Allocation Triage Protocol for Severe Resource Shortage

Instructions for the application of the triage protocol to determine a patient's need for care resources during a severe shortage* (e.g. Pandemic illness, mass casualty or natural disaster)

1. Confirm that a resource shortage exists
   1a. Pediatric patients: Clinicians should seek transfer to an available designated Pediatric Critical Care center
   Adult patients: proceed according to protocol
2. Assess options for mitigation and use if available
3. If critical shortage and no mitigation strategy available, use multi-principle strategy for allocation:
   3a. Calculate the SOFA score
   3b. Determine if the patient has a major comorbid condition or a severely life limiting condition and add to SOFA score
4. Calculate the multi-principle score and assign priority based combined score using color coded groups
5. Reassess at daily intervals using the SOFA score and clinical assessment to determine whether care should be continued, adjusted or discontinued.

Step 1: Resource Shortage?

What type of resource does the patient need which is affected by a critical shortage?

- Critical care beds and related staffing
- Mechanical ventilation and related staffing
- Renal replacement therapy (eg. intermittent hemodialysis, CVVH)
- Blood products
- Pharmaceutical supplies

How many additional patients can be treated with the current supply of the resource?

Are there pre-defined mitigation strategies for this resource?

Are there additional anticipated supplies or needs for this resource in the next 24-48 hrs?

PEDIATRICS

Step 1a: Pediatrics

Critically ill pediatric patients should be stabilized and transferred to a pediatric intensive care institution, such as UCSF Benioff Children's Hospital (UCSF BCH) San Francisco or Oakland campus through existing transfer process.

If immediate transfer unavailable, proceed as below using PELOD-2 scoring for pediatric critical care

For ADULT patients go to next page

Step 2: Assess the potential for mitigation strategies

Is there a strategy that will provide benefit to the patient(s) in question and avoids excluding others from this resource?[1]

Examples:

- Transfer to another hospital where the resource is in greater supply
- Splitting a ventilator across two patients with similar mechanical ventilation settings
- Alternatives to the recommended renal replacement therapy, such as using different dialysate baths
- Using 2nd, 3rd line alternative medications with similar effects in a pharmaceutical shortage
- Providing a trial/brief period of higher intensity care on a medical-surgical unit if critical care beds are unavailable
- Using blood conservation techniques or alternative products instead of new units for transfusion

*****If a mitigation strategy exists, the mitigation strategy should be used before excluding a patient from a treatment resource.*****

[1] it is a consistently held value that exclusion/denial of treatment is the least desirable outcome and should be used only as a last resort. It is preferable to deviate from the non-crisis standard of care in order to allow treatment for the greatest number of patients.

Step 3: Use multi-principle strategy for allocation

3a: Calculate SOFA Score[2]

Sequential Organ Failure Assessment Score

Variables	SOFA Score				
	0	1	2	3	4
Respiratory	PaO_2/FiO_2: > 400 SpO_2/FiO_2: > 302	PaO_2/FiO_2: < 400 SpO_2/FiO_2: < 302	PaO_2/FiO_2: < 300 SpO_2/FiO_2: < 221	PaO_2/FiO_2: < 200 SpO_2/FiO_2: < 142	PaO_2/FiO_2: < 100 SpO_2/FiO_2: < 67
Cardiovascular (doses in mcg/kg/min)	MAP ≥ 70 mm Hg	MAP ≥ 70 mm Hg	Dopamine ≤ 5 or ANY dobutamine	Dopamine > 5 Norepinephrine ≤ 0.1 Phenylephrine ≤ 0.8	Dopamine >15 or Norepinephrine > 0.1 Phenylephrine > 0.8
Liver (bilirubin, mg/dL)	< 1.2	1.2-1.9	2.0-5.9	6.0-11.9	> 12
Renal (creatinine, mg/dL)	< 1.2	1.2-1.9	2.0-3.4	3.5-4.9	> 5.0
Coagulation (platelets x $10^3/mm^3$)	≥ 150	< 150	< 100	< 50	< 20
Neurologic (GCS score)	15	13-14	10-12	6-9	< 6

Abbreviations: GCS, Glasgow coma scale; FiO_2, fraction of inspired oxygen; MAP, mean arterial pressure; PaO_2, arterial oxygen pressure; SOFA, sequential organ failure assessment (score); SpO_2, oxygen saturation.

[2] For pediatric patients if no transfer is available, use the PELOD-2 scoring system. See addendum.

Step 3b: Identify the presence of major comorbidities or severe life limiting diagnoses[3,4,5]:

Examples of Major comorbidities (associated with decreased 5 year survival)	**Examples of Severely Life Limiting Comorbidities** (associated with survival < 1 year)
CANCER: • Malignancy with < 5 year survival with available treatment	CANCER: • Metastatic cancer receiving only palliative treatments

CARDIAC DISEASE:
• New York Heart Association (NYHA) Class III heart failure
• Severe, inoperable multi-vessel CAD
	CARDIAC DISEASE:
	• New York Heart Association (NYHA) Class IV heart failure
	• Cardiac arrest with:
	  • No ROSC after 60 minutes from onset or unverifiable duration
	  • Refractory/recurrent cardiac arrest

IMMUNOLOGIC/INFECTION: • HIV/AIDS with CD4 < 200 or opportunistic infection despite antiretroviral therapy	IMMUNOLOGIC/INFECTION: • HIV/AIDS with terminal wasting, HIV/AIDS-related dementia, or secondary malignancy despite antiretroviral therapy • Autoimmune disease (eg. scleroderma, SLE) with chronic multiorgan failure
LIVER DISEASE: • Cirrhosis with MELD score 10-20 or Child-Pugh Class B (score 7-9)	LIVER DISEASE: • Cirrhosis with MELD score ≥20 or Child-Pugh Class C (score ≥ 10)
LUNG DISEASE: • COPD: GOLD Stage III, PaO2 PaO2 > 55, FEV1 > 25% pred, no PHTN • Pulmonary Fibrosis with PaO2 > 55, VC or TLV > 60% pred, no PHTN • CF with FEV1 > 25% pred, PaO2 > 55	LUNG DISEASE: • COPD with FEV1< 25% predicted, baseline PaO2 < 55 mm Hg, or secondary pulmonary hypertension (GOLD stage IV) • Pulmonary fibrosis with VC or TLC < 60% predicted, baseline PaO2< 55 mm Hg or second secondary pulmonary hypertension • Cystic fibrosis with post-bronchodilator FEV1 < 25% predicted, or baseline PaO2 < 55mm Hg • Primary pulmonary hypertension with NYHA class III or IV heart failure, right atrial pressure > 10 mm Hg, or mean pulmonary arterial pressure > 50 mm Hg

NEUROLOGIC DISEASE:
• Moderate dementia (FAST 4-6, baseline Rankin score 3-4)
• Neuromuscular disease or prior neurological injury with baseline ADL impairment not requiring mechanical ventilation
	NEUROLOGIC DISEASE:
	• Severe dementia (FAST Stage 7c or baseline Rankin score 5)
	• Severe hypoxic-ischemic brain injury after cardiac arrest
	  • Coma (no response to verbal commands) after ROSC with non-shockable rhythm
	• Severe neurological injury (rule out sedation, transient seizure, or treatable hydrocephalus)
	  • Supratentorial intracerebral hemorrhage with ICH Score ≥ 5
	  • Brainstem intracerebral hemorrhage with deep coma (GCS ≤ 5)
	  • Aneurysmal subarachnoid hemorrhage with Hunt-Hess score of 5 and age > 60
	  • Traumatic brain injury with ≥ 90% predicted severe disability/death at 6 months on IMPACT score
	  • Ischemic stroke with NIH Stroke Scale score ≥ 22, age > 60, and either not eligible for acute revascularization or > 24 hours after revascularization treatment
	• Severe degenerative neuromuscular disease without specific effective treatment other than long-term mechanical ventilation

RENAL DISEASE: • End stage renal disease on routine hemodialysis	RENAL DISEASE: • End stage renal disease without option/intent for hemodialysis

	TRAUMA:
	• Severe burns of patient with any 2 of the following:
	  • Age > 60 years old
	  • 40% of total body surface area affected
	  • Severe inhalation injury
	• Severe trauma: Trauma Injury Severity Score predicting ≥90% mortality

[3] This is a non-comprehensive list of example conditions. Please refer to expert consultation, longevity calculators such as eprognosis.ucsf.edu or disease specific mortality studies for further consideration of disease impact on longevity.

[4] Patients living with chronic stable disability or chronic illness who use an assistive device or therapy at baseline are exempt from allocation review for that therapy if using their home device (E.g. a patient on a chronic home ventilator does not require allocation scoring to use their home ventilator in the hospital.) Similarly, home devices brought by patients are not subject to re-allocation. If a patient requires transition from their home device to a hospital device due to worsening illness, they would require consideration via allocation guidelines with all other patients who require that therapy. In complex cases, recommend Triage Committee review.

[5] Patients listed for organ transplant should be scored based on their current severity of illness (prior to transplantation).

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Step 4: Calculate the multi-principle score

Principle	Specification	Point System*			
		1	2	3	4
Save the most lives	Prognosis for short-term survival (SOFA score)	SOFA score < 6	SOFA score 6-9	SOFA score 10-12	SOFA score > 12
Save the most life-years	Prognosis for long-term survival (medical assessment of comorbid conditions)	…	Major comorbid Conditions (decreased 5 year survival)	…	Severe life-limiting condition (significant decrease in 1 year survival)

SOFA= Sequential Organ Failure Assessment
* Persons with the lowest cumulative score would be given the highest priority to receive mechanical ventilation and critical care services.

Step 4: Assign priority based on the color coded groups

Code color and Level of Priority	Priority score from Multi-principle Scoring System
RED **Highest priority**	**Priority score 1-3**
ORANGE **Intermediate priority** (reassess as needed)	Priority score 4-5
YELLOW **Lowest priority** (reassess as needed)	Priority score 6-8
GREEN **Do not manage with scarce critical care resources** (reassess as needed)	No significant organ failure or no requirement for critical care resources

In the case of multiple simultaneous allocation decisions with same score:
If N patients are simultaneously in need of a resource, which has supply of N-1, and no mitigation strategy is available, considerations should include:

1. Patients with younger chronological age ***(emphasis on life-cycle considerations; opportunity to live through life's stages)***
2. Anticipated duration of need for the resource, e.g. expected number of days of mechanical ventilation ***(emphasis on distributive justice, opportunity for as many people as possible to benefit from the resource)***

If a decision cannot be made based on multi-principle system and the above considerations, a lottery can be used to determine allocation.

Step 5: Reassessment and adjustment

Resources in critical shortage are provided as a trial of therapy. It is important to communicate this concept to patients, families/caregivers and surrogate decision makers (if applicable) along with the planned duration of the trial and plan for reassessment.

Each patient receiving a trial of a critically scarce resource should be reassessed (including clinical assessment, SOFA score, color grouping) at an appropriate interval for response to treatment. The interval for reassessment should be relevant to the clinical characteristics of the disease.

- Patients who do not respond in a clinically significant fashion to treatment should be transitioned to a different strategy of care to allow others to have an opportunity for treatment.
- Patients who develop terminal complications of disease and/or elect to focus on comfort should be transitioned to comfort-focused care with appropriate consultation.
- If a patient develops a terminal complication of disease, the triage officer/committee may decide to end a trial period before the specified length.

The triage officer and/or triage committee will review clinical trajectories and responses to treatment and can assist in considering reassessment and treatment adjustment if the clinical team is uncertain.

EQUITY STATEMENT:

ZSFG is committed to providing equitable care for all people. This guideline is intended to guide clinical decisions based on the medical criteria listed above. It is imperative to ensure non-discrimination and to avoid bias due to race, ethnicity, religion, language, immigration status, gender identity, sexual orientation, physical appearance, income, occupation, or other social factors. For further support, providers and staff are encouraged to discuss with key contacts listed below.

KEY CONTACT NUMBERS:

Resources for consultation and support include:

- ZSFG Triage Officer 628-XXX-XXXX
- ZSFG Ethics Committee 415-443-0595 or www.pagerbox.com
- ZSFG Supportive and Palliative Care Service 415-443-5063 or www.pagerbox.com
- ZSFG Chaplaincy 628-206-8500 or on-call pager 415-327-1187
- ZSFG Administrator on Duty 628-206-3519
- ZSFG Patient Experience 628-206-5176
- ZSFG/DPH Risk Management 628-206-6600
- UCSF Risk Management 628-206-6052

Addendum: TRIAGE ACUITY SCORING TOOL for PEDIATRIC PATIENTS

PELOD-2 (PEDIATRIC Logistic Organ Dysfunction) SCORE

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)]).

INTERRELATED SCORING	
SOFA	**PELOD-2**
6	9
7-10	10-19
11	20