

## VIEWPOINT

# A Framework for Rationing Ventilators and Critical Care Beds During the COVID-19 Pandemic

**Douglas B. White, MD, MAS**

Program on Ethics and Decision Making in Critical Illness, The CRISMA Center, Department of Critical Care Medicine, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania.

**Bernard Lo, MD**

The Greenwall Foundation, New York, New York; and University of California, San Francisco.



Supplemental content

**As the coronavirus disease 2019 (COVID-19)** pandemic intensifies, shortages of ventilators have occurred in Italy and are likely imminent in parts of the US. In ordinary clinical circumstances, all patients in need of mechanical ventilation because of potentially-reversible conditions receive it, unless they or their surrogates decline. However, there are mounting concerns in many countries that this will not be possible and that patients who otherwise would likely survive if they received ventilator support will die because no ventilator is available. In this type of public health emergency, the ethical obligation of physicians to prioritize the well-being of individual patients may be overridden by public health policies that prioritize doing the greatest good for the greatest number of patients.<sup>1</sup> These circumstances raise a critical question: when demand for ventilators and other intensive treatments far outstrips the supply, what criteria should guide these rationing decisions?

Existing recommendations for how to allocate scarce critical care resources during a pandemic or disaster contain ethically problematic provisions, such as categorically excluding large populations of patients from access to scarce intensive care unit (ICU) resources. This

## To respond to the looming threat of shortage of ventilators, hospitals and states urgently need to establish and implement policies that more fairly allocate these scarce resources

viewpoint addresses these ethical concerns and provides a framework for making allocation decisions that incorporates multiple ethically relevant considerations, while allowing all patients in need to be eligible for access to critical care.

### Categorically Excluding Large Groups of Patients From Receiving Mechanical Ventilation Is Ethically Problematic

Professional society guidelines<sup>2</sup> and some states' recommendations exclude from access to ICUs large groups of patients with certain comorbid conditions, such as class III or IV heart failure, severe chronic lung disease, end-stage renal disease, and severe cognitive impairment.<sup>2,3</sup> These exclusions are not explicitly justified, and they are ethically flawed because the criteria for exclusion (long-term prognosis and functional status) are selectively applied to only some types of patients, rather than to all patients being considered for critical care. This violates the principle of justice

because it applies additional allocation criteria to some patients but not others, without making clear what is ethically different about the patients that would justify doing so. Categorically excluding patients will make many feel that their lives are "not worth saving," which may lead to perceptions of discrimination. Moreover, categorical exclusions are too rigid to be used in a dynamic crisis, when ventilator shortages will likely surge and decline episodically during the pandemic. In addition, such exclusions violate a fundamental principle of public health ethics: use the means that are least restrictive to individual liberty to accomplish the public health goal. Categorical exclusions are not necessary because less restrictive approaches are feasible, such as allowing all patients to be eligible and giving priority to those most likely to benefit.

### It Is Ethically Insufficient to Solely Focus on Survival to Hospital Discharge

The most commonly recommended approach to allocate scarce ventilators is to prioritize those critically ill patients most likely to survive to hospital discharge with treatment. Although relevant, this specification of doing the greatest good for the greatest number is inadequate because it ignores other ethically relevant considerations. For example, it is also relevant to consider the number of years of life saved. The moral intuition of many people would support prioritizing a patient who stands to otherwise lose 40 years of life, compared with one with a chronic illness that will in all likelihood result in death within a few years. There is precedent for using this criterion in allocation of scarce medical resources; US rules to allocate lungs for transplantation incorporate patients' expected duration of survival after transplantation, not simply whether transplantation will avert impending death.<sup>4</sup>

Another ethically relevant consideration that should be incorporated into allocation decisions is giving individuals equal opportunity to pass through the stages of life—childhood, young adulthood, middle age, and old age.<sup>5</sup> Younger individuals should receive priority, not because of any claims about social worth or utility, but because they are the worst off, in the sense that they have had the least opportunity to live through life's stages. Public engagement about allocation of critical care resources during a pandemic support the use of the life-cycle principle in allocation decisions.<sup>6</sup>

Persons who have essential responsibilities in saving lives during the pandemic, such as health care workers and first responders, also deserve heightened priority. This prioritization is not because these individuals are

#### Corresponding

**Author:** Douglas B. White, MD, MAS, Program on Ethics and Decision Making in Critical Illness, Department of Critical Care Medicine, University of Pittsburgh School of Medicine, 3550 Terrace St, Scaife Hall, Room 608, Pittsburgh, PA 15261 (douglas.white@pitt.edu).

more intrinsically worthy but because of their instrumental value in saving others. Such prioritization could also be considered reciprocity for putting themselves at risk to help others.

It should be made explicit that ventilators will not be allocated on the basis of morally irrelevant considerations, such as sex, race, religion, intellectual disability, insurance status, wealth, citizenship, social status, or social connections.

### Recommendations for a Multiprinciple Allocation Framework

Because no single criterion captures all morally relevant values, multiple criteria should be integrated into a single tool to prioritize which patients should receive ventilators when not all can.<sup>7</sup> On March 23, 2020, the commonwealth of Pennsylvania endorsed just such an approach. The state of Minnesota has endorsed a similar strategy. One example of how to accomplish this is contained in a model policy that is being adopted by many US hospitals (eAppendix in the Supplement).<sup>8</sup>

Under this allocation framework,<sup>8</sup> all patients who meet usual medical indications for ICU beds and ventilators are eligible and are assigned a priority score using a 1 to 8 scale (lower scores indicate higher likelihood of benefit from critical care), based on (1) patients' likelihood of surviving to hospital discharge, assessed with an objective measure of acute illness severity; and (2) patients' likelihood of achieving longer-term survival based on the presence or absence of comorbid conditions that influence survival. In addition, individuals who perform tasks vital to the public health response are given heightened priority by subtracting points from their priority score. In the event that there are ties in priority scores between patients, life-cycle considerations are used as a tiebreaker, with priority going to younger patients, who have had less opportunity to live through life's stages.

This allocation framework is based on intensive engagement with diverse citizens' groups, ethicists, and disaster medicine experts.<sup>6</sup> A major strength compared with other allocation frameworks is that it does not categorically exclude large groups of patients and allows priority to go to those most likely to benefit. Another advantage is that it can be consistently applied during rapid changes in the availability of ventilators. A severe shortage on one day might be followed by a surplus several days later. Using a system that allows all patients in need to remain eligible is superior to

an exclusion-based system in which individual patients would abruptly move from being "categorically excluded" to being a "candidate" as the availability of ventilators increases.

### More Guidance Is Needed on Withdrawing Life Support From One Patient to Provide It to Another

Existing guidelines acknowledge the need to "reallocate" ventilators when capacity is overwhelmed but generally do not address the medical uncertainties and psychological complexities of this action. The ethical justification for ventilator withdrawal is that in a public health emergency the goal of maximizing population outcomes would be jeopardized if patients unlikely to survive were allowed indefinite use of ventilators. Reallocation will be distressing to health care workers, patients, and families, because in ordinary clinical care ventilators are withdrawn only if the family agrees. Several steps can improve these agonizing decisions.

First, when discussing the use of mechanical ventilation with patients and families, ventilator use should be presented as a time-limited therapeutic trial, not an unlimited promise, to appropriately set expectations. Second, the duration of the trial of ventilation must not be too brief, to avoid a "rapid cycling" of withdrawing ventilators from patients who, if treated for several more days, would have survived. Third, a triage officer or team, not the treating physician, should make decisions about allocating and discontinuing ventilators. The separation of the triage role from the clinical role is intended to enhance objectivity, avoid conflicts of commitments, and minimize the moral distress of clinicians providing treatment. Fourth, when mechanical ventilation is discontinued, expert comprehensive palliative care is imperative. Providing comfort at the end of life is difficult when patients with COVID-19 are in isolation precautions to prevent virus transmission. Family members of patients near death should be granted compassionate use of personal protective equipment if possible so that they can be with the dying patient. If this is not possible, hospitals should help families use videoconferencing technology to hold bedside vigils at a distance. Health care workers will also need emotional support.

To respond to the looming threat of shortage of ventilators, hospitals and states urgently need to establish and implement policies that more fairly allocate these scarce resources and that better support dying patients and their families.

#### ARTICLE INFORMATION

**Published Online:** March 27, 2020.  
doi:10.1001/jama.2020.5046

**Funding/Support:** This work was funded by National Institutes of Health–National Heart, Lung, and Blood Institute grant K24HL148314 (Dr White).

**Role of the Funder/Sponsor:** The National Heart, Lung, and Blood Institute had no role in the preparation, review, or approval of the manuscript and the decision to submit the manuscript for publication.

**Conflict of Interest Disclosures:** None reported.

#### REFERENCES

- Gostin L. Public health strategies for pandemic influenza: ethics and the law. *JAMA*. 2006;295(14):1700-1704. doi:10.1001/jama.295.14.1700
- Christian MD, Sprung CL, King MA, et al; Task Force for Mass Critical Care. Triage: care of the critically ill and injured during pandemics and disasters: CHEST consensus statement. *Chest*. 2014;146(4)(suppl):e615-e745. doi:10.1378/chest.14-0736
- Colorado Department of Public Health and Environment. CDPHE All Hazards Internal Emergency Response and Recovery Plan: Annex B: Colorado Crisis Standards of Care Plan. Published 2018. Accessed March 21, 2020. <https://drive.google.com/file/d/1j4O1j7qstpJaR7XQcr2ayTFZFyYrBzq2/view>
- Egan TM, Murray S, Bustami RT, et al. Development of the new lung allocation system in the United States. *Am J Transplant*. 2006;6(5, pt 2):1212-1227. doi:10.1111/j.1600-6143.2006.01276.x
- Williams A. Intergenerational equity: an exploration of the "fair innings" argument. *Health Econ*. 1997;6(2):117-132. doi:10.1002/(SICI)1099-1050(199703)6:2<117::AID-HEC256>3.0.CO;2-B
- Biddison ELD, Gwon HS, Schoch-Spana M, et al. Scarce resource allocation during disasters: a mixed-method community engagement study. *Chest*. 2018;153(1):187-195. doi:10.1016/j.chest.2017.08.001
- White DB, Katz MH, Luce JM, Lo B. Who should receive life support during a public health emergency? using ethical principles to improve allocation decisions. *Ann Intern Med*. 2009;150(2):132-138. doi:10.7326/0003-4819-150-2-200901020-00011
- White DB. A Model Hospital Policy for Allocating Scarce Critical Care Resources. University of Pittsburgh School of Medicine. Published March 23, 2020. Accessed March 25, 2020. <https://ccm.pitt.edu/?q=content/model-hospital-policy-allocating-scarce-critical-care-resources-available-online-now>