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### CASE AND COMMENTARY: PEER-REVIEWED ARTICLE

#### What Should Be Roles of Federal Clinician Governors in Motivating Equity in Locally Coordinated Triage Protocols?

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##### Abstract

This commentary on a case examines racially inequitable outcomes, especially for Black patients, resulting from use of Sequential Organ Failure Assessment (SOFA) scores to triage patients during the COVID-19 pandemic and how inequitable outcomes in triage protocols could be reduced. It also considers the nature and scope of clinician governor responses to members of federally protected classes who are disadvantaged by use of the SOFA score and argues that clinician leaders of the Centers for Disease Control and Prevention, specifically, should provide federal guidance that motivates clear legal accountability.

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##### Case

Dr D is an infectious disease specialist, an epidemiologist, and the medical director of a state department of health. Following a flu season that was socially and fiscally devastating, Dr D administers budget for essential personnel, surge planning, tertiary triage strategy, and critical care inventory (eg, ventilators, dialysis machines, medications, personal protective equipment). Dr D assembles a central committee of regional triage officers from around the state, which forges consensus about communication plans that activate the triage strategy across the state in response to an emergency (ie, epidemic, multi-locale mass casualty events, natural disaster) and how to train teams to implement protocols efficiently and equitably.

State epidemiological data reveal that low-income communities and communities of color were inequitably burdened (in terms of higher morbidity, more complications, higher mortality) by the most recent flu outbreak. Age-adjusted flu hospitalizations were highest among Black persons, second highest among American Indian and Alaska Native persons, and third highest among Latinx persons.

Dr D is contacted by Centers for Disease Control and Prevention (CDC) officials, who offer specific clinical recommendations to amend the state's triage protocol to avoid replicating inequity demonstrated during the past flu season. The CDC officials specifically expressed concern that inequity stems prominently from states' triage protocols' reliance on Sequential Organ Failure Assessment (SOFA) scores, which are routinely used to prioritize critical care resource allocation to patients with the lowest SOFA scores, often by one of 2 approaches. One triage strategy Dr D and committee members created uses just patients' SOFA scores to inform critical care resource allocation to patients. A second strategy sorts patients more granularly (ie, by preexisting comorbidities, age, and other factors, including equity, which inform prognosis and survivability), with "ties" among scores being broken by clinicians' on-site assessments about how to best identify, interpret, and apply these and possibly other factors.

Dr D is unsure about the legal nature and scope of any federal authority in defining, developing, implementing, and overseeing equitable on-site triage practices in organizations and locales across the state. Triage plans normally vary by state, so Dr D wonders how best to separate the state department of health's ethical from its legal obligations in overseeing local implementation of triage protocols and responding to persistent inequity. Dr D considers how to respond to the CDC's inquiry.

### Commentary

In order for Dr D to respond to the concerns of the CDC officials, she must first gain a better understanding of the national [crisis standards of care \(CSC\)](#) landscape, of which the SOFA score typically is a part. The SOFA is a clinical decision-making tool created in 1994 by the European Society of Intensive Care Medicine and used to assess the degree of an individual's organ dysfunction.<sup>1</sup> In the context of triage under CSC, the SOFA score is used to estimate how likely it is that a patient will survive intensive care.<sup>2</sup> The SOFA score produces a numeric value (based on the summation of 6 scores, each ranging from 0 to 4), with a higher number expressing a lower likelihood of survival. During the COVID-19 pandemic, some states used the SOFA score alone to group patients into priority groups for receiving scarce treatments (eg, ventilators), and other states added additional metrics, such as prioritization based on the group to which a patient belongs (eg, essential workers, children, pregnant people).<sup>3</sup> Despite SOFA's widespread use during the COVID-19 pandemic when CSC guidelines were reviewed, limitations of using the SOFA score were noted as early as 2020.<sup>4</sup>

Here, we summarize key evidence demonstrating that use of SOFA scores in CSC risks exacerbating inequities, as SOFA scores overestimate the mortality of Black patients, resulting in these patients being placed in lower priority groups and hence having a lower survival rate than White patients, whose care is overprioritized. We then highlight ways of attenuating inequities that have been proposed in the literature and argue for the development of federal guidance as a means of promoting equitable resource allocation. Our own guidance stems from the lessons that ought to have been learned from the nation's most recent reckoning with the inequitable effects of CSC during the pandemic. Dr D requires knowledge of both inequity resulting from use of SOFA scores in CSC and how inequities in CSC can be reduced in order to effectively change existing protocols. We conclude with a discussion of how Dr D should respond to the CDC's concerns.

### **Harms of Using SOFA**

*Studies examining SOFA alone.* Roy et al found that Black patients had higher mean peak and mean 24-hour SOFA scores than patients of other races despite not having significantly greater ICU admission and in-hospital mortality rates.<sup>5</sup> Although Gershengorn and colleagues found SOFA accuracy to be consistent among racial and ethnic groups,<sup>6</sup> accuracy does not guarantee equitable treatment. In a large multisite cohort study, Miller et al found that Black patients' odds of dying were 2% lower than those of White patients with equivalent SOFA scores.<sup>7</sup> Studying differences within triaged groups, Ashana et al demonstrated that within highest-priority groups (SOFA score < 6), Black patients had a lower in-hospital mortality rate than White patients and that when Black patients were reclassified from intermediate (SOFA score 6-8) to higher priority levels, their in-hospital mortality rates were similar to those of White patients.<sup>8</sup> The authors concluded that "the SOFA score underestimated in-hospital mortality risk for White patients and overestimated it for Black patients."<sup>8</sup> Likewise, Keller et al cautioned against using SOFA scores to triage COVID-19 patients, citing its inaccuracies in predicting inpatient hospital mortality.<sup>9</sup>

In a study of 4 allocation approaches for critically ill COVID-19 patients, including SOFA only and a lottery, Bhavani et al found that, in the SOFA-only protocol, Black and Hispanic patients were assigned higher SOFA scores than White patients and that Black patients had a significantly lower survival rate than the average survival rate of all patients included in the study.<sup>10</sup> When the ventilators were randomly assigned, there were no significant differences in survival between groups.<sup>10</sup> Rubin et al raised similar concerns in a retrospective cohort study of patients who required ventilation, finding that SOFA scores were not able to reliably predict short-term survival.<sup>11</sup>

*Studies examining multi-criteria algorithms, including SOFA scores.* State guidelines that use SOFA scores as part of multi-criteria frameworks also disadvantage people of color. In a multisite retrospective cohort study, Wunsch et al found that a slightly higher percentage of patients of color were categorized in the lowest-priority groups using the New York State guidelines.<sup>12</sup> Moreover, Jezmir et al found in a multicenter cohort study of patients intubated on admission to the intensive care unit that the use of the Colorado guidelines prioritized the patient most likely to survive 71% of the time in the White subcohort but only 63% of the time in the Black subcohort.<sup>13</sup> The hypothetical raw SOFA algorithm followed this same trend, selecting patients most likely to survive more often in the White than in the Black subcohort.<sup>13</sup> Despite the Colorado guideline's slightly better prediction of 28-day survival than the New York State guideline,<sup>3</sup> Colorado's inclusion of comorbidities was flagged as a concern by Bharadwaj et al due to the risk of exacerbating racial and socioeconomic disparities, as "those who are most disadvantaged are most likely to have multiple comorbidities," thereby decreasing their estimated likelihood of short-term survival.<sup>3</sup>

*Historical context of SOFA harms.* Sederstrom and Wiggleton-Little<sup>14</sup> and Cleveland Manchanda et al<sup>4</sup> emphasize that typical uses of the SOFA score in CSC for patients with COVID-19 ignore historical inequities by assuming equivalent baseline health among all patients. CSC thus deprioritize patients of color with comorbidities, such as hypertension and chronic obstructive pulmonary disease, which are more common in racial and ethnic minorities due to adverse social and political determinants of health. Schmidt et al 2022 echo these points, noting that the SOFA score's creatinine measure simultaneously measures kidney function and social disadvantage and that, when this measure is included, the SOFA score generally advantages White patients while

disadvantaging Black patients.<sup>15</sup> It should be clear to Dr D that creating a more equitable triage protocol is an urgent task required to reduce health care and health disparities among Black and other historically marginalized groups.

### SOFA Alternatives

There are many leads on equitable triage protocols in the literature for Dr D to work with. One way in which inequities can be mitigated is by alternatives to the SOFA score. In a reserve system, such as proposed by Miller et al,<sup>7</sup> units of the scarce resource are reserved for a particular subset of the population (eg, zip code, age, chronic condition), and allocation decisions for those reserved resources will be made without members of the given subset of the population competing with patients outside of that subset. While Miller et al did not specifically mention race as a potential category of a reserve system, prioritizing groups with higher chronic disease burdens and lower socioeconomic status zip codes would prioritize Black and other historically marginalized and minoritized patients, thereby helping to balance different stakeholders' interests. Another way of mitigating inequities is demonstrated by the National Academies of Sciences, Engineering, and Medicine's incorporating the Social Vulnerability Index (SVI) into coronavirus vaccine allocation guidelines in spring 2020.<sup>16</sup> SVI ranks census tracts on 15 social factors, such as population of historically marginalized racial groups or disability rate. An individual's SVI score is used in the guideline as a tiebreaker between otherwise equally prioritized individuals. Finally, Bhavani et al explored age-related and random lottery systems. They highlighted that a youngest-first allocation system had a higher survival rate than all other protocols and a higher survival rate for Black patients than the lottery, likely reflecting the younger age of severe COVID patients who are Black.<sup>10</sup> Random ventilator allocation via a lottery saved the least lives, but survival to hospital discharge did not differ among racial and ethnic groups.<sup>10</sup>

Another way inequities can be mitigated is by making modifications to the SOFA score. This could be done, for example, by removing the creatinine component from the SOFA score, as the Black population has elevated creatinine levels.<sup>4,7,8,15</sup> Sederstrom and Wiggleton-Little propose that SOFA scores be amended to allocate points back to Black Americans to alleviate some of the burden of blackness for patients in triage.<sup>14</sup> Moreover, the approach assigns additional points to patients who currently reside in areas of resource deprivation. The authors state that this deliberate and antiracist "give-back" approach "does not result in an environment where the intentional favoring of Black patients nets a positive over other patients."<sup>14</sup>

Sarkar et al suggest that incorporating socioeconomic and geographical markers, alongside biomarkers related to the present disease, will make future prediction models more accurate.<sup>17</sup> Schmidt et al suggest improving diversity on decision-making teams, as well as more downstream approaches, such as adjusting SOFA creatinine penalties by average race or ethnicity levels and replacing creatinine with alternative measures, such as cystatin C, to curb inequitable outcomes.<sup>18</sup>

In sum, the literature demonstrates that the SOFA score overestimates the mortality of Black patients and simultaneously prioritizes White patients, in part due to flawed study design. In response, a wide range of proposals have been made to attenuate this harm—not adopting any of these recommendations risks becoming complicit in structures that sustain, if not exacerbate, existing inequities. It is the responsibility of Dr D and her team to act quickly in putting one of these plans or a better, novel alternative into action expeditiously.

## Conclusion

Dr D is in a difficult position. At a minimum, she should act in a manner that does not exacerbate existing inequities, as recommended by Hick et al.<sup>16</sup> She has a responsibility as a physician to act in accordance with both justice and nonmaleficence. Since the literature is clear on the limitations of the SOFA score, ignoring the need for adjusting CSC triage protocols risks violating both these ethical principles. Dr D should hence respond to the CDC's concerns in 2 main ways. First, she should urge CDC officials to press for binding federal guidance through an internal mechanism. Second, in the interim, she should take immediate action to reduce the risk of inequitable outcomes from SOFA at the hospital where she practices.

We suggest that Dr D appeal to clinical administrators at her hospital to create CSC guidelines that recognize the most recent **evidence of racial inequity** in allocation approaches during the COVID-19 pandemic—for example, by incorporating a reserve system or an SVI. She should also prompt an investigation of her hospital's demographics to address specific areas of potential harm. Importantly, a mild improvement should not be delayed in hopes of a perfect solution. Dr D should act quickly to implement a more equitable plan to minimize the accumulated harm of SOFA based on existing research while working to create a more ideal CSC. Most importantly, however, Dr D and CDC officials should advocate for revision of CSC guidelines at a national level. The lack of federal guidelines allows states to choose whether they will make the effort to mitigate the harms of a racially inequitable triage protocol. However, since racial and ethnic minority groups constitute a federally protected class, they should be protected under a federal CSC. A federal guideline that takes structural inequities into account is imperative to mitigate the exacerbation of health inequities faced by Black and other historically marginalized and minoritized patients. Additionally, it would likely reduce the burden of moral decision making among physicians concerned about social justice.<sup>20</sup>

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#### Editor's Note

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#### Conflict of Interest Disclosure

The author(s) had no conflicts of interest to disclose.

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