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CODE VENT Triage Plan To Manage Scarcity of Ventilators During a Public Health Emergency

Introduction

In the event of an overwhelming public health emergency, the primary goal of the health care system is to save as many lives and life-years as possible. The purpose of this document is to provide guidance for the allocation of ventilators to critically ill patients presenting to the emergency department in the event that a public health emergency creates demand for ventilators that outstrips the supply. These triage recommendations will be enacted only if: 1) ventilator capacity is, or will shortly be, overwhelmed despite taking all appropriate steps to increase the surge capacity to care for patients needing mechanical ventilator support; and 2) a regional authority has declared a public health emergency. This triage framework is consistent with the system policy for allocating scarce critical care resources, including ventilators, to patients in the hospital setting during a public health emergency.

Consistent with accepted standards during public health emergencies, the primary goal of the allocation framework is to maximize benefit to populations of patients, often expressed as doing the greatest good for the greatest number. It should be noted that this goal is different from the traditional focus of medical ethics, which is centered on promoting the wellbeing of individual patients. As described below, the triage framework operationalizes the broad public health goal by giving priority for ventilators and consequent critical care resources to patients who are most likely to survive to hospital discharge and beyond with treatment.

This document describes: 1) the creation of triage teams to support clinicians and ensure consistent decision making; 2) criteria for initial triage of patients in need of mechanical ventilation.

Section 1. Structure and Qualifications of Triage Teams

The purpose of this section is to provide guidance to create a local triage team whose responsibility is to implement the triage framework described in Section 2. It is important to emphasize that emergency medicine specialists treating patients should not make the ventilator-related triage decisions described herein. These decisions are grounded in public health ethics, not clinical ethics, and therefore a triage team with expertise (and ideally training) in the triage framework should make triage decisions impacted by ventilator scarcity. The separation of the triage role from the clinical role is intended to enhance objectivity, avoid conflicts of commitments, and minimize moral trauma and distress.

Triage Team Leader

The triage leaders will be appointed by the local hospital Incident Command, but notably must be willing to serve in this role. Because this CODE VENT situation during the COVID19 pandemic is expected to exceed 12 hours of duration, two triage leaders must be appointed so they can alternate shifts. The triage leaders should be the most senior physicians available with the skills needed to perform this task based on prior experience in leadership, resuscitation or emergency preparedness. They also should already be identifiable leaders in the reporting structure of the primary caregivers.

The triage leader will oversee the triage process for the relevant patients, assign a level of priority for each, communicate with treating physicians, and direct attention to the highest-priority patients. He or she is expected to make decisions according to the triage 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. To optimize effective functioning in a crisis, the triage leader should ideally be well prepared and trained in advance by means of disaster drills or exercises. The triage leader has the responsibility and authority to make decisions about which patients will have the highest priority for receiving mechanical ventilator therapy in the emergency department. The triage leader will assist the local Incident Command in the selection of the other triage team members.

Triage Team Officers

During the COVID19 pandemic CODE VENT, it is anticipated that the number of patients arriving or requiring assessment by the triage leader may exceed their capacity to rapidly triage, evaluate and render a decision. Additional triage team officers should be appointed should this occur. These individuals will be selected by the triage leader, report to the triage leader, and perform the triage activities described below on his/her behalf to expand the capacity of the triage process.

Additional Triage Team Support

A representative from the regional allocation team should serve as a liaison to the triage team to ensure that triage team members have accurate information regarding the availability of ventilators and the current census and priority grouping of hospital patients in the queue for ventilators. A representative from the hospital's Incident Command should also be linked to the team, in order to serve as a liaison with hospital leadership. A representative from an ethics support service within the region also shall be available for additional support.

Quality Assurance

Team decisions and supporting documentation should be reported daily to appropriate BILH leadership and BILH incident command. This system group will review decisions to confirm consistent and unbiased application of the triage criteria across the system, and to ensure the triage mechanism is not inadvertently creating or furthering inequities between groups (e.g., race, physical abilities, socioeconomic status, etc.).

Triage Mechanism

The triage leader and triage officers will use the triage framework, detailed in Section 2, to determine priority scores of all patients whose ideal care would involve a ventilator. The triage team should be as blinded and unbiased as possible, particularly with regard to patient demographic details that are unrelated to the clinical determination. The triage leader will review the comprehensive list of priority scores for all patients in the emergency department and, through communication with the regional allocation officer, for patients already admitted to the hospital. The triage leader then will communicate with the emergency medicine clinical teams immediately after a decision is made regarding use of a ventilator.

Communication of triage decisions to patients and families

Although the *authority* for triage decisions rests with the triage leader or triage officer (as applicable), there are several potential strategies to *communicate* triage decisions to patients and families. Communication or disclosure of such triage decisions to patients and/or their next of kin is a required component of a fair allocation process that provides respect for persons. The triage leader should first inform the affected patient's treating emergency medicine specialist about the triage decision. Those two physicians should collaboratively determine the best approach to inform the individual patient and family. Options for who should communicate the decision include: 1) solely the attending physician; 2) solely the triage leader; or 3) a collaborative effort between the attending physician and triage leader. The best approach will depend on a variety of case-specific factors, including the dynamics of the individual doctor-patient-family relationship and the preferences of the attending physician. Under the third (collaborative) approach, the attending physician would first explain the severity of the patient's condition in an emotionally supportive way, and



then the triage leader would explain the implications of those facts in terms of the allocation decision. The triage leader would also emphasize that the allocation decision was not made by the attending physician but is instead one that arose from the extraordinary emergency circumstances, and reflect a public health decision. Regardless of who communicates the decision, it may be useful to explain the medical factors that informed the decision, as well as the factors that were not relevant (e.g., race, ethnicity, gender, insurance status, perceptions of social worth, immigration status, etc.). If resources permit, palliative care clinicians or social workers should be present or available to provide ongoing emotional support to the patient and family.

A script to be provided for both clinician and triage officer is included at the end of this document.

Section 2. Triage process for ventilation in the emergency department

The purpose of this section is to describe the triage framework that should be used to make initial triage decisions for patients who present with illnesses that typically require mechanical ventilation. The scoring system applies to all patients presenting with a potential need for mechanical ventilation, not merely those with COVID19.

To be clear, emergency medicine specialists should perform the immediate stabilization of any patient in need of critical care, as they would under normal circumstances or this CODE VENT policy, if time permits. Every effort should be made to stabilize the patient without the use of a scarce ventilator. Temporary ventilatory support may be offered to allow the triage leader to assess the patient for critical resource allocation, in accordance with the steps below. When recognizing that a patient may shortly need mechanical ventilation, Emergency medicine specialists should trigger a Code Vent that alerts the triage team of a patient in need of assessment for mechanical ventilation.

During a Code Vent scenario, patients arriving in asystolic cardiac arrest will not have resuscitative efforts continued in the ED as their prognosis is poorest and ventilator resources will be unavailable for prolonged resuscitative efforts. Patients that may not be in respiratory distress on initial evaluation but would have low priority once they decompensate should have early social work involvement for careful consideration of goals of care and code status with consideration of comfort measures only (CMO) status if they were to decompensate.

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 for populations of patients, often expressed as “doing the greatest good for the greatest number.”

DEPLOYMENT OF A CODE VENT PROCESS

Step 1: Coordination with Regional Allocation Team (Only if Time Permits)

If time permits, the regional allocation team operating under the BILH Policy on Allocation of Scarce Critical Care Resources During a Public Health Emergency should be contacted prior to starting a patient on a ventilator when ventilators are a scarce resource. The regional allocation team will work with the triage leader to determine the patient’s priority score, using the regional allocation team’s scoring criteria (**Addendum 1**) if time permits, and whether the patient should be allocated a ventilator in light of the hospital ventilator availability and patients in queue for such.

Step 2: Calculate Relevant Patients' Scores and Assign to Priority Groups

The triage leader or triage officer will use the allocation framework to determine the priority scores of all patients in the emergency department potentially requiring mechanical ventilation. For patients already being mechanically ventilated, their primary caregivers will perform a reassessment to evaluate for clinical improvement or worsening at pre-specified intervals, (see **Reassessment for ongoing provision of critical care/ventilation**). Based on the priority score, patients will be assigned to one of three color coded priority groups in descending priority (see Patient Priority Score):

This triage framework is based primarily on two considerations: 1) saving the most lives; and 2) saving the most life-years. Patients who are more likely to survive with ventilator support and consequent intensive care are prioritized over patients who are less likely to survive with ventilator support and/or intensive care. Patients who do not have serious comorbid illness are given priority over those who have illnesses that limit their life expectancy.

To be of use in the ED a scoring system needs to be both easy to calculate and not be overly dependent on lab or imaging information which may not be immediately available; Patients arrive to the ED unannounced and often with limited information accompanying them. Nonetheless, the goal of this abbreviated scoring system is to produce a priority score (and consequently, priority grouping) for patients consistent with the priority score the patient would receive through the regional allocation team criteria with more clinical information and time for consideration. We recognize that 100% consistency is unlikely, but the two teams will complete pre-testing (as time permits) and retrospective review to determine what revisions to this scoring system are necessary to improve consistency.

Patients will be reassessed at intervals dependent on their clinical status and rescored once more information is available. Again, if time permits the rescoring will be based on the regional allocation criteria, and otherwise will be based on the scoring criteria outlined herein.

The following point system will be utilized for scoring patients based on 4 separate domains. Each domain should be given a score and a final score reached by adding the scores from I-IV. That score will then be used to place the patient in one of the priority levels described in triage.

Point System (Points in parentheses)

(Table format of this same information follows)

- I. Survivability based on Baseline Functional Status (associated with decreased short-term survival)
 - (-30) Advanced dementia, bedbound, unable to independently complete ADLS, cancer being treated with palliative interventions
 - (0) Requires daily care (e.g., many nursing home residents)
 - (30) Independent living without assistance for ADLS
- II. Survivability based on Comorbidities (associated with decreased short-term survival)
 - (0) O2 dependent lung dx advanced CHF or CAD -liver failure - ESRD age >75- metastatic cancer- any other disease limiting life expectancy to < 5 years
 - (15) Lung, heart, kidney disease, immunocompromised state
 - (30) No underlying comorbidities
- III. Survivability based on age-defined risk (association of age and decreased survival in COVID)
 - (0) >85



- (2) 75-85
- (5) 65-74
- (10) 55-64
- (15) 40-54
- (20) <40

IV. Survivability based on Acute Disease Risk

- (0) Respiratory failure plus multi-organ failure
- (10) Acute renal failure + respiratory failure
- (20) Isolated respiratory failure

Point System in Table format

Category	Survivability based on Baseline Functional Status (associated with decreased long-term survival)		Survivability based on Comorbidities (associated with decreased long-term survival)		Survivability based on age-defined risk (association of age and decreased survival in COVID)		Survivability based on Acute Disease Risk	
Priority	Points	Description	Points	Description	Points	Description	Points	Description
Lower	-30	- Severe Alzheimers or - Dementia, bedbound, unable to independently complete ADLS, cancer being treated with palliative interventions	0	-O2 dependent lung dx advanced CHF or CAD -liver failure - ESRD age >75 - metastatic cancer - any other disease limiting life expectancy to < 5 years	0	> 85	0	Respiratory failure plus multi-organ failure
					2	75 - 85		
Moderate	0	Requires daily care (e.g., many nursing home residents)	15	Lung, heart, kidney disease, immunocompromised state	5	65 - 75	10	Acute renal failure + respiratory failure
High	30	Independent living without assistance for ADLS	30	No underlying comorbidities	10	< 56 - 65	20	Isolated respiratory failure
					15	< 41 - 55		
					20	< 40		

Irrelevant Criteria

In determining the priority score for a patient, the triage team may have access to information about patients that have no bearing on the likelihood or magnitude of benefit from receiving the scarce critical care resource, including, but not limited to: race, disability, perceived quality of life, gender, sexual orientation, gender identity, ethnicity, ability to pay, socioeconomic status, perceived social worth, immigration status, or past or future use of resources. The triage team must not consider such information in any way in assigning priority scores.

Step 3: Determine Whether Patient Receives Ventilator Based on Availability

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 allocation 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 leaders to create operationally clear priority groups to receive ventilators, according to their score on the multi-principle allocation framework. For example, individuals in the red group have the best chance to benefit from use of critical care resources 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.

Table 3. Assigning Patients to Color-coded Priority Groups

Use Raw 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 100-80
ORANGE Intermediate priority (reassess as needed)	Priority score 79-60
YELLOW Lowest priority (reassess as needed)	Priority score < 60

Emergency medicine specialists will send information regarding patients potentially in need of mechanical ventilation to the triage leader or triage officers to allow the triage team to maintain an up-to-date and comprehensive list of such patients. The triage leader 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 of a critical care resource.

Hospital leaders, regional allocation officers and triage leaders should make determinations twice daily, or more frequently if needed, about what priority scores will result in access to ventilators in the emergency department and to critical care resources in the hospital. These determinations should 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 near-term (several days). For example, if there is clear evidence that there is imminent shortage of critical care resources (i.e., few ventilators available and large numbers of new patients daily), only patients with the highest priority should receive scarce critical care resources. As scarcity subsides, patients with progressively lower priority should have access to critical care interventions.

In the event that there are 'ties' in priority scores between patients and not enough critical care resources for all patients with the lowest priority score, the actual numerical score should be used. If there are still ties patients should be rapidly re-evaluated and any new data available taken into account. If there is still need for differentiation after applying priority based on new data, a lottery (i.e., random allocation) should be used to ensure fairness.



Appropriate clinical care of patients who cannot receive critical care. Patients who are not allocated certain scarce critical care resources will receive other medical care that includes intensive symptom management and psychosocial support, as well as a code status consistent with their clinical situation in light of non-allocation of the scarce resource.

Patients should be reassessed regularly to determine if changes in resource availability or their clinical status warrant provision of a ventilator and/or a change in code status. 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.

Implications of the triage process on determination of code status. Our duty to treat patients with respect and dignity is always at the forefront of the care we provide. Accordingly, we should understand patients' goals of care and offer only those available interventions that are consistent with such goals. Time permitting, all care teams, including emergency medicine specialists, should discuss patient goals and wishes as soon as possible in the course of any illness and with a change in the patient's clinical status. This is particularly important during a public health crisis. It is imperative that clinicians have a frank conversation with patients (and their families) about the likelihood of success of CPR. It is essential that providers share with patients and families as accurate a prognosis as possible. If the clinical assessment is that attempts at resuscitation are expected to be harmful, ineffective or of no medical benefit (e.g., unlikely to lead to patient's survival to hospital discharge), this should be compassionately conveyed to patients and families. Only with this information will they be able to decide if an attempt at resuscitation would still reflect their goals and wishes in the setting of a poor prognosis. Clinicians also must make clear, however, that a patient's decision to forego resuscitative efforts (i.e., be DNAR) will not impact other aspects of the patient's care, including their eligibility for a ventilator if one becomes necessary.

During a public health emergency that requires allocation of scarce critical care resources, allocation decisions may impact the code status of patients:

1. Patients who presently need but are not allocated a ventilator will be considered DNAR. It is not supportable to start CPR on a patient with an inability to escalate care or perform intubation without the possibility of ventilator support.
2. All patients who may reasonably be anticipated to need resuscitative efforts should be assessed for priority of receiving ventilator support, should it become necessary. If the patient would not receive a high enough priority for the subsequent critical care required for continued survival (assuming they survived resuscitative efforts), then the patient should be considered DNAR.
3. If upon reassessment of the patient and the system resources, a patient's priority scoring changes such that they are allocated a ventilator or would be if it became necessary, their code status should be reassessed and determined according to the institution's then-current relevant policies (i.e., re: code status and ineffective interventions).

Appeals process for individual allocation decisions

It is possible that patients, families, or treating clinicians will challenge individual triage decisions. Procedural fairness requires the availability of an appeals mechanism to resolve such disputes, to the extent time allows. Initial triage decisions for patients awaiting a ventilator while receiving care in the emergency department will likely be made in highly time-pressured circumstances. Therefore, an appeal will



need to be adjudicated in real time to be operationally feasible. It is possible, therefore, that an appeal may not be possible given time constraints dictated by patients' clinical situations.

All appeals should be decided by a BILH-level Allocation Appeal Committee that is independent of the hospital's emergency department triage team and of the patient's care team. The Allocation Appeal Committee should be made up of at least three individuals, recruited from the following groups or offices: Chief Medical Officer or designee, Chief Nursing Officer or other Nursing leadership, Legal Counsel, a hospital Ethics Committee or Consult Service, members of an institution's ethics faculty, and/or an off-duty allocation officer. Three committee members are needed for a quorum to render a decision, using a simple majority vote. The process can happen by telephone or in person, and the outcome will be promptly communicated to whomever brought the appeal.

For the initial allocation decision, the only permissible appeals are those based on a claim that an error was made by the allocation team in the calculation of the priority score. The process of evaluating the appeal should include the Allocation Appeal Committee verifying the accuracy of the priority score calculation by recalculating it. The treating clinician or triage leader should be prepared to explain the calculation to the patient or family on request.

DRAFT SCRIPT FOR ATTENDING/TRIAGE OFFICER

We are very sorry that your loved one is so sick. Because of the current situation we currently do not have enough resources for all of our sick patients. The hospital has a process in place when we are forced to make decisions on which patients receive resources when they are limited. This process was developed prior to these decisions being made today. We are sorry to inform you that we currently do not have enough ventilators available to be able to place your loved one on a ventilator. We will provide him/her with all of the resources and care that we have available and if the situation were to change, we will reassess him/her. I know this is a terrible situation and will answer any questions you have about your loved one's current status and prognosis or how this decision was made. If you would like you can appeal this decision to the triage review committee, and they will rapidly evaluate the situation and we will let you know if the decision changes. We are very sorry to have to do this but are unable to provide everyone with everything we would want to give them at this time.

ADDENDUM 1
Allocation criteria from Critical Care Resource Allocation Policy
(for patients already in the hospital)

STEP 1: Calculate each patient’s priority score using the multi-principle allocation framework.

Table 1. Multi-principle Strategy to Allocate Critical Care/Ventilators 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 6-8	SOFA score 9-11	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	...	Severely life-limiting conditions; death likely within 1 year

#SOFA= Sequential Organ Failure Assessment; note that another measure of acute physiology that predicts in-hospital mortality, such as LAPS2 score, could be used in place of SOFA, but should similarly be divided into 4 ranges.

*Scores range from 1-8, and persons with the lowest score would be given the highest priority to receive critical care beds and critical care resources.

Points are assigned according to the patient’s SOFA score (range from 1 to 4 points) plus the presence or absence of comorbid conditions (2 points for major life-limiting comorbidities, 4 points for life-limiting comorbidities likely to cause death within a year (**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 of benefiting from critical care, and priority will be given to those with lower scores.

Table 2. Examples of Major Comorbidities and Severely Life Limiting Comorbidities*

Examples of Major comorbidities (+2 pts.) (associated with significantly decreased long-term survival)	Examples of Severely Life Limiting (+4 pts.) Comorbidities (commonly associated with survival < 1 year)
<ul style="list-style-type: none"> • Moderate Alzheimer’s disease or related dementia • Malignancy with a < 10 year expected survival • New York Heart Association Class III heart failure • Moderately severe chronic lung disease (e.g., COPD, IPF) • End-stage renal disease in patients < 75 • Severe multi-vessel CAD 	<ul style="list-style-type: none"> • Severe Alzheimer’s disease or related dementia • Cancer being treated with only palliative interventions (including palliative chemotherapy or radiation) • New York Heart Association Class IV heart failure plus evidence of frailty • Severe chronic lung disease plus evidence of frailty • Cirrhosis with MELD score ≥20, ineligible for transplant

<ul style="list-style-type: none"> • Cirrhosis with history of decompensation 	<ul style="list-style-type: none"> • End-stage renal disease in patients older than 75
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*This Table only provides examples. There are likely other reasonable approaches to designating 0, 2, or 4 points according to the “save the most life-years” principle. Indices such as Elixhauser or COPS2 may be an option, but these scores may be difficult to calculate quickly.

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 allocation priority group, which should be noted clearly on their chart/EHR (**Table 3**). This color-coded assignment of priority groups is designed to allow Allocation 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 use of critical care resources 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.

Table 3. Assigning Patients to Color-coded Priority Groups

Use Raw 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

Distinguishing Within a Priority Group:

Giving heightened priority to those who have had the least chance to live through life's stages:

Life-cycle considerations should be used as the first differentiator if there are not enough resources to provide to all patients within a priority group, with priority going to younger patients. Ages will be broken out into the following categories: age 12-40, age 41-60; age 61-75; older than age 75. First and foremost, evidence suggests that the older a patient, the less likely they are to benefit from critical care resources, particularly ventilatory support. Moreover, beyond this utilitarian justification, an additional ethical justification for incorporating the life-cycle principle 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.⁷ The justification for this principle does not rely on considerations of one's intrinsic worth or social utility. Rather, younger individuals receive priority because they have had the least opportunity to live through life's stages. Evidence suggests 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.⁸ Public engagement about allocation of critical care resources during an emergency also supported the use of the life-cycle principle for allocation decisions.⁴ 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."⁹

Raw Score

If there is still need for differentiation after applying priority based on life-cycle considerations, the raw score on the patient prioritization score should be used as a differentiator, with priority going to the patient with the lower raw score.

** Differentiation after this point should be applied at the BILH-system level.*

Lottery

If there is still need for differentiation after applying priority based on raw score, a lottery (i.e., random allocation) should be used to ensure fairness.

