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Disaster Response

Bedside Resource Stewardship in Disasters: A Provider's Dilemma Practicing in an Ethical Gap

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ABSTRACT

During disasters, clinicians may be forced to play dual roles, as both a provider and an allocator of scarce resources. At present, a clear framework to govern resource stewardship at the bedside is lacking. Clinicians who find themselves practicing in this ethical gap between clinical and public health ethics can experience significant moral distress. One provider describes her experience allocating an oxygen tank in the intensive care unit at a hospital in Port-au-Prince, Haiti, immediately following the 2010 earthquake. Using a clinical vignette and reflective narrative she attempts to identify the factors that influenced her allocation decision, opening up the factors for commentary and debate by an ethicist. A better paradigm for the ethical care of patients during disasters is needed to better guide provider choices in the future.

I arrived in Haiti 10 days after the 12 January 2010 earthquake. I am an emergency physician with prior experience working in developing countries, including 15 months in Haiti, but I had never before deployed in a major disaster. I was assigned by Partners in Health to work the night shifts at the badly damaged University Hospital in downtown Port-au-Prince. The physical and psychological environments were unlike anything I had ever experienced. I routinely worked 14 to 16 hours at a stretch. Finding sleep was a challenge. My tent was a pressure cooker in the noonday sun, and the roosters and incoming cargo planes created a cacophony that even utter exhaustion couldn't overcome. I was lucky if I slept three hours a day.

At the hospital each night, I was faced with an overwhelming number of patients in need of care. In my sleep-deprived state, I found myself making critical clinical and ethical decisions almost reflexively. I triaged, I rationed, and I allocated scarce resources at the bedside. I made decisions and I moved on. I did not stop to reflect on my choices. Had I done so, I might have become incapacitated by the moral weight of those choices. It was only later, in my quiet moments alone, that I began to contemplate what I had done. I wondered if I had made the "right" decisions.

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One of the scenarios that haunts me involved multiple patients in the intensive care unit. I arrived one evening to find four individuals in respiratory distress. They were all exhibiting significant air hunger, were tachypneic, and had oxygen saturations in the low 80s. Intubation was not a viable option. There were no ventilators. In fact, I had only one functional oxygen tank—the others were effectively useless, as they had no regulators.

I had to choose which patient to give the oxygen to, knowing the others would suffer and even die as a consequence of my decision. The patients were:

1. A 15-year-old girl with a past medical history significant for meningoencephalitis. She was neurologically devastated at baseline and completely dependent on others for her care. She had a treatable pneumonia. Antibiotics and intravenous fluids were available.
2. A 40-year-old woman with HIV. Her chest x-ray showed cavitary lesions highly suspicious for tuberculosis (TB). She had three children at her bedside (ages five to 15.) They kept imploring me to help their mother. The medications needed to treat her TB and HIV were not yet available, and I did not know when they would be.
3. A 25-year-old previously healthy male nurse, three days post-op from major bowel surgery for perforated typhoid enteritis. He had not been receiving heparin prophylaxis and likely had a pulmonary embolism (PE.) Limited supplies of heparin and warfarin for treatment were available.
4. A heart-breakingly beautiful 18-year-old girl with acute decompensated heart failure. She had marked cardiomegally and a loud washing machine murmur on exam. Her acute heart failure was easily correctable, but the underlying condition (probably a congenital heart defect or a valve disorder) was not correctable in Haiti.

Which of these four patients should have been given the oxygen? Why? If another oxygen source became available, who should have been treated next? Why? How do providers make these choices? How should providers make these choices?

Before being confronted with these patients, I thought I knew how to prioritize patients to receive care. In my daily practice in the United States, patients with the greatest need are treated first, with little regard for the resources they consume. Faced with multiple patients, each with an equal need for a limited resource, I found myself trying to determine in whom the resource could be used most effectively. When it became apparent that need and medical effectiveness alone were not sufficient to assign priority to these four patients, I considered other factors to help me determine for whom the resource use seemed the most appropriate.

In retrospect, one of the reasons these cases gave me such angst is that it quickly became clear that the most medically salvageable patient in the short term, the 15-year-old neurologically devastated child with a treatable pneumonia, was not the patient I prioritized to receive the oxygen. Indeed, she was the last person I would have given the oxygen to. Did I make a medical judgment based on a co-morbidity or a value judgment based on my own latent biases? I am honestly not sure. Let me try to make explicit in words what was implicit in my decision making, so that it can spur discussion and debate.

To help me determine in whom the resource would be most medically effective, I first considered short-term salvageability. Many scoring systems exist (SOFA, APACHE, MODS, and modified versions of each) to help predict short-term survival. They all have their limitations, and many of the data points needed to calculate such scores were largely unavailable in Haiti. My best estimation was that Patient #1 had the greatest likelihood of short-term survival, followed by Patient #4, Patient #3, and Patient #2. Should short-term survivability alone define effective medical care or should a more long-range view be used?

I next considered long-term survivability. A resource might be defined as "wasted" if used on a patient that lived for a week, but succumbed to her or his illness the next week (or month, or year.) Given the size and scope of the

disaster in Haiti, and the fractured healthcare system in that country at baseline, long-term patient survival and the potential for continued use of healthcare resources seemed to warrant consideration. I tried to make some reasoned predictions for long-term survivability and resource consumption based on the patient's current, pre-existing, and co-morbid conditions. I recognize that there are significant problems with making such predictions, but I still considered it an important part of the equation.

Patient #3 was otherwise healthy, and if he could get over the current insult of a PE and major abdominal surgery, he would likely return to his pre-morbid level of good health. He had the best chance of long-term survival, and would presumably not be a continued drain on resources. Patient #1 was neurologically impaired at baseline. She could not communicate verbally and required help with feeding, toileting, and other activities of daily living. She was potentially susceptible to sacral decubital ulcers, aspiration events, and other illnesses due to her chronic invalid state. Prior to the earthquake, she was cared for at home by her family, but their resources for her continued care in the wake of the earthquake were uncertain. Patient #2 had HIV, TB, and possibly AIDS. The patient would require administration of directly observed therapy for TB for one year to avoid the emergence of a multi-drug resistant infection. She would also need antiretroviral treatment. If she did have AIDS, she would be susceptible to opportunistic infections until her immune system could be reconstituted. I may have been more optimistic for this patient's long-term survival if I had known when and where HIV and TB medications would be available. Patient #4 had a congestive heart failure (CHF) exacerbation and an ill-defined underlying condition. She might return to her premorbid functioning with just mild limitations in her activity level, or she may have continued, frequent exacerbations until she ultimately succumbed to her disease. Cardiac ultrasound would have been helpful to further define her anatomy and better predict her likelihood of long-term survival. In summary, Patient #1, Patient #2, and Patient #4 all had significant co-morbid illnesses likely to affect their long-term prognosis. The nuances of each of their diseases made accurate forecasting difficult, and I had trouble ranking these patients. What was clear, however, was that Patient #3, who had no co-morbidities, was the individual to whom giving the oxygen to would seem most medically effective in the long term.

At this point, my dilemma intensified. I could not determine who should receive the resource based on need—they all had equal need. I could not determine to whom I should give the resource based on medical effectiveness, as it depended on how I defined "medically effective." Is medical effectiveness a short- or a long-term phenomena? How good are our predictions of each? If I chose the short-range view, I should give the resource to the neurologically devastated child, Patient #1. If I chose the long-range view, I should give the resource to the nurse with the PE, Patient #3. If my predictions were accurate (and this is a BIG "if"), the nurse had a slightly higher probability of dying in the short-term, but a better chance of surviving long-term. If assigning priority based on medical effectiveness was not adequate, what other factors could I reasonably use to help make a decision?

One factor I considered was the patients' role or function in society. Patient #3 was a nurse. The nursing school on the hospital grounds had collapsed in the earthquake, killing 140 nursing students, effectively wiping out the next generation of Haiti's healthcare providers. The recovery of the nation's fragile health system would depend on people with the skill set this patient had acquired. If a main goal of disaster response is to get society back up and functioning as quickly as possible, arguably it may be appropriate to consider a patients' instrumental value in disaster recovery. I also gave weight to the possibility that the nurse may have contracted his typhoid enteritis in the line of duty. If healthcare providers put themselves at increased risk of exposure to illness after disasters, we may have an additional moral obligation to care for them when they fall ill.

Another factor that influenced my decision was the idea of saving or sacrificing one life to help save the lives of others. Saving the life of the nurse would potentially save the lives of future patients. Saving the life of the mother would help save the lives of her three dependents. Her kids were desperately tugging on my shirt sleeves and imploring me to help. I was not immune to their pleas. They had already lost their father in the earthquake, could I allow them to lose their mother too? Unfortunately, that same mother was refusing to wear a mask and was actively and violently coughing. She had the potential to spread TB to her children and the patients around her. Should she be allowed to die in an attempt to stop the spread of contagion? Were there other goods I needed to consider beyond the individual patients' survival?

An additional influence on my patient prioritization was that of a certain kinship and empathy bred from shared experiences. I am a healthcare provider who is on the front lines, exposing myself to harm to treat patients during disasters. Did this lead me to prioritize the nurse? I am also a mother with two dependent children. Did this make me more sympathetic to the plight of the mother? Is this a personal bias or a societal one? If I were the mother of a disabled child, would I have been more inclined to use the oxygen on Patient #1? The girl with CHF was stunningly beautiful. Was I influenced by her appearance to choose her over the less attractive child? Not consciously, but it is these very hidden biases in our nature that can lead even the best-intentioned individuals astray. If asked, I would say that personal feelings should not influence decisions about resource stewardship, but I am human. I cannot honestly say that these factors held no sway in my decision.

Finally, I questioned whether judgments regarding quality of life played any role in my decision. As I looked at the neurologically impaired child, I am sure I assumed her quality of life was poor. This potential influence on my decision troubles me the most. After all, who am I to judge? Given the setting and time constraints, I had no opportunity to try to assess quality from the patient's and her family's perspectives. I understand that my own interpretation of quality of life is limited by my own good health. Quality of life considerations should not have played a role here, because the necessary information wasn't available. Still, I cannot help but think that my interpretation of the more rational criteria was affected by my underlying beliefs about a life worth living.

In the end, I cannot offer a mathematical equation to explain how I made my final allocation decision. First and foremost, I considered short- and long-term survivability in determining medical effectiveness, recognizing the inherent inaccuracies of such predictions. I then considered the patients' roles in society and disaster recovery, their dependents, and their potential for saving or harming others. I likely also considered our shared life experiences, the empathy a given patient evoked, and their perceived quality of life.

I ultimately prioritized the patients as follows:

1. Patient #3 (the nurse with the PE),
2. Patient #2 (the mother with HIV/TB),
3. Patient #4 (the young woman with CHF),
4. Patient #1 (the neurologically devastated child with pneumonia).

My decision was made in less than five minutes. I applied the oxygen to the nurse. I treated the other patients as best I could with the resources at hand. Midway through the night, one of the soldiers stationed at the hospital devised a way to split the oxygen tubing between two patients. His ingenuity allowed me to give oxygen to the mother as well. The disabled child progressively deteriorated and died the next night on my watch. The beautiful girl with heart failure responded transiently to lasix and nitroglycerin, but she ultimately succumbed as well. The mother never did get the drugs needed to treat her TB and HIV. She was ultimately deprioritized from the oxygen when another, more salvageable, patient came along. The nurse with the blood clot was slowly improving a week later when I boarded the plane home. Did I make the "right" decisions? I still don't know.

Interestingly, I have now presented these cases to more than 100 physicians, students,

and laypeople, and an overwhelming majority chose the patient I chose—Patient #3 (the male nurse.) Patient #2 (the mother of three children) is usually chosen next, followed by Patient #4. Patient #1, the disabled child, is almost always last. By no means were the votes unanimous, but there seems to be at least a consensus. The reasons people cited for their choices have been as varied as mine.

My approach to the problem of resource allocation in Haiti was largely based on my very basic medical school training in ethics, some experience with ethics committee work, and several years as a practicing emergency physician. These experiences formed the foundation for what Jeffrey Berger would term my "moral intuition."[1] My residual anxiety over these cases led me to conclude that my current training wasn't adequate to make such complex decisions. My moral intuition is strong, but perhaps my latent and unfair biases are stronger. A clear framework for decision making in disasters would be invaluable to providers who find themselves having to make these difficult choices at the bedside.

MASKING OF THE CASES

Some details regarding the patients discussed in this article have been changed to protect their privacy.

NOTES

1. J.T. Berger, "Imagining the Unthinkable, Illuminating the Present," *The Journal of Clinical Ethics* 22, no. 1 (Spring 2011): 17-9.