. The following grid provides an example of triage decisions that may become necessary in the setting of overwhelmed resources or in austere conditions where crisis standards of care may be instituted. The survivability grid utilizes the same 4 color scheme used for EMS personal. Survivability will differ if the patient has sustained an inhalation injury. • 44. Use of the survivability table should be done in close collaboration with the Burn Center but should **NOT** substitute for a more global assessment of the patient. (See ABLS 2018 update) http://ameriburn.org/wp-content/uploads/2019/08/2018-abls-providermanual.pdf • 45. If Burn Center resources are limited, critical burn patients may need to be cared for in non-burn centers. Just in Time training and on-line resources are available to non-burn centers in these situations. Please refer to: https://crisisstandardsofcare.utah.edu/Pages/home.aspx; This website requires registration and login password. please consider planning ahead and gaining access before an event occurs.	*Re-Alloc*			



Burn Dressing Guide and Supply Estimates:

- Goal for partial thickness burn healing is to keep the wound moist and free from infection
- **1st degree burn:**
  - **1st degree burns do not count when calculating the TBSA using the Rule of Nines burn chart.** Apply lotion or ointment and leave open to air. No dressings needed
- **2nd degree burn:**
  - Apply a greasy gauze dressing with thin layer of antibiotic ointment. Change every 1-2 days
  - Or apply silver impregnated dressing to moist burns on flat surfaces. Dressing must lay flat against the burn. Secure in place with elastic, netting etc. Change every 7 days
- **3rd degree burn:**
  - Apply SSD and cover with thin layer of gauze Change every 1-2 days

- SSD 400 gm jar: 1 jar per 9% tbsa
- Antibiotic ointment: 1 tube per 9% tbsa
- Greasy gauze 4 in x 9 yard roll: 1 roll per 9% tbsa
- Gauze 6 inch x 3 yd roll: 1 roll per 9% tbsa
- 4x4 gauze: (1 box or boat) per 4% tbsa

Adult	SSD (Jar)	Greasy gauze (roll)	Antibiotic ointment (tubes)	Kerlix roll (6 in)	4x4 Gauze (Boat or package)	4x8 Gauze	18x18 Gauze	Elastic netting (inch)	Silver Impregnated drg
Head	1	1/4 face	8	-	1	3	-	10 inch	-
Arm	1	1	8	1	-	-	1-2	6 inch	Three 8x 8s OR One 8x 20
Hand/Fingers	1/4	1/4	1	1/2	1	1	-	Hand 4 in Fingers 1 in	-
Torso (ant/post)	2 each side	2	16	2	-	-	2	12 inch	Four 8 x 8s OR Two 8x 20s
Perineal (ant/post)	1/2 each side	1/4	1	-	1	1	2	12 inch	Two 8x 8s
Leg	2	2	8	2	-	-	3-4	10 inch	Six 8x 8s OR Four 8x 20
Foot/Toes	1/2 each	1/4	1	1/2	1	1-2	-	6 inch	-

References:

- *i. American Burn Association. Advanced Burn Life Support Provider Manual 2018 Update. http://ameriburn.org/wp-content/uploads/2019/08/2018-abls-providermanual.pdf*
- *ii. American Burn Association. 2013 Burn Care Resources in North America US Burn Centers available from http://ameriburn.org/BCRDPublic.pdf*
- *iii. American College of Surgeons, ATLS: Advanced Trauma Life Support. 2018, Chapter 9, Pgs 169-185*
- *iv. DMEP: Disaster Management and Emergency Course, American College of Surgeons Committee on Trauma, Subcommittee on Disaster And Mass Causalities 2016 112-120*
- *v. Guidelines for Burn Care Under Austere Conditions: Introduction to Burn Disaster, Airway and Ventilator Management, and Fluid Resuscitation; ABA, J Burn Care&Res; Sep-Oct,2016; Kearns, Randy D.*
- *v1: Guidelines for Burn Care Under Austere Conditions: Special Etiologies: Blast, Radiation, and Chemical Injuries; ABA, JBurn Care&Res 38(1) e482; Cancio, Leopoldo C; Jan-Feb, 2017*
- *viii. https://crisisstandardsofcare.hsc.utah.edu/ Requires login and password, recommend obtaining during planning not response.*

1st degree Superficial

2nd degree Partial Thickness

3rd degree Full Thickness

Date: 2/24/2020

Washington State Department of Health

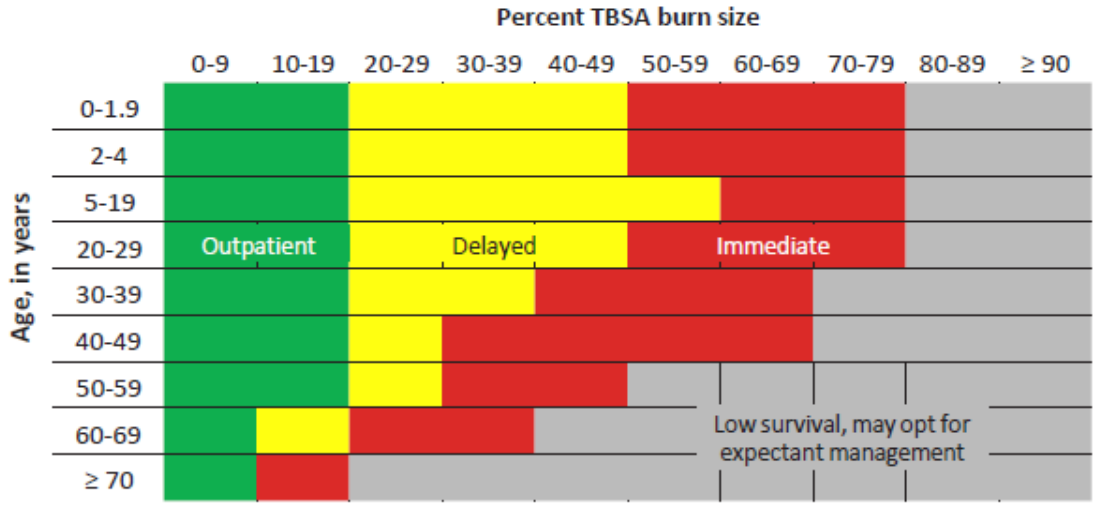


Table A

Saffle, JR, et al. Defining the ratio of outcomes to resources for triage of burn patients in mass casualties. J burn Care Rehabil 2005 26(6):478

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 and adjustment to standards of care (Hick et al, 2009).

RECOMMENDATIONS	***Strategy***	***Conventional***	***Contingency***	***Crisis***
Equipment and Supplies and Training • 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).	*Prepare*			
IV Fluid Conservation Strategies[1] • 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] (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".[3] • 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.[4]				
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** Pediatric maintenance fluids: • 17. Four mL/kg/h for first 10kg of body weight (40 mL/h for 1st 10 kg). • 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). Supplement for each diarrhea or emesis.	*Substitute*			
Provide nasogastric or gastrostomy (NG, G-tube) hydration for both adults and pediatric patients when applicable. • 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. 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.	*Substitute*			

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 [T] designed for use in austere environments.	*Conserve*			
• 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*			
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. **Intraosseous** • 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. **Hypodermoclysis** [5,6] • 31. Cannot correct more than moderate dehydration via this technique. • 32. Many medications cannot be administered subcutaneously. • 33. Common infusion sites: pectoral chest, abdomen, thighs, upper arms. • 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*			

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

FINAL version: *March 19, 2019*

Next review and update due: *2022*

[1] https://www.fda.gov/downloads/Drugs/DrugSafety/DrugShortages/UCM582461.pdf

[2] *http://anesthesiology.pubs.asahq.org/article.aspx?articleid=2596245&_ga=2.204142672.159725813.1522250986-851673073.1522250986*

[3] https://www.ismp.org/sites/default/files/attachments/2017-11/ISMP97-Guidelines-071415-3.%20FINAL.pdf

[4] https://www.fda.gov/downloads/Drugs/Guidances/UCM434174.

[5] *Caccialanza, R, et al, Subcutaneous Infusions of Fluids for Hydration or Nutrition: A Review, JPEN 2018;42:296-307*

[6] *Bruno, VG, Hypodermoclysis: a literature review to assist in clinical practice, Einstein (Sao Paulo) 2015;13(1):122-8*

MECHANICAL VENTILATION/EXTERNAL OXYGENATION

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).

RECOMMENDATIONS	***Strategy***	***Conventional***	***Contingency***	***Crisis***
Increase Hospital Stocks of Ventilators and Ventilator Circuits, ECMO or bypass circuits	*Prepare*			
Access Alternative Sources for ventilators / specialized equipment • Obtain specialized equipment from vendors, healthcare partners, regional, state, or Federal stockpiles via usual emergency management processes and provide just-in-time training and quick reference materials for obtained equipment.	*Substitute*			
Decrease Demand for Ventilators • Increase threshold for intubation / ventilation. • Decrease elective procedures that require post-operative intubation. • Decrease elective procedures that utilize anesthesia machines. • Use non-invasive ventilatory support when possible.	*Conserve*			
Re-use Ventilator Circuits • Appropriate cleaning must precede sterilization. • If using gas (ethylene oxide) sterilization, allow full 12-hour aeration cycle to avoid accumulation of toxic byproducts on surface. • Use irradiation or other techniques as appropriate.	*Re-use*			
Use Alternative Respiratory Support Technologies • Use transport ventilators with appropriate alarms – especially for stable patients without complex ventilation requirements. • Use anesthesia machines for mechanical ventilation as appropriate / capable. • Use bi-level (BiPAP) equipment to provide mechanical ventilation. (Contingency and Crisis) • Consider bag-valve ventilation as temporary measure while awaiting definitive solution / equipment (as appropriate to situation extremely labor intensive and may consume large amounts of oxygen).	*Adapt*			
Assign Limited Ventilators to Patients Most Likely to Benefit if No Other Options are Available: **See Pediatric and/or Adult Critical Care Algorithm**	*Re-allocate*			

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

As of June 19, 2017

OXYGEN - 03/29/2019 DRAFT REVISION

STRATEGIES FOR SCARCE RESOURCE SITUATIONS

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RECOMMENDATIONS	*Strategy*	*Conventional*	*Contingency*	*Crisis*
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.	*Substitute & Conserve*			
High-Flow Applications • 6. Assure all resuscitation oxygen bags have shut off valves and are shut off when not in use.	*Conserve*			
• 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.	*Conserve*			
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.	*Conserve*			
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.	*Substitute & Adapt*			
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.	*Substitute & Conserve*			
• 18. Reduce hospital wide PSI from 50-40.	*Conserve*			
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.	*Conserve*			

• 21. Consider variable parameters for initiating and continuing oxygen therapy: **Starting Example** / **Initiate O2** / **O2 Target** Normal Lung Adults: SPO2 <88-90% / SPO2 90% Pediatrics: SPO2 <88-90% / SPO2 90% Severe COPD History: SPO2 <85% / SPO2 88-90% **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.)							
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.				*Re-use*			
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.				*Re-Allocate*			

Renal Replacement Therapy Card

STRATEGIES FOR SCARCE RESOURCE SITUATIONS

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Category	*RECOMMENDATIONS*	*Inpatient*	*Outpatient*	*Strategy*	*Conventional*	*Contingency*	*Crisis*
A. General	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)	√	√	*Prepare*			
	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. • 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: https://www.kidney.org/sites/default/files/11-10-0807_IBD_disasterbrochure.pdf https://www.davita.com/kidney-disease/overview/living-with-ckd/emergency-preparedness-for-people-with-kidney-disease/e/4930		√				
	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]	√	√				
	Transportation Interruptions 4. Chronic dialysis patients should coordinate with their service providers/dialysis clinics first for transportation and other assistance during service/transportation interruptions.		√	*Prepare*			
	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].		√	*Adapt*			
B. Water	**Water Supply** 6. Identify and quantify water-purifying capabilities for dialysis 7. Identify alternative water source if city water is unavailable	√	√	*Prepare*			
	8. Identify limitations and special arrangements needed to use water tanker a) Availability of reverse osmosis (RO) machines with carbon tanks b) Available means to generate adequate water pressure to units providing dialysis	√	√				
	Water Contamination 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.	√	√	*Prepare*			
	10. Consider transferring stable inpatients to outpatient dialysis centers for dialysis treatments and vice versa depending on location of purified water source	√	√	*Substitute Adapt*			

	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	√	√	*Adapt*			
C. Power	12. Consider transferring stable inpatients to outpatient dialysis centers for dialysis treatments and vice versa	√	√	*Substitute* *Adapt*			
	13. Consider transferring inpatients or outpatients to other hospitals or facilities out of the affected region until issues have been resolved.	√	√				
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)	√	√	*Prepare*			
	15. Identify other sources of supplies and machines	√	√				
	16. Transfer machines/supplies between outpatient centers and hospitals, or between hospitals	√	√	*Substitute*			
E. Staff	17. Consider alternative staffing assignments with the following recommendations:			*Substitute*			
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.	√		*Conserve*			

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 2. General Nurse with prior dialysis experience.	1. General RN or Transplant RN with previous HD[1] or PD[2] experience 2. Critical Care nurse with a dialysis training 3. Critical Care Nurse with no dialysis experience and JIT[3] 4. General nurse with JIT	1. Telemedicine nephrologist 2. Retired nephrologist who has maintained medical license 3. ARNPs/PAs trained in dialysis 4. Critical Care MD with experienced dialysis nurse and JIT training. 5. Dialysis nurse with extensive inpatient dialysis experience

[1]Hemodialysis
[2]Peritoneal Dialysis
[3]Just-in-time Training (i.e. video, written instructions, handbook, etc.)

	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.	√	√	*Substitute*			
	Increased Demand on Resources 20. Shorten duration of dialysis for patients that are more likely to tolerate it safely	√	√	*Conserve*			
	21. Patients to utilize their home "kits" of medication (Kayexalate) and follow dietary plans to help increase time between treatments.		√				
G. Triage	**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	√	√	*Conserve*			
	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.	√	√	*Re-allocate*			

Adapted From the Minnesota Department of Health, Office of Emergency Preparedness ***Approved: 5/10/17***

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.

PARTICULATE RESPIRATORS[1] AND GENERAL PPE
(N95, Elastomeric, PAPR, CAPR)
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).

RECOMMENDATIONS	*Strategy*	*Conventional*	*Contingency*	*Crisis*
General Infection Control Procedures • 1. Screen all patients for symptoms specific to current situation and keep updated to any changing screening recommendations • 2. At healthcare facilities where patients have scheduled appointments, consider screening prior to arrival to limit exposure and resources • 3. Establish procedures for managing visitors and ill healthcare personnel. • 4. Establish triage procedures and separate areas for ill and well patients. • 5. Assign dedicated staff to minimize exposure. • 6. Require, when possible, or strongly encourage vaccination of primary personnel and first responders, according to vaccine schedule as recommended for existing circumstances by the CDC and the Advisory Committee for Immunization Practices (ACIP). • 7. Seriously consider creation of a registry to reflect the vaccination status of primary personnel and first responders to aid in decisions regarding service assignments. • 8. Educate and routinely train all staff regarding appropriate use and proper donning and doffing procedures of PPE and particulate respirators. • 9. Maintain good hand hygiene procedures including gloves, hand washing with soap and water and/or alcohol based hand sanitizers depending on the current recommendations. • 10. Maintain plan for N95 Fit Testing **Engineering Controls** • 11. When applicable to specific institution consider designing and installing engineering controls to reduce or eliminate exposure by shielding healthcare providers and other patients from infection individuals. Examples of engineering controls include physical barriers or partitions to guide patients through triage areas, curtains between patients in shared areas, closed suctioning systems for airway suctioning for intubated patients, as well as appropriate air-handling systems (with appropriate directionality, filtration, exchange rate, etc.) that are installed and properly maintained. **Cache/ Increase Supply Levels** • 12. Clarify current CDC and OSHA guidelines for respirator and other PPE use; monitor for updates and recommendations.[2] • 13. Cache additional supplies of PPE and respirators and their functional components (e.g. fit testing supplies, batteries, cartridges, filters, hoods etc.). • 14. Review vendor agreements, contingencies for delivery and production, including alternate vendors. • 15. Consider other NIOSH approved respirators in times of short supply (e.g. These include N99, N100, P95, P99, P100, R95, R99, and R100.)[5] • 16. Review current supply of PPE and determine baseline and surge burn rates to better plan supply needs. • 17. Maintain a reserve sufficient to meet estimated needs of PPE for all infectious diseases. • 18. Review cached PPE on a regular basis for expirations dates and consider replacing/updating caches by rotating PPE into daily use	*Prepare*			
• 19. Obtain masks, cartridges and other PPE from alternate sources such as industrial suppliers and companies – welding, manufacturing, etc. – as indicated.	*Substitute*			

• 20. Request Strategic National Stockpile of respirators with the knowledge that they may be from different manufacturers. They may not be functional in all situations (i.e. surgical use) and they may require additional fit testing before deployment. • 21. Do not discard unused expired PPE; submit for extension through *** (?NIOSH? CDC?)				
Decrease Use of PPE • 22. Clarify current CDC, OSHA and NIOSH guidelines for PPE use; monitor for updates and recommendations.[2,3] • 23. Medical/surgical masks can be reused by infected patients until the masks are no longer useable due to moisture or damage.	*Substitute & Conserve*			
• 24. When PPE, especially Respirators are in short supply, aerosol-generating procedures should only be performed on patients when medically necessary and cannot be postponed. • 25. Limit the number of healthcare personnel with patient contact to only those essential for patient care and support, especially during aerosol generating procedures. • 26. Consider primary use of PAPRs, CAPRs Elastomeric or other Respirators to conserve on N95 masks • 27. Ensure staff are educated and understand specific PPE requirements during current situations so as not to *overuse* PPE • 28. Develop specific protocols for PPE distribution so as to ensure PPE is being used responsibly • 29. Cohort patients with known disease to limit donning and doffing of PPE • 30. Consider limiting visitors • 31. Consider changes in staffing (i.e. unimmunized staff given assignments that would not require significant PPE use)	*Conserve*			
Respirator Extended Use[6] • 32. Clarify current CDC and OSHA guidelines for respirator use; monitor for updates and recommendations.[6] • 33. Policies and recommendations around "extended use" or "re-use" of respirators should include input from occupational health, infection control, infectious disease specialists, state and local public health and any national recommendations around the situation at hand. • 34. For N95, consider wearing a loose-fitting barrier that does not interfere with fit or seal (e.g., surgical mask, face shield) over the respirator to extend its use. • 35. In general, wearing an N95 respirator over multiple serial patient encounters (while minimizing touching) is favored over removing and re-donning between encounters (i.e. extended use is favored over re-use of N95).[3] • 36. Cleaning and filter replacement procedures and extended use of filters and/or hoods/shields on all other mechanical respirators (i.e. elastomeric respirators, PAPRs , CAPRs etc.) should be done according to manufacturer's protocols and guidelines.	*Re-use*			
Re-use Respirator After Removal[6] • 37. Clarify current CDC and OSHA guidelines for respirator use; monitor for updates and recommendations.[6] • 38. Review manufacturer recommendations for cleaning and re-using PAPRs and CAPR face shields when appropriate. • 39. Policies and recommendations around "extended use" or "re-use" of respirators should include input from occupational health, infection control, infectious disease specialists, state and local public health and any national recommendations around the situation at hand.	*Re-use* *Re-allocate*			
• 40. Use and store used respirators (hood, mask, shield) individually in such a way that the physical integrity and efficacy of the respirator will not be compromised.[6] • 41. Label respirator with a user's name before use to prevent inadvertent use by another individual.[6] • 42. Practice appropriate hand hygiene before and after removal of the respirator and, if necessary and possible, appropriately disinfect the object used to store it.[6] • 43. Respirators should be discarded if visibly damaged or contaminated.[6] • 44. The specific number of safe reuses for N95's is very difficult to estimate. In general check the specific N95 manufacturer recommendations. In general Five (5) is the recommended number of donning of a re-used N95-type respirator.[6] • 45. Consider N95 decontamination with ultraviolet germicidal irradiation (UVGI), or other tested method of decontamination to extend the use of respirators.[4] **Re-allocate/ prioritize** • 46. Respirators use should be prioritized only to those healthcare providers identified as highest risk based on epidemiology of current situation. • 47. Identify medical personnel and caregivers with documented vaccination, immunity after an illness or lower risk of complicated infection to provide direct patient contact without a respirator.	*Re-use* *Re-allocate*			

[1]*Refers to any device such as N95, elastomeric respirators, Powered Air Purifying respirators (PAPRs), Controlled Air Purifying Respirator (CAPRs) or equivalent. NIOSH approved particulate respirators can be found at: https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/RespSource.html; https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/default.html*

[2]*CDC and NIOSH overview of respirators: https://www.cdc.gov/niosh/topics/respirators/default.html*

[3]*OSHA eTool: https://www.osha.gov/SLTC/etools/respiratory/index.html*

[4]*"Extended use" is defined as wearing the same respirator for repeated close contact encounters with multiple patients without removing the respirator between patients (e.g. triage area, dedicated waiting rooms or wards, etc). "Reuse" is defined as using the same respirator for multiple encounters but removing it after each encounter. https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedquidanceextuse.html https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource3respreuse.html*

[4]*Current research on the decontamination of N95 Respirators: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4699414/pdf/nihms747549.pdf, https://academic.oup.com/annweh/article/53/8/815/154763 https://academic.oup.com/annweh/article/56/1/92/166111*

[5] *https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/default.html*

[6]*https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedquidanceextuse.html*

FINAL APPROVED: 2/2020

STAFFING

STRATEGIES FOR SCARCE RESOURCE SITUATIONS

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RECOMMENDATIONS	*Strategy*	*Conventional*	*Contingency*	*Crisis*
Staff and Supply Planning • Assure facility has process and supporting policies for disaster credentialing and privileging - including degree of supervision required, clinical scope of practice, mentoring and orientation, and verification of credentials. • Encourage employee personal preparedness planning (ready.gov, redcross.org). • Cache adequate personal protective equipment (PPE) and support supplies. • Educate staff on facility disaster response and recommend regularly scheduled HICS training. • Educate staff on community, regional and state disaster plans and resources. • Develop facility plans addressing staff's family / pets or staff shelter needs (such as daycare and unaccompanied minor needs) as well as transportation plans for staff to get to and from the facility. • Include a process of staff identification and verification. Recommend photos and hard-copy files. • Create Job Cards for essential services and functions. • Pre-identify critical positions and ensure redundant staffing for these. • Recommend redundant staff communications and notification plans/procedures.	*Prepare*			
Focus Staff Time on Core Clinical Duties • Minimize meetings and relieve administrative responsibilities not related to event. • Cohort inpatients per OSHA/Public Health or CDC guidelines.	*Conserve*			
• Reduce documentation requirements.	*Adapt*			
Using Supplemental Staff • Utilize administrative positions (e.g. nurse managers) as patient care extenders. • Adjust personnel work schedules (longer but less frequent shifts, etc.) if this will not result in skill / PPE compliance deterioration. • Voluntary call-back of staff • Increase use of agency, per diem, travelers, float pools, locums staff • Retain staff for extended hours (in accordance with labor contract and existing contracts/agreements when applicable) • Use family members/lay volunteers to provide basic patient hygiene and feeding – releasing staff for other duties. • Postpone and reschedule out-patient non-acute and preventative care appointments to open more acute care out-patient appointments during surge.	*Substitute* *Adapt*			
Focus Staff Expertise on Core Clinical Needs • Personnel with specific critical skills (ventilator, burn management) should concentrate on those skills; specify job duties that can be safely performed by other medical professionals. • Reduce availability of non-time sensitive laboratory, radiographic, and other studies. • Postpone and reschedule elective procedures if it will improve staffing and space needs and does not result in undue patient inconvenience	*Conserve*			
• Have specialty staff oversee larger numbers of differently specialized staff and patients (for example, medical/surgery nurses working in critical care are overseen by a critical care nurse).	*Substitute* *Conserve*			
Use Alternative Personnel to Minimize Changes to Standards of Care • Bring in equally trained staff (burn or critical care nurses, Disaster Medical Assistance Team [DMAT], other health system or Federal sources). • Cancel all non-acute/preventative care appointments, surgeries and procedures (e.g. endoscopies, etc.) and divert staff to emergency duties including in-hospital or assisting public health at external clinics/screening/dispensing sites.	*Adapt*			

• Use less trained personnel from outside institution with appropriate mentoring and just-in-time education (e.g., healthcare trainees or other health care workers, Medical Reserve Corps, retirees). • Implement alternate consultation and care techniques such as telemedicine. • Provide just-in-time training for specific skills.				

SCARCE RESOURCE ALLOCATION IN CRISIS CARE GUIDANCE: TRIAGE PROTOCOL

The State of Montana has adopted and will use the ethical framework developed by the National Academy Medicine for use during Crisis Standards of Care,[1,2] which stresses the importance of an ethically grounded system to guide decision-making in a crisis care situation. All decisions and communications will be based on the ethical principles below. The National Academy of Medicine defines these ethical principles as: [1,2]

- **Fairness** – Standards that are, to the highest degree possible, recognized as fair by 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, refocusing on population-based health rather than individual care.
- **Transparency** – in design decision-making, and information sharing.
- **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, past use of resources).
- **Proportionality** – public and individual requirements must be commensurate with the scale of the emergency and degree of scarce resources.
- **Accountability** – of individual decisions and implementation standards, and of governments for ensuring appropriate protections and just allocation of available resources.

For patients who require mechanical ventilation, ICU care, or other scarce resources, the following protocol shall be followed to determine triage priority for resource allocation. All patients who require scarce resources should be allocated resources based on the same allocation algorithm, including patients with a pandemic condition (such as COVID-19) and those presenting with other illness or injury. The system proposed is based on a combination of policies from Washington state, the state of Maryland, the Veterans Health Administration, and the east-coast working group lead by the University of Pittsburgh. This system was created in acute response to the COVID-19 pandemic and should be revisited in the future with additional opportunity for public engagement. This Crisis Care Guidance provides a framework for decision making but should be seen as flexible and adaptable for local circumstances and changes in understanding about the clinical characteristics of COVID-19.

Definitions:

- **Allocation:** The process is used to determine which patients will receive a scarce resource during a crisis care situation. This process is evidence-based, using objective medical standards. Allocation is an ongoing process that occurs throughout the entire time a patient has a medical need for initiation or continuation of a scarce resource. Allocation includes initiation of therapy, maintenance of therapy, and discontinuation of therapy to reallocate scarce resources to other patients. The goal of allocation is to save the most lives when resource scarcity prevents all lives from being saved.
- **Scarce resources**: Scarce resources include any/all resources for which there is greater demand than available. This may include mechanical ventilators, intensive care unit beds, critical care nursing staff, ventilator circuits, and/or any other scarce resource necessary to prolong life.

[1]Institute of Medicine. Guidance for Establishing Crisis Standards of Care for Use in Disaster Situations: A Letter Report. Washington, DC: National Academies Press. 2009. [2]Institute of Medicine. Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response. Washington, DC: National Academies Press. 2012.

Allocation Decisions are Determined by the Triage Team

Facilities should identify indicators and triggers for the need to activate their triage team as part of their crisis response plan. Optimally, triage teams should be activated before crisis care occurs or allocation decisions need to be made. However, because, care can move from contingency to crisis very quickly this may not always be possible, and triage teams may need to be activated acutely. The need to make an allocation/reallocation decision about a scarce resource which cannot be provided to all patients is a trigger that crisis care is occurring and the facility's triage team should be activated. In addition to activating the triage team, facilities should also work to improve the resource supply vs. resource demand imbalance in order to minimize the time spent in crisis care and the need to make further allocation/reallocation decisions.

Each facility should designate a pool of individuals to serve on the Triage Team. The on-call Triage Team members should rotate among these individuals on a regular basis. Critical access facilities may request the assistance of their regional centers to assist in triage decisions. The Triage Team should follow the Triage Algorithm described below. Whenever possible, members of individual patients' treating team should not make triage determinations. However, the Triage Team may consult with the patients' treating team when assessing overall survival prognosis. Treating healthcare workers have a special obligation to their patients, and the Triage Team needs to make decisions grounded in population health ethics rather than in clinical ethics.

Triage Officer
A group of Triage Officers should be appointed. The on-call Triage Officer is primarily responsible for leading the on-call Triage Team, communicating directly with treating physicians or assigning other members of the Triage Team to do so, and communicating with hospital leadership regarding ongoing scarcity of resources. Ideally, Triage Officers should be physicians with some knowledge of critical illness; however, many facilities will not have a sufficient number of physicians with such knowledge and may rely on other healthcare workers to fill this role. Whenever possible, healthcare workers who are currently engaged in direct patient care (the physician working in the emergency department, the on-service intensivist, the emergency room or ICU charge nurse, etc.) should not be the Triage Officer as this would create conflicting obligations.

Triage Team
When possible, the Triage Officer should lead a Triage Team in order to allow for different perspectives when allocating scarce resources. Many facilities will not have sufficient personnel to construct Triage Teams and may need to rely solely on the on-call Triage Officer for decision-making. The Triage Team should make allocation decisions based on the Triage Protocol herein, unbiased by personal relationships with patients/families or other non-clinical considerations. Whenever possible, healthcare workers who are currently engaged in direct patient care (the physician working in the emergency department, the on-service intensivist, the emergency room or ICU charge nurse, etc.) should not be on the Triage Team as this would create conflicting obligations.

Regional Support
When necessary, Triage Officers and/or Teams may contact their regional referral center for support with triage decisions. Regional referral centers should coordinate with each other to ensure that regional resources are allocated in a manner that helps save the most lives and that maintains equitable access to resources independent of a patient's presentation at a rural community or regional referral center.

Healthcare Ethics Support
When the Triage Team is faced with difficult choices, it may be helpful to consult with the facility's ethics committee or with a certified and/or trained healthcare ethics consultant at the regional referral center.

Communication of Triage Decisions to Patients and Families
Clear, honest, accessible and timely communication with patients and families is essential.

- For patients who are allocated scarce resources, the treating team should inform that patient and family of the triage process and ensure that they understand that the scarce resources may be removed from the patient in order to provide resources to another patient. This communication is key in order to limit conflict if the scarce resource is later reallocated to another patient. When possible, patients and families should receive written materials so that they better understand the potential of reallocation of resources.
- For patients who are not allocated scarce resources, it may be most appropriate for either the treating team, the Triage Officer, or a combination to inform the patient and family of the decision. Such information should be provided in a clear, honest, accessible and compassionate manner. Because such communication will necessarily include information about prognosis, involvement of the treating physician is essential. This should include discussion of the best available appropriate care that can to be provided—including palliative care and symptom management. Involvement of palliative care specialists is recommended when they are available. It may also be helpful for other healthcare workers (social worker, psychologist, chaplain, healthcare ethics consultant, independent living specialist, ombudsman, etc.) to be involved in such communication.
- For patients who had been allocated scarce resources and now those resources will be removed and reallocated to another patient, great care should be taken in communication. It may be most appropriate for either the treating team, the Triage Officer, or a combination to inform the patient and family of the decision. Such information should be provided in a clear, honest, accessible and compassionate manner. Emphasis should be placed on the best available appropriate care that will continue to be provided including palliative care and symptom management. Whenever possible, other healthcare workers (social worker, psychologist, chaplain, healthcare ethics consultant, etc.) should be involved in such communication.

Triage Team Decisions

The Triage Team may allocate all resources at all times in order to maximize the benefit to patients. However, as scarce resources are allocated to higher priority patients, it may be appropriate for the Triage Team to determine that only patients in the Highest Priority category, or only those in the Highest and Intermediate Priority categories, should receive resources. This is particularly true in times when patients in lower priority categories are being removed from scarce resources in order to reallocate resources to higher priority patients. There is significant emotional difference between not starting an intervention and removing that intervention knowing that it will likely lead to the patient's death, therefore there may be times when not starting interventions on patients for whom there is a very high chance that those intervention will later be removed would be appropriate. The Triage Team should communicate such decisions to clinicians in the emergency department, clinicians at facilities that refer patients to the facility, facility leadership, and other care areas as appropriate. Communication during transfer discussions between facilities is key so that patients who will not be candidates for scarce resources are not transferred with the intention of receiving them.

Operation of the Triage Team

Patient information given to the triage team should include two identifying factors, date of birth and medical record number, and the raw priority score. At times, it may be helpful for the Triage Team to work with treating teams to determine priority score, particularly regarding point allocation for long-term survival. The triage team should not receive information that could introduce bias including patient name, race, or any other factor without direct medical impact or that is not included in the triage algorithm. The Triage Team should not use subjective assessments of quality of life when making triage decisions. Only medically relevant patient data should be used in making triage decisions. Consistent triage tools should be used within institutions. Persons with disabilities must receive equal treatment, and reasonable accommodations should be made to provide appropriate care regardless of disability status. The triage team should have access to an accurate real time count of the availability of all scarce resources as well as a list of all patients currently receiving the scarce resource and their raw priority score (recalculated as appropriate per triage algorithm). The triage team should apply the triage algorithm and, in the event that a tie remains between patients to either be allocated a resource or have it reallocated, the tie resolution protocol should be employed. If a mortality prediction score with superior accuracy but similar ability to differentiate patients into categories based on probability of mortality becomes available, it can be incorporated into this framework

Do Not Attempt Resuscitation Status

In general, the decision of whether to provide CPR and/or other resuscitative interventions is based on whether specific interventions are medically indicated and the individual patient's values, goals, and preferences. In crisis care, the risk to healthcare workers and significant resource use in resuscitation efforts must be considered as well. The responsible physician, nurse practitioner, or physician assistant should determine resuscitation status based on several factors including:

- The patient's values, goals, and preferences. When patients have a completed Physician Orders for Life-Sustaining Treatment (POLST) form limiting interventions, an Advance Directive indicating that they would not want some/all life-prolonging interventions, or surrogate/proxy medical decision-makers indicate that the patient would not want some/all life-prolonging interventions, such wishes should be respected.
- The potential benefit to the patient. Clinicians should consider the potential benefit to each individual patient based on likelihood of survival to discharge if that patient were to decompensate to the point of requiring resuscitation. Further, because in outbreak situations resuscitation efforts may be delayed because healthcare workers are required to don personal protective equipment before starting resuscitation efforts, such delays should be considered in determining the potential benefit to the patient.
- The potential risk to healthcare workers. In spite of appropriate personal protective equipment, resuscitation efforts may place healthcare workers at potentially significant risk of infection. If healthcare workers become infected, this not only puts those workers at risk, but they will also likely be removed from the workforce thereby further limiting resources for other patients.

The responsible physician, nurse practitioner, or physician assistant should determine resuscitation status based on weighing the potential benefit to survival for the individual patient and the potential risk to healthcare workers and other patients. Providing accommodations to persons with disabilities or working with a person's durable medical

equipment to provide treatment cannot be considered in determining resuscitation status. When the physician determines that the potential risks outweigh the potential benefits, the physician should write a Do Not Attempt Resuscitation order. Such an order in a crisis care situation does not require the agreement of the patient or surrogate decisionmaker and should be ordered even over the objection of the patient or surrogate decision-maker due to the public health considerations. It should be noted that in all cases patients with Do Not Attempt Resuscitation orders should continue to receive all appropriate medical interventions including, but not limited to, mechanical ventilation, inotropic/presser medication, antibiotics, blood transfusions, etc. that are not specifically restricted in the Do Not Attempt Resuscitation order. There are no situations in which patients should not be provided with medically indicated palliative interventions such as pain control if resources are available for this care.

ALLOCATION ALGORITHM

Ethical Goals of the Allocation Algorithm

In circumstances of scarce resources, there exist conflicting ethical duties. On the one hand, healthcare workers have an ethical obligation to provide treatment to, and advocate for, their patients. Such an obligation prioritizes the physician-patient relationship. On the other hand, the community has an obligation to create systems that promote the greatest good for the population as a whole. Such an obligation may prioritize likelihood of survival, life-years saved, equity among members of the population, and other population health ideals. Obligations include ensuring the use of current objective medical evidence and avoiding generalized assumptions about a person's quality of life. The Montana Allocation Algorithm is a balance of these competing ethical principles designed to fairly, transparently, and consistently allocate resources while also prioritizing the physician-patient relationship.

Patients who can be reasonably treated without scarce resources should be treated with the minimum necessary interventions in order to reserve scarce resources for only those patients who require them. Facilities are encouraged to follow this algorithm in order to provide consistent and equitable care throughout the state, consistent with healthcare ethics principles.

Step 1: Determine if patient is an appropriate patient for ICU interventions

A. Is mechanical ventilation and/or ICU care consistent with the patient's values, goals, and wishes? This may be evidenced by a completed POLST form, Advance Directive, decision by the surrogate/proxy medical decision-maker, etc. Facilities should involve any appropriate surrogate/proxy medical decision-maker, guardian, interpreter, disability advocate, or tribal liaison as needed to ensure accuracy and transparency in communication.

   If no, patient is not an ICU candidate: **Triage category Black**

B. Is there a reasonable expectation that, with ICU interventions, the patient will improve sufficiently to survive outside the acute care setting and is otherwise an appropriate candidate for ICU care?[1]

   If no, patient is not an ICU candidate: **Triage category Black**

For patients who are not Triage category Black, proceed with calculation of Priority Score (steps 2-4 below).

[1]Kon AA, Shepard EK, Sederstrom NO, et al. Defining Futile and Potentially Inappropriate Interventions: A Policy Statement From the Society of Critical Care Medicine Ethics Committee. Crit Care Med 2016;44:1769-74.

Step 2: Determine short-term survival prognosis

Assign 1 to 4 points based on SOFA score (patients 18 years of age or older), PELOD-2 score (patients under 18 years of age) or SNAPPE-II score (newborn) (see Appendices for SOFA, PELOD-2, and SNAPPE-II scoring systems). If there is an alternate disease-specific assessment tool that allows more accurate grouping for estimating mortality, then that tool can be used.

Short-term Survival Prognosis	Points Assigned			
	1	2	3	4
Age ≥ 18 years SOFA score	≤ 6	7-9	10-12	≥ 13
Age < 18 years PELOD-2	≤ 9	10-13	14-15	≥ 16
Newborn SNAPPE-II score	≤ 30	31-50	51-60	≥ 61

Point categories based on predicted mortality rates:
SOFA score[1]: ≤ 6, mortality <10%; 7-9, mortality 15-35%; 10-12, mortality 40-50%; ≥ 13, mortality >80%.
PELOD-2 score[2]: ≤ 9, mortality <10%; 10-13, mortality 15-35%; 14-15, mortality 40-60%; ≥ 16, mortality >70%.
SNAPPE-II score[3]: ≤ 30, mortality <10%; 31-50, mortality 15-40%; 51-60, mortality 65%; ≥ 61, mortality >80%.

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[1]Ferreira FL, Bota DP, Bross A, Melot C, Vincent JL. Serial evaluation of the SOFA score to predict outcome in critically ill patients. JAMA 2001;286:1754-8.
[2]Leteurtre S, Duhamel A, Salleron J, et al. PELOD-2: an update of the PEdiatric logistic organ dysfunction score. Crit Care Med 2013;41:1761-73.
[3]Harsha SS, Archana BR. SNAPPE-II (Score for Neonatal Acute Physiology with Perinatal Extension-II) in Predicting Mortality and Morbidity in NICU. J Clin Diagn Res 2015 9(10):SC10-2.

Step 3: Determine long-term survival prognosis
Assign 0, 2, or 4 points based on preexisting conditions

Long-term Survival Prognosis	Points Assigned		
	0	2	4
	No significant comorbidities	Major comorbid conditions with substantial impact on long-term survival	Severely life-limiting conditions; death likely within 1 year

Step 4: Assign patient color-coded Priority Category
For patients who are ICU candidates, add scores from Step 2 and Step 3 to yield the patient's total Priority Score. Triage category determined by Priority Score:

Priority Category and Code Color	Priority Score (from Step 2 + Step 3)
RED **Highest priority** (reassess regularly)	**Priority Score 1 3**
ORANGE **Intermediate priority** (reassess regularly)	**Priority Score 4-5**
YELLOW **Lowest priority** (reassess regularly)	**Priority Score 6-8**
BLACK **ICU care not appropriate***	**Determined in Step 1**

Resolving "ties" within the same Priority Category
Patients in higher priority categories should be given scarce resources over patients in lower priority categories. When patients require resources and there are insufficient resources for all, those in higher priority categories should receive those resources. When there are insufficient resources for all patients who require them and there are lower priority patients currently receiving resources and higher priority patients present needing those resources, the resources should be reallocated to the higher priority patients (i.e., the resources should be taken from the lower priority patients and given to the higher priority patients). Priority category is the primary determinant of who gets scarce resources.

In the event that there is more than one patient in a Priority Category and not enough scarce resources for all patients, the following tie resolution algorithm shall be used. ***These steps apply to allocation, reallocation, and removal from scarce resource decisions.***

Tie Resolution step 1: Children
Due to children's dependence on adults, class inability to participate in policy development, and class inability to vote for elected officials, we have a special obligation to protect children and prioritize them for life-saving scarce resources. As such, children (patients under 18 years of age) should have priority for scarce resources over adults.

Tie Resolution step 2: Raw SOFA Score
The Triage Team should consider raw SOFA Score and give priority to patients with lower SOFA Scores when the difference in score predicts significant differences in survival probability.

Tie Resolution step 3: Life Cycle Considerations
Among adults, there is value in allowing individuals to experience as many life-cycle periods as possible. When there are large age differences between patients (for example, > 30 years age difference), resources should be allocated to significantly younger patients.

Tie Resolution step 4: Patients Already Receiving Scarce Resources
The physician-patient relationship is highly valued, and healthcare workers have a special obligation to their patients. Further, there is a significant emotional difference for patients, families, and healthcare workers between not initiating an intervention and removing an intervention. For these reasons, priority should be given to patients who are already receiving scarce resources. However, public health ethics requires that resources be allocated fairly, not on a "first-come, first-served" basis. Public heath ethical principles suggest that those who are already receiving resources should not have an advantage of other patients. To balance these conflicting values, the Montana Triage Algorithm places priority on medical factors, probability of survival, and life cycle considerations above prior allocation which is only considered when patients cannot be distinguished from each other by these prior steps.

Tie Resolution step 5: Random Allocation
If there remains a tie after steps 1-4 above, the Triage Team should use random selection (i.e., lottery) to determine which patient(s) shall receive resources.

Reassessment of Priority Category
Patients' raw priority score and Priority Category should be reassessed periodically. The timing of reassessment should be based on the clinical trajectory of the disease. In some cases, it would be expected that patients would improve or deteriorate quickly. In such cases, reassessment after several hours or within a day or two might be appropriate. In other cases, it would be expected that patients would improve or deteriorate slowly, or they may be expected to deteriorate before improving. In such cases, it might be appropriate to not reassess patients for several days or weeks. In general, patients who were not allocated resources should be reassessed regularly in case their clinical status improves, and they may become candidates for scarce resource allocation. The decision of timing for reassessment should be made by the Triage Team based on the best medical knowledge at the time.

Ventilators Brought to Facility by Patient
Some patients may bring home ventilators with them to facilities. Such ventilators will not be removed from the patient bringing the ventilator to reallocate to other patients.

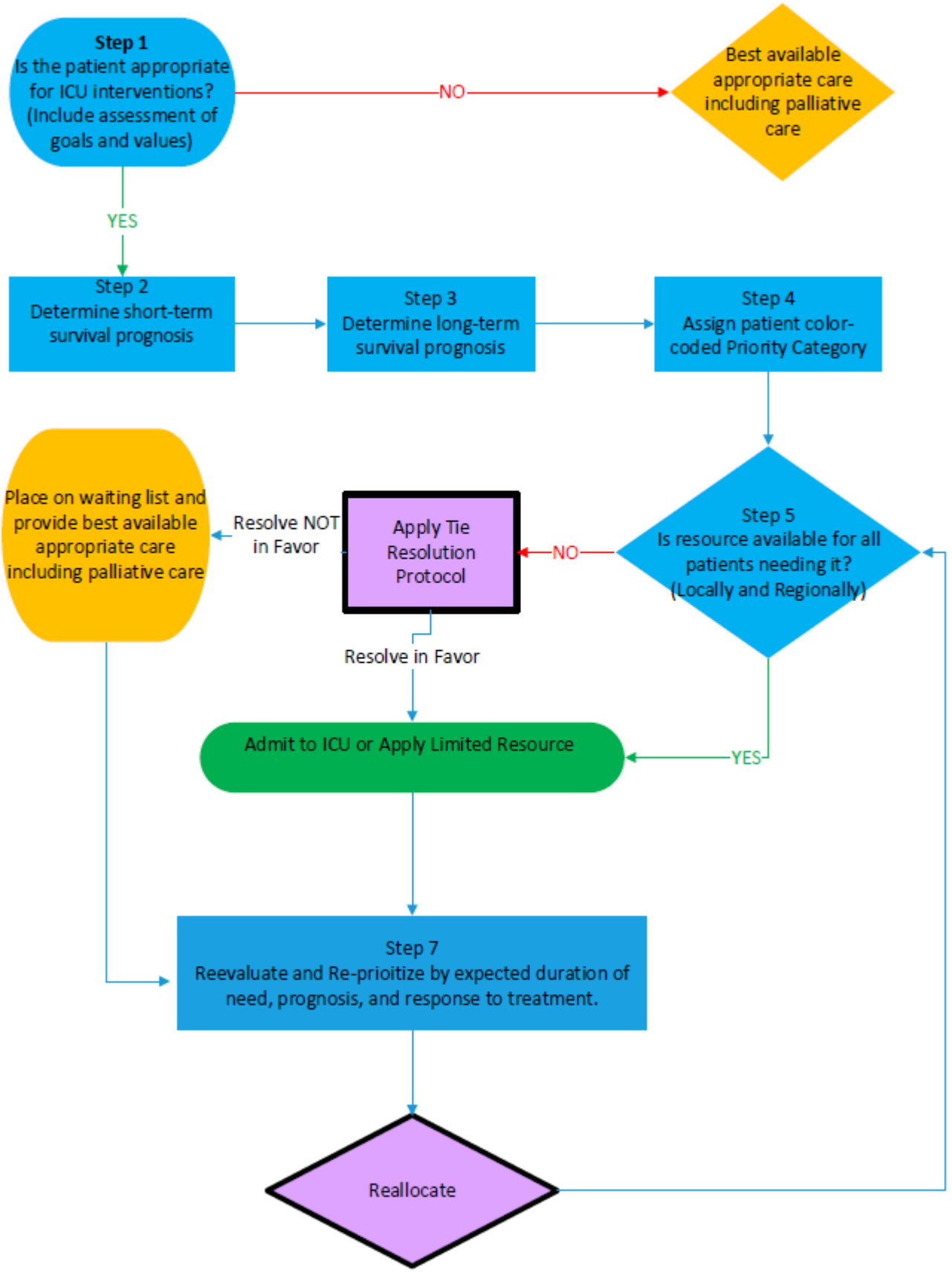
Appropriate Clinical Care of Patients Who Do Not Receive Scare Resources
Patients who are not triaged to receive scarce, life-saving resources or from whom life-sustaining resources are removed to reallocate to other patients should receive the best available appropriate medical care that resource availability will allow. This should include intensive symptom management and psychosocial support. Patients should be reassessed at appropriate intervals as determined by the Triage Team to determine if changes in resource availability or their clinical status warrant provision of scarce, life-saving resources. Where available, specialist palliative care teams should be made available for consultation. Where palliative care specialists are not available, the treating clinical teams have an obligation to provide palliative care services as resource availability allows. Where appropriate, patients should be discharged to a setting where they can receive appropriate palliative care, including the home

Patient, Family, and Community Education and Communication
Based on the allocation algorithm, patients may be removed from scarce resources at any time and with little warning in order to provide resources to other patients. It is expected that this will be very difficult for families. Healthcare facilities have an obligation to inform patients and families about the triage system and the risk that the patient might not receive or might potentially have life-saving therapies withdrawn. This communication should occur as early as possible during hospitalization and be reiterated when providing clinical updates. Facilities should provide emotional and spiritual support to such patients and families to the extent that patients and family wish and to the extent possible, and should develop family support teams, including social workers, psychologists, child-life specialists, therapists, chaplains, and others who can provide expert support to patients and families. The State has an obligation to inform the general public of the system in place at the state level.

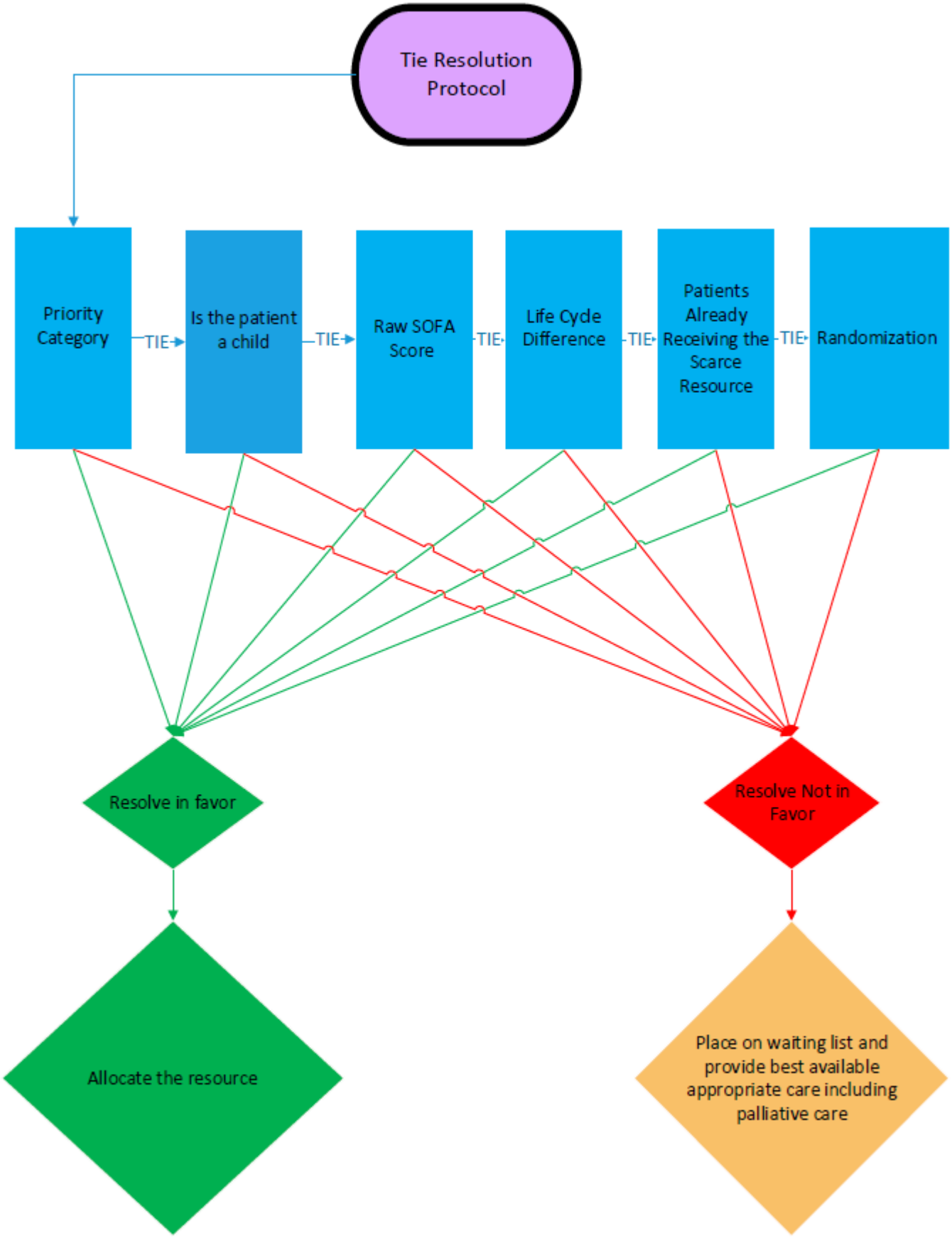
Staff Education and Communication
The Triage Team, or other facility leadership, has an obligation to educate facility staff regarding the triage system. Staff members may not require detailed education; however, staff should have a general understanding of the system that will be employed and the ethical justification for the system.

Participation in the Physical Withdrawal of Scarce Resources After Triage Committee Reallocation
Reallocation of scarce resources (removal of scarce, life-prolonging resources from some patient for the sake of other patients), is consistent with public health ethical principles and multiple published guidelines, and is necessary in order to save the most lives in a pandemic response when operating under Crisis Care Guidance. Healthcare workers may have strong personal moral objections to participating in withdrawal of a scarce, life-prolonging resource from a patient for whom they are caring in order to reallocate that resource to another patient. Whenever possible, facilities should develop policies that allow healthcare workers to opt in or opt out of participation in withdrawal of resources for the sake of other patients. Further, facilities should provide support services, including psychological and/or spiritual support and counseling, for staff as needed. The creation of volunteer teams who manage both the withdrawal of the scarce resource and ongoing palliative care efforts may be considered.

Montana COVID-19 Triage Algorithm



Montana COVID-19 Triage Algorithm Tie Resolution



APPENDIX 1: The Sequential Organ Failure Assessment (SOFA) score[1]

SOFA score	1	2	3	
Respiration[a]				
PaO_2/FIO_2 (mm Hg)	<400	<300	<220	<100
SaO_2/FIO_2	221-301	142-220	67-141	<67
Platelets $\times 10^3/mm^3$	<150	<100	<50	<20
Bilirubin (mg/dL)	1.2-1.9	2.0-5.9	6.0-11.9	>12.0
Hypotension[b]	MAP <70	Dopamine ≤5 or dobutamine (any)	Dopamine >5 or norepinephrine ≤0.1	Dopamine >15 or norepinephrine >0.1
Glasgow Coma Score	13-14	10-12	6-9	<6
Creatinine (mg/dL) or urine output (mL/d)	1.2-1.9	2.0-3.4	3.5-4.9 or <500	>5.0 or <200

MAP, mean arterial pressure; SaO_2, peripheral arterial oxygen saturation.

[a]PaO_2/FIO_2 ratio is used preferentially. If not available, the SaO_2/FIO_2 ratio is used

[b]Vasoactive mediations administered for at least 1 hr (dopamine and norepinephrine mcg/kg.min).

[1]Jones AE, Trzeciak S, Kline JA. The Sequential Organ Failure Assessment score for predicting outcome in patients with severe sepsis and evidence of hypoperfusion at the time of emergency department presentation. Crit Care Med 2009;37:1649-54.

APPENDIX 2: The PEdiatric Logistic Organ Dysfunction (PELOD-2) Score[1]

Organ Dysfunctions and Variables[a]	Points by Severity Levels						
	0	1	2	3	4	5	6
Neurologic[b]							
Glasgow Coma Score	≥ 11	5–10			3–4		
Pupillary reaction	Both reactive					Both fixed	
Cardiovascular[c]							
Lactatemia (mmol/L)	< 5.0	5.0–10.9			≥ 11.0		
Mean arterial pressure (mm Hg)							
0 to < 1 mo	≥ 46		31–45	17–30			≤ 16
1–11 mo	≥ 55		39–54	25–38			≤ 24
12–23 mo	≥ 60		44–59	31–43			≤ 30
24–59 mo	≥ 62		46–61	32–44			≤ 31
60–143 mo	≥ 65		49–64	36–48			≤ 35
≥ 144 mo	≥ 67		52–66	38–51			≤ 37
Renal							
Creatinine (μmoL/L)							
0 to < 1 mo	≤ 69		≥ 70				
1–11 mo	≤ 22		≥ 23				
12–23 mo	≤ 34		≥ 35				
24–59 mo	≤ 50		≥ 51				
60–143 mo	≤ 58		≥ 59				
≥ 144 mo	≤ 92		≥ 93				
Respiratory[d]							
Pao_2 (mm Hg)/Fio_2	≥ 61		≤ 60				
$Paco_2$ (mm Hg)	≤ 58	59–94		≥ 95			
Invasive ventilation	No			Yes			
Hematologic							
WBC count (× 10^9/L)	> 2		≤ 2				
Platelets (× 10^9/L)	≥ 142	77–141	≤ 76				

[a]All variables must be collected, but measurements can be done only if justified by the patient's clinical status. If a variable is not measured, it should be considered normal. If a variable is measured more than once in 24 hr, the worst value is used in calculating the score. Fio_2: fraction of inspired oxygen.

[b]Neurologic dysfunction: Glasgow Coma Score: use the lowest value. If the patient is sedated, record the estimated Glasgow Coma Score before sedation. Assess only patients with known or suspected acute central nervous system disease. Pupillary reactions: nonreactive pupils must be > 3 mm. Do not assess after iatrogenic pupillary dilatation.

[c]Cardiovascular dysfunction: Heart rate and mean arterial pressure: do not assess during crying or iatrogenic agitation.

[d]Respiratory dysfunction: Pao_2: use arterial measurement only. Pao_2/Fio_2 ratio is considered normal in children with cyanotic heart disease. $Paco_2$ can be measured from arterial, capillary, or venous samples. Invasive ventilation: the use of mask ventilation is not considered invasive ventilation.

Logit (mortality) = −6.61 + 0.47 × PELOD-2 score.

Probability of death = 1/(1 + exp [−logit(mortality)]).

[1]Leteurtre S, Duhamel A, Salleron J, et al. PELOD-2: an update of the PEdiatric logistic organ dysfunction score. Crit Care Med 2013;41:1761-73.

APPENDIX 3: SNAPPE-II Score[1]

Parameter Range	Score Points
Mean blood pressure (mmHg)	
>30	0
20-29	9
<20	19
Lowest temperature (°F)	
>96	0
95-96	8
<95	15
pO2/FiO2 ratio	
>2.5	0
1-2.49	5
0.3-0.99	16
<0.3	28
Lowest serum pH	
>7.2	0
7.1-7.19	7
<7.1	16
Multiple seizures	
No	0
Yes	19
Urine output (ml/kg/hr)	
>1	0
0.1-0.9	5
<0.1	18
APGAR score	
>7	0
<7	18
Birth weight (gm)	
>1000	0
750-999	10
<750	17
Small for gestational age	
<3rd percentile	12

Score was awarded zero for a particular variable when the investigation was not ordered based on clinical assessment

[1]Harsha SS, Archana BR. SNAPPE-II (Score for Neonatal Acute Physiology with Perinatal Extension-II) in Predicting Mortality and Morbidity in NICU. J Clin Diagn Res 2015 9(10):SC10-2.

This Worksheet, along with the Scarce Resource Allocation in Crisis Care Guidance protocol and flowsheet, are to be used by "Triage Teams" during a declared emergency event whereby an appropriate healthcare official has implemented Crisis Care Guidance. 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 "Scarce Resource Allocation in Crisis Care Guidance: Triage Protocol" for further information.

Step 1: Determine if patient is an appropriate patient for ICU interventions

A. Is mechanical ventilation and/or ICU care consistent with the patient's values, goals, and wishes? This may be evidenced by a completed POLST form, Advance Directive, decision by the surrogate decision-maker, etc. Facilities should involve any appropriate surrogate decision-maker, guardian, interpreter, disability advocate, or tribal liaison as needed to ensure accuracy and transparency in communication.

   If no, patient is not an ICU candidate: **Triage category Black**

B. Is there a reasonable expectation that, with ICU interventions, the patient will improve sufficiently to survive outside the acute care setting and is otherwise an appropriate candidate for ICU care?[1]

   If no, patient is not an ICU candidate: **Triage category Black**

[1]Defining Futile and Potentially Inappropriate Interventions: A Policy Statement from the Society of Critical Care Medicine Ethics Committee. Crit Care Med 2016;44:1769-74.

For patients who are not Triage category Black, proceed with calculation of Priority Score (steps 2-4 below).

Step 2: Determine short-term survival prognosis

Assign 1 to 4 points based on SOFA score (patients 18 years of age or older), PELOD-2 score (patients under 18 years of age) or SNAPPE-II score (newborn) (see Appendices for SOFA, PELOD-2, and SNAPPE-II scoring systems)

Short-term Survival Prognosis	Points Assigned			
	1	2	3	4
Age ≥ 18 years SOFA score	≤ 6	7-9	10-12	≥ 13
Age < 18 years PELOD-2 score	≤ 9	10-13	14-15	≥ 16
Newborn SNAPPE-II score	≤ 30	31-50	51-60	≥ 61

Step 3: Determine long-term survival prognosis
Assign 0, 2, or 4 points based on preexisting conditions

Long-term Survival Prognosis	**Points Assigned**		
	0	2	4
	No significant comorbidities	Major comorbid conditions with substantial impact on long-term survival*	Severely life-limiting conditions; death likely within 1 year*

Triage Teams may consult with other experts for assistance determining scoring.

Step 4: Assign patient color-coded Priority Category

For patients who are ICU candidates, add scores from Step 2 and Step 3 to yield the patient's total Priority Score. Triage category determined by Priority Score:

Priority Category and Code Color	Priority Score (from Step 2 + Step 3)
RED **Highest priority** (reassess regularly)	**Priority Score 1 3**
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BLACK **ICU care not appropriate***	**Determined in Step 1**

Resolving "ties" within the same Priority Category

Patients in higher priority categories should be given scarce resources over patients in lower priority categories. When patients require resources and there are insufficient resources for all, those in higher priority categories should receive those resources. When there are insufficient resources for all patients who require them and there are lower priority patients currently receiving resources and higher priority patients present needing those resources, the resources should be reallocated to the higher priority patients (i.e., the resources should be taken from the lower priority patients and given to the higher priority patients). Priority category is the primary determinant of who gets scarce resources.

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Tie Resolution step 1: Children

Children (patients under 18 years of age) should have priority for scarce resources over adults.

Tie Resolution step 2: Raw SOFA Score

The Triage Team should consider raw SOFA Score and give priority to patients with lower SOFA Scores when the difference in score predicts significant differences in survival probability.

Tie Resolution step 3: Life Cycle Considerations

When there are large age differences between patients (> 30 years age difference), resources should be allocated to significantly younger patients.

Tie Resolution step 4: Patients Already Receiving Scarce Resources

Patients already receiving scarce resources should have priority over those who have not yet been allocated scarce resources.

Tie Resolution step 5: Random Allocation

The Triage Team should use random selection (i.e., lottery) to determine which patient(s) shall receive resources.