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**Crisis Standards of Care
Planning Guidance for the COVID-19 Pandemic**

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I. Overview

A Crisis Standards of Care Advisory Committee was convened by the Commissioner of Public Health to prepare guidance in the event of the potential scarcity of necessary medical treatment resources in the Commonwealth caused by a surge in need due to the number of people suffering from COVID-19. This Committee included medical experts and ethicists from across the Commonwealth, representing both large academic medical centers and community hospitals and charged with expeditiously developing recommendations for ethical, equitable and transparent guidelines for providing acute care during a crisis. Members of the committee included:

- Scot Bateman, MD
Director, Office of Ethics, UMass Memorial Medical Center
- Monica Bharel, MD MPH
Commissioner, Massachusetts Department of Public Health
- Paul Biddinger, MD FACEP
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- Joshua Kornbluth, MD
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- Abraar M Karan, MD MPH DTM&H
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- Christine Mitchell, RN
Executive Director, Center for Bioethics, Harvard Medical School
- Emily Rubin, MD
Pulmonary Critical Care Medicine; Co-Chair of Optimum Care Committee,
Massachusetts General Hospital
- Rev. Dean Shapley, MDiv,
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- Michael Wagner, MD FACP
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- J. Matthias Walz, MD, FCCP
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UMass Memorial Healthcare
- Ellen Weinstein, JD
Deputy General Counsel, BMC Health System

The Committee was able to leverage extensive prior planning work by the Department of Public Health and by the experts on the Committee to make its recommendations. The guidelines were reviewed by the Medical Advisory Group of the COVID-19 Response Command Center and approved by the Commissioner of Public Health.

II. Introduction

Crisis care must be the best care it can be in light of the circumstances and available resources. The purpose of this document is to provide guidance for the triage of critically ill patients in the event that the public health emergency caused by the COVID-19 pandemic creates demand for critical care resources that outstrips the supply.

The foundation of the Commonwealth’s approach to crisis standards of care is that such tragically difficult decisions must be based on criteria that ensure that every patient has equitable access to any care from which they might benefit. These criteria must be as clear, transparent, and objective as possible, and must be based on biological factors related only to the likelihood and magnitude of benefit from the medical resources. Factors that have no bearing on the likelihood or magnitude of benefit, including but not limited to race, disability, gender, sexual orientation, gender identity, ethnicity, ability to pay, socioeconomic status, perceived social worth, perceived quality of life, immigration status, incarceration status, homelessness or past or future use of resources, are irrelevant and not to be considered by providers making allocation decisions.

Catastrophic events such as natural disasters, infectious disease threats, and terrorism, whether they occur suddenly or over time, can drastically disrupt the health care system, exhaust resources, and overwhelm the system’s capacity to deliver care as usual. Depending on the type and duration of a particular disaster, healthcare system resources including adequate inpatient or outpatient clinical care spaces, medical supplies, and available trained staff may become depleted or in short supply.

Changes in the usual approaches to care and practice may be necessary due to limitations or fluctuations in resources. The healthcare system may be forced to transition from conventional or usual care, to contingency care that supports the provision of functionally equivalent care, and, if necessary, to “crisis” care when available resources are inadequate to meet all important patient needs. The National Academies (formerly the Institute of Medicine (IOM)) have defined the level of health and medical care capable of being delivered during a catastrophic event as “crisis standards of care” (CSC).¹

¹ Guidance for establishing crisis standards of care for use in disaster situations: A letter report. National Institute of Medicine (2009). According to the National Academies, crisis standards of care would be applicable only when there is “a substantial change in usual healthcare operations and the level of care it is possible to deliver, which is made necessary by a pervasive (e.g., pandemic influenza) or catastrophic (e.g., earthquake, hurricane) disaster.” A disaster that creates the level of need for medical care that overwhelms available resources for an extended period would necessitate a shift of focus from the absolute care of each individual to promoting the conscientious stewardship of limited resources with the goal of providing the best possible health outcomes for the population as a whole. Such a shift from conventional or contingency care to crisis care will be justified only in the most extraordinary circumstances, when formally declared by a state government, in recognition that crisis operations will be in effect for a sustained period.

Crisis standards of care are limited to disaster scenarios where the resources available are significantly inadequate to the need. Crisis standards of care are part of a comprehensive preparedness strategy that acknowledges that regardless of the best planning and other preparatory efforts, a pandemic or catastrophic natural or human-generated disaster could overwhelm the healthcare system in ways that will require challenging and painful decisions about how to allocate limited and potentially life-saving resources.

This guidance is intended to:

- Help healthcare institutions and providers make consistent decisions about the use and allocation of scarce medical resources;
- Ensure that critical resources are conserved and distributed efficiently, equitably and ethically across the healthcare system;
- Promote transparent decision-making and public trust in the fairness and equity of the system;
- Protect those who might otherwise face barriers to accessing care; and
- Assure patients and their families that they will receive fair access to care under the circumstances regardless of where they live in the Commonwealth.

III. CSC Purpose, Assumptions, and Ethical Principles

A. Purpose

This guidance is intended to provide a unified, transparent framework that supports consistent hospital and provider decision-making aimed at maximizing the number of life years saved. To assure providers, patients, their families, and the community that CSC will be applied fairly, it is essential that the ethical grounding of this guidance be clearly and specifically stated. The overwhelming need for care created by a disaster would necessitate a shift of focus from the absolute care of each individual to promoting the conscientious stewardship of limited resources intended to result in the best possible health outcomes for the population as a whole. The delivery of healthcare under CSC is ultimately about maximizing the care delivered to the population as a whole under austere circumstances that may limit treatment choices for both providers and patients.

B. Assumptions

- The wide spread of an infectious disease, such as COVID-19 may result in a surge of patients requiring medical care that could overwhelm available resources.
- Demand on local medical resources may overwhelm local or regional capacity and capabilities, and local medical resources may be damaged or unavailable.
- Healthcare facilities may experience extreme resource challenges that may include: inadequate inpatient or outpatient care space, supply and equipment shortages, and/or a lack of sufficient trained personnel, and may become overwhelmed with persons seeking care.
- A significant percentage of healthcare workers may be unable to report or stay on the job because of:
 - Their own illness or injury, or that of family members, or
 - Practical impediments such as lack of dependent care or transportation.

- A percentage of healthcare workers may be unwilling to report or stay on the job during CSC situations because of:
 - Concerns about their personal health or safety, or that of family members, or
 - Concerns about their ability to effectively provide care, or
 - Concerns about legal liability.
- Individuals with access and functional needs will have special and enhanced access, medical, and emotional needs that must be addressed within CSC guidance to ensure equitable care.
- Pre-hospital and healthcare institutions have mutual aid agreements in place on a regional basis for supporting one another where possible, and will utilize these plans to the extent possible during a disaster.
- Patients will require medical transportation to and between healthcare facilities, and the increased volume of patient movement may require tracking.
- Coordination among response partners at all levels (facility, local, regional, state, and federal) is expected in order to best meet medical surge needs.
- Crisis standards of care are to be activated only in extraordinary circumstances when the level of demand for medical care exceeds available resources and crisis operations will be in effect for a sustained period.
- The public will need access to up-to-date, accurate, and transparent information about the use of CSC, and access to any relevant instructions as to how they may best seek access to care during the disaster.
- DPH may provide clinicians with supplemental clinical guidance specific to the incident type and specific resource shortages. Such guidance will be supplied from DPH to affected stakeholders.
- DPH will monitor for uneven levels of demand across the state with the assistance of regional Health and Medical Coordinating Coalitions (HMCCs), and will take all available steps to mitigate the need for use of CSC, or to limit the duration of need for CSC, by coordinating the movement of response assets from one region to another and the redistribution of patients in need of care where appropriate.

C. Concepts

1. Continuum of Care

As described by the National Academies, the need for healthcare surge capacity in a disaster occurs along a continuum based on demand for health care services and available resources.

- **Conventional Capacity** The spaces, staff, and supplies used to deliver care are consistent with daily practices within institutions. The clinical care spaces and practices that are used in response to the disaster are adequate to support clinical care that is equivalent to usual patient care.
- **Contingency Capacity** The spaces, staff, and supplies used are not consistent with daily practices, but support care that is functionally equivalent to usual patient care practices. Alterations in the use of clinical care spaces or practices may be used temporarily during a major mass casualty incident or on a more sustained basis during a disaster (when the demands

- **OPTIMIZE ALLOCATION:** Allocate resources to patients whose need is greater or whose prognosis is more likely to result in a positive outcome with limited resources.²

2. Triage

Triage is the process of screening, evaluating, and sorting patients based on their medical status and likely outcome.³ Triage may occur at the site of a disaster, in the pre-hospital setting, in the emergency department or in the inpatient or outpatient acute care setting. Effective triage will be essential to prioritize care and to do the greatest good for the greatest number of patients. Although triage is generally a part of all disaster plans, many physicians, nurses, and others may be unfamiliar or uncomfortable with the process.

Primary triage is the first level of evaluation and prioritization and typically occurs before initial medical interventions: in the out-of-hospital setting, on EMS arrival, or in the hospital lobby.

Secondary triage occurs after an additional patient assessment and initial medical interventions are performed (e.g., intravenous fluids or airway management). These decisions are usually performed by medical staff to establish priority for diagnostic studies or treatment.

Tertiary triage involves assessment of the value of ongoing resource commitment during delivery of definitive care (e.g., deciding about continued ventilator support).⁴

Reverse triage may be utilized while CSC are in effect. Reverse triage is a system of reviewing the acuity and needs of current inpatients when a catastrophic disaster occurs and determining which patients may be safely triaged for early discharge from healthcare institutions. Discharging noncritical patients can be an effective way to increase a hospital's capacity for emergency admissions during a public disaster.⁵ Patients with a level of one (minimum risk) can typically be discharged. Patients with a level of two (low risk) may be appropriate for transfer to a non-acute care facility (e.g., skilled nursing facility, rehabilitation facility) or for early discharge when the effects of a disaster exceed the risks of remaining in the hospital. Patients with a level of three (moderate risk) may be transferred to a facility with moderate capabilities if appropriate. Level 4 and level 5 will typically remain in the hospital.

3. Indicators and Triggers

² Adapted from The Guidelines for Use of Modified Health Care Protocols in Acute Care Hospitals During Public Health Emergencies, September 2013, Kansas Department of Health and Environment

³ Dictionary of Military and Associated Terms US Department of Defense 2005

⁴ *Allocating scarce resources in disasters: emergency department principles*. Hick JL1, Hanfling D, Cantrill SV. Ann Emerg Med. 2012 Mar;59(3):177-87.

⁵ Inpatient disposition classification for the creation of hospital surge capacity: a multiphase study Kelen, Gabor D et al. The Lancet, 2006 Dec 2;368(9551):1984-90.

Indicators and triggers will guide transitions along the continuum of care, from conventional to contingency to crisis, and in the return to conventional care. ⁶ CSC will be triggered only when there is no acceptable alternative, and its use will be discontinued as soon as possible.

Indicators are measures or predictors of changes in demand and/or resource availability in the healthcare system that may be based on situational awareness or factors specific to an event. The presence of indicators is detected through monitoring events that may affect the healthcare system and observing changes to the usual resources and usage patterns at the local, regional, and state levels.

Triggers are decision points leading to activation of CSC. Based on changes in resource availability that require adaptations to health care services delivery along the care continuum, these events show that strategies implemented for contingency care are no longer sufficient to provide functionally equivalent care. In this case, an individual hospital or health system should contact the Mass Department of Public Health to discuss if there were any available resources, whether that be supplies, staff, or space, via which a CSC activation could be averted. If that were not available, a CSC would be activated in coordination with the Massachusetts Department of Public Health.

E. Ethical Principles

The allocation framework for critical care services set forth in this document is grounded in ethical obligations that include the duty to care, duty to steward resources, distributive and procedural justice, and transparency. Consistent with accepted standards during public health emergencies, the primary goal of the allocation framework is to maximize benefit to populations of patients.^{7,8} It should be noted that this goal is different from the focus of routine medical care, which is centered on promoting the wellbeing of individual patients.⁹ As described below, the allocation framework operationalizes the broad public health goal by giving priority to patients who are most likely to survive to hospital discharge and beyond with appropriate treatment with critical care resources.

The allocation framework described in this document differs in two important ways from other allocation frameworks. First, it does not categorically exclude any patients who, in usual circumstances, would be eligible for critical care resources. All patients are treated as eligible to receive critical care resources and receive a priority assignment based on illness severity. Second, the allocation framework goes beyond attempting to maximize the number of patients who survive to hospital discharge, because this is a narrow conception of maximizing benefit to the population. Instead, the allocation framework also attempts to maximize the number of life-years saved.

⁶ Definitions taken from: Crisis Standards of Care: A Toolkit for Indicators and Triggers. Board on Health Sciences Policy. Dan Hanfling, John L. Hick, and Clare Stroud, Editors; Institute of Medicine of the National Academies. The National Academies Press. Washington, D.C.; Released: July 31, 2013.

⁷ Childress JF, Faden RR, Gaare RD, et al. Public health ethics: mapping the terrain. *J Law Med Ethics* 2002;30:170-8.

⁸ Gostin L. Public health strategies for pandemic influenza: ethics and the law. *Jama* 2006;295:1700-4.

⁹ Beauchamp TL, Childress JF. *Principles of Biomedical Ethics*. 6th ed. ed. New York, NY: Oxford University Press; 2009.

1. The overarching principle that will guide decision-making regarding use of critical care resources in this or any public health emergency is maximizing overall benefit to populations while handling individual cases fairly.
2. To the extent resources become scarce, maximizing benefit will involve attempting to maximize life years saved, not only attempting to save the most lives. This will involve determinations of eligibility for critical care resources based on a combination of prognosis for short-term survival and prognosis for long-term survival.
3. Characteristics that have no bearing on the likelihood or magnitude of benefit including, but not limited to, race, disability, gender, sexual orientation, gender identity, ethnicity, ability to pay, socioeconomic status, perceived social worth, perceived quality of life, immigration status, incarceration status, homelessness or past or future use of resources are irrelevant and not to be considered by healthcare providers making allocation decisions.
4. There are inherent limitations in our ability to prognosticate and there are innumerable potential individual scenarios that may arise. Establishing a fair process to determine the optimum use of scarce resources will promote ethical decision-making and ensure that similarly situated people are treated similarly. This process must balance use of decision frameworks with application of clinical judgment.
5. There is a duty to care for all patients irrespective of resource scarcity. Critical components of crisis standards of care include transparent, compassionate communication and the best comfort-oriented care including general and sub-specialty palliative care for those who may benefit from it.
6. There are specific ethical issues involved in allocation of critical care resources, particularly when such allocation involves withdrawal of life sustaining treatment. These issues may be particularly pronounced when resources are withdrawn from patients who are already receiving them at the time that a crisis standard of care is initiated. However, in the event of a worsening crisis, adhering to a first come, first-served principle for those who were already receiving intensive care prior to application of the crisis standard may result in unjust allocation of resources. As such, careful assessment and allocation will be necessary in order to maximize benefit during a crisis.
7. As a public health emergency evolves, expansion of critical care capacity by all means possible will be the first measure taken followed by conservation and allocation of critical care resources only if necessary. The timing of implementation of each measure should balance the dual imperatives of (a) minimizing the potential harms related to implementing such measures and (b) implementing the measures in a timely enough fashion that they accomplish the goal of maximizing overall benefit. For healthcare facilities, prior to the implementation of the triage recommendations included in this document, each institution will take all possible steps to extend capacity to deliver critical care resources, including by (a) accumulating supplies; (b) delaying non-urgent

care; (c) preparing to use space, staff and other resources that are not typically used for critical care delivery to deliver critical care; and (d) intensifying efforts to reduce critical care utilization for patients who are significantly unlikely to benefit from it.

IV. Activation of Crisis Standards of Care Planning Guidance for COVID-19

On March 10, 2020, Governor Charles D. Baker declared a State of Emergency to support the Commonwealth's response to COVID-19. On March 11, 2020, in view of the grave threat that COVID-19 presents to the public health, the Public Health Council authorized and directed the Commissioner to act pursuant to G. L. c.17, § 2A, and to take all appropriate actions, incur such liabilities, and establish such rules, requirements, and procedures necessary to prepare for, respond to, and mitigate the spread of COVID-19 in order to protect the health and welfare of the people of Massachusetts.

On March 14, the COVID-19 Response Command Center (Command Center) was established, led by Secretary of the Executive Office of Health and Human Services Marylou Sudders, to serve as the Commonwealth's single point of strategic decision making and coordination for the Administration's comprehensive COVID-19 response. In support of the Command Center, the State Emergency Operations Center has been partially activated, and MEMA's Regional Operations Centers in Tewksbury, New Bedford, and Agawam have been partially activated to support local communities.

In response to COVID-19, the Commissioner activated the MDPH Emergency Operations Plan, which provides the operational framework for the Department's response to all emergencies and disasters that affect the public health and healthcare system in Massachusetts. The Commissioner also activated the MDPH Infectious Disease Emergency Response Plan. An incident command structure was established to ensure internal coordination of gathering and sharing information, respond to resource requests, provide guidance on clinical and laboratory issues, and support other needs related to the response.

Due to the unique nature of healthcare delivery and the uneven distribution of resources across healthcare facilities, the resources at one facility may become exhausted well before another facility. If a healthcare facility becomes, or anticipates becoming, no longer able to provide the usual standard of care, the facility must contact the DPH Duty Officer available 24-7 at (617) 339-8351. The statewide incident command will either direct the triage of patients to a reasonable alternative facility or coordinate the reallocation of resources to the facility in need. Every effort will continue to be made to avoid a situation where the crisis standards need to be utilized.

In such an event, clear and frequent internal and external communication is essential to convey information and maintain situational awareness with hospitals, EMS, alternate care systems, healthcare personnel, and the public. It is important that the public be provided with a clear understanding of CSC concepts such as triage of resources. Public information and messaging must be consistent and timely and be culturally and linguistically accessible to ensure that information reaches individuals who are deaf or hard of hearing, are blind, or have low vision, or have, limited English proficiency.

These guidelines will be deactivated when healthcare facilities are no longer operating at a crisis level. This deactivation will occur when all affected healthcare regions and facilities are able to meet patient

demand using contingency-level surge standards, or when patient transfer or evacuation becomes a feasible tactic to alleviate crisis-level surge at affected healthcare facilities.

V. Strategies for Maximizing Critical Care Resources (Allocation Framework)

Key Triage and allocation principles

For healthcare facilities, each institution may modify its specific triage processes based on its particular resources and circumstances, but each institution will adhere to the core triage principles set out in this document. These include: 1) creation of a triage team to separate triage decisions from bedside clinical decisions; 2) use of a critical care allocation framework that incorporates the scoring system and prioritization categories laid out in this document; 3) reassessment of patients receiving critical care with reallocation of resources where appropriate; and 4) incorporation of an appeals process for decisions to withdraw life-sustaining treatment over the objection of a patient or surrogate.

While other allocation protocols may be in place or could be developed that fulfill the ethical principles outlined in Section II.E, there are profound advantages to having a uniform protocol across Massachusetts. Most importantly, maintaining the trust of the public requires that the allocation of scarce critical care resources should be uniform across the Commonwealth.

Creation of Triage Teams

Separation of triage role from clinical role

Each acute care hospital should define a Triage Team whose responsibility it is to implement the allocation framework described below. Patients' treating physicians should not make triage decisions. A Triage Team with expertise in the allocation framework, which is grounded in public health ethics, should make allocation decisions. The separation of the triage role from the clinical role is intended to enhance objectivity, avoid conflicts of commitments, and minimize moral distress.

Triage Officers

A group of Triage Officers should be physicians with established expertise in the management of critically ill patients, leadership ability, and effective communication and conflict resolution skills will be appointed at each hospital. If available at an institution, pediatric intensivists and neonatologists will serve as Triage Officers for children and newborns, respectively. Triage Officers will oversee the triage process, assess all patients, assign a level of priority for each, communicate with treating physicians, and direct attention to the highest-priority patients. Triage Officers will make decisions according to the allocation framework described below, which is designed to benefit the greatest number of patients, even though these decisions may not necessarily be best for some individual patients. The Triage Officers will have the responsibility and authority to make decisions about which patients will receive the highest priority for receiving critical care. They will also be empowered to make decisions regarding reallocation of critical care resources when patients experience substantial clinical deteriorations after being allocated critical care interventions. In carrying out these

responsibilities, the Triage Officers will communicate clearly with bedside nurses, physicians and other clinicians. In the event that triage decisions must be made that involve adults, children, and newborns, the Triage Officers appropriate for each age group involved will collaborate to determine respective priority levels.

Triage Officers will be nominated by the chairs/directors of the clinical departments within each hospital that provide care to critically ill patients, the chief medical officer, the chief of medical affairs, the President of the Medical Staff, the hospital's diversity officer and/or other administrative leadership at each hospital. The Chief Medical Officer and the individual responsible for Emergency Management should approve all nominees. A roster of approved Triage Officers should be maintained that is large enough to ensure that Triage Officers will be available on short notice at all times and that each physician will have sufficient rest periods between shifts.

Triage Team

There will be a Triage Team whose role it will be to provide information to the Triage Officer(s) making individual triage decisions, to help facilitate and support their decision-making process, to assist in the identification of patients receiving critical care who need to be reassessed, and to document, review and report out to hospital leadership how triage is being conducted.

Composition: The Triage Team should consist of at least one nurse with supervisory experience and one administrative staff member. Depending on the resources of the institution, the Triage Team should ideally include a critical care physician (or other physician with experience in triaging critically ill patients) separate from the Triage Officer(s).

Roles: The nurse and critical care physician will aggregate information, review patients who are currently receiving critical care and will require reassessment under the allocation framework, serve as liaisons with the leadership of all the intensive care units, and assist in troubleshooting implementation of the allocation framework.

The administrative staff member will conduct data-gathering activities, documentation, and record keeping. The staff member must be provided with appropriate computer and IT support to maintain updated databases of patient priority levels and scarce resource usage and availability (total numbers, location, and type).

Supporting roles: A representative from hospital administration should also be linked to the Triage Team in order to supervise maintenance of accurate records of priority scores and to serve as a liaison with hospital leadership. As hospital resources permit, there may be representatives from social work, chaplaincy and palliative care who are linked to the Triage Team to assist in coordinating psychosocial support and/or intensive symptom management for patients and families in situations where critical care resources cannot be offered or need to be reallocated.

Triage mechanism

The Triage Officer(s) will use the allocation framework to determine priority scores of all patients eligible to receive the scarce critical care resource. For patients already being supported by the scarce

resource, the evaluation will include reassessment to evaluate for clinical improvement or worsening at pre-specified intervals, as detailed below. The Triage Officers, with assistance from the triage team, will review the comprehensive list of priority scores for all patients and will communicate with the clinical teams immediately after a decision is made regarding allocation or reallocation of a critical care resource.

Triage Review and Oversight Committee

There will be a Triage Review and Oversight Committee made up of individuals selected from among the following: Chief Medical Officer (or his/her designee), Chief Nursing Officer (or his/her designee), Legal Counsel, member of Ethics Committee leadership, a designated off-duty Triage Officer.

The roles of the Triage Review and Oversight Committee will be: 1) to hear appeals of individual decisions to withdraw life sustaining treatment; 2) to review at regular intervals the triage process and appeals process to determine whether the triage and appeals processes are being conducted in a fair, effective and timely manner; and 3) to adjudicate disputes or controversies that may arise, including in the breaking of ties.

The Triage Review and Oversight Committee will have the ability to convene immediately when needed.

Communication of triage decisions to patients and families

The Triage Officer (or designee) will first inform the affected patient's attending physician about the triage decision. The Triage Officer (or designee) and attending physician, in conjunction with bedside or supervisory nursing staff, will collaboratively determine the best approach to inform the individual patient, family or emergency contact. As a default, the attending physician and Triage Officer (or designee) will conduct this conversation together with the attending physician explaining the severity of the patient's condition in an emotionally supportive way and the Triage Officer (or designee) explaining the implications of those facts in terms of the triage decision. If visitor restriction policies are in place, reasonable effort should be made to contact the patient's family or emergency contact. The Triage Officer (or designee) should also emphasize that the triage decision was not made by the attending physician but is instead one that arose from the extraordinary emergency circumstances, and reflected a public health decision. It may also be appropriate to explain the medical factors that informed the decision, as well as the factors that were not relevant (e.g., race, ethnicity, insurance status, perceptions of social worth, immigration status, etc.). Other options for communicating a triage decision include 1) the Triage Officer conducts the conversation; or 2) the attending physician conducts the conversation. To the extent possible within the constraints of the institution's resources, social workers, chaplains and/or palliative care clinicians may also be present when the triage decision is communicated.

Allocation process for ICU admission/ventilation

This section describes the framework that will be used to make initial triage decisions for patients who present with illnesses that typically require critical care resources. The scoring system detailed below applies to all patients presenting with critical illness, not simply those with the disease or disorders that arise from the public health emergency. This triage process involves several steps, detailed below:

1. Calculating each patient's priority score based on the multi-principle allocation framework;
2. Assigning each patient to a priority group (to which hospitals may assign color codes); and
3. Determining on a frequent basis how many priority groups will receive access to critical care interventions.

Initial assessment

First responders and bedside clinicians should perform the immediate stabilization of any patient in need of critical care, as they would under normal circumstances. Along with stabilization, temporary ventilator support may be offered to allow the Triage Officer time to assess the patient for critical care resource allocation. Every effort should be made to complete the initial triage assessment within 90 minutes of the recognition of the need for critical care resources

Ethical goal of the allocation framework

Consistent with accepted standards during public health emergencies, the primary goal of the allocation framework is to maximize benefit to populations of patients.

Step 1: Calculation of each patient's priority score using the multi-principle allocation framework

A. Priority Scoring for Adult Patients (18 and over)

This allocation framework is based on two considerations: 1) saving the most lives; and 2) saving the most life-years. Patients who are more likely to survive with intensive care are prioritized over patients who are less likely to survive with intensive care. Patients who do not have serious comorbid illness are given priority over those who have illnesses that limit their life expectancy. As summarized in Table 1, the Sequential Organ Failure Assessment (SOFA) score is used to characterize patients' prognosis for hospital survival. The presence of significant life-limiting comorbid conditions is used to characterize patients' longer-term prognosis.

Points are assigned for SOFA score category (1-4 points) and the presence of comorbid conditions (2 points for major life-limiting comorbidities, 4 points for severely life-limiting comorbidities (Table 2)). These points are then added together to produce a total priority score, which ranges from 1 to 8. Lower scores indicate higher likelihood to benefit from critical care; priority will be given to those with lower scores.

Table 1: Multi-principle Strategy to Allocate Critical Care to Adult Patients During a Public Health Emergency

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 with substantial impact on long-term survival	...	Severe comorbid conditions; death likely within 1 year

SOFA = Sequential Organ Failure Assessment

*Persons with the lowest cumulative score will be given the highest priority to receive critical care services.

Regarding the use of the SOFA score as a marker of prognosis for short-term survival, there are several objective scoring systems used to assess severity of critical illness and likelihood of survival, but each has limitations and all should be applied in the context of clinical judgment.

Other scoring considerations:

1. Pregnancy: Pregnant patients will be assigned a priority score based on the same framework used for non-pregnant patients. If a pregnant patient is at or beyond the usual standards for fetal viability, the patient will be given a two-point reduction, giving her a higher priority score.
2. Limited data: If laboratory values or other elements needed for the priority score are not available prior to the need for a time sensitive decision by the Triage Officer, the Triage Officer will do his/her best to approximate a priority score
3. Individuals who perform tasks that are vital to the public health response, including all those whose work directly to support the provision of care to others, should be given heightened priority. This category should be broadly construed to include those individuals who play a critical role in the chain of treating patients and maintaining societal order.

B. Approach to Pediatric Patients (< 18 years of age)

When disasters affect adults more than children (e.g., COVID-19 pandemic), the care of pediatric patients should be concentrated in large pediatric centers, thereby allowing hospitals that treat both

adults and children to devote more resources to adult patients. If CSC triage guidelines are in effect, pediatric ICU patients may be stabilized in their local combined hospital emergency departments and then transferred to the pediatric center where the triage can occur by an expert pediatric/neonatal triage team.

Scoring systems that are meaningful for adult critical care patients do not apply to pediatric patients or newborns. While there are similar scoring systems for pediatric and neonatal patients, they are less reliable as the basis for determining priority for several reasons. During normal, non-CSC times, most children requiring critical care and mechanical ventilation have a much higher likelihood of survival to hospital discharge than adults who require these interventions and therefore most will have favorable scores. Moreover, many children who require neonatal or pediatric critical care have chronic medical and surgical conditions, some congenital and some acquired. Many of these are rare conditions that require multi-specialist expertise, and the interplay between the underlying disease and the current illness is not captured by any scoring system. Finally, within the small range of ages included under the umbrella of pediatrics, patient age is not a meaningful factor to distinguish priority for ventilators or critical care.

For these reasons, experienced pediatric intensivists and neonatologists serving as Triage Officers should exercise clinical judgment in assigning priority scores for children. Triage Officers will focus on the likelihood of surviving the current admission and will also take into account conditions that are expected to severely limit survival in the near-term regardless of whether the patient recovers from the episode of critical illness. Triage should be guided by the acute severity of the patient's current medical condition, the epidemiology of the disease, and the current status of any underlying medical diseases that may hinder recovery. Triage Officers may use validated scoring systems (e.g., PELOD-2, modified pediatric SOFA, SNAPPE-II) to aid in their assigning of priority scores. Triage Officers should not factor a patient's pre-hospitalization quality-of-life or predictions of future quality-of-life into the assignment of priority scores.

Points are assigned for prospect of short-term survival (1-4 points) and the presence of comorbid conditions (3 points for severe comorbidities with life expectancy < 1 year and 4 points for conditions expected to be non-survivable during the hospital admission (Table 3)). These points are then added together to produce a total priority score, which ranges from 1 to 8. Lower scores indicate higher likelihood to benefit from critical care; priority will be given to those with lower scores.

C. Other Considerations

In determining the priority score for a patient, the Triage Officer(s) may by necessity as part of the evaluation have access to characteristics that have no bearing on the likelihood or magnitude of benefit (including but not limited to: race, disability, gender, sexual orientation, gender identity, ethnicity, ability to pay, socioeconomic status, perceived social worth, perceived quality of life, immigration status, or past or future use of resources). Triage Officers must not consider such characteristics in any way in making priority determinations.

Table 2: Multi-principle Strategy to Allocate Critical Care to Pediatric Patients During a Public Health Emergency

Principle	Specification	Point System*			
		1	2	3	4
Save the most lives	Prognosis for short-term survival	75-100% chance of short-term survival	50-75% chance of short-term survival	25-50% chance of short-term survival	0-25% chance of short-term survival
Save the most life-years	Prognosis for long-term survival (medical assessment of comorbid conditions)	...		Severe comorbid conditions; death likely within 1 year	Conditions expected to be non-survivable during this admission

Step 2: Assign patients to color-coded priority groups

Once a patient’s priority score is calculated using the multi-principle scoring system described in Table 2, each patient will be assigned to a color-coded triage priority group, which should be noted clearly on their chart/EHR (Table 3). This color-coded assignment of priority groups is designed to allow Triage Officers to create operationally clear priority groups to receive critical care resources, according to their score on the multi-principle allocation framework. For example, individuals in the Red group have the best chance to benefit from critical care interventions and should therefore receive priority over all other groups in the face of scarcity. The Orange group has intermediate priority and should receive critical care resources if there are available resources after all patients in the Red group have been allocated critical care resources. The Yellow group has lowest priority and should receive critical care resources if there are available resources after all patients in the Red and Orange groups have been allocated critical care resources. The priority scoring process should be consistent across organizations, although specific color codes used to designate priority group may vary.

All patients other than those who are thought to be imminently dying regardless of critical care interventions will be *eligible* to receive critical care beds and services regardless of their priority score. The availability of critical care resources will determine how many eligible patients will receive critical care. Patients who are not triaged to receive critical care/ventilation will receive medical care that includes intensive symptom management and psychosocial support. They should be reassessed daily to determine if changes in resource availability or their clinical status warrant provision of critical care services.

Where available, specialist palliative care teams will be available for consultation. Where palliative care specialists are not available, the treating clinical teams should provide primary palliative care.

Step 2- Use Priority Score from Multi-principle Scoring System to Assign Priority Category	
Level of Priority and Code Color	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

Step 3: Make daily determination of how many priority groups can receive the scarce resource

Hospital leaders and the Triage Team will make determinations twice daily, or more frequently if needed, about what priority groups will have access to critical care services. These determinations will be based on real-time knowledge of the degree of scarcity of the critical care resources, as well as information about the predicted volume of new cases that will be presenting for care over the following several days. For example, if there is clear evidence that there is an imminent shortage of critical care resources (i.e. few ventilators available and large numbers of new patients daily), only patients in the highest priority group (Red group) should receive the scarce critical care resource. As scarcity subsides, additional priority groups (e.g. first Orange group, then Yellow group) should have access to critical care interventions.

There may be situations in which the hospital determines that it will offer critical resources to a certain priority group on a given day, and then there are not enough critical care resources for all patients within that priority group to receive them. In such a case, the raw priority scores will determine the priority order for patients in the same priority group (the lower the score, the higher the priority). In some circumstances, it may be ethically permissible to conserve scarce critical care resources during times of high demand to assure that the resources are available to those with the best prognoses.

Other considerations:

1. Resolving “ties” in priority scores between patients. In the event there are ties between patients (“tie” being defined at the discretion of each organization as either two patients in the same priority group or two patients with the exact same numerical priority score), life-cycle considerations should be used as a tiebreaker, with priority going to younger patients (first priority age 0-17; second priority age 18-49; third priority age 50-65; fourth priority age 65-80; fifth priority age > 80). The ethical justification for using the lifecycle principle as a tiebreaker is that it is a valuable goal to give individuals equal opportunity to pass through the stages of life — childhood, young adulthood, middle age, and old age.¹⁰ There is precedent for incorporating life-cycle considerations into pandemic planning. The U.S. Department of Health and Human Services’ plan to allocate vaccines and antivirals during an influenza pandemic prioritizes infants and children over adults.¹¹ Empirical data suggest that, when individuals are asked to consider situations of absolute scarcity of life sustaining resources, most believe younger patients should be prioritized over older ones.¹² Public engagement about allocation of critical care resources during an emergency also supported the use of the lifecycle principle for allocation decisions.¹³ Harris summarizes the moral argument in favor of life-cycle-based allocation as follows: “It is always a misfortune to die . . . it is both a misfortune and a tragedy [for life] to be cut off prematurely.”¹⁴

If there are still ties after applying priority based on life cycle, a lottery (i.e. random allocation) should be used to break the tie.

While age may break ties between an adult and pediatric patient, age should not serve as a tiebreaker between two patients under the age of 18.

2. Categorical exclusion criteria and non-survivable conditions: A central feature of this allocation framework is that it avoids the use of categorical exclusion criteria to indicate individuals who should not have access to critical care services under any circumstances during a public health emergency. There are some conditions that lead to immediate or near-immediate death despite aggressive therapy (e.g., cardiac arrest unresponsive to appropriate ACLS, overwhelming traumatic injuries or burns, advanced and irreversible neurologic event, intractable shock). During a public health emergency, clinicians should still make clinical judgments about the appropriateness of critical care using the same criteria they use during normal clinical practice and, to the extent critical care utilization would be deemed non-beneficial during normal clinical practice, it should not be offered during a public health emergency. Triage Officers and attending physicians will make clear in communicating with families

¹⁰ Emanuel EJ, Wertheimer A. Public health. Who should get influenza vaccine when not all can? *Science* 2006;312:854-5.

¹¹ Rosenbaum SJ, Bayer R, Bernheim RG, et al. Ethical considerations for decision making regarding allocation of mechanical ventilators during a severe influenza pandemic or other public health emergency. Atlanta: Centers for Disease Control and Prevention, 2011.

¹² Neuberger J, Adams D, MacMaster P, Maidment A, Speed M. Assessing priorities for allocation of donor liver grafts: survey of public and clinicians. *Bmj* 1998;317:172-5.

¹³ Daugherty Biddison EL, Gwon H, Schoch-Spana M, et al. The community speaks: understanding ethical values in allocation of scarce lifesaving resources during disasters. *Annals of the American Thoracic Society* 2014;11:777-83.

¹⁴ Harris J. *The Value of Life*. London: Routledge and Kegan Paul; 1985.

whether critical care is not being offered based on the existence of a non-survivable medical condition or based on the allocation framework.

Reassessment for ongoing provision of critical care/ventilation

The purpose of this section is to describe the process the triage team will use to conduct reassessments on patients who are receiving critical care services, in order to determine whether he/she continues with the treatment.

Ethical goal of reassessment of patients who are receiving critical care services

In a public health emergency, when there are not enough critical care resources for all, the goal of maximizing population outcomes would be jeopardized if patients who were determined to be unlikely to survive were allowed indefinite use of scarce critical care services. In addition, periodic reassessments lessen the chance that arbitrary considerations, such as when an individual develops critical illness, unduly affect patients' access to treatment.

Approach to reassessment

All patients who are allocated critical care services (other than those who receive critical care briefly to allow for initial triage by a Triage Officer and are subsequently determined to be unable to receive critical care based on priority assignment) will be allowed a therapeutic trial of a duration to be determined by the clinical characteristics of the patient's disease and the expected trajectory of recovery. To the extent that the public health emergency involves a novel disease, the decision about trial duration for patients with that novel disease will ideally be made as early in the public health emergency as possible, when data become available about the natural history of the disease. The trial duration for such patients should be modified as appropriate if subsequent data emerge which suggest the trial duration should be longer or shorter.

The Triage Team will conduct periodic reassessments of all patients receiving critical care/ventilation. These assessments will involve re-calculating SOFA scores and consulting with the treating clinical team regarding the patient's clinical trajectory. Patients showing improvement will continue with critical care/ventilation until the next assessment. If there are patients in the queue for critical care services, then patients who upon reassessment show substantial clinical decline as evidenced by worsening SOFA scores or overall clinical judgment, or demonstrate a failure to progress towards discharge from an intensive care unit, should not receive ongoing critical care/ventilation. Although patients should generally be given the full duration of a trial, if patients experience a precipitous decline (e.g. refractory shock and DIC) or a highly morbid complication (e.g. massive stroke) that portends a very poor prognosis, the Triage Team may make a decision before the completion of the specified trial length that the patient is no longer eligible for critical care treatment.

Patients who are no longer prioritized for critical care treatment should receive medical care including intensive symptom management and psychosocial support. If available, specialist palliative care teams will be available for consultation.

This approach to reassessment will apply to all patients receiving critical care resources, including those who were already receiving critical care resources at the time the allocation framework was activated. The Triage Team will review all patients receiving critical care at the time the allocation framework was activated and will determine in conjunction with bedside clinicians when it is appropriate to reassess those patients.

Rapid reassessment of patients unable to be triaged initially

Those patients who receive critical care services (e.g. mechanical ventilation) emergently in order to allow time for initial triage by a Triage Officer, but who are subsequently determined to be unable to receive critical care based on priority assignment, will receive medical care including intensive symptom management and psychosocial support. They will not receive a full trial of critical care as described above. By way of example, this might include patients intubated in the field, patients intubated emergently in the emergency department, patients with severe trauma stabilized in the emergency department and brought to the ICU, and patients resuscitated on a medical floor in a code situation. The appeals process for withdrawal of critical care described below will not apply to these patients.

Appeals

Appeals process for individual triage decisions

It is possible that patients, families, or clinicians will challenge individual triage decisions. Procedural fairness requires the availability of an appeals mechanism to resolve such disputes.

Initial triage decisions. By necessity, many initial triage decisions will be made in highly time-pressured circumstances. As such, for initial triage decisions, the only appeals that will be entertained are those based on a claim that an error was made by the Triage Officer in the calculation of the priority score. In the event of such an appeal, the Triage Team will verify the accuracy or the priority score by recalculating it.¹⁵

Decisions to withdraw scarce resources: Decisions to withdraw scarce resources (including mechanical ventilation) from a patient who is already receiving critical care may cause heightened moral concern and may also depend on more clinical judgment than initial allocation decisions. Clinicians, patients and surrogates will be informed of their right to appeal any such decisions. If a clinician, patient or surrogate would like to appeal such a decision, the following process will take place.

- The appeal will be immediately brought to the Triage Review and Support Committee.
- The individuals who are appealing the triage decision should explain the grounds for their disagreement with the triage decision. An appeal may not be brought based on an objection to the overall allocation framework.
- The Triage Team should explain the grounds for the triage decision that was made.

¹⁵ Zucker H, Alder K, Berens D, et al. Ventilator allocation guidelines. Albany: New York State Department of Health Task Force on Life and the Law, November 2015 (https://www.health.ny.gov/regulations/task_force/reports_publications/docs/ventilator_guidelines.pdf. opens in new tab).

- The appeals process must occur quickly enough that the appeals process does not harm patients who are in the queue for the scarce resource.
- Three committee members will be needed for a quorum to render a decision, using a simple majority vote. The process can happen by telephone or in person.
- The decision of the Triage Review and Oversight Committee for a given hospital will be final.
- The decision of the Triage Review and Oversight Committee will be documented in sufficient detail to demonstrate that the outcome represents a well-considered decision.

Other Provisions

Communication with staff: Once Hospital Incident Command System (HICS) leadership has determined that the institution is activating the allocation framework, this will be communicated clearly and consistently to all hospital clinical staff.

Consolidation of critical care triage: Once the allocation framework has been activated, critical care triage throughout the institution will be consolidated and the allocation framework will be applied to all critical care triage within the institution.

Early intervention: Once the allocation framework has been activated, every effort should be made to identify early those patients in the hospital who are at high risk of declining to the point of requiring critical care within 24-48 hours. Those patients should be called to the attention of a Triage Officer.

Transparency: Once the allocation framework is activated, clinicians will communicate in transparent language with patients and families about the public health emergency and the need to allocate resources differently than we ordinarily would.

Documentation: All triage decisions made through the Triage Officer and Triage Team will be documented in the medical record. As long as the allocation framework is in effect, the overall allocation of critical care resources within the institution will be documented and reported to promote transparency. When the appeals process is conducted, it will be documented in sufficient detail to demonstrate that the outcome reflects a well-considered decision.

Palliative Care: To the extent the resources of the institution allow, there will be palliative care staff specifically designated to work closely with the Triage Officer and Triage Team and to facilitate development of care plans for patients who require intensive symptom management and psychosocial support.

Cardiopulmonary Resuscitation and Intubation: Any patient who is evaluated by the Triage Team and is determined to be unable to receive scarce critical care resources under the allocation framework will not undergo cardiopulmonary resuscitation or intubation. If circumstances materially change and the patient subsequently is assigned a priority score that would allow receipt of critical care, the clinical management in life-threatening circumstances should be reconsidered.

Use of extracorporeal life support: If the allocation framework is activated, all decisions regarding use of extracorporeal life support (“ECLS”) will be made by the Triage Team in consultation with Hospital Incident Command leadership and critical care ECLS specialists with the goals to reserve this

limited resource for those who would be most likely to benefit from it and to avoid prolonged use in patients who are not showing signs of recovery.

Use of other specific critical care resources: Once the allocation framework is activated, there may be specific critical care resources other than ECLS that become limited (e.g., dialysis, mechanical circulatory support). Once Hospital Incident Command leadership has made this determination, the Triage Team in conjunction with respective clinical are groups (e.g nephrology in the case of dialysis, cardiology and cardiac surgery in the case of mechanical circulatory support) will make all decisions regarding initiation of such specific resources. The goals will be to reserve these resources for those most likely to benefit from them and to avoid prolonged use in patients who are not showing signs of recovery.

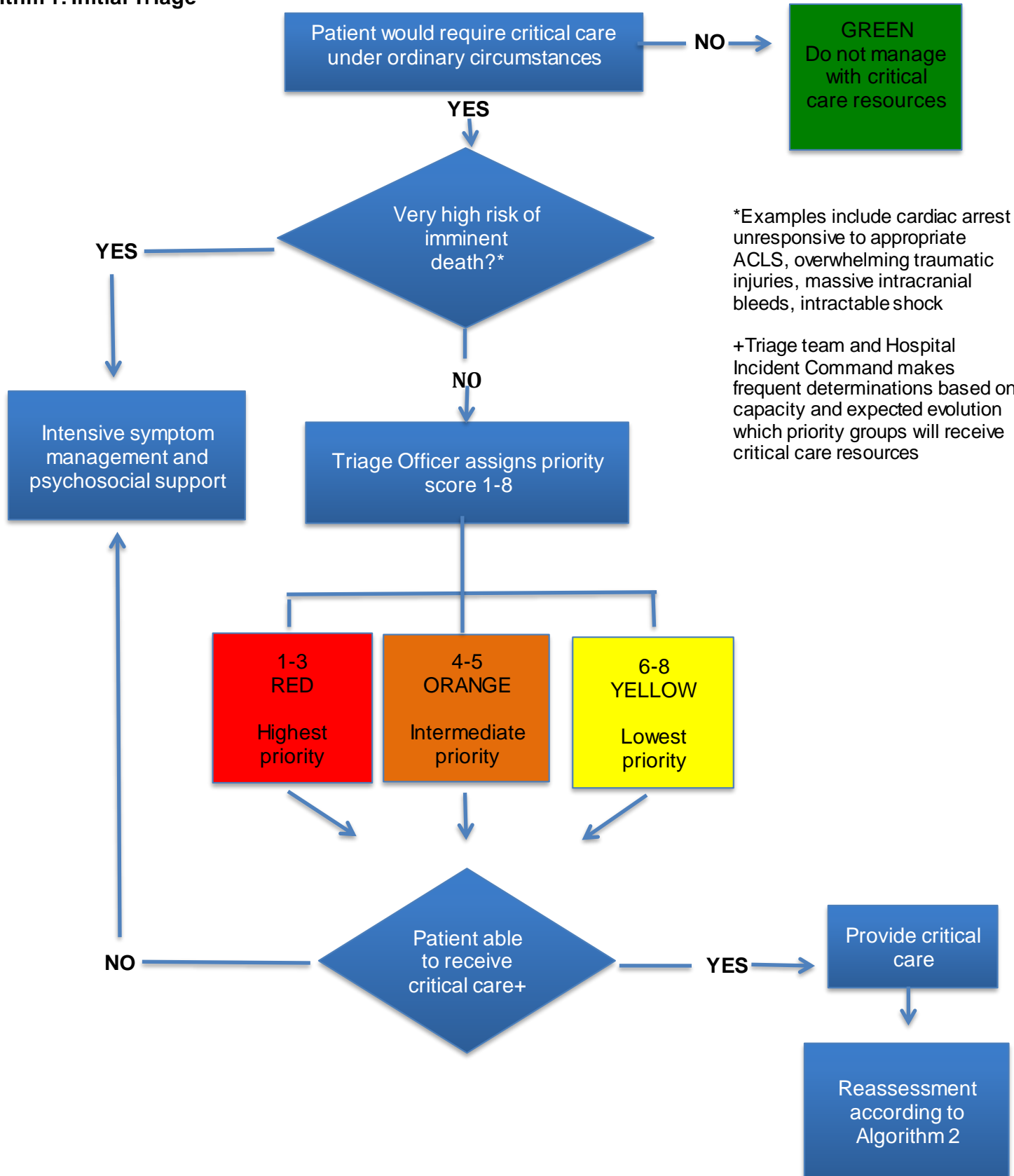
Outside hospital transfers: When the allocation framework is activated, triage of outside hospital requests for an ICU bed will be centralized through the Triage Team. In communicating about a proposed transfer of a patient, the transferring hospital should communicate the priority score of the patient to the receiving hospital.

Suspension of standard hospital policy: The Hospital Incident Commander should suspend hospital policies based on routine operations that are in conflict with this document to the extent these can be identified in a timely fashion.

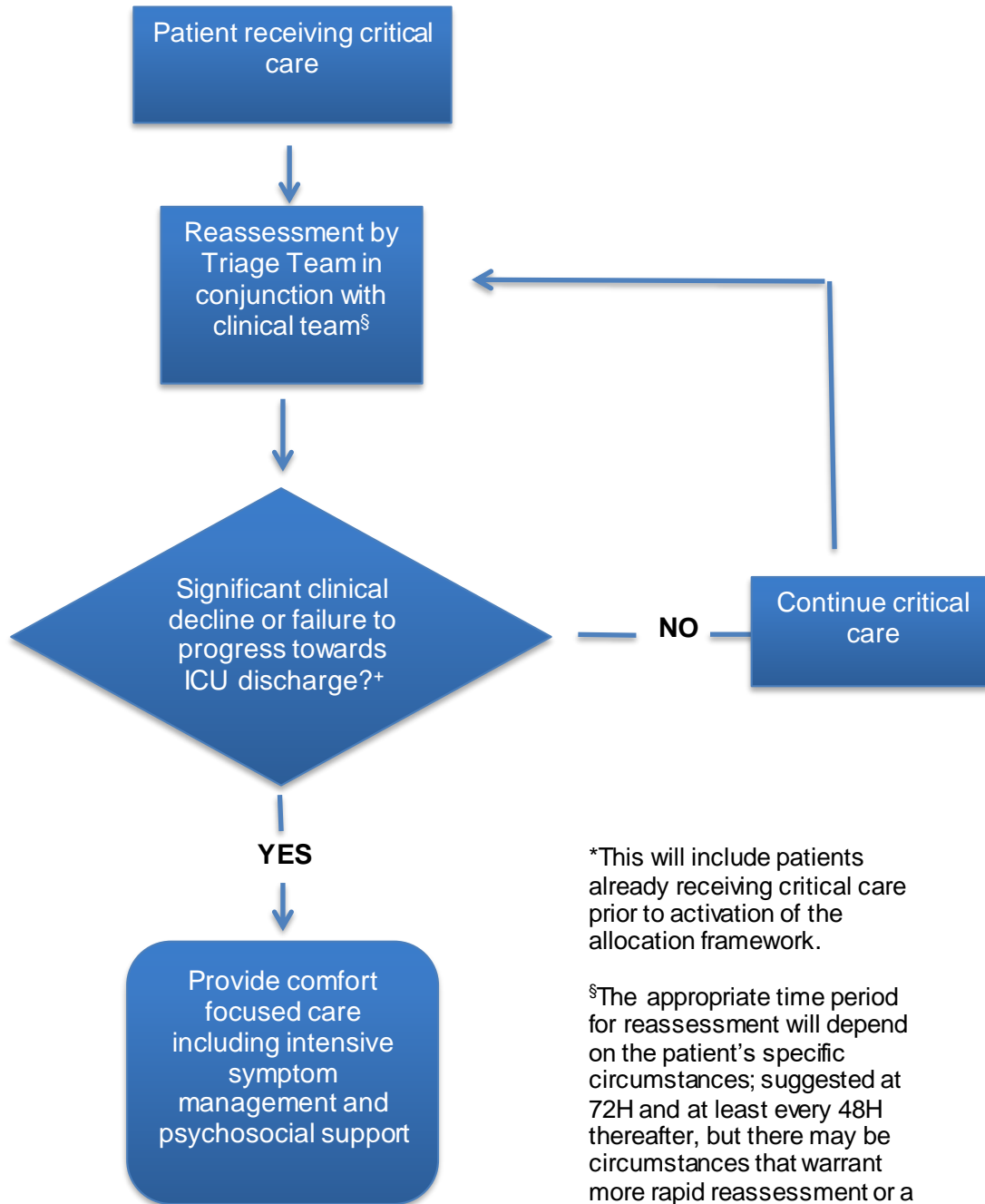
Flexibility and limitations: This document provides a framework for decision-making regarding critical care resources in the event that demand for critical care resources outstrips capacity. In institutions that have a limited number of critical care, ethics or other resources, it may not be possible to follow the precise processes and guidelines outlined in this document. Each institution will follow the processes and guidelines to the extent possible, modifying as necessary to adhere to the spirit of the document given constraints. If the processes laid out in this document need to be modified throughout the course of the public health emergency, any modifications will be done through a fair and transparent process that involves Hospital Incident Command, critical care and ethics leadership.

VI. Appendices and Resources

Algorithm 1: Initial Triage



Algorithm 2: Reassessment of all patients receiving critical care*



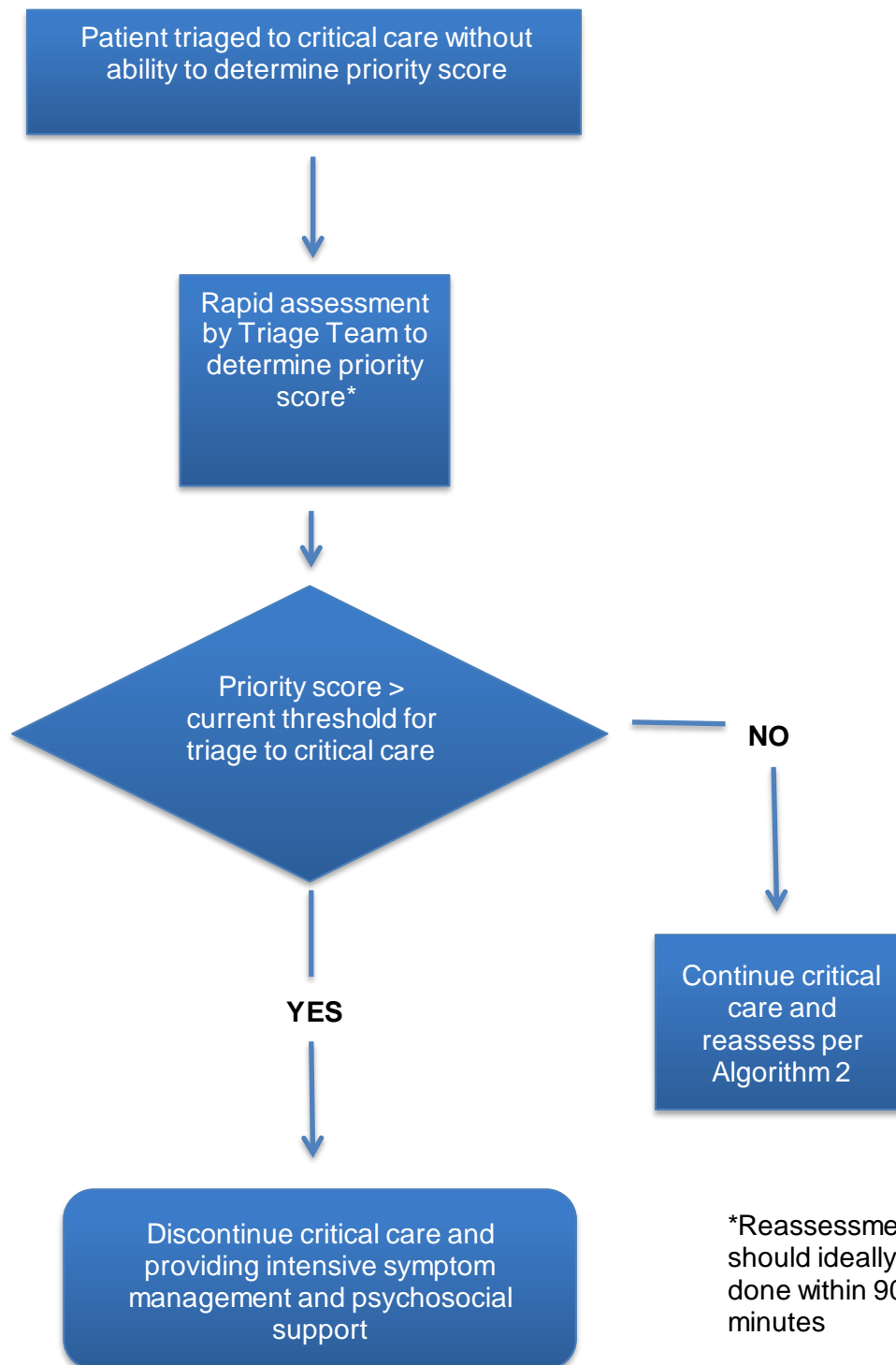
*This will include patients already receiving critical care prior to activation of the allocation framework.

§The appropriate time period for reassessment will depend on the patient's specific circumstances; suggested at 72H and at least every 48H thereafter, but there may be circumstances that warrant more rapid reassessment or a longer trial of critical care prior to reassessment.

+ "Significant clinical decline" will be determined based on a combination of clinical judgment and SOFA score.

Algorithm 3: Rapid reassessment of patients emergently triaged to critical care after initiation of allocation framework

This algorithm applies to situations of “missed triage,” i.e. situations in which patients do not receive a triage score before being triaged to critical care (e.g. patients intubated in the field, patients emergently intubated in the emergency department, patients with no information in the electronic medical record, trauma patients stabilized in the ED prior to ability to triage).



Triage tools

Sequential Organ Failure Assessment (SOFA) Score						
Variable	Score 0	Score 1	Score 2	Score 3	Score 4	Score for each row
PaO₂/FIO₂ ratio*	≥400	< 400	< 300	< 200	< 100	
Platelets/nl	≥150	<150	<100	<50	<20	
Bilirubin, mg/dl	< 1.2	1.2-1.9	2.0-5.9	6.0-11.9	≥12	
Hypotension*	None	MABBP <70	Dop ≤ 5 or dobutamine (any dose)	Dop 5.1-15 or Epi ≤0.1 or Norepi ≤0.1	Dop >15 or Epi >0.1 or Norepi >0.1	
Glasgow Coma Scale	15	13-14	10-12	6-9	<6	
Creatinine level, mg/dl	<1.2	1.2-1.9	2.0-3.4	3.5-4.9 or urine output <500 mL in 24 hours	>5 or urine output <200 mL in 24 hours	
SOFA Score (total from all rows)						

*FIO₂=fraction of inspired oxygen; MAP mean arterial pressure; PaO₂ partial pressure of oxygen

**Hypotension:

- MABP=mean arterial blood pressure in mm Hg [diastolic + 1/3(systolic-diastolic)]
- Dop=dopamine in micrograms/kg/min
- Epi=epinephrine in micrograms/kg/min
- Norepi=norepinephrine in micrograms/kg/min

Functional Assessment Staging (FAST)		
1	No difficulty, either subjectively or objectively	Normal
2	Complains of forgetting location of objects; subjective word finding difficulties only	Normal Aged Adult
3	Decreased job function evident to coworkers; difficulty in traveling to new locations	Mild Cognitive Impairment
4	Decreased ability to perform complex tasks (e.g., planning dinner for guests; handling finances; marketing)	Mild AD
5	Requires assistance in choosing proper clothing to wear for the day, season, or occasion	Moderate AD
6	6a. Improperly putting on clothes without assistance or cuing 6b. Unable to bathe properly without assistance 6c. Inability to handle mechanics of toileting 6d. Urinary incontinence 6e. Fecal incontinence	Moderately Severe AD
7	7a. Ability to speak limited to approximately a half a dozen intelligible different words or fewer in an average day 7b. Speech ability limited to the use of a single intelligible word in an average day 7c. Non-ambulatory 7d. Unable to sit up without assistance 7e. Unable to smile. 7f. Unable to hold up head	Severe AD

Glasgow Coma Scale Scoring Criteria			
Criteria		Score	Criteria Score
Eye Opening Response	No eye opening	1	---
	To pain only	2	
	To verbal stimuli	3	
	Spontaneous	4	
Verbal Response	No response	1	---
	Incomprehensible	2	
	Inappropriate words	3	
	Confused conversation but able to answer questions	4	
	Oriented	5	
Motor Response	No response	1	---
	Extension response in response to pain	2	
	Flexion response in response to pain	3	
	Withdraws in response to pain	4	
	Purposeful movement in response to pain	5	
	Obeys commands for movement	6	
Total Score (range 3-15)			

MELD Score	
Calculation	MELD = 3.78×ln[serum bilirubin (mg/dL)] + 11.2×ln[INR] + 9.57×ln[serum creatinine (mg/dL)] + 6.43
Notes	<p>MELD scores are reported as whole numbers, so the result of the equation above is rounded.</p> <p>UNOS has made the following modifications to the score:</p> <ul style="list-style-type: none"> •If the patient has been dialyzed twice within the last 7 days, then the value for serum creatinine used should be 4.0 mg/dL •Any value less than one is given a value of 1 (i.e. if bilirubin is 0.8 a value of 1.0 is used) to prevent subtraction from any of the three factors, since the natural logarithm of a positive number below 1 (greater than 0 and less than 1) yields a negative value.
Interpretation	<p>40 or more — 71.3% observed mortality</p> <p>30–39 — 52.6% observed mortality</p> <p>20–29 — 19.6% observed mortality</p> <p>10–19 — 6.0% observed mortality</p> <p><9 — 1.9% observed mortality</p>

New York Heart Association (NYHA) Classification	
Class I (Mild)	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation (rapid or pounding heart beat), dyspnea (shortness of breath), or anginal pain (chest pain).
Class II (Mild)	Slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea, or anginal pain
Class III (Moderate)	Marked limitation of physical activity. They are comfortable at rest. Less than ordinary activity causes fatigue, palpitation, dyspnea, or anginal pain.
Class IV (Severe)	Unable to carry on any physical activity without discomfort. Symptoms of heart failure or the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased.

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