Pediatric Critical Care Triage Algorithm

Crisis Standards of Care

Updated Version: Mar 2020

This Algorithm is intended to be used alongside the attached Worksheet.
Answering each question requires the supplemental information in the Worksheet.
*****Please use them together.*****

Assumptions for use:

1. Health Officer has declared a crisis situation requiring scarce resource management and crisis standards of care, where crisis standards of care is defined as *"a substantial change in usual healthcare operations and the level of care it is possible to deliver which is made necessary by a pervasive or catastrophic disaster"*.[1]
2. Healthcare systems are overwhelmed despite maximizing all possible surge and mitigation strategies impacting the space and/or staff and/or supplies needed to deliver usual levels of care.

Washington State has adopted and will use the ethical framework developed by the National Academy of Medicine, which stresses the importance of an ethically grounded system to guide decision-making in a crisis standards of care situation. All decisions and communications will be based on the ethical principles below. The National Academy of Medicine defines these ethical principles as:

- **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, reflecting the utilitarian goal of saving the greatest possible number of lives.
- **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.[2]

1,2 IOM (Institute of Medicine) 2009. Guidance for Establishing Crisis Standards of Care for Use in Disaster Situations: A Letter Report. Washington, DC: National Academies Press.

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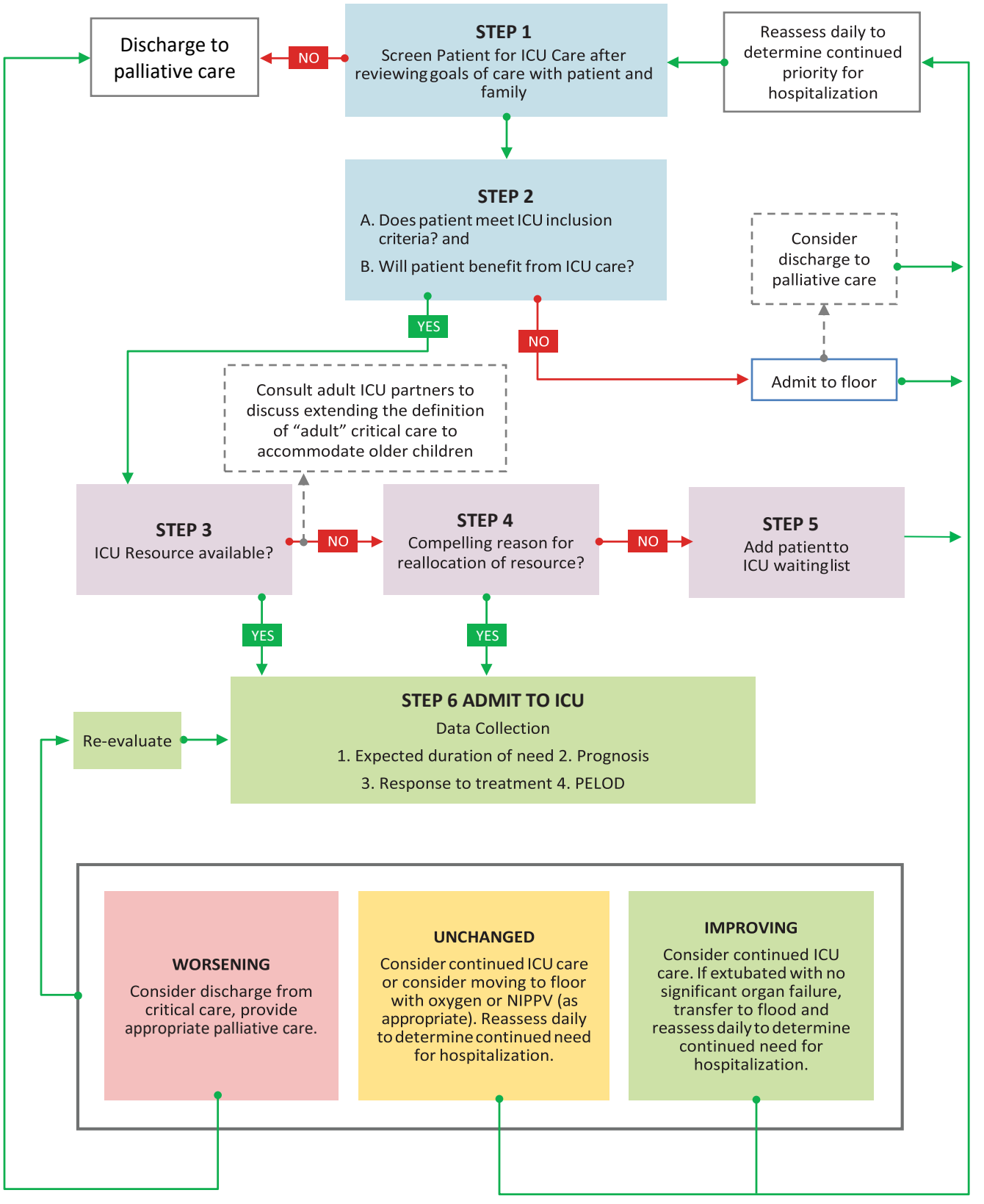

Pediatric Critical Care Triage Worksheet

Critical Care Guidelines During Crisis Capacity[1]

Updated Version: Mar 2020

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

STEP 1: Screen Pediatric Patients for ICU care During Scarce Resources

Proceed to the following after reviewing goals of care with patient and family (e.g. limited code status). The goals of care should reflect the best interest of the patient.

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

- [ ] 1. Pre-existing or Persistent encephalopathy, coma or vegetative state
- [ ] 2. Severe acute trauma (e.g. non-survivable head injury)
- [ ] 3. Severe burns with Low Survival burn scores based on the Triage Decision for Burn Victims table (See Table A). See Burn Scarce Resource Card for management of critical burn patient outside of a Burn Center.
- [ ] 4. Significant underlying disease process that predict poor short term survival*

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

- *Known severe chromosomal abnormalities with poor prognosis*
- *Known severe metabolic, neuromuscular, cardiac, oncologic or pulmonary disease with poor prognosis*
- *Extreme prematurity at the limits of viability*

STEP 2: Determine if patient meets ICU Inclusion Criteria

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

1. Requires ventilatory support, either invasive or non-invasive
   - Clinical evidence of impending respiratory failure
     - *Refractory hypoxemia (SpO2<90% on FIO2>0.85)*
     - *Respiratory acidosis (pH<7.2)*
   - Inability to protect or maintain airway
2. Hypotension (see table A) or clinical evidence of shock (defined as an altered level of consciousness, decreased urine output, or other evidence of end stage organ failure) refractory to volume resuscitation secondary to either an acute medical or trauma condition that cannot be managed in a non-ICU setting.

Age	SBP (mmHG)
0-28 days	<60
1 month – 1 year	<70
1 year – 10 years	(age in years x 2) + 70
>10 years	<90

Table A[2]

2B: To determine critical care resource allocation the following should be considered:

- Expected duration of need of critical care resource
- Prognosis with consideration to both current epidemiology and underlying illness*
- Response to current treatment
- Degree of Organ Dysfunction as measured by the Pediatric Logistic Organ Dysfunction (PELOD 2) score. **(Table C) – *Please see Step 6 regarding use of scoring systems.***

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

- *Known severe chromosomal abnormalities with poor prognosis*
- *Known severe metabolic, neuromuscular, cardiac, oncologic or pulmonary disease with poor prognosis*
- *Extreme prematurity at the limits of viability*

STEP 4: Assess for re-allocation of Critical Care Resource

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

- Expected duration of need of critical care resource
- Prognosis with consideration to both current epidemiology and underlying illness*
- Response to current treatment
- Degree of Organ Dysfunction as measured by the Pediatric Logistic Organ Dysfunction (PELOD 2) score. **(Table C) – *Please see Step 6 regarding use of scoring systems.***

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

- *Known severe chromosomal abnormalities with poor prognosis*
- *Known severe metabolic, neuromuscular, cardiac, oncologic or pulmonary disease with poor prognosis*
- *Extreme prematurity at the limits of viability*

STEP 5: Critical care waiting list

If a patient meets ICU inclusion criteria and resources are not available, patient will be placed on an ICU waiting list. As resources become available their clinical situation will be re-assessed and they will be re-triaged based on criteria outlined in Step 6. If a clear distinction cannot be made between patients of similar triage priority, the resource will be allocated to the patient who has been waiting the longest.

STEP 6: Admit to ICU

Patient data collection outlined on Step 6 of the Algorithm will be continuous and ongoing. It is recommended that every 24 hours of a patient's ICU stay, their clinical condition will be reviewed and they will be determined to be "Improving", "Unchanged" or "Worsening". This determination must not only take into account data points as outlined in Step 6 but must also include updated epidemiology, critical care resource availability and census demands.

Pediatric prognostic scoring systems currently available (e.g. PELOD2) are unable to accurately predict patient outcomes and thus should not be used as a sole indicator of prognosis especially in a disaster situation. When considering critical care resource allocation in a crisis, it is recommended that decisions be made by a Triage Team. Decisions should be made based on best clinical judgment with full knowledge of regional resource availability. (Ped Crit Care 2011)

Other Pediatric Considerations

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

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

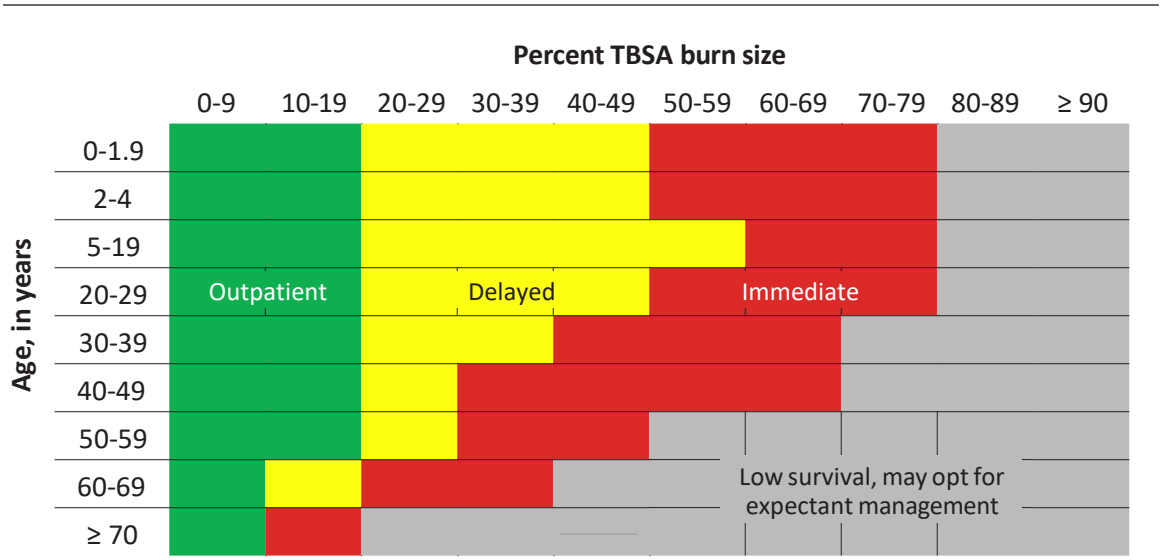

Table B

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

Table C. PELOD2 Scoring System[3]

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)]).

CRITICAL CARE MEDICINE

1. Crisis Capacity: Adaptive spaces, staff and supplies are not consistent with usual standards of care, but provide sufficiency of care in the setting of a catastrophic disaster (i.e. provide the best possible care to patients given the circumstances and resources available). Crisis capacity activation constitutes a significant adjustment to standards of care. (Hick et al, 2009)
2. ECC Guidelines 2010, Circulation 2010;122 Suppl3:S876-S908
3. Leteurtre, Stéphane; Duhamel, Alain; Salleron, Julia; Grandbastien, Bruno; Lacroix, Jacques; Leclerc, Francis; on behalf of the Groupe Francophone de Réanimation et d'Urgences Pédiatriques (GFRUP); Critical Care Medicine41(7):1761-1773, July 2013. doi: 10.1097/ CCM.0b013e31828a2bbd