Allocation of Scarce Resources During Public Health Emergency

Purpose:
This policy provides for ethically and clinically sound allocation of scarce resources during a public health emergency.

Rationale:
During an Influenza Pandemic or other Public Health emergency, the demand for health care resources eventually may exceed the capacity of the Hospital. Extraordinary demand for resources compared to available supply creates both ethical and clinical challenges. This policy provides for ethically and clinically sound allocation of scarce resources by moving from a routinely person-oriented standard of care with the sickest patients often receiving first claim on medical resources to a community-oriented disaster standard with the patients having the best chance of recovery generally receiving first claim on medical resources.

Ethically, routine triage determines the type of care patients will receive with the available hospital resources. Community-oriented disaster triage activated under the Hospital Incident Command System during a public health emergency intends to provide the greatest good for the greatest number in our community. Consistency in application of disaster triage standards and basing these practices on sound scientific evidence supports the ethical principles of equity/fairness, trust, and reciprocity.

Policy:

I. Initiation of Triage Protocol

A. Potential Triggers to Initiate Triage Process:

- Lack of critical equipment/supplies, including
  - Mechanical ventilators
  - Beds
  - Medical gases
  - Antibiotics
  - Vasopressors
  - Crystalloid
  - Operating room equipment
  - Antiviral Medication
  - Vaccines
- Lack of Critical Infrastructure, including
  - Security
  - Isolation ability
  - Personal protective equipment
  - Decontamination equipment
  - Power
  - Staff support (food, housing, medication)
- Inability to transfer patients to another facility that limits ability to perform clinical care
- Lack of specialty care (burn, trauma, surgical)
- Lack of adequate staff

B. Conditions That Alone or in Combination May Lead to the Initiation of the Triage Process to Allocate Scarce Resources

- Declared State of Emergency or incident of national significance
- Activation of the Emergency Health Powers Act (SC Code § 44-4-100, *et seq.*)
- Attempts at conservation, reutilization, adaptation and substitution are performed maximally. (e.g., cessation of elective surgery and other outpatient services)
- Surge capacity fully employed within health care system
- Identification of critically limited resources (ventilators, antibiotics)
- Identification of limited infrastructure (staff, isolation, power)
- Request for resources and infrastructure made to SC DHEC
- Partial and focused or full activation of the Emergency Operations Plan and Hospital Incident Command System

II. Responsibility Structure for Triage Decision Making

A. Scarce Resource Allocation (SRA) Team

Working under the Hospital Incident Command System, the following Medical Technical Specialists will be activated and comprise the Scarce Resource Allocation (SRA) Team: Chair/designee of the Ethics Committee, Chair/designee of the Infection Control Committee, the VP of Clinical Operations/designee, Executive Medical Director/designee and a member of Risk Management/Director of Legal Affairs/designee. Executive Medical Director/designee chairs the SRA team. The SRA team will oversee the Sequential Organ Failure Assessment (SOFA) triage decisions of all facilities. The team works closely with the Incident Command at all facilities.

1. Acquires the information necessary to facilitate and oversee informed and ethical triage and scarce resource allocation decisions.
2. Advises and assists the health care system to carry out the mission during a public health emergency through resolution of uncertainties and disputes over the health care systems capacity.
3. Reviews all triage decisions retrospectively during a disaster to serve as a routine quality review process.
4. Resolves real time appeals regarding triage decisions (see II-E. Appeals Process below).

B. Sequential Organ Failure Assessment (SOFA) Triage Team

The SOFA Triage Team is comprised of a Team Leader who is: Chief of Staff/Designee and the following team members: Clinical Nurse Specialist/RN, Respiratory Therapist, a representative of the Pastoral Care Department, and a management representative. The Clinical Nurse Specialist/RN and Respiratory Therapist will collect the data on the individual patients for input into the Sequential Organ Failure Assessment (SOFA) ***Table 1*** scoring system. This team takes direction from the SRA Team and works closely with the Medical Branch Director of the Operations Section at the respective inpatient facilities. The expected need will be a minimum of 2 Triage Teams. If the majority of patients are children, the Chief of Staff should designate a Pediatric clinician for the SOFA Triage Team.

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Table 1 - Sequential Organ Failure Assessment Score

Variable	SOFA Score				
	0	1	2	3	4
PaO2/FiO2 mmHg	> 400	301 – 400	201 – 300	101 – 200	≤ 100
Platelets, x 103/µL or x 106/L	> 150	101 – 150	51 – 100	21 – 50	≤ 20
Bilirubin, mg/dL (µmol/L)	<1.2 (<20)	1.2-1.9 (20 – 32)	2.0-5.9 (33 – 100)	6.0-11.9 (101 – 203)	>12 (> 203)
Hypotension	None	MABP < 70 mmHg**	Dop ≤ 5	Dop 6 – 15 or Epi ≤ 0.1 or Norepi ≤ 0.1	Dop >15 or Epi > 0.1 or Norepi > 0.1
Glasgow Coma Score	15	13 - 14	10 - 12	6 - 9	< 6
Creatinine, mg/dL (µmol/L)	< 1.2 (<106)	1.2-1.9 (106 – 168)	2.0-3.4 (169 - 300)	3.5-4.9 (301 – 433)	> 5 (> 434) or anuric

Note: Clinicians will determine the total SOFA score for each patient by summing the scores for each variable. Dopamine [Dop], epinephrine [Epi], norepinephrine [Norepi] doses in ug/kg/min. SI units are noted in parentheses ( ).

** For children <10 yrs of age, define hypotension as systolic BP < 70 + (2 x age in years). Infants with hypotension initially require higher doses of dopamine; for infants < 1 yr of age requiring dopamine, use hypotension score of 2 for < 10 microgram/kg/min, score of 3 for 10 – 15 microgram/kg/min, and score of 4 for > 15 microgram/kg/min .

*Adapted from: Ferreira et al., 2001. Explanation of variables: PaO2/FiO2 indicates the level of oxygen in the patient's blood. Platelets are a critical component of blood clotting. Bilirubin is measured by a blood test and indicates liver function. Hypotension indicates low blood pressure; scores of 2, 3, and 4 indicate that blood pressure must be maintained by the use of powerful medications, including dopamine, epinephrine, and norepinephrine, that require ICU monitoring. The Glasgow coma score is a standardized measure that indicates neurologic function; low score indicates poorer function. Creatinine is measured by a blood test and indicates kidney function.

1. SOFA Triage Team member(s) should not participate in triage decisions based on this policy and procedures on their individual clinical patient(s).
2. Meet at least daily to assess all patients who have clinical indications for scarce lifesaving resources for inclusion and exclusion criteria to determine the appropriateness of the initiation and continuation of scarce lifesaving resources.

3. Make triage decision based on the allocation protocol, assigning patients to triage categories based on a SOFA Score.
4. Provide patient SOFA score priority categories to treating clinicians who will implement these triage decisions.
5. Will reassess patient priority scores for all patients eligible for critical care resources at 48- and 96-hour intervals. (Circumstances may require more frequent assessments.)
6. Team leader documents the SOFA score and priority categories in the patients' medical record.
7. Communicates the patient triage score and facility resources to the appropriate clinicians.
8. During severe pandemics, the allocation of ventilators and other critical resources may require choosing between patients with equal SOFA Scores. In these cases, other ethical criteria may apply and be considered by the Triage Team, for example, maximizing the number of "life-years" saved and prioritizing younger patients to offer opportunities to live through life's stages, as in "Multi-principle Strategy to Allocate Ventilators During a Public Health Emergency" (see Table 2). During especially severe public health emergency, triage of persons with equal multi-principle scores may require use of lottery or "first come, first served."

Table 2: Multi-principle Strategy to Allocate Ventilators during a Public Health Emergency

		→ Point System ←			
Principle	**Specification**	**1**	**2**	**3**	**4**
Save the most life-years	Prognosis for long-term survival(medical assessment of comorbid conditions)	No comorbid conditions that limit long-term survival	Minor comorbid conditions with small impact on long-term survival	Major comorbid conditions with substantial impact on long-term survival	Severe comorbid conditions; death likely within 1 year
Life-cycle principle	Prioritize those who have had the least chance to live through life's stages (age in years)	Age 12-40 y	Age 41-60 y	Age 61-74 y	Age ≥75 y

Note: Persons with the lowest cumulative score would be given the highest priority to receive mechanical ventilation and critical care services. Pediatrics < 12 years must be separately considered due to usual limited availability of pediatric critical care capability (Life-cycle principle for age < 12 yr = 0 points).

9. Maintains a record of triage decisions and the data upon which the decisions are based and reports the triage decisions to the SRA Team for oversight and reporting to Incident Command.

C. Treating Clinicians

1. Should not, ideally, have responsibility of deciding whether to institute or remove a patient from lifesaving resources based upon disaster triage policy and procedures.
2. Will implement treatment consistent with the SOFA Triage Team's decision regarding patient triage category.
3. Will conduct and document an Allow Natural Death discussion with patients and/or the surrogates of patients who do not qualify under the SOFA triage protocol for scarce life-saving resources.
4. Will offer palliative or other appropriate care.

D. Emergency Physicians

1. Emergency physicians will apply the initial assessment tool for all patients who have clinical indications for critical care or require scarce resources.
2. Will report the initial assessment to the Disaster Triage Team.

E. Appeals Process

A treating physician or patient family member may appeal the decision of the SOFA Triage Team for a specific patient to the SRA Team. During such appeal, the SRA Team will review the patient record, SOFA scores, and, if indicated, the Multi-principle Scores. In consultation with select members of the Ethics Committee, the SRA Team will render a final decision within 24 hours of the appeal. The decision of the appeals process will be documented in the patient's medical record by a member of the SRA Team.

F. Communications with Patients and their Families

If critically ill patients do not meet inclusion criteria for critical care under SOFA triage, treating physicians will so notify those patients and/or their surrogates and will initiate palliative care.

Upon critical care admissions/transfers, treating physicians will inform patients and their families that ventilator support represents a trial of therapy which may not improve the patient's condition significantly and that the ventilator will be removed if the patient does not meet specific clinical criteria.

III. SOFA Triage Protocol

A. Minimum Qualifications for Survival (MQS)

MQS represents the ceiling on resources allocated to one individual. MQS requires ongoing, 48 hour and 96 hour patient reassessments utilizing the SOFA scoring system. Greater severity of the public health emergency will require more frequent SOFA scoring. If a patient ever develops a SOFA score of > 11 or any exclusion criteria, the patient moves to palliative care. MQS attempts to identify early those patients not improving or likely to have poor outcome, since scarce resources preclude prolonged critical care during a pandemic.

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B. Application of the SOFA Triage Protocol

The SOFA triage protocol applies to ***all patients*** undergoing assessment for possible critical care admission and not only those with influenza-like symptoms during a public health emergency.

SOFA scoring comprises criteria for inclusion and exclusion from critical care and minimum qualifications for survival. Scores place patients into three categories: blue patients receive palliation; red patients have highest priority for ventilation, followed by yellow patients; green patients receive acute care outside of the critical care units. SOFA reassessments define movement between categories.

SOFA identifies patients for admission to critical care, primarily due to respiratory failure. The ability to provide invasive ventilatory support differentiates critical care units from other acute care areas, such as step-down units. However, expanded care units for surge capacity may offer hemodynamic support and other advanced care in areas which have appropriate monitoring but do not typically provide that level of care. If hemodynamic support is not available elsewhere, non-ventilator patients may receive critical care.

1. Assess whether the patient meets the inclusion criteria (Step 1) below
    - If yes, proceed to step 2
    - If no, reassess patient later to determine whether clinical status has deteriorated
2. Assess whether the patient meets the exclusion criteria (Step 2) below
    - If no proceed to step 3
    - If yes, assign a “BLUE” triage code; do not transfer to critical care; continue current level of care or provide palliative care as needed
3. Proceed to triage tool, initial assessment (Step 3)

Step 1 Inclusion Criteria

The patient must have one of the following:

A. Requirement for invasive ventilatory support
    - Refractory hypoxemia (SpO_2 , 90% or below on non-rebreather mask or FiO_2 > 0.85)
    - Respiratory Acidosis (pH < 7.2)
    - Clinical evidence of impending respiratory failure
    - Inability to protect or maintain airway

B. Hypotension (systolic blood pressure < 90 mm Hg or relative hypotension with clinical evidence of shock (altered level of consciousness, decreased urine output or evidence of end-organ failure) refractory to volume resuscitation requiring vasopressor or inotrope support that cannot be managed outside of an intensive care setting.

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Step 2 Exclusion Criteria

Triage officers making decisions regarding the allocation of critical care resources during a pandemic or public health emergency should take all available factors into consideration. The following medical conditions are independently associated with higher morbidity and mortality, and as such the presence of any of these should be factored into the decision-making process. The availability, or lack thereof, of necessary life-support capabilities at individual facilities should also be considered (i.e., dialysis, continuous renal replacement therapy, extracorporeal hemodynamic support, specialty medical or surgical expertise).

Use of extracorporeal membrane oxygenation (ECMO) for average of 10 days has resulted in survival of patients critically ill with H1N1. Decision to continue ECMO if started would depend upon available resources.

A. People with very poor prognosis/chance of survival even when treated with aggressive critical care:
    - Severe burns (body surface area > 40%) or severe inhalation injury
    - Unwitnessed or recurrent cardiac arrest patients or no response to standard measures (prompt electrical interventions) or trauma-related arrest.
    - Patients with a SOFA score > 11 (whose predicted mortality rate exceeds 90% even with full critical care during normal circumstances)
B. People needing level of resources that cannot be met during pandemic:
    - Trauma or medical conditions requiring high volume blood transfusion due to high mortality and limited supply of uninfected blood products
C. People with advanced medical illnesses with high short-term mortality even without concurrent critical illness:
    - Advanced cancer or immunosuppression
    - End-stage organ failure
        i. Cardiac: NYHA (New York Heart Association) stage III – IV heart failure
        ii. Pulmonary: Severe chronic lung disease with FEV1 < 25% predicted
        iii. Hepatic: MELD (model of end-stage liver disease) score >20
        iv. Renal: Dialysis dependent
            This criterion accepts that no organ transplants will occur during pandemic.
        v. Neuro: severe irreversible neurological event/condition with high expected mortality.

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Step 3 Initial Triage Tool

Critical Care Triage Tool for INITIAL ASSESSMENT		
Category	Initial Criteria	Priority/Action
Blue	**Exclusion Criteria** or **SOFA > 11**	**DC from Critical Care; Medical Management +/- Palliate**
Red	**SOFA ≤ 7** **or** **Single Organ Failure**	**Highest priority for Critical Care**
Yellow	**SOFA 8 - 11**	**Intermediate priority for Critical Care**
Green	**No significant organ failure**	**Refer or DC, Reassess as needed**

SOFA data from Belgium is validated for 48 and 96 hrs, with the statistics being stronger for the first 48 hrs. The data set included incremental change in score, which showed worsening mortality rates with increase of scores between the 48 and 96 hr time points; mortality rate also increased if the score remained the same between these time points.

- **48hrs - (greatest predictor of mortality)**
  - **score >11 = >90% mortality**
  - **decreasing score = < 6% mortality**
  - **unchanged or increasing (SOFA 2-7) = 37%**
  - **unchanged or increasing (SOFA 8-11) = 60%**

- **96 hr - regardless of the initial score**
  - **increased score = 50% mortality**
  - **unchanged = 27-35% mortality**
  - **decreased = <27%**

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48 Hour Reassessment

Critical Care Triage Tool for 48-HOUR REASSESSMENT		
Category	48 Hour Criteria	Priority/Action
Blue	**Exclusion Criteria or SOFA > 11 or SOFA 8 – 11 and no change**	**Palliate and DC from Critical Care**
Red	**SOFA ≤11 and decreasing**	**Highest priority for Critical Care**
Yellow	**SOFA < 8 and no change**	**Intermediate priority for Critical Care**
Green	**No longer ventilator dependent**	**Refer or DC from Critical Care, reassess as needed**

96 Hour Reassessment

Critical Care Triage Tool for 96-HOUR REASSESSMENT		
Category	**96 Hour Criteria**	**Priority/Action**
Blue	**Exclusion Criteria or SOFA > 11 or SOFA ≤11 and no Change**	**Palliate and DC from Critical Care**
Red	**SOFA ≤11 and decreasing progressively**	**Highest priority for Critical Care**
Yellow	**SOFA < 8 and minimal decrease (< 3 point decrease in past72 hours)**	**Intermediate priority for Critical Care**
Green	**No longer ventilator dependent**	**Refer or DC from Critical Care, reassess as needed**

Reevaluating patients presents a better picture of prognosis or disease trajectory for a particular patient. Worsening prognosis signals health care providers to counsel family members, preparing them for the possibility of palliation.

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