

# 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

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**KEY WORDS:** COVID-19 pandemic; disaster preparedness; scarcity of resources; surge capacity; triage

### Perspective

The current pandemic of the novel 2019 coronavirus disease (COVID-19) because of SARS-CoV-2 has led to a substantial increase in the demands on acute and critical care services in hospitals around the world. Even modest numbers of critically ill patients with COVID-19 are rapidly exceeding existing hospital capacity. Although a minor or moderate surge can be accommodated by using conventional and contingency surge strategies such as conserving, substituting, adapting, and reusing existing resources, current experiences from other countries managing COVID-19 suggest that the

magnitude of the surge will substantially exceed capacity, necessitating a crisis surge response.<sup>1-4</sup> The clinical demands will exceed the ability to provide one or more crucial resources essential to deliver basic critical care, therefore necessitating decisions regarding the reallocation of resources. This potential requires preparation of a triage system to best allocate available critical care resources to meet severe surge to maximize benefit for the greatest number of people.<sup>4,5</sup> Importantly, this triage system should only be deployed as a last resort and implemented as resources become limited and after all

**ABBREVIATIONS:** COVID-19 = novel 2019 coronavirus disease; HCW = health-care worker; PPE = personal protective equipment; SOFA = Sequential Organ Failure Assessment

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111 attempts to surge, move patients, or shift resources from  
112 regions with greater availability have been made.

113 When implemented, triage must be applied to all current  
114 and new patients presenting with critical illness,  
115 regardless of the diagnosis of COVID-19 or another  
116 illness, while maintaining underlying ethical principles  
117 of social justice, beneficence, nonmaleficence, respect for  
118 people and their dignity, veracity and the need to uphold  
119 trust within society, and fidelity to one another within  
120 health systems. We must uphold our duty to care for all  
121 patients, even those unable to receive critical care  
122 interventions. To enact this triage plan, a triage decision  
123 support protocol, infrastructure, processes, legal and  
124 regulatory protections, and training<sup>5</sup> are required, all of  
125 which are currently lacking in most institutions and  
126 regions.  
127

128  
129 Additionally, there is a need to ensure that patients who  
130 do not initially receive critical care resources are still  
131 provided the best supportive care possible and are  
132 reevaluated, at minimum daily, for consideration of  
133 resource allocation as supplies become available. This  
134 will result in a sliding scale from crisis to contingency,  
135 and flexibility should be anticipated. The absence of a  
136 triage system, consistently applied within and between  
137 hospitals, may lead to unnecessary deaths, increased  
138 moral distress for frontline physicians, and a lack of public  
139 confidence in the fairness of scarce resource allocation. It  
140 is important to recognize that the initiation of adult  
141 triage levels does not itself imply initiation of pediatric  
142 triage (or vice versa). However, dependent on the level of  
143 impact within the pediatric system, pediatric hospitals  
144 will need to consider lower-level triage initiation at a point  
145 when adult systems have reached crisis triage, to respect  
146 the principles of utility and fairness population-wide.  
147

148  
149 With appropriate critical care surge planning, we hope  
150 that the use of a triage plan that limits the delivery of  
151 critical care should be rare, but the potential  
152 consequences of failing to prepare for this eventuality  
153 are serious.  
154

155 **Table 1** provides operational steps to implement a triage  
156 system within a state, county, or jurisdiction and  
157 highlights respective stakeholder responsibilities.  
158

## 159 Justification/Rationale

### 160 Surge Planning

161 COVID-19 is caused by a novel coronavirus that can  
162 cause severe acute respiratory illness. Early experience  
163 with the virus in China and Italy suggests that the virus  
164  
165

166 has a community symptomatic attack rate of COVID-19  
167 of up to 30% (with approximately double that number of  
168 SARS-CoV-2 infections because up to one-half of cases  
169 appear to be asymptomatic or paucisymptomatic). Of  
170 these, as many as 5% to 25% may require hospital  
171 admission, 5% to 8% may require ICU admission, and  
172 2% to 4% may require mechanical ventilation for acute  
173 respiratory failure. For example, in the greater New York  
174 City metropolitan area alone (with a population of 8.4  
175 million people), a community attack rate of 35% (ie, a  
176 symptomatic attack rate of 17.5%), leading to 1.3 million  
177 people with varying levels of disease from now until  
178 midsummer, could generate approximately 88,000 total  
179 hospitalizations and 13,000 ICU admissions under a  
180 scenario in which 7% of all affected people require  
181 hospitalization and 14% of those require critical care  
182 beds. Under a more severe scenario (20% hospitalized  
183 and 24% to ICU, rates now seen during the week of  
184 March 23, 2020, at New York City hospitals), this could  
185 lead to up to 190,000 hospitalizations and 58,000 ICU  
186 admissions over the course of the pandemic, with a peak  
187 concurrent ICU census of approximately 22,000 before  
188 summer. At baseline, the United States has approximately  
189 68,000 adult and 5,000 PICU beds, a per capita ICU bed  
190 availability that exceeds most other countries.<sup>6</sup> Clearly,  
191 either scenario is likely to vastly overwhelm any current  
192 health system, as is occurring in Italy and elsewhere.  
193

194  
195 Triage is the course of action that we take when we have  
196 exhausted our ability to expand our critical care resources,  
197 that is, to surge. Surge capacity refers to the ability of a  
198 hospital or other health-care system to expand its normal  
199 operating capacity in the setting of an emergency. Surge  
200 capacity includes the key features of staff, space, supplies,  
201 and systems with communications as a critical fifth  
202 feature. All five of these elements are necessary to permit  
203 hospitals to surge effectively in disasters. The Task Force  
204 for Mass Critical Care<sup>3</sup> provided a classification system  
205 for differing levels of surge response in their 2014  
206 guidelines on the management of the critically ill during  
207 disasters and pandemics.  
208  
209

210  
211 **Conventional Capacity:** A hospital should be able to  
212 increase its critical care capacity by approximately  
213 20% above its normal limitations. This level would be  
214 implemented in major mass casualty incidents that  
215 trigger activation of the hospital emergency operations  
216 plan. Most facilities should be able to achieve this level  
217 of response using existing staffing and resources,  
218 including strategies such as cancellation of elective  
219 procedures and transferring of appropriate patients out  
220 of ICUs.

**TABLE 1 ]** Operational Steps to Implement a Triage System

Specific Actions Suggested	Stakeholders Responsible	
1. Inventory of potential ICU resources for a surge in demand a. Physical ventilators and beds (eg, OR, PACU) b. Human resources (staff with ICU training) c. Supplies and space to deliver care (eg, medications, disposable items, PPE, PACU)	Individual health-care facilities	276 277 278 279 280 281 282
2. Establish identification triggers for and initiation of triage: as clinical demand reaches crisis stage and that crisis standards of care, including triage, should be initiated a. The decision to initiate triage should be made by an identified regional authority with situational awareness of regional health-care demands b. Triage must be consistently applied across the region, with documented rationale and oversight by the relevant regional authority	Regional government health authorities (county/state/province/national) Regional or national emergency management authorities (eg, CDC or equivalent, state/province public health department)	283 284 285 286 287 288
3. Preparation of a triage system a. Create central triage committee for the region, tasked with coordination and standardization. This should include representation of key stakeholders (medical, nursing, ethics, law, patient and community representatives) b. Identify members of institutional tertiary triage teams and support structures c. Prepare and distribute training materials to local officials for standardization of implementation	Public health department/ministry of health Local hospitals with an ICU	289 290 291 292 293 294
4. Agreement on a triage protocol to target resources to those with the greatest incremental benefit	Regional health authorities and coalitions Critical care professional societies and community, along with multistakeholder input	295 296 297 298 299
5. Consideration of changes to allow limits to the delivery of life-sustaining measures in times of crisis care, and indemnity against litigation for decisions made in accordance with the triage policy a. Options include a modification or waivers of existing requirements through legislative means, an order through the Public Health Act, or through emergency powers	Regional health authority (ie, state health commissioner, provincial health minister) Regional justice authority (ie, attorney general, governor)	300 301 302 303 304
6. Standards of care a. Modify end-of-life care policies to indicate that the standard of care in a pandemic is to triage patients according to an accepted plan, and that consent is not required to implement treatment decisions taken according to that plan b. Ensure that patients unable to receive invasive life-sustaining therapies (eg, mechanical ventilation) are provided the best available care under the circumstances (eg, supplemental oxygen through another route, palliative care, family support) c. Clear clinical guidelines for medical management of people with respiratory failure, including palliative measures d. Standardized communication tools (eg, sensitive information sheets) to inform members of the public about triage decisions and the rationale behind them	State/provincial physician licensing board Critical care/palliative care community	305 306 307 308 309 310 311 312 313 314
7. Family and societal support a. Transparency with the public about triage processes b. Communication plans with the public (telephone hotlines, online resources) to ensure that information is readily available c. Work to preserve the integrity of family units, especially in cases of young children and during end-of-life d. Ensure support for grieving families	Institutional social work, mental health, and palliative care services Consideration of COVID-19 hospice services	315 316 317 318 319 320
8. Health-care worker support a. A systematic communication plan with the reasons for triage system activation, training on its use, and companion decision support tools to ensure consistent implementation is essential b. Triage decisions must be made collaboratively, using a team-based approach that includes the designated triage officer, providers directly assigned to care for individual patients, with support from hospital ethics and palliative care experts when necessary c. A systematic approach to support health-care workers, including incident debriefing, resiliency skills, and services to provide emotional support must be implemented in advance of triage system activation	Regional health authorities and attorney general, in collaboration with regional critical care leaders and ICU directors Individual institutions	321 322 323 324 325 326 327 328 329 330

(Continued)

TABLE 1 ] (Continued)

Specific Actions Suggested	Stakeholders Responsible
9. Pediatric considerations a. Concentrate care for children at pediatric centers to preserve necessary pediatric systems, including accepting any pediatric transfers, even ones for whom they may not typically care b. Increasing pediatric age thresholds to 21, 25, or 30 years iteratively as surge requires (as long as no adult comorbidities exist that are not consistent with pediatric critical care practice) a. concentrate pediatric care in pediatri	Local health-care coalitions

CDC = Centers for Disease Control and Prevention; COVID-19 = novel 2019 coronavirus disease; OR = operating room; PPE = personal protective equipment.

**Contingency Capacity:** This level would be used during a disaster whose medical demands significantly exceeded routine hospital and community resources. At this level, a hospital will expand its critical care capacity by up to 100%, in part through modification of existing spaces and expanding the use of certain staff members. For example, critical care services may be provided in a postanesthesia care unit, stepdown unit, or other high-dependency area with cross-training of staff under the direction of critical care team members. Ventilators intended for the operating room, noninvasive ventilation, or transport can be repurposed to augment the overall ventilator supply. At this level of surge response, it can be expected that medical care will be at or near the predisaster prevailing community standard.

**Crisis Capacity:** This level would be implemented in catastrophic situations, such as suggested by the current COVID-19 modeling, that result in a significant impact on the standard of medical care that can be provided. Severe limitations of space, staff, and supplies would not allow hospitals to provide the usual standard of medical care. At this level, hospitals and communities will need to consider triage principles.

The numbers provided are a construct, not absolute rules. As the balance of resources vs demand shifts over time during an emergency, the degree of the surge response and any necessary triage will shift as well (Fig 1). Shortages of trained staff, ventilators, or personal protective equipment (PPE) are very real threats in the current pandemic and will likely be triggers for shifting to triage and crisis standards of care if they should occur. As such, we need to have an accurate inventory of those resources, understanding that the limitations would likely be staff rather than ventilators or space; however, the ongoing experiences in New York suggest that all three may easily be in short supply. However, the early experience in Italy, which has roughly the same number of ICU beds and ventilators per capita as many other

developed countries, indicates that our current critical care resources are insufficient to manage a similar outbreak.

*A Triage Plan Is Necessary to Ensure the Greatest Benefit to the Greatest Number, and to Reduce the Number of Patients Who Will Be Unable to Receive Critical Care Resources*

A number of pandemic triage plans have already been proposed for viral respiratory illness and are outlined in a recent overview on triage.<sup>7</sup> When the demand for critical care overwhelms the resources available, a resource allocation plan is essential to deliver both the greatest benefit to the greatest number of people, and to maintain the function of the health-care system and prevent random or otherwise inequitable distribution of scarce resources.

Triage require us to accept that some individuals will not receive critical care resources which might have been dedicated to their care under normal circumstances, whereas some individuals will have critical care interventions withdrawn if they fail to improve. Although as yet untested in practice, modeling studies evaluating predicted mortality in pandemics have demonstrated that more people will die because of lack of critical care resources than would have died if triage systems were implemented.<sup>8,9</sup> Without a triage plan, patients will receive critical care resources by random chance or a first-come, first-serve basis, likely leading to overall worse outcomes across a population and more individuals being denied critical care.

A triage system requires an ethical basis, which we summarize in Figure 2.<sup>10</sup> Limiting and withdrawing critical care resources are justified by the utilitarian principle of providing the greatest good to the greatest number of people. Although the general principle of saving the most lives possible holds true in any system, the decisions of identifying which patients to prioritize

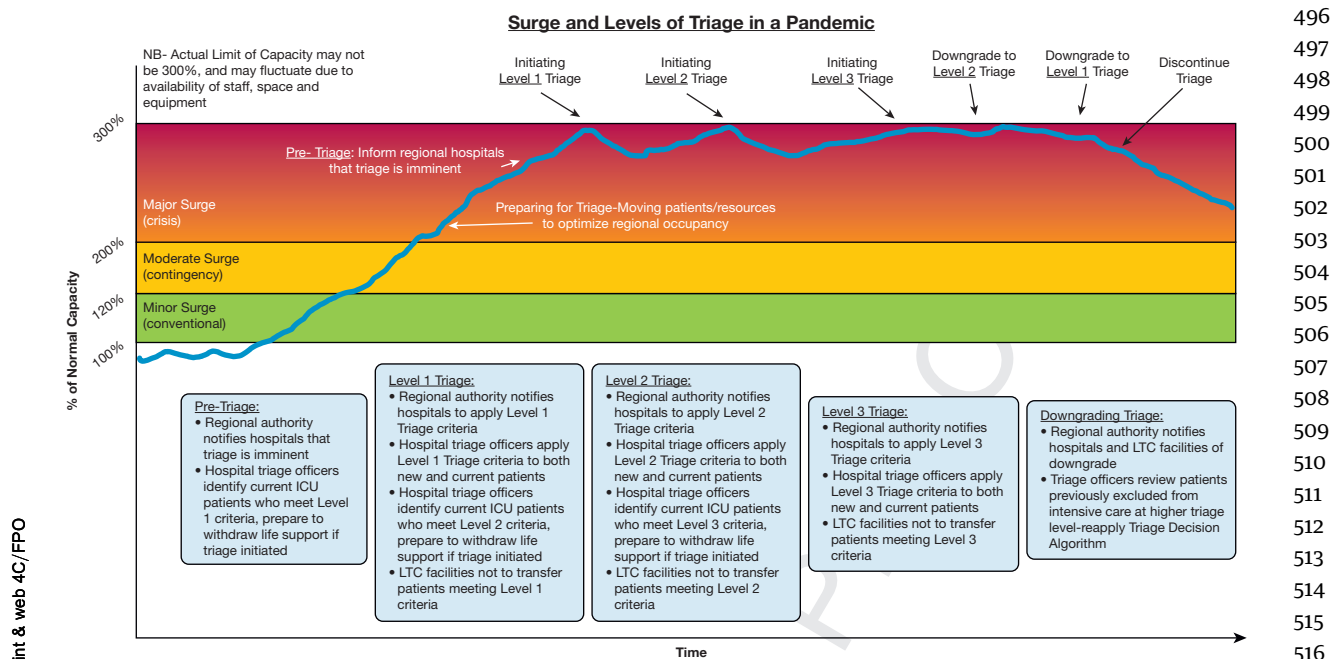


Figure 1 – Impact of triage in crisis surge response to balance demand and capacity, demonstrating different levels of triage depending on the degree of demand in relation to system capacity.

for access to critical care will be difficult. A first-come, first-served model of triage has the advantage of simplicity but will exclude patients who lack transportation or easy access to care. A system based on age alone, with mechanical ventilation denied to patients over a given age cutoff, does not account for

**Substantive values to guide ethical decision-making<sup>1</sup>**

- Individual Liberty
- Protection of the public from harm
- Proportionality
- Privacy
- Duty to provide care
- Reciprocity
- Equity
- Trust
- Solidarity
- Stewardship

**Procedural values to guide ethical decision-making<sup>1</sup>**

- Reasonableness
- Transparency
- Inclusiveness
- Responsiveness
- Accountability

**Ethical principles possible to inform triage**

- Utilitarian: “greatest good for the greatest number”
- Egalitarian: “allocation based upon need”
- Libertarian: “protection of individual liberty & patient choice” Social benefit
- Communitarian: “respect for social & cultural values”
- Life cycle: “fair innings or years life saved”

Figure 2 – Ethical principles involved in triage systems. (Adapted with permission from the University of Toronto Joint Centre for Bioethics Pandemic Influenza Working Group.<sup>10</sup>)

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551 differences in baseline mortality risk because of  
 552 underlying health.

553 Communities may choose to prioritize to key groups, to  
 554 include health-care workers (HCWs), first responders,  
 555 research volunteers, or others who are either perceived  
 556 as risking their own safety for the public's benefit or who  
 557 have a special role in pandemic response; however, strict  
 558 definitions of who is included in these key groups and  
 559 the social utility of such preferences remain unresolved.  
 560 Children and pregnant women may receive special  
 561 priority in other schema, with the concept of saving not  
 562 only the most lives but also the greatest number of years  
 563 of life.<sup>11,12</sup> All of these must be taken in consideration,  
 564 and different cultural priorities will vary between (and  
 565 within) different countries. This paper is inadequate to  
 566 answer these questions for a given community; sample  
 567 triage protocols are available on the CHEST website for  
 568 review and guidance.

571 These decisions to implement a triage system should be  
 572 driven by the inability of regional health systems to  
 573 deliver care to all critically ill patients because of an  
 574 overwhelming surge in demand that reaches crisis levels.  
 575 The triage protocol we are referring to in this case is for  
 576 tertiary triage, which takes place at an acute care hospital  
 577 when deciding whether or not to admit for critical care  
 578 services.<sup>5</sup> In a broad sense, patients who present for  
 579 tertiary triage are going to fit into one of three categories:  
 580 (1) too well to benefit from critical care, (2) too sick to  
 581 benefit from critical care because of severe underlying  
 582 illness or a poor likelihood of surviving their  
 583 hospitalization, or (3) sick enough to benefit from  
 584 critical care. The goal of triage protocols is not to  
 585 exclude categories of patients based on age or underlying  
 586 disease, and protocols that explicitly exclude patients  
 587 based on a single criterion alone may run afoul of  
 588 antidiscrimination laws in many jurisdictions. Rather,  
 589 the goal of a triage protocol is to maximize the use of  
 590 critical care resources for patients in the third category.  
 591 These categories apply to all patients presenting with  
 592 critical illness under crisis standards of care, not just  
 593 those infected with SARS-CoV-2.<sup>13</sup> Although we must  
 594 recognize that patients less likely to benefit from critical  
 595 care may not be provided those services and  
 596 interventions under a triage system, reallocation may  
 597 occur as resources and demand change.

602 The best available epidemiologic data, combined with  
 603 expert input, will be required to create triage protocols  
 604 that reflect COVID-19-specific mortality and resource  
 605 utilization predictions. Although the use of acute illness

606 scores, such as the Sequential Organ Failure Assessment  
 607 (SOFA) score, were proposed for previous pandemic  
 608 triage plans, a growing body of evidence suggests such  
 609 scoring systems are unlikely to predict critical care  
 610 outcomes with sufficient accuracy,<sup>14,15</sup> in particular  
 611 patients suffering from COVID-19,<sup>16-19</sup> or be a useful  
 612 basis for triage decisions based on the current protocol  
 613 cut points.<sup>13,20,21</sup>

614 The prognostic accuracy of SOFA varies across its range  
 615 of scores, with greater variability and less accuracy at  
 616 lower scores than at higher scores, and is not  
 617 immediately applicable to all disease states: a patient  
 618 with sepsis may have a SOFA score of 4 and a low  
 619 mortality risk, for example, whereas a patient with an  
 620 intracranial hemorrhage and a Glasgow Coma Scale  
 621 score of 3 could share this SOFA score of 4 but have a  
 622 very high risk of death. Potentially subjective elements,  
 623 such as the dose of vasopressor administered or the  
 624 assessment of Glasgow Coma Scale during sedation  
 625 breaks, are subject to physician judgment and are  
 626 affected by drugs and other interventions.<sup>22</sup> Because  
 627 outcomes at differing SOFA scores vary across studies  
 628 and are generally absent in the context of crisis  
 629 standards of care, system-level data are necessary to  
 630 guide selection of threshold values.

631 All of these factors combine to raise a number of  
 632 logistical and ethical concerns regarding the use of the  
 633 SOFA score in a triage algorithm. Therefore, we propose  
 634 triage protocols that are not solely dependent on SOFA  
 635 (or another single scoring tool) because SOFA is unlikely  
 636 to be adequate in and of itself for triage decisions. It is  
 637 important to mention that any scoring system at this  
 638 stage of the pandemic will need to be pragmatic and  
 639 combine other predictors of ICU mortality, such as  
 640 disease-specific indicators for non-COVID-19  
 641 conditions, frailty scores, comorbidity indices, and  
 642 physician judgment as best possible. This will need to be  
 643 balanced against the need for a triage scoring tool that is  
 644 actionable: complex enough to provide prognostic  
 645 information with acceptable accuracy, but simple  
 646 enough to be implemented in a timely manner.

647 As our knowledge of COVID-19 increases, it is likely  
 648 that better prognostic scoring tools will be developed;  
 649 when this occurs, triage systems should incorporate  
 650 these into their protocols to improve our prediction of  
 651 critical care outcomes and mitigate the limitations of  
 652 physiological indices in isolation.

653 Periodic reassessment of patients is a necessary part of  
 654 any triage algorithm, to assess for clinical improvement,  
 655  
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 659  
 660

deterioration, or any other changes that affect prognosis. COVID-19 illness seems to last longer than influenza, suggesting that reassessments at 48 and 120 h noted in earlier triage protocols<sup>5,13</sup> are too short to provide an adequate trial of therapy in patients with COVID-19. Therefore, any triage protocol will need to be reassessed and modified as clinical experience with SARS-CoV-2 infection grows.

### *Effective and Ethical Triage Requires Infrastructure, Oversight, Processes, and Training*

Triage criteria are one component of a three-part system designed to integrate clinical decisions with incident commanders at the facility and jurisdictional level. They include the following:

- Concept of operations: what is the process that is followed at the facility when making resource allocation decisions?
- Criteria: what is the protocol that is used, and how is that reviewed and updated as new information becomes available?
- Coordination: how are the efforts of the facility integrated with other hospitals in the area to assure information sharing, consistent policies, and patient and resource movement to diffuse impact as needed to assure a consistent standard of care in the region?

**Concept of Operations:** Concept of operations describes a proactive approach to triage which should be invoked whenever a prolonged incident occurs. This strategy is preferable to reactive bedside decisions based on physician discretion that may occur early in an event. It involves the following several key elements:

- Assuring that resource allocation decisions are integrated into the hospital incident command system, and that the process and protocols are understood and accepted by leadership. The incident command cycle for crisis events is illustrated in [Figure 3](#).
- A multidisciplinary clinical care committee associated with incident command that makes medical practice recommendations to address increased demand and provides oversight of any triage decisions. This group has broad clinical representation and includes ethics and legal input.
- A described process for multidisciplinary decision-making—ideally involving more than one physician with expertise in the area, expectations of the decision process, communication, appeals (where possible), and review ([Fig 4](#)).

The decision process is designed to be rapid, but still will likely take up to 1 h. This may have to be abbreviated during times of overwhelming demand, and this expectation should be spelled out. Those providers forced into real-time decision-making should use the same protocol and criteria, and the situation should be documented by incident command.

### *Triage Protocol*

The actual clinical criteria on which the decisions are based should be approved by the clinical care committee and updated as additional information about the specific epidemiologic and outcome characteristics of the disease are understood. Other resources will likely be in short supply and will require guidance from the clinical care committee. A reference card set is available that describes general approaches to a range of resources (<https://www.health.state.mn.us/communities/ep/surge/crisis/standards.pdf>). A simplified version of a triage protocol is provided in [Figure 5](#) for reference.

**Coordination:** Triage criteria and processes should be as consistent as possible within a region. Strong, collaborative regional efforts are a cornerstone of effective response and must be implemented regardless of any competitive posture between health-care systems that may exist during usual operations. Hospitals must share information, adjust protocols, and balance resources and patient loads across the immediate surrounding region to ensure as consistent a standard of care as is possible. The regional structures should involve sharing information about available beds, ventilators, advanced care resources such as ECMO (a regional approach to ECMO allocation is found in the card set previously referenced), and staff, and a critical care working group to establish joint triage protocols and coordinate mass critical care planning, and potentially involve a central gatekeeping mechanism for regional referrals and critical care triage. A central triage committee should be appointed, with connections to local triage officers and teams at each hospital. A standardized documentation process (paper or electronic) should be used to allow efficient data collection and decision-making. The protocol should be made available to all triage personnel in advance to allow familiarization and feedback. A mechanism to revisit triage decisions that vary from conventional care practices should be strongly considered to reassess individual patient progress if clinical demand decreases or if capacity increases. [Figure 6](#) illustrates the structure

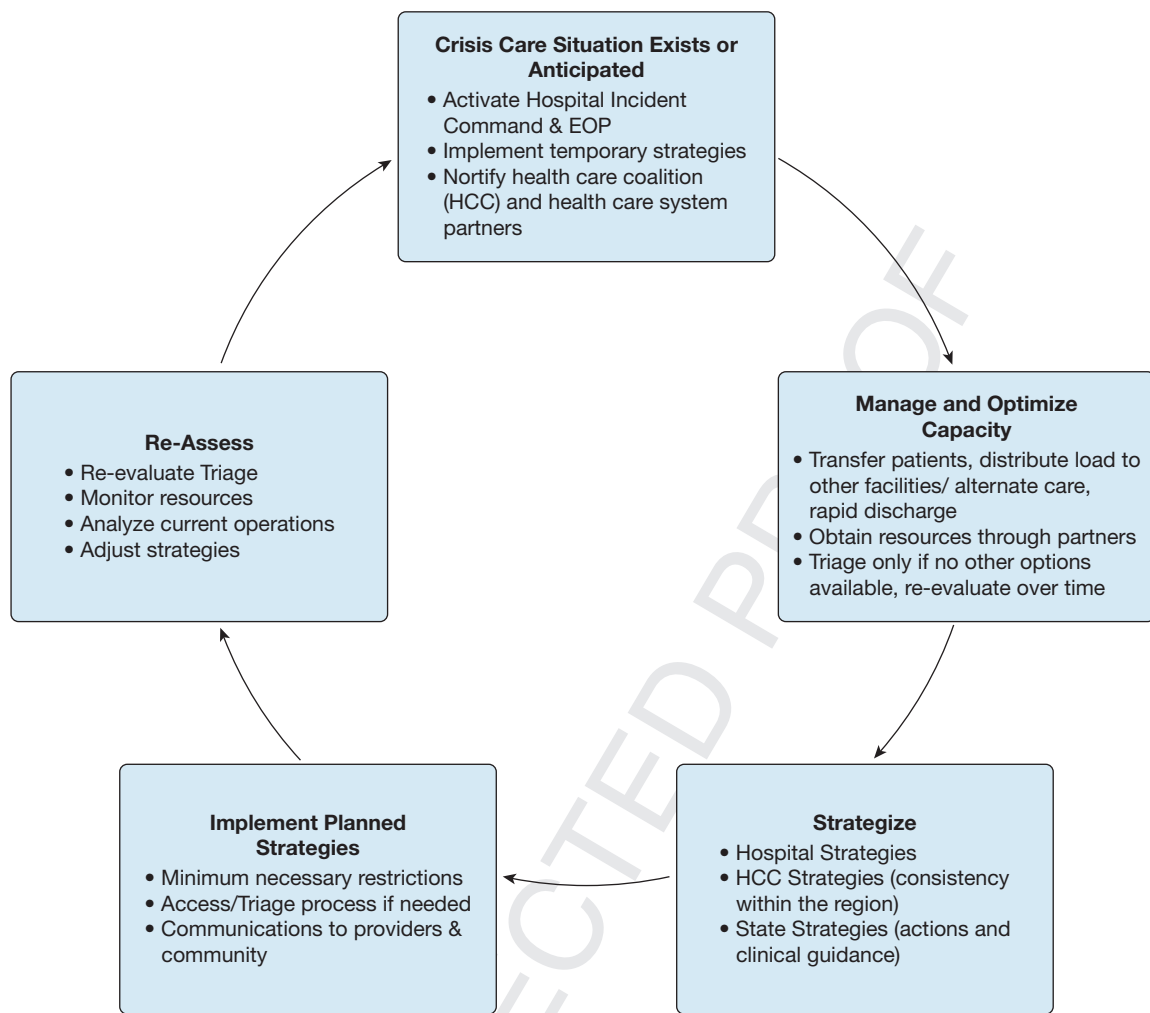


Figure 3 – Process for crisis care integration with incident command. HCC = health-care coalition.

of a triage system at the regional level and integration with a hospital incident command structure.

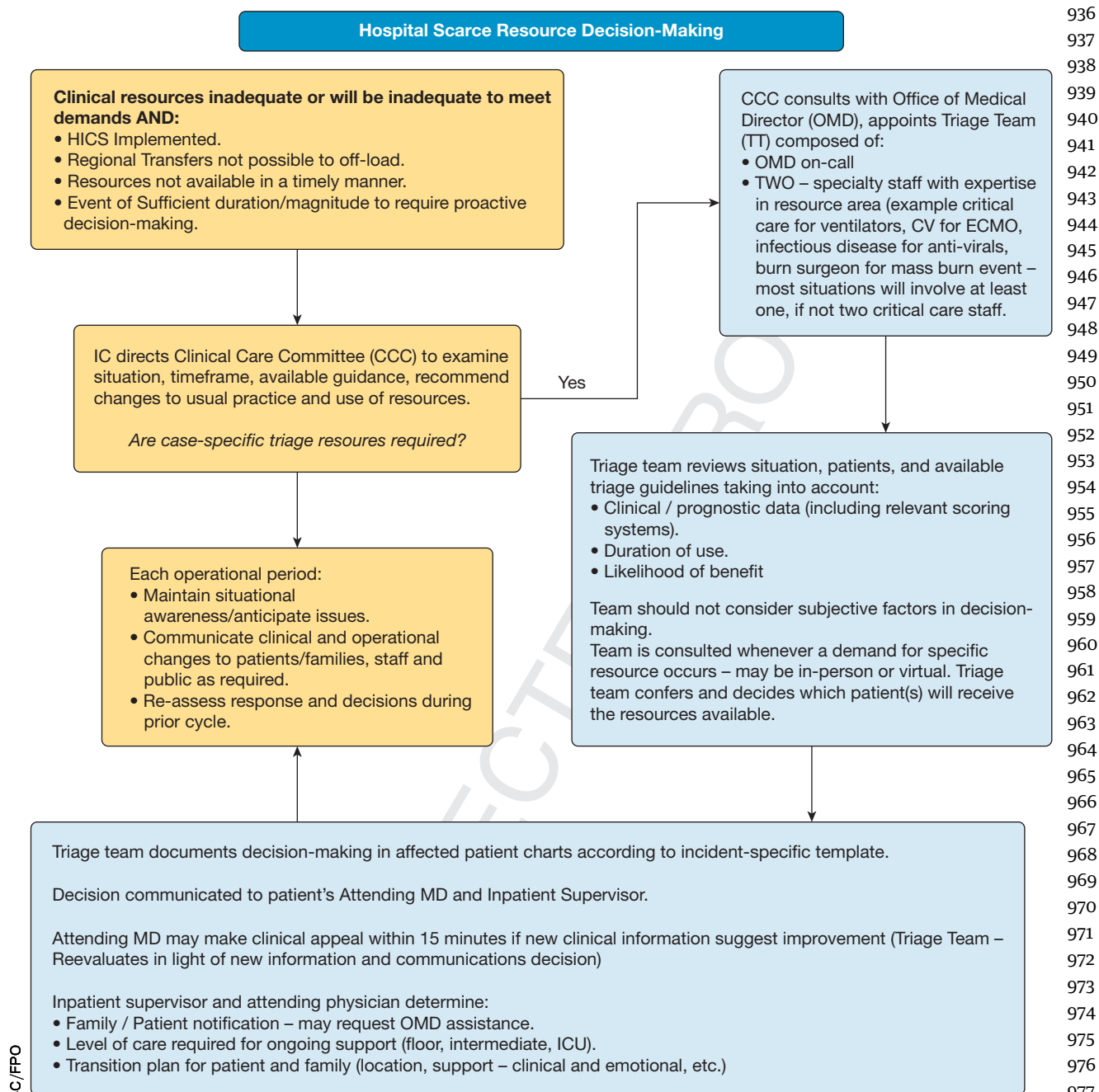
### *Many Current Legal and Regulatory Frameworks Preclude a Triage System Because of the Need to Withhold or Withdraw Artificial Life Support Without Consent*

Legislation in most states and provinces provides the framework for medical decision-making. Broadly speaking, these laws indicate that plans of treatment require consent of the patient or their surrogate. In some jurisdictions, courts have ruled that physicians do not require consent to withhold CPR (or other life-sustaining measures) that they thought to be outside the standard of care.<sup>23</sup> Even within a single country, there may be wide regional variation on the degree to which physicians may make unilateral decisions regarding the provision of resuscitative care.<sup>24</sup>

A published report from the Institute of Medicine<sup>25</sup> outlined some of the important considerations for medical and legal standards of care in a disaster. Key elements of this report include that (1) medical and legal standards of care are not always the same, (2) standards are flexible according to the context of the situation, and (3) authorities need to provide clarity and guidance about standards. Physicians who face uncertainty about how courts and regulatory agencies will assess the standard of care “may react negatively to actual or perceived risks of liability,”<sup>25</sup> which would result in worse outcomes for all patients, families, and providers alike whether infected with COVID-19 or not.

To implement a triage system, many jurisdictions would need a modification or suspension of their health-care consent acts to the effect that in the situation of pandemic triage, consent would not be required for decisions about the withholding or withdrawal of





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\*Algorithm and plan does not apply to immediate, reactive triage decisions in the early phase of a disaster (e.g. ED, trauma surgery) or to non-emergency circumstances (specialty providers will engage colleagues in decision-making). This algorithm is a summary of select actions in the HCMC Crisis Care Annex which should be referred to for further details.

Figure 4 – Sample hospital decision process (Minnesota Department of Health). CCC = Clinical Care Committee; OMD = Office of Medical Director; TT = triage team.

artificial life support. In addition, medical licensing bodies should modify their policies to indicate that the standard of care in a pandemic is to triage patients according to an accepted plan, and that consent is not required for treatment decisions taken according to that plan.

Although standards of care may change during a pandemic, crisis standards of care still represent standards; indeed, the need for oversight and review may be even more pressing in this context. If time and circumstances allow, a mechanism for appeal may be built into the system. Such an appeal system must be

**Triage Decision Algorithm**

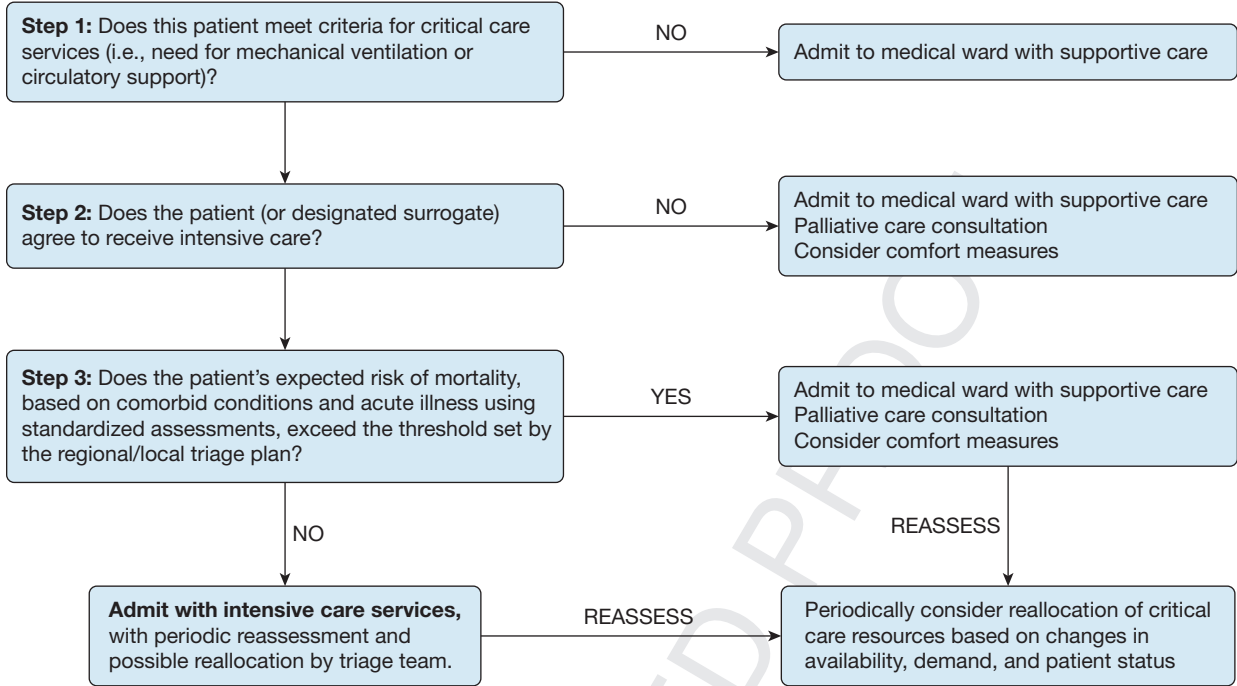


Figure 5 – Triage decision process flow.

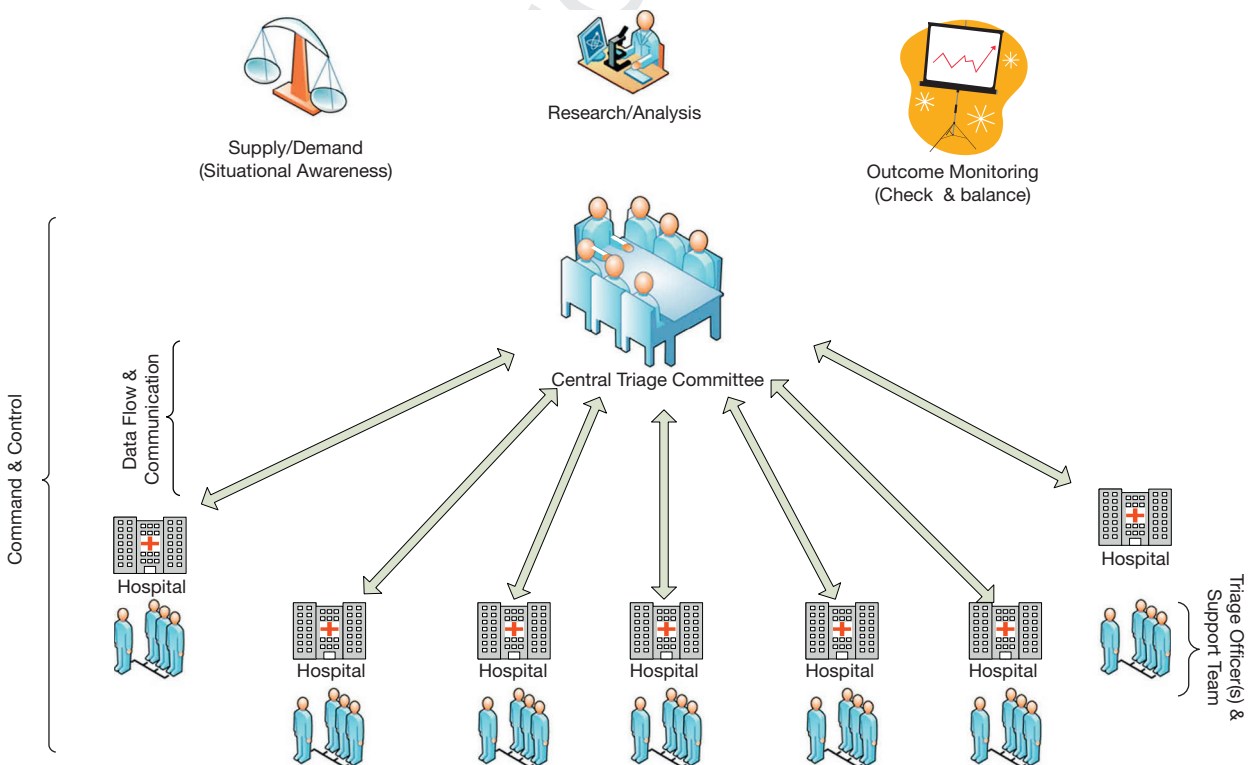


Figure 6 – Triage infrastructure. (Reprinted with permission from Christian et al.<sup>5</sup>)

1101 rapidly accessible and able to decide in a timely enough  
 1102 manner to provide actionable direction to physicians.  
 1103 All triage decisions should eventually be reviewed to  
 1104 allow for transparency and accountability.  
 1105

### 1106 *Standards of Care*

1107 Withholding critical care resources must not mean  
 1108 neglect, and it should not be considered tantamount to  
 1109 terminal care or medical assistance during the dying  
 1110 process. We must care for all patients.  
 1111

1112 Patients who do not receive critical care because of a  
 1113 triage system must be supported, and the rationale for  
 1114 medical decision-making must be clearly communicated  
 1115 to them or their family members. Shifting the normal  
 1116 role that patients and their surrogates play in decision-  
 1117 making is a substantial deviation from normal medical  
 1118 practice, carrying with it a commensurately large  
 1119 obligation to ensure that these individuals will receive  
 1120 the best possible care given the crisis response.  
 1121

1122 Studies of severe acute respiratory illness have suggested  
 1123 that many patients with respiratory failure can recover  
 1124 effectively without mechanical assistance, and opioids can  
 1125 be used to treat dyspnea without increasing mortality.<sup>26</sup> A  
 1126 patient unable to receive invasive mechanical ventilation  
 1127 may be able to receive supplemental oxygen through a  
 1128 noninvasive route as resources permit. The  
 1129 implementation of early palliative care interventions can  
 1130 provide a better quality of life, less treatment intensity,  
 1131 and no consistent impact on mortality.<sup>27,28</sup> This offers a  
 1132 strong rationale for the careful integration of symptom  
 1133 management, in alignment with palliative care principles,  
 1134 for all patients impacted by crisis care.<sup>29</sup>  
 1135

1136 Clear clinical guidelines must be established by  
 1137 institutions for the care of all patients with respiratory  
 1138 failure and shock, including those patients unable to  
 1139 receive critical care therapies. It may be possible,  
 1140 depending on the capabilities of a given institution, to  
 1141 provide some forms of critical care monitoring and  
 1142 therapy in a crisis situation outside of the traditional ICU.  
 1143 Protocols to support the use of opioids for dyspnea, other  
 1144 key supportive and palliative interventions, and the  
 1145 conscientious use of therapies subject to shortages (eg,  
 1146 bronchodilators, antimicrobial agents, fluid therapy) can  
 1147 be of service for bedside physicians. Similarly, clear and  
 1148 standardized communication tools, such as information  
 1149 sheets, can inform the public about crisis standards of  
 1150 care, can inform about triage criteria, and may offer the  
 1151 wider community opportunities for feedback as a means  
 1152 of increasing public trust.  
 1153  
 1154  
 1155

### 1156 *Family and Societal Support*

1157 An effective triage system must help physicians maintain  
 1158 transparency in their decision-making. The transition of  
 1159 health-care systems to crisis care delivery requires a  
 1160 systematic communication strategy at the community  
 1161 level to explain the situation and ongoing efforts to  
 1162 maintain the best possible level of care. Patients and  
 1163 families have the right to expect that those with similar  
 1164 critical care needs will be treated fairly and equitably,  
 1165 with no preference to any particular group. A hotline  
 1166 and electronic communication platform may help gauge  
 1167 community response and concerns during the event and  
 1168 will inform leaders regarding the emotional reassurances  
 1169 needed by members of the society.<sup>30</sup>  
 1170

1171 Many centers have limited the number of caregivers at  
 1172 the bedside, reduced family movement in the hospital,  
 1173 and required the use of PPE for all visitors to the  
 1174 bedside. This use of PPE by visitors and caregivers will  
 1175 become increasingly problematic considering worldwide  
 1176 shortages, with some centers reportedly only permitting  
 1177 their use by visitors at crucial contact times, such as the  
 1178 end of life. These limitations in family contact can only  
 1179 increase the burden of suffering, and new methods will  
 1180 be needed to reduce this burden, to include the use of  
 1181 technologic solutions (eg, video conferencing via tablets  
 1182 and smartphones) to attempt to preserve as much  
 1183 intrapersonal contact as possible.<sup>31</sup>  
 1184

1185 With the use of triage algorithms in crisis care, even the  
 1186 most transparent systems of decision- making may lead  
 1187 to prolonged feelings of guilt from lack of personal  
 1188 preparedness, an inability to assist, or frustration toward  
 1189 the government and the medical system. Ancillary team  
 1190 members (including palliative care, psychiatrists,  
 1191 psychologists, other mental health workers, and social  
 1192 workers) will need to assist with the burden of  
 1193 communication with ICU families. These professionals  
 1194 should remain in regular communication with family via  
 1195 telephone, text message, or other means as best possible.  
 1196 It is additionally important to anticipate and plan for  
 1197 supporting these professionals, who themselves will  
 1198 require support because of secondary moral distress.  
 1199  
 1200  
 1201  
 1202

### 1203 *HCW Support*

1204 The term moral injury has been increasingly suggested  
 1205 to describe the distress that HCWs can experience from  
 1206 the excessive demands of energy, strength, and resources  
 1207 often experienced within current health-care systems.<sup>32</sup>  
 1208 The resulting constellation of symptoms—fatigue,  
 1209 frustration, cynicism, and inefficiency—has historically  
 1210

1211 been defined as burnout, but this term fails to capture  
1212 the similarities that this syndrome may share with  
1213 posttraumatic stress disorder or the severity of the  
1214 associated psychological injury.<sup>33</sup>  
1215

1216 Beyond the issues of fatigue and burnout, however, there  
1217 are the very real threats of infection and personal harm  
1218 because of workplace exposure to COVID-19. Shortages  
1219 of PPE in the United States and other countries have  
1220 exacerbated this threat; reports of hospitals curtailing  
1221 PPE use and sanctioning HCWs for using their own  
1222 personal PPE in the presence of shortages have only  
1223 made these issues more acute.  
1224

1225 The principles of beneficence and nonmaleficence are  
1226 core to the practices of medicine and nursing, and the  
1227 impact of asking physicians to shift their perspective  
1228 during a crisis surge response should not be  
1229 underestimated.<sup>6</sup> Feelings of social isolation are  
1230 common in times of crisis and are further exacerbated  
1231 by current recommendations for social distancing,  
1232 infection control practices, and prolonged use of PPE.  
1233 Disruptions in normal routines, concern for personal  
1234 welfare, and fear for the safety of loved ones all add  
1235 additional stress. A significant number of physicians in  
1236 active practice already exhibit signs and symptoms of  
1237 moral injury, with higher self-reported rates of poor  
1238 patient safety habits, more medical errors in their  
1239 practice, and increased rates of suicidal ideation.<sup>34</sup> The  
1240 personal risk to bedside physicians during the COVID-  
1241 19 pandemic, especially in light of international  
1242 shortages of PPE, only increases this strain on the  
1243 workforce. This can be a significant threat to both the  
1244 quality and efficiency of care in a crisis.  
1245  
1246

1247 Providing members of the health-care team with  
1248 structured opportunities to debrief after critical events  
1249 and ongoing opportunities for engagement and input to  
1250 improve the inevitably dynamic work environment have  
1251 also been shown to be effective to promote community,  
1252 connectedness, and meaning. Incorporating these  
1253 principles thoughtfully during triage system activation  
1254 requires a systematic leadership communication plan to  
1255 explain the reasons for its use; formal training to ensure  
1256 consistent implementation; and collaborative, team-  
1257 based approaches to decision-making led by the  
1258 designated triage officers and including physicians  
1259 directly caring for patients with the strong support of  
1260 hospital ethics and palliative care experts.  
1261  
1262

1263 Similarly, institutions and governments must prevent  
1264 the sanctioning of HCWs for attempting to protect their  
1265 own (and their families') safety through nonstandard

PPE usage; instead, health-care organizations need to  
redouble efforts to expand PPE availability, be it through  
innovative reuse methods, adoption of acceptable  
alternative forms of PPE (eg, the use of industrial  
respirators), and governmental and industry support for  
increased manufacturing.

Existing resilience measures and support programs will  
need to be strengthened to protect the psychological  
well-being of patients, families, and the HCWs treating  
them both during and after these events.<sup>5</sup> It is wise to  
consider a structured schedule of opportunities within  
each work unit and the hospital at large to encourage  
staff to learn about and use these measures, especially in  
the setting of anticipated prolonged periods of modified  
work practices that the current COVID-19 pandemic  
threatens to create.

Institutions may refer to existing resources in  
implementing plans, such as the National Academy of  
Medicine in the United States ([https://nam.edu/  
clinicianwellbeing](https://nam.edu/clinicianwellbeing)) and the Intensive Care Society in the <sup>Q12</sup>  
United Kingdom ([www.ics.ac.uk](http://www.ics.ac.uk)), which has put a free  
Wellbeing Resource Library online with specific content  
relevant to COVID-19.

A personal connection with the patients is perhaps the  
most important and powerful tool to maintain our sense  
of purpose and best care for their ongoing needs, and  
structured opportunities to develop and maintain a  
human connection with the individuals whose needs we  
serve will also help to combat feelings of  
depersonalization in the critical care environment that  
are only exacerbated by the current crisis.<sup>35</sup>

### *Pediatric Considerations*

Any triage system must balance the need to save the  
most lives possible with the need to save total life-years.  
Critically ill children therefore are usually considered  
separately from adults when triage considerations are  
made. The fundamental precepts of crisis critical care—  
including care and attention to the health of the entire  
family as a unit and respect for the role of parents—  
remain critical to the success of disaster management.  
Institutions must balance the needs of family-centered  
care vs the risk of disease transmission. One or more  
caregivers usually accompany pediatric patients; these  
caregivers are likely to be close contact with a patient  
and should be treated as presumably exposed; however,  
they may be asymptomatic at the time, and will require  
monitoring for symptomatic disease and potential  
quarantine.

1321 Incorporating children into a regional triage algorithm is  
 1322 complicated for a disease process such as COVID-19  
 1323 that largely affects adults, at least in terms of critical  
 1324 illness. Much of pediatric critical care is separated into  
 1325 very few pediatric centers, with only some pediatric  
 1326 resources being applicable to adult groups. To prevent  
 1327 any hospital from needing to use crisis standards of care,  
 1328 pediatric-only hospitals in an affected region have a duty  
 1329 to surge to prevent adult and mixed adult/pediatric  
 1330 hospitals going into crisis as regional capacity needs  
 1331 require. In such a scenario, pediatric-only hospitals  
 1332 should consider the steps outlined in [Table 1](#).

1333 Pediatric care should preferably be concentrated in  
 1334 pediatric centers to preserve necessary pediatric systems.  
 1335 Given the low mortality of most conditions with which  
 1336 children are admitted to intensive care (< 5%),  
 1337 patients < 18 years of age who meet the mortality  
 1338 criteria associated with the adult triage levels will be very  
 1339 rare, such that the adoption of the same triage system in  
 1340 pediatrics is unlikely to mobilize further resources. An  
 1341 entirely different algorithm that is pediatric-specific  
 1342 would be necessary in considering pediatric-specific  
 1343 triage policies. Some centers have modeled situations  
 1344 where a certain mortality rate or predicted ventilator-  
 1345 days could preclude the offering of invasive ventilator  
 1346 support to some children at a time of significantly  
 1347 increased short-term ventilator needs,<sup>8</sup> but there is a  
 1348 paucity of pediatric-specific data to guide such triage.  
 1349 Medical specifics aside, the guiding ethical principles  
 1350 remain the same for pediatric triage and should still be  
 1351 applied.

1352 Pediatric centers should regionally activate pediatric  
 1353 triage when shared pediatric resources (accounting for  
 1354 transportation capacity) are exhausted, with mortality  
 1355 predictions subject to expert opinion, which should be  
 1356 agreed on and documented by at least two members of  
 1357 the treating team. Prior to movement to higher triage  
 1358 levels, especially considering such steps being unlikely to  
 1359 mobilize resources, discussions should be held regarding  
 1360 movement of ventilators to pediatric centers from adult  
 1361 sites if there is a difference in resource demand.

## 1362 Conclusions

1363 This framework can provide the essential tools to rapidly  
 1364 assist communities to establish the infrastructure  
 1365 necessary to equitably meet the clinical needs of the  
 1366 greatest number of patients with COVID-19 during a  
 1367 time of scarce resources. It is the goal of the Task Force

1376 to minimize the need for allocation of scarce resources  
 1377 as much as possible.

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