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Ventilator Triage Policies During the COVID-19 Pandemic at U.S. Hospitals Associated With Members of the Association of Bioethics Program Directors

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Background: The coronavirus disease 2019 pandemic has or threatens to overwhelm health care systems. Many institutions are developing ventilator triage policies.

Objective: To characterize the development of ventilator triage policies and compare policy content.

Design: Survey and mixed-methods content analysis.

Setting: North American hospitals associated with members of the Association of Bioethics Program Directors.

Participants: Program directors.

Measurements: Characteristics of institutions and policies, including triage criteria and triage committee membership.

Results: Sixty-seven program directors responded (response rate, 91.8%); 36 (53.7%) hospitals did not yet have a policy, and 7 (10.4%) hospitals' policies could not be shared. The 29 institutions providing policies were relatively evenly distributed among the 4 U.S. geographic regions (range, 5 to 9 policies per region). Among the 26 unique policies analyzed, 3 (11.3%) were produced by state health departments. The most frequently cited triage criteria were benefit (25 policies [96.2%]), need (14

[53.8%]), age (13 [50.0%]), conservation of resources (10 [38.5%]), and lottery (9 [34.6%]). Twenty-one (80.8%) policies use scoring systems, and 20 of these (95.2%) use a version of the Sequential Organ Failure Assessment score. Among the policies that specify the triage team's composition (23 [88.5%]), all require or recommend a physician member, 20 (87.0%) a nurse, 16 (69.6%) an ethicist, 8 (34.8%) a chaplain, and 8 (34.8%) a respiratory therapist. Thirteen (50.0% of all policies) require or recommend those making triage decisions not be involved in direct patient care, but only 2 (7.7%) require that their decisions be blinded to ethically irrelevant considerations.

Limitation: The results may not be generalizable to institutions without academic bioethics programs.

Conclusion: Over one half of respondents did not have ventilator triage policies. Policies have substantial heterogeneity, and many omit guidance on fair implementation.

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The severe threat posed by the current coronavirus disease 2019 (COVID-19) pandemic has resulted in resource shortages, requiring difficult decisions about the allocation of essential resources, such as critical care beds, ventilators, and medications (1–3). (We will subsequently refer to “ventilators” and “mechanical ventilation” for the sake of simplicity.) In general, health care is provided according to a conventional, well-established standard of care. When health care resources are severely strained, contingency standards of care, which modify usual practices but still aim at producing similar clinical outcomes, may be implemented. For example, health care providers may substitute or reuse scarce supplies. However, such changes may not be sufficient (4). If demand is greater than the available resources, it becomes ethically justifiable to shift the focus from individual patients' preferences or best interests to saving the most lives possible (5–7). It may, unfortunately, be necessary to withhold or withdraw mechanical ventilation from individuals who would otherwise benefit from its use. What criteria should be used to ethically allocate scarce resources, and what processes should be used to fairly implement allocation decisions are monumental questions facing many hospitals, health care systems, and governmental entities.

To help answer these questions, we report a mixed-methods analysis of U.S. triage policies.

Triage criteria include need (providing resources only to individuals who will not survive without them) and benefit (providing resources to individuals most likely to survive with their use). However, there is considerable debate over how best to assess need and benefit, and which, if any, additional criteria should be used (8–10). For instance, some have argued for conserving resources: for example, sequentially allocating a ventilator to 2 people who are each likely to require it for 1 week to survive instead of to 1 person who is likely to require it for 2 weeks (8, 11). Others have advocated for the principle of narrow social utility: prioritizing such groups as health care workers, whose efforts are in short supply and are necessary to save lives (9, 12). Although age is generally not a good proxy for benefit,

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some contend that younger individuals should be given priority to have an equal opportunity to survive into adulthood (10, 13, 14).

With regard to implementation, it is generally agreed that allocation decisions should be made by an institutional triage team or officer not directly involved in patient care (15).

In the face of COVID-19, many hospitals, health care systems, and health departments are urgently developing new or revising existing triage policies. Hospitals in other countries, and increasingly in the United States, have already had to make difficult allocation decisions (2, 16). There will be justified variation in these policies owing to jurisdictional differences and local norms, but unjustified variation could exacerbate structural inequities, squander valuable resources, and undermine public trust.

As members of the Association of Bioethics Program Directors (ABPD) who share a concern for ethically sound and fair policies, we sought to understand whether, in the face of vigorous academic and public debate about allocation criteria and processes, some consensus is emerging. We compared triage policies from institutions across the United States to characterize the criteria and scoring systems they use, and how the criteria and scoring systems are implemented.

METHODS

We used an invitation letter (Supplement 1, available at [Annals.org](#)) to solicit ventilator triage policies from ABPD members. The ABPD is a voluntary membership organization of the leadership of academic bioethics programs in the United States and Canada (17). We requested that each program director indicate whether the institution with which they are affiliated has a ventilator triage policy, or whether it does not have or is developing one. If the institution has a policy, whether approved or in draft form, we asked the director to provide a copy. The initial solicitation and subsequent reminders were sent via e-mail. Participation was voluntary, and we provided no incentives. We contacted directors between 19 and 30 March 2020.

Coding of the Policies

We coded the policies by using qualitative methods, starting with a set of categories based on the literature and modifying or adding new categories on the basis of a preliminary review of the policies (18). Thirteen ABPD members coded the policies. Each policy was assigned to 2 members who coded independently and reconciled any differences through mutual agreement. With the exception that no members coded policies that they had written or that came from their own institution, assignment was made without reference to the policy's content. Reviewers were blinded to the policy's origins to the extent possible. Two reviewers also independently coded demographic information about the institutions and policies. We obtained information on the institutions from the American Hospital Directory (19). We characterized the location by using the U.S.

Census Bureau's Census Regions and Divisions of the United States (20) and the Federal Office of Rural Health Policy's Data Files (21). Data were collected and managed by using REDCap electronic data capture tools (Supplement 2, available at [Annals.org](#)), which is hosted at Western Michigan University Homer Stryker M.D. School of Medicine (22, 23), and were analyzed by using descriptive statistics.

The research protocol was reviewed by Cincinnati Children's Hospital Medical Center's Institutional Review Board, which determined that it did not constitute human subject research and therefore did not require its approval. If ABPD members requested that their policy remain confidential, we honored their request and assured them that we would report only deidentified results.

Role of the Funding Source

The study was not funded.

RESULTS

The ABPD has 91 members representing 79 unique institutions. Six of these institutions do not have direct relationships with hospitals that provide critical care. Of the 73 eligible institutions, 67 program directors responded, resulting in a response rate of 91.8%. Individuals who responded but had retired or changed institutions were considered nonresponders.

The responding directors indicated that 36 (50.0%) of their associated institutions did not have policies or had policies currently under development, and 7 (9.7%) had policies but the directors could not share them. The 29 (40.3%) hospitals with policies represent 18 states and the District of Columbia. The following locations were represented by more than 1 hospital: Massachusetts (3 hospitals), Michigan (2 hospitals), Minnesota (2 hospitals), New York (3 hospitals), Pennsylvania (2 hospitals), Texas (2 hospitals), Utah (2 hospitals), and Washington (2 hospitals). Nine (31%) of the hospitals are located in the Northeast, 9 (31%) in the South, 5 (17%) in the Midwest, and 6 (21%) in the West (Table 1). All are located in urban areas. Seven (24%) of the institutions are governmental, 2 (7%) proprietary, and 20 (69%) voluntary nonprofit. For 1 hospital, information on teaching status, trauma center status, and number of staffed beds was not available. All institutions with complete information have academic affiliations. Eighteen (64%) hospitals with complete information are Level 1 trauma centers. The institution's total number of staffed beds ranged from 288 to 1663 (mean, 770 beds) and special care beds, which includes intensive and coronary care units, from 22 to 481 (mean, 174 beds).

Three directors each contributed policies from 2 different associated sites, and 3 pairs of institutions utilized the same policy: the New York State Task Force's Ventilator Allocation Guidelines (24), Veterans Health Administration's Meeting the Challenge of Pandemic Influenza (25), and the Washington State Department of Health's Scarce Resource Triage Team Guidelines (26).

Table 1. Characteristics of Hospitals With Triage Policies

Hospital Characteristic	Value
U.S. region, n (%)	
Northeast	9 (31)
South	9 (31)
Midwest	5 (17)
West	6 (21)
Type of control, n (%)	
Governmental	7 (24)
Proprietary	2 (7)
Voluntary nonprofit	20 (69)
Level 1 trauma center, n (%)*	
Yes	18 (62)
No	10 (34)
Mean beds (range), n*	
Total staffed	770 (288-1663)
Special care	174 (22-481)

* Data were unavailable for 1 hospital.

This resulted in 26 unique triage policies for analysis (Figure).

Three (11.3%) of these policies were authored by state health departments, 1 (3.8%) by a regional bioethics committee network, and 1 (3.8%) by a state bioethics advisory committee. Nine (34.6%) are publicly available (they can be located searching the internet). Fourteen (53.8%) policies specify the date of the current version, and 7 (50.0%) of these were written or revised within 30 days of collection. Seven (26.9%) of the policies were approved, 13 (50.0%) were in draft, and 6 (23.1%) did not specify approval status. The policies were 2 to 272 pages (mean, 34.1 pages) long.

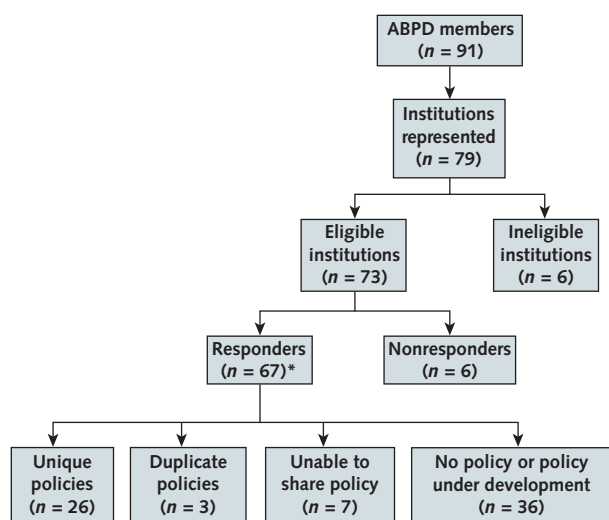
The policies articulate many ethical and professional values. The 5 most frequently mentioned are jus-

tice (23 policies [88.5%]), transparency (20 [76.9%]), stewardship (16 [61.5%]), duty to care (15 [57.7%]), and duty to prevent unnecessary loss of life (12 [46.2%]). In terms of explicitly stated triage criteria, the 5 most commonly mentioned are benefit (25 policies [96.2%]), need (14 [53.8]), age (13 [50.0%]), conservation of resources (10 [38.5%]), and lottery (9 [34.6%]). Only 6 (23.1%) policies utilize a first-come, first-served allocation framework. No policy utilized lottery or first-come, first-served as its sole or exclusive criterion. Ten (38.4%) policies give preference to health care workers: 5 (19.2%) on the basis of reciprocity (recognition of their voluntary acceptance of risk), 4 (15.4%) on the basis of narrow social utility, 1 (3.8%) on the basis of both reciprocity and narrow social utility, and 2 (7.7%) without articulating a specific reason. In specifying need and benefit, 21 (80.8%) policies use scoring systems and the most commonly used scoring system is the Sequential Organ Failure Assessment (SOFA) score or the Modified SOFA (MSOFA) score, used in 20 (95.2% of policies that use scoring systems). Twelve (46.2% of all policies) utilize specific clinical diagnoses as allocation criteria—for example, excluding patients with cardiac arrest or severe burns. Although 13 (50.0%) policies utilize age criteria, only 2 (7.7%) specify age thresholds (Table 2). Seventeen (65.4%) policies also specify criteria that should not be considered in allocation decisions. These include the ability to pay, insurance status, or socioeconomic status (13 [50.0% of all policies]); race (12 [46.2%]); broad social utility (social status or social worth) (11 [42.3%]); ethnicity (9 [34.6%]); and citizenship, gender, religion, or sexual orientation (8 [30.8% each]). Only 7 (26.9%) policies specify that decisions should not be based on disability, and 4 (15.4%) prohibit decisions based on age.

In terms of policy activation, only 10 (38.5%) explicitly state that governmental authorization is necessary to activate the policy. Eight (30.8%) policies do not specify an activating authority. The composition of the bodies that make triage decisions (triage committees, teams, or officers) varies among policies. Twelve (46.2%) specify the number of members of this body, and the number ranges from 1 to 8 (mean, 3.7 members). Twenty-three (88.5%) policies specify the composition of these bodies. Among the policies that specify the composition, all require or recommend a physician member. Eighteen (78.3%) of these 23 policies specify that this physician should be trained in critical care and 7 (30.4%) emergency medicine, and 11 (47.8%) specify that this physician should be the chief medical officer or the officer's designee. The other most commonly required or recommended disciplines to compose the body are nurses (20 policies [87.0%]), ethicists or ethics committee members (16 [69.6%]), chaplains (8 [34.8%]), and respiratory therapists (8 [34.8%]). Two (7.7%) policies require or recommend a community member. Nine (34.6% of all policies) exclude individuals who are providing direct patient care from making triage decisions, and an additional 4 (15.4%) recommend that these individuals be excluded.

Although many policies list factors that should be excluded from the triage decision, only 2 (7.7%) require

Figure. Ascertainment of ventilator triage policies.



ABPD = Association of Bioethics Program Directors.

* Two responders each reported on 2 associated hospitals and 1 responder on 4 hospitals.

Table 2. Most Common Values and Triage Criteria Included in Triage Policies

Ethical Value or Criterion	Policies, n (%)	Exemplary Quotations (Policy Identification Number)
Value		
Justice	23 (88.5)	A system of allocation during crisis must be applied consistently and broadly, to maximize the chances of fairness and minimize the influence of biases such as ageism, sexism, racism, or ableism (policy 2). A fair distribution of potentially life-saving treatment requires that persons and communities be treated equally when they are equal in morally relevant ways. Hence, severity of illness and likelihood of benefit (e.g. prognosis with or without ventilator assistance) can be considered morally relevant features, while social or economic standing would not (policy 15).
Transparency	20 (76.9)	Transparency—the Plan developed here was developed with input from the community and efforts will be made to engage and educate our community about the Plan (policy 12). Transparent, public and explicit assumptions and reasoning about rationing decisions will give members of the community the opportunity to understand how and why difficult decisions are made and help engender trust in the institution (policy 15).
Stewardship	16 (61.5)	Duty to steward resources is the need to responsibly manage resources during periods of true scarcity (policy 11). Professionals enjoy great power and standing, and with this comes the responsibility to ensure that resources are used wisely and not squandered (policy 14).
Duty to care	15 (57.7)	Patients ineligible for scarce resources are still under a physician's care. Other treatments, including the basic provision of comfort care, that will optimize clinical outcomes should be provided for such patients (policy 1). [Institution Name] staff have a duty to care for our patients even in a time of pandemic (policy 5). In order to maintain a clinician's duty to care, a patient's attending physician does not determine whether his/her patient receives (or continues) with ventilator therapy; instead a triage officer or triage committee makes the decision (policy 11).
Duty to prevent unnecessary loss of life	12 (46.2)	Limited resources at [Institution Name] will be allocated so as to maximize the number of lives saved (policy 2). Failure to plan for this at the institutional and governmental levels invited disorder, permits arbitrariness, risks bias and increased the likelihood that patients who would have survived with ventilator support will die because patients likely to die were using the machines (policy 14).
Triage criterion		
Benefit	25 (96.2)	The first step in allocation of ventilators during scarcity is determining who is least likely to benefit from being mechanically ventilated, and this group is excluded from consideration (policy 1). Allocation and Triage decisions shall be made based on the likelihood of medical benefit as determined by expected incremental increase in short-term and long-term survival (policy 3).
Need	14 (53.8)	A patient who might survive even if not given critical care resources should receive lower priority . . . (policy 13). Level of Priority and Code Color: Green—Do not manage with scarce critical care resources. Priority Score: No significant organ failure or no requirement for critical care resources (policy 26).
Age	13 (50.0)	If patients have similar expected incremental increases in survival, triage decisions may include consideration of patient age based on the principle that people should have the opportunity to live as much of the normal human life cycle as possible (policy 3 and policy 5). In the event that there are ties in priority scores between patients, life-cycle considerations will be used as a tiebreaker, with priority going to younger patients, who have had less opportunity to live through life-stages (policy 23).
Conservation of resources	10 (38.5)	Patients . . . who will require a disproportionate amount of resources to survive are given lower priority (policy 2, policy 3, and policy 5). Another category of exclusion criteria includes patients who may benefit from critical care but would require intense use of resources and prolonged care that cannot be justified during a multi-casualty event or pandemic (policy 12).
Lottery	9 (34.6)	. . . when patients cannot be clearly distinguished on the basis of anticipated short- or long-term survival, we recommend that scarce life-saving resources be allocated by chance (lottery) rather than by a first-come, first served basis whenever possible . . . (policy 7)

decisions to be blinded (Table 3). One policy, for example, states, “No additional clinical information [in addition to the SOFA score and intubation status] is to be provided to the Triage Committee (policy 6).”

Most policies (22 [84.6%]) specify that decisions should be reevaluated and do so in various ways, including at specific frequencies (for example, every 24 hours), at unspecified frequencies (such as periodically), at specific points in time (for example, at 48 and 120 hours), or on changes in the patient's clinical condition (such as improvement, stagnation, or deteriora-

tion). No policy precludes reallocation or withdrawal of resources once they are initially assigned. Most policies (23 [88.5%]) require or recommend the provision of palliative care to individuals from whom resources are withheld or withdrawn. Seven (26.7%) policies permit providers to write do-not-resuscitate orders for patients from whom mechanical ventilation is withheld or withdrawn without proxy consent, and the rest (19 [73.1%]) do not address this issue. Six (23.1%) policies triage extracorporeal membrane oxygen (ECMO) according to the policy, 1 (3.8%) suspends the use of ECMO un-

der a crisis standard of care, and the remainder (19 [73.1%]) do not address ECMO.

Eighteen (69.2%) policies permit appeals, although 11 (61.1%) of these policies limit their scope. For example, one policy states, "The appeal, however, will likely be limited in scope to include only claims of injustice regarding whether the process was completed in full or according to the established standards (policy 4)." In only 2 (11.1%) policies is the appeal heard by the initial decision-maker. Sixteen (61.5% of all policies) also specify a method for retrospectively reviewing decisions to assure that the policy is being implemented fairly or to revise the policy on the basis of clinical experience.

DISCUSSION

Many institutions sampled did not yet have approved ventilator triage policies, and the approved and draft policies we reviewed demonstrate substantial heterogeneity. Although most policies utilize clinical need and benefit, determined by SOFA or MSOFA scores, additional criteria vary widely. Furthermore, many policies lack key implementation information, such as whose authority is required to activate the policy and what mechanisms should be used to minimize potential bias.

In anticipation of the H1N1 influenza pandemic in 2009, many institutions engaged in contingency planning, including the development of ventilator triage policies. Some articulated an ethical duty to plan for mass casualty events (27, 28). It is therefore notable that many of the institutions surveyed did not yet have triage policies at the onset of the COVID-19 pandemic. The rapidity with which these policies are being developed may unfortunately substantially limit stakeholder, including public, engagement (5, 29).

The heterogeneity of the policies is also notable. The 2 most common criteria for making allocation decisions are clinical need and benefit, but outside this area of agreement, policies differ widely in the use of other criteria, such as age, conservation of resources, or giving preference to health care workers. Beyond ethical arguments for and against each of these criteria,

the variation among policies is itself problematic, because it may result in injustice. For example, if different institutions within the same community use different criteria or prioritize criteria differently, an individual might unknowingly be admitted to a facility with a policy that is unfavorable to him or her. If policies are public, patients might select facilities on the basis of which policy is favorable to them rather than on which policy is fair or ethically sound. State or regional planning for disasters that affect large areas is thus important (5, 6).

Policies that direct action should not have omissions or inconsistencies in their application. Many of the policies sampled do not specify who has the authority to activate the policy (5, 29). It would be problematic if a single institution, without adequate situation awareness to know whether other nearby institutions have available resources, were to become overwhelmed and begin triaging ventilators rather than transferring patients.

Criteria also may not be adequately operationalized, or scoring systems or other assessments may be inconsistent with values articulated in the policies. Some policies, for example, contend that age should be considered without specifying how. Is any difference in age sufficient, or is there a minimum difference in age that is relevant? Clearly operationalized criteria are essential for triage committees or officers implementing the policies. There are also potential inconsistencies between criteria and assessments within some policies. For example, some policies exclude disability discrimination but categorically exclude patients with certain preexisting conditions from receiving mechanical ventilation (30, 31).

Policies that rely on triage teams' or officers' judgment may introduce implicit bias or discrimination (32). Most policies exclude clinicians providing direct patient care from making triage decisions, to avoid role conflicts and preferential consideration being given to certain individual patients, which could bias triage decisions (15). Few policies, however, specify blinding mechanisms to prevent those making triage decisions from access to information about patients that is ethically irrelevant, such as the ability to pay or race. A related concern is the lack of specification in some policies of how triage decisions may be appealed or how they are retrospectively reviewed to ensure consistency and fairness.

Our study has limitations. First, the sample focuses primarily on academic medical centers, and the results may not be generalizable to community hospitals; however, if academic medical centers, with their more expansive resources, are inadequately prepared, community hospitals may be in an even worse position. Second, given the lack of a methodologically rigorous way to differentiate between health care systems and hospitals and to characterize systems, institutions were characterized by their primary hospital. Third, as a result of the difficulty in identifying state triage policies and comparing policies that may have been reformatted or adapted, it was not possible to determine institutional adherence to state recommendations. Finally,

Table 3. Composition and Operation of Triage Teams*

Characteristic	Policies, n (%)
Makeup of triage team†	
Physician	23 (100)
Critical care	18 (78.3)
Chief medical officer or designee	11 (47.8)
Emergency medicine	7 (30.4)
Nurse	20 (87.0)
Ethicist/ethics committee member	16 (69.6)
Chaplain	8 (34.8)
Respiratory therapist	8 (34.8)
Operational triage decisions	
Triage team not involved in direct patient care‡	13 (50.0)
Triage decisions blinded	2 (7.7)

* Based on 23 policies.

† Three policies do not specify members.

‡ Either required or recommended.

to speed the coding process, a relatively large number of individuals were involved in coding, which may produce inconsistency in results; however, potential inconsistencies were reduced by having 2 individuals code each policy and resolve any disagreements through consensus.

In conclusion, hospitals and health care systems are seeking to meet or prepare for extraordinary clinical demands during the COVID-19 pandemic. Developing clear, clinically useful ventilator triage policies is a necessary part of this preparation. Agreement on key criteria for allocating resources is important for policies to be ethically sound and to minimize the harms of unjustified variation. In preparing triage policies, institutions should seek to adequately specify criteria and to reduce the potential influence of discrimination and implicit bias in the triage process.

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