



# ARIZONA DEPARTMENT OF HEALTH SERVICES

## **COVID-19 Addendum: Allocation of Scarce Resources in Acute Care Facilities Recommended for Approval by State Disaster Medical Advisory Committee (SDMAC) – 6/12/2020**

### **Development of the COVID-19 Addendum**

This addendum was created from a proposed COVID-19 triage protocol given to the Arizona Department of Health Services on April 16, 2020. The proposal was the product of a joint collaboration between Chief Medical Officers or their designees: Dr. David Beyda of the University of Arizona College of Medicine - Phoenix, Dr. Hannah Dillon of Tucson Regional Medical Center, Dr. William Ellert of Abrazo Healthcare and Carondelet Healthcare Phoenix, Tucson & Nogales, Dr. Keith Frey of CommonSpirit Arizona Division Dignity Health, Drs. C. Bree Johnston and Patricia Mayer of Banner Health, Dr. Nina Shah of Honor Health, and Dr. Zebulon Timmons of Phoenix Children's Hospital.

Additionally, attendees of the statewide addendum discussions included Chief Medical Officers or their Designees from the following systems/facilities: Canyon Vista Medical Center, Havasu Regional Medical Center, Indian Health Service, Kingman Regional Medical Center, Northern Arizona HealthCare, Summit Healthcare, Veteran's Administration, Valleywise Health, Yavapai Regional Medical Center, and Yuma Regional Medical Center.

Upon receipt, the Arizona Department of Health Services reformatted and organized the document in line with the preexisting *Arizona Crisis Standards of Care Plan*, 3<sup>rd</sup> edition. Clarifications in line with the U.S. Health and Human Services (HHS) bulletins were made, but otherwise no other substantive content changes.

### **Scope of COVID-19 Addendum**

This addendum specifies statewide triage protocols for acute care facilities during the COVID-19 pandemic. It corresponds with the *Arizona Crisis Standards of Care Plan*, 3<sup>rd</sup> edition but offers further guidance to reflect current best practices and recently published evidence on COVID-19. Triage color groupings have been updated to include SOFA scores consistent with current literature.

After describing the Scope and Principles, the structure of this Addendum includes Section A (Stabilization of Patients Awaiting Triage), Section B (COVID-19 Triage Protocols for Scarce Resource Allocation), Section C (Pediatric Considerations) and References.

### **Principles of COVID-19 Addendum**

All lives are precious. If resources are sufficient, all patients who can potentially benefit from therapies will be offered therapies. If resources are insufficient, all patients will be individually assessed. No one will be categorically denied care based on stereotypes, assumptions about any person's quality of life, or judgement about a person's "worth" based on the presence or absence of disabilities.

All patients, regardless of resource availability, will be treated with respect, care, and compassion. Triage decisions will be made without regard to basis of race, ethnicity, color, national origin, religion, sex, disability, veteran status, age, genetic information, sexual orientation, gender identity, quality of life, or any other ethically irrelevant criteria.

**It is the intention of Arizona health systems to collaborate such that no system reaches a Contingency or Crisis Level unless all do.** These triage protocols will go into effect when a facility moves from Conventional (hereafter called Conventional, see page 18 of the *Arizona Crisis Standards of Care Plan*, 3<sup>rd</sup> edition) to Contingency or Crisis Levels of Care (hereafter called Contingency or Crisis, respectively). If time permits, facilities that have reached Contingency or Crisis Levels and face shortages of resources (hospital beds, ICU beds, ventilators, dialysis machines, etc.) should work with other facilities to see if these resources are available elsewhere. If time does not permit and/or other facilities are short on critical resources, triage protocols as outlined here will go into effect. The Arizona Department of Health Services will coordinate information regarding the Contingency and Crisis Indicators and lead the decision-making process of transitioning to Contingency or Crisis Levels.

Prior to, as well as during, implementation of Crisis Standards of Care, all efforts must be made to determine a patient's goals of care and treatment preferences. It is imperative to know whether aggressive interventions such as hospitalization, ICU admission or mechanical ventilation are consistent with a patient's preferences. For a patient with decision-making capacity, the individual's informed refusals should be respected. All hospitalized patients should be asked about advance care planning documents, goals of care, and are strongly encouraged to appoint a proxy decision-maker (e.g., medical durable power of attorney (MDPOA) or health care agent) if not previously in place. Patients in nursing homes, skilled nursing facilities, other long-term care settings, and outpatient care settings should also be asked about their goals of care and advance care planning documents and encouraged to appoint a proxy who is aware of their preferences regarding hospitalization and critical care if not in place. If advance care planning documents are in place and available the healthcare provider should verify the patient's goals of care and treatment preferences remain the same. Medical orders and advance care planning documents should be updated if the patient's treatment wishes have changed.

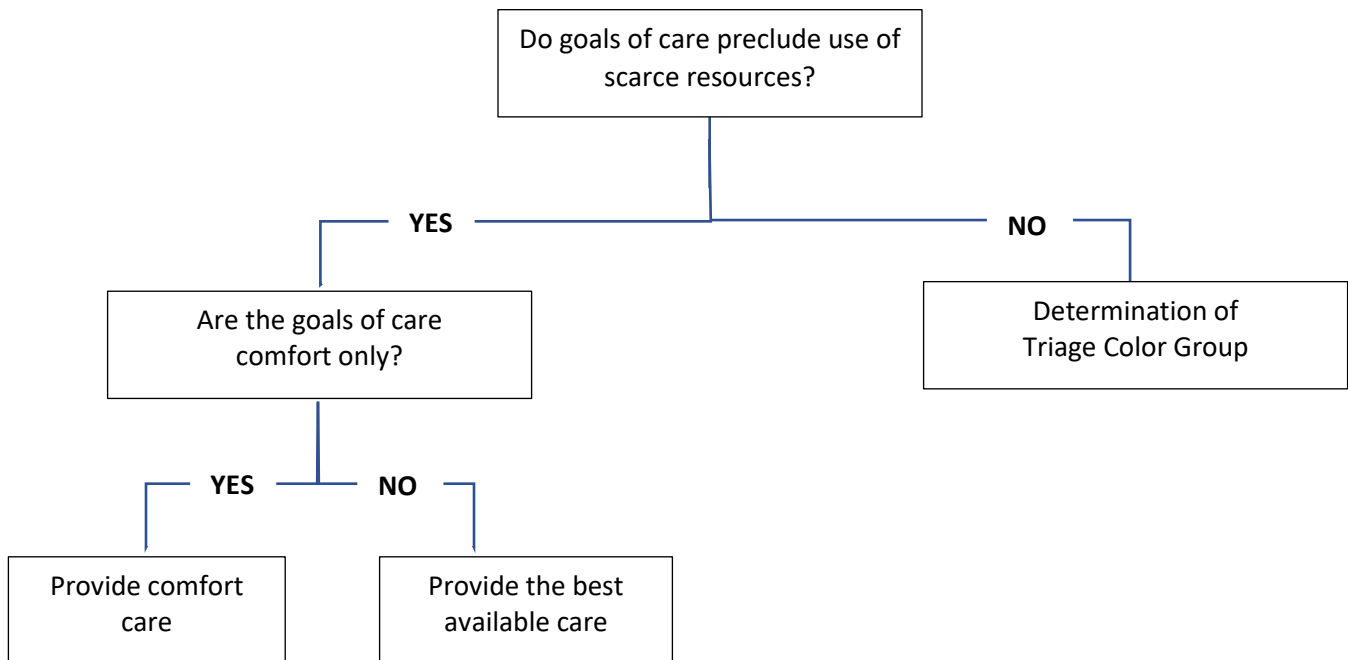
## Section A: Stabilization of Patients Awaiting Triage

First responders and treating clinicians should stabilize undifferentiated patients as they would under normal or Conventional circumstances (up to and including intubation for those in respiratory distress).

If a facility or EMS agency is in Contingency or Crisis Levels and critical resources are scarce, consultation with a Triage Officer (facility) or Incident Command in conjunction with Administration Medical Director (EMS Agency) may be done when making critical resource allocation decisions. Temporary support may be offered (e.g., nonrebreather reservoir mask, bag valve mask for ventilation, intravenous fluids, vasopressors) until the Triage Officer/Incident Command can complete their assessment. Every effort should be made to complete the initial triage assessment as soon as possible if critical care resource need is identified.

Diagram 1 represents the flow of patient arrival through receiving triage and the importance of establishing goals of care.

Diagram 1



## Section B: COVID-19 Triage Protocols for Critical Care Resource Allocation

As per the *Arizona Crisis Standards of Care Plan*, 3<sup>rd</sup> edition (pages 16, 70-72) on designating a Clinical Care Committee (CCC) and Triage Officers, those serving as representatives of the CCC and Triage Staff should not be treating providers, unless that is impossible given the staffing capabilities of the facility. Triage staff will recuse themselves from triage determinations for patients they are personally treating unless no other option exists.

These triage protocols would then be applied to both COVID-19 and non-COVID-19 patients.

### Initial Process

1. The CCC will maintain situational awareness and report to the facility or system Incident Commander to coordinate Crisis Standards of Care priorities and guidance within the Emergency Operations Center. The CCC will liaise between the Arizona Department of Health Services and the healthcare facility as needed to implement the Crisis Standards of Care at the facility level.
2. Triage Officers will review all cases brought forth for review under the Crisis Standards of Care and will triage patients according to the Crisis Standards of Care priorities and any additional protocols or guidance developed or approved by the Arizona Department of Health Services.
  - a. If Crisis Standards of Care are implemented, treating providers will communicate pertinent clinical details to the representative of the CCC and the Triage Officer(s) as necessary.
  - b. Providers will assign Triage Priority Scores and Triage Color Groups, modeled on several other state protocols, but remove age as a factor. This is conceptually consistent with the *Arizona Crisis Standards of Care Plan*, 3<sup>rd</sup> edition. Assessments must be individualized for each patient based on the best available, relevant, and objective medical evidence.
    - i. STEP 1: Assign points for the triage priority score according to the individual patient's SOFA score (range from 1-4 points), according to Reference Table 1-A / Reference Table 1-P and Summary Table 1.
    - ii. STEP 2: Assign additional points based on the individual evaluation of the patient and consideration of 1 year or 5 year mortality. A maximum of 4 points (not 6 points) will be added from this step.
    - iii. STEP 3: Add points from STEP 1 and STEP 2 together to produce a total triage priority score, which ranges from 1-8.
    - iv. STEP 4: Triage color groupings are then assigned based on the triage priority score, according to Summary Table 2. Lower scores indicate higher likelihood of benefiting from critical care, and priority is given to those with lower scores.
  - c. In the rare instance in which Reference Tables 1-3 may not capture an element important in determining prognosis, providers may consider extra elements in cases where triage color groupings are equal or are unable to be determined due to a lack of clinical data.
  - d. After presenting relevant clinical information, treating providers will be recused and the Triage Officer(s) will make a triage decision regarding the allocation of scarce resources; for example,

the initiation, continuation, or withdrawal of a particular scarce resource. Treating providers will not make decisions to withhold or withdraw life-sustaining interventions in Crisis Standards of Care situations as long as an independent Triage Officer is available.

- e. Treating providers may make decisions to withhold or withdraw life-support based on goals of care conversations through shared decision-making with patient/family. This is consistent with conventional practice.

### Explanation of Triage Priority Scores and Triage Color Groups

Triage Priority Scores are calculated using a point system based in a multi-principle allocation framework. No single score (SOFA or PELOD-2) or condition alone is used to determine a final triage priority score. All patients will be eligible to receive critical care beds and services regardless of their triage priority score, but available critical care resources will be allocated according to priority score, such that the availability of these services will determine how many patients will receive critical care.

Triage Priority Scores can be converted to three color-coded priority groups, called Triage Color Groups, in accordance with the *Arizona Crisis Standards of Care Plan*, 3<sup>rd</sup> edition: RED, YELLOW and BLUE (pages 30-31). Triage Color Groups, indicating priority for critical care resources, are assigned and modeled on several other state protocols, but remove age as a factor for Triage Priority Scores or Triage Color Groups.

If there are multiple patients that have equal Triage Priority Scores, an Equal Priority Process will be used, which is described below. If there is still not resolution of priority, then a second review will be obtained from another non-treating Triage Officer.

### Determination of Triage Priority Scores and Triage Color Groups

The following tables and diagrams will assist in determining the Triage Priority Score and Triage Color Groups for an individual patient. Summary Tables 1 and 2 illustrate the crux of the determination; Reference Table 1-A is the Sequential Organ Failure Assessment (SOFA) Score. Reference Table 1-P is the PELOD-2 score. If some of the information normally used to determine the severity of underlying conditions is not immediately available, clinical judgment will be required.

**Summary Table 1: Multi-principle Strategy for Determining Triage Priority Score for an Individual Patient; Based on Pittsburgh, California and Maryland Frameworks**

	0 POINTS	1 POINT	2 POINTS	3 POINTS	4 POINTS
SOFA score (Table 1-A)  Or PELOD-2 score (Table 1-P)		ADULT SOFA SCORE (<6) OR PEDIATRIC PELOD-2 SCORE <12	ADULT SOFA SCORE (6-8) OR PEDIATRIC PELOD-2 SCORE 12-13	ADULT SOFA SCORE (9-11) OR PEDIATRIC PELOD-2 SCORE 14-16	ADULT SOFA SCORE (≥12) OR PEDIATRIC PELOD-2 SCORE ≥ 17
<b>-----PLUS-----</b>					
	ADD 0 POINTS		ADD 2 POINTS		ADD 4 POINTS
Additional considerations	Expected to live more than 5 years if patient survives the acute illness		Death expected within 5 years despite successful treatment of acute illness		Death expected within 1 year despite successful treatment of acute illness

Example: SOFA SCORE 14(4 points) + EXPECTED TO LIVE MORE THAN 5 YRS IF THEY SURVIVE THE ACUTE ILLNESS(0 points)=  
**TRIAGE PRIORITY SCORE: 4**

Example: SOFA SCORE 6(2 points) + DEATH EXPECTED WITHIN 5 YRS DESPITE SUCCESSFUL TREATMENT OF ACUTE ILLNESS(4 points)=  
**TRIAGE PRIORITY SCORE: 6**

Example: SOFA 14(4 points) + DEATH EXPECTED WITHIN 1 YR DESPITE SUCCESSFUL TREATMENT OF ACUTE ILLNESS(4 points)=  
**TRIAGE PRIORITY SCORE: 8**

**Summary Table 2: Determining Triage Color Group for an Individual Patient**

Triage Color Group	Triage Priority Score from Summary Table 1
<b>RED</b> HIGHEST PRIORITY FOR CRITICAL CARE RESOURCES	1-3
<b>YELLOW</b> INTERMEDIATE PRIORITY FOR CRITICAL CARE RESOURCES	4-5
<b>BLUE</b> LOWEST PRIORITY FOR CRITICAL CARE RESOURCES	6-8

## Reference Table 1-A: Sequential Organ Failure Assessment (SOFA) Score

TABLE 1

Sequential Organ Failure Assessment (SOFA) Score <sup>1-2</sup>

Organ System	0	1	2	3	4
Respiratory PaO <sub>2</sub> /FiO <sub>2</sub> , mmHg	>400	≤400	≤300	≤200	≤100
Coagulation Platelets x10 <sup>3</sup> /μL	>150	≤150	≤100	≤50	≤20
Liver Bilirubin, mg/dL	<1.2	1.2-1.9	2.0-5.9	6.0-11.9	>12.0
Cardiovascular, hypotension	No hypo- tension	MAP <70 mm Hg	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 urine output mL/d	<1.2	1.2-1.9	2.0-3.4	3.5-4.9 or urine <500 mL/d	>5.0 or urine<200 mL/d

### Equal Priority Resolution Process

Before proceeding with this process, it is important to be aware there are some persons who are likely to experience immediate or near-immediate death despite aggressive therapy, such that during conventional care clinicians do not provide critical care services (e.g., massive intracranial bleeds not amenable to surgical intervention, intractable shock despite treatment). During a public health emergency, clinicians must still make those same judgments about the medical appropriateness of critical care services using the criteria they use during conventional care.

Once patients have been classified according to their Triage Priority Scores and Triage Color Groups, a situation could still arise where limited resources are needed by two or more patients with the same Triage Priority Scores.

If two or more patients require a single resource, additional factors *may* be considered as priorities, including:

1. Pediatric patients < 18 years of age
2. First responders or frontline healthcare workers (HCWs). This prioritization reflects the instrumental value HCWs serve in the community during a pandemic, as well as an acknowledgement of the increased risk they are assuming in caring for high-risk patients. They specifically do not receive priority because of an estimation of worth.
3. Single caretakers for minors or dependent adults
4. Pregnant patients

5. Opportunity to experience life stages (childhood, young adulthood, middle years, and older years). The justification for this principle does not rely on considerations of one's intrinsic worth or social utility, but rather that younger individuals have had the least opportunity to live through life's stages. Public engagement regarding allocation of critical care resources supports the use of this principle for allocation decisions. (Neuberger 1998)

If patients requiring the same scarce resource cannot be effectively prioritized with any of the above, allocation should proceed randomly.

### Ongoing Triage

At regular intervals (daily for hospitalized patients) Triage Priority Scores will be recalculated. This does not mean patient care will necessarily change; this is to allow treating physicians and Triage Officers to remain aware of each patient's status and for Incident Command awareness of local resources in relationship to demand.

1. If an individual patient receiving scarce resources develops a condition that would drastically affect their Triage Priority Score, that individual patient could have their triage color group reassigned.
2. A patient will not be reassigned a lower Triage Color Score simply because they continue to require a scarce resource such as a ventilator. As long as the clinical course is not dramatically worse (e.g., the development of a devastating complication) and the attending physician feels continued use of the scarce resource is medically indicated, the resource will not be reassigned. The attending cannot overrule the Triage Officer. Emerging clinical information on COVID-19 infections indicates some patients require prolonged ventilation; we also expect new information might change treatments or current therapies for this new and incompletely characterized infection. This document is not meant to interfere with that need or with clinical judgment concerning ongoing treatment.
3. Withdrawing and withholding of life sustaining resources differ in triage whereas they are considered ethically equivalent in non-triage circumstances. We therefore expect the withdrawal of a scarce resource from one patient to require a more stringent justification than the withholding of a scarce resource from another.
4. At regular intervals, cases will be systematically reviewed by Leadership and the Triage Officer(s) other than those making the original decision to ensure consistency, fairness, and adherence to the process.

### Appeals Process

1. Appeals will be allowed if there is concern regarding whether an individual patient's Triage Priority Score or Triage Color Grouping is accurate; appeals based on rejection of the criteria will not be allowed.
  - a) If a *clinician* elects to appeal a decision, another appointed Triage Officer(s) not involved in the original decision, if available, will be asked to review the case.
  - b) If the *family or decision maker* elects to appeal the decision, another appointed Triage Officer(s) not involved in the original triage decision, if available, will be asked to review the case.
2. An appeal could be denied if there is a time-critical situation and insufficient time to conduct the appeal.



### Note on Chronically Ventilated Patients

When a chronically ventilated patient with their own ventilator is admitted, they will continue to be ventilated using that ventilator which is considered to be their personal property. While ventilated by their own ventilator, patients will be exempt from the triage process. Under no circumstances will a patient's home ventilator be "reallocated" to another patient. This is likewise true of other durable medical equipment that belongs to a patient.

However, if a chronically ventilated patient's respiratory status changes and they need to be ventilated with a new ventilator provided by the hospital, the patient will be included for assessment and resource allocation if a triage protocol is in place for crisis standards of care. If this occurs, that patient's home ventilator remains personal property and will not be subject to involuntary reallocation.

## **Section C: Pediatric Considerations**

### Similarities to adult triage protocols: Triage strategies

Prioritization of scarce resources is a similar process to adults. In the event life-ending or life-limiting decisions are being made, they should be made (when possible) in concert with the attending provider, a peer provider, clinical leadership (CMO/CQO), and clinical ethics.

The triage process, ongoing triage, review and appeals are similar to adults. Once a patient is in the ICU, they should be reassessed (like adults) once daily for continued need for ICU care and development of conditions in Tables 2P and 3P that could change their priority score.

### Differences from the adult triage protocols: ECMO, Equal priority resolution process and Tables 1-3

The decision to use ECMO should be on a case-by-case basis, if ECMO is available.

Summary Table 1 is still the main reference for pediatric triage protocols for scarce critical care resources, the PELOD-2 scoring table is Reference Table 1-P.

If pediatric patients require the same resource and have the same Triage Priority Score, allocation should proceed randomly.

**Reference Table 1-P: Pediatric Logistic Organ Dysfunction Score (PELOD-2)**

**Table I - Pediatric Logistic Organ Dysfunction Score - (PELOD-2)<sup>6</sup>**

Organ dysfunctions and variables	Points by severity level						
	0	1	2	3	4	5	6
<b>Neurologic</b>							
• Glasgow coma score	≥11	5-10			3-4		
• Pupillary reaction	Both reactive					Both fixed	
<b>Cardiovascular</b>							
• Lactatemia (mmol/L)	<5.0	5.0-10.9			≥11.0		
• Mean arterial pressure (mmHg) (months)							
0-<1	≥ 46		31-45	17-30			≤ 16
1-11	≥ 55		39-54	25-28			≤ 24
12-23	≥ 60		44-59	31-43			≤ 30
24-59	≥ 62		46-61	32-44			≤ 31
60-143	≥ 65		49-64	36-48			≤ 35
≥144	≥ 67		52-66	38-51			≤ 37
<b>Renal</b>							
• Creatinine (μmol/L) (months)							
0-<1	≥ 69		≥ 70				
1-11	≥ 22		≥ 23				
12-23	≥ 34		≥ 35				
24-59	≥ 50		≥ 51				
60-143	≥ 58		≥ 59				
≥144	≥ 92		≥ 93				
<b>Respiratory</b>							
• PaO <sub>2</sub> (mmHg)/FiO <sub>2</sub>	≥ 61		≤ 60				
• PacO <sub>2</sub> (mmHg)	≥ 58	59-94		≥ 95			
• Invasive ventilation	No			Yes			
<b>Hematologic</b>							
• WBC Count (x10 <sup>9</sup> /L)	>2		≤ 2				
• Platelet (x10 <sup>9</sup> /L)	≥142	77-141	≤ 76				

## References

- Advance Care Planning Tips from the National Institute on Aging, Jan 2018. Retrieved from: <https://order.nia.nih.gov/sites/default/files/2018-03/advance-planning-tip-sheet.pdf>
- Antommara, AH., Powell, T., Miller, JE., Christian, MD. (2011). Ethical issues in pediatric emergency mass critical care. *Pediatric Critical Care Medicine*, 12(6 Suppl): S163-8. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/22067926>
- Berger, JT., Howe, EG., Powell, T., Trotter, G., Rosoff, PM., McCullough, LB.,... Vawter, DE. Clinical Ethics in Catastrophic Situations: Mapping a Standard of Care—Imagining the Unthinkable. Berger, JT (Ed). *The Journal of Clinical Ethics*, Special Publication. Retrieved from: <http://www.clinicalethics.com/>
- Biddison, D., Faden, R., Gwon, HS., Mareiniss, DP., Regenber, AC., Schoch-Spana, M.,... Toner, ES. (2019). Too Many Patients. A Framework to Guide Statewide Allocation of Scarce Mechanical Ventilation During Disasters. *Chest*, 155(4):848-854. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/30316913>
- Cohen, G, Crespo, A, White D. Potential legal liability for withdrawing or withholding ventilators during COVID 19. *JAMA*, April 1, 2020; 10.1001/JAMA.2020.5442
- Curtis, JR., Kross, EK., Stapleton, RD. (2020). The importance of addressing advance care planning and decisions about do-not-resuscitate orders during novel coronavirus 2019 (COVID-19). *JAMA*. Retrieved from: <https://jamanetwork.com/journals/jama/fullarticle/2763952>
- Emanuel, E., Persad G., Upshur, R., Thome, B., Parker, M., Glickman, A.,... Phillips, J. (2020). Fair Allocation of Scarce Medical Resources in the time of COVID. *The New England Journal of Medicine*, 1-7. Retrieved from: <https://www.nejm.org/doi/full/10.1056/NEJMs2005114>
- Grissam, CK., Brown, SM., Kuttler, KG., Boltax, JP., Jones, J., Jephson, AR., Orme, JF. (2010). A Modified Sequential Organ Failure Assessment (MSOFA) Score for Critical Care Triage. *Disaster Med Public Health Prep*, 4(4): 277-84. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/21149228>
- Institute of Medicine. (2012). Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response: Volume 1: Introduction and CDC Framework. *The National Academies Press*. Retrieved from: <https://www.nap.edu/catalog/13351/crisis-standards-of-care-a-systems-framework-for-catastrophic-disaster>
- Lambden, S., Laterre, PF., Levy, MM., Francois, B. (2019). The SOFA score—development, utility and challenges of accurate assessment in clinical trials. *Critical Care*, 23 (374). Retrieved from: <https://ccforum.biomedcentral.com/articles/10.1186/s13054-019-2663-7#citeas>
- Leteurre S<sup>1</sup>, Duhamel A, Salleron J, Grandbastien B, Lacroix J, Leclerc F; Groupe Francophone de Réanimation et d'Urgences Pédiatriques (GFRUP). PELOD-2: an update of the Pediatric logistic organ dysfunction score. *Crit Care Med*. 2013 Jul;41(7):1761-73. doi: 10.1097/CCM.0b013e31828a2bbd.
- Maves, RC., Downar, J., Dichter, JR., Hick, JL., Devereaux, A., Geiling, JA.,... Christian, MD, On behalf of the ACCP Task Force for Mass Critical Care. (2020). Triage of scarce critical care resources in COVID-19: an implementation guide for regional allocation An expert panel report of the Task Force for Mass Critical Care and the American College of Chest Physicians. *Chest*. Retrieved from: <https://www.sciencedirect.com/science/article/pii/S0012369220306917?via%3Dihub>

- Neuberger J, Adams D, MacMaster P, Maidment A, Speed M. Assessing priorities for allocation of donor liver grafts: survey of public and clinicians. *Bmj* 1998;317:172-5.
- New York State Task Force on Life and the Law New York State Department of Health. (2015). Ventilator Allocation Guidelines. *New York State Department of Health*. Retrieved from: [https://www.health.ny.gov/regulations/task\\_force/reports\\_publications/docs/ventilator\\_guidelines.pdf](https://www.health.ny.gov/regulations/task_force/reports_publications/docs/ventilator_guidelines.pdf)
- Pandemic Influenza Working Group. (2005). STAND ON GUARD FOR THEE, Ethical Considerations in Preparedness Planning for Pandemic Influenza. *University of Toronto Joint Centre for Bioethics*. Retrieved from: [http://www.jcb.utoronto.ca/people/documents/upshur\\_stand\\_guard.pdf](http://www.jcb.utoronto.ca/people/documents/upshur_stand_guard.pdf)
- Papadimos, TJ., Marcolini, EG., Hadian, M., Hardar, GE., Ward, N., Levy, MM.,... Davidson, JE. (2018). Ethics of Outbreaks Position Statement. Part 1: Therapies, Treatment Limitations, and Duty to Treat. *Critical Care Medicine*, 46(11): 1842-1855. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/30312224>
- Papadimos, TJ., Marcolini, EG., Hadian, M., Hardar, GE., Ward, N., Levy, MM.,... Davidson, JE. (2018). Ethics of Outbreaks Position Statement. Part 2: Family-Centered Care. *Critical Care Medicine*, 46(11): 1856-1860. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/30312225>
- Ranney, ML., Griffeth, V., Jha, AK. (2020). Critical Supply Shortages — The Need for Ventilators and Personal Protective Equipment during the Covid-19 Pandemic. *The New England Journal of Medicine*. Retrieved from: [https://www.nejm.org/doi/full/10.1056/NEJMp2006141?url\\_ver=Z39.88-2003&rfr\\_id=ori:rid:crossref.org&rfr\\_dat=cr\\_pub%3dpubmed](https://www.nejm.org/doi/full/10.1056/NEJMp2006141?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed)
- Straney, L., Clements, A., Parslow, RC., Pearson, G., Shann, F., Alexander, K., Slater, A. (2013). Paediatric index of mortality 3: an updated model for predicting mortality in pediatric intensive care\*. *Pediatric Critical Care Medicine*, 14:673–681. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/23863821>
- Strategies for Optimizing the Supply of N95 Respirators. (2020). *Centers for Disease Control and Prevention Coronavirus Disease 2019 (COVID-19)*. Retrieved from: [https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fhcp%2Frespirators-strategy%2Fcrisis-alternate-strategies.html#](https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fhcp%2Frespirators-strategy%2Fcrisis-alternate-strategies.html#)
- Subject Matter Experts Advisor Panel. (2020). Crisis Standards of Care Guidelines for Hospitals for the COVID-19 Pandemic. *Governors Expert Emergency Epidemic Response Committee*, Version 0.9. Retrieved from: <https://www.colorado.gov/pacific/sites/default/files/Crisis%20Standards%20of%20Care%20Triage%20Standards-April%202020.pdf>
- Thompson, AK., Faith, K., Gibson, JL., Upshur, REG. (2006). Pandemic Influenza Preparedness: An Ethical Framework to Guide Decision-making. *BMS Medical Ethics*, 7(12). Retrieved from: <https://bmcmethics.biomedcentral.com/articles/10.1186/1472-6939-7-12>
- Truong, RD., Mitchell, C., Daley, GQ. (2020). The Toughest Triage — Allocating Ventilators in a Pandemic. *The New England Journal of Medicine*. Retrieved from: <https://www.nejm.org/doi/full/10.1056/NEJMp2005689>.

- Utah Hospitals and Health Systems Association. (2010). Utah Pandemic Influenza Hospital and ICU Triage Guidelines. *Utah Department of Health*, Version 4b. Retrieved from: [https://health.utah.gov/wp-content/uploads/Final\\_PANFLU\\_CSC-2.pdf](https://health.utah.gov/wp-content/uploads/Final_PANFLU_CSC-2.pdf)
- Washington State Department of Health and Northwest Healthcare Response Network (2020). Scarce Resource Management & Crisis Standards of Care. Retrieved from: [https://nwhrn.org/wp-content/uploads/2020/03/Scarce\\_Resource\\_Management\\_and\\_Crisis\\_Standards\\_of\\_Care\\_Overview\\_and\\_Materials-2020-3-16.pdf](https://nwhrn.org/wp-content/uploads/2020/03/Scarce_Resource_Management_and_Crisis_Standards_of_Care_Overview_and_Materials-2020-3-16.pdf)
- White, DB., Halpern, SD. (2020). Allocation of Scarce Critical Care Resources During a Public Health Emergency. *University of Pittsburgh Department of Critical Care Medicine*. Retrieved from: [https://ccm.pitt.edu/sites/default/files/Model%20hospital%20policy%20for%20allocation%20of%20critical%20care\\_2020-03-23%20web.pdf](https://ccm.pitt.edu/sites/default/files/Model%20hospital%20policy%20for%20allocation%20of%20critical%20care_2020-03-23%20web.pdf)
- White, DB., Katz, MH., Luce, JM., Lo, B. (2009). Who Should Receive Life Support During a Public Health Emergency? Using Ethical Principles to Improve Allocation Decisions. *Annals of Internal Medicine*, 150(2): 132-138. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2629638/>
- White, DB., Lo B. (2020). A Framework for Rationing Ventilators and Critical Care Beds During the COVID-19 Pandemic. *JAMA*. Retrieved from: <https://jamanetwork.com/journals/jama/fullarticle/2763953>