SPECIAL REPORT

Triage Management, Survival, and the Law in the Age of Ebola

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ABSTRACT

Liberia, Sierra Leone, and Guinea lack the public health infrastructure, economic stability, and overall governance to stem the spread of Ebola. Even with robust outside assistance, the epidemiological data have not improved. Vital resource management is haphazard and left to the discretion of individual Ebola treatment units. Only recently has the International Health Regulations (IHR) and World Health Organization (WHO) declared Ebola a Public Health Emergency of International Concern, making this crisis their fifth ongoing level 3 emergency. In particular, the WHO has been severely compromised by post-2003 severe acute respiratory syndrome (SARS) staffing, budget cuts, a weakened IHR treaty, and no unambiguous legal mandate. Population-based triage management under a central authority is indicated to control the transmission and ensure fair and decisive resource allocation across all triage categories. The shared responsibilities critical to global health solutions must be realized and the rightful attention, sustained resources, and properly placed legal authority be assured within the WHO, the IHR, and the vulnerable nations. (*Disaster Med Public Health Preparedness*. 2015;9:38-43)

Key Words: triage, Ebola, disaster medicine, epidemiology, public health emergencies, health law

No matter what discipline they come from, health practitioners recognize triage as an entity that exists to provide the greatest good to the greatest number of victims. Triage is common to all disasters, regardless of size. *Simple triage*, what most practitioners identify with in their careers, is used at the scene of a mass casualty incident to choose patients who require immediate transport to a hospital opposed to patients who can wait for help. *Advanced triage* portends a more extensive and serious event and refers to decisions made where severely injured should not be rationed care because they are unlikely to survive and available care is rationed to those with some hope of survival. Familiar color-coded sorting categories—expectant (black), immediate (red), observation (yellow), wait (green), and dismiss (white)—are widely recognized. *Military triage* in conventional warfare ensures that casualties are routed under assigned priorities to highly resourced echelons of advanced care; a major goal of triage is to treat minor injuries rapidly and return them to duty ensuring a sustainable and viable fighting force. *Triage in complex humanitarian emergencies* primarily focuses on civilians both from trauma and illness in environments where access and availability of health care and basic public health resources are scarce or nonexistent. A constant state of triage exists with multisectoral public health resources (water, food, health care, sanitation, shelter, fuel, and security) as vital factors in every triage decision. In *large-scale communicable disease* events (endemics, epidemics, and pandemics), the goal of triage becomes successfully identifying and treating primary infections and preventing secondary infections.[1]

The PICE (Potential Injury/Illness Creating Event) disaster nomenclature provides a method for consistency in disaster classification. With the progression from a "local, static, and controlled" disaster to an "international, dynamic, and paralytic" catastrophe, disaster and triage management (TM) become one entity.[2] TM, as a process, occurs in a resource-limited, poor, or constrained environment where the demand for life-saving resources clearly exceeds supply. Individual TM decisions must "reach beyond" Ebola treatment centers (ETCs) to protect the surrounding community, the country, and the region. The decision operatives in the triage process are the likelihood of medical success and the conservation of scarce resources.[1]

The clinical, technical, and organizational triage processes involved in mass care infectious disease crises are complex and distinct from the triage process seen in other large-scale disaster events. Triage does not exist in isolation, but represents a complex process that balances clinical requirements with resource allocation and system management. The process, if done

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appropriately, will protect and conserve numerous assets by addressing the unique factors that affect triage decisions for that particular disease. Control and containment will not be realized without attention to triage decisions. In many ways, TM keeps the crisis recovery process honest by revealing unmet or unrecognized vulnerabilities and shortfalls.

An accurate triage process is one that is sensitive, specific, and inherently influenced by the epidemiology of the infectious agents.[3] Decisions of triage managers must show control of the transmission or reproductive rate (R_0) of Ebola or the ratio of primary to secondary infections. When reports indicate that "Ebola is winning," they are referring to these data. Simply, if the $R_0 > 1$ indicates a continuance of the epidemic, a $R_0 < 1$ indicates that the disease eventually will disappear and the epidemic will be controlled.[3] The R_0 averages have ranged between 1.51 and 2.53 for the 3 West African countries. While considerably higher R_0 values exist with more well-known infectious diseases such as measles and severe acute respiratory syndrome (SARS), the lethality of Ebola is much greater. Admittedly, while the R_0 is crucial in evaluating TM decisions, the available rates for those infectious and dead may be a quarter to half of what is accurate. All one can say with confidence is that those susceptible to Ebola have not fallen. Indeed, with reports from Liberia of only 17% of Ebola victims being treated in ETCs, modeling science suggests that "the epidemic will only begin to decrease and eventually end if approximately 70% of victims are in medical care facilities or ETCs."[4]

TRIAGE CHALLENGES IN WEST AFRICA

Andrew Price-Smith's 2002 *Health of Nations* reminds us that infectious disease spread and successful containment are directly dependent on public health capacity, capability, and the strength of a nation's governance, economy, and stability.[5] His research and conclusions focused on infectious diseases because, to overcome epidemics and pandemics, these crises demand full capacity and capability from every sector of government.[5] Nowhere are his theories more evident than the current severity of the Ebola virus in West Africa, as gauged by its ability to indiscriminately infect and transmit itself in a susceptible population and the inability of chronically deprived governance of nations to meet that challenge. In all 3 countries, the public health system, the economy, and governance are not capable of stemming the Ebola tide alone. An uncontrolled epidemic becomes the expected collective symptom of those failures, known to the global health community but unfortunately often not acted on or followed through in legislation and laws by world decision-makers.

Rural Ebola outbreaks in the past have been contained by early and robust public health containment and treatment skills from the World Health Organization (WHO), EpiCentre, the Centers for Disease Control and Prevention (CDC), and nongovernmental organizations (NGOs). The collection of interventional tasks, also referred to as "operational public health skill sets," date back to the early 1970s.[6,7] Indigenous and expatriate health care practitioners defined these tasks as surveillance and epidemiology, case investigation, contact tracing, case management, infection control disease containment strategies (isolation and quarantine, laboratory and treatment options), and burial interventions designed to identify and terminate the chain of human-to-human transmission of the virus, control the epidemic, and ultimately save the maximum number of lives. Today the same countries and communities suffer rapid and widespread urbanization, absence of public health infrastructure and protections, and poor health care systems that allowed the endemic in previously rural and sparse population areas to advance rapidly to dense urban conclaves and a country-wide epidemic.

TM played a critical role, especially in the early stages of prior outbreaks. A major challenge facing both health care providers and policy decision-makers lies in their capacity to make that operational shift from individual-based care to population-based care and to understand the consequences of these decisions and actions. What is different in the current Ebola epidemic is that TM has already been practiced but not consistently from one county, ETC, or hospital to another. While TM is an essential step in these public health skill sets, it must be made universal in order to fully optimize diminishing resources and outcomes.

LEGALITY

Currently, in the 3 West African countries, triage is being managed at the local facility level primarily as "suspected versus nonsuspected of exposed/infectious" patients. Within the WHO and their clinical partner assets (e.g., indigenous clinics and hospitals, NGOs), it is the medical staff themselves, both national and international, who are performing TM. The International Health Regulations (IHR) monitoring framework and checklist for national IHR capacities refer to triage only in passing.[8] As of this writing, WHO is updating the triage protocols for individual practitioners; however, currently there is no requirement for weekly or monthly resource reporting to a central authority. Arguably, there are no protocols for a system-wide population-based TM system nor are there clear mandates on how and by whom such a system would be implemented and under what authority. The non-legal peer review literature supports that it is an ethical and moral obligation that a triage plan exist and that the best "opportunity" for survival be provided to all victims.[9]

The importance of global health crises, including epidemics and pandemics, is reflected by the numerous treaties, mandates, regulations, guidelines, and local laws promulgating some degree of medical responsibility to those with the political means and resources. International investment in this goal was first articulated in the 1946 Constitution of the WHO, whose preamble states that "the enjoyment of the highest attainable standard of health is one of the fundamental rights of every

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human being without distinction of race, religion, political belief, economic or social condition."[10] Recognition of the importance of health as a right protected under international law followed shortly thereafter when the 1948 Universal Declaration of Human Rights was unanimously proclaimed by the UN General Assembly as a common standard for all humanity.[11,12] Many international, national, and regional efforts have followed that further solidify as well as expand these rights. As Alicia Yasmin states in a 2005 article describing the right of health care under international law, the rights afforded by these labors not only include the right to health care but also encapsulate a much broader concept of health. She goes on to point out that "[b]ecause rights must be realized inherently within the social sphere,….,determinants of health and ill health are not purely biological or 'natural' but are also factors of societal relations."[12]

No plan for support of global health operational decisions, whether suggested by treaty or by law can succeed without a level of enforcement overhead. Failure to meet the responsibilities relating to health have an impact on economic and social wellness but also run the risk of noncompliance under regional, national, and international law.[9,12] More than 70 national constitutions are thought to recognize the right to health with still more legislating aspects of the right to health.[12] In these situations, enforcement and implementation is often left to the states themselves.[9,12] When international treaty violations are thought to exist, enforcement has also been instituted by overseeing treaty organizations.[9,12] Still, violations exist. Important to acknowledge, however, is that many countries that may wish to comply simply will not have the political, social, or medical infrastructure to do so. These important limitations are perhaps best reflected in that the requirement for the "highest attainable standard" of health, as stated in the preamble of the WHO Constitution, incorporates a reasonableness standard, thereby acknowledging that there are factors beyond a state's control.[12] This compromised status, within the affected West African countries, was known and acknowledged before the current Ebola outbreak.

With that backdrop, the International Covenant on Economic, Social and Cultural Rights (ICESCR) was adopted by the United Nations General Assembly in 1966. Article 12 of the ICESCR recognizes "the right of everyone to the enjoyment of the highest attainable standard of physical and mental health."[9,13] Included in the language is "[t]he prevention, treatment and control of epidemic, endemic, occupational and other diseases."[13] This "prevention, treatment and control" in fact *translates operationally into a well thought out and designed triage plan and process that ensures resources be used appropriately and fairly*. The methodology by which the plan occurs is called the triage process.

Laws are also important to an effective emergency response at times of crisis. As Hodge points out in a 2010 law review article on global legal triage, state-specific laws allow for the public health infrastructure through which governments can adequately detect, declare, and address emergencies.[14] *Legal issues are not easily resolved at the height of a public health emergency*. Furthermore, Hodge reminds us that because one country's public health legal responses may not mimic another's, there remains the continued risk to global economic, social, and health well-being.[14]

Appreciating the potential pitfalls arising from a country-led legal approach to public health emergencies, international efforts have also been undertaken. WHO revised its IHRs in 2005 following lessons learned during the 2003 SARS epidemic.[15] The member states and countries under the IHR treaty are required to establish surveillance capacities and to share information relevant to public health risks.[15] However, as the IHRs are meant more as a guide than a legal mandate, difficulties with enforcement may arise.[14] Furthermore, national emergency and public health laws govern by default.[14] Compliance with the regulations is essentially voluntary, although member states risk losing WHO status and suffering public censure with violation.[14] As with so many other laws promulgating health, many nations may not possess the political or public health infrastructure to adhere to the IHR treaty.

POPULATION-BASED TRIAGE FOR INFECTIOUS DISEASES

A population-based approach in epidemics and pandemics requires a departure from the individual care role of clinicians with patients. It "does *not* minimize the importance of clinical tasks but rather adds the dimension of new public health and surge-capacity interventions that improve access and availability of limited health resources for the entire population."[16] Individual practitioners who only have experience with one-on-one patient-centered care may initially object or openly resist any population-based approach. Yet population-based approaches are both layered onto and intertwined within those individual patient decisions. Skill sets, especially those modified to the specific infectious agent, must be learned and practiced. A shared team approach in decision-making favors long-term success and outcomes but this may not be readily recognized by any one practitioner.

Population-based TM depends on recognition that everyone in the population falls into one of five TM categories (SEIRV):[16]

Susceptible category: susceptible but not exposed; make up the majority of the population.
Exposed category: those who are infected, incubating without signs or symptoms, and not contagious.
Infectious category: those experiencing signs or symptoms listed in the case definition and contagious; includes those who died but whose remains are contagious.
Removed category: those who are no longer a source of infection, including bodily remains that are no longer

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contagious and those geographically evacuated to another country with a different resource profile (e.g., United States, Spain, United Kingdom, France).

Vaccine-protected category: those recovered and protected either by experimental vaccination or serum antibody infusion or who have antibodies from previous epidemic recovery. They remain a crucial treatment option and must be followed as potential donors.

All categories have shared health care needs and all require some interventions. If not served, those in the susceptible category risk slippage into exposure and infection, risking preventive morbidity and mortality. The TM decisions for each category are resource and surge-capacity dependent and require unprecedented coordination and collaboration.[16] For example, the susceptible category requires robust health information and education resources that are culturally and religiously sensitive and supported by a multidisciplinary task force that includes religious and community leaders, heads of households, anthropologists, social workers, the mental health community, and security personnel to name but a few. For the exposed, there is an inherent impetus to over-triage into this category. This can be attributed to[1,16]

- The novel nature of the disease
- Absence of rapid diagnostic tests
- Lack of a vaccine
- Unusual or unclear viral shedding patterns
- Subclinical or atypical presentations
- Lack of effective treatment
- Inherent severity reflected in high case-fatality rate
- Uncertainty regarding modes of transmission and transmission potential

Much of this is true with the present Ebola epidemic. Actually, we still know very little about this virus and the disease. Suspicions about when and how patients become exposed and contagious are not necessarily clear. Mutation to aerosol spread has occurred within other primates that have had Ebola in the past, but despite more than 300 mutations so far, human-to-human passage has not been proven. The presence of US Navy laboratories will shorten the time for ETCs to learn the status of those in the exposed category, enhancing the capacity of starting treatments earlier to those infected and releasing those who are not.

For the infectious category in resource-poor areas, requirements include the uncomfortable but real determination of inclusion and exclusion criteria and minimal qualifications for survival for those who have a low probability of survival given the limited resources that are available.[3,15]

- **Inclusion criteria** are the expected standards of Ebola treatment that health practitioners are trained to meet with every patient.
- **Exclusion criteria** conversely refer to situations in which expected resources are limited or lacking and care must proceed without all standards of care and equipment being met. For example, many ETCs are currently lacking intravenous fluids, antiemetics, and antibiotics for secondary infections. The lack of proper personal protective equipment, however, is a criterion for ceasing direct patient care.
- **Minimal Qualifications for Survival (MQSs)** represent a ceiling on the amount of resource expenditures that will be allocated to any one case definition, ensuring that a maximum benefit of available resources is realized to ensure a population-based best opportunity for survival. One example is ceasing advanced and resource-dependent interventions (e.g., IVs, use of sparse antibiotics, experimental vaccines) for those who will clearly not survive. In MQS situations one usually limits care to pain medication and basic non-resource-dependent nursing and comfort care. Each MQS diagnosis is always fluid and subject to change on arrival of surge-capacity resources.

A triage team approach is favored. The knowledge base for triage decisions requires multidisciplinary team guidance. Successful TM is at any one time patient, community, and organizational resource centered. Most important is that resource constraints and how they impact clinical decisions must be immediately transmitted to a central authority to mitigate the threat it exposes. Too often we are being reminded that even slight breaches in protocol will lead to transmission... the very action that proper TM is supposed to prevent.

TRIAGE MANAGEMENT AUTHORITY

It is imperative that greater technical and organizational leadership is required for West Africa at the regional and country levels. On August 8, 2014, the WHO Director General accepted the recommendation of the IHR Emergency Committee Regarding the 2014 Ebola Outbreak in West Africa in declaring the Ebola outbreak a Public Health Emergency of International Concern (PHEIC).[17] This is one of 5 level 3 emergencies faced by the WHO today. Additionally, Temporary Recommendations under IHR were issued to reduce the international spread of Ebola.[17] These include that the WHO "must coordinate daily activities of international teams (e.g., MSF, ICRC, GOARN, US-CDC, UNICEF), serve as a focal point for national and international teams" and report directly to the Ministries of Health.[18]

Neither the WHO nor the IHR address who would have the authority and responsibility to declare the need for a country-wide or regional TM system when a government(s) or governance is incapable of providing those skills themselves. In reality, this TM state has existed almost from the outset of the epidemic in West Africa and has steadily worsened in part because of the lack of centralized control of resources and decision-making. While objectionable claims from a host country based on sovereignty is possible, it is unlikely in a steadily worsening environment where governance capacity and capability are failing. TM decisions require skills beyond

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any one nation state's capabilities. As they did during the SARS pandemic, the WHO and the IHR must assume this vital leadership role garnering renewed support from the global community (e.g., quasi-quarantine of Ontario). The central authority would enforce compliance and ensure continual data collection, analysis, and measures of effectiveness and utilize this information as the basis of daily reports and decision-making that impact practice, policy, and country-wide resource allocation among the SEIRV categories.

The SEIRV-TM methodology requires an authority that has "absolute command and control over critical care resources to ensure accountability and transparency," similar to Emergency Operation Centers in the developed world. It must be determined whether each SEIRV category and limited resources are available and accessible to all.[16] While this status is expected in a resource strong setting, the very definition of a resource poor or constrained environment means these resources are not present and TM must begin from the outset of the outbreak. Whether some indigenous surveillance and data collection is available or comes from outside assistance (e.g., NGOs, WHO), the very substance and boundaries of the triage categories must become clear and better defined for the caretakers. Currently, ETCs practice unsupervised TM because inclusion and exclusion criteria are overwhelmed. Health workers' risk for transmission increases when they have never seen Ebola before or when they have seen so much of it that they are overwhelmed. This must include top-down assurance that appropriate inclusion and exclusion criteria and MQS are consistently practiced until resource acquisition cancels out those mandates country wide.

Numerous dilemma situations may confront the national and global leadership. For example, the WHO and IHR must accept governance as an essential public health infrastructure and must not allow governments to fail. All sectors of governance are crucial to success including border and internal security. United Nations may best fill those sector gaps temporarily or even assume temporary receivership. It is a major responsibility to prevent the export of Ebola from West Africa. It sets up an additional set of unknown complexities when the virus enters any new habitat, even in countries who boast of robust capacity. Other options may be necessary; as harsh as it might first appear, the central authority may decide to not permit travel outside the country until potential travelers complete an observed 21-day quarantine. If experimental vaccines become available, which may occur in a matter of months, who receives the limited resources? Health care providers have been placed high on that list, but some claim that government leaders and the military be vaccinated first, fearing a coup from within or outside their borders. Whatever the nature of the problems and the solutions, WHO/IHR leadership must have clear authority under international law to debate and decide those population-based decisions and to call on any additional global resources they require.

CONCLUSIONS

The current epidemic in West Africa has revealed multiple unmet challenges provoking apocalyptic fears in those affected countries, among the world community, and within developed countries where it has spread. Optimistic forecasts suggest that it will take an unprecedented additional 12 to 24 months to contain this crisis. Whatever the outcome, the world will not be the same. All disasters define public health vulnerabilities and expose difficult decisions like TM that demand unprecedented leadership; Ebola rapidly and ashamedly revealed grave unmet commitments that arose from the 2003 SARS pandemic. We argue here that a better understanding of the complex issues and shared responsibilities that define global health crises must be realized and the rightful attention, resources, and properly placed legal authority be assured within the WHO, the IHR, and vulnerable nations to prevent, prepare, and respond to this crisis and to those in the future.

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