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# Ebola—Not the Next Pandemic?

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**T**he increasing alarm surrounding the most recent outbreak of the Ebola virus disease (EVD) is a chilling reminder of the potential for the spread of viruses to rapidly reach epidemic proportions. The virus causes hemorrhagic fever marked by severe bleeding, organ failure and, often, death. The first recorded outbreak was in 1976 and since then EVD has recurred sporadically in Central and Western Africa claiming over 3,000 lives.

The scale and spread of the current emergencies in Guinea, Sierra Leone and Liberia are of concern as the disease has claimed more lives than any previous outbreak. Cases have also now been confirmed in Nigeria and Senegal. The Centres for Disease Control and Prevention confirmed over 17,000 cases by December 2014. The World Health Organization believes its own numbers may be under reported five-fold. The current mortality rate is approaching 50 percent with an unprecedented number of health workers counted amongst the dead.

EVD is typically transmitted within small communities and health-care settings, but it has now appeared in cities as well as rural and border areas. It is also striking that this outbreak occurred almost simultaneously in three previously unaffected countries. Fears modern logistics could facilitate spread to other countries within Africa, or even internationally, have been confirmed.

WHO has therefore escalated its response in a bid to halt ongoing transmissions within six to nine months but conceded in August its Ebola Response Roadmap that accomplishing this goal will be tough as affected countries struggle to control the outbreak “against a backdrop of severely compromised health systems, significant deficits in capacity and rampant fear.”

Now, and for the first time, a person has developed symptoms whilst on U.S. soil, following a visit to Liberia. Although serious, an isolated case can be contained; such is the strength of U.S. health care. In contrast EVD cases will continue to rise in West Africa if there are “no additional interventions or changes in community behavior” according to Centers for Disease Control models. The lack of

sufficient isolation beds is the root cause for the sustained and rapid growth in new infections.

## Diagnosis and Treatment

Outbreaks of EVD occur primarily in remote areas following close contact with the wild animals that host the virus. It spreads easily between humans through direct contact with broken skin and damaged mucous membranes, during sex, infected blood and bodily fluids including sweat, or indirectly through contact with virus contaminated environments. People remain infectious as long as their blood and secretions contain the virus, typically up to seven weeks, and this risk persists even after death. Family members are often infected as they care for sick relatives or prepare the dead for burial.

A person infected with EVD complains of sudden-onset fever, intense weakness with muscle pain, headache and a sore throat. These rather non-specific symptoms suggest a mild illness and raise the possibility of many diseases, including hepatitis, typhoid fever and malaria—all of which must be ruled out before a diagnosis of EVD can be made. During this time symptoms worsen to include vomiting, diarrhea, rash, impaired kidney and liver function, and in some cases, both internal and external bleeding.

The incubation period—the time interval from infection to onset of symptoms—is two to 21 days, so some people seek help sooner than others. An EVD diagnosis is confirmed in a laboratory setting by isolating the virus in cell culture, antigen detection or enzyme-linked immunosorbent assay (ELISA). Other findings include low white blood cell and platelet counts and elevated liver enzymes.

People severely ill with EVD require intensive care in total isolation. Supportive treatment includes intravenous fluid to prevent dehydration, and maintenance of blood oxygen and blood pressure levels, as most sufferers die of low blood pressure and not bleeding. Transfusions may be needed to replace blood lost through hemorrhage and subsequent infections need to be treated. In a rural setting where the health infrastructure is weak or mistrusted, and where cultural beliefs strongly influence how people interpret symptoms and seek treatment, diagnosis and intervention are likely to be delayed.

No specific drug medication is available although new drug therapies are being evaluated. The WHO has even agreed that it is ethical, in these extreme circumstances, to treat people with experimental interventions. One is ZMapp, a serum composed of three humanized monoclonal antibodies not yet evaluated for safety in humans but already administered to a couple of patients. Another is TKM-Ebola, which has recently received FDA approval for emergency use.

## Identifying Those at Risk

Travel to Africa increases the risk of exposure to the virus. The Centers for Disease Control warns to avoid all nonessential travel to infected areas and advises those who must travel there to protect themselves by avoiding contact with the blood and body fluids of people who are sick with Ebola. The WHO has stopped short of recommending travel restrictions or border closures but admits this position is fluid.

The ease with which people travel worldwide implies infection could spread rapidly and without control, but there is no evidence of this yet. Modeling of disease and air travel patterns revealed the probability of spread beyond the African region is “small but not negligible.”<sup>21</sup> The International Air Transport Association advises that in the rare event a person infected with the virus is unknowingly transported the risk to other passengers is low. It seems highly unlikely that a person with the advanced signs of EVD—the stage when onward transmission is most likely—would be physically well enough to undertake air travel.

Health and humanitarian workers who disclose plans to travel to or from the region of concern pose an increased risk. No vaccine is currently available. Medical personnel may be infected if they fail to take appropriate precautions to avoid infection by wearing protective clothing, masks and gloves when tending to the patients. In this new outbreak, several health workers have been infected whilst treating patients with suspected or confirmed EVD and not strictly practicing infection control techniques.

Anyone who requires treatment in poorly equipped medical centers in the affected area may be exposed to re-used needles and syringes or contaminated

equipment that has been improperly sterilized. People involved in animal research or observation have an increased chance of contact. Anyone who has been butchering or eating infected animals or who comes into contact with their waste, increases their chance of infection.

EVD makes people very sick very quickly, so it seems unlikely any person who has it would slip through the underwriting net. An applicant with unexplained or unusual illness and who has visited an affected area within the preceding month should be viewed with increased suspicion.

People who survive EVD make a slow recovery, taking many months to regain their weight and strength as the virus remains in the body for weeks. Typically they suffer hair loss, sensory changes, eye and testicular inflammation, hepatitis and general malaise. Survivors often develop chronic inflammatory conditions affecting the eyes (uveitis) and joints.

## Epidemic or Pandemic?

It seems unlikely that EVD poses a threat beyond its immediate geographical location or the indigenous population and visitors working closely with them. Isolation centers, arrivals screening and modern treatment facilities would use quarantine to limit international spread and ensure that the rapid incubation of EVD experienced during the current outbreak is not replicated in other countries. A focus on basic public health and infection-control measures, not tiny supplies of costly experimental drugs, seems more likely to lead to control.

The WHO was praised for its work in containing the 2003 Severe Acute Respiratory Syndrome (SARS) epidemic in Asia albeit in wealthy nations with strong governments. Cuts in funding and altered priorities since then may have left the organization ill-equipped to respond to this new threat in nations less capable of mounting a defense. It is therefore entirely possible that the desperate situation in West Africa will continue to deteriorate.

The EVD outbreak has impacted the recovering yet still fragile economies of Liberia, Sierra Leone and Guinea. The costs associated with these outbreaks and disruption to commerce are unprecedented and likely to affect GDP—a reminder of the potential for

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epidemic disease to reach beyond the tragedy of individual loss.

In June 2009, as the number of people with H1N1 (swine) influenza reached 42,000 in 80 countries, the WHO elevated its pandemic alert to “level 6”—the highest emergency state. In the end that strain of flu proved far less deadly than was feared. Should life insurers and underwriters now be at “level 6” in response to Ebola? Despite the unprecedented dimension of this fast-moving outbreak, the evidence about its transmission and spread suggests not. Deadly though it undoubtedly is, EVD is not airborne and so there is no credible risk of a swine flu-like epidemic.

Follow the updates here;

<http://www.who.int/csr/don/archive/disease/ebola/en/>

<http://wwwnc.cdc.gov/travel/notices/warning/ebola-liberia>

<http://wwwnc.cdc.gov/travel/notices/warning/ebola-guinea>

<http://wwwnc.cdc.gov/travel/notices/warning/ebola-sierra-leone> ■

#### ENDNOTES

- <sup>1</sup> Gomes MFC et al., “Assessing the International Spreading Risk Associated with the 2014 West African Ebola Outbreak,” PLOS Currents Outbreaks doi:10.1371/currents.outbreaks.sd818f63d40e-24aef769dda7df9e0da5