

## VIEWPOINT

# The Ebola Epidemic

## A Global Health Emergency

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**On August 8**, the World Health Organization (WHO) Director-General Margaret Chan declared the West Africa Ebola crisis a “public health emergency of international concern,”<sup>1</sup> triggering powers under the 2005 International Health Regulations (IHR). The IHR requires countries to develop national preparedness capacities, including the duty to report internationally significant events, conduct surveillance, and exercise public health powers, while balancing human rights and international trade. Until last year, the director-general had declared only one such emergency—influenza AH1N1 (in 2009). Earlier this year, she declared poliomyelitis a public health emergency of international concern and now again for Ebola, signaling perhaps a new era of potential WHO leadership in global health security.

### The West African Ebola Epidemic

Ebola virus disease (EVD) has 3 species of human significance: Zaire, Sudan, and Bundibugyo. The West Africa outbreak is from a new strain of the Zaire species,<sup>2</sup> with a reported case-fatality rate of 55%. Infection can cause fever, vomiting, diarrhea, and generalized bleeding as well as death.

Fruit bats likely carry Ebola virus, with humans infected by close contact with infected body fluids and “bushmeat” of primates, forest antelope, wild pigs, and bats. Human-to-human transmission occurs only by close contact with infected body fluids. Importantly, no airborne transmission between humans has been demonstrated. Early EVD symptoms are similar to those of malaria and typhoid fever—as well as endemic hemorrhagic fevers such as Lassa—rendering symptomatic differential diagnosis difficult.

Before the current outbreak began in December 2013, West Africa had no recorded Ebola deaths. Yet this outbreak is the largest, with the crisis worsening. As of August 8, WHO reported 1779 Ebola cases, with 961 deaths.<sup>3</sup> Cases were first reported in Guinea on March 23, followed by Liberia, Sierra Leone, and Nigeria (due to an infected airline passenger from Liberia). Of greatest concern is the potential urban spread, including capital cities. Previously Ebola was concentrated in rural areas, where the public health response was sufficiently rapid to prevent spread to populated cities.

### Vaccines and Treatment: Ethical Dilemmas

Since 1976 more than 15 Ebola outbreaks have erupted in sub-Saharan Africa, yet therapeutic options remain undeveloped. There are no licensed vaccines or specific antiviral or immune-mediated treatments for ill patients or for postexposure prophylaxis. The US National Institutes of Health is supporting the first phase 1 clinical trial of a new prototype experimental vaccine expected to begin in September 2014.

Fueling disquiet about global justice, 2 US aid workers infected in Liberia were treated with an experimental anti-Ebola antibody prior to being transported to Atlanta.<sup>4</sup> This serum had been previously used only in nonhuman primates.<sup>5</sup> Even though the serum's safety and efficacy remain unknown, it sparked an international controversy. Should US workers receive a drug in extremely scarce supply when Africans are affected in far greater numbers? Balanced against this sense of injustice is the ethical concern of administering an experimental drug to African patients that has not undergone any safety testing in humans.

On August 11, WHO convened an expert committee to assess the bioethical implications of withholding or providing early access to experimental treatments.<sup>6</sup> If a scarce treatment offers benefits to patients, the ethical question is who should have priority access? Society, for example, owes a duty to health workers who place themselves at heightened risk. Other ethical considerations could grant priority to patients most likely to benefit, as well as targeting the drug to prevent spread in hospitals or the community. Moreover, who should decide whether an experimental treatment should be administered? Liberian officials apparently did not approve the use of an investigational drug administered in their territory.<sup>7</sup> National leaders also would need to be part of future decision making processes for allocating scarce vaccines and medications.

### Public Health Countermeasures

Sierra Leone's president captured the state of crisis: “The very essence of our nation is at stake.”<sup>8</sup> Without effective vaccines or treatments, West African governments have declared public health emergencies, invoking extraordinary powers—a divisive trade-off between population health and human rights. The following classic public health measures are standard responses to EVD but are supported by variable levels of evidence.

**Isolation and Quarantine.** Affected states have invoked multiple forms of quarantine, ranging from stay-at-home days for “reflection, education, and prayers” to guarded home confinement. The military has been deployed for house-to-house searches, traveler checkpoints, and *cordon sanitaire* (a guarded line preventing anyone from leaving)—sometimes separating people and regions of the country. Yet states have exhibited lax enforcement, with the inability to police an evolving crisis. Given EVD's incubation period, quarantine must last up to 21 days—a task requiring intensive monitoring, enforcement, and delivery of essential services such as food and health care.

**Social Distancing.** Governments have invoked social distancing, such as school closures and bans on public gatherings, including sporting, shopping, and entertainment. In some areas, fear has produced an eerie quiet

in usually bustling neighborhoods, while in other areas social life has continued unabated.

**Risk Communication and Burial.** Public education has been incomplete, with governments occasionally impeding news coverage and accurate risk communication.<sup>9</sup> Ministries of health have ordered mandatory reporting and required cremation of bodies. Yet traditional burial services often continue, with loved ones in close contact with the deceased, posing transmission risks.

**Travel Restrictions.** Porous borders place West Africa in jeopardy, but airline travel could propel Ebola's international spread, as occurred in Nigeria. Nigeria is screening all arriving air passengers, while several air carriers temporarily suspended flights to the region. The US Centers for Disease Control and Prevention (CDC) issued a level 3 travel warning to the region, reserved for the most serious threats.

**Health Care Settings.** Without trained staff, isolation units, personal protective equipment, and strict infection control, hospitals have become "amplification points" for spread of EVD, placing health workers at significant risk; approximately 140 African health care workers have been infected, with 80 deaths.<sup>10</sup> The high risk incurred by workers, often with inadequate salaries, has compounded a severe human resource shortage. There are numerous ethical dilemmas, such as whether health professionals have a duty to report to work without adequate personal protective equipment. The United States is considering medical evacuation of infected aid workers, while the CDC will send additional workers to the region. Beyond health workers, patients fearing EVD have shunned hospitals, remaining in the community without adequate treatment. Affected states rank lowest in global development, with fragile health systems and lacking the capacity and expertise to contain the epidemic and treat those infected.

## Global Governance

The West African Ebola crisis is unique given the virulence, intensive community and health facility transmission patterns, and weak health systems. The WHO director-general's declaration of a public health emergency of international concern underscores the urgency of a coordinated international response and the imperative of raising the capacity of low-income states. The WHO declaration

triggered temporary recommendations directed to affected states, bordering states, and the international community.

**Affected States.** The WHO director-general asked states with active Ebola transmission to declare a national emergency, activate disaster management plans, and establish emergency operation centers. Emergency funding should build core capacities including infection prevention and control. The director-general urged mobilization of health workers, with full remuneration, personal protective equipment, and worker safety assurances. Traditional leaders and healers should be fully engaged in risk communication.

All confirmed cases should be isolated and treated, while exposed individuals should be monitored daily, with restricted travel within the 21-day incubation period. However, to protect freedom of movement, the director-general did not recommend travel bans but advised exit screening at international airports, seaports, and land-crossings. Individuals with EVD-like illness should not be allowed to travel except for medical evacuation.

**Land-Border States.** Land-border states should conduct rigorous surveillance to quickly identify clusters of unexplained fevers or deaths, with qualified laboratories, rapid-response teams for contact investigations, and case management.

**The International Community.** The director-general cautioned against international travel or trade restrictions, except for EVD cases and contacts. All states should implement risk communication and laboratory diagnostics and prepare for medical evacuations. International capacity building for low-income states was conspicuously absent in the recommendations, even though it is arguably the most effective and humane way to contain the outbreak.

Years of civil unrest and weak development have left West Africa with fragile health systems as it faces a crisis. Although the director-general urged international solidarity, global governance once again was weakened from a lack of capacity in developing countries. A sustainable solution to EVD, and other emerging threats, requires binding commitments for funding and technical assistance to build national preparedness capabilities, including surveillance, laboratories, health systems, and rapid response.

## ARTICLE INFORMATION

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