

Minnesota Hospitals' Plans for Implementing Statewide Guidance on Allocation of Scarce Critical Care Resources During the COVID-19 Pandemic

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Abstract

Objectives: To assess hospitals' plans for implementing Minnesota's statewide guidance for allocating scarce critical care resources during the COVID-19 pandemic.

Patients and Methods: Individuals from 23 hospitals across Minnesota were invited to complete a 25-item survey between July 20, 2020, and September 18, 2020 to understand how hospitals in the state intended to operationalize statewide clinical triage instructions for scarce resources (including mechanical ventilation) and written ethics guidance on the allocation of critical care resources in the event crisis standards of care triggered triage.

Results: Of individuals invited from 23 hospitals, 14 hospitals completed the survey (60.9% institutional response rate) and described plans for triage at their respective hospitals. Planned triage team composition and size varied. Hospitals' plans for which individuals should assign a triage score (reflecting patients' illness severity) also differed markedly. Most respondents described plans for staff training to address potential bias in triage.

Conclusion: Despite explicit state guidance to encourage consistency across hospitals, we found considerable heterogeneity in implementation plans. Plans diverged from Minnesota's written ethics guidance on whether to consider race during triage to help mitigate health disparities. Inconsistencies between the state's 2 guidance documents could explain some of these differences. Collaboration between hospitals and committees developing statewide guidance may help identify barriers to effective operationalization. Ongoing review of published guidance and hospital plans can identify issues of clarity and consistency and promote equitable triage.

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Soon after the eruption of the COVID-19 pandemic in 2020, it became apparent that state and regional surges could lead to acute shortages of scarce critical care resources. Multiple states, including Minnesota, revised or developed written triage procedures to be used if crisis standards of care (CSC) were triggered, defined as “a substantial change in usual health care operations and the level of care it is possible to deliver, which is made necessary by a pervasive (eg, pandemic influenza) or catastrophic (eg, earthquake and hurricane) disaster.”^{1,2}

Minnesota has a robust history of developing both ethics guidance and clinical triage instructions for scarce resource allocation (Table 1).³⁻⁸ Minnesota COVID Ethics Collaborative (MCEC) developed an ethics framework to guide allocation of ventilators and other critical care resources in the COVID-19 pandemic, to be used in the event that scarcity caused authorities to trigger the onset of CSC for these resources (“ethics guidance” hereafter).⁶ This document was published on the Minnesota Department of Health’s website on May 4, 2020, and centers on the trigger for

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TABLE 1. Timeline of Statewide Triage Guidance in Minnesota

Development of ethics guidance before COVID-19	Developed in the Minnesota Pandemic Ethics Project (2007-2010) ⁴ and the project to develop ethics guidance for crisis standards of care (2016-2017). ⁵ Minnesota's ethics guidance was developed and refined with extensive community engagement. Activities included solicitation of written public comment as well as engagement with residents in diverse communities throughout the state and with individuals in relevant professional roles.
Development of clinical triage instructions before COVID-19	In 2010, the Minnesota Department of Health (MDH) first published "Patient Care Strategies for Scarce Resource Situations," containing clinical triage instructions for each scarce resource, including mechanical ventilation. ³ This tool was developed by MDH's Science Advisory Team, reviewed and promulgated by MDH, and periodically revised, with the last update before the pandemic in 2016.
Formation of Minnesota COVID Ethics Collaborative (MCEC) and development of COVID-19 ethics guidance	In March 2020, in response to the declaration of the COVID-19 pandemic by the World Health Organization, the MCEC formed to address ethical challenges specific to the pandemic in collaboration with the MDH, the University of Minnesota, and the Minnesota Hospital Association. Ethics guidance developed by MCEC was reviewed by the MDH Scientific Advisory Team and posted to the MDH website in updated form on May 4, 2020. ⁶ No additional revisions occurred during the COVID-19 pandemic.
Formation of Critical Care Work Group (CCWG) and review of clinical triage instructions for COVID-19	Also in March 2020, a group of critical care physicians from around Minnesota began meeting regularly as the CCWG to review MDH's clinical triage instructions ³ and strategize about optimizing patient access to hospital care. ⁷ The statewide CCWG reviewed MDH's clinical triage instructions on mechanical ventilation but did not issue revised guidance. The clinical triage instructions were last revised in August 2021.
Scarcity during COVID-19	Although CSC were never formally triggered by Minnesota authorities, conditions of acute scarcity did exist in some Minnesota hospitals at different times in 2020 and 2021. ⁸
CSC, crisis standards of care.	

activation of the allocation framework, ethical principles to guide allocation decisions, and recommended triage procedures (Table 2).^{3,6} No additional revisions to this document occurred during the COVID-19 pandemic.

Minnesota Department of Health's clinical triage instructions for allocating ventilators are found in section 6 of "Patient Care Strategies for Scarce Resource Situations" (hereafter "clinical triage instructions").³ This document was last updated in 2016 and was subsequently revised in August 2021 in response to COVID-19. A Critical Care Work Group (CCWG), separate from MCEC, was convened in March 2020 to review the clinical triage

instructions but did not issue any revisions. The clinical triage instructions involve calculating a score to determine severity of organ dysfunction, the sequential organ function assessment (SOFA), as well as evaluation of the severity of comorbid conditions, an estimation of likely duration of critical illness, and assessment of disease trajectory (Table 2).

There are areas of divergence between the ethics guidance and clinical triage instructions. Notably, the ethics guidance limits prognostic assessments for purposes of triage to survival to hospital discharge, whereas the clinical triage instructions allows for consideration of survival 2 years postdischarge (revised to 1

TABLE 2. Summary of Central Ethical and Clinical Guidance for Mechanical Ventilation Allocation Decisions in Minnesota

Allocation of ventilators and related scarce critical care resources during the COVID-19 pandemic (ethical guidance) ⁶	Patient care strategies for scarce resource situations (clinical triage instructions) ³
Triage/rationing decisions should be separated from bedside care and made by a triage officer or team	Assess condition-specific prognosis and underlying disease state
Only substantial differences in prognosis should be used to prioritize patients	Assess severity of organ dysfunction using sequential organ function assessment or other scoring mechanism (small differences should not be used for allocation decisions)
Prognostication should be limited to survival of current illness to hospital discharge	Assess duration of need of mechanical ventilation (ie, long duration vs short duration)
Triage/rationing decisions should be based on an individual's clinical trajectory; such decisions should be reviewed and revised as necessary	Assess clinical trajectory (ie, improving or worsening clinical condition over time)
Triage decisions should not be based on race, ethnicity, gender identity, citizenship, age, disability status, quality of life or social value judgments, life expectancy beyond current event, ability to pay, or "first come, first served"	Reassess patients at regular intervals; mechanical ventilation may be reallocated from patients with a poor prognosis
Triage officer or team should not be provided with patient characteristics irrelevant to determining likelihood of survival to hospital discharge	
A review team should be established for oversight of the triage officer or team	
Triage and retrospective review decisions should be documented in the patient's chart using a standardized template	
Bias in decision-making should be mitigated via advanced training or inclusion of institutional equity and inclusion officers in triage or retrospective review teams	

year survival in 2021).³ Minnesota hospitals planning for the possibility of triage under CSC were left to navigate this inconsistent guidance.

For statewide guidance on patient triage to influence practice, hospitals must review and translate it into a workflow and oversight process that could be operationalized under conditions of acute scarcity, across diverse practice settings. There are few accounts of how hospitals bridged the gap between guidance and implementation. We report results of a survey conducted in July to September 2020 with individuals from health systems across Minnesota to assess their hospitals' planned response to Minnesota's clinical triage instructions and ethics guidance. This historical case study explores how institutions

prepared to operationalize state triage guidance, including triage team composition, patient assessment, review of triage decisions, and steps to mitigate bias and enhance equity in triage decisions. Identifying unresolved issues with translating state guidance into practice creates an opportunity for Minnesota to clarify and harmonize written guidance and increase triage consistency for the future.

PATIENTS AND METHODS

Survey Instrument

The study team (K.A.R., J.P.L., N.S., and E.S.D.), including members with expertise in bioethics, health equity, and critical care, developed a 25-item survey ([Supplemental Materials](#), available online at <http://www.mayoclinicjournal.org>).

mcpiqojournal.org) containing both closed-ended and open-ended questions to elicit respondents' understanding of their hospitals' plans for implementing Minnesota's statewide clinical triage instructions and ethics guidance.^{3,6} The survey was additionally refined in collaboration with leading members of the Minnesota statewide CCWG (S.K. and J.D.) and MCEC (D.D. and S.M.W.). The survey was distributed using REDCap and piloted with 3 content experts for face validity in May 2020. The study was reviewed and determined to be exempt by Mayo Clinic's institutional review board (#20-005327), and consent was obtained from all participants.

Data Collection

An initial recruitment email was sent to 1 or more individuals from 23 hospitals across the state, who were identified by the research team as having been actively involved in statewide MCEC and CCWG discussions, according to group rosters. If an individual self-identified as knowledgeable about their hospital's plans for triage implementation, a survey invitation was extended. A statement was appended to the beginning of the survey informing respondents that continuing with the survey constituted consent to participate. All survey responses were collected

anonymously, although hospital names were collected for internal tracking purposes. The survey was open from July 20, 2020, to September 18, 2020.

Data Analysis

Fixed responses were analyzed using descriptive statistics. Short-text responses were qualitatively analyzed via inductive content analysis, based on frequencies and descriptions of implementation strategies. Results are presented anonymously to prevent identification of participants or hospitals.

RESULTS

Individual respondents from 14 hospitals (of the 23 hospitals invited) completed the survey (61% response rate), including hospitals within all 9 major health care systems in Minnesota.⁹ Only 1 survey was completed per hospital, although 3 respondents indicated they worked at hospitals within the same health system. All survey responses were included for analysis, including hospitals within the same health system. Hospitals ranged from large academic and private hospitals to small community hospitals, spanning both urban and rural settings around the state. Five were outside of the largest urban centers in the state, and 2 were publicly funded; hospitals ranged in size from >500 beds (4 hospitals), 300-499 beds (7), and <300 beds (3). Most respondents were physicians (11/14), specializing in palliative medicine (6), internal or hospital medicine (4), family medicine (1), general surgery (1), and critical care (1). Other professional backgrounds included social work and graduate-level training in ethics. Each respondent affirmed that their hospital had developed or was in the process of developing an operational plan for triage in response to the pandemic.

Triage Team Composition

Minnesota's ethics guidance recommends the establishment of a triage officer or team with expertise in ethics and the management of critically ill patients. The guidance also recommends training on equity and fairness in triage for team members. Respondents were asked to describe the composition of their planned triage teams (Table 3). All hospitals planned to have physicians participate in

TABLE 3. Triage Team Characteristics

Characteristic	N=14
No. of members	
≤3	2
4-7	5
7-10	1
>10	5
Unsure	1
Mode of consultation	
Conference call	7
Video conference	5
In-person	1
Unsure	1
Rotating call schedule	
Yes	12
No	2
Triage team training session	
Already commenced	8
Currently planning	5
Unsure	1

TABLE 4. Institution-Specific Plans for Assigning Triage Scores

Institution	Individuals responsible for assigning SOFA score	Additional clarification	Assessment of prognosis/ comorbidities, duration of need, and response to mechanical ventilation	Additional clarification
1	Generated by EHR	GCS calculated by bedside RN	Bedside physician or NPPA; research RN	Bedside clinician enters assessment into electronic medical record
2	Research RN	Bedside physician or NPPA available for clarification	Research RN	Triage officer available for confirmation or clarification
3 ^a	Generated by EHR	GCS calculated by bedside RN or physician	Bedside physician or NPPA	Duration of need documented by intubating physician Comorbidities by clinical documentation improvement specialists
4	Triage team		Triage team	Will be discussed with ethics and equity and inclusion officers on triage team
5	Bedside physician or NPPA		Triage team	Comorbidities not included due to ethical concerns
6	Bedside physician or NPPA	Critical care triage support team available as a resource	Bedside physician or NPPA	Bedside physician or NPPA assesses comorbidities and duration of need Data team oversees and prompts triage support teams to assist with triage scoring
7	Generated by EHR	Reviewed by triage officer	To be determined	Automated predictive value calculations for COVID-19 and readmission will be used as a guide Staff will be identified to complete this step when necessary
8	Bedside physician or NPPA Ethics triage officer Triage team		Bedside physician or NPPA Critical care lead Ethics triage officer Triage team	
9 ^b	Critical care lead Ethics triage officer		Unsure	
10 ^b	Bedside physician or NPPA Critical care lead		Bedside physician or NPPA Critical care lead	
11	Bedside physician or NPPA	Reviewed and adjusted by triage officer	Bedside physician or NPPA	Reviewed and adjusted by triage officers
12 ^b	Ethics triage officer Triage team	Initial assignment by triage officer Reviewed by triage team	Ethics triage officer Triage team	Triage team likely to complete Ethics triage officer may not have time for chart review
13	Generated by EHR	Reviewed by triage team	Triage team	Triage RN reviews chart and presents to triage team

Continued on next page

TABLE 4. Continued

Institution	Individuals responsible for assigning SOFA score	Additional clarification	Assessment of prognosis/ comorbidities, duration of need, and response to me- chanical ventilation	Additional clarification
14 ^a	Generated by EHR	GCS calculated by bedside RN or physician	Bedside physician or NPPA	Duration of need determined by intubating physician Comorbidities determined by clinical documentation improvement specialists
EHR, electronic health record; GCS, Glasgow Coma Score; NPPA, nurse practitioner/physician assistant; RN, registered nurse; SOFA, sequential organ failure assessment.				
^a Institutions are affiliated.				
^b Institutions are affiliated.				

triage, with 10 indicating that these members would include specialists in critical care or palliative medicine. Eight hospitals planned to include an ethicist, and 3 included a member of their hospital's diversity, equity, and inclusion team. No hospitals planned to include a community member on the triage team. Five hospitals' planned triage teams had from 4 to 6 members, whereas 5 additional hospitals planned to include more than 10 members. Most hospitals planned to require a quorum of 3 to reach a triage decision (8/14 hospitals). Eight triage teams had completed at least one training session by the time of the survey, with an additional 5 hospitals indicating they were planning training sessions.

Plans for Implementing Triage Protocols

A patient's SOFA score is a key component of Minnesota's clinical triage instructions. Respondents were asked to describe who was responsible for assigning patients a SOFA score at their hospital (Table 4). Five hospitals planned to use an automatic SOFA calculator in the electronic health record, with 6 more hospitals relying on the bedside team to calculate the SOFA score. Eleven respondents provided additional detail about SOFA score assignment, such as plans for clinicians to confirm accuracy of automated SOFA calculations and manual calculation of certain score elements (eg, Glasgow Coma Score).

Minnesota's 2020 clinical triage instructions called for calculating patients' triage scores by assessing severity of chronic illness, prognosticating 2-year survival and estimating duration of mechanical ventilation, whereas ethics guidance recommended considering

only likelihood of survival to hospital discharge. Respondents described divergent planned approaches for performing these assessments. Responsible parties would include bedside clinicians, triage team members, redeployed research nurses, or billing and coding specialists. In their written comments, some clarified that the triage officer or team and/or ethics committee would participate real-time in review of comorbidity and length of stay assessments. One respondent indicated that their hospital did not plan to factor comorbidities into ventilator allocation decisions, citing ethical concerns about the disproportionate burden of chronic diseases on historically disadvantaged populations.

Minnesota's ethics guidance recommends that the triage team should be blinded to patient demographic characteristics to prevent bias in triage decisions. Respondents described plans for information sharing and documentation at their hospitals (Table 5). Eight hospitals planned for all triage team members to have full access to medical records of patients during triage assessments (including access to patient demographic characteristics), with the remaining hospitals describing restricted medical record access for triage team members, or no direct access. Although most respondents (11/14) stated that the bedside and triage teams at their respective hospitals would directly communicate with each other, one specified that an ethics triage officer would liaise between the clinical and triage teams.

Minnesota's ethics guidance recommends that hospitals designate the individual responsible for communicating triage decisions to patients and families, such as a triage officer,

TABLE 5. Triage Team Workflow

Workflow	N=14
Triage team access to medical records	
Full access, all members	8
Full access, some members	3
Limited access	2
No access	1
Direct communication between triage team and clinical team permitted	
Yes	11
No	3
Communication of triage decision to patient/family	
Triage team members	6
Clinical team	6
Third party (eg, palliative care, social work, and chaplain)	2
Documentation of triage team decisions	
Health record	6
Database outside of electronic health record	1
Dual record keeping	7

bedside clinician, or palliative care team. Respondents described different anticipated pathways for communicating triage decisions to patients and families. One respondent specified that a representative from palliative medicine and chaplaincy would accompany the patient's attending physician in relaying triage determinations to families. A respondent at a different hospital indicated that the decision would be communicated by the clinical team. One respondent stated that their hospital was in the process of training teams (e.g., a physician and social worker) to assist with patient/family communication.

The ethics guidance also recommends that all triage decisions should be documented in the patient's health record. Respondents indicated that dual record keeping was planned for many of the hospitals (7/14), meaning that triage decisions would be recorded in the patient's medical record and in a separate database maintained by the hospital, to facilitate review of allocation decisions for fairness and outcomes.

Real-Time and Retrospective Review of Cases

A step-by-step procedure for appeals (real-time review) of a triage decision is outlined in the ethics guidance. All respondents stated

that patients, surrogate decision-makers, or the bedside team could initiate the appeal of a triage decision. Plans for adjudicating appeals differed by hospital, with 5 respondents indicating that their hospitals planned to create an appeals team; 6 hospitals planned to create a review team whose responsibilities would include adjudicating appeals and conducting regular retrospective review of all triaged cases. One respondent stated that hospital ethics leadership would adjudicate any appeals, whereas another indicated conducting these reviews would be the responsibility of the hospital's chief executive officer or their designee.

The ethics guidance recommends routine retrospective review of all triage decisions by a multidisciplinary team comprised of at least 3 members. At the time of the survey, 11 hospitals were planning a review process to retrospectively evaluate all triage decisions, with meeting frequency determined by triage volume. Most respondents (7 of the 11 hospitals planning a review process) described a review team composed of multiple disciplines, including clinicians of various specialties and representatives from ethics, equity, social work, clergy/chaplaincy, and hospital leadership. At the time of the survey, only one review team planned to include community members on the retrospective review team.

Efforts to Reduce Bias in Triage

The ethics guidance also recommends safeguards against bias such as antiracism and disability bias training. Most respondents identified at least 1 strategy to reduce bias/discrimination in their hospitals' planned triage process, including hospital-wide antibias training for all employees (11/14). Hospital-wide antibias training was mandatory for 5 hospitals and optional for 6 hospitals. Six respondents noted that antibias training was required for triage team members. A few clarified that their hospitals intended to intensify antibias training for staff involved in triage decisions (e.g., equity training and formal triage exercises). Other planned strategies to mitigate bias included ensuring diversity on the triage team (6/14) or review committee (8/14). Respondents reported that 6 hospitals planned to blind triage teams to patient demographic characteristics, including race. Two

respondents indicated that their hospitals were debating whether race should be affirmatively considered in triage decisions to mitigate existing inequities.

DISCUSSION

Hospitals face a challenge in translating the guidance expressed in statewide ethics frameworks and scarce resource allocation protocols into an operational hospital triage plan. Factors such as setting (rural vs urban), affiliation (within a major health system or unaffiliated), hospital size, existing consultative ethics expertise, and institutional culture may influence the implementation of statewide guidance. Evidence suggests that even within states, adaptation of statewide guidance may vary by health care system.¹⁰ Implementation is also challenging when state guidance is not uniform. To our knowledge, this is the first description of how hospitals planned to adapt statewide pandemic resource allocation guidance to their respective practice settings. The variation we found may not only reflect the need to adapt guidance to diverse hospitals across the state, but it also may reflect state failure to communicate clear and consistent guidance or hospital disagreement with that guidance. Variation in how hospitals within a state plan to conduct triage may have troubling implications for patient care if it results in substantially different triage outcomes across individual hospitals within a state.

Although intended plans for implementation of statewide guidance varied by hospital, respondents described processes consistent with most of the components of Minnesota's ethics guidance. Divergent responses may reflect the different resources available to each hospital based on their size, available staff, and whether they were part of a broader health system. When intended plans deviated from fundamental aspects of Minnesota's ethics guidelines, such as the recommendation that triage decisions not consider the patient's race or ethnicity, individuals responsible for planning at those hospitals may have reasoned that a different strategy would better fulfill the ethical commitments and objectives embraced as the foundation of the state's guidance. In fact, during statewide ethics and CCWG discussions in 2020, participants actively debated questions such as to the degree to which

bedside teams should be involved in triage and how to combat discrimination experienced by persons with disabilities and minoritized racial groups.

The ethics guidance stated that triage and retrospective review teams should include individuals with ethics expertise. The importance of including individuals with ethics expertise in triage is stressed in the literature, particularly in shaping hospital policies, promoting more equitable outcomes for historically disadvantaged groups, and reducing the moral distress that bedside clinicians may face regarding triage decisions.^{11,12} Several respondents specified in their open-ended responses that their hospitals were intentional about who they planned to include on the triage team, to ensure triage decisions were made by those with relevant clinical and ethics expertise and diverse lived experience, to mitigate bias. This commitment to an ethically sound triage process also extended to plans for enhanced training for their triage teams or review teams, with most respondents indicating that their hospital had held at least some training sessions as of September 2020, although some had not yet begun this process.

One point of divergence among hospitals was in the parties responsible for clinical assessments at various steps in the triage process. Respondents described differing plans for assessing the components of the triage score. This was not a surprising finding, given the differences of opinion that emerged in statewide CCWG discussions, with some individuals advocating that bedside clinicians were the most knowledgeable parties to both evaluate patients and communicate triage decisions to families, but others arguing that bedside clinicians should be prohibited from involvement in the triage process to reduce potential bias and moral distress. Respondents reported that 5 hospitals proposed use of SOFA scores generated by their electronic medical records, whereas other respondents questioned automated scores' accuracy, particularly with respect to neurologic assessments and assignment of SOFA points when clinical data were missing. Respondents from some hospitals stressed the importance of factoring clinical judgment into evaluation of patients' chronic medical conditions, advocating that experienced critical care clinicians perform

triage. Other hospitals trained redeployed research nurses or even billing specialists to participate in triage assessments, suggesting they had insufficient staff to devote an intensivist to triaging patients.

Since early in the pandemic, patient activists, civil rights attorneys and scholars, as well as the federal Office for Civil Rights have criticized triage policies for perpetuating disadvantage on the basis of race/ethnicity, age, disability, socioeconomic status, and other factors without immediate clinical relevance.¹³⁻¹⁷ SOFA and scoring mechanisms based on severity of organ dysfunction have been criticized for discriminating against persons with disabilities or with underlying chronic disease,¹⁸ particularly when triage protocols call for prognostication beyond the acute illness.¹⁹ Additionally, data published because this survey was fielded shows that SOFA overestimates in-hospital mortality for Black patients but underestimated for White patients,²⁰ leading to calls to modify SOFA (e.g., removing creatinine)²¹ or develop an alternative prognostic measure to mitigate this potential source of bias, as has been advocated by some scholars. Minnesota's MCEC and CCWG debated how to address SOFA concerns. Several respondents indicated that their hospital had yet to reach internal consensus on the best strategy to enhance triage fairness with regard to race/ethnicity, age, and disability. Although some respondents described hospital plans to review and adjust SOFA scores for disability or chronic disease, other hospitals were considering using patient race as corrective factors for systematic disadvantage. Notably, affirmative prioritization of minoritized racial or ethnic groups in triage deviates from MCEC's guidance that race ought not to be considered in critical care triage decisions.²²⁻²⁴ Minnesota's ethics guidance states that likelihood of survival to hospital discharge should be considered during triage. In contrast, Minnesota's clinical triage instructions call for the consideration of specific comorbidities and postdischarge prognostication; instructions that, despite disability and equity concerns raised, are still prevalent in state triage guidance across the United States.^{19,25}

Strengths and Limitations

Findings may not be generalizable to other states, particularly considering Minnesota's

years-long prepandemic planning, a history of robust community engagement, COVID-era statewide collaboration, and presence of guidance documents that were not fully harmonized.²⁶⁻²⁸ Although respondents were employed by diverse hospitals, survey responses do not describe all implementation planning across Minnesota. Other hospitals may have developed different strategies and resources to operationalize Minnesota's guidance, if at all. Responses are reflective of summer 2020; perspectives on triage ethics may have evolved after survey completion or during surge events.^{8,9}

Selection criteria may have biased survey respondents in favor of closer adherence to Minnesota's guidance, because invitations were issued based on known involvement in MCEC and/or CCWG. Individuals were not formally designated representatives of their respective hospitals and might have had variable knowledge of hospital plans, especially unwritten plans. Surveying multiple respondents per hospital could have yielded a more complete rendering of implementation plans, particularly in large hospitals where responsibility for planning and overseeing triage was shared. Finally, this study was not designed to assess hospitals' written policies on triage implementation because these data were unavailable.

CONCLUSION

Issuing statewide pandemic triage guidance does not guarantee uniformity in implementation. Instead, state guidance initiates a process of hospital planning for operationalizing that guidance and determining how to cope with episodes of acute scarcity requiring triage. From the standpoint of patients, what matters most is what hospitals and clinicians plan to do if triage is needed.

Hospitals would benefit from continuing review of operational plans developed during the COVID-19 pandemic. States should review their triage guidance, resolving any inconsistency or unintentional ambiguity that could create obstacles to implementation. Greater collaboration between hospitals and the state should include channels for bidirectional communication about practical challenges hospitals are facing with translating guidance into practice.

POTENTIAL COMPETING INTERESTS

Dr DeBruin reports the following grants: FEMA Region V for Kids (January 1, 2024 to September 25, 2024) funded as subcontract with Children's MN, the primary grantee for the state of MN for this regional project. Funding for the regional project provided by US Administration for Strategic Preparedness and Response and the project focuses on developing preparedness resources for pediatrics; Improving Crisis Preparedness: Lessons from Acute Care Settings (March 26, 2024 to December 31, 2024); and Contract with MN Department of Health to gather input from healthcare stakeholders, to be used to draft recommendations for improvements in MN's crisis preparedness and response frameworks. Drs DeBruin and Wolf were coleads of the Minnesota COVID Ethics Collaborative (MCEC) during its operation (2020-2022). Dr Wolf is supported by NIH/NIA grant R03AG073987 (as a consultant). Dr Leider reports institutional grants from Public Health Accreditation Board, Health Resources and Services Administration, Minnesota Department of Health, Ampact, University of Michigan, Cook County Department of Public Health, National Association of County and City Health Officials, National Coordinator for Health Information Technology, Mission Square Retirement, DHHS Administration for Children and Families, and National Environmental Health Association; is a consultant for National Association of County and City Health Officials, Johns Hopkins University Payments, and de Beaumont Foundation; reports speaking honoraria for Michigan Premier Public Health Conference 2023 and SME to National Americorps Working Group (from JBS); and reports travel honoraria from Michigan Premier Public Health Conference 2023 and NACCHO 2022. Dr Sederstorm reports the following patents: Digital Advance Healthcare Management, 63029969, May 26, 2020; and Digital Advance Healthcare Directive Management, Blockchain, 63/379,069, October 11, 2022; reports participation in the data safety monitoring board of the cardiac resynchronization therapy using his/left bundle pacing vs biventricular pacing with a left ventricular epicardial lead

in patients with heart failure with LVEF $\leq 50\%$ and with either a wide QRS complex (>130 ms) or with/anticipated $>40\%$ pacing randomized clinical trial; reports leadership roles as a board member in the following: American College of Chest Physician, Groves Learning Organization, Make A Wish Minnesota, and St. Catherine University; and is the owner of UzObi. Dr Dichter is in the Executive committee Task Force for Mass Critical Care—a scientific “think group” that works together on academic projects previously published in CHJEST. Dr DeMartino receives funding from the National Institute on Aging (NIA) through grant number R03AG073987; is additionally funded by Mayo Clinic's Annenberg Career Development Award; and is the Chair, Ethics and Conflicts of Interest Committee for the American Thoracic Society. The other authors report no competing interests.

ETHICS STATEMENT

This study was approved by Mayo Clinic's institutional review board. The institutional review board waived the need for written informed consent because of the minimal risk nature of the study.

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SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at <http://www.mcpiqjournal.org>. Supplemental material attached to journal articles has not been edited, and the authors take responsibility for the accuracy of all data.

Abbreviations and Acronyms: CCWG, Critical Care Work Group; CSC, crisis standards of care; MCEC, Minnesota COVID Ethics Collaborative; MDH, Minnesota Department of Health; SOFA, sequential organ failure assessment

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REFERENCES

- Institute of Medicine. *Guidance for Establishing Crisis Standards of Care for Use in Disaster Situations: A Letter Report*. National Academies Press; 2009.
- Maves RC, Downar J, Dichter JR, et al. 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. *Chest*. 2020;158(1):212-225. <https://doi.org/10.1016/j.chest.2020.03.063>.
- Patient care strategies for scarce resource situations. Minnesota Department of Health. <https://www.health.state.mn.us/communities/ep/surge/crisis/standards.pdf>. Accessed October 19, 2023.
- Minnesota Pandemic Ethics Project. Minnesota Department of Health. <https://www.health.state.mn.us/communities/ep/surge/crisis/panethics.html>. Accessed October 19, 2023.
- Minnesota crisis standards of care framework: ethical guidance. Minnesota Department of Health. <https://www.health.state.mn.us/communities/ep/surge/crisis/framework.pdf>. Accessed October 19, 2023.
- Allocation of ventilators & related scarce critical care resources during the COVID-19 pandemic. Minnesota Department of Health. <https://www.health.state.mn.us/communities/ep/surge/crisis/ventilators.pdf>. Accessed October 19, 2023.
- Dichter JR, Devereaux AV, Sprung CL, et al. Mass critical care surge response during COVID-19. *Chest*. 2022;161(2):429-447. <https://doi.org/10.1016/j.chest.2021.08.072>.
- Richert C, Bakst B. Despite plans, precautions, COVID-19 nearly broke Minnesota hospitals. Why? Hennepin Healthcare Newsroom. <https://www.mprnews.org/story/2022/02/16/despite-plans-precautions-covid19-nearly-broke-minnesota-hospitals-why>. Accessed October 19, 2023.
- Masson G. 9 Minnesota hospital CEOs run ad sounding alarm over COVID surge. Becker's Hospital Review. <https://www.beckershospitalreview.com/hospital-management-administration/9-minnesota-hospital-ceos-run-ad-sounding-alarm-over-covid-surge.html>. Accessed October 19, 2023.
- Sullivan DR, Sama N, Hough CL, et al. Differences in US regional healthcare allocation guidelines during the COVID-19 pandemic. *J Gen Intern Med*. 2023;38(1):269-272. <https://doi.org/10.1007/s11606-022-07861-2>.
- Supady A, Curtis JR, Abrams D, et al. Allocating scarce intensive care resources during the COVID-19 pandemic: practical challenges to theoretical frameworks. *Lancet Respir Med*. 2021;9(4):430-434. [https://doi.org/10.1016/S2213-2600\(20\)30580-4](https://doi.org/10.1016/S2213-2600(20)30580-4).
- Han SA, Koch VG. Physicians should not be forced to determine resource allocation: triage committees may reduce physician trauma. *Health Aff (Forefront)*. May 8, 2020. <https://doi.org/10.1377/forefront.20200507.584159>.
- Auriemma CL, Molinero AM, Houtrow AJ, Persad G, White DB, Halpern SD. Eliminating categorical exclusion criteria in crisis standards of care frameworks. *Am J Bioeth*. 2020;20(7):28-36. <https://doi.org/10.1080/15265161.2020.1764141>.
- Cleveland Manchanda E, Couillard C, Sivashanker K. Inequity in crisis standards of care. *N Engl J Med*. 2020;383(4):e16. <https://doi.org/10.1056/NEJMp2011359>.
- Mello MM, Persad G, White DB. Respecting disability rights—toward improved crisis standards of care. *N Engl J Med*. 2020;383(5):e26. <https://doi.org/10.1056/NEJMp2011997>.
- Segal JB. Why I don't support age-related rationing during the COVID pandemic. The Hastings Center. <https://www.thehastingscenter.org/why-i-dont-support-age-related-rationing-in-treating-covid-19/>. Accessed October 19, 2023.
- Savin K, Guidry-Grimes L. Confronting disability discrimination during the pandemic. The Hastings Center. <https://www.thehastingscenter.org/confronting-disability-discrimination-during-the-pandemic>. Accessed October 19, 2023.
- Raschke RA, Agarwal S, Rangan P, Heise CW, Curry SC. Discriminant accuracy of the SOFA score for determining the probable mortality of patients with COVID-19 pneumonia requiring mechanical ventilation. *JAMA*. 2021;325(14):1469-1470. <https://doi.org/10.1001/jama.2021.1545>.
- Ennis JS, Riggan KA, Nguyen NV, et al. Triage procedures for critical care resource allocation during scarcity. *JAMA Netw Open*. 2023;6(8):e2329688. <https://doi.org/10.1001/jamanetworkopen.2023.29688>.
- Miller WD, Han X, Peek ME, Charan Ashana D, Parker WF. Accuracy of the sequential organ failure assessment score for in-hospital mortality by race and relevance to crisis standards of care. *JAMA Netw Open*. 2021;4(6):e2113891. <https://doi.org/10.1001/jamanetworkopen.2021.13891>.
- Ashana DC, Anesi GL, Liu VX, et al. Equitably allocating resources during crises: racial differences in mortality prediction models. *Am J Respir Crit Care Med*. 2021;204(2):178-186. <https://doi.org/10.1164/rccm.202012-4383OC>.
- Schmidt H. Vaccine rationing and the urgency of social justice in the Covid-19 response. *Hastings Cent Rep*. 2020;50(3):46-49. <https://doi.org/10.1002/hast.1113>.
- Sederstrom N. The "give back": is there room for it? Bioethics Today. <https://bioethicstoday.org/blog/the-give-back-is-there-room-for-it/>. Accessed October 19, 2023.
- White DB, Lo B. Mitigating inequities and saving lives with ICU triage during the COVID-19 pandemic. *Am J Respir Crit Care Med*. 2021;203(3):287-295. <https://doi.org/10.1164/rccm.202010-3809CP>.
- DeMartino ES, Ennis JS, Wolf SM, Sulmasy DP. Learning from COVID-19 triage schemes to face the next public health emergency. *J Am Geriatr Soc*. 2024;72(4):1298-1301. <https://doi.org/10.1111/jgs.18765>.
- Cleveland Manchanda EC, Sanky C, Appel JM. Crisis standards of care in the USA: a systematic review and implications for equity amidst COVID-19. *J Racial Ethn Health Disparities*. 2021;8(4):824-836. <https://doi.org/10.1007/s40615-020-00840-5>.
- Ne'eman A, Stein MA, Berger ZD, Dorfman D. The treatment of disability under crisis standards of care: an empirical and normative analysis of change over time during COVID-19. *J Health Polit Policy Law*. 2021;46(5):831-860. <https://doi.org/10.1215/03616878-9156005>.
- Piscitello GM, Kapania EM, Miller WD, Rojas JC, Siegler M, Parker WF. Variation in ventilator allocation guidelines by US State during the coronavirus disease 2019 pandemic: a systematic review. *JAMA Netw Open*. 2020;3(6):e2012606. <https://doi.org/10.1001/jamanetworkopen.2020.12606>.