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**POINT:**

## Is Considering Social Determinants of Health Ethically Permissible for Fair Allocation of Critical Care Resources During the COVID-19 Pandemic? Yes

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There is growing agreement that triage protocols for scarce medical resources such as ICU beds and ventilators should—at the very least—not exacerbate the profound disparities in health outcomes that are occurring during the COVID-19 pandemic among racial or ethnic minorities, persons with disabilities, and low-income people. Some have suggested that ICU triage guided solely by medical prognosis (ie, chances of survival to hospital discharge) will accomplish this.<sup>1</sup> Although pure prognosis-based triage may seem equitable, it is not; it would exacerbate health disparities that have become a national priority to mitigate. Counterintuitively, this would be the case even if there were no differences in medical prognoses among hospitalized patients according to race or other forms of

social disadvantage. Therefore, if we take seriously the commitment to fairness in triage, we cannot rely solely on prognosis-based triage. To show equal respect for all members of society, we must take steps to lessen the extent to which disadvantaged people are further disadvantaged by triage processes.<sup>2</sup>

We delineate three mechanisms by which triage solely according to medical prognosis would exacerbate health inequities. We then argue that to accomplish the dual ethical goals during a public health emergency of promoting population health outcomes and promoting fairness, additional criteria beyond medical prognosis should be incorporated into triage protocols. We focus on one strategy to do so: adding a correction factor to the triage scores of patients from highly disadvantaged neighborhoods to lessen the extent to which triage would exacerbate disparities arising from structural inequities.

### Disparities in COVID-19 Outcomes

Disadvantaged groups, including racial or ethnic minorities, low-income people, and individuals with disabilities, are dying at disproportionately high rates during the COVID-19 pandemic. For example, recent data from the United States indicate that the rate of hospitalization requiring ICU admission was more than three times higher among Black individuals than White (191 per 100,000 vs 60 per 100,000).<sup>3</sup> Structural racism (ie, differential access to goods, services, and opportunities by race) has contributed to racial disparities in COVID-19 through two primary mechanisms: individual risk and place-based risk.<sup>4</sup> Increased individual risk comes from differential access to opportunity (eg, quality education) that has resulted in a disproportionate number of racial/ethnic minorities working in essential, high-exposure jobs; decreased access to health care has resulted in worse baseline health among Black individuals; the chronic stress of discrimination has increased their risk of diseases such as hypertension, obesity, and cardiovascular disease.

Place-based risk arises from persistent racial residential segregation in which Black neighborhoods are more likely to have housing facilities that are poorly ventilated and densely populated, less likely to have resources needed to shelter in place (eg, grocery stores), and more

**ABBREVIATIONS:** ADI = Area Deprivation Index; OCR = Office for Civil Rights; SOFA = Sequential Organ Failure Assessment Score; SVI = Social Vulnerability Index

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likely to have higher indexes of neighborhood disadvantage, which independently correlate with COVID-19 burden.<sup>5</sup>

Other disadvantaged groups also have been disproportionately affected by the pandemic. For example, people with cognitive disabilities—who are significantly more likely to live in disadvantaged neighborhoods<sup>6</sup>—have experienced high rates of infection and death from COVID. Thus, neighborhood disadvantage is a common denominator among groups experiencing a disproportionate burden during the pandemic, including racial or ethnic minorities, low-income people, and those with disabilities.

### Mechanisms by Which Pure Prognosis-Based Triage Would Exacerbate Racial Disparities

There are several mechanisms by which purely prognosis-based triage would further disadvantage socially marginalized populations; here we focus on the impact on Black patients. First, prognosis-based triage would worsen racial disparities because Black patients disproportionately present for care with higher severity of illness, and therefore lower survival probabilities, compared with White patients. This is likely attributable to several sources of structural inequity, including higher rates of comorbid conditions (eg, congestive heart failure and chronic kidney disease), limited access to health care facilities, and delayed care-seeking behaviors because of institutional distrust. Two recent studies from large, diverse cohorts in Chicago, Illinois, and New Haven, Connecticut, found that Black patients have a worse survival prognosis at the time of triage compared with White patients and would therefore be more frequently disadvantaged by a triage strategy focused narrowly on prognosis of survival to hospital discharge.<sup>7,8</sup>

Second, the most commonly recommended risk prediction score in states' triage protocols—the Sequential Organ Failure Assessment (SOFA) score—is miscalibrated across races in a way that systematically disadvantages Black patients. For example, Ashana and colleagues<sup>9</sup> found that the SOFA score underestimates in-hospital mortality for White patients and overestimates in-hospital mortality for Black patients with the same scores.<sup>9</sup> Miller and colleagues<sup>10</sup> reported a similar SOFA miscalibration, which led to 16% of Black patients unjustifiably being deprioritized for scarce resources in triage simulations.<sup>10</sup>

Third, because disadvantaged groups disproportionately require ICU care during the pandemic because of social

determinants of poor health, they will also be disproportionately harmed if resource shortages arise that require triage of critically ill patients. Using published data on US racial disparities in rates of ICU admission during the pandemic, [Table 1](#) illustrates how purely prognosis-based triage would widen racial disparities among patients with COVID-19 compared with when there is no shortage of ICU resources. This example likely underestimates the extent to which prognosis-based triage would worsen disparities because it (counterfactually) assumes there are no baseline differences in triage scores across racial groups and no racial bias in triage scores. In the setting of a moderate to severe shortage of ICU resources, the use of prognosis-based triage would cause the population-based excess death rate among Black patients compared with White patients to increase from 55 deaths per 100,000 in times of no ICU bed shortages to 70.9 deaths per 100,000 in times of ICU scarcity in which pure prognosis-based triage is used. In short, prognosis-based triage would exacerbate racial disparities because it would transform the fact that Black individuals disproportionately need ICU-level care into a disproportionately high rate of treatment denial to Black patients during times of scarcity.

### Potential Strategies to Mitigate Inequitable Outcomes

Elsewhere we have proposed a multi-principle framework to allocate scarce ICU resources to achieve the dual ethical goals of promoting population outcomes and promoting equity.<sup>11</sup> Our proposal is not intended as a redress for the many harms of historical and present-day racism in the United States. Instead, the goal of introducing equity considerations into ICU triage is far more limited: to lessen the extent to which the act of triage widens the health disparities occurring during the pandemic, which arise from unjust social conditions.

Using medical prognosis as a core allocation criterion, we proposed several strategies to mitigate health inequities during ICU triage: introducing a correction factor into patients' triage scores to reduce the impact of baseline structural inequities (described later), giving heightened priority to frontline essential workers (who are disproportionately racialized minorities), giving heightened priority to the young (on the grounds that dying young is a severe form of disadvantage, which is disproportionately experienced by already disadvantaged groups), and rejecting use of categorical exclusion criteria and consideration of longer-term life

**TABLE 1 ] Example Showing That Pure Prognosis-Based Triage Would Exacerbate Population-Level Racial Disparities**

Situation	Race	ICU Need (per 100k) <sup>a</sup>	Death Rate due to 30% ICU Bed Scarcity (per 100k) <sup>b</sup>	Death Rate Among Patients Receiving ICU Treatment (per 100k) <sup>c</sup>	Total Deaths Among Critically Ill Patients (per 100k) <sup>d</sup>	Excess Death Rate Among Black Patients (per 100k) <sup>e</sup>
No ICU scarcity	Black	191	...	85.5	85.5	55.0
	White	61	...	30.5	30.5	...
ICU scarcity and prognosis-based triage	Black	191	57.3	46.8	104.1	70.9
	White	61	18.3	14.9	33.2	...

<sup>a</sup>ICU admission rate by race is derived from published US data.

<sup>b</sup>Death rate caused by ICU bed scarcity is 0 when no triage is required and 30% of eligible patients in each racial group, assuming a moderately severe shortage of ICU beds and assuming that all patients who are denied an ICU bed die.

<sup>c</sup>Under conditions of no triage, 50% of patients who receive ICU care die, which is comparable to outcomes of intubated COVID patients. Under conditions of prognosis-based triage, 35% of patients who receive ICU care die; the lower death rate among patients who receive ICU treatment under conditions of triage is attributable to the fact that the group who receive ICU care would have fewer patients with a poor prognosis because of triage and therefore would have a lower mortality rate.

<sup>d</sup>Total deaths among critically ill patients is calculated by adding the death rate attributable to ICU bed scarcity and the death rate among patients receiving ICU treatment.

<sup>e</sup>The excess death rate among Black patients per 100,000 is calculated by subtracting the total deaths among White patients from the total deaths among Black patients. Excess death rate is a measure of the disparities in COVID-19 outcomes. In this hypothetical example, when no triage is required, the magnitude of disparities in death rates between Black and White patients is in excess of 55 deaths per 100,000 among Black patients. When prognosis-based triage is used, the excess death rate among Black patients increases to 70.9 deaths per 100,000. The degree to which prognosis-based triage exacerbates racial disparities is the increase in death rate between circumstances in which no triage is required and conditions in which prognosis-based triage is used (ie, 15.9 excess deaths among Black patients per 100,000).

expectancy. We and others have defended each of these criteria elsewhere.<sup>12,13</sup>

We focus our analysis here on adding a correction factor to triage scores for patients who have experienced high levels of unjust disadvantage that negatively affect their health outcomes (eg, structural racism and ableism). Although it would be infeasible during ICU triage to conduct a detailed assessment of each patient’s individual degree of disadvantage, it is feasible to use an established composite measure of disadvantage, such as the Area Deprivation Index (ADI).<sup>14</sup> The ADI is a geographic measure of socioeconomic disadvantage that is calculated at the level of census blocks (approximately 1,500 people). The ADI is an aggregate measure of disadvantage on a 10-point scale, based on 17 measures of disadvantage related to poverty, education, employment, physical environment, and infrastructure within a neighborhood.<sup>15</sup> Less than a minute is needed to determine a patient’s ADI score by entering their home address into a publicly accessible online calculator. Because the strongest association between ADI scores and health outcomes occurs at the highest levels of disadvantage, one way to use this disparity-mitigating strategy is to incorporate an adjustment into the triage score for individuals that reside in the most disadvantaged neighborhoods (ie, ADI scores of 8, 9, or 10).

A strength of using the ADI metric is that, rather than directly considering a patient’s race or disability status in triage decisions, which in the United States would be legally and politically fraught,<sup>16,17</sup> it targets key mechanisms by which structural racism and ableism adversely affect health outcomes. Using an ADI correction to promote equity has been shown to be feasible among inpatients for the allocation of scarce COVID therapeutics.<sup>18</sup>

Some may object to the use of a population-based measure such as the ADI on the grounds that it may misclassify some individuals as disadvantaged who are not. However, just as we accept using probabilistic approaches to increasing the number of lives saved with triage (eg, by using probabilistic mortality prediction scores), we should also accept using a probabilistic approach to lessen the extent to which triage exacerbates disparities (eg, via incorporating an ADI correction into triage scores).

## Conclusion

Allocating scarce ICU resources according to medical prognosis alone may seem equitable, but in fact doing so would widen the health disparities that have occurred during the pandemic. Incorporating equity

considerations—such as a correction factor to triage scores using a geographic measure of disadvantage—is one strategy to show equal respect for all during the pandemic. More broadly, ICU triage policies should be one among a suite of policy interventions to address the profound inequities in health outcomes that disadvantaged groups are experiencing during the pandemic.

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## COUNTERPOINT: Is Considering Social Determinants of Health Ethically Permissible for Fair Allocation of Critical Care Resources During the COVID-19 Pandemic? No

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COVID-19 has laid bare existing inequities in health care,<sup>1,2</sup> and the disproportionate impact on the poor and communities of color have rightfully driven a search for solutions to improve access across the spectrum of medical care delivery. Identifying at-risk areas of our community for targeted interventions is thus a key mitigation strategy to reduce further impact.

Social determinants of health are environmental, structural, and socioeconomic factors that shape the health of communities and individuals alike. Identifying these risks and mitigating them allows everyone the best opportunity for optimal health service access. Individual health is not, however, dictated by social determinants but remains a complex interplay with other factors such as genetics, environment, and conscious decisions—decisions such as whether to make appointments, take medication, or receive vaccinations. It is not on physicians to assess or judge to what degree each

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