Allocation of Scarce Medical Resources in a Pandemic: Recommended Framework for Maryland

Adapted from Daugherty, et al., 2017[1,2] & Ehmann, et al., 2020[3]

Introduction

Earlier in the COVID-19 pandemic, Johns Hopkins Medicine, the University of Maryland Medical System, MedStar Health, Lifebridge Health, and Luminis Health partnered and developed a framework for the allocation of scarce, life-sustaining resources if that became necessary in their institutions.[3] This multi-system framework was based in part on a previous, 5-year effort that included public input to understand the values of Maryland citizens and health care professionals regarding the allocation of scarce critical care resources. [1,2] Continuing this iterative process, the Maryland Healthcare Ethics Committee Network (MHECN), in collaboration with Justice in Aging and Disability Rights Maryland, has further modified the multi-system framework in an effort to address any potential for disparate impact on discrete populations (e.g., people with disabilities, older adults). Lastly, MHECN developed a generic response flow, vetted by the health care system representatives, Maryland Region III Health and Medical Coalition, and the Maryland Region V Emergency Preparedness Coalition, to serve as a template in developing each hospital's implementation plan to support the responsibilities of the Triage Team through each hospital's incident command system.

MHECN recommends this framework for use across Maryland hospitals in the event that demand outstrips supply for critical care resources at the state level during the pandemic.

Guidance for Allocation of Scarce Resources

This guidance document is based on an ethical framework that includes the duty to provide care, duty to steward resources, distributive and procedural justice with equitable and standardized practices, and transparency, especially for vulnerable populations that have been marginalized and may be distrustful of the health system (e.g., including, but not limited to, age-based discrimination, persons from racial and ethnic minority groups, persons with disabilities, persons with limited English proficiency, persons who are LGBTQ+, the uninsured, and immigrants to the U.S.). The primary goal is to maximize benefit of treatment and to enhance survival for as many patients as possible when resources are scarce. To accomplish the goal of prioritizing patients for whom ventilator therapy and other scarce lifesaving interventions would be required, the following tenets should apply:

A. Patients who, on presentation or at any point during their hospitalization, have a medical condition that will result in immediate or near-immediate mortality even with aggressive therapy are not eligible for critical care interventions.

B. Applying evidence-based risk factors for mortality, the Triage Team (see Item I below) will determine whether patients are at high risk of mortality during the current hospitalization or soon thereafter (within 30 days). For example, the Triage Team will use scores such as SOFA or mSOFA, PELOD-2, nSOFA, and SNAPPE-II to determine whether patients should receive a scarce resource or continue to receive a scarce resource already given. Evidence-based mortality predictors such as SOFA and its variations are limited based on the research methods, populations, assumptions, and expected applications. Modifications exist to correct for inadvertent disability bias. As other systematic biases are identified (e.g., race), they may also require correction.

C. Basis for Resource Allocation: For their patients requiring a scarce life-sustaining resource (e.g., ventilators, dialysis), attending physicians will, as per usual standard of care, conduct regular clinical assessments to determine overall prognosis. In addition, based upon the aforementioned validated scoring systems (SOFA, mSOFA, nSOFA, SNAPPE-II), the Triage Team (see Item I) will evaluate the clinical data and overall

prognosis to decide whether patients should continue with their treatments (see Appendix A). Any decision to remove/reallocate a life-sustaining resource should be carefully considered, be based upon ethical principles, applied equitably, and not discriminate based upon non-clinical factors or sociodemographic characteristics (see tenet G). Appendix B provides a flowchart of various roles and responsibilities.

D. Alternatives: Patients who are triaged not to receive a life-sustaining resource will be offered alternative forms of care, including palliative care or hospice services. See Appendix C for scripts that suggest approaches to conversations with patients and families.

E. Right of appeal: If triaged not to receive a life-sustaining resource, patients or their authorized decision-maker, as well as the attending physician, will be notified of the decision and may request a secondary review, as described in Appendix A. In emergent triage situations, a secondary review may not be available.

F. State guidance: To assure that secondary review processes are consistent with effective, fair, and timely application as described within the Allocation of Scarce Medical Resources framework, we support the creation of a state-appointed review committee to receive information about triage decisions from participating hospitals. The committee may recommend modifications to the future allocation processes based upon accumulated data. By design, this review will be conducted retrospectively and not punitively.

G. Non-discrimination principles**:** Every person in need of medical care will be assessed using the same standardized method, applied equally to all. Patients will not be assessed using any other non-clinical factor or sociodemographic characteristic that would violate federal civil rights laws and will not be discriminated against, excluded, or treated differently based upon their race, color, ethnicity, national origin, age, language, physical or mental disability, religion, sex, sexual orientation, gender identity or expression, immigration status, or ability to pay. In particular, persons with disabilities and older adults will not be denied medical care on the basis of stereotypes, assessments of quality of life, functional impairment, need for assistance with activities of daily living, or judgments about a person's relative "worth" based on the presence or absence of disabilities.[4]

H. Retaining Personal Resources: Any person presenting to the hospital with their own personal ventilator used in their day-to-day lives will not have that ventilator re-allocated for use by another patient. The person with their own ventilator may nonetheless be subject to other allocation decisions.

1. Patients with disabilities have the right to a support person to assist them in communicating their health care needs and decisions, and the hospital will provide reasonable accommodations for the support person's inclusion while maintaining infection control protections.

I. Prioritization: All Triage Teams, rather than the patient's providers, will implement the priority structure in this guidance based upon clinical data provided by the patient's providers. This role sequestration serves to provide greater objectivity to decisions and limit moral distress to the care team. Hospital size may affect the ability to achieve role sequestration; best efforts should be implemented to achieve this standard.

J. Transparency will be achieved by: (a) communicating the alternative standards of care provided by this framework to patients and families both on admission to the hospital and when triage decisions are made and (b) through efforts to inform the public regarding the goals of this framework.

K. Health Care Provider Support: Hospitals will develop and implement multi-faceted mechanisms to support health care providers experiencing moral distress, psychological trauma or burnout as a result of providing care under this framework.

The multi-system framework originally published[3] includes additional scarce resource allocation algorithms that are not included in this framework (e.g., Extra-Corporeal Membrane Oxygenation or "ECMO" and blood products).

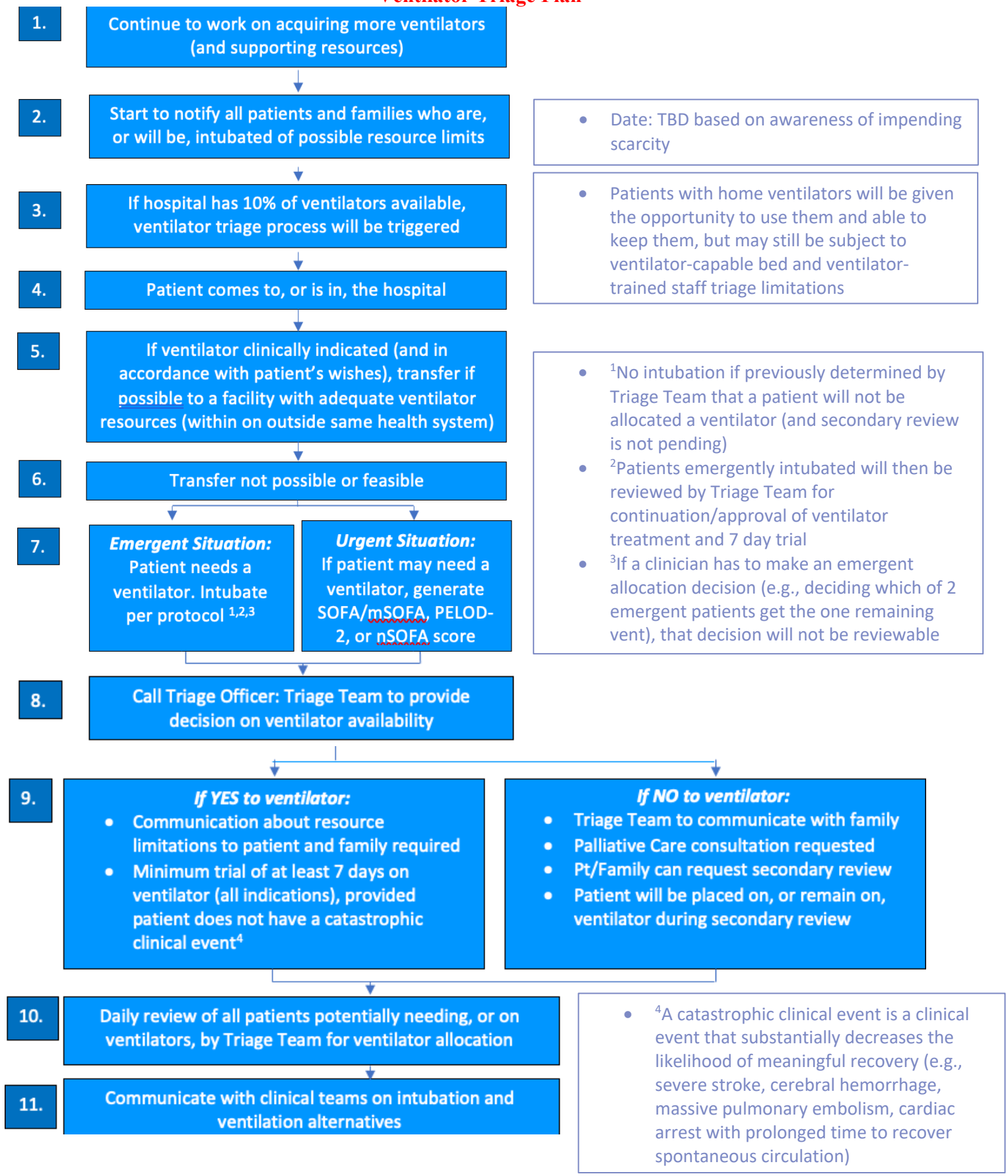
REFERENCES

1. Daugherty Biddison EL, et al. Too Many Patients … A Framework to Guide Statewide Allocation of Scarce Mechanical Ventilation During Disasters. *Chest*. 2019;155(4):848-854.
2. Daugherty Biddison EL, et al. (24 Aug 2017). Maryland Framework for the Allocation of Scarce Life-sustaining Medical Resources in a Catastrophic Public Health Emergency https://www.law.umaryland.edu/media/SOL/pdfs/Programs/Health-Law/MHECN/ASR%20Framework_Final.pdf. Accessed 23 Mar 2020.
3. Ehmann MR, et al. . Operational recommendations for scarce resource allocation in a public health crisis. *CHEST,* 2021; 1*59*(3), 1076-1083.
4. Truog RD, et al. The Toughest Triage – Allocating Ventilators in a Pandemic. *N Engl J Med*. 2020;382(21):1973-1975.

ACRONYMS

ASR	Allocation of Scarce Resources	ICS	Incident Command System
CCS	Critical Care Support	ICT	Incident Command Team
CHF	Congestive Heart Failure	ICU	Intensive Care Unit
CSR	Cost Sharing Reduction	IT	Information Technology
CVVH	Continuous Veno-Venous Hemofiltration	JIC	Joint Information Center
		LOC	Level of Consciousness
CVVHD	Continuous Veno-Venous Hemodialysis	mSOFA	Modified Sequential Organ Failure Assessment
CVP	Central Venous Pressure	nSOFA	Neonatal Sequential Organ Failure Assessment
DIC	Disseminated Intravascular Coagulation	OPS	Operations
		OR	Operating Room
DNI	Do Not Intubate	PACU	Post-Anesthesia Care Unit
DNR	Do Not Resuscitate	PD	Peritoneal Dialysis
ECMO	Extra-Corporeal Membrane Oxygenation	PELOD-2	Pediatric logistic organ dysfunction score-2
ED	Emergency Department	PIO	Public Information Officer
EID	Emerging Infectious Disease	PPE	Personal Protective Equipment
EUA	Emergency Use Authorization	ROSC	Return of Spontaneous Circulation
GCS	Glasgow Coma Score	SNAPPE-II	Score for Neonatal Acute Physiology with Perinatal Extension-II
HD	Hemodialysis		
HEIC	Hospital Epidemiologist, Infection Control	SOFA	Sequential Organ Failure Assessment
		TAVR	Transcatheter Aortic Valve Replacement
HFO	High Frequency Oscillatory	TT	Triage Team

Ventilator Triage Plan



>>>SEE APPENDIX A FOR TRIAGE TEAM COMPOSITION & PROCESS<<<

Process for Triage Team to Allocate Ventilators

Step 1:

Assign individual score for ICU survival (with the support of a ventilator and other intensive care)

For adults (age ≥ 18 years), use the lowest SOFA score (i.e., lowest points) over the past 24 hours:

SOFA ≤ 8 = 1 point	SOFA 9-11 = 2 points	SOFA 12-14 = 3 points	SOFA > 14 = 4 points

NOTE: Modifications may be necessary to ensure that SOFA scores accurately assess likelihood of survival, for example, if components of SOFA are missing (e.g., platelets, bilirubin) or if the person's baseline condition would render the standard SOFA scoring inaccurate. In calculating the Glasgow Coma Score (GCS), modifications need to be made for certain patients, especially those with stable neurological impairment at the time of admission. For example, for patients on chronic ventilator care, an estimated verbal score will be used. For patients with verbal impairments, only the eye score will be used and the verbal and movement categories will be assigned the best score. In the example of an individual with quadriplegia, the patient will be assigned the best motor score on the GCS and not penalized based on their baseline function.

For children (> 37 week gestation infants, age 1 month - 18 years), use the lowest PELOD-2 score (i.e., lowest points) over the past 24 hours:

PELOD-2 < 12 = 1 point	PELOD-2 12-13 = 2 points	PELOD-2 14-16 = 3 points	PELOD-2 ≥ 17 = 4 points

For neonates (term infants > 37 week gestation, age 2 days – 30 days OR premature infants age > 2 days), use the lowest nSOFA score (i.e., lowest points) over the past 24 hours:

nSOFA 0-3 = 1 point	nSOFA 4-7 = 2 points	nSOFA 8-11 = 3 points	nSOFA ≥ 12 = 4 points

For all neonates (day of birth until 2 days of age), use the SNAPPE-II tool:

SNAPPE-II 0-59 = 1 point	SNAPPE-II 60-69 = 2 points	SNAPPE-II 70-79 = 3 points	SNAPPE-II ≥ 80 = 4 points

Individual ICU survival score = _____

Step 2:

Consider whether the patient has one or more severe comorbid conditions that are likely to result in death within 30 days, even if the patient is able to survive to ICU or hospital discharge.,.

It is likely that the patient will die within 30 days = 3 points
It is not likely that the patient will die within 30 days = 0 points

Individual 30-day survival score = _____

Step 3:

Add scores from Step 1 and Step 2 to determine composite score (minimum 1, maximum 7)

For pregnant patients, obstetrical evaluation of a fetal heart beat should be performed urgently. Based on this evaluation, individuals in whom a fetal heart beat is expected and is detected will be given a 1-point "credit" (reduction) on their composite score, thus giving them higher priority. For those individuals early in pregnancy where a fetal heart beat would not be expected to be detectable, they will be given a 1-point "credit" (reduction)

on their composite score. All other criteria still apply.

Composite score (ICU survival score + 30-day survival score) = _____

Step 4:

In the event that equivalent composite scores are assigned to 2 or more individuals, proceed to Step 5

Otherwise, ventilator is preferentially allocated to that individual with lowest composite score from Step 3

Step 5 (if necessary):

In case of equivalent composite scores for 2 or more individuals in Step 4, allocate ventilator based on fair chance wherein individuals with equivalent composite scores in Step 4 are each assigned a single lottery number, sequentially ordered beginning with 1, 2, 3, etc.

After all individuals with equivalent composite scores are assigned a single lottery number, a random drawing of assigned numbers is performed by the Triage Officer and the ventilator is allocated to that individual with the first-drawn corresponding lottery number

Sample Cases

1. Patient A, 24 years of age, has a SOFA score of 13, and no severe comorbid conditions resulting in likely death during hospitalization. Patient B, 52 years of age, has a SOFA score of 10, and no severe comorbid conditions. Patient A's composite score is 3 points and Patient B's composite score is 2 points. Patient B is prioritized.

2. Patient A, 20 years of age, has a SOFA score of 7. Patient B, 39 years of age, has a SOFA score of 8. Neither has severe comorbid conditions. Both receive a composite score of 1. Both are equally stable. The scarce resource is allocated based on chance in a fair and transparent way with a lottery. Patient A is assigned lottery #1 and Patient B is assigned lottery #2. The triage officer blindly draws #2, so Patient B is prioritized.

ICU Bed Triage Plan

*NOTE: TBD = To be determined based on awareness of impending scarcity

ICU BED TRIAGE CRITERIA

NOTE: The scoring system below has limited evidence to support its validity and reliability, and thus should be used to supplement best clinical judgment.

	Criteria		Points
TREATMENT	Patient needs clinically indicated (taking into account patient preferences) **TREATMENT** that is usually available only in ICU Need 20 pts (needs a treatment that can be delivered in ICU, but not floor or intermediate unit) Urgency 10 pts (within in 1 day) 20 pts (immediately)	Need	0 or 20
		Urgency	0, 10, or 20
MONITORING	Patient needs clinically indicated **MONITORING** and potential rescue that is available only in ICU Need 10 pts (needs monitoring that can be delivered in ICU, but not floor or intermediate unit) Urgency 5 pts (within 1 day) 10 pts (immediately)	Need	0 or 10
		Urgency	0, 5, or 10
30 DAY SURVIVABILITY	**SURVIVABILITY** Low = 0 pts Mid-Range = 15 pts High = 30 pts		0, 15, or 30
PREGNANCY	**PREGNANT PATIENT** No = 0 pts Yes (see note 3 below) = 10 pts		0 or 10
ONLY FOR PATIENTS IN ICU: TIME IN ICU	< 72 hrs = + 10 pts 72 hrs to 168 hrs = 0 pts >7 - 13 days = - 10 pts >14 days = -20 pts		-20, -10, 0, 10
ONLY FOR PATIENTS IN ICU: SOFA SCORE CHANGE (since admission to ICU)	If patient in ICU < 72 hours, 0 pts Worsening: Score change < -1 pt = - 20 pts No change: Score change from -1 to 1 pt = 0 pts Improvement: Score change > 1 pt = 20 pts		-20, 0, 20
	TOTAL		

Notes:

1. **The greater the number of points, the higher the patient will be placed on the list and the likelier they are to be allocated an ICU bed.** This is different than the ventilator allocation system where lower points lead to a higher likelihood of allocation.

2. DNR/DNI status does not result in a change in points.
3. For pregnant patients, obstetrical evaluation of a fetal heart beat should be performed urgently. Based on this evaluation, individuals in whom a fetal heart beat is expected and is detected will be given a 10 point credit. For those individuals early in pregnancy where a fetal heart beat would not be expected to be detectable, they will be given a 10 point credit. All other criteria still apply.
4. If a patient is discharged from the ICU and returns $\geq$ 24 hours later, the time in ICU clock restarts.
5. For patients going to surgery from the ICU and returning to the ICU, the time in ICU clock does not restart.
6. An "ICU capable" bed indicates that it is adequately staffed and supported per institutional policies and procedures.

TIEBREAK if points are equal (in descending order of priority)

1. If ED is not over capacity, by patient location (in descending order of priority):
    - Floor patients
    - ED
    - OR Holds/PACU

2. Time waiting for ICU bed

CONDITIONS OR TREATMENTS THAT **SUPPORT** PRIORITIZATION FOR ICU CAPABLE BED TREATMENT DURING PANDEMIC (These may vary somewhat depending upon the individual institutions' availability of more intensive nursing/technical support on floors outside of the ICU)

Respiratory

1. On ventilator (Patient must qualify for ventilator, if ventilators are in critical supply)
2. Hemoptysis >150 cc in a 12-hour period
3. Respiratory distress or failure with elevated CO2, sustained increased respiratory rate, and/or decreased O2 saturation

Cardiovascular

4. Systolic BP >200 with organ dysfunction (papilledema, CHF, hematuria, seizure, encephalopathy) attributable to hypertension
5. Pulmonary arterial catheter placement and management
6. Hemodynamic monitoring, including arterial lines, pulmonary artery monitoring and CVP monitoring
7. Temporary (percutaneous) transvenous pacing, transcutaneous pacing
8. Unstable arrhythmia
9. Intra-aortic balloon pump placement and/or management
10. Patients s/p TAVR, immediately post procedure
11. Hemodynamically unstable pericardial tamponade, or actively progressing tamponade with high risk of hemodynamic compromise
12. Dissecting aortic aneurysm
13. Arterial and venous sheaths
14. Antiarrhythmic infusions
15. Vasopressor dependent
16. ECMO

Neuro

17. Rapidly changing neurological status (i.e., rapid or recent deterioration in LOC or neuromuscular function, e.g., Guillain-Barre) and/or neuro checks q1 hour or more

18. ICP Monitoring
19. Generalized status epilepticus
20. Persons placed in induced coma for treatment of convulsive or non-convulsive status epilepticus or acute brain anoxia
21. Thrombolytics (e.g., rt-PA after stroke) and continuous infusions for venous or arterial embolus

Endocrine

22. Thyroid storm or myxedema coma.
23. Diabetic ketoacidosis with pH < 7.3
24. Serum sodium <115 or >160
25. Use of hypertonic solutions
26. Any substance overdose with risk of arrhythmias, shock or other life-threatening organ dysfunction
27. Insulin infusions

General / Other Conditions / Treatments

1. Major active bleeding
2. Severe DIC
3. Severe agitation requiring frequent sedative boluses or changes in continuous IV sedation.
4. Worsening agitation from alcohol/substance withdrawal
5. Moderate or Conscious Sedation
6. CVVH

Infections

1. Severe sepsis with end organ dysfunction
2. Stevens Johnson syndrome

CONDITIONS OR TREATMENTS THAT **WEIGH AGAINST PRIORITIZATION** FOR ICU CAPABLE BED TREATMENT DURING PANDEMIC

1. Severe illness with low likelihood of survival to hospital discharge (e.g., sepsis with end organ dysfunction)
2. Cardiac arrest (with or without ROSC)
3. Severe and irreversible coagulopathy
4. Extensive burn injuries
5. Severe and irreversible organ failure in which survival to hospital discharge is unlikely
6. Invasive infection with low likelihood survival to hospital discharge
7. Comfort care only status

Dialysis Triage Plan

1. Dialysis capacity at low level:
<20% of HD or CVVHD machines
OR
Dialysate supply for HD, PD, or CVVHD <2 weeks
(Capacity includes machines, staff, and supplies)

- HD capacity likely limited by staffing constraints
- CVVHD capacity likely limited by machine and dialysate constraints
- PD capacity likely limited by staffing and dialysate constraints

2. Dialysis Resource Conservation team to meet 2-4 times/week to discuss possible hospital-wide conservation measures as well as procurement of more supplies

AND

Dialysis Triage Team meets daily with nephrology teams to determine dialysis treatment plans

General principle:
For all patients for whom dialysis is clinically indicated and wish to receive dialysis, all will receive dialysis, but will receive lower intensity of treatment (e.g., shorter runs, less frequent runs)

- If dialysis resources are available at another facility, transfer considered for those patients that can be safely transferred

3. Dialysis capacity at critically low level:
<5% of HD or CVVH machines
OR
dialysate supply for HD, PD, or CVVHD < 1 week

4. Continue above measures

AND

Ask for state to help with supply movement between health systems or dialysis centers

>>>SEE APPENDIX A FOR TRIAGE TEAM COMPOSITION & PROCESS<<<

APPENDIX A – SRA TRIAGE TEAM COMPOSITION & PROCESS

SRA TRIAGE OFFICER/TEAM PRINCIPLES

- Officers and Teams will possess critical or acute care expertise and administrative support, as needed
- Officers and Teams shall adhere to anti-discrimination principles to safeguard against implicit and explicit bias that leads to discrimination or disparate impact (see *non-discrimination principles* , page 2, Item G)
- The size of each team, the number of teams, and the number of officers will be commensurate with the number of ICU beds, life-saving resources (e.g., ventilators and dialysis), and staffing available in the hospital, but must have a minimum of three voting members (all of whom are clinicians)

ROLE OF THE SRA TRIAGE OFFICER AND/OR TEAMS

- The Triage Officer or Teams will review the clinical information:
    - of all patients who have had emergent, newly initiated life-support (e.g., mechanical ventilation)
    - for patients that the clinical teams have reported might require mechanical ventilation in the near future
    - for all mechanically ventilated patients daily
- A standardized scoring system will be utilized for all evaluations
- When necessary, the Triage Team will consider transfer to other facilities with capacity to provide the limited resource (e.g., ventilators, dialysis, staffed beds)
- If scarce resource circumstances dictate need for discontinuation of life support, the Triage Officer or Team will have responsibility to communicate these recommendations to the patient and/or family. The Triage Officer will coordinate with the patient's clinical team on how best to communicate.
- If a clinician has to make an emergent allocation decision (e.g., deciding which of 2 emergent patients receives the one remaining scarce life-saving resource such as a ventilator), that decision will not be reviewable. An emergent situation arises when the attending physician determines-- with a reasonable degree of medical certainty—that there is a substantial risk of death or immediate and serious harm to the patient and that the life or health of the patient would be affected adversely by delaying treatment. An *emergent allocation decision* occurs when two or more patients are similarly situated in an emergency.
- The Triage Officer or Team's decision to withdraw support will be subject to a secondary review if so requested by the patient or authorized decision-maker, or the attending physician.

SECONDARY REVIEW COMMITTEE PRINCIPLES

- Multidisciplinary
- Minimum of three members
- Committee members shall adhere to *non-discrimination principles* (page 2, Item G) to safeguard against implicit and explicit bias that leads to discrimination or disparate impact
- Oversight of the Triage Officer and Team
- Upon request, performs secondary reviews of Triage Team recommendations when scarce resources dictate need for cessation of support for individual patients

SECONDARY REVIEW PROCESS

1. Upon request for a secondary review by the patient, the patient's authorized decision maker, or the attending physician, the Triage Officer immediately contacts the Secondary Review Team.

2. The Secondary Review Team reviews the steps by which the Triage Team made the decision to withhold or withdraw the scarce resource. The review will determine if the criteria for allocation were appropriately followed. The Secondary Review Team will determine if a withdrawal or withholding decision had not considered all of the relevant clinical triage criteria or had misapplied the criteria in a

way that created inequities, such as by considering non-clinical factors or sociodemographic characteristics.

3. The decision of the secondary review committee will be determined by a majority vote. The Secondary Review Team will respond back to the Triage Officer with its decision within 1 hour (but may take longer depending on the complexity of the circumstances). As with the initial Triage Team decision, the Triage Team will be responsible for communicating the secondary review committee's decision to the requestor.

4. The Secondary Review Team will consist of an attending level physician for adults (for adult cases), attending level physician for children (for pediatric cases), a nurse, and another clinician with relevant expertise. A patient's care provider cannot serve on the Secondary Review Team. A Triage Officer (or a member of the Triage Team) will be available to answer questions about the initial triage decision and criteria used. Depending on available resources, an ethicist or member of the ethics committee, representative from the Office of Diversity and Inclusion, community representative, and legal counsel may be available for consultation but will not have voting privileges.

Secondary Review Team Role	Notes	Proposed Names
Attending level physician for adults (adult cases) or Attending level physician for children (pediatric cases)		
Nurse		
Clinician with relevant expertise		
Ethicist	May be available for consultation, but nonvoting member	
Triage Officer (or a member of the Triage Team)	May be available for consultation, but nonvoting member	
Legal Counsel	May be available for consultation, but nonvoting member	
Representative for Diversity and Inclusion or Disabilities	May be available for consultation, but nonvoting member	
Community representative	May be available for consultation, but nonvoting member	

APPENDIX B – ASR Framework Response Flow

This Allocation of Scarce Resources (ASR) response flow serves as the foundation for hospitals to develop their responsibilities to support the role of the Triage Team (TT). It aligns the tasks developed for the TT with those tasks assigned to other groups. These essential responsibilities will support the TT through the hospital or health care system incident command team (ICT), as described in the middle column and other hospital departments and local/state agencies in the third column. All these duties will allow the TT to select the next patient when critical care resources become available. Where "ventilator" is listed below, this may also refer more generally to critical care support (CCS).

Also, we proposed the following positions to assume these responsibilities. If these ICT positions do not exist in your hospital or health care system ICT, assign the tasks to the most appropriate person, group, or department. All these responsibilities represent the essential components to support the TT.

Administration should also approve the TT as the official entity responsible for allocating scarce resources. We also suggested the TT has a dual reporting relationship with the highest medical position on the incident command team and also reports to the chief medical officer at each hospital.

Triage Team*	Incident Command Team (ICT)**	Other Group Support**
1. Continue to work on acquiring more critical care resources Leader of Triage Team: Brief ICS (Incident Command System) Team members on approach to ensure support team is aware of process and procedures moving forward.	*Incident Commander*: Ensure who the designated hospital representative(s) will receive the Governor or designee's declaration of an ASR emergency *Incident Commander*: Lead team to Implement internal actions to increase acute care and ICU surge beds to accommodate more patients as influx rises above staffed beds (see below) *Incident* Commander: Conduct briefings with incident command team members, department leaders, c-suite, departmental leaders, and healthcare system ICT to discuss areas of focus, situational assessments, and tasks at scheduled intervals *Medical Control Chief*: Inform triage team leader when acute care or ICU occupancy and/or scarce resources reach near 90% use levels *Liaison Officer, Operations & Logistics Chiefs*: Activate diversion and transfer procedures for ER and transfer patients to other hospitals in collaboration with ED attendings or	*HEIC Hospital Epidemiologist, Infection Control), EM Surveillance*: Monitor the incidence of potential EIDs (Emerging Infectious Diseases) in the event it arrives in the US. If the Emerging Infectious Disease (EID) is spreading in the US, initiate surveillance process with HEIC to minimize transmission and/or implement appropriate levels of protection and preparedness (e.g., space, stuff, and staff) if the epidemic is heading toward this state and jurisdiction *Respiratory Therapy and Anesthesia*: Activate use of approved backup ventilators, transport ventilators, and anesthesia machines, or other specified resources. Provide real time training when (for example) surge ventilators are put into operation *P&T, Antibiotic Management Group, etc.*: Assume responsibility for addressing eligibility and distribution for drug shortages, EUA (Emergency Use Authorization) drugs, etc. *Critical Care Committee or equivalent*: Coordinate critical care treatment plans

	ICU attendings and ICU charge nurses *Incident Commander*: Activate procedures to discharge/transfer as many patients to reduce overcapacity or occupancy when needed *Operations (OPS) & Logistics Chiefs*: Transfer non-infected ICU patients to ICUs not caring for infectious patients if possible. Inventory key equipment and assume responsibility, along with designated depts., to track their availability and distribution *Situational Assessment Chief*: Activate process to cohort infected patients from non-infected patients on acute care units. Provide scheduled situational assessment updates and new information at scheduled intervals to ICT and departments *Incident Commander or Liaison Chief*: Activate mutual aid agreements or memoranda of understanding to request and receive space, stuff and/or staff *ICT*: Delay activation of crisis standards of care for adult and/or pediatric patients by coordinating with designated depts. to implement and maintain: 1) *Situational Assessment Chief*: Establishment of a 2-hospital system within each hospital to separate contagious from non-contagious patients that will facilitate care for infectious patients versus emergent and urgent non-infectious admissions if possible 2) *OPS & Logistic Chiefs*: Addition of surge bed capabilities and alternate care beds/space for acute care,	across all ICUs and stepdown units for pandemic patient population *Safety or Designee*: Prepare to activate real-time fit testing for alternate and reusable N-95 respirators when primary N-95 respirator masks are no longer available or in short supply *CSR*: Determine feasibility to autoclave disposable respirators to reuse them *HEIC*: Determine who is eligible to don N-95 masks versus surgical masks and other types of masks *Supply Chain Depts.*: Buy more scarce resources: ventilators, ventilator accessories, PPE, respirators, drugs, etc. from private sector and mutual aid opportunities (in conjunction with Logistics Chief or Liaison Officer. Request assistance and/or approval from Financial and Administrative Chief if more financial resources are needed to buy more resources *Bed Management/Admitting*: Each hospital will activate surge/additional acute and ICU beds in established bed management system to trigger appropriate tracking and delivery of supplies and services to critical care patients in contingency and crisis target status. Provide occupancy reports and access to data based for ICS to view inpatient bed occupancy. Notify support depts. of any acute care beds converted to ICU beds so appropriate resource are provided. If multiple hospitals exist in a health care system, each hospital's bed management system will independently complete these tasks. If beds are needed from a sister hospital, these reports will facilitate mutual aid functions between the hospitals by the designated liaisons.

	ICU, and pre-discharge care (before official discharge) as needed through cancellation of elective surgeries and procedures, reverse triage, scheduling home care visits, etc. 3) *Planning Chief*: Activation of tiered staffing models and real-time training before adding acute care and ICU beds 4) *Medical Control Chief*: Lead process to repurpose critical care equipment 5) *Operations & Logistic Chiefs*: Transfer patients pending admission to other facilities having resource capacity and capability if internal resources are exhausted. If no beds exist at other hospitals, implement shelter-in-place procedures 6) *Medical Control Chief*: Consider discontinuing high resource alternative therapies [i.e., Extracorporeal Membrane Oxygenation (ECMO), High Frequency Oscillatory (HFO) Ventilation, Inhaled Nitric Oxide, Continuous Veno-Venous Hemodialysis (CVVHD), etc.), and therapeutics (i.e., drugs back ordered or in short supply) with medical leaders 7) *Incident Commander*: Resolve any unique procedures within your hospital or health care system that are not part of the modified ASR framework without changing any key components in the modified framework *Incident Commander*: Employ established procedures once triggers are met to consider ASR framework activation	*Administration*: Request Maryland OHCQ (Office Health Care Quality) to approve the expansion of acute care or ICU beds when rolling out these additional beds. Communicate decision to Incident Commander and Bed Management when decision is received from OHCQ *Respiratory Therapy*: Work with Liaison Officer or Logistics Chief to get additional ventilators or ventilator accessories via mutual aid or Strategic National Stockpile (SNS) through City or County Health Departments. Develop real time training if ventilators received are different than those routinely used in hospital *Planner and/or Logistics Chief*: Support established vaccination teams to administer vaccines to HCWs and other employees *IT (Information Technology)*: Make ICU focused software and automated procedures accessible to staff on acute care units that had their beds converted to ICU beds and their associated critical care services to facilitate the completion of treatment plans and bedside procedures by clinical team members

	Medical Control Chief or Designee: Oversee the effectiveness of the Triage Team along with Bed Management Teams and Attendings in the Emergency Room. Liaison with CMO (Chief Medical Officer) to communicate situational assessment issues, progress of Triage Team and Secondary Review Team. Complete requested tasks to direct or coordinated with leaders of Triage Team and Secondary Review to facilitate the completion of appeal and retrospective review processes.	
2. Start to notify all patients and families possible resource limits	*OPS Chief*: Alert all appropriate departments *Liaison Officer/OPS Chief*: Alert designated agencies of occupancy, resource, and staffing levels to support mutual aid and potential declaration of ASR framework	*Admitting, ERs, Direct Admit Groups*: Change re-route status through Maryland Institute for Emergency Medical Services Systems (MIEMSS). Ensure compliance to EMTLA (Emergency Medical Treatment & Labor Act) regulations unless there are no more inpatient beds or medical discipline does not exist to treat newly transferred ER patient to your hospital
3. If hospital has ≤10% of critical care support (CCS) capacity available, triage will be triggered and begin to review clinical information for all patients requiring that support	*Medical Control Chief, Situational Assessment Chief and Key Departments and Staff*: Begin preparatory process to activate established ASR framework procedures If hospital is not at 10% of its CCS capacity, but the jurisdiction, region or state activates this alert, comply with posting requested data points and monitor internal indicators to provide mutual aid when possible. *PIO (Public Information Officer) or External Media PIO*: Work with state or regional JIC to develop one message for public. State JIC has priority over any other local or regional JIC activated. *PIO or Internal Media PIO*: Adopt equivalent message for internal use established by the Joint Information Center (JIC)	*IT*: Responsible group to produce reports (i.e., SOFA (Sequential Organ Failure Assessment) , PELOD-2 (Pediatric Logistic Organ Dysfunction-2), etc.) for Triage Team at scheduled intervals *Lead of Secondary Review Team and Palliative Care Team* are also alerted when Triage Team are notified to activate *Ethics Committee Members or Equivalent Body (Scarce Resource Allocation Committee or Team, etc.)*: Engage in Secondary Review Team or appeals process if requested to do so.

4. Patient comes to, or is in, the hospital. If ventilator clinically indicated (and in accordance with patient's wishes), transfer, if possible, to a facility with adequate ventilator resources (within or outside health system)	*Operations and Logistic Chiefs*: Assist attendings and hospitalists in identifying potential external beds and ambulance transportation to expedite transfer of in-house patients	If patient is on an acute care unit, *attending* will work with charge nurse and social work to identify an appropriate bed and continuity of care for early discharge or reverse triage (method to rapidly create inpatient surge capacity who do not require major medical treatment in a hospital. These patients can be discharged and, if necessary, schedule home care services to continue medical treatment at home). If an existing inpatient can be transferred to another hospital when reverse triage is activated, the *ICU Director* will identify a bed at another facility and then coordinate with *Logistics Chief* to transport patient
5. Transfer not possible or feasible: *Emergent Situation*: Patient needs a ventilator. Intubate per protocol[1, 21 3] *Urgent Situation*: If patient may need a ventilator, generate SOFA/mSOFA, PELOD-2, or nSOFA score	*Liaison Chief*: Work with other hospitals, health care systems, and government to establish external surge capacity, surge capabilities, and quarantine sites for infected and close contact cases	*Admitting/Bed Mgt.*: Ensure bed availability report is up to date at scheduled intervals *Inpatient Units*: Assure bed occupancy status is communicated to Bed Mgt. as bed is open for new admissions *Bed Mgt.*: Turn on shadow bed management system to identify acute care beds converted to ICU or additional ICU beds created
6. Call Triage Officer: Triage Team to provide decision on ventilator availability: *If Yes to Ventilator* • Communication about resource limitations to patient and family required. • Minimum trial of at least 7 days on ventilator (all indications), provided patient does not have a catastrophic clinical event *If No to Ventilator*	*Medical Control Chief*: Support designated groups to facilitate decision-making and logistics for EUA drugs and new approved drugs in treatment of EID	*Legal Counsel, Risk Management, Social Work, Patient Relations, and Chaplain Services*: Prepare to respond to patient, family members and/or their representatives when ASR framework is activated *Designated Groups*: Complete retrospective review or appeal to Triage Team decisions by the established group designated by the CMS (e.g., Secondary Review Team) to withdraw a ventilator from an existing patient *Secondary Review Team*: Communicate decision to Triage

• Triage Team to communicate with family. • Palliative care consultation requested. • Pt. and family can request secondary review. Provide information collected by Triage Team to facilitate review of decision by Secondary Review Team • Patient will be placed on, or remain on, ventilator during secondary review		Officer within 1 hour, if possible. Also inform decision to requestor of review *Attendings or Hospitalists*: Order palliative care or hospice consult when Triage Team informs bedside physician there are no more ventilators to assign, ICU beds available or ventilator is withdrawn.
7. Daily review of all patients potentially needing, or on ventilators, by Triage Team for ventilator allocation		*Secondary Review Team*: Work with State's Central Triage Committee to address any changes to the state-wide decision-making process, maintain situational awareness, and perform research and modify allocation algorithms as needed
8. Communicate with clinical teams on intubation and ventilation alternatives		*Key Departments* (Respiratory Therapy, Anesthesia, ICU Directors, ICU Nurse, Mgrs., Charge Nurses, etc.) will be integral members to carry out alternative procedures
9. Provide summary report each shift containing decisions to withhold or withdrawal ventilators, areas of concerns and their status to MCC and designated leaders	*PIO or Designee*: Summarize report for each shift containing decisions that addressed concerns and their status, business continuity, support to Triage Teams, etc. for Incident Commander and designated leaders to approve prior to distribution	*Internal Psychological Services*: Provide services to support health care providers experiencing moral distress, psychological trauma, or burnout as a result of providing care under this guidance

Legend

* Allocation of Scarce Medical Resources During the COVID-19 Crisis: Appendix 1, supplement to: Ehmann MR, et al. . Operational recommendations for scarce resource allocation in a public health crisis. *CHEST,* 2021; 1*59*(3), 1076-1083.

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APPENDIX C - SCRIPTS

Allocation of Resources Script for Patients / Families

Keep in mind that the patient and the patient's authorized decision-maker may be dealing with a range of emotions. Try using the SHARE mnemonic (adapted from VitalTalk COVID Ready Communication Playbook. https://www.vitaltalk.org/guides/covid-19-communication-skills/). Communication tools should be modified to accommodate persons with disabilities or limited English proficiency/language differences.

NOTE: These are conversations to inform patients/surrogates about the basis for decision-making under crisis standards of care; this differs from consent conversations in clinical shared decision-making. Individuals should be informed that requests for appeal may be limited based on the nature of the public health emergency.

"SHARE"

For crisis use only***. Talking about resource allocation (i.e. rationing).

Show the guideline	"Here's what our institution / system / region is doing for patients with this condition." (State the part directly relevant to that person.)
Headline what it means for the patient's care	"So for you, what this means is that we care for you on the floor and do everything we can to help you feel better and treat this illness. What we won't do is to transfer you to the ICU." (Note that you talk about what you *will* do first, then what you won't do)
Affirm the care you will provide	"We will be doing [the care plan], and we hope you will recover."
Respond to emotion	"I can see that you are concerned."
Emphasize that the same rules apply to everyone	"We are using the same rules with every other patient in this hospital / system /institution. We are not singling you out."

***This talking map is only used when an institution has declared use of crisis standards of care, or a surge state. When the crisis standards or surge are discontinued, this map should no longer be used.

VITALtalk

Part 1: PREAMBLE FOR EVERY PATIENT (OR AUTHORIZED DECISION-MAKER) REGARDLESS OF DIAGNOSIS

Before starting the conversation, ask the patient with decision-making capacity (or their authorized decision-maker):

- How do you think you are doing right now?
- Have you talked with anyone about using a ventilator or breathing machine during your hospital stay?
- What concerns do you have now?

When communicating with the patient or the authorized decision maker, remember to:

- Allow time for the information to sink in
- Show empathy
- Speak clearly (not too fast)
- Ask questions
- Listen
- Wait for the person's response
- Don't just ask the patient or the authorized decision maker if they understand. Instead, use the Teach-Back method to have the patient or the authorized decision maker explain to you what has been said.

This document is written to support conversations with patients. The language should be customized if you are speaking to an authorized decision-maker.

Healthcare provider:
We are currently in a national health care crisis because of the Coronavirus outbreak. As a result, we are treating more patients than usual, who are much sicker than our hospitals normally serve. Although we did our best to prepare, we do not have all of the resources that we need at this time. We have joined with other health care systems in Maryland to design a way to share these limited resources with those who need them and are most likely to recover. We want to assure you that we are doing everything we can to make this a fair and equitable process. But, this means that not everyone will be able to receive certain treatments.

This is difficult news for me to share. I know how hard it must be for you to hear this. Unfortunately, we will have to make difficult decisions during these challenging times. We want all of our patients to get better and we remain committed to providing all patients with fair, equitable, respectful and compassionate care.

FOR ALL PATIENTS
If our supplies get low, we will follow these steps:

1. Do you have an advance directive? If yes, do you have it with you? What does it say?
2. If you become too sick to speak for yourself, is there someone you have chosen to make medical decisions for you?
3. If you become sick enough to need treatment to stay alive, what treatments would you want? Are there any treatments that you would not want, such as CPR or a breathing machine?
4. We will evaluate every patient using the same clinical scoring system to see whether they would benefit from a breathing machine or ventilator.
5. The same scale will be applied to every patient regardless of their race, color, ethnicity, national origin, age, language, physical or mental disability, religion, sex, sexual orientation, and gender identity or

expression, immigration status, or ability to pay. Patients will not be denied medical care on the basis of stereotypes, assessments of quality of life, or judgments about a person's relative "worth" based on the presence or absence of disabilities. Every person in need of medical care will be assessed using the same standardized method.

6. This clinical scoring system will help us make decisions about who receives which treatments. This scoring system considers the patient's current illness, their chances of recovering from their current illness as well as their one year survival.
7. A Triage Team, which is different from your regular care team, will use this evaluation to see which treatments may work for you. Your regular care team will keep treating you to the best of their abilities.
8. If you don't agree with the Triage Team's decision, you can ask for a review by a Secondary Review Team that is also different than your care team
9. We are here to answer any questions you may have and to guide you through the next steps of your treatment.

Part 2: ONLY TO PATIENTS ELIGIBLE FOR VENTILATOR

1. To recover, you may need the help of a breathing machine or ventilator. We plan to keep you on the breathing machine until your illness improves and you no longer need it to help you breathe.
2. If your condition does not improve with the help of the breathing machine, it is possible that the breathing machine will be stopped. We would keep providing other treatments to relieve your symptoms and increase your comfort at that time.
3. We will let you and your authorized decision-maker know of your progress and the treatments that are available to you.
4. We are here to answer any questions you may have and to guide you through the next steps of your treatment.

Part 3: ONLY TO PATIENTS WHO ARE NOT ELIGIBLE FOR VENTILATOR

1. Based on the clinical evaluation we use for everyone, we will manage your breathing problems by using medications and other treatments. We cannot provide you with a breathing machine. at this time. We know this is difficult news to hear and wish we had different news to share.
2. We will keep providing other types of treatments to relieve your symptoms and increase your comfort for as long as you need them.
3. If you don't agree with the Triage Team's decision, you can ask for a review by a Secondary Review Team that is not currently providing you care.
4. We are here to answer any questions you may have and to guide you through the next steps of your treatment.

Part 4: FOR PATIENTS WHOSE CONDITIONS ARE NOT IMPROVING AND ARE AT RISK OF DISCONTINUING VENTILATION

1. We may need to stop using the breathing machine since your illness is not improving.
2. We know this is difficult news to hear and wish we had different news to share.
3. Would you like to speak with someone to make sense of this difficult situation? (Offer the services of spiritual care and chaplaincy, palliative care, or social work.)
4. We will keep watching your condition. If the breathing machine is no longer helping you, we will need to stop it in about 24 hours.
5. We will keep providing other types of treatments to relieve your symptoms and increase your comfort after the ventilator is removed. We will continue to support you and your loved ones during this difficult time.

6. If you don't agree with the Triage Team's decision, you can ask for a secondary review by a different team that is not currently providing you care.
7. We are here to answer any questions you may have and to guide you through the next steps of your treatment.

Part 5: FOR PATIENTS YOU EXPECT WILL PROGRESS TO DEATH

1. We are worried that you may not survive because your illness is not responding to treatment.
2. As your illness gets worse, we will keep providing other treatments to relieve your symptoms and increase your comfort as you near the end of life taking into account your advance directive preferences.
3. We will provide support to you and your loved ones, including spiritual care and chaplaincy, comfort care specialists (palliative care), and others.
4. Depending on hospital policy, we may be able to only allow 1-2 visitors (or none) at this time, but we will do our best to work with them as much as possible during this crisis. In accordance with Maryland law, disability support persons are exempted from these limitations as a reasonable accommodation.
5. Please let us know what things are important to you during this time.
6. We are here to answer any questions you may have and to guide you through the next steps.

Part 6: NEONATAL AND PEDIATRIC PATIENTS

1. We will evaluate infants and children as needed using the same clinical scoring system to see whether they would benefit from a breathing machine or ventilator.
2. We will not treat any patients differently based upon their race, color, ethnicity, national origin, age, language, physical or mental disability, religion, sex, sexual orientation, gender identity or expression, immigration status, or ability to pay.
3. This clinical scoring system will help us make decisions about who receives which supplies. This scoring system considers the patient's current illness, their chances of recovering from their current illness as well as their 30 day survival.
4. A Triage Team, which is different from your child's regular care team, will use this evaluation to see which treatments may work for your child. Your child's regular care team will keep treating your child to the best of their abilities.
5. If you don't agree with the Triage Team's decision, you can ask for a review by a Secondary Review Team that is not currently providing your child care.
6. We are here to answer any questions you may have and to guide you through the next steps of your treatment.

REQUESTS FOR SECONDARY REVIEW OF TRIAGE TEAM DECISION:

Part 7: FOR PATIENTS OR AUTHORIZED DECISION-MAKERS WHO REQUEST SECONDARY REVIEW

1. We understand you do not agree with the Triage Team's decision about the breathing machine and have asked for a review by a Secondary Review Team that is not currently providing you care. We will let the review team know about your request.
2. The Secondary Review Team includes an experienced attending physician, a senior nurse, and another clinician with relevant expertise. Some hospital's secondary review teams may also include an ethicist or member of the ethics committee, representative from the Office of Diversity and Inclusion, or a community representative..
3. Once their review is done, a member of the Secondary Review Team will contact the Triage Officer and we will talk to you about their decision.

Part 8: FOR PATIENTS FOR WHOM THE TRIAGE TEAM DECISION IS CONFIRMED BY THE SECONDARY REVIEW

1. The Secondary Review Team met and reviewed the evaluation that the Triage Team used to make its decision about not using (or stopping) the breathing machine.
2. The Secondary Review Team agreed with the Triage Team's decision. We know this is difficult news to hear and wish we had different news to share.
3. We are unable to provide treatment with a breathing machine now. We will keep providing other types of treatments to relieve your symptoms and increase your comfort as long as you need it.
4. We are here to answer any questions you may have and to guide you through the next steps of your treatment.

Part 9: FOR PATIENTS FOR WHOM THE TRIAGE TEAM DECISION IS OVERTURNED BY THE SECONDARY REVIEW

1. The Secondary Review Team met and reviewed the evaluation that the Triage Team used to make its decision about not using (or stopping) the breathing machine.
2. The Secondary Review Team disagreed with the Triage Team's decision. There were factors that the Triage Team did not fully consider in your evaluation.
3. You remain very sick and your regular care team will continue to keep treating you to the best of their abilities.
4. We will keep watching your condition. If your condition does not improve with the help of the breathing machine, it is possible that the breathing machine will be stopped in the future.

In addition to this guidance, clinicians may want to consider including suggested communication skills tips from VITALtalk COVID Ready Communication Playbook: https://www.vitaltalk.org/guides/covid-19-communication-skills/