Allocation of Scarce Resources in Crisis

Assumptions for use:

- A crisis situation has been declared at the state or institutional level requiring scarce resource management and crisis standards of care.
- The healthcare system is overwhelmed despite maximizing all possible surge and mitigation strategies for space and/or staff and/or supplies needed to deliver usual levels of care.

Section 1: Background

Crises in which demand for scarce medical resources exceeds supply of those resources cause a tension between doing what is best for individual patients and the obligation to care for all members of the community. In such crises, we are obligated to shift our concern from providing care to every patient to efficiently distributing scarce resources in order to save the most lives. In these situations, medical need alone cannot dictate who receives resources, and so value-based procedures for distributing care should be put in place. These procedures should be transparent, consistent, and respectful.

The hospital is committed to supporting our patients and their families, healthcare providers, staff, and our community. This document outlines an ethical framework to guide decision-making regarding allocation of scarce resources for adult patients in the event that the need for such resources exceeds our supply. Under such conditions of scarcity, it may not be possible to provide all patients with all of the interventions that they require to survive. This document focuses specifically on the distribution of potentially life-saving clinical resources such as ventilators, ICU beds, and other medical treatments/interventions such as ECMO and CPR in the event of their scarcity during times of dire widespread need.[i] This document is meant to provide a general structure for reference and is subject to change. It is based on the New York State Department of Health's (NYS DOH) publicly available guidelines for the allocation of ventilators in the event of a crisis, and also takes into account general ethical principles and discussions currently taking place among members of bioethics institutes across the country. The NYS DOH guidelines are available here: https://www.health.ny.gov/regulations/task_force/reports_publications/docs/ventilator_guidelines.pdf

Section 2: Healthcare Workers' Ethical Obligations During a Crisis

Duty to Care

- When resources are scarce, triage teams should make resource allocation decisions based on procedural guidelines. Providers directly caring for patients will not be responsible for these choices.
- Patients ineligible for scarce resources are still under a physician's care. Other treatments that will optimize clinical outcomes, including the basic provision of comfort care, should be provided for such patients.
- Physicians should initiate frank discussions about long-term prognoses and plans of care with patients and families as early as possible in their hospital encounters to ensure that patients and their families can have their wishes heard and respected. If a patient does not have an advance directive, a physician should complete one with the patient or the appropriate surrogate decision-maker as soon as possible.

- As in all cases, allocation decisions are not made based on socioeconomic status (ability to pay), insurance status or type, gender, race, ethnicity, religion, citizenship status, sexual orientation, or other morally irrelevant factors.

Duty to Steward Resources

- Increased demand can impose limitations on availability of staff, hospital space, and supplies, which may reduce the effectiveness of care that can be consistently delivered.[ii]
- As an institution and a community, we must balance the obligation to save the greatest possible number of lives against the obligation to intervene on the behalf of each individual patient.
- Providers should accept fair limitations on the care of individual patients and work within the capacity of hospital resources while still relieving suffering.

Duty to Promote Distributive Justice

- A just system of allocation must be transparent and applied consistently to be fair to all.
- Responses to public health emergencies should not exacerbate disparities in access to care.
- It is important be mindful of the fact that socially vulnerable populations are most likely to suffer the greatest impact during public health emergencies. All patients should be treated respectfully and fairly.

Section 3: Creation of Triage Teams

Decisions to withhold or withdraw potentially life-saving interventions when the number of patients requiring scarce resources exceeds the availability of those resources will be made by a triage team and will not be made by members of a patient's care team. The separation of the triage role protects the bedside physician from moral injury and enhances objectivity by avoiding potential bias.

Triage Officer

A triage officer (or officers) will be appointed. A triage officer will be a physician who has an in-depth understanding of the following allocation guidelines and the NYS DOH Ventilator Allocation Guidelines, and who demonstrates the ability to lead, communicate, and resolve conflicts. The triage officer will be the point-person to operationalize the guidelines and triage teams, to be available to assist in communication when necessary, and to serve as the representative of the triage teams to the administration.

Triage Teams

There will be four triage teams, each made up of representatives from each of the following groups. The critical care physician (or equivalent, see #1 below) will be designated the team lead.

The members of the triage teams will include:

1. Physician familiar with tertiary triage/critically ill patients ***triage team lead***
2. Nursing leadership/Social Work leadership
3. Bioethicist
4. Hospital administration representative
5. Other (specialty such as cardiology, pulmonology, anesthesiology, etc. as appropriate)

- The four triage teams will rotate 24-hour call. The on-call team for each day will conduct "Triage Rounds" after the bedside teams of all ventilated patients have rounded.
- Triage Team Rounds:

The physicians (primary team or consultant) taking care of patients either on ventilators or being considered/eligible for ventilators will provide the following to the triage team:

i. MSOFA score: see below for scoring methodology and timing
ii. Five-Item Modified Frailty Index: a one-time calculation of co-morbidities (**Table 4**)
iii. Any significant clinical events that have changed since the last time the patient was evaluated (prone, new renal replacement therapy, etc.) that may assist in ventilator allocation decisions.

- These data will be entered on a single live, protected spreadsheet that all teams will have the ability to simultaneously edit and will review during virtual triage team rounds.
- Triage team members will have access only to anonymized identifiers (medical record number, day and month of birth) and clinical information as provided by the bedside clinicians.
- When appropriate and necessary, the triage teams will use the triage criteria to allocate resources to or away from individual patients.
- The triage teams will implement triage criteria consistently and will not give preferential treatment based on personal or professional interests, and they will recuse themselves from allocation discussions involving patients with whom they have personal or professional relationships.
- The triage team will only use the objective criteria described here on which to base decisions. As such, persons with disabilities 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 or age. Decisions concerning whether an individual is a candidate for treatment will be based on an individualized assessment of the patient and his or her circumstances, based on the best available objective medical evidence.

Triage Appeals Committee

This is a group made up of individuals of the same disciplines as the triage teams, but serves as a 5th team that will be called upon to objectively review decisions of the triage teams when they have been challenged or appealed. *See "Appealing Triage Decisions" below.*

Section 4: New York State Department of Health Allocation Criteria[iii]

These criteria are divided into three steps, which are detailed below:

1. **Exclusion Criteria:** determine if a patient meets exclusion criteria for consideration for therapy utilizing scarce resources
2. **Mortality Risk Assessment: Modified Sequential Organ Failure Assessment (MSOFA):** assessment that is a proxy for mortality risk
    a. **Tie-breaker**, if necessary
3. **Time Trials:** scheduled clinical reassessment using MSOFA score

Step 1: Exclusion Criteria

The first step in the allocation protocol is the identification of those patients who are least likely to benefit from being mechanically ventilated. These patients will be excluded from consideration for ventilation. If a patient meets any of the exclusion criteria listed below in **Table 1**, alternative forms of medical intervention and/or palliative care will be initiated.

Importantly, if patients voice wishes not to be intubated, or if they have pre-existing advanced directives/DNI orders/MOLSTs indicating limitations of these interventions, alternative forms of medical intervention and/or palliative care will be initiated according their goals. If an advance directive is not available, the care team admitting the patient should make every attempt to assess goals of care with the patient and/or family if feasible prior to intubation.

Presuming no preexisting advance directive, the attending physician examines the patient for exclusion criteria and forwards this clinical data to the triage team. If medical information is not readily available or accessible, it may be assumed a patient is free of exclusion criteria and may proceed to the next step of the protocol.

Table 1: Exclusion Criteria

Step 1: List of Exclusion Criteria for Adult Patients Medical Conditions that Result in Immediate or Near-Immediate Mortality Even with Aggressive Therapy
- Cardiac arrest: unwitnessed arrest, recurrent arrest without hemodynamic stability, arrest unresponsive to standard interventions and measures; trauma-related arrest - Irreversible age-specific hypotension unresponsive to fluid resuscitation & vasopressor therapy - Traumatic brain injury with no motor response to painful stimulus (i.e., best motor response=1) (See chart below) - Severe burns: where predicted survival ≤10% even with unlimited aggressive therapy (See chart below) - Any other conditions resulting in immediate or near immediate mortality even with aggressive therapy

For specific guidelines on evaluating brain injuries and burns, see page 237 of the New York Health Department guidelines.

Step 2: Modified Sequential Organ Failure Assessment (MSOFA)

The second step in allocation is assessing patient mortality risk utilizing MSOFA. The MSOFA Score Scale can be found below in **Table 2,** with mortality risk assessments in **Table 3.** For patients who are currently intubated/sedated, the pre-intubation GCS **(Appendix B)** is used unless there is clinical reason to suspect a change in the patient's neurologic status without sedation.

Table 2: Modified Sequential Organ Failure Assessment (MSOFA)

Organ System	0	1	2	3	4
Respiratory*: SpO_2/FiO_2	>400	≤400	≤315	≤235	≤150
Liver	No scleral icterus or jaundice			Scleral icterus or jaundice	
Cardiovascular: hypotension	No hypotension	MAP <70 mmHg	dopamine ≤5 or dobutamine any dose	dopamine >5 epinephrine ≤0.1 norepinephrine ≤0.1	dopamine >15 epinephrine >0.1 norepinephrine >0.1
CNS: Glasgow Coma Score	15	13-14	10-12	6-9	<6
Renal: Creatinine mg/dL	<1.2	1.2-1.9	2.0-3.4	3.5-4.9	>5.0

*If patient not on ventilator, please see FiO_2 Conversion Table in **Appendix C**
MAP = mean arterial pressure
Pressor doses in mcg/kg/min
CNS = central nervous system

Table 3: Triage Chart for MSOFA

Mortality Assessment Using MSOFA[1]	
Color Code and Level of Access	**Assessment of Mortality Risk/Organ Failure**
Blue No ventilator provided. Use alternative forms of medical intervention and/or palliative care or discharge. Reassess if ventilators and other critical care resources become available.	Exclusion Criterion OR MSOFA > 11
Red Highest Use ventilators and other critical care resources as available	MSOFA ≤ 7 OR Single organ failure[2]
Yellow Intermediate Use ventilators and other critical care resources as available	MSOFA 8-11
Green Use alternative forms of medical intervention or defer or discharge. Reassess as needed.	No significant organ failure AND/OR No requirement for lifesaving resources

[1] If a patient develops a condition on the exclusion criteria list at any time from the initial assessment to the 48-hour assessment, change color code to blue. Remove the patient from the ventilator and provide alternative forms of medical intervention and/or palliative care.

[2]Intubation for control of the airway (without lung disease) is not considered lung failure.

- Patients assigned the red color code have the highest level of access to treatment because they are most likely to recover with treatment (and not likely to recover without it) and have a moderate risk of mortality. If resources are available, patients in the yellow category also have access to treatment. Those assigned the blue code are patients who potentially have the worst outlook for survival, even with ventilator therapy, and therefore have lower priority. The green category represents patients who are most likely to survive without ventilator therapy or are eligible for ventilator weaning. If resources become available, patients in the blue color category, or those with exclusion criteria, are reassessed and may become eligible for ventilator therapy and other scarce resources.
- A patient's clinical data from Steps 1 and 2 are provided to a triage officer/committee who examines the information and assigns the patient a color code (i.e., blue, red, yellow, or green), which determines the patient's level of access to treatment.

Tiebreaking method:

At Step 2, a triage team may encounter a situation in which there are several patients in the same MSOFA color category who are equally eligible to receive scarce resources. (MSOFA scores within the same color category are to be considered equal for the purposes of triage.) If all the equally-eligible patients are adults, ties will be broken as follows:

Patients will be scored according to the 5-Item Modified Frailty Index (5-mFI). Patients with lower scores will receive higher priority. See **Table 4** below.

If the 5-mFI does not break a tie, then patients who are healthcare workers actively involved in the clinical setting taking care of sick patients will be given priority in tiebreaking *only if* their attending physicians expect that giving them access to scarce treatment resources will allow them to recover and resume their life-saving work before the crisis ends. Prioritizing healthcare workers at this stage is justified because of their instrumental value: if all clinical measures of eligibility are equal, breaking ties in favor of health care workers who could resume working during the crisis promotes the goal of maximizing the overall number of lives saved.[iv]

If the foregoing criteria fail to break a tie, then a lottery (rolling of dice in the presence of an attesting witness) will be used to choose an adult patient to receive scarce resources. The tie-breaking process is repeated each time additional resources become available and demand exceeds availability. Patients waiting for therapy wait in an eligible patient pool and continue to be evaluated based on MSOFA score. They will receive alternative forms of medical intervention and/or palliative care until resources become available.

A flowchart of this method can be found in **Appendix D**.

Table 4: 5-Item Modified Frailty Index

Comorbidity	Points assigned
History of COPD or pneumonia	1
Congestive heart failure	1
Diabetes*	1
Hypertension*	1
Non-independent functional status	1

*requiring medication

Step 3: Time Trials - Re-evaluation of Allocation Decisions

- Periodic clinical assessments by the patient's physician utilizing the MSOFA occur at: 48 hours after intubation (**Table 5**), 120 hours after intubation (**Table 6**), and then every 24 hours thereafter (utilizing **Table 6**). Those eligible for a ventilator but not intubated are evaluated with a MSOFA every 24 hours and whenever resources become available.
- The results of the time trial clinical assessments are provided to the triage team, which will assign a color code (blue, red, yellow, or green) to the patient.
- The color code assigned is dependent on the MSOFA score itself and the magnitude of change between the MSOFA score at the current assessment and the MSOFA score from the previous assessment. The decision whether to continue allocating resources to a patient is dependent on the trend of the MSOFA score data.
- At 48 hours, a patient must exhibit a pattern of significant improvement to be placed in the red color code.
- After 120 hours, a patient must demonstrate a pattern of further significant improvement in health to be placed or kept in the red color code.
- After the 120-hour clinical assessment, a patient who continues with therapy is reassessed every 24 hours using the 120-Hour Clinical Assessment Chart (Table 6). The triage committee determines whether a patient continues with therapy based on the extent of change in MSOFA scores.
- The official MSOFA assessments occur after 48 and 120 hours of therapy. No formal triage decision or action may be taken until a patient's official 48-hour assessment. However, at any point during the time trial, even before an official assessment occurs, if a patient develops a condition on the exclusion criteria list, or if the patient's surrogate decision maker elects to withdraw therapy, resources are reallocated.
- Patients not receiving scarce resources are given alternative forms of medical intervention and/or palliative care.
- A flowchart of this method can be found in **Appendix E**.

Table 5

Step 3 – Ventilator Time Trials (48 Hour Assessment)[1]	
Color Code and Level of Access	**Assessment of Mortality Risk/Organ Failure**
Blue No ventilator provided.[2] Use alternative forms of medical intervention and/or palliative care or discharge. Reassess if ventilators and other critical care resources become available.	Exclusion Criterion OR MSOFA > 11 OR MSOFA 8-11 and No Change in MSOFA Score Compared to the Initial Assessment[3]
Red Highest Use lifesaving resources as available	MSOFA < 7 and Decrease in MSOFA Score Compared to the Initial Assessment[4] OR MSOFA < 11 and Decrease in MSOFA Score Compared to the Initial Assessment[5]
Yellow Intermediate Use lifesaving resources as available	MSOFA < 7 and No Change in MSOFA Score Compared to the Initial Assessment
Green Use alternative forms of medical intervention or defer or discharge. Reassess as needed.	No longer ventilator dependent/ Actively weaning from ventilator

[1] If a patient develops a condition on the exclusion criteria list at any time from the initial assessment to the 48-hour assessment, change color code to blue. Remove the patient from the ventilator and provide alternative forms of medical intervention and/or palliative care.
[2] A patient assigned a blue color code is removed from the ventilator and alternative forms of medical intervention and/or palliative care are provided.
[3] The patient remains significantly ill.
[4] These criteria apply to a patient who has placed into the red category at the initial assessment.
[5] These criteria apply to a patient who was placed into the yellow category at the initial assessment but because a ventilator was available, the patient began ventilator therapy.

Table 6

Step 3 – Ventilator Time Trials (120 Hour Assessment and beyond)[1]	
Color Code and Level of Access	**Assessment of Mortality Risk/Organ Failure**
Blue No ventilator provided.[2] Use alternative forms of medical intervention and/or palliative care or discharge. Reassess if ventilators and other critical care resources become available.	Exclusion Criterion OR MSOFA > 11 OR MSOFA <7 and No Change in MSOFA Score Compared to the Previous Assessment
Red Highest Use lifesaving resources as available	MSOFA < 7 and Progressive Decrease in MSOFA Score Compared to the Previous Assessment
Yellow Intermediate Use lifesaving resources as available	MSOFA < 7 and Minimal Decrease in MSOFA Score (< 3 Point Decrease in Previous 72 Hours) Compared to the Previous Assessment
Green Use alternative forms of medical intervention or defer or discharge. Reassess as needed.	No longer ventilator dependent/ Actively weaning from ventilator

[1] If a patient develops a condition on the exclusion criteria list at any time from the 48 hour assessment to the 120 hour assessment, change color code to blue. Remove the patient from the ventilator and provide alternative forms of medical intervention and/or palliative care.
[2] A patient assigned a blue color code is removed from the ventilator and alternative forms of medical intervention and/or palliative care are provided.

Section 5: Appealing Triage Decisions

Situations may arise in which triage decisions are challenged by a member of the care team, or by families. Appeals based on the overall allocation framework should not be granted. However, if there is concern that there is a miscalculation of a MSOFA score or 5-mFI, or that the overall severity of illness was not adequately captured, the Triage Appeals Committee will be called upon as an objective group to re-evaluate the decision. This decision will be communicated to the Triage Team and will be reflected by a note in the chart of the patient written by the Triage Appeals Committee. The decisions of the Triage Appeals Committee are final.

Section 6: Guidance for the Adult Emergency Department

When the number of ventilators or other resources are scarce, a situation may arise in which an emergent decision needs to be made in the Emergency Department about whom to intubate. As in the hospital, such decisions will be based on the availability of institutional resources and the acuity of the patients currently using those resources. Such decisions will not be the responsibility of the treating physicians, but rather the triage team on call.

The ED care team is in the unique position of being able to potentially capture patients' goals and values prior to intubation and while family members may be available to assist in planning conversations. One goal of care is to elicit patient preferences and assist in making plans of care that patients and providers can move forward with.

Like the process outlined in Section 4 of this document, the ED triage process is divided into three steps. However, Step 2: Mortality Risk Assessment, will be primarily completed utilizing the clinical criteria included in 5-mFI, rather than the MSOFA, given the time constraints frequently encountered in the ED and the fact that the criteria necessary to complete a MSOFA are not always readily available when decisions need to be made.

Steps for determining eligibility for scarce resources in the ED:

1. **Exclusion Criteria** (Table 1, above): determine if a patient meets exclusion criteria for consideration for therapy utilizing scarce resources
2. **Mortality Risk Assessment:** 5-Item Modified Frailty Index (Table 4, above): assessment that is a proxy for mortality risk, followed by MSOFA (Table 2&3, above) as results come back
3. **Discussion with the triage team on call regarding allocation of resources**

Appendix A: CPR

Due to the progressive nature of COVID-19, early discussion with patients and their families with documentation is critical to gaining an understanding of their goals of care. Patients and their families must be informed that if CPR is necessary and determined to be appropriate, all providers on the code team must have adequate PPE in place in order to participate.

As is true with any patient, if the clinician determines that the patient is likely to clinically benefit from CPR such that the benefits outweigh the risks of exposure of faculty and staff, it is reasonable to proceed with CPR, but only after the appropriate PPE has been put into place.

If the cardiopulmonary arrest is due to progression of the COVID-19 infection, and the risks to providers outweigh the benefits of performing CPR (thus effectively making them unavailable to participate), then CPR should not be performed. These clinical judgments take priority over the requests of a patient's legally authorized representative.

Appendix B: Glasgow Coma Scale

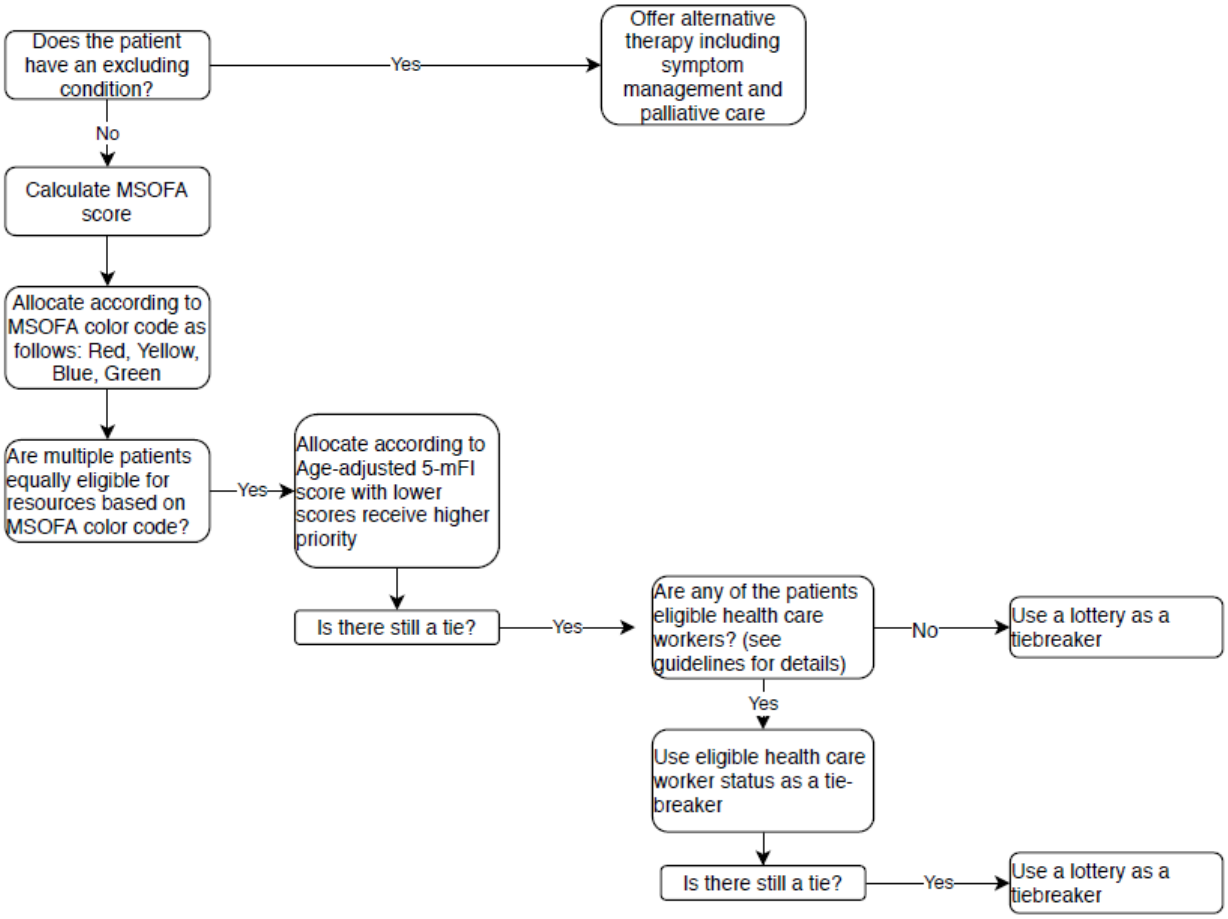
Additional Clinical Information regarding SOFA
Glasgow Coma Scale Score Criteria

Criteria	Adults	Score	Criteria Score
Best Eye Response (1 – 4)	No eye opening	1	
	Eye opens to painful stimulus	2	
	Eye opens to verbal command	3	
	Eyes open spontaneously	4	
Best Verbal Response (1 – 5)	No verbal response	1	
	Incomprehensible sounds	2	
	Inappropriate words	3	
	Confused	4	
	Oriented	5	
Best Motor Response (1 – 6)	No motor response	1	
	Extension to painful stimulus	2	
	Flexion to painful stimulus	3	
	Withdraws from painful stimulus	4	
	Localizes to painful stimulus	5	
	Obeys commands	6	
Total Score (add three subscores, range from 3 to 15):			

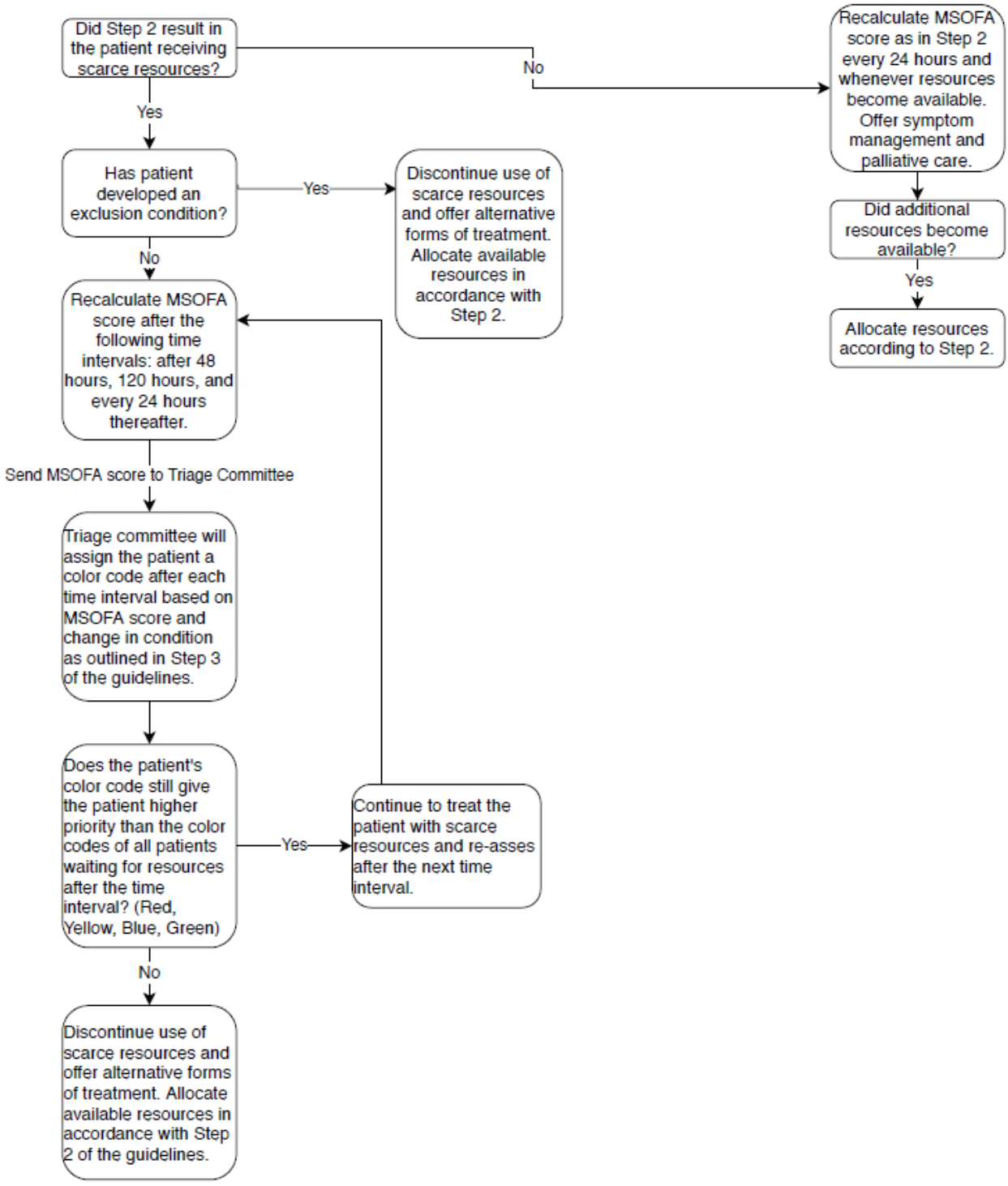
Appendix C: FiO_s Conversion Table[v]

Oxygen Flow, L/min	Estimated FiO_2	
	Nasal Cannula	Face Mask
1	0.24	0.24
2	0.28	0.28
3	0.32	0.32
4	0.36	0.36
5	0.40	0.40
6	0.44	0.50
7	0.44	0.50
8	0.44	0.60
9	0.44	0.60
10	0.44	0.60

Appendix D: Allocation Tiebreaker Flowchart



Appendix E: Flowchart for Mortality Risk Assessment



Citations

[i] See Appendix A for CPR guidance.

[ii] Berlinger N et al. Ethical Framework for Health Care Institutions Responding to Novel Coronavirus SARS-CoV-2 (COVID-19). Guidelines for Institutional Ethics Services Responding to COVID-19. Managing Uncertainty, Safeguarding Communities, Guiding Practice. The Hastings Center. March 2020.

[iii] "Ventilator Allocation Guidelines" developed by the New York State Department of Health's Task Force on Life and the Law (2015).

[iv] Persad, G., Wertheimer, A., & Emanuel, E. J. (2009). Principles for allocation of scarce medical interventions. The Lancet, *373*(9661), 423-431.

[v] Simon M et al. High-Flow Nasal Cannula Versus Bag-Valve-Mask for Preoxygenation Before Intubation in Subjects With Hypoxemic Respiratory Failure. Respir Care. 2016 Sep;61(9):1160-7.