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REVIEW ARTICLE

Crisis Standard of Care: Refocusing Health Care Goals During Catastrophic Disasters and Emergencies

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When medical and health needs of a disaster-stricken population exceed currently available resources, surge capacity must be created. The *3S Surge System* consists of *staff* (personnel), *stuff* (supplies and equipment), and *structure* (physical location and incident management). Because it is not feasible to deliver health care in the usual way during a catastrophe, the goal shifts from optimizing *individual* to maximizing *population* medical and health outcomes. Allocation of scarce resources requires an evidence-based approach that encompasses national and international standards while maintaining regional and local flexibility. At some point in time following a catastrophe, it may become imperative to implement a *crisis standard of care* putting protocols, such as rationing of health care supplies and medications into action. In developing and defining this *crisis standard of care*, there are a multiple considerations, including medical, ethical, legal, and implementation/deactivation procedures. This manuscript reviews the origin of the concept of *crisis standard of care* with a discussion of its development, changes in health care delivery goals during emergencies, when to adopt crisis care policies and protocols, issues to address in catastrophic disaster planning, ethical and legal considerations, and directions for future research.

1. Introduction

To cope with increased health care demands during disasters, resources, such as personnel and supplies, are reorganized and systematically managed according to surge capacity plans. Not all major incidents will lead to health care needs that exceed available resources. Even in the September 11, 2001 attack in Lower Manhattan, analysis of casualties reported from the three main Lower Manhattan receiving hospitals shows that no hospital was overwhelmed by critically injured patients.[1] Hospitals and other entities with systems in place to mobilize and redeploy critical resources in a rapid and timely fashion will be less affected than those without programs in place at the time of a catastrophe.

What happens then when health care demand outstrips supply? Overwhelming patient surge may follow events, such as an influenza pandemic, a large-scale terrorist event, or an earthquake. In a study by Menon et al[2] on the impact of an influenza pandemic on critical care services in England, by simulating an 8-week epidemic and 25% attack rate, demand for ventilatory support was noted to exceed 200% of present capacity. Similarly, the US Department of Health and Human Services outlines that in a "severe" 1918-like scenario, 9.9 million patients may require hospitalization and 743,000 patients would require ventilation.[3]

Such crisis situations may be made worse by diminished local hospital capacity because of direct impact on hospital structure (earthquake) and staffing (pandemic). It may also be worsened by emergency department closures and crowding in some countries.[4] As indicated in a summary from a multidisciplinary panel convened under the Critical Care Collaborative Initiative which examined critical care services, most countries have insufficient resources to provide timely, usual critical care to a surge of critically ill victims. When demand outstrips supply, many people with clinical conditions that are survivable under usual health care system conditions may have to forgo life-sustaining interventions owing to deficiencies in supplies or staffing.[5]

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To address this circumstance, Barbisch and Koenig[6] developed a concept of Surge Capacity that Koenig terms "the 3S System" for "staff, stuff, and structure" (Figure 1).[7–9] When medical and health needs of patients exceed the resources of a system at a given point in time, a surge system is needed. This includes providing adequate numbers of appropriately skilled personnel (staff); event-specific supplies (stuff); and patient care locations, such as hospitals or alternate care sites plus an incident management system infrastructure (structure = physical locations plus management infrastructure).

How should society view standard of care during emergencies when ability to provide "usual critical care" is lacking? Some have suggested that the definition of standard of care change in tandem with the realities of crises; however, others have adopted a fixed legal definition of "standard of care" described as what the prudent person would do under similar circumstances.[10,11] Thus the "standard" is not what changes but rather the goal of the care. Changes in health care delivery during emergencies are best understood from the vivid experiences shared by health care workers on disaster relief missions. In an account from the Haiti earthquake, Camacho-McAdoo[12] shared real challenges on the ground with regards to triage, scope of practice, and meeting usual care expectations. With the focus on saving as many people as possible, nurses, working outside their normal scope of practice, performed nerve and hematoma blocks, reductions and splinting without X-rays, and even procedural sedation without having access to oxygen, suction, or advanced airway supplies.

2. Developing a Crisis Standard of Care

The impulse toward clearly delineated "crisis standards" dates back to the World Trade Center and anthrax letter attacks of 2001 in the United States and to the fears of an avian influenza pandemic in 2004.[13] In 2004, the Agency for Healthcare Research and Quality and the Office of the Assistant Secretary for Preparedness and Response in United States drove discussions by convening a panel of experts. This resulted in a document entitled "Altered Standards of Care in a Mass Casualty Event (MCE)," which provided important framework and guiding principles for developing the concept during MCEs.[14]

In May 2006, following on this work, Koenig and Kelen co-chaired the Society for Academic Emergency Medicine Consensus Conference, "The Science of Surge," which largely focused on surge capacity. During this meeting, Dr Robert Wise (at that time Vice-President, Division of Standards and Survey Methods, Joint Commission on Accreditation for Healthcare Organizations) discussed challenges faced by regulatory agencies when setting meaningful standards on hospital emergency management. They include absence of history to provide wisdom and difficulty of reliably predicting events.[15]

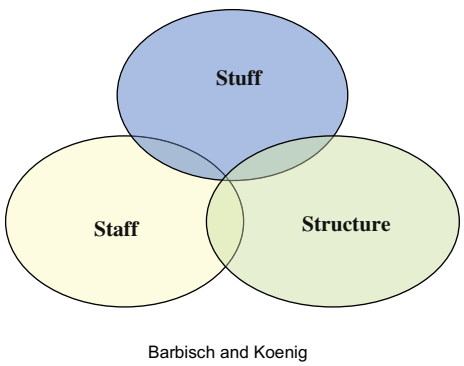

Figure 1 The 3S surge system.

In 2007, a subsequent report from Agency for Healthcare Research and Quality, "Mass Medical Care with Scarce Resources: A Community Planning Guide," further advanced the field by providing a framework for developing policies and protocols for crisis standards of care.[16] It outlined approaches and strategies that could be used to provide the most appropriate standards of care possible under the circumstances of an MCE. The issue was also explored by the American Nurses Association in their publication "Adapting standards of care under extreme conditions: Guidance for professionals during disasters, pandemics, and other extreme emergencies" in March 2008.[17]

In the midst of these national discussions, other terms surfaced, including "graceful degradation of care." To mitigate the risk of misinterpretation by the public, the media, ethicists, and other health care providers, Koenig and Backer coined the term "crisis standard of care" in California in 2008 to describe the shift in focus from the individual patient to optimizing outcomes for populations of patients in a scarce resource environment.[7,18] Surge Capacity planning in California included the concept that there needs to be "triggers" to move into a crisis standard of care as well as "triggers" to return to baseline operations. In a prolonged event, such as a pandemic, the system may move in and out of a crisis standard of care model multiple times.

The phrase "crisis standard of care" was embraced nationally and eventually in international forums. A unique high level partnership initiative of the American Health Lawyers Association, the U.S. Centers for Disease Control and Prevention and the U.S. Department of Health and Human Services Office of the Inspector General resulted in a co-sponsored invitational meeting entitled: Public Interest Dialogue Session Pandemic and H5N1 Flu: A Prescription for Preparedness.[19] During this meeting, Koenig introduced the concept of crisis standard of care and this was embraced by the President of the American Health Lawyers Association.

More recently, the Institute of Medicine (IOM) in United States has been involved in developing crisis standards of care. A committee was convened by the IOM and charged specifically to identify and describe the key elements that should be included in standards of care protocols, to identify potential triggers, and to develop a template matrix that for use by state and local public health officials as a framework for developing specific guidance for health care provider communities to develop crisis standards of care. This committee outlined their findings in the letter report—"Guidance for Establishing Crisis Standards of Care for Use in Disaster Situations," which was published in 2009.[20] Of note, most participants on the IOM Committee believed that the term "standards" rather than "standard" more appropriately described the situation, a deviation from the original concept of a single "standard" of care. As a practical method to address the controversy between "crisis standard of care" and "crisis standards of care" coupled with the concern that some experts had about using the phrase "standard of care" at all as it is generally a legal term, the State of California later adopted the term "Crisis Care" as the phrase for use in its policy and planning activities.

Concurrently, a series of regional workshops in United States organized by IOM's Forum on Medical and Public Health Preparedness for Catastrophic Events (Preparedness Forum) fostered dialogue among a broad range of stakeholders. Their goals were to categorize work already done on crisis standards of care; identify areas that require further development, research, and consideration; and facilitate communication and collaboration between jurisdictions. The presentations and discussions are summarized in "Crisis Standards of Care: Summary of a Workshop Series."[21]

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3. Standard of Care—Does it Change in Emergencies?

There are legal, medical, and ethical definitions for standard of care.[22] A legal definition for standard of care is "the degree of care a reasonable person would take to prevent an injury to another."[23] It is the amount of skill that a medical practitioner should exercise in particular circumstances based on reasonable and common practice in medical care.[21] In discussions on "alternative" standard of care, Pepe said, "An accepted community standard of care grows out of either custom or practice or it grows out of outcomes-based research, which has led to consensus with respect to how to treat certain conditions."[21]

Medically, standard of care means "a diagnostic and treatment process that a clinician should follow for a certain type of patient, illness, or clinical circumstance."[24] This process (or type and level of medical care required in specific circumstances) is based on professional requirements and norms, established by professional societies, accrediting organizations, and other entities. From the ethical perspective, the Hippocratic Oath gives guidance. It states, "I will follow that system of regimen which, according to my ability and judgment, I consider for the benefit of my patients and abstain from whatever is deleterious and mischievous."

These definitions of "standard of care" are all relevant and important when considering "crisis standards of care," which is defined as a substantial change in usual healthcare operations and the level of care it is possible to deliver, which is made necessary by a pervasive (e.g., pandemic influenza) or catastrophic (e.g., earthquake, hurricane) disaster. This change in the level of care delivered (or in the focus of care on optimizing population rather than individual outcomes) is justified by specific circumstances. Some have advocated that crisis standard of care must be formally declared by a state or federal government, in recognition that crisis operations will be in effect for a sustained period. The formal declaration that crisis standards of care are in operation enables specific legal/regulatory powers and protections for health care providers in the necessary tasks of allocating and using scarce medical resources and implementing alternate care facility operations.[20] A minority opinion by a State of California attorney suggests that a formal state declaration could have the opposite effect than that is intended by undoing provider protections already in place under Good Samaritan laws.

The introduction and suggestion of "new" standards allowing different levels of care poses challenges. Some experts and legal practitioners believe that the standard of care should not be lowered, diminished, or "altered" even during disasters.[22,25–27] Being a flexible doctrine, it is the same regardless of the circumstances—understood simply as doing what you can under the circumstances, with the patient's informed consent.[25] By having different standards, it may create confusion on which one to use and when they apply, as well as what level of care is required by each.

The IOM Workgroups recognized that efforts are needed to define a common taxonomy and framework for discussion to ensure a proportional response, to develop protocols that are sufficiently detailed so as to be implementable, and to begin the discussion of exactly when health care providers and facilities should implement crisis standards of care.[21] But until a common taxonomy is implemented, the focus of discussions should be on the goal in scarce resource environments, specifically, "to optimize population medical and health outcomes rather than individual outcomes."[26] Regardless of the "standard," this goal remains the same. There should also be a consistent level of care across the affected community and/or region that is based on improving overall health outcomes for each patient as best as can be achieved with the limited resources, working toward returning to predisaster conditions as rapidly as possible. This applies whether addressing who gets seen next by a physician or who gets a scarce resource, such as a medication or a ventilator.[22]

Recognizing that it is not feasible to deliver health care in the usual way during disasters, Kanter[28] conducted a study using quantitative simulations. The results suggest that by planning and "altering" standards of care using response strategies that control patient distribution and expanding capacity, lower mortality rates in large disasters may be achieved.

4. Are Resources Truly in Short Supply?

Implementation of allocation plans first requires recognition of an actual or impending resource shortfall. It underscores the importance of having situational awareness because access to and use of resources may differ even in the same locality. Even before disaster strikes, emergency managers need to identify resources available locally, regionally, and from national and possibly international stockpiles. Such planning requires sound estimates of surge capacity and a quantitative vision of demand.[29]

When DeLia and Wood[30] calculated surge capacity in New Jersey hospitals in 2003 by using beds that hospitals were licensed to operate as the denominator, occupancy across the state varied from 60% to 68%, with zero days above the threshold occupancy rate of 85%. But when calculated with beds that hospitals actually maintained (i.e., those set up and staffed on any given day) as the denominator, occupancy ranged from 73% to 84%, with 58% of days above the threshold occupancy rate of 85%. Her findings emphasize the fact that by using the wrong statistic, a very misleading picture of capacity is painted. In addition to that, capacity is not solely bed count but also about supplies, staff, and treatment space. Therefore, a simple count of available beds, however calculated, may give a false sense of alarm (or security) about the true surge capacity within a health care system.[31] For a start, planners may focus on a list of resources (see List 1) likely to be scarce during emergencies and possibly justifying planning and tracking.

List 1 Resources likely to be scarce in a crisis care environment and possibly justifying specific planning and tracking

1. Ventilators and components;
2. Oxygen and oxygen delivery devices;
3. Intensive care unit beds (adequately staffed and equipped);
4. Health care providers, particularly critical care, emergency medicine, burn, and surgical/anesthesia staff (nurses and physicians) and respiratory therapists;
5. Hospitals and related health care facilities (because of infrastructure damage or compromise);
6. Specialty medications, intravenous fluids, blood products (e.g., sedatives/analgesics, specific antibiotics, antivirals, and vaccines); and
7. Medical transportation.

5. Rationing—Finding Answers to a Difficult Challenge Through Public Engagement and Scientific Research

Medical surge response plans should include stockpiling, conservation, reuse, adaptation, and substitution, as well as resource-sharing or mutual aid agreements.[32] By stewarding resources well, rationing or allocation can more easily be avoided. However, in a disaster, the closer one is to the incident when evaluating resources relative to needs, the more likely that rationing must take place.[1] Rationing may be the best albeit last course of action to be taken to maximize population-based health outcomes in disasters. There are no simple approaches for two reasons. First, there is

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uncertainty on when and how the public should be engaged for discussions. Second, triage systems and predictive tools based on physiological parameters are currently unproven and lack robust scientific evidence that they will work well in MCEs.

Rationing is the process by which scarce resources are distributed, ideally in a prioritized manner to the needy. Triage systems help to achieve this assignment of priority. Community health care leaders must determine the method of triage before an event, as decisions are usually needed within a short period of time after an incident occurs. During discussions to delineate triage plans, the foundations for fair allocation that must be broadly covered include:

1. Legal considerations,
2. Procedural justice,
3. Evidence-based decision-making process,
4. Ethics, and
5. Public engagement and communication.

Challen et al[33] suggested that the process for developing triage plans should be valid, reproducible, transparent, and consistent with distributive justice, which refers to the fair distribution of scarce or limited resources. They advocate the development and validation of physiological scores for use as a triage tool, coupled with candid public discussion of the process.[34]

There is a public and media interest on "who gets what first" in emergencies, as witnessed in the case of Memorial Hospital during Hurricane Katrina—although in this case, triage for evacuation came under scrutiny.[35] Most stakeholders will agree that public communication, community education, and buy-in are important. Yet, the very mention of rationing and triage may conjure images of vulnerable populations left to fend for themselves because of access limitation and thoughts of government authorities "not doing enough" resulting in preventable and unjustified morbidity and mortality. The topic that is often linked to deep emotions and personal ethical and cultural/religious convictions may become politicized and potentially polarizing.

If the public is not engaged in developing care standards, if it is not involved in evaluating the harsh choices that must be made, if it does not understand and agree with the ethics and logic surrounding those choices, even the best laid plans will likely fail.[21] Some have suggested using smaller focus group meetings as platforms for communication, perhaps relying on community groups or faith-based organizations as a centralizing mechanism.[21] At which part of the planning process the public should get involved remains debatable.

The current lack of evidence-based mass casualty triage systems hinders the implementation of scientifically based allocation decisions.[36] At the moment, there is no triage-allocation protocol that is proven to maximize health outcomes during disasters. Even the prevalent START triage system for rapid initial assessment is controversial and has proven overtriage and is not uniformly accepted.[37,38] The reliability and accuracy of triage systems may be limited by lack of consideration for the mechanism of injury. Although recommendations, such as the PLUS prehospital mass casualty triage, and Cone and Koenig's proposal of algorithms, which are account for chemical, biological, radiological, and nuclear events, attempt to address this issue, they are based on expert opinion and remain largely untested in real-life incidents in the field.[39,40] Who should perform disaster triage is also a controversial issue. Using experienced health care providers as triage officers is not necessary a solution for optimizing triage, as one study in Israel notes that primary triage (for patients admitted to the emergency department following a MCE) can be unreliable even when performed by experienced trauma surgeons.[41]

The use of a physiological scoring system to aid decisions on resource allocation has appeal as it provides an objective tool for prioritization based on predicted outcomes. Among such systems, although not available in the immediate aftermath of a disaster, the Sequential Organ Failure Assessment (SOFA) score has been most considered and included in several works.[42–45] Recently, Grissom et al[46] empirically developed Modified SOFA, which required only one laboratory measurement thereby increasing ease of use. Limitations of SOFA and Modified SOFA include the lack of validation for use in children and uncertain role for predicting outcomes for unusual conditions, such as critical illness associated with novel strains of influenza.[47] In perspective, SOFA remains a useful contributor to a wider comprehensive triage process for certain types of events.

6. When to Adopt a Crisis Standard of Care?

At some point in time following a catastrophe, it may become imperative to implement a crisis standard of care, thereby putting protocols, such as rationing of health care supplies and medications into action. The question is when? The letter report from IOM stated that "in an important ethical sense, entering a crisis standards of care mode is not optional—it is a forced choice, based on the emerging situation.[20] Under such circumstances, failing to make substantive adjustments to care operations—that is, not to adopt crisis standards of care—is very likely to result in greater death, injury, or illness."

Although different countries and states may take different approaches, some form of formal governmental declaration (such as a state of public health emergency) is usually needed to initiate modified operations during emergencies. In a rapid onset no-notice event, such as a catastrophic earthquake or large bomb blast, the formal declaration of a disaster may be delayed and the authority to shift to crisis care retroactive to the time of onset.

Operational procedures and policies should stem from a single general framework and ideally they should also be flexible enough to allow specific considerations for individual disaster scenarios. Many workshop members at IOM's forums indicated the need for multiple triggers operating at different levels and with different time frames.[21] These triggers need to be factual and capable for application retroactively to provide legal protection to caregivers.

Hick et al[48,49] proposed a taxonomy within surge capacity of conventional capacity (implemented in major MCE and representing care as usually provided at the institution), contingency capacity (using adaptations to medical care spaces, staffing constraints, and supply shortages without significant impact on delivered medical care), and crisis capacity (implemented in catastrophic situations with a significant impact on standard of care). This "refinement" that resounded with participants during IOM's workshop discussions may be used to identify the appropriate time for rationing protocols and also aid phased implementation of other care plans.

7. Issues to Address When Developing Crisis Care Protocols

Several important issues demand attention when developing crisis care protocols. They include:

1. The need for a single national/multinational guidance with a single general framework;
2. Consistent approach across territories and jurisdictions;
3. Collaboration and sharing of practices among authorities, experts, and the public;

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4. Comprehensive address of different areas and types (from prehospital emergency medical services to palliative care) of health care services; and
5. Flexibility of standards for local application.

Difficult choices may be encountered when attempting to develop plans suitable for a community's particular values and characteristics, while concurrently aiming to ensure a consistent approach across neighboring jurisdictions. Such consistency when planning is also important in prevention of "hospital shopping" for the most advantageous treatment protocols. Without consistency, individual physicians may be exposed to increased legal liability from patients who believe that they could have received better care at a different hospital.[21]

Suggested steps for developing protocols are:

1. Working groups and committees to outline ethical considerations, review legal authority, and draft guidance;
2. Broad public stakeholder engagement process and incorporating changes raised;
3. Finalization of ethical elements and crisis standards of care;
4. Establishment of a Medical Disaster Advisory Committee that will provide ongoing advice to the government authority regarding changes to the situation and potential corresponding changes in the implementation of crisis standards of care.[20]

National leadership and guidance is crucial in providing authority and reassurance. One of their key roles can be that of a convening mechanism for gathering and sharing information between agencies and development of the science. They should not become overly imposing on community solutions. On the other hand, local authorities and administrations with their ears to the ground should actively engage themselves to guide those decisions and contribute essential knowledge required for drafting local, workable solutions.

8. Ethical Considerations

Ethics is the discipline of dealing with what is good and bad, with moral duty and obligation. As ethics reflects the moral values of society, it is therefore not absolute. During disasters, ethical norms in medical care do not change as health care professionals are always obligated to provide the best care that they reasonably can under given circumstances. In fact, the recommendation is to adhere to ethical norms during crisis standards of care.[20] By considering ethics, the aim is to achieve a set of moral principles and values as guiding philosophy and governance over conduct, even when freedom and autonomy of choices by patients and practitioners are limited by scarcity of resources.

Ethical principles serve as the foundation of laws and justify some actions taken during emergencies that would not be acceptable under ordinary situations. The principle of distributive justice is of particular importance. Its influence on shaping strategies is enhanced by the lack of certainties in triage science. Ensuring that the system and plans are based on sound ethical considerations will serve to improve the community's compliance and willingness to accept sacrifices.

Seven important components of ethical considerations are useful for developing ethical crisis care protocols: fairness, duty to care, duty to steward resources, transparency, consistency, proportionality, and accountability.[20] White et al[50] mentioned three ethical principles, which are important in allocation. They are: (1) saving the most lives—utilitarian rule of maximum number of lives saved; (2) maximizing the number of "life-years" saved; (3) life-cycle principle or "fair innings," which is egalitarian, by giving priority to those who have had the least chance to live through life's stages.

Eventually, society must be aware that the choices made, on which ethical principles are important, should be universally applicable to all patients, rather than selectively to certain patient groups (e.g., the elderly or those with chronic organ dysfunction or disabilities) to avoid discrimination. Discussions may take bearing and lever on what has already been established for organ transplant programs or prioritization for blood products. Often, the reasoning that supports ethical choices may not be clearly articulated, which is one reason the public needs to be more engaged.

There is no lack of references or literature that guides or provides aid to developing ethical crisis care protocols. Many center on those for pandemic preparedness, such as policies for ventilator triage.[44,51–53] These works may serve as useful models for allocation in other scenarios and for other resources. The IntegratedEthics tools offered on the website of the Veterans Health Administration's National Center for Ethics in Health Care is a useful resource developed by leading experts in the field that is a recommended starting point for communities.[54]

9. Legal Considerations

Although litigation is quite common in some countries, such as the United States, and there are famous anecdotal cases, medical malpractice claims have typically not proliferated in emergencies.[35,55] Although the assumption that health care providers will not be willing to care for injured victims unless they are informed and granted adequate legal immunity for practicing in crisis environments appears reasonable, it has no historical basis. Most will still assist in the absence of clarity on those conditions because they value the sanctity of life and would focus on their professional duty and calling to relief suffering.

Liability is one of the important aspects of the legal framework that governs public health emergency response work. It is defined as "the quality or state of being legally obligated or responsible."[56] The public policy purposes of liability are first to deter misconduct and second to provide compensation for injured parties. Implementation of crisis standards of care can bring about liability risks ranging from malpractice, acting beyond the scope of practice, and patient abandonment to privacy invasion and discrimination.[32] Modified care procedures to maximize population health outcomes may be directly associated with greater individual patient risks for morbidity or mortality. Consequently, law enforcement authorities and people who are injured or their survivors may seek to hold responders legally liable for their actions and to obtain redress.[57]

Planning ahead to ensure that the legal environment will support an effective, fair, and consistent response is a crucial step in preparing for crisis standards of care during an emergency.[21] Mechanisms should be in place to allow waiver or suspension of certain legal requirements and regulations following emergency declaration so as to ensure a legal environment that is facilitative and not burdensome or a hindrance to surge responses.

Patient harms stemming from fair treatment and allocation of limited resources are an expected reality in emergencies. These harms should not result in successful liability claims when practitioners meet crisis standards of care as long as gross negligence is not present.[55] If the threat of liability is too high, it may deter individuals or entities (especially private sector organizations) from participating in emergency response activities. Set it too low and public trust will be lost. Reduced liability for health care providers during emergencies should not be mistaken for "no liability." There is no sound public policy reason to suspend the criminal law for physicians even in dire emergencies.[25] Immunity from civil liability

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for harm to patients may be available through multiple legal sources, including: (1) Governmental sovereign immunity (if the worker or volunteer is a government employee or agent); (2) Federal and state volunteer protection acts; (3) Good Samaritan statutes; (4) State emergency health powers statutes; and (5) Mutual aid compacts.[16] The legal definition of "volunteer" must be clarified before an event. For example, if a responder is paid to participate on a disaster medical assistance team, does this represent a volunteer?

A review by Hoffman et al[57] found that United States immunity law constitutes a patchwork with many gaps and inconsistencies. No source of law comprehensively addresses liability and immunity issues. They suggested an enactment of a comprehensive immunity provision, one establishing that no health care providers will be liable for injuries or harm caused by good faith actions undertaken to respond to a public health emergency as long as the following conditions are met: they are acting in their capacity as public or private entities or their agents or employees in the affected area or are volunteering under the direction of governmental authorities or nonprofit organizations and they are not engaged in willful misconduct, gross negligence, or criminal activity.

10. Conclusion

Much work remains to be done to address crisis standard of care and establish modified care protocols for disasters, including the development of triggers to guide when to implement crisis care and to return to baseline operations. More public and private engagement is needed to raise awareness on barriers and challenges faced when planning. International, national, regional, and local leadership is important for authorization and commitment of planning resources to improve patient outcomes. Stakeholders in health care must act with compassion and respect for human dignity. To uphold distributive justice and nondiscrimination, emergency management plans should consider vulnerable populations, such as pediatric, geriatric, and mental health patients. For those who do not receive or require life-sustaining resources, the provision of reasonable palliative care when it is needed is equally important. Although a difficult concept that has legal and ethical implications, both the public and the academic community must be engaged in developing and defining an evidence-based, culturally acceptable crisis standard of care before a catastrophic event occurs.

References

1. Roccaforte JD, Cushman JG. Disaster preparedness, triage, and surge capacity for hospital definitive care areas: optimizing outcomes when demands exceed resources. *Anesthesiol Clin* 2007;**25**:161–77.
2. Menon DK, Taylor BL, Ridley SA. Modelling the impact of an influenza pandemic on critical care services in England. *Anaesthesia* 2005;**60**:952–4.
3. U.S. Department of Health and Human Services. HHS pandemic influenza plan—Part 1: strategic plan. Available at, http://www.hhs.gov/pandemicflu/plan/part1.html [Date accessed: January 16, 2011].
4. Kaji AH, Koenig KL, Lewis RJ. Current hospital disaster preparedness. *JAMA* 2007;**298**:2188–90.
5. Devereaux A, Christian MD, Dichter JR, Geiling JA, Rubinson L. Summary of Suggestions From the Task Force for Mass Critical Care Summit, January 26–27, 2007. *Chest* 2008;**133**:1S–7S.
6. Barbisch DF, Koenig KL. Understanding surge capacity: essential elements. *Acad Emerg Med* 2006;**13**:1098–102.
7. Koenig KL, Schultz CH, editors. *Koenig and Schultz's Disaster Medicine: Comprehensive Principles and Practices*. NY, USA: Cambridge University Press, American College of Emergency Physicians; 2010.
8. Shih FY, Koenig KL. Improving surge capacity for biothreats: experience from Taiwan. *Acad Emerg Med* 2006;**13**:1114–7.
9. Tadmor B, McManus J, Koenig KL. The art and science of surge: Experience from Israel and the US military. *Acad Emerg Med* 2006;**13**:1130–4.
10. Dobbs D. *The Law of Torts*. St. Paul: West Publishing Company; 2000.
11. Mastroianni AC. Liability, regulation and policy in surgical innovation: The cutting edge of research and therapy. *Health Matrix Clevel* 2006;**16**:351–442.
12. Camacho-McAdoo G. Triage following a natural disaster: a Haitian experience. *J Emerg Nurs* 2010;**36**:385–7.
13. McKenna M. The most good for the most people: emergency physicians lead push for creating "crisis standards of care" in tough political climate. *Ann Emerg Med* 2010;**56**:22A–4A.
14. Agency for Healthcare Research and Quality. Altered standards of care in mass casualty events. Department of Health and Human Services. April 2005. Available at, http://www.ahrq.gov/research/altstand/ [Date accessed: January 16, 2011].
15. Wise RA. The creation of emergency health care standards for catastrophic events. *Acad Emerg Med* 2006;**13**:1150–2.
16. Agency for Healthcare Research and Quality. Mass medical care with scarce resources—a community planning guide. February 2007. Available at, http://www.ahrq.gov/research/mce/ [Date accessed: January 16, 2011].
17. American Nurses Association. *Adapting Standards of Care Under Extreme Conditions—Guidance for Professionals During Disasters, Pandemics and Other Extreme Emergencies*. MD, USA: American Nurses Association; 2008.
18. Chang EF, Backer H, Bey TA, Koenig KL. Maximizing medical and health outcomes after a catastrophic disaster: defining a new "crisis standard of care". *West J Emerg Med*. Available at, http://escholarship.org/uc/item/9j62f2b5, 2008;**9** [Date accessed: January 28, 2011].
19. American Health Lawyers Association. Health Lawyers' Public Information Series-Community pan-flu preparedness: a checklist of key legal issues for healthcare providers. Available at, http://www.healthlawyers.org/Resources/PublicInterest/Public%20Information%20Series/Documents/Pan-Flu%20Checklist.pdf; 2008 [Date accessed: January 28, 2011].
20. Altevogt BM, Stroud C, Hanson SL, Hanfling D, Gostin LO. *Guidance for Establishing Crisis Standards of Care for Use in Disaster Situations: A Letter Report*. Available at. Washington, DC: Institute of Medicine, National Academy of Sciences, http://www.nap.edu/catalog.php?record_id=12749; 2010 [Date accessed: January 16, 2011].
21. Stroud C, Altevogt BM, Nadig L, Hougan M. *Rapporteurs. Crisis Standards of Care: Summary of a Workshop Series*. Available at. Washington, DC: Institute of Medicine, National Academic of Sciences, http://www.nap.edu/catalog.php?record_id=12787; 2010 [Date accessed: March 12, 2010].
22. Koenig KL, Cone DC, Burstein JL, Camargo CAJ. Surging to the right standard of care. *Acad Emerg Med* 2006;**13**:195–8.
23. The 'Lectric Law Library Lexicon. Standard of care. Available at, http://www.lectlaw.com/def2/s063.htm [Date accessed: January 16, 2011].
24. MedicineNet.com. Definition of standard of care. Available at, http://www.medterms.com/script/main/art.asp?articlekey=33263 [Date accessed: January 16, 2011].
25. Annas GJ. Standard of care—in sickness and in health and in emergencies. *N Engl J Med* 2010;**362**:2126–31.
26. Koenig KL. Point-Counterpoint: A "Crisis Standard of Care:" Doing the right thing when you must do something and you can't do everything" Expert Panelist, The Third National Emergency Management Summit, March 4, 2009, Washington, DC.
27. Schultz CH. "Altered Standards of Care: Is that really the issue?" Expert Panelist, The Third National Emergency Management Summit, March 2009. Available at, www.ehcca.com/presentations/emsummit3/schultz_3.pdf [Date accessed: January 28, 2011].
28. Kanter RK. Strategies to improve pediatric disaster surge response: potential mortality reduction and tradeoffs. *Crit Care Med* 2007;**35**:2837.
29. Fuhrman BP. Pandemic planning—preparing for the expected. *Pediatr Crit Care Med* 2010;**11**:299–300.
30. DeLia D, Wood E. The dwindling supply of empty beds: implications for hospital surge capacity. *Health Aff (Millwood)* 2008;**27**:1688–94.
31. Schull MJ. Hospital surge capacity: if you can't always get what you want, can you get what you need? *Ann Emerg Med* 2006;**48**:389.
32. Gostin LO, Hanfling D. National preparedness for a catastrophic emergency: crisis standards of care. *JAMA* 2009;**302**:2365–6.
33. Sztajnkrycer MD, Madsen BE, Alejandro Baez A. Unstable ethical plateaus and disaster triage. *Emerg Med Clin North Am* 2006;**24**:749–68.
34. Challen K, Bentley A, Bright J, Walter D. Clinical review: mass casualty triage—pandemic influenza and critical care. *Crit Care*:212. Available at, http://ccforum.com/content/pdf/cc5732.pdf, 2007;**11** [Date accessed: January 16, 2011].
35. Okie S. Pou and the hurricane–implications for patient care during disasters. *N Engl J Med* 2008;**358**:1–5.
36. Jenkins JL, McCarthy ML, Sauer LM, Green GB, Stuart S, Thomas TL, Hsu EB. Mass-casualty triage: time for an evidence-based approach. *Prehosp Disaster Med* 2008;**23**:3–8.
37. Navin DM, Sacco WJ, McCord TB. Does START triage work? The answer is clear! *Ann Emerg Med* 2010;**55**:579–80. author reply 580–581.
38. Kahn CA, Schultz CH, Miller KT, Anderson CL. Does START triage work? An outcomes assessment after a disaster. *Ann Emerg Med* 2009;**54**:424–30.
39. Bar-Dayan Y. Editorial comments: -PLUS prehospital mass-casualty triage: a strategy for addressing unusual injury mechanisms. *Prehosp Disaster Med* 2010;**25**:237–8.
40. Cone DC, Koenig KL. Mass casualty triage in the chemical, biological, radiological, or nuclear environment. *Eur J Emerg Med* 2005;**12**:287–302.
41. Ashkenazi I, Kessel B, Khashan T, Haspel J, Oren M, Olsha O, Alfici R. Precision of in-hospital triage in mass-casualty incidents after terror attacks. *Prehosp Disaster Med* 2006;**21**:20–3.

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42. Vincent JL, Moreno R, Takala J, Willatts S, De Mendonca A, Bruining H, Reinhart CK, et al. The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure. *Intensive Care Med* 1996;**22**:707–10.
43. Hick JL, O'Laughlin DT. Concept of operations for triage of mechanical ventilation in an epidemic. *Acad Emerg Med* 2006;**13**:223–9.
44. Powell T, Christ KC, Birkhead GS. Allocation of ventilators in a public health disaster. *Disaster Med Public Health Prep* 2008;**2**:20–6.
45. Christian MD, Joynt GM, Hick JL, Colvin J, Danis M, Sprung CL. Chapter 7. Critical care triage. Recommendations and standard operating procedures for intensive care unit and hospital preparations for an influenza epidemic or mass disaster. *Intensive Care Med* 2010;**36**(Suppl 1):S55–64.
46. Grissom CK, Brown SM, Kuttler KG, Boltax JP, Jones J, Jephson AR, Orme Jr JF. A Modified Sequential Organ Failure Assessment Score for Critical Care Triage. *Disaster Med Public Health Prep* 2010;**4**:277–84.
47. Rubinson L, Knebel A, Hick JL. MSOFA: An important step forward, but are we spending too much time on the SOFA? *Disaster Med Public Health Prep* 2010;**4**:270–2.
48. Hick JL, Barbera JA, Kelen GD. Refining surge capacity: conventional, contingency, and crisis capacity. *Disaster Med Public Health Prep* 2009;**3**:S59.
49. Hick JL, Koenig KL, Barbisch D, Bey TA. Surge capacity concepts for health care facilities: the CO-S-TR model for initial incident assessment. *Disaster Med Public Health Prep* 2008;**2**(Suppl 1):S51–7.
50. White DB, Katz MH, Luce JM, Lo B. Who should receive life support during a public health emergency? Using ethical principles to improve allocation decisions. *Ann Intern Med* 2009;**150**:132.
51. Ethics Subcommittee, Advisory Committee to the Director, Centers for Disease Control and Prevention. Ethical Considerations for Decision Making Regarding Allocation of Mechanical Ventilators during a Severe Influenza Pandemic or Other Public Health Emergency—approved as a working draft for public comment. Available at, http://www.cdc.gov/od/science/integrity/phethics/docs/ethical-considerations-allocation-mechanical-ventilators-in-emergency-201011.pdf [Date accessed: January 16, 2011].
52. Kinlaw K, Levine R. Ethical Guidelines in Pandemic Influenza. Recommendations of the Ethics Subcommittee of the Advisory Committee to the Director, Centers for Disease Control and Prevention (CDC). February 15, 2007. Available at, http://www.cdc.gov/od/science/integrity/phethics/panFlu_Ethic_Guidelines.pdf [Date accessed: January 16, 2011].
53. Upshur REG, Faith K, Gibson JL, Thompson AK, Tracy CS, Wilson K, Singer PA. Stand on guard for thee—ethical considerations in preparedness planning for pandemic influenza. November 2005. Available at, http://www.jointcentreforbioethics.ca/people/documents/upshur_stand_guard.pdf [Date accessed: January 16, 2011].
54. National Center for Ethics in Health Care. IntegratedEthics program. Available at, http://www.ethics.va.gov/integratedethics/index.asp [Date accessed: January 16, 2011].
55. Hodge JGJ, Courtney B. Assessing the legal standard of care in public health emergencies. *JAMA* 2010;**303**:361–2.
56. Garner BA, editor. *Black's Law Dictionary*. St Paul, MN: Thomson West; 2004.
57. Hoffman S, Goodman RA, Stier DD. Law, liability, and public health emergencies. *Disaster Med Public Health Prep* 2009;**3**:117–25.

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