SPECIAL FOCUS

Resource Allocation After a Nuclear Detonation Incident: Unaltered Standards of Ethical Decision Making

J. Jaime Caro, MDCM; Evan G. DeRenzo, PhD; C. Norman Coleman, MD; David M. Weinstock, MD; Ann R. Knebel, DNSc, RADM-USPHS

ABSTRACT

This article provides practical ethical guidance for clinicians making decisions after a nuclear detonation, in advance of the full establishment of a coordinated response. We argue that the utilitarian maxim of the greatest good for the greatest number, interpreted only as "the most lives saved," needs refinement. We take the philosophical position that utilitarian efficiency should be tempered by the principle of fairness in making decisions about providing lifesaving interventions and palliation. The most practical way to achieve these goals is to mirror the ethical precepts of routine clinical practice, in which 3 factors govern resource allocation: order of presentation, patient's medical need, and effectiveness of an intervention. Although these basic ethical standards do not change, priority is given in a crisis to those at highest need in whom interventions are expected to be effective. If available resources will not be effective in meeting the need, then it is unfair to expend them and they should be allocated to another patient with high need and greater expectation for survival if treated. As shortage becomes critical, thresholds for intervention become more stringent. Although the focus of providers will be on the victims of the event, the needs of patients already receiving care before the detonation also must be considered. Those not allocated intervention must still be provided as much appropriate *comfort, assistance, relief of symptoms, and explanations* as possible, given the available resources. Reassessment of patients' clinical status and priority for intervention also should be conducted with regularity.

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Key Words: ethics, resource allocation, nuclear detonation, priority setting, need, efficiency

The prospect of a global pandemic, the possibility of another major terrorist attack like that of September 11, 2001, or of a major natural disaster such as Hurricane Katrina has prompted much discussion about the ethics of medical decision making under conditions in which demand for care may far exceed capacity, coupled with a high degree of uncertainty.[1-14] The literature has advanced the understanding of the multiple ethical values at stake and the tensions that are often framed as a debate about giving weight to the utilitarian norm of using resources to maximize lives saved (efficiency) vs the duty-based norm of treating people equally.

Recently, the Institute of Medicine (IOM) published a report[6] on the first phase of a project, supported by the Department of Health and Human Services and the Office of the Assistant Secretary for Preparedness and Response but with no editorial control, aimed at producing guidance for establishing the modifications to routine health care acceptable in the context of a disaster in which demand far exceeds capacity (referred to as "crisis standards of care," defined as a substantial change in usual health care operations and the level of care it is possible to deliver, made necessary by a disaster). The report focuses on the processes for defining and implementing the crisis standards of care, and is aimed at the policymakers at federal, state, and local levels. As part of that project, the IOM panel addressed the ethical principles that should apply to clinical practice during the crisis. They were especially strong in advocating the importance of duty-based norms for the clinicians and the central role of fairness in guiding medical decisions during this time. They also recognize the importance of stewarding the scarce resources, but note that "there is no uniform answer about how to weigh such competing values" and that "addressing this balancing act under very difficult conditions, with the goal of making decisions that will be recognized as fair under the circumstances, makes it critical to establish ethical processes for decision-making."[6]

Like other articles in this special issue of *Disaster Medicine and Public Health Preparedness*, this article is not intended to be an exhaustive review of the literature in this domain, nor is it a theoretical philosophical analysis. Rather, we provide practical guidance for clinicians to establish ethical processes for decision making immediately after a nuclear detonation. "Immediately" is defined as the time before a formalized command infrastructure is fully established and there is not yet formal triage by personnel other than the treating clinicians (this special issue addresses the first 3 to 4 days in the setting of crisis standards of care[15]), recognizing that there will be great heterogeneity in the functioning infrastructure and surge patterns based on the clinicians' location and time after the incident.

DISTINGUISHING FEATURES OF A NUCLEAR INCIDENT

The conditions immediately after a nuclear detonation incident, described in more detail in the other manuscripts in this series,[15-23] are sufficiently different from conditions considered elsewhere in the literature on ethics and mass casualty to warrant revisiting the ethical approach to dealing with the resulting extreme resource scarcity. Such a detonation is anticipated to create a sudden, massive, and unprecedented but local shortage in resources coupled with destruction of infrastructure and health care facilities. It is anticipated that health care facilities left standing within reach of people in need of medical care will vary in remaining functionality, but most can expect a catastrophic shortage of medical resources to occur quickly.[16,19,23] Here, a critical level of resource scarcity is reached when it is no longer possible to fully meet the demand for essential lifesaving interventions. Under such critical shortage, many individuals will not be given the care required to avert imminent death, and palliation for those dying will also be severely constrained.

The situation after a nuclear detonation is complicated in ways that pandemic influenza and other kinds of massively demanding crises are not.[15,16,19,23] These ways include difficulties in diagnosis and prognosis attendant to uncertain radiation exposures, severe damage to the health care system in the immediate vicinity, problems with the general infrastructure impeding transport and communications, and prospects for mass panic throughout the general population and a high degree of military activity. Given that most people have no experience with radiation incidents, there is naturally fear of secondary exposure, which may make providers more reluctant to intervene. Health care professionals may find themselves with a large influx of casualties but little situational awareness and poor information regarding what to expect in terms of relief or rescue, or even the flow of patients. (In the aftermath of a nuclear detonation, medical venues close to the detonation [ie, within 10-20 mi] will likely be overwhelmed.[19-21] Thus, it is reasonable for providers to expect an onslaught of incoming victims, both gravely injured and less so, but seeking reassurance.) In the immediate period—at least the first 3 to 4 days—after a nuclear detonation, there may not be access to trained triage officers or others experienced in dealing with radiation catastrophes. From the local point of view, it may even look as if there is a threat to the integrity of the nation, even though models show that the impact may be reasonably limited to the blast zone and its vicinity.[24-26] These contextual features are critically important because they limit the ability for decisions to be made in a coordinated manner by a body with established legitimacy to dictate shifts in clinical standards of practice.

Radiation exposure will make assessment of trauma and other injuries more complicated and uncertain and will worsen the prognosis, possibly transforming otherwise salvageable conditions into assuredly terminal ones.[15,16,19,23] Indeed, even people with mild or no traumatic injuries may face certain death from radiation. This possibility can further confuse medical decisions because some of these terminal exposures will not produce visible signs immediately, as is normally the case in patients triaged to supportive care only. For these patients, death could be delayed for some time, yet still be unavoidable. Without appropriate tests and expertise, it is difficult to assess exposure to radiation, leaving substantial uncertainty for clinicians.[15,16,19,23]

ETHICAL RECOMMENDATIONS

The focus of the Scarce Resources for a Nuclear Detonation Project is to define approaches for planners and responders to address triage and resource allocation immediately postdetonation, and the methods for the project as a whole are detailed by Coleman et al.[17] Although the project was initiated by the Department of Health and Human Services and expenses for face-to-face meetings were covered, there was no remuneration of the participants (other than a small stipend of $500 for group leads), and the membership of the ethics committee was constituted by self-selection. The members were the authors of the present article and all of them were personally responsible for their positions and for the article as a whole. The opinions of the institutions with which the authors are affiliated were neither sought nor reflected in this work and no editorial control was exerted by anyone not on the author list.

During a period of several months, the ethics team developed the clinical ethics guidance reported in the present article. Initial meetings with the experts in disaster response and other participants in this project centered on the conflict between the desire to save the most lives with the available resources (eg, efficiency, utilitarianism) regardless of what actions this may imply (eg, bypassing some from rescue or treatment because of perceived higher resource requirements) and the duty-based norm to accord each patient the same importance (ie, egalitarianism). These opinions were debated within the ethics team and these discussions resulted in a draft manuscript capturing the key elements of the practical guidance for clinicians. This manuscript was distributed for review to the project participants and to selected external reviewers who had been involved in developing other ethical guidelines. The authors of the manuscript met several times to consider the comments, including a face-to-face meeting with some of the key reviewers, and the paper was revised as a result of these additional discussions. The manuscript was further revised in response to detailed peer review. Throughout the process, the specialized literature in this field was examined, but there was no formal or systematic review.

The resulting guidance remains the opinion of the expert panel authors. It is expected that the ideas in the present article will be subject to additional analysis by other groups involving clinical and philosophical ethicists representing various philosophical positions, and that there is much empirical research that can and should be performed to learn more about the public's opinion regarding the clinical ethics approach taken here.

Fairness as the Guiding Principle for the Frontline Clinician

The starting point in much of the extensive literature on the ethics of priority setting in the face of scarce resources is the basic utilitarian notion to provide the greatest good across the greatest number of people. In the literature on mass casu-

alty events, "the good" has often been interpreted as saving the most lives,[3] without further ethical specification. Taking lives saved as a starting point accords with the centrality of protecting human life. The practical clinical ethics question, however, that evolves from this central human drive—reinforced in clinicians by training and experience under conditions of plentiful resources—is how best to pursue the objective of balancing efficiency with attention to the duty-based norm of providing the best care possible to each patient, in the context of crisis standards of care after a nuclear detonation.

There is always the concern that trying to maximize the number of lives saved will trample the rights of the few. In addition, the ability to predict outcomes and consequences is notoriously weak in catastrophic circumstances.[27-30] Thus, it is important that approaches that focus on utilitarian goals like "most lives saved"[31] be refined and made explicit for clinicians who are making triage decisions.[5,32-34] Although administrators with broader situational awareness may make decisions based more on efficiency, for the clinician faced with limited or no administrative infrastructure, the traditional ethical standards of treating patients continue. Consistent with the IOM report,[6] the analysis presented here takes the position that although efficiency is important, fairness is the key modifying ethical principle. Fairness is generally defined as considering people's needs "equally *without favoritism or discrimination*" "just or appropriate *in the circumstances*" (emphasis added).[35] Both of the emphasized aspects are important in allocating resources. Clinical decisions must be based on medical need and the ability to meet that need under the catastrophic circumstances and with the available resources (effectiveness,[36] not the efficacy extant in normal practice). Decisions should not consider patient characteristics such as race, sex, socioeconomic status, or prior state unrelated to effectiveness; potential future state or utility; and should not favor or discriminate against a particular class of people.

Criteria of Need and Effectiveness

When resources are insufficient to meet the needs of all of the patients presenting for care, despite the best efforts to marshal additional resources and redeploy the existing ones, it becomes necessary to ration those resources. Prioritization inevitably involves making judgments about the merit of 1 person's medical needs relative to others'. Given that these needs pertain to alleviating suffering and treating illness—core personal and social necessities—strong emotions from patients, families, and providers are inescapable, making a fair approach crucial. Clinicians, who rarely, if ever, in the United States are forced to make on-the-spot decisions to ration lifesaving treatments due to resource constraints, may experience extreme distress because they would be forced in this scenario to refuse potentially beneficial treatment to patients when the expected outcome of that refusal is death.

Under conventional standards of care, treatment in order of presentation is widely perceived as fair. In the doctor's office or the emergency department, for example, the sequence of arrival prevails. If the circumstances change, however, because someone presents with a much higher need (eg, with severe trauma), then it is generally considered fair to give priority to that person. The idea is that the risk of experiencing serious harm if intervention is delayed outweighs the inconvenience to those who must wait longer.

Thus, need is an important determinant of priority in routine clinical circumstances. This does not mean that priority is adjusted according to fine gradations of need; the queue is not reordered because of small differences. Only major differences are taken into account. This manifestation of the principle of proportionality continues to apply if more than 1 patient has equally high needs. Under such conditions, priority is again established on a first-come, first-served basis. In the uncommon situation in which multiple people with equivalent needs present simultaneously, then random allocation strategies of the resources, such as lotteries, are deemed fair. If resources can be subdivided among the group, then equal shares may be considered fair. In all cases, withholding interventions that will not be effective is felt to be fair and ethically appropriate, regardless of how severe the need. Nevertheless, in routine practice in the United States, most clinicians offer the intervention if there is any uncertainty about effectiveness and often intervene even when there is little likelihood of benefit.

The ethical question is whether the extreme circumstances after a nuclear detonation modify these basic ethical principles of clinical practice and, if so, to what extent. This guidance takes the position that the basic principles continue to apply, even in this context, but 5 aspects are modified: the minimum risk of death considered as high enough to trump other needs, the level of effectiveness required for deployment of interventions to prevent death, the minimum risk of serious sequelae that accords secondary priority, the degree of effectiveness required of interventions to prevent serious sequelae, and consideration of availability of resources. An algorithm incorporating these is presented in Figure 1.

Thus, high need coupled with sufficient ability to meet that need would be given the highest priority, whereas high needs with little possibility to meet them would be given low priority. By the same token, minimal needs would not be a priority, regardless of the possibility of meeting them, unless the available resources could meet only the lower needs (eg, only bandages and disinfectant are available). In the extreme, lifesaving resources are not allocated to some patients despite an exceedingly high risk of dying if the expected ability to reduce the risk of death is judged to be too low in the circumstances. The Scarce Resources for a Nuclear Detonation Project has so far addressed only the criteria required for the highest level of need and for the effectiveness in meeting it. Neither the criteria pertaining to serious sequelae nor how many resources[37,38] can be allocated to any one patient have been defined. The criteria for how likely death must be and for the required effectiveness in postponing death are given in other ar-

ticles in this issue.[16,22] Although these determinations are made in the face of uncertainty and involve clinical judgment, and thus the possibility of error, they are considered fair because they are made solely on the basis of the need and the ability to meet it. This assessment of effectiveness is different from the assessment during routine practice in which resources are plentiful and hence much lower degrees of effectiveness are deemed acceptable. Although this departure from normal practice can add considerably to clinicians' and others' distress, reports of experience during recent disasters suggest that our recommendation to adhere to the established, contemporary ethical strategy of fair distribution of medical resources based on need and expectations for interventional success will produce less distress than a pure efficiency approach.

It is emphasized that failure to meet the lifesaving need does not mean that other needs, such as pain relief and comfort, should not be met by personnel not immediately required for lifesaving interventions.

Determinants of Need

Need is primarily determined by the severity of the presenting condition (Figure 2). It is absolute in the sense that it neither depends on other factors such as the surrounding circumstances nor on the needs of others. Nonetheless, it is extremely difficult to precisely define, particularly within the chaotic context of a mass casualty incident, and especially in the setting of possible radiation exposure. With most medical conditions, time has a strong impact on both the adverse consequences and the effect of intervention. Thus, "urgency" is also a determinant of need: If the risk or gravity of the consequences increases as time without treatment passes, or effectiveness diminishes, then the need is more acute.

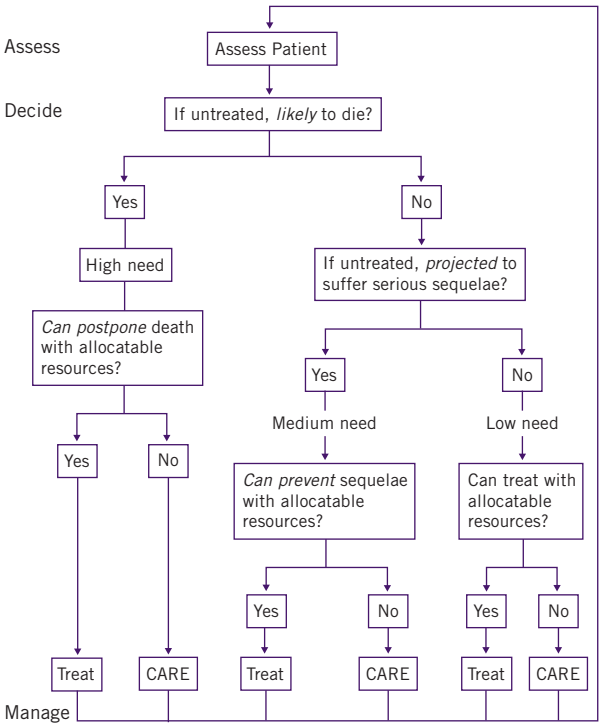
Because death precludes any further intervention, we tend to consider imminent fatality as the highest need, to the exclusion of all else. In other articles in this issue,[16,19,22,23] this is reaffirmed: During critical scarcity, the only conditions that are dire enough to qualify for intervention are those where (nearly) all of the patients would die if untreated.

Given high uncertainty, particularly in the chaotic circumstances after a nuclear incident and likely inexperience with the presenting conditions, a clinician should err on the side of triaging victims for "immediate" treatment. The victims must then share resources or wait for their turn. This is particularly true for victims with unclear radiation injury, which can be difficult to define in the absence of patient-specific information such as location at the time of and after the detonation or signs of radiation injury (eg, burns, lymphocyte count).

As scarcity lessens, a threshold is eventually reached at which the needs of patients with lower risks of death if left untreated or nonfatal but serious injuries gain importance. This threshold is, in principle, when the hazard of death drops below a level that is no longer considered "imminent." It is not easy, how-

FIGURE 1

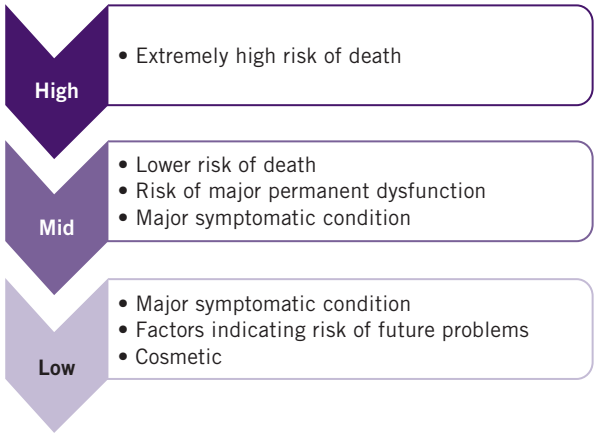
Algorithm for determining priority for treatment



Abbreviation: CARE=Comfort, Assist, Relieve symptoms, Explain.
When scarcity is critical, High needs should have the highest priority. As resources become plentiful, Medium needs begin to gain some priority. Low needs receive attention only as resources approach normal. Allocatable depends on scarcity and degreeof excess demand—it is based on decision maker's judgement of the amount and type of resources available for any given patient. It also has to do with the effectiveness of those resources in meeting the needs. If the available resources cannot meet a need, then they should not be allocated to that patient and someone with equal, or even lesser, needs who can benefit should receive them. Likely (death) depends on scarcity, time between reassessments, expectation for additional resources; in the setting of a nuclear detonation incident, it must tak into account the time course of radiation injury. Judgements regarding effectiveness always bear some uncertainty and this needs to be taken into account, with decisions erring in favor of treatment if uncertainty is high.

FIGURE 2

Level of medical need according to impact of presenting condition(s)



ever, to establish that threshold and it is likely to differ depending on the circumstances. Moreover, patients may deteriorate rapidly because of unappreciated injury, especially in this context with limited diagnostics.

Other factors,[39,40] particularly patient characteristics, are not fair determinants of need. Thus, an elderly person facing imminent death is no less in need than a younger one. It is recognized that some would advocate adjusting priority based on characteristics such as age.[41-43] This is only fair if these are determinants of effectiveness; they are not determinants of need. Any other modifying factors (eg, responsibility for dependents) are not fair determinants of need and, if they are to be implemented, they should be identified in advance with community participation.[44] Physicians ought never to make such decisions ad hoc. Institutional approaches to developing such algorithms for resource allocation and triage in advance of situations in which resources are critically scarce are included in several recent documents.[45,46]

Need can change as time passes. Thus, the condition of patients who are initially believed to present a lower need may worsen and their need rises correspondingly. Similarly, needs assessed as high but which remain unmet given resource scarcity may diminish over time as the patients improve on their own, or additional resources may become available. Hence, it is necessary to periodically reassess needs and not rest on the initial appraisal. Creating a regularity for this reassessment of patients' needs in the context of varying resource availability is of central importance to ensuring that the decision-making process is considered fair. Regular reassessment would demonstrate that a good faith effort is being made to ensure that patients' changing clinical status is considered and addressed. Furthermore, attention to patients during reassessments ought to be based on the same concepts of need and effectiveness as their initial assessment.

Although the focus of providers may be on the demands of the victims of the catastrophe, it is important to remember that the preexisting needs of patients under their care before the incident are to be considered equally with the casualties from the incident. In determining the allocation of resources, the same criteria for needs assessment should be applied to predetonation patients. If the conditions of patients being treated before the incident are unlikely to be immediately fatal if untreated, then they would have reduced priority for resource allocation; however, if they were potentially fatal (eg, ventilator dependent), then they have an equivalent high need and their priority depends on the ability to continue to meet that need.

Determinants of Effectiveness

The expected ability to meet a need (effectiveness) must be substantial to accord priority. If the effectiveness of intervention, in the circumstances extant after a nuclear detonation, is expected to be so low as to be tantamount to nonexistent, then there is little question that it is fair to reduce the priority to "delayed" and withhold the resources. In other articles in this issue, this threshold is presented and discussed.[15-17,19,23]

There are many influences on the expected effectiveness of an intervention, including patient characteristics, the context in which the intervention is delivered, and the amount of resources that can be allocated. Many characteristics of patients are determinants of effectiveness and it is fair to consider these in judging whether an intervention is likely to be so ineffective that it can be withheld. Thus, it is fair to consider age, for example, but only if an elderly patient is much less likely to respond to treatment. As resource scarcity eases, the importance of these characteristics in determining effectiveness and priority setting should drop.

It is also fair to consider the context in determining whether an intervention may be effective. Although need is absolute, the ability to meet it is not; it is highly context dependent. An intervention that would work well in 1 setting (eg, aseptic conditions) may perform much worse, even not at all, in the circumstances after a catastrophic event. It may be particularly difficult, however, to determine the impact of changing chaotic conditions on effectiveness. Indeed, medical knowledge may not be equal to the task or the practitioner may not be aware of the evidence. Thus, decision makers should be cautious in estimating expected effectiveness, and the other articles in this issue provide some guidance in this regard.

Although it is theoretically feasible to consider the amount of resources required to meet a need in setting priority, it may be extremely difficult to apply this consistently and fairly in practice (termed "minimum qualification for survival").[32,47] Although examples can be constructed in which it seems obvious that the available resources should be allocated to save many patients rather than a single patient, this clarity is difficult to imagine in the context of a nuclear detonation. Determining what is "too much" involves knowledge of such factors as what resources are available and will be forthcoming, estimates of what will be required by the specific patient, assessment of what other patients are in the queue, and what their requirements will be. Knowledge of all of these factors, especially within the early time frame focused on here, is not likely to be practicable. Moreover, making this determination dynamically predisposes to inconsistency, arbitrariness, and perceptions of unfairness. An alternative approach has been to propose a list of conditions (eg, end-stage renal disease[14]) that would lead to the patient losing priority because these conditions entail the use of a large amount of resources. These exclusions are problematic because they are fixed and the list cannot be comprehensive. Also, these guidelines disadvantage an identified group of patients compared with others who may require similar levels of resources but whose condition is not on the list. It should also be noted that many of the conditions that may end up on such a list would diminish priority anyway because such conditions are associated with greatly reduced effectiveness, especially in the setting of scarce resources.

Figure 3 summarizes the relation between need and effectiveness, the latter composed of efficacy and resources available. Based on the resource scarcity, the situation will change from conventional to contingency to crisis[6] and the standards of care and order of triage of injuries will vary, as discussed in other manuscripts in this issue.[16,22]

COMMENT

As long as individual clinicians are making decisions for individual patients, whether existing or new, they will be juggling the same ethical criteria as any clinician would at any other time. The decisions consider what resources are available and the case mix of patients presently at hand or who are known to be immediately incoming. They do not consider theoretical patients who may be coming at some unknown future time because the real needs of the patients already there cannot be postponed. Given the suddenness of a nuclear detonation, the participants in the Scarce Resources for a Nuclear Detonation Project strongly believed that tools need to be made available in advance to assist responders who are overwhelmed by victims and to mitigate chaos and moral distress resulting from variability in the triage process. The present article presents the ethical component of this guidance.

In the ethics of everyday medicine, the utilitarian maxim of doing the greatest good for the greatest number covers the goals of saving lives, curing disease where possible, treating noxious symptoms at a minimum, and providing comfort measures to those who are dying. These goals, under everyday circumstances in affluent economies, do not usually conflict. With resources generally available to meet patient need, just about everyone presenting for care is treated. Thus, any debate about fairness concerns how much and how well all patients should be treated, not usually whether patients should be treated at all. After a nuclear detonation, however, the situation is much different. Under these crisis conditions, making difficult resource allocation decisions fairly will be central to ethical clinical care.

One approach to managing scarce medical resources under crisis conditions has been to focus on saving the most lives and has thus advocated a strategy of shifting ethical standards from fairness to efficiency. Here, we have refined that ethical analysis. Rather than focusing only on lives saved as the mark of maximizing the good, we have broadened the "good" to include avoiding discriminating against categories of patients. As a result, this secures the additional "good" of reduced moral distress on clinicians during and after the event and of strengthening the public trust in the medical enterprise and the nation's response to crises.

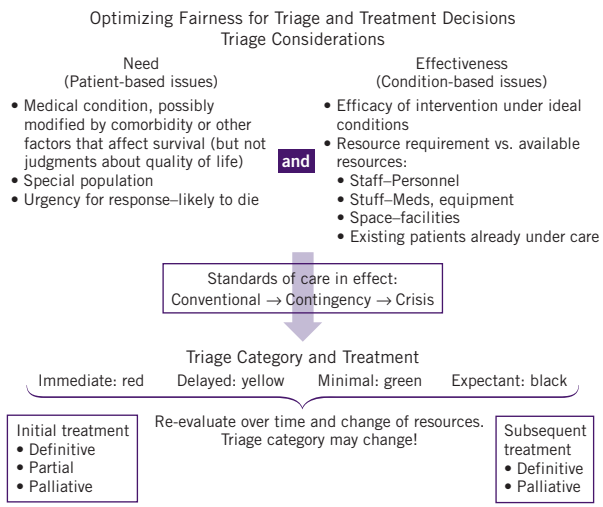
Our ethical approach to obtaining this good is to pursue efficiencies in resource allocation only to the degree that fairness permits, recognizing that this moral constraint on practices of efficiency could result in greater loss of life.[48,49] Fair treatment, we claim, is what allows patients to trust physicians and the public to trust its government. Maintaining trust through fairness is necessary to allow some to make decisions on behalf of others. The clinical-ethical analysis strategy favored here rests on accepted criteria for making ethically sound, fair medical judgments. By following accepted standards of ethical practice in which clinicians judge how to best assess, treat, and reassess, ethically optimal care can be achieved under conditions of a nuclear detonation. Because this strategy does not alter the fundamentals of the way physicians already make ethical decisions,[50] it is expected to produce the best outcome for the most victims, remembering that under conditions of a nuclear detonation, best outcome is defined as effective intervention (including comfort care) from stabilization to discharge or transport.

In the end, the exact numbers of lives saved compared to numbers of lives lost during this early stage of a nuclear detonation may be psychologically invisible in the disaster's aftermath. What may be more visible and more important to the recovery of the nation is society's judgment that clinicians caring for injured and dying, as well as existing, patients made a good faith effort to apportion care fairly. Indeed, a fair allocation of resources can itself be taken as providing the "greatest good for the greatest number."

Prioritizing fairness is not new to the philosophical literature.[51] The centrality of this clinical-ethical approach to the management of scarce medical resources has been established in several recent discussions about ethics during crisis stan-

FIGURE 3

Optimizing fairness for triage and treatment decisions



The medical need depends on the person's clinical condition (whether resulting from the nuclear detonation or not). Priority for treatment may be modified by co-morbid illnesse-sor other factors that have an impact on effectiveness. The urgency for response is based on the likelihood of dying or other serious adverse outcome, with treatable prority 1 leading to Immediate category. Factors that don't affect immediate survivability such as quality of life are not included. The Effectiveness is given by the efficacy of intervention under ideal conditions but modified by the resources available to meet the need. Thus, a normally highly effective intervention could have low effectiveness if there are insufficient resources. Triage category varies depending on what the standard of care (as outlined by the IOM[6]) is at the time. (Specifics of triage and medical care are presented elsewhere in this series of manuscripts.) As the resource setting can change dramatically as the response unfolds, re-evaluation may alter triage category and delivery of treatment. (Partial treatment is a temporizing intervention such as transfusing a limited amount of blood rather than the full amount needed in anticipation/hope of additional resources being available.)

dards of care.[2,6,9] This literature offers an increasingly nuanced approach that incorporates fairness alongside efficiency. Thus, the position taken in the present article, although novel in that it is focused solely on conditions of a nuclear detonation incident, is not logically or philosophically different from current thinking about the clinical ethics for management of critically short resources. The guidance goes further, however, to operationalize the approach.

Fair allocation of critically scarce medical resources involves basing decisions solely on the patient's clinical needs and the ability to meet those needs under the conditions of the moment. When resources are critically constrained, the criteria for required degree of need and level of effectiveness become more stringent. Patients with equally high need and effectiveness are dealt with according to order of presentation or other fair methodology such as a lottery. These basic ethical principles have practical implications: Just allocation does not allow discrimination based on factors such as prior health state and age per se or on predictions of future state or other modifiers. Thus, prior health state and age can be considered only if they influence effectiveness. Fairness also dictates that assignment to treatment vs comfort care not be static: All of the Scarce Resources for a Nuclear Detonation Project participants agreed emphatically that patients should be reassessed periodically and as the resource setting changes.

Although it has been emphasized here, as elsewhere,[6] that patients not prioritized for treatment should still receive *comfort, assistance, relief of symptoms, and explanations*, the approach to providing palliation given critical resource scarcity has not been operationalized beyond stating that this task fall to other personnel not immediately involved in lifesaving.[52] This does not address what to do if even those resources are scarce, much less how to distribute resources that can be used for either purpose (eg, opiates), other than to emphasize that fairness encompasses lifesaving and palliation. This important aspect of the planning remains to be worked out.

The goal of the Scarce Resources for a Nuclear Detonation Project has been to begin planning for the aftermath of an improvised nuclear device detonation and to have some operational response proposals available should such an incident occur and while further work on these issues is accomplished. Other organizations have also taken up the ethical basis for dealing with resource limitations during natural or manmade crises. Going forward, it is important that steps are taken to coordinate these various guidelines and to resolve or at least identify inconsistencies. Clinicians, policymakers, and the public deserve the clearest, least ambiguous, and most consistent guidance possible and an appreciation for the difficult setting in which medical decision making would occur after a nuclear detonation.

CONCLUSIONS

One wishes never to have the problem this special issue describes, but one does not want to face the catastrophe of a nuclear detonation without thoughtful preincident deliberation.[53,54] Because this article is not a philosophical ethics treatise, we leave to others the difficult, if not impossible, task of determining which ethical theory is most fully explanatory. We offer a clinical ethics strategy designed to provide treating medical professionals with a practical approach to making ethical decisions about allocating resources to those already in their hospital and those who reach their doors in the first days after a nuclear detonation incident. We suggest that the way physicians make ethically sound decisions during the average day ought not to be altered under conditions of scarce resources: Needs of patients and effectiveness of intervention are the criteria that matter ethically, and that does not change from situation to situation.

Author Affiliations: Dr Caro is with the Department of Epidemiology, Biostatistics and Occupational Health, and Division of General Internal Medicine, McGill University, and with United Biosource Corporation; Dr DeRenzo is with the Center for Ethics, Washington Hospital Center; Drs Coleman and Knebel are with the Office of the Assistant Secretary for Preparedness and Response, US Department of Health and Human Services; and Dr Weinstock is with the Dana-Farber Cancer Institute, Harvard Medical School.

Correspondence: Address correspondence and reprint requests to Dr J. Jaime Caro, United Biosource Corp, 430 Bedford St, Suite 300, Lexington, MA 02420 (e-mail: jaime.caro@mcgill.ca).

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