ICU
MANAGEMENT & PRACTICE
@ICU_Management
2024
VOLUME 24
ISSUE 2

# Decision-Making in the ICU



icu-management.org

INTENSIVE CARE | EMERGENCY MEDICINE | ANAESTHESIOLOGY | CARDIOLOGY | MANAGEMENT | LEADERSHIP

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# The Least Bad Decision: Crisis Standards of Care After the Pandemic

COVID-19 was an emergency that lasted for years and left few regions of the world untouched. The pandemic shone a spotlight on both the strengths and weaknesses of our disaster planning. What worked, what did not, and how can we better plan for future emergencies?

The COVID-19 pandemic forced hospitals and health systems around the world to confront shortages on a massive scale. Previous public health emergencies have strained intensive care units (ICUs), but these events tended to be time-limited, geographically restricted, or less severe. COVID-19 was unique: an emergency that lasted for years and left few regions of the world untouched. As such, the pandemic shone a spotlight on both the strengths and weaknesses of our disaster planning.

Large-scale emergencies, such as natural disasters and pandemics, lead to patient needs that exceed the capacity of hospitals to provide safely. When hospital capabilities are exceeded, careful planning is needed to provide the best available care possible under difficult circumstances. In 2009, the Institute of Medicine (IOM) in the United States defined crisis standards of care (CSC) as "a substantial change in usual healthcare operations and the level of care it is possible to deliver which is made necessary by a pervasive or catastrophic disaster" (Altevogt 2009). The goal of CSC is not to provide less care but rather to provide the best care possible under difficult circumstances, within the limitations imposed by external factors. As the IOM report put it in 2009, "in an important ethical sense, entering a crisis standards of care mode is not optional—it is a forced choice, based on the emerging situation. Under such circumstances, failing to make substantive adjustments to care operations—i.e., not to adopt crisis standards of care—is very likely to result in greater death, injury, or illness". Today, with the acute phase of the pandemic hopefully behind us, professionals in intensive care medicine need to assess the effect of our CSC plans: what worked, what did not, and how can we better plan for future emergencies?

The core pillars of CSC planning are "staff, stuff, space, and systems". Staff are the personnel needed to provide patient care in the hospital, both direct patient care at the bedside and the supporting personnel needed to maintain core hospital functions. Stuff is the material needed to provide patient care, including durable equipment such as ventilators and consumables such as personal protective equipment (PPE) and drugs. Space is the physical location for care, not only in the traditional ICU but also in overflow spaces such as emergency departments (EDs), post-anaesthesia care units (PACUs), and medical wards. Overarching all three are systems to organise care within and between institutions (Christian et al. 2014).

Crises differ in terms of severity. It has been estimated that a typical ICU can increase its capacity by approximately 20% with existing resources (Hick et al. 2014). In this conventional phase of CSC, ICUs may need to call on additional staff members to support and use caches of supplies stored in advance, but local resources should be sufficient to maintain routine ICU functions. Contingency care occurs when ICU demand increases to the point where demand is up to 100% greater than a normal census. In this phase of CSC, additional patient care spaces, including EDs and PACUs, may need to provide extended care for ICU patients; supplies may need to be conserved or re-purposed; and non-ICU-trained staff may be needed to serve as critical care extenders, such as hospitalists, cardiologists, and medical-surgical nurses. Paediatric ICUs may provide care for selected adult patients and vice versa (Wasserman et al. 2021). Despite this, the standard of care during the contingency phase is essentially unchanged, and the intent of these surge responses is to maintain a close approximation of routine operations and to avoid the need for crisis standards and triage.

The final phase of CSC is true crisis care, the time when patients' needs are greater than available resources despite attempts to increase capacity through surge responses. At this point, triage becomes necessary to identify which patients are allocated the necessary resources. During the early COVID-19 pandemic, a great deal of concern was reasonably focused on ventilator availability. Some of these efforts led to improvements in care, e.g., increased usage of noninvasive respiratory support modalities such as high-flow nasal oxygenation (Long et al. 2021). Other efforts were less successful, such as the use in the United States of the Defense Production Act to construct 200,000 ventilators, the great majority of which were unsuitable for the care of patients with severe

acute respiratory failure, and strategies such as shared ventilators where a single device would provide support to multiple patients (Branson and Rodriguez 2021). Any scarce resource may require triage and allocation, however. Continuous renal replacement therapy (CRRT) machines and circuits were scarce in many regions during the pandemic. Allocation systems were implemented for initially limited supplies of remdesivir, with reasonable success (Devereaux et al. 2022).

As noted above, the aim of triage is to provide the best possible care to the greatest extent possible in an emergency. Triage systems seek to identify patients most likely to benefit from critical care services. The ethical underpinnings of such systems can vary according to a community's standards; for example, a strictly utilitarian structure will seek to provide care to the numerically largest number of patients possible, whereas a more egalitarian system will allocate resources based on perceived needs, and a more communitarian system may place greater emphasis on social and cultural values (Maves et al. 2020). These triage systems, regarding of their underlying ethical models, should apply to all patients potentially requiring ICU care during an emergency, not just those with the pandemic disease of the moment.

The optimal "design" of a triage system is uncertain. Prior to the pandemic, it was proposed that decisions regarding triage should be made by triage teams distinct from the teams providing direct bedside care. This separation of functions would serve two purposes: first, to reduce any potential bias and ensure greater objectivity in these life-and-death decisions, and second, to reduce the moral distress faced by the bedside ICU team. Triage teams would then use diagnostic data and a variety of scoring systems to determine the likelihood of ICU survival, including metrics of short-term survival, such as the Sequential Organ Failure Assessment (SOFA) score and longer-term survival, such as the Charlson Comorbidity Index (CCI). Patients at a high risk of short-term mortality would be prioritised lower for scarce resources, such as a ventilator, than patients with a greater likelihood of recovery (Devereaux et al. 2008). It is important to note that "no ventilator" does not mean "no care". A patient not allocated a ventilator would still have access to noninvasive modalities as well as, if needed, the best available palliative care.

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Jurisdictions around the world rapidly adapted and published these triage plans early in the pandemic. Difficulties with these plans became apparent early on. SOFA-based triage scores were problematic in COVID-19; SOFA is highly predictive of in-hospital mortality in general ICU populations based on pre-pandemic data (Sanchez-Pinto et al. 2021), but SOFA at the time of presentation has not been shown to be strongly predictive of COVID-19 mortality (Raschke et al. 2021). Similarly, other prognostic scoring systems, such as the National Early Warning Score (NEWS), mostly appear useful in excluding the need for critical care. Low NEWS scores are prognostically favourable, but a score of 7 or greater is only about 50% predictive of either death or the need for invasive ventilation, an inadequate number for making triage decisions (Colombo et al. 2021). While there are scores with stronger predictive performances in COVID-19, e.g., the ISARIC 4C scores, they are also specific for COVID-19 and may not correlate as well with other disease states (Knight et al. 2022).

Why do these scoring systems perform poorly? One hypothesis is simple: COVID-19 is a different disease than influenza or bacterial sepsis, with (at least initially) a tendency to present with single-organ failure followed by prolonged hospitalisation and need for respiratory support. Acute illness scores, such as SOFA, may be insensitive as a result of the specific features of COVID-19. The problem with these scores, however, may be more fundamental. These scores are well-suited for many purposes, such as use as a screening test or for standardisation of acuity in clinical research; their use for crisis triage may be premature at best.

If not a physiologic scoring system, then what? Clinician assessment at the bedside is an imperfect tool for prognostication, but it performs reasonably well compared to formal scoring systems (Escher et al. 2018). Frailty is well-known to be a strong predictor for ICU mortality, independent of chronological age (Jung et al. 2021). However, all these systems carry the danger of exacerbating existing inequities. A score such as CCI or SOFA may, for example, give extra points for increased serum creatinine (and thus de-prioritise a patient for ICU resources). However, a patient with chronic kidney disease may be the victim of years of socioeconomic deprivation and limited access to medical care. Is it right, then, to penalise that person again during a public health emergency? Appreciating this imbalance, attempts have been made to account for these circumstances with tools to account for socioeconomic factors, reducing the potential inequities implicit in these systems (Kopar and Brown 2020).

Unfortunately, many triage plans did not survive first contact with the virus. Patients with COVID-19 did not present to our hospitals all at once but in a steady stream; patients needing intubation were intubated when they arrived, and first-come-first-serve was the rule rather than formal scoring by a triage team. Prioritisation systems may still be useful for less time-sensitive treatments such as haemodialysis or antiviral medications but not for emergency interventions like invasive mechanical ventilation (Troug 2021).

How should we reconsider our triage plans? If withholding intubation is not an option, time-limited trials of mechanical ventilation may be a reasonable alternative. A single SOFA measurement at presentation may not be informative in pandemics, but serial changes in organ function over time could be more useful. It is additionally not clear that triage decisions should be separated from the bedside intensivist. While the goals of increasing objectivity and decreasing bias are praiseworthy, it is possible that we are merely transferring moral distress from one group (the primary ICU team) to another (the triage team). Subtle prognostic findings and changes over time may also be apparent to bedside intensivists but hidden from an external team. As such, triage teams made up of active attending clinicians on service, using time-limited trials as a model, may be a workable alternative to existing systems (Knochel et al. 2022).

We all hope that COVID-19 will remain a singular event in our lives, but disasters are not rare, and hope is not a strategy. We have increasing data that patient mortality rises with increasing levels of ICU strain (Kadri et al. 2021). Our priority must remain preventing crisis care and thus the need for triage. We can improve our surge responses through improved staffing, balancing patient loads between over- and less-burdened hospitals, and reducing ICU demand through public health measures such as vaccination and PPE (Dichter et al. 2022). Triage may be the least bad decision left to us in a crisis, but we need to try and make it one that we can live with.

## Conflict of Interest

Dr Ryan Maves receives research support paid to his institution from AiCuris, Sound Pharmaceuticals, GeoVax, and Biotest. He serves as a member of a scientific advisory panel to Shionogi and receives honoraria for that work. He is a member of the examination approval committee for Critical Care Medicine at the American Board of Internal Medicine. There are no conflicts of interest related to the content of this manuscript.

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