

# Scarce Resource Allocation During Disasters

## A Mixed-Method Community Engagement Study



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**BACKGROUND:** During a catastrophe, health-care providers may face difficult questions regarding who will receive limited life-saving resources. The ethical principles that should guide decision-making have been considered by expert panels but have not been well explored with the public or front-line clinicians. The objective of this study was to characterize the public's values regarding how scarce mechanical ventilators should be allocated during an influenza pandemic, with the ultimate goal of informing a statewide scarce resource allocation framework.

**METHODS:** Adopting deliberative democracy practices, we conducted 15 half-day community engagement forums with the general public and health-related professionals. Small group discussions of six potential guiding ethical principles were led by trained facilitators. The forums consisted exclusively of either members of the general public or health-related or disaster response professionals and were convened in a variety of meeting places across the state of Maryland. Primary data sources were predeliberation and postdeliberation surveys and the notes from small group deliberations compiled by trained note takers.

**RESULTS:** Three hundred twenty-four individuals participated in 15 forums. Participants indicated a preference for prioritizing short-term and long-term survival, but they indicated that these should not be the only factors driving decision-making during a crisis. Qualitative analysis identified 10 major themes that emerged. Many, but not all, themes were consistent with previously issued recommendations. The most important difference related to withholding vs withdrawing ventilator support.

**CONCLUSIONS:** The values expressed by the public and front-line clinicians sometimes diverge from expert guidance in important ways. Awareness of these differences should inform policy making.

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**KEY WORDS:** allocation; disaster; ethics; ventilator

**ABBREVIATIONS:** CHEST = American College of Chest Physicians; IOM = Institute of Medicine

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During most disasters, the existing health-care system can care for patients without major alterations in the standard of care. However, during a catastrophic event, there may not be enough resources for all who need them, making it hard or impossible to maintain conventional standards of care. In such circumstances, difficult questions will arise regarding who will receive access to limited life-saving resources. How and according to which ethical principles should these decisions be made?

These questions have been explored by others largely through conceptual analyses in the ethics literature or recommendations offered by panels of experts.<sup>1,2</sup> Both the Institute of Medicine (IOM) Letter Report on Crisis Standards of Care and the American College of Chest Physicians (CHEST) Mass Critical Care Work Group have outlined guidance on this topic.<sup>3-5</sup> However,

community values on this issue remain poorly characterized. To the extent that the public's values have been considered, it has primarily been by inviting comment on an established framework.<sup>6</sup> Few<sup>7,8</sup> have assessed public attitudes *prior to* creating an allocation framework.

Understanding these values has both practical and ethical implications for developing an allocation framework that is likely to be acceptable to the public during a crisis. This project explored the values and preferences of Maryland citizens regarding the question of how scarce mechanical ventilators ought to be allocated during a severe influenza pandemic. A larger context for the project is the anticipated development of a Maryland framework for allocating scarce medical resources in a disaster.

## Methods

### Study Approach

The study used a constructivist theoretical outlook and a deliberative democracy methodology based on the assessment that how best to apportion limited life-saving resources in a disaster is a potentially divisive policy issue, as well as one in which technical and normative aspects are tightly interwoven.<sup>9</sup> Democratic deliberation provides a structured process through which citizens can learn relevant facts about a public policy matter and explore their own views and those of their peers in an extended civil moderated forum.<sup>10</sup> Multiple aims are possible through a deliberative approach: *knowledge exchange* to convey information from policymakers to the public and to transmit views from the public to policymakers, *innovation* to elicit rich insights that come from crowdsourcing a problem and delving into people's experiential knowledge, and *democratic accountability* to ensure broad representation in a policy decision about the common good.<sup>11,12</sup> Designed to elicit informed opinion rather than build consensus, the process has been used successfully to engage citizens in discussion about potentially volatile value-laden topics such as same-sex marriage and fracking.<sup>13</sup> The protocol for democratic deliberation (as detailed further on) enabled data gathering for qualitative content analysis of participants' value-based reasoning and quantitative evaluation through a survey of opinions pre-deliberation and post-deliberation.

### Process Development

As recounted elsewhere, a multi-institutional team collaborated to develop project procedures and informational resources that were then pilot tested in two distinct communities.<sup>14</sup> Fields of expertise that were represented on the team included critical care and emergency medicine, emergency management, bioethics, social science, and democratic deliberation theory and methods. Specifically, the team developed several resources to support the project (Table 1). During the pilot period, the team evaluated those materials in one inner city and one suburban setting. The findings from those initial meetings informed revisions of the support materials, verbal overview, and meeting organization, as outlined further on.

### Measures

The team also developed both preforum and postforum surveys and an exit interview protocol. Surveys queried respondents on demographic

information, previous experience with mechanical ventilation, prior experience with decision-making in critical illness, opinions of the various ethical principles, and comfort with the concept of reallocation of ventilators. The surveys were assessed for construct validity through a comparison of responses to articulated understanding of concepts and value preferences during exit interviews in the pilot phase. Oral and written materials were developed and presented in English. All documents were assessed for reading level prior to study use.

### Participant Recruitment

The project used a mix of purposive and convenience sampling. For geographic and regional cultural diversity, participants were solicited

TABLE 1 ] Project Resources

An <i>extended background document</i> designed to provide an overview of
A representative disaster scenario
The characteristics and limitations of mechanical ventilators
Two key allocation questions:
What should we do in situations in which there are more patients needing ventilators than there are ventilators to use?
Should health-care providers ever be allowed to remove a ventilator from 1 patient who needs it to survive and give it to another patient who also needs it to survive?
Six representative ethical principles that could be used to make allocation decisions (see Table 3)
A <i>1-page quick reference document</i> including
Abbreviated scenario
Summary of key ethical principles
An <i>introductory PowerPoint presentation</i> reiterating background information

from each of Maryland's five emergency management districts. Based on pilot session observations, "health-care and disaster worker" and "lay" communities were recruited to separate forums to ensure that small group deliberations were not biased through perceptions about the expertise of certain participants. Health-care and disaster workers included individuals with professional backgrounds in disasters or health, or both (eg, public health, health care, emergency medical services, emergency management); all others were assigned to the layperson groups. Lay participants were recruited through newspaper and radio advertisements, flyers, Craig's List, and community-based networks (eg, hospital outreach, volunteer organizations, colleges, religious institutions). Health-care and disaster worker participants were recruited through these methods in addition to communication through professional societies and networks. Participants registered through a website created for the project<sup>15</sup> and were previously unknown to the researchers.

Incentives for lay participants included food and a gift card worth \$50 to \$100; health-care and disaster professionals received food and continuing education credits. To improve accessibility, lay forums were held on Saturdays in convenient community locations (ie, hospitals, hotel conference room, colleges, and places of worship), except one that was held in a synagogue on a Sunday. To accommodate health professional schedules, health-care and disaster worker forums were held on weekday afternoons at hospitals and hotel conference rooms.

#### Forum Protocol and Personnel

Participants were provided the full background document to review in advance. At the start of each forum, participants were divided into small groups of five to nine based on observed demographics to ensure sex and racial diversity; they were then administered a presurvey by facilitators and given time to review the precirculated materials. A 30-min orientation by a team member included a verbal review of the information covered in the extended background document (Table 1) and a detailed overview of the day's schedule (Table 2). After orientation, the small groups first addressed the question, "What should we do in situations in which there are more patients needing ventilators than there are ventilators to use?" Participants then considered a second question, "Should health-care providers ever be allowed to remove a ventilator from one patient who needs it to survive and give it to another who also needs it to survive?"

Subsequently, each small group was charged with agreeing on one or two content-oriented questions to ask a panel of subject matter experts, who delivered their answers in a plenary format. Sample questions posed to the expert panel included whether ventilators could be shared between patients and whether frameworks like those used for transplant organ allocation could be applied in this instance. Panelists were drawn from a small pool of subject matter experts with knowledge of the project and consistently included at least one clinician, one disaster expert, and one project team member. Exact makeup varied based on availability. Panel members were instructed to limit their answers to factual information that might help facilitate conversation and avoid sharing personal opinions or value judgments related to the principles. Following the question and answer period, individual groups reflected on the panel comments and the day's overall proceedings.

Volunteer facilitators worked to elicit the participants' preferences and associated values. Participants discussed each of six ethical principles (Table 3) and how they might be used alone or in combination, and they were asked about other principles or factors that affected their views. Additional volunteers took notes electronically at each table in a template provided by the project team. After each forum concluded, note takers, facilitators, and investigators engaged in a

**TABLE 2 ] Example Schedule for Maryland Allocation of Scarce Resources Community Meetings**

9:00 AM	Registration
9:00-9:45 AM	Convene in small groups
9:45-9:50 AM	Welcome and agenda review
9:50-10:15 AM	Opening remarks
10:15-11:15 AM	Phase I: small group discussion What should we do in situations in which there are more patients needing ventilators than there are ventilators to use?
11:15 AM-12:00 PM	Small group discussion Should health-care providers ever be allowed to remove a ventilator from 1 patient who needs it to survive and give it to another who also needs it to survive?
12:00-12:15 PM	Phase II: small group discussion Participants at individual tables develop 2 questions to ask panel (1 to be asked, 1 as a backup)
12:15-12:30 PM	Break and pick up box lunches
12:30-1:30 PM	Phase III: Working lunch and panel discussion
1:30 - 1:50 PM	Phase IV: small group discussion Group reflections on panel and day's discussion Complete postsurvey
1:50-2:00 PM	Closing comments

debriefing exercise to compare and contrast the individual table discussions, identify recurrent and unusual findings, and discuss potential process improvements. Forum summary reports were then prepared.

Volunteer staff were trained by the project team and either had prior experience with group facilitation (eg, mental health counseling or conflict mediation) or were graduate students in a related field. RESOLVE, a nonprofit facilitation/mediation organization, provided project management for the forums. The principal investigator and coinvestigators participated in meetings as either observers or subject matter experts. All study personnel received a 3-hour training session in the principles and methods of deliberative democracy.

**TABLE 3 ] Ethical Principles Discussed in Forums**

Prioritize those most likely to survive the current illness
Prioritize those most likely to live the longest after recovery (considering comorbid conditions)
Prioritize those who have lived fewer life stages
Prioritize those who have particular instrumental value to others in a pandemic
First come, first served
Lottery

## Data Collection, Analysis, and Advisory Phases

The forums were conducted across the state of Maryland over a 2-year period (May 2012-May 2014). Data collection was stopped after at least one forum had been held for laypersons and one for health-care and disaster workers in each Maryland emergency management region. On the basis of postforum debriefings, all team members agreed that thematic saturation had been achieved by that time (ie, no new themes had emerged).

Primary data sources were pre-deliberation and post-deliberation surveys and the notes on small group deliberations compiled by trained note takers. Data were also available from exit interviews completed with a subset of participants who provided feedback on the forum process and their understanding of the issues.

Survey data were entered, checked for accuracy, and analyzed. Analyses included logistic regressions to explore potential statistically significant demographic influencers. Using a content analysis approach, transcribed notes were evaluated inductively to identify key emerging (or “grounded”) themes, with a focus on exploring why certain views were held. Under investigator (L. D. B. and E. T.) supervision, two coders used NVivo software, version 10 (QSR International) to code and manage the data. The highest-level code categories used were strengths and weaknesses of competing ethical principles, practical challenges of implementing the ethical principles, patient factors affecting eligibility for priority access, desired attributes of an allocation decision-making process, and unintended adverse consequences of allocation decisions.

## Results

We convened eight lay forums, including two pilot forums, and seven health-care and disaster worker forums. Of the total 324 forum participants, demographic data were available for 311 (Table 4). Of note, when appropriate we have included the responses of the pilot meeting participants in the overall analysis of findings included here. Key forum themes gleaned from the qualitative portion of our study are summarized in the following section.

### Forum Themes

From the qualitative analysis of the 15 forums, 10 major themes emerged (examples are taken directly from notes compiled in real time during the forums; verbatim transcription was not performed).

**Finding 1:** Participants (both lay and health-care and disaster workers) emphasized the importance of transparency and public awareness around efforts to develop and implement an allocation framework.

*Whatever gets put in place, there needs to be education. The community, their families, they all need to understand what's going on.*

*Whatever the rules are, they need to be widely known, transparent, clear, and known ahead of time.*

**Finding 2:** Lay participants sought to solve the scarcity problem through “technological fixes” (eg, creating more ventilators) before being willing to face the moral dilemma posed by the scenario.

*Can't they build more ventilators?*

*Can't patients share or take turns on a ventilator?*

**Finding 3:** Lay and health-care and disaster worker participants equally debated the feasibility of implementing any single ethical principle on its own and

were open to using a combination of principles, tailoring allocation decisions based on the dynamic conditions of an influenza pandemic.

*Most [principles are] valid in theory but [are] not practical.*

*You will need to be able to shift and change depending on the context, depending on how bad things are.*

**Finding 4:** Both lay and health-care and disaster worker participants emphasized the importance of planning, coordination, and communication about the framework across the state in advance of a crisis.

*I would want a hard and fast set of rules that we could all know and follow so that there is consistency and accountability.*

*It would be hard for a hospital to get the community to trust them, especially if [the policies] are not consistent with others in the area.*

**Finding 5:** Many lay participants expressed a desire to reallocate a scarce medical resource to a loved one or to someone in greater need. Additionally, lay and health-care and disaster worker participants expressed strong concerns about those who did not receive critical resources, expressing a need for specific plans for how to treat these individuals.

*I would give it up to someone else's grandchild, expecting maybe someone would do the same for mine.*

*If not supporting [them] any more. Do we take [them] away and make them comfortable?*

**Finding 6:** Many participants (lay and health-care and disaster workers) expressed concerns that health-care providers may make biased decisions, and professional participants, while seeing the limitations of decision support tools, often pondered how to retrofit

**TABLE 4 ] Characteristics of Forum Participants**

Variable	Lay Participants (n = 228)	Health-Care/ Disaster Workers (n = 83)
Age, mean (SD)	50 (18.9)	51.4 (11.8)
Sex, female	148 (69.5)	49 (61.3)
Marital status <sup>a</sup>		
Married	95 (45.5)	55 (68.8)
Never married	71 (34)	10 (12.5)
Divorced/widowed	43 (20.6)	15 (18.8)
Race/ethnicity <sup>a</sup>		
Black	61 (29.2)	9 (11.3)
White	121 (57.9)	64 (80)
Hispanic	9 (4.3)	2 (2.5)
Other	18 (8.6)	5 (6.3)
Religion		
Christian	135 (65.5)	62 (78.5)
Jewish	24 (11.7)	5 (6.3)
Muslim	2 (1.0)	1 (1.3)
Agnostic/atheist	21 (10.2)	5 (6.3)
Other	24 (11.7)	6 (7.6)
Political affiliation <sup>a</sup>		
Democrat	131 (63.3)	27 (35.1)
Republican	24 (11.6)	27 (35.1)
Other	52 (25.1)	23 (29.9)
Household income <sup>a</sup>		
< \$40,000	72 (35.5)	1 (1.3)
\$40,000-100,000	93 (45.8)	30 (39.0)
> \$100,000	38 (18.7)	46 (59.8)
Education <sup>a</sup>		
College degree or higher	133 (63)	75 (93.8)
Have you or someone close to you ever been a patient on a ventilator? <sup>a</sup>	89 (41.4)	53 (66.3)
Have you ever made decisions regarding continuing/stopping medical treatment? <sup>a</sup>	73 (33.6)	55 (68.8)

Except when indicated, values are represented as No. (%) of total for the given group. In some cases percentages do not total 100 due to rounding. <sup>a</sup>Indicates  $P < .05$  for comparison between lay and health-care/disaster worker groups.

existing triage protocols and scoring systems for allocation purposes.

*[It is] much easier to work with hard numbers than make value judgments on the ground.*

*The problem is...that you have actual people making that decision, and there is a bias involved here, and what if they don't agree or make a mistake?*

Finding 7: Lay participants worried that emergency allocation decisions would replicate existing inequities (eg, insured vs uninsured, urban vs rural), and some expressed concerns over certain perceived “undesirable” groups (eg, prisoners, undocumented immigrants) receiving resources before “more deserving” others. Equity and preferential treatment issues were often framed in concrete local terms, with Maryland-specific points of reference.

*I don't think we need to discuss [first-come, first-serve] because if you don't have insurance, you won't get [the ventilator].*

*We have to look into the value of people in society. Prisoners, for example, should not be prioritized.*

Finding 8: Lay and professional participants expressed concerns over the ability of some individuals to figure out how to “game” the system (eg, buying a resource, manipulating facts about a patient’s medical history) and reiterated that access to resources should be based on need rather than wealth, political influence, or favored social status.

*We have not touched on the fact of money, [that is] those people who have always thought they could buy anything they want if they put enough pressure, and somewhere down the road, that will happen, and what is in place has to apply to them too.*

Finding 9: Participants expressed concern over the concept of withdrawing a ventilator from one patient to reallocate it to another patient with a better prognosis. Lay participants expressed significant concern about the moral acceptability of reallocating a ventilator, especially if a patient did not continue to deteriorate while receiving that support. Professionals tended to worry about the emotional, psychological, and moral distress of withdrawing a ventilator, as well as the legal ramifications of doing so.

*Doesn't it go against the Hippocratic oath? They're supposed to save lives, not take lives [lay person].*

*Can the health-care professional override the wishes of the patient or family [provider]?*

Finding 10: Both lay and health-care and disaster worker participants worried about the emotionally wrenching aspects of allocating scarce medical

resources. Among the traumatized would be the person passed over and his or her family, the family of the failing patient from whom a ventilator needs to be withdrawn, and the provider who has to choose one recipient over another.

### Participant Survey Responses

In premeeting and postmeeting surveys, participants were asked how often each of the six principles should be used to make allocation decisions based on a 5-point Likert scale (never, rarely, sometimes, often, always). Participant responses following discussion (postmeeting) are shown in Table 5. Overall, participants more frequently indicated that saving the most lives (survive current illness) and saving the most life-years (live longer) should often or always be considered in making allocation decisions (Table 5). Conversely, participants indicated that first come, first served and lottery should “never” or “rarely” be used more frequently than the other principles. Importantly, participants’ interest in using “life cycle” (fewer life stages) was much more evenly divided than were opinions on the other principles.

Although “value to others” was frequently selected as a principle that should “often” or “always” be considered in making allocation decisions (Table 5), table discussions revealed this to be a complex and difficult to operationalize principle, with varying conceptions regarding both timing and what sort of values to others, in particular, should be favored. Some participants took this principle to mean value to others in the response to the current pandemic, whereas others considered what sort of skills or qualities would be valuable in rebuilding society in the aftermath of a significant disaster.

Overall, participants favored “survive current illness” (save the most lives) and “live longer” (save the most

life-years) as “first” or foundational principles for decision-making during disasters (Table 6). However, based on both table discussions and survey findings about the other four principles, participants did not view these two principles as appropriate sole drivers for decision-making (data not shown).

In multivariable analyses of survey results, after controlling for age, sex, and location of meeting, African American participants had significantly *lower odds* of wanting to always or often use “saving the most life-years” as a criterion for allocation decisions than their white colleagues (OR, 0.34; 95% CI, 0.21-0.58). Conversely, African American participants were significantly *more likely* to favor often or always using “first come, first served” to drive these key decisions (OR, 2.36; 95% CI, 1.29-4.29). The results of these two analyses are shown in Table 7.

In our analyses, age appeared to be associated more with opposing the use of certain principles than with supporting any particular one. Those younger than 60 years of age, those from the Baltimore area, and men were significantly more likely than their counterparts to object to using “life cycle” as a decision-making criterion. Also, increasing age was a significant predictor of objecting to the use of a lottery for decision-making (OR, 1.03; 95% CI, 1.02-1.04). Little significant demographic variability was seen in participants’ response to using “instrumental value” as a decision-making criterion.

Participants consistently expressed concerns about the possibility of removing a ventilator from one person who needs it to survive to give it to someone else who needs it to survive. Nearly one-third of all respondents were either opposed to or ambivalent about the idea of reallocation of a ventilator. For lay respondents, > 40% were opposed or

**TABLE 5 ]** Proportion of Responses for How Often Each Principle Should Be Used in Making Allocation Decisions Across All Respondents

Principle	Never/Rarely			Often/Always		
	Lay Participant (%)	Health-Care/Disaster Worker (%)	All (%)	Lay Participant (%)	Health-Care/Disaster Worker (%)	All (%)
Survive current illness	7.8	6.8	7.6	69.1	77	71.1
Live longer <sup>a</sup>	21	2.7	16.4	50.2	74.3	56.3
Fewer life stages <sup>a</sup>	31.5	19.2	28.4	31.1	24.7	29.5
Value to others	20.6	23.6	21.3	48.4	47.2	48.1
First come, first served <sup>a</sup>	43.7	59.5	47.8	23.7	13.5	21.1
Lottery <sup>a</sup>	85.5	71.2	81.8	2.4	9.6	4.2

<sup>a</sup>P < .05 for comparison of response frequency between lay and health-care/disaster worker groups.

**TABLE 6 ]** Proportions of Which Principle to Use First by Lay and Health Professional Participants

Principle	Lay (%)	Health-Care/Disaster Worker (%)	All (N = 221) (%)
Survive current illness	35.3	22.5	31.2
Live longer	29.3	54.9	37.6
Fewer life stages	3.3	2.8	3.2
Value to others	19.3	12.7	17.2
First come, first served	12	4.2	9.5
Lottery	0.7	2.8	1.4

Total respondents differs from demographic data, as this question was added to the survey instrument after the pilot meetings.  $P = .003$  for Fisher exact comparison of responses between lay and health-care/disaster workers.

ambivalent based on their postdiscussion survey responses (Table 8). Additionally, 49.8% of respondents ( $n = 122$ ) for whom pre-deliberation and post-deliberation responses were available changed their minds about this issue during the deliberation.

### Discussion

This novel application of deliberative democratic methods in exploration of a challenging sensitive health policy issue allowed identification of key principles from which to build a functional framework that would have a high likelihood of broad acceptability. Moreover, it generated a nuanced qualitative understanding of citizens' perspectives on key principles, demonstrating places and ways in which those perspectives vary across one diverse state. This understanding is essential to building public trust and guiding public leaders during a

crisis response. Officials can be more responsive in their communication about ventilator allocation, for instance, before and after the health emergency by knowing what themes and moral conflicts are especially salient for members of the public and can craft messages and express empathy appropriately. That the foundational principles embraced by study participants (ie, "save the most years" and "live longer") parallel priorities that have surfaced in other parts of the country<sup>7,8</sup> bodes well for there being a potential set of core values to sustain a productive national dialogue on scarce medical resources in the pandemic flu context.

To date, IOM and CHEST guidance has dominated professional discourse on this topic.<sup>2-5</sup> That these documents reflect many of the same values articulated by study participants (ie, members of a broader public who would be affected by such guidance in an

**TABLE 7 ]** Multivariable Logistic Regressions for Odds of Choosing "Save the Most Life-Years" and "First Come, First Served" to Drive Decision-Making in Situations in Which Resources Are Limited

Characteristic	Often/Always Save the Most Life-Years			Often/Always First Come, First Served		
	Adjusted OR			Adjusted OR		
	OR	95% CI	P Value	OR	95% CI	P Value
Pilot vs nonpilot	0.24	0.16-0.38	< .001	0.60	0.34-1.05	.07
Age, y	...	...		1.01	0.99-1.02	.39
< 60	0.99	0.97-1.02	.644	...	...	
> 60	1.06	1.01-1.11	.03	...	...	
Baltimore vs non-Baltimore area	1.25	0.88-1.76	.21	0.78	0.43-1.42	.42
Female vs male	0.62	0.27-1.40	.25	1.26	0.68-2.32	.47
Race						
White	Reference	...	...	Reference	...	...
African American	0.34	0.21-0.58	< .001	2.36	1.29-4.29	.01
Other	0.84	0.46-1.52	.56	1.36	0.72-2.57	.34
Parent vs nonparent	0.85	0.46-1.60	.63	1.01	0.59-1.73	.98
Provider vs community	2.07	0.89-4.81	.09	0.57	0.19-1.78	.34

**TABLE 8 ]** Are There Situations in Which Health-Care Providers Should Remove a Ventilator From One Patient Who Needs It to Survive and Give It to Another Who Also Needs It to Survive?

	Lay Participants (n = 217) (%)	Health-Care/Disaster Worker (n = 71) (%)	All (N = 288) (%)
Yes	58	78.6	63.1
No	25.8	11.4	22.3
Unsure	16.1	10	14.6

Total No. differs from that of demographic data, as this question was added to the survey instrument after the first pilot meeting.  $P = .006$  for  $\chi^2$  comparison of lay and health-care/disaster worker groups.

emergency) is reassuring. Nonetheless, some participants articulated values that were not entirely consistent with key portions of these documents. Notable divergences included the distinction between withdrawing and withholding a life-saving resource and the strong desire to pass along a scarce resource to a loved one. These points of difference require deeper consideration, as they signal potential tensions between the judgments of many bioethics<sup>16-18</sup> and policy-making “experts” and the moral intuitions and convictions of a substantial portion of the public. This may reflect an initial lay focus on the apparent difference between direct actions, such as withdrawing care, and acts of omission, like withholding care. This distinction becomes a bit murkier on close analysis. Withdrawing lifesaving care similarly evoked concern in another public engagement exercise regarding resource allocation during an influenza pandemic.<sup>8</sup> Nonetheless, lacking some mechanism for reallocation in a catastrophic shortage situation, the allocation framework would sooner or later devolve into first-come, first-served as the supply of ventilators is exhausted. These findings underscore the importance of crisis communications before, during, and after such an event.

Moreover, although formal guidance has espoused principles such as fairness in the abstract, many participants expressed their understanding of those principles in more concrete experiential terms, including fears that allocation decisions will follow locally known patterns of inequity/unfairness. The finding of local ethical “dialects,” suggests the potential need for policy makers to communicate the rationale for an allocation framework in terms that are salient for specific audiences.

Findings in the multivariate analyses underscore the need for careful consideration of the varying concerns of differing communities in the state. Regardless of which criteria a framework includes, the rationale for their use or exclusion should be carefully outlined and clearly communicated, as they may hold different weightings across different social groups. This finding is consistent with that of a public engagement exercise that oversampled for Spanish speakers in which Hispanics were noted to prioritize children and pregnant women at much higher rates than non-Hispanics.<sup>8</sup>

### Limitations

We note several limitations to this study. First, due to financial constraints, we were unable to engage in random sampling. That small groups of people may not represent the interests and views of the broader public is a common critique of the use of deliberative methods.<sup>16</sup> Further, the size of our sample did not allow for robust comparison of responses based on ethnicity, which would have been ideal. Nevertheless, we enrolled a diverse sample (Table 4) and relied on trained facilitators to create an open environment for divergent views. These measures helped strengthen representativeness. Second, nonparticipation bias may have been introduced by the 4- to 5-hour time commitment involved. Finally, also due to budget constraints, we were unable to perform verbatim transcription of conversations. This limitation was mitigated by careful training of all note takers and team review of the notes to ensure that all key themes had been captured.

### Conclusions

Our effort to engage the community in a discussion about key principles prior to drafting a framework for allocating scarce life-saving resources in a disaster represents an important shift. We believe that listening to the values of the community that an allocation framework intends to serve will strengthen its development. Eliciting and incorporating community input should also have the practical benefit of enhanced public “buy-in” and support for the framework, which will be especially important in times of crisis. Through this project, we have refined a process for ongoing community engagement that can continue difficult conversations and serve as a channel for adapting a framework to reflect changes in technology and priorities.



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