CONCEPTS IN DISASTER MEDICINE

The Duty of Mind: Ethical Capacity in a Time of Crisis

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ABSTRACT

In a disaster, physicians are forced to make challenging and heartbreaking ethical decisions under conditions of physical and emotional exhaustion. Evidence shows that the conditions of stress that mark disasters can undermine the process of ethical decision-making. This results in biased allocation of scarce resources, fewer utilitarian and altruistic decisions, and a wider variation in decisions. Stress also predisposes clinicians to decision strategy errors, such as premature closure, that lead to poor outcomes. The very ability to make sound and ethical decisions is thus a scarce resource. Ethical frameworks underpinning disaster protocols enumerate many physician obligations, but seldom articulate the risk posed by having decisions made ad hoc by decision-makers who are compromised by the stress of the concurrent crisis. We propose, therefore, that a "duty of mind"—the obligation to make critical decisions under the clearest possible state of thought—be added to ethical frameworks for disaster response. Adding the duty of mind to the pillars on which planning is based would force attention to a moral imperative to include decision support tools in disaster planning. By moving the consideration of possible choices to a moment when time and consultation facilitate clear and considered thought, the duty of mind is upheld. (*Disaster Med Public Health Preparedness*. 2018;12:657-662)

Key Words: disaster planning, ethics, health care rationing, decision-making, organizational

Catastrophic events put severe stress on medical resources. Critical materials such as ventilators, vaccines, and medications may become scarce, and even infrastructural supplies like power and evacuation capacity may have to be rationed. Loss of information systems or communication lines can make it difficult to determine the match between supply and demand, or to anticipate the needs even the next few hours will bring. The cognitive and emotional capacity of physicians will additionally be stretched to the limit, thus potentially compromising the ethical choices that allocate those same materials and treatments.

In this article, we argue that physicians have a "duty of mind" among their other obligations to the communities they serve. That is, the physician is obliged to always make life-and-death decisions under conditions of maximal ethical clarity. Planning for judicious use of resources during a crisis, therefore, is as much an ethical imperative as a practical one. We advocate decision support tools to fulfill what we are calling *the duty of mind*.

DUTY OF MIND

The duty of mind stipulates our obligation as physicians to perform our jobs with utmost cognitive and ethical clarity, even when circumstances beyond our control may compromise our abilities without our being aware.

It is our ethical obligation to address how decisions are made and apply research on metacognition as prevention against medical and diagnostic error.[1] This obligation is couched in the body of literature that looks at cognitive functioning in diagnostic decision-making.[2-4] If it is our ethical duty to safeguard against bias in clinical judgment that leads to medical error, is it not by extension also our ethical imperative to safeguard against biases in ethical decision-making that will determine which patients receive potentially lifesaving resources?

It seems inaction on this issue fundamentally contradicts the guiding principles of beneficence and nonmaleficence. Even with no crisis on the horizon, it is a weighty task to decide the hypothetical questions about who would receive potentially lifesaving medical resources in the event of disaster. With no immediate threat to drive the conversation, this heavy and uncomfortable task tends to be avoided by hospital administrations. However, life and death decisions made ad hoc and under duress are less likely to be consistent or impartial, compared to those based on preconsidered policies for standards of care and resource availability. It is our obligation to proactively promote healthy decision-making. Plans should be made to mitigate fatigue through planned rest periods and staff rotation. Remote consultation to physicians off scene can provide access to clearheaded decision-making. However, depending on the nature of the crises, functioning telecommunications and even staffing could become scarce resources themselves. Additionally, while telemedicine is a valuable resource, the consulted physician is still limited by a

lack of situational awareness and dependent on the information provided by an exhausted and stressed on-site provider. Thus, it is critically important that we create decision-making tools a priori—when we are sound of mind and have the luxury of time to fully contemplate the consequences—to assist us at a time when our mental faculties may become inadvertently compromised.

ETHICS AND DECISIONS UNDER DURESS: THE LITERATURE

A large body of literature exists on the effect of stress on decision-making and a full discussion is beyond the scope of this article. However, we will briefly touch on a few examples of how stress can alter physician decision-making as they relate to ethical principles commonly included in frameworks for disaster planning.

A common ethical objective in care delivery during a disaster is consistency. Consistency is a critical component to just and fair distribution of resources. The literature shows that stress does not affect decision-making the same way in all individuals. Responses to stress have also been shown to vary by gender and age.[5,6] Subsequently, varied individual responses to stress will lead to heterogeneity of decisions. Experience has been shown to mediate the effect of acute stress on decision-making.[7] Relevant past experience decreases individuals' stress responses, and thus their decision-making abilities are less impaired.[7] However, although this phenomenon may hold true for first responders[7] and firefighters,[8] most community physicians hit with a large-scale crisis do not have prior experience practicing under similar circumstances and are at risk for having their decisions compromised by stress. The individual variation in stress response could well produce inconsistent decisions regarding the allocation of medical resources. Across similar choices, decisions must be consistent to be just, whether they are made by one physician or by several doctors operating simultaneously under the same conditions.

During a disaster, it is our duty to provide care for patients and to steward resources. This often requires alterations in standards of care that must be done systematically. Keinan[9] found that stress conditions lead decision-makers to close on decisions prematurely, following incomplete and nonsystematic review of alternatives. The chaotic experience and immediate urgency that typify a disaster overload on medical resources make it even less likely that the decision-maker will be able to access enough information or adequately assess the supply situation.

Tasked with processing large amounts of information usually under severe time constraints, practitioners resort to ever-simpler modes of information processing, in which alternatives are not explored fully.[10] Studies have found that subjects under stress tended to wait until a deteriorating

situation had further deteriorated before acting.[10] Stress predisposes to more risky decisions. Under stress, people are more sensitive to losses than gains.[6] The threat of loss has been shown to result in hasty and often riskier decisions.[11] Similarly, Leder et al[12] found that study participants under stress were less able to apply strategy to decisions, to understand instructions, and to perform calculations necessary to strategize. The implications for disaster care would be that physicians may take more risks in their treatment choices than they normally would, while being more prone to errors and less able to judge costs and benefits.

A growing body of evidence demonstrates that stress specifically alters ethical decision-making, resulting in variation of outcomes and undermining the greater good. The areas of the brain involved in moral decisions include the ventral regions of the prefrontal cortex and the limbic system,[13] areas also involved in emotional processing and affected by the acute stress response.[6,13]

Most studies looking at stress and ethical decision-making refer to decisions as utilitarian, altruistic, or egoistic. Utilitarian decision-making holds the desired outcome as the greatest good delivered to the most possible persons. Altruistic decisions are decisions not compromised by personal interest. Egoistic decisions personally benefit the deciding individual, whereas altruistic decisions benefit others.

Starke et al[14] looked at the effect of stress on egoistic versus altruistic moral decision-making. In the post hoc analysis there was an association between larger cortisol increase and egoistic decision-making. They suggested, by using cortisol as the proxy for actual stress experienced, that stress was in fact positively associated with egoistic decision-making.[14] Other studies have found that participants pressed to make ethical decisions under stress took longer and made fewer utilitarian judgments.[15,16] Stressful conditions have been shown to decrease the participants' consistency between their beliefs and their actions.[12] Under stressful crisis conditions, we cannot expect ad hoc choices to be consistent with the deciding physician's usual moral and ethical values.

Stress is often defined as "an appraisal process in which perceived demands exceed resources, resulting in undesirable physiological, emotional, cognitive and social changes."[10] Importantly, stress can arise *from the decision itself* when the choice requires ethical dilemmas, high risk, or elevated emotional involvement.[6,9] Not all decisions encountered in a disaster setting will have the gravity to elicit a stress response in the decision-maker. However, in a large-scale crisis likely to present with scarcity of both time and critical resources, we might expect an increase in egoistic decision-making at the cost of the greater good.

Most of the literature on stress and ethical decision-making is based on laboratory conditions. It is fair to question whether

the results of task performance under threat of electric shock[9] or anticipation of having to give a speech[13] can be generalized to emergent conditions where the consequence of failure is that someone is injured or killed. There are obvious ethical limitations on how extreme a test condition of stress can be. However, it is the best evidence available on which to base practice.

Given the evidence that the ability to confront ethical decisions is altered by stress, we believe it is our duty to mitigate that effect on the decisions that will be made in a time of crisis. In other words, there is an ethical duty of mind that must be upheld, even under severe conditions. We believe the best way to do that is to undertake advance planning, specifically, through designing protocols and creating decision tools and algorithms during a time of non-crisis that can guide human decision-makers should catastrophic events occur. By designing these tools a priori, we provide relief to those responding during a crisis and serve our community by making our best effort to ensure just distribution of scarce resources. In this way, the duty of mind can be upheld by moving the choice to a time of greater clarity and the potential to invoke consensus.

THE ETHICAL FRAMEWORK

In a disaster, circumstances could arise that require the standards of care to change, moving away from a focus on providing care to the fullest extent for every individual who seeks it toward a more utilitarian distribution in order to steward scarce resources.[17-19] Choosing how to then distribute those resources depends on core values that dictate a prescribed ethical framework. However, we believe that ethical frameworks for resource allocation algorithms must be altered to explicitly recognize the duty of mind.

Consider, for instance, the New York State protocol, which was developed with great attention to transparency. The workgroup published the ethical framework that served as the basis for their triage tool. The framework addressed the following elements: duty to care, duty to steward resources, duty to plan, distributive justice, and transparency.[20] Similarly, the Institute of Medicine describes their ethical framework for the 2012 Crisis Standards of Care and includes the following pillars: fairness, duty to care, duty to steward resources, transparency, consistency, proportionality, and accountability.[21] The Minnesota Department of Health has also published ethical frameworks for rationing that state their commitment to accountability, transparency, and fairness.[22] A brief discussion of the common principles in such frameworks will show the gap to be filled by the proposed new duty of mind.

1. Duty to Care

We have a duty to come to work and to care for patients during a crisis. Patients should not have any fears of abandonment or of being turned away for services. We must ensure that all patients receive care, whether that care is curative or palliative. However, there is an implicit assumption that the caring professional is in a state of mind where care can be given appropriately, not just willingly.

2. Duty to Steward Resources

The premise of resource allocation will change from the sickest patients receiving the most resources toward a more population-based prioritization. Responding physicians must balance the need to save the greatest possible number of lives with the need to provide the best care available to each individual patient. As we have discussed, however, the stress of a disaster is highly likely to compromise the physician's propensity toward utilitarian decisions.

3. Duty to Plan and Accountability

While the exact parameters of a crisis cannot be precisely predicted, crises themselves are not altogether unforeseeable, and we must accept responsibility for those elements that can be anticipated. Decision-making guidelines, especially for resource allocation, can ease the burden for exhausted providers. The responsibility to plan serves not only patients, but also offers legal protections for health professionals forced to make life and death decisions in situations rarely encountered in day-to-day practice.[23]

4. Distributive Justice, Consistency, and Fairness

The decisions of who will receive scarce resources must be applied consistently. Lack of consistency can produce the perception of injustice and lead to mistrust in the health care system. As discussed above, ad hoc decisions made by providers under duress are more likely to suffer from bias and be tarnished by personal interest. Thus, a commitment to distributive justice calls for a duty to preserve ethically sound decision-making in the urgent moment.

5. Transparency

Decisions made in a crisis should be readily transparent to the community being served. A process of developing a protocol allows for community members to be informed and provide input before a disaster ever occurs. This ensures that the process reflects and respects community values. This is accomplished through forethought, multi-party input, ethical debate, and community feedback. In contrast, decisions made under mental and emotional stress may not only be inconsistent or unfair, but also difficult to remember, reconstruct, and justify after the disaster passes. This may be perceived as a lack of transparency, when the underlying problem was a failure to preserve duty of mind.

We can see, therefore, that the common elements from ethical frameworks for disaster planning presume or rely upon an implicit duty—the obligation to preserve the ethical decision-making capacity to act decisively, correctly, fairly, and consistently in the interest of the greater good. Thus, we

propose the *duty of mind* should be an articulated pillar of all such protocols, rather than an invisible and unattended, but necessary precondition.

DECISION SUPPORT SYSTEMS

The literature on stress and decision-making suggests that there is enough impairment of ethical judgment, cognitive function, and efficiency to warrant prioritization tools to support decision-making under times of high stress. Algorithms cannot replace thoughtful exploration of options. However, the adoption of a protocol mitigates the potential for the poor choices that occur when the decision-maker is under extreme stress and time pressure but has limited access to information (and there is no possibility for input from an ethics committee). A written protocol thus serves as a decision support system for responders in a disaster and can be considered a preventative measure for guarding against ethical violations.

Acknowledging that the circumstances under which these decisions must be made and developing a support tool in advance can be considered a component of *primary risk management,* defined as an action plan undertaken to avoid an adverse outcome and/or advance toward a desired goal.[24]

Crowley and Gottlieb[11] have applied this concept of a primary preventative model to the prevention of ethical dilemmas in psychology. It should follow that providers in other fields could take a preventative approach with field-specific models. Keinan[9] proposed that, "the investigation of decision-making improvement via training should be supplemented by the design of decision procedures and aids that would compel the decision-maker to scan and weigh his or her alternatives fully and systematically." Such tools relieve on-the-scene providers, working under acute stress, from the task of balancing highly nuanced and competing values that scholars and ethicists struggle to resolve from the well-rested, peaceful comfort of their academic workspaces.

Many health departments and medical societies have issued guidelines and consensus statements toward this goal.[21,25] Of note, the Minnesota Department of Health has produced a wealth of guidelines to address crisis standards of care and shortages of many patient care essentials from oxygen and food supplies to staffing and ventilators.[26] These are easily used single-page tools that can assist providers in making changes to standards of care. The strategies are flexible and designed to be applied along a continuum from mild shortage to truly austere conditions. Ease of use and adaptability make these decision support tools especially useful in crisis settings, and potential event responders should be given access to them and education on their implementation.

Ontario[27] and New York State[20] have produced 2 very similar protocols for allocation of ventilators in a mass casualty event. Ontario developed their protocol in 2006 for the allocation of critical care resources in the event of an influenza pandemic.[28] New York State's ventilator protocol came about in 2008 and borrowed heavily from Ontario's. The protocols outline specific inclusion and exclusion criteria for patients to which they apply. The inclusion criteria specify requirements such as hypoxemia, respiratory acidosis, or hypotension with evidence of septic shock. The exclusion criteria cover a range of patient characteristics including age over 85 years and clinical conditions such as severe burns covering more than 40% of the body surface area. The determining metric for prioritization after inclusion is the Sequential Organ Failure Assessment (SOFA) score.[29] This is a prognostic indicator calculated from physiologic parameters from multiple organ systems. Patients' SOFA scores are then used to triage them for ventilators with reassessments of their SOFA scores and triage status at 48 and 120 hours.

There are other similar prognostic metrics such as the multiple organ dysfunction score (MODS)[30] or the acute physiology and chronic health evaluation (APACHE II).[31] The merits of one critical care metric versus another are beyond the scope of this article. However, the approach of using a prognostic metric based on clinical data applies evidence-based medicine to ethical decision-making. Using an objective metric divorces the decision of whether to provide a ventilator to a patient from, for instance, his or her class, gender, social capital, immigration, parental, or marital status, and it reframes the decision in terms of the likelihood of clinical improvement and survival. Implemented on a large scale, this type of approach should reduce overall mortality during a capacity crisis. It also allows us to satisfy our ethical duty to manage scarce resources and to provide care to our patients with the peace of mind that we are doing both in the most equitable way possible.

The tools used by Minnesota, Ontario, and New York State are dynamic, allowing for reassessment and redistribution of resources as needed. Conditions in a disaster are constantly changing—both the scarcity of resources and patient conditions are subject to change and thus it is important to have decision-making support tools that are similarly dynamic. However, there are limitations for their use. For example, the Ontario and New York ventilator protocols rely on laboratory values that may be unavailable under certain conditions. They also do not address what to do once all ventilators are in use. They do not include plans or decision guidance for extubation. However, the issue of exit-triaging patients for withdrawal of ventilation has been addressed in the literature.[32] Nonetheless, such protocols are a step toward guiding clinical judgment through agreed upon criteria to reach the shared goal of just distribution of resources.

CONCLUSION

A duty to respond to a crisis and serve our patients and community invokes a duty to make life and death decisions with the greatest possible cognitive and ethical clarity.

Making these decisions can be hard under the most ideal of circumstances, without the stresses of the situation compounding the difficulty, raising the risk for inconsistency, premature closure, and bias.

Safeguarding clear decision-making as a potential scarce resource is a multifaceted task. Transparent hospital policies that provide prescriptive guidelines for allocating resources in the event of a disaster could help physicians make ethical decisions at a time when their own physical and psychological reserves are stretched beyond recognition. Tools should be developed with built-in flexibility to adapt to ever-changing circumstances that occur across a range of severity and scarcity. Guidelines should also include procedures for reassessment complete with contingency plans.

In addition to the decision support tools discussed here, every effort must be made to ensure that responders rest and that staff rotates. Advanced communication technologies such as satellite phones have the potential to provide great relief. Investment in devices upfront to allow for outside expert consultation during an event should be considered whenever feasible. Additionally, it is worth considering incorporating an ethical decision-making role into relief efforts provided by national and regional Medical Reserve Corps.

Each disaster has its own unique set of challenges and solutions that should be shared at debriefing events to improve preparedness moving forward. It is important to keep in mind that this process is iterative. Preparedness protocols should be living documents, frequently modified to include new knowledge and strategies gained from evidence and the experience of those unfortunate enough to have been called upon to respond. Adopting a set of guidelines and algorithms for making life-and-death decisions under extreme conditions can, on its face, seem impersonal and mechanistic. However, such a choice is exactly the opposite. The deep thought and compassionate planning done at the outset acknowledges that the worst circumstances make us all vulnerable, and the most humane choice is to prepare before the danger comes.

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