

University of Virginia Health System Ethics Committee
Ethical Framework and Recommendations for COVID-19 Resources Allocation
When Scarcity is Anticipated

March 26, 2020

Purpose

This document provides guidance for allocating resources within the University of Virginia Health System (UVAHS) to care for critically ill patients in the event of scarcity during a COVID-19-declared emergency in which crisis standards of care have been implemented.

Introduction

In times of widespread community illness and pandemic, certain resources may be in short supply. With the current COVID-19 pandemic, anticipated scarcity of healthcare resources requires policies and procedures to ensure ethical allocation when they are needed. This guidance document assumes a situation in which UVAHS is facing a shortage of resources to care for critically ill patients even while maximizing all available surge and mitigation strategies to deliver usual levels of care, and that there are no other practicable interventions or strategies to prevent or mitigate the shortage of the resource(s) being allocated.

As Virginia Governor Ralph Northam has said, “Our top priority is to make sure Virginians stay safe and healthy, and that our response to this situation leaves no one behind.” UVAHS recognizes our responsibility to non-Virginians seeking our care as well. In order to assist UVAHS in developing a transparent, equitable, and consistent approach to allocating scarce resources to our patients, the UVA Health Ethics Committee, together with the UVA Center for Health Humanities and Ethics, provides this guidance document, which includes:

- an ethical framework for scarce resource allocation to aid in development of policies and procedures (Section A);
- recommendations for organizational structures to develop and implement such policies and procedures (Section B);
- recommendations for resource allocation decision-making (both procedural and substantive) under situations in which crisis standards of care are implemented, with particular attention to resources in which scarcity during the COVID-19 pandemic may be anticipated, such as staff, ICU beds, ventilators, ECMO, PPE, antivirals, vaccines, end-of-life/palliative care, etc. (Section C);
- select educational resources to further guide the development of clinical standards for decision-making, such as clinical exclusion and inclusion criteria, within the scope of the ethical framework adopted (Appendix 1); and
- guidance in the form of questions that need to be considered in establishing triage team(s) and the standards under which they would operate (Appendix 2).

This document has been produced with significant reliance on the work of the Society of Critical Care Medicine¹ and others, as noted in the Appendices and elsewhere in this document.

A. Ethical Framework

1. **Ethical Goals and Commitments:** To put the health, dignity, and safety of patients first by developing guidance for allocating resources that:
 - is accountable, transparent and trustworthy;
 - promotes fidelity, solidarity, and mutual responsibility;
 - responds to needs fairly, effectively and efficiently; and
 - values the voices/perspectives of multiple communities both within and outside of the UVAHS.
2. **Ethical Principles:** The foundational ethical principles that underlie these recommendations are (in no particular order):
 - *Trustworthiness:* Acting to foster trust between all entities, both internal and external to UVAHS. Paying special attention to relationships that differ in terms of power, voice, and influence (e.g., administration/staff, clinician/patient/family).
 - *Fidelity to and non-abandonment of patients, staff, and community:* Even though all persons have needs that may not be optimally fulfilled, attention to the dignity of all persons and comfort care needs remain paramount. For example, although some ill patients may not have access to ICU admission under policies established for distributing scarce resources, these patients will receive care that addresses their needs to the best of our ability.
 - *Benefitting persons and not harming them:* Identifying and weighing potential benefits, harms and risks associated with clinical treatments as well as potential benefits, harms and risks to persons from triage plans and alterations in staff management in response to COVID-19. Particular attention should be paid to ensuring the availability of supportive and palliative care to all.
 - *Equity, fairness, and justice:* Attending to the process of distributing scarce goods. Apportionment of goods need not be identical, but rather according to prospectively determined ethics frameworks and standards of care that may evolve as both the pandemic and means to address it change. Processes should be reasonable, open, and transparent and take into consideration the voices and perspectives of those most affected and those most vulnerable.
 - *Privacy/Confidentiality:* Protecting privacy and confidential communications as required by usual care standards. Crisis standards of care do not weaken fundamental obligations to protect the privacy and confidentiality of patients.

¹ Add source once available.

- *Solidarity and community*: Acting under the belief in a common dignity shared by all persons and the belief that, as members of the same human family, we are responsible for and to one another,² both within and without UVAHS. Solidarity within our community recognizes that UVAHS is a significant part of the Charlottesville community and region, both dependent upon it and responsible to it.
- *Stewardship of resources*: Protecting and conserving available resources in order to fulfill obligations to provide excellent patient care.

Although the foregoing ethical principles require special attention during the development and implementation of scarce resource allocation, other ethical principles relevant to the provision of healthcare also remain in effect. For example, although scarce resource allocation may not allow for a patient's desired treatment option, to the extent possible, other decisions about medical care should be guided by respect for decisions made by patients or their health care agents ("respect for autonomy") as under usual care standards for shared decision-making.

B. Recommendations for COVID-19 Resources Allocation Group

1. The Ethics Committee recommends that UVAHS leadership establish a COVID-19 Resources Allocation Group (CRAG) with potential sub working-groups to develop and disseminate specific guidelines for allocating resources anticipated to become scarce when providing care under a crisis standard of care, for example, when a public health emergency has been established. CRAG should be composed of physicians, nurses and clinicians from a variety of domains, including at least critical care and palliative care, and representatives from ethics, community members, and content-specific experts (e.g, representatives from respiratory therapy, pharmacy, laboratory services, etc.) as appropriate.

When building the CRAG, attention should be given to diversity of race, ethnicity, gender, disability, socioeconomic status, and viewpoint.

2. CRAG should do the following (see Appendix 1 for suggested toolkits and examples to aid in these steps):
 - a. **Scarce resource identification and allocation criteria.** During crisis level scarcity, there will be times when resources (e.g., ICU beds, ventilators, ECMO, CPR, PPE, antivirals, vaccines, palliative care, staff) are not allocated to everyone determined to need them or are re-allocated from one patient to another more likely to benefit clinically. CRAG should determine which resources are anticipated to become scarce and will require allocation or re-allocation according to crisis standards of care (i.e., rationing). See Appendix 1 for a suggested toolkit developed by the Institute of Medicine (IOM, now the National Academy of Medicine, NAM). While this may occur at different times for different resources, there is also interdependency among resources (e.g., while there may be enough ventilators, there may be a shortage of negative pressure rooms and/or staff with expertise to manage ventilators). A widely accepted spectrum of responses to anticipated scarcity of

² Sarah B. Garlington, Mary Elizabeth Collins, and Margaret R. Durham Bossaller, An Ethical Foundation for Social Good: Virtue Theory and Solidarity, *Research on Social Work Practice* 2019 30:2, 196-204 (citing ter Meulen, R., Solidarity, justice, & recognition of the other, *Theoretical Medicine and Bioethics* 2016, 37, 517–529).

resources includes the following steps: prepare, conserve, substitute, adapt, re-use, and re-allocate.³ While CRAG **must** develop guidance to address the last step—crisis level allocation or re-allocation of resources—guidance to address the prior steps should also be developed if not already done. This can be accomplished by a separate group.

- b. **Inclusion and exclusion criteria.** CRAG will identify patient inclusion/exclusion criteria for access to scarce resources based on the ethical framework provided above and the best available clinical evidence to support allocation of the resource.
- i. When in effect, crisis level allocation or re-allocation of scarce resources will apply to all patients in need of a resource, whether it be related to COVID-19 or another illness.
 - ii. Inclusion and exclusion criteria should be based on pre-determined objective clinical measures to the extent possible that assess the relative risk for mortality (regardless of cause) and the relative likelihood and magnitude of clinical benefit. Clinical assessment at the bedside is necessary but insufficient without objective measures to guide allocation decisions. Allocation decisions should not be made on the basis of certain patient characteristics, as set out in Section C, under Triage Response Team. (See C.1.e.)
 - iii. Since the application of ethical frameworks should be a fluid process that moves back and forth along a continuum contingent on available resources and as our understanding of the spread, pathophysiology, treatment, and outcomes of COVID-19 infection evolves, CRAG should frequently re-evaluate their allocation criteria.
 - iv. For certain allocated scarce resources, CRAG should establish re-evaluation time periods for continued use in patients initially allocated to receive the resource. For example, time periods for patient reassessment could be adjusted to allow for a therapeutic trial on a ventilator for a specified period, e.g., every 48 hours, during which the patient would not be removed from a ventilator

³ Hick, John L., et al. "Duty to Plan: Health Care, Crisis Standards of Care, and Novel Coronavirus SARS-CoV-2." NAM Perspectives (2020), which adapted this list from other sources for COVID-1.

These steps are further described as follows:

- Prepare – e.g., anticipate challenges, develop plans, stockpile materials;
- Conserve – implement conservation strategies for supplies in shortage or anticipated shortage to ensure the minimum impact/compromise possible (e.g., determining “at-risk” groups with priority for therapies in shortage and overall strategies to conserve use of oxygen delivery devices or personal protective equipment);
- Substitute – provide an equivalent or near-equivalent medication or delivery device;
- Adapt – use of equipment for alternative purposes (e.g., anesthesia machine as a ventilator);
- Re-use – plan to re-use a wide variety of materials after appropriate disinfection or sterilization (may include oxygen delivery devices, for example);
- Re-allocate – if no alternatives, remove a resource from one area/patient and allocate to another who has a higher likelihood of benefit (e.g., triage of scarce resources such as Extra-Corporeal Membrane Oxygenation [ECMO] or ventilators).

unless their clinical status significantly declines (or improves to the point where ventilation is not needed). This mechanism is recommended as a means of preventing cycling of patients on and off ventilators too quickly to allow for benefit, and to support wise stewardship of scarce resources.

- v. Criteria established for allocation and re-allocation decisions should be reviewed by appropriate legal counsel to ensure legal requirements are satisfied.
 - vi. The concept of “key workers” and whether “key worker” status should factor into allocation decisions is controversial and unresolved. Whether key workers should be considered for priority would depend on the resource being allocated and other circumstances. (For example, vaccines would bear different consideration than ventilators.) In discussions of this issue, the term “key workers” generally refers to personnel defined as “of necessity to society at this time in this crisis.”
- c. **Internal Communications.** CRAG should determine the best means to communicate clearly and consistently to appropriate UVAHS personnel about when crisis level allocation or re-allocation is and is not in effect.
 - d. **Consideration of staff.** Consider plans for ensuring staff safety, maintaining clinician-to-patient ratios, training additional personnel, supporting staff resiliency and providing resources for staff (FEAP, child care, payment, sick leave, etc.)
 - e. **Palliative care.** Broaden institutional palliative care to meet the needs of as many patients as possible, with particular attention to the needs of patients who will not receive life-sustaining treatments because they do not meet criteria for accessing these resources under crisis level allocation and re-allocation.
 - f. **Triage Response Team.** Establish a Triage Response Team to make specific allocation and re-allocation decisions for accessing scarce resources under crisis level allocation and re-allocation. (See Section C.) CRAG should develop a system for timely informing the Triage Resource Team of resource amount.
 - g. **External communications.** Ensure appropriate communication to patients, the community, and the general public about plans for scarce resource allocation.

C. Recommendations for Triage Decision-making Processes.

1. The COVID-19 Resources Allocation Group should appoint a multi-disciplinary Triage Response Team and establish processes and standards that the Team should follow. This section provides some guidance on the decisions that need to be made in creating a triage system. Further guidance is provided in Appendix 2. The Team, processes, and standards should be established prior to the time that resources become so scarce that rationing is required.

- a. A single member of the health care team⁴ caring for a patient should not bear the responsibility of determining a patient's eligibility for scarce resource allocation. Instead, a Triage Response Team (or multiple Triage Response Teams when needed) should make scarce resource allocation decisions applying the criteria developed by CRAG. Members of the Triage Response Team should not be directly involved in a patient's care under its review.
- b. CRAG should determine whether there should be one UVAHS Triage Response Team to make all decisions across the system or several unit-based Teams. Whether one or multiple teams, any team should be large enough to allow rotations of duty to ensure 24 hour/7 day-a-week coverage and also ensure that the multi-disciplinary on-call team consists of at least
 - i. Two or three senior clinicians, preferably with experience in complex medical decision-making, prognostication, and tertiary triage; and
 - ii. A clinical ethicist.
- c. CRAG should determine whether decisions of the Triage Response Team will be made by majority vote or some other vote requirement, or whether each Team can determine for itself the voting requirement for an allocation decision. As noted by the Society for Critical Care Medicine, "Unanimity is important when such high risk decisions are to be made, but consideration should also be given to allowing participants the right to express a dissenting opinion as this may help prevent moral distress."

2. Triage decisions should be

- a. Based on the inclusion/exclusion criteria developed by CRAG as applied to a patient's clinical condition and other relevant medical information relevant to prognostication. When a patient falls under a specific specialty such as oncology or trauma, appropriate consultation, as necessary, should be made to a specialist in that field.
- b. Documented, and such documentation should include the patient's medical record number (MRN), referring provider, the clinical information relied on, and the Triage Response Team's final decision.
- c. Reviewed on a regular and frequent basis, by CRAG or a group it designates for that purpose in order to ensure consistency and fairness, and adjustment of resource allocation criteria and application as needed.
- d. Triage decisions shall NOT be based on any of the following:
 - i. A patient's race, ethnicity, gender, , sexual orientation or gender identity, religious beliefs, citizenship or immigration status.

⁴ The health care team includes the attending physician and other licensed independent practitioners, nurses, respiratory therapists, and other professionals who are currently involved in the patient's care.

- ii. A patient's age. Given the epidemiology of severe and critical illness with COVID-19, the preponderance of Triage Response Team decision-making will occur with older adult populations. Thus, triage decision-making must be acutely aware of complex psychosocial, function, and medical concerns in this population, including ageism.
 - iii. A patient's ability to pay or insurance coverage.
 - iv. Quality of life judgments.
 - v. Social worth or social value judgments.
 - vi. Solely whether a patient has a DNAR or DDNR (Durable Do Not Resuscitate) order, unless the scarce resource being allocated is CPR. A DNAR or DDNR order should not be interpreted to mean "do not treat." It is a limited order that means that CPR should not be attempted in the event of cardiac or respiratory arrest.
- e. CRAG should develop a system by which the same categories of information are provided to the Triage Response Team for allocation decisions and information not relevant to the triage decision is not included. Information not relevant to the triage decision includes any patient demographics, personal information, and the patient characteristics described above in C.2.d.
- f. CRAG should develop and implement a limited appeals process for triage decisions. An appeal should be based on the claim of incorrect adherence to established triage criteria and processes (e.g., based on an error in applying the triage criteria or the timing of re-evaluation), rather than an appeal for an exception to the process itself. The process should work as follows:
 - 1. To promote the ethical principles of trustworthiness, equity, fairness, and justice, an appeals team and rapid appeals process should be established by CRAG to consider decisions of the Triage Response Team when:
 - a. Requested by a patient, family member, or health care team member, and
 - b. The Triage Response Team's decision, if implemented, will likely result in the patient's death or the denial of significant access of care which would, under usual standards of care, be offered to the patient.
 - 2. All appeals should be reviewed by an appeals team established by CRAG for a rapid determination that the processes adopted for the Triage Response Team have been applied appropriately and consistently. Members of the appeals team should not also serve on the Triage Response Team or be involved in the patient's direct care.

Appendix 1.

These areas of consensus and debate are summarized after an extensive, but not exhaustive review of the available literature (available in references). Additional areas of consensus may emerge as international, national, and local guidelines, policies, and procedures are made available for review.

1. Areas of consensus within the academic literature.
 - a. Framework: A guiding ethical framework/approach forms the basis for a justifiable response to critical resource scarcity. While some guidelines are not explicit, they rely on implicit assumptions about the values underlying such endeavors. It is preferable to explicitly articulate the ethical guidance underpinning decisions about the allocation of scarce resources.
 - b. Community engagement: Engaging community members to the extent possible in planning, policy, and process is desirable.
 - c. Allocation of scarce resources:
 - i. The criteria developed for exclusion, triage, and re-allocation during a pandemic ought to apply to all hospitalized patients, and not only to patients with the pandemic illness.
 - ii. Pre-defined triggers for enacting criteria for allocation of scarce resources are preferable to leaving the decision to particular units, teams, or clinicians. Ideally, this should be coordinated across communities, counties, states, etc. (see Section 3 of this Appendix for available tools/examples for defining triggers).
 - iii. Pre-determined criteria for the allocation of scarce resources is preferable to individual bedside assessments by clinicians in real-time.
 - iv. For ventilators specifically, allocation on the basis of need and clinical efficacy is widely accepted.
 - v. The following are rejected as criteria for allocation of scarce resources: gender, race, religion, nationality, ability to pay, social worth.
 - vi. Re-allocation of scarce resources is ethically justifiable in a severe pandemic. The trigger for re-allocation is typically when the resource in question is at capacity and additional patients are presenting whose care requires the resource in question.
 - vii. Allocation and re-allocation decisions require re-evaluation at pre-determined time intervals. This avoids the use of first-come, first-served criteria for scarce resources, which are generally considered inappropriate because it may give priority to those who have greater access to health care and does not account for the potential for relative benefit from the resource being allocated.
 - viii. Documentation and review of all allocation/re-allocation decisions is necessary.
 - ix. A timely and pre-defined appeals process should be available for allocation and re-allocations.
 - x. Palliative care resources will be required for those not allocated critical care resources.

2. Areas of debate within the academic literature. We list these for educational purposes only; their listing here does not indicate debate within the Ethics Committee or Center for Health Humanities and Ethics or modify the recommendations in the main document.
 - a. The timing of implementation and specific exclusion criteria used for critical care admission (See Section 4 of this Appendix for examples)
 - i. Use of SOFA/pSOFA for viral respiratory pandemics
 - ii. What tools/scoring systems/criteria can best predict relative risk for mortality, and relative likelihood and magnitude of benefit.
 - iii. Use of Age
 - iv. Use of “prospects for long-term survival” and/or use of “stage of life” or “life cycle” considerations.
 - v. Use of QOL considerations
 - vi. Use of Key Worker Status
 - vii. Use of lottery in the event all other criteria are equal
 - b. The specific re-allocation criteria that is appropriate in the current pandemic. (See section 4 of this Appendix for Example Re-allocation criteria)
 - i. Timing of re-evaluation
 1. COVID specific recommendations are limited, but may warrant a longer “trial period”
 - ii. Use of SOFA/pSOFA in re-allocation decisions
 - c. As noted in the main document,

“The concept of ‘key workers’ and whether ‘key worker’ status should factor into allocation decisions is controversial and unresolved. Whether key workers should be considered for priority would depend on the resource being allocated and other circumstances. (For example, vaccines would bear different consideration than ventilators.) In discussions of this issue, the term ‘key workers’ generally refers to personnel defined as ‘of necessity to society at this time in this crisis.’”

Whether status as a “key worker” should be considered for allocation of scarce resources is debated in the literature and no consensus has been reached. Inclusion of “key worker” status as a criterion depends on the particular resources under consideration (considerations for a vaccine will differ from consideration for ICU admission). Arguments for inclusion when considering scarce resources based on *social utility* (healthcare workers, key infrastructure employees, etc.) presume that ill workers will be able to return to health/work quickly. An appeal to *reciprocity* has been made for healthcare workers on the front lines of patient care, but this would extend to other frontline workers in food service, waste removal, mail carriers, etc. Another argument for special consideration for healthcare workers during a pandemic with respect to allocation of scarce resources is to *promote ongoing staffing*, but this too would extend to other frontline workers. All in all, arguments for prioritizing “key workers” may be theoretically compelling, but achieving agreement on how to determine who qualifies as a “key worker” in a manner that is helpful in these kinds of crisis level allocation decisions is complex.

3. Defining Triggers

This information is summarized from the Institute of Medicine 2013. Crisis Standards of Care: A Toolkit for Indicators and Triggers. Washington, DC: The National Academies Press.

<https://doi.org/10.17226/18338>.

- a. Key Questions for consideration when identifying triggers (worksheet below):
 - i. What potential indicator data are available at the community or state level and who coordinates or has access to them (systems data, epidemiologic data, alerts)?
 - ii. Who monitors and interprets these data; how are they communicated or used in decision making?
 - iii. What additional information could be accessed during an incident or event that would be helpful to guide facility/agency actions?
 - iv. Do any defined actions or notifications occur once an indicator is noted or a threshold exceeded?
 - v. Is the facility an active participant in its regional health care coalition and if so, what resources are available, what is the trigger for requesting them, and how are they requested (medical coordination center)?
 - 1. At what threshold (indicator or trigger) does interfacility communication and/or coordination begin (including EMS, emergency management, public health, and coalition/community health care organizations)?
 - 2. How do the facility and coalition share information (including impact, resource availability, case and clinical information) with state and local public health agencies to optimize situational awareness and resource management?
 - vi. What triggers exist at the state level to provide declarations of emergency (and/or regulatory and liability protections) from public health or emergency management? If there are not predesignated triggers, how are requests handled on these actions?
 - vii. How does the institution internally and externally (with local public health) recognize the need for and support alternate care sites?
 - viii. Example from IOM:
 - 1. Indicators
 - a. # of available ventilators.
 - 2. Triggers
 - a. Inadequate ventilators for all patients that require them.
 - 3. Response/Tactics
 - a. Implement Triage Response Team.
 - b. Triage access to ventilators and re-allocate as required.
 - ix. Example from Swiss Academy of Medical Sciences
 - 1. Stage A: ICU beds available, but capacity limited
 - a. Admission triage
 - b. Presence of one of the following criteria for little or no likelihood of benefit with ICU treatment, and means that

continuation of ICU treatment is no longer indicated and the patient will receive palliative care:

- i. Occurrence of cardiac arrest during ICU stay, unless resuscitation with defibrillation is successful;
 - ii. Occurrence of a new significant organ failure not present on admission.
2. Stage B: No ICU beds available
- a. Resource management through decisions on discontinuation of treatment
 - b. Cardiopulmonary resuscitation is not to be undertaken in patients admitted with cardiac arrest.
 - c. The presence of one criterion means that continuation of ICU treatment is no longer indicated and the patient will receive palliative care.
 - i. No improvement in respiratory or hemodynamic status
 - ii. Occurrence of cardiac arrest during ICU stay
 - iii. Failure of two organs in addition to the lungs
 - iv. Advanced multiple organ failure, e.g. significant increase in SOFA score (>2 points) within 24 hours

Scope and Event Type: _____

Indicator Category	Contingency	Crisis	Return Toward Conventional
Surveillance data	Indicators: Triggers: Tactics:	Indicators: Crisis triggers: Tactics:	Indicators: Triggers: Tactics:
Communications and community infrastructure	Indicators: Triggers: Tactics:	Indicators: Crisis triggers: Tactics:	Indicators: Triggers: Tactics:
Staff	Indicators: Triggers: Tactics:	Indicators: Crisis triggers: Tactics:	Indicators: Triggers: Tactics:
Space/Infrastructure	Indicators: Triggers: Tactics:	Indicators: Crisis triggers: Tactics:	Indicators: Triggers: Tactics:
Supplies	Indicators: Triggers: Tactics:	Indicators: Crisis triggers: Tactics:	Indicators: Triggers: Tactics:
Other categories	Indicators: Triggers: Tactics:	Indicators: Crisis triggers: Tactics:	Indicators: Triggers: Tactics:

4. Example Criteria

- a. Powell T, et al. (Mar 2008) “Allocation of Ventilators in a Public Health Disaster.” *Disaster Medicine and Public Health Preparedness*, 2(1): 20-26.

Exclusion Criteria for Ventilator Access*

Cardiac arrest
 Unwitnessed arrest
 Recurrent arrest
 Arrest unresponsive to standard measures
 Trauma-related arrest
 Metastatic malignancy with poor prognosis
 Severe burn: body surface area >40%, severe inhalation injury
 End-stage organ failure
 Cardiac: New York Heart Association class III or IV
 Pulmonary: severe chronic lung disease with FEV₁ † <25%
 Hepatic: MELD‡ score >20
 Renal: dialysis dependent
 Neurological: severe, irreversible neurological event/condition with high expected mortality

*Adapted from Ontario Health Plan for an Influenza Pandemic guidelines.

†Forced expiratory volume in 1 second, a measure of lung function.

‡Model of end-stage liver disease.

- b. Devereaux A, et al. (2008) “Definitive Care for the Critically Ill During a Disaster: A Framework for Allocation of Scarce Resources in Mass Critical Care.” *Chest*, 133: 51S-66S. Available online at: http://www.chestjournal.org/content/133/5_suppl/51S.full (last visited March 9, 2009).

Table 6—Exclusion Criteria

1. SOFA score criteria: patients excluded from critical care if risk of hospital mortality \geq 80%
 - A. SOFA > 15
 - B. SOFA > 5 for \geq 5 d, and with flat or rising trend
 - C. \geq 6 organ failures
2. Severe, chronic disease with a short life expectancy
 - A. Severe trauma
 - B. Severe burns on patient with any two of the following:
 - i. Age > 60 yr
 - ii. > 40% of total body surface area affected
 - iii. Inhalational injury
 - C. Cardiac arrest
 - i. Unwitnessed cardiac arrest
 - ii. Witnessed cardiac arrest, not responsive to electrical therapy (defibrillation or pacing)
 - iii. Recurrent cardiac arrest
 - D. Severe baseline cognitive impairment
 - E. Advanced untreatable neuromuscular disease

- F. Metastatic malignant disease
 - G. Advanced and irreversible neurologic event or condition
 - H. End-stage organ failure meeting the following criteria:
 - i. Heart
 - a. New York Heart Association class III or IV heart failure
 - ii. Lungs
 - a. COPD with $FEV_1 < 25\%$ predicted, baseline $PaO_2 < 55$ mm Hg, or secondary pulmonary hypertension
 - b. Cystic fibrosis with postbronchodilator $FEV_1 < 30\%$ or baseline $PaO_2 < 55$ mm Hg
 - c. Pulmonary fibrosis with vital capacity or total lung capacity $< 60\%$ of predicted, baseline $PaO_2 < 55$ mm Hg, or secondary pulmonary hypertension
 - d. Primary pulmonary hypertension with New York Heart Association class III or IV heart failure, right atrial pressure > 10 mm Hg, or mean pulmonary arterial pressure > 50 mm Hg
 - iii. Liver
 - a. Child-Pugh score ≥ 7
 - I. Age > 85 yr
 - J. Elective palliative surgery
- c. Vawter, Dorothy E., et al. "For the good of us all: Ethically rationing health resources in Minnesota in a severe influenza pandemic." *Minneapolis, MN: Minnesota Center for Health Care Ethics and University of Minnesota Center for*

MECHANICAL VENTILATION/EXTERNAL OXYGENATION STRATEGIES FOR SCARCE RESOURCE SITUATIONS (cont.)

MINNESOTA HEALTH CARE PREPAREDNESS PROGRAM

RECOMMENDATIONS

STEP TWO: Compared to other patient(s) requiring and awaiting external ventilation/oxygenation, does this patient have significant differences in prognosis or resource utilization in one or more categories below that would justify re-allocation of the ventilator/unit? Factors listed in relative order of importance: weight, injury/epidemiologic factors may have the highest predictive value in some cases and may also affect the predictive ability of the SOFA score.				Strategy	Crisis
Criteria	Patient keeps resource	Resource re-allocated			
1. Organ system function ^a	Low potential for death (SOFA score ≤ 7)	Intermediate potential for death (SOFA score 8-11)	High potential for death (SOFA score ≥ 12)		
2. Duration of benefit / prognosis	Good prognosis based upon epidemiology of specific disease/ injury.	Indeterminate/intermediate prognosis based upon epidemiology of specific disease/ injury	Poor prognosis based upon epidemiology of specific disease/ injury (e.g., pandemic influenza)		
3. Duration of need	No severe underlying disease. ^b	Severe underlying disease with poor long-term prognosis and/or ongoing resource demand (e.g., home oxygen dependent, dialysis dependent) and unlikely to survive more than 1-2 years.	Severe underlying disease with poor short-term prognosis (<1 year) prognosis		
4. Response to mechanical ventilation	Short duration – flash pulmonary edema, chest trauma, other conditions anticipating < 3 days on ventilator	Moderate duration – e.g., pneumonia in healthy patient (estimate 3-7 days on ventilator)	Long duration – e.g., ARDS, particularly in setting of preexisting lung disease (estimate > 7 days on ventilator)		
5. Response to mechanical ventilation	Improving ventilatory parameters over time ^c	Stable ventilatory parameters over time	Worsening ventilatory parameters over time		
<p>^a The Sequential Organ Failure Assessment (SOFA) score is the currently preferred assessment tool but other predictive models may be used depending on the clinical/epidemiologic setting. Note: mortality prediction for SOFA scores in respiratory failure cases is poor. Specific SOFA scores should never be used to deny a ventilator to a patient but should be used in combination with other factors to compare patients needing the resource.</p> <p>^b Examples of underlying diseases that predict poor short-term survival include (but are not limited to):</p> <ol style="list-style-type: none"> 1. Congestive heart failure with oxygen fraction < 25% (or peritubular ischemia unresponsive to therapy or non-reversible ischemia with pulmonary edema). 2. Severe chronic lung disease including pulmonary fibrosis, cystic fibrosis, obstructive or restrictive diseases requiring continuous home oxygen use prior to onset of acute illness. 3. Central nervous system, solid organ, or hematopoietic malignancy with poor prognosis for recovery. 4. Critical illness with acute history of venous bleeding, hard coagulopathy or encephalopathy. 5. Acute hepatic failure with hypoprothrombinemia. <p>^c Changes in Oxygenation Index over time may provide comparative data, though of uncertain prognostic significance. $OI = \frac{MAP}{FiO_2} \times \frac{P_{aO_2}}{P_{aO_2}}$ where: OI = oxygenation index, MAP = Mean Airway Pressure, P_{aO_2} = arterial oxygen pressure (May be estimated from oxygen dissociation curve if blood gas unavailable).</p>					
<p>STEP THREE: Re-allocate ventilator/resource only if patient presenting with respiratory failure has significantly better chance of survival/benefit as compared to patient currently receiving ventilation. Follow additional regional and state/federal guidance and institutional processes for scarce resource situations.</p>					

FROM: Daugherty Biddison EL, Faden R, Gwon HS, Mareiniss DP, Regenberg AC, Schoch-Spana M, Schwartz J, Toner ES. Too Many Patients...A Framework to Guide Statewide Allocation of Scarce Mechanical Ventilation During Disasters. Chest. 2019 Apr;155(4):848-854. doi: 10.1016/j.chest.2018.09.025.

Table 1 summarizes in tabular format a strategy for crisis level ventilator allocation proposed by this group in Maryland. Table 2 provides examples of how this strategy would prioritize 2 patients vying for the same ventilator. The article provides background on the ethical principles guiding this strategy as well as practical issues raised by it's use.

TABLE 1] Proposed Strategy for Ventilator Allocation in Epidemics of Novel Respiratory Pathogens

Principle	Specification	Point System			
		1	2	3	4
Prognosis for short-term survival	Adults (SOFA) or pediatrics (PELOD-2)	SOFA score ≤ 8 PELOD-2 ≤ 12	SOFA score 9-11 PELOD-2 12-13	SOFA score 12-14 PELOD-2 14-16	SOFA score > 14 PELOD-2 ≥ 17
Prognosis for long-term survival	Prognosis for long-term survival (assessment of comorbid conditions)	Severe comorbid conditions; death likely within 1 y	...
Secondary consideration					
Lifecycle considerations	Prioritize those who have had the least chance to live through life's stages (age)	Age 0-49 y	Age 50-69 y	Age 70-84 y	Age ≥ 85 y

Examples of severe comorbid conditions with associated life expectancy < 1 year are listed. This list is meant as a guideline and is not exhaustive. Patients meeting the criteria of < 1 y predicted survival based on what of the listed or other similar conditions should be assigned a score of 3. NYHA = New York Heart Association.

1. NYHA class IV heart failure.
2. Advanced lung disease with $FEV_1 < 25\%$ predicted, total lung capacity $< 60\%$ predicted, or baseline $PaO_2 < 55$ mm Hg.
3. Primary pulmonary hypertension with NYHA class III or IV heart failure.
4. Chronic liver disease with Child-Pugh score > 7 .
5. Severe trauma.
6. Advanced untreatable neuromuscular disease.
7. Metastatic malignant disease or high-grade primary brain tumors.

TABLE 2] Example Allocation Scores

Patients	History	Score Based on Table 1	Priority Based on Table 1 and Additional Considerations
Case 1			
Patient A	24 y of age, SOFA score 13, and no severe comorbid conditions	3	Patient B is prioritized via the framework
Patient B	52 y of age, SOFA score 10, and no severe comorbid conditions	2	
Case 2			
Patient A	20 y of age, SOFA score 7, and no severe comorbid conditions	1	Each receives 1 point for lifecycle considerations, giving both a total score of 2. The resource would then be allocated based on chance in a fair and transparent way (eg, lottery)
Patient B	39 y of age, SOFA score 8, and no severe comorbid conditions	1	
Case 3			
Patient A	45 y of age, SOFA score 15, and no severe comorbid conditions	4	For life-cycle considerations, Patient A receives 1 additional point and Patient B receives 3 additional points, yielding final scores of 5 and 7, respectively. Therefore, Patient A is prioritized.
Patient B	74 y of age, SOFA score 7, and metastatic cancer with death likely in 1 y	4	

SOFA = Sequential Organ Failure Assessment.

5. Selected Resources/References

- Virginia Department of Health > Disease Prevention > Critical Resource Shortages Planning Guide. <http://www.vdh.virginia.gov/disease-prevention/disease-prevention/critical-resource-shortages-planning-guide/>
- Hick, John L., et al. "Duty to Plan: Health Care, Crisis Standards of Care, and Novel Coronavirus SARS-CoV-2." *NAM Perspectives* (2020).
- Gostin, Lawrence O., et al., eds. *Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response: Volume 1: Introduction and CSC Framework*. Vol. 3. National Academies Press, 2012.
- Stroud, Clare, John L. Hick, and Dan Hanfling, eds. *Crisis Standards of Care: A Toolkit for Indicators and Triggers*. National Academies Press, 2013.
- Roccaforte, J. David, and James G. Cushman. "Disaster preparedness, triage, and surge capacity for hospital definitive care areas: optimizing outcomes when demands exceed resources." *Anesthesiology clinics* 25.1 (2007): 161-177.
- Christian, Michael D., et al. "Triage: care of the critically ill and injured during pandemics and disasters: CHEST consensus statement." *Chest* 146.4 (2014): e61S-e74S.
- Biddison, Lee Daugherty, et al. "Ethical considerations: care of the critically ill and injured during pandemics and disasters: CHEST consensus statement." *Chest* 146.4 (2014): e145S-e155S.
- Leider, Jonathon P., et al. "Ethical guidance for disaster response, specifically around crisis standards of care: a systematic review." *American journal of public health* 107.9 (2017): e1-e9.
- Joint Centre for Bioethics. *Pandemic Influenza Working Group Members* (Ross E.G. Upshur, Karen Faith, Jennifer L. Gibson, Alison K. Thompson, C. Shawn Tracy, Kumanan Wilson, Peter A. Singer). *Stand on Guard for Thee: Ethical Considerations in Preparedness Planning for Pandemic Influenza*. Toronto: University of Toronto Joint Centre for Bioethics. 2005. Available at: <http://www.utoronto.ca/jcb/home/documents/pandemic.pdf>.
- World Health Organization. *Pandemic influenza preparedness and response: a WHO guidance document*. Geneva: World Health Organization, 2009.
- Christian, Michael D., et al. "Introduction and executive summary: care of the critically ill and injured during pandemics and disasters: CHEST consensus statement." *Chest* 146.4 (2014): 8S-34S.
- Farmer, J. Christopher, Randy S. Wax, and Marie R. Baldisseri, eds. *Preparing Your ICU for Disaster Response*. Society of Critical Care Medicine, 2012.
- Calgary Health Region. *Ethics of health care decision making during a pandemic crisis* (Section 3). *Pandemic Influenza Response Plan*. 2007. Available at: http://www.calgaryhealthregion.ca/pandemic/pdf/chr_response_plan_0307.pdf.
- Institute of Medicine 2013. *Crisis Standards of Care: A Toolkit for Indicators and Triggers*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/18338>.
- Vawter, Dorothy E., et al. "For the good of us all: Ethically rationing health resources in Minnesota in a severe influenza pandemic." Minneapolis, MN: Minnesota Center for Health Care Ethics and University of Minnesota Center for Bioethics (2010).

- Devereaux A, et al. (2008) “Definitive Care for the Critically Ill During a Disaster: A Framework for Allocation of Scarce Resources in Mass Critical Care.” *Chest*, 133: 51S-66S. Available online at: http://www.chestjournal.org/content/133/5_suppl/51S.full (last visited March 9, 2009).
- Powell T, et al. (Mar 2008) “Allocation of Ventilators in a Public Health Disaster.” *Disaster Medicine and Public Health Preparedness*, 2(1): 20-26.
- Swiss Academy of Medical Sciences.(Mar 2020) “COVID-19 pandemic: triage for intensive-care treatment under resource scarcity.” sams.ch/en/corona

Appendix 2- Guidelines for Establishment of Triage Response Team

1. Structure of Triage Response Team (TRT)
 - a. Decide if there will be one TRT for UVAHS, or if each service/resource (e.g., ECMO, ventilators, beds, staffing, supplies, etc.) will have its own sub-TRT that reports to a lead TRT.
2. Membership of Triage Response Team
 - a. Decide who and how many persons will be on the TRT
 - i. Clinical Staff
 - ii. Clinical Ethics staff
 - iii. Community Member(s), as feasible
 - b. Decide whether TRT membership will rotate, and if so, how frequently?
 1. SCCM recommends a 3-5 day rotation system to avoid burnout, etc.
3. Decision making guidelines for Triage Response Team
 - a. Decide if TRT decisions will be:
 - i. Unanimous or majority vote
 1. If majority- simple or supermajority?
 2. If majority- what is role of dissent (e.g., does this trigger the appeals process or a consultation to facilitate disagreement?)
 - ii. Based on a quorum (e.g., if all members can't be reached to make an emergency decision is a quorum sufficient?)
 1. If a quorum is sufficient, decide on number needed.
 - b. Decide what type of review of TRT decisions is needed to ensure consistency
 - i. For example, should all TRT decisions be reviewed at the end of each day to ensure consistency of application of inclusion/exclusion criteria and/or make adjustments based on developments throughout the day, or reviewed less frequently?
 - ii. Does Health Systems leadership want a daily/weekly update of all TRT decisions?
 - c. Decide what information categories are necessary for TRT decisions, such as:
 - i. Patient's current clinical condition
 - ii. Information about patient necessary to apply inclusion/exclusion criteria
 - iii. Up-to-date information of availability of resource being allocated
 - d. Decide what should be documented to support all TRT decisions, such as
 - i. Patient's MRN
 - ii. Referring provider
 - iii. Clinical information relied on to make TRT decision
 - iv. Resource allocation availability at time decision was made
 - e. Develop process to review TRT decisions based on change in patient status or resource availability
 - f. Decide where to document all TRT decisions (e.g., EMR alone would not facilitate quick review of decisions for comparison purposes)
 - g. Develop process for communicating all TRT decisions to appropriate persons/groups, such as

- i. Referring clinician
- ii. Palliative Care group
- iii. Chaplaincy
- iv. Other groups