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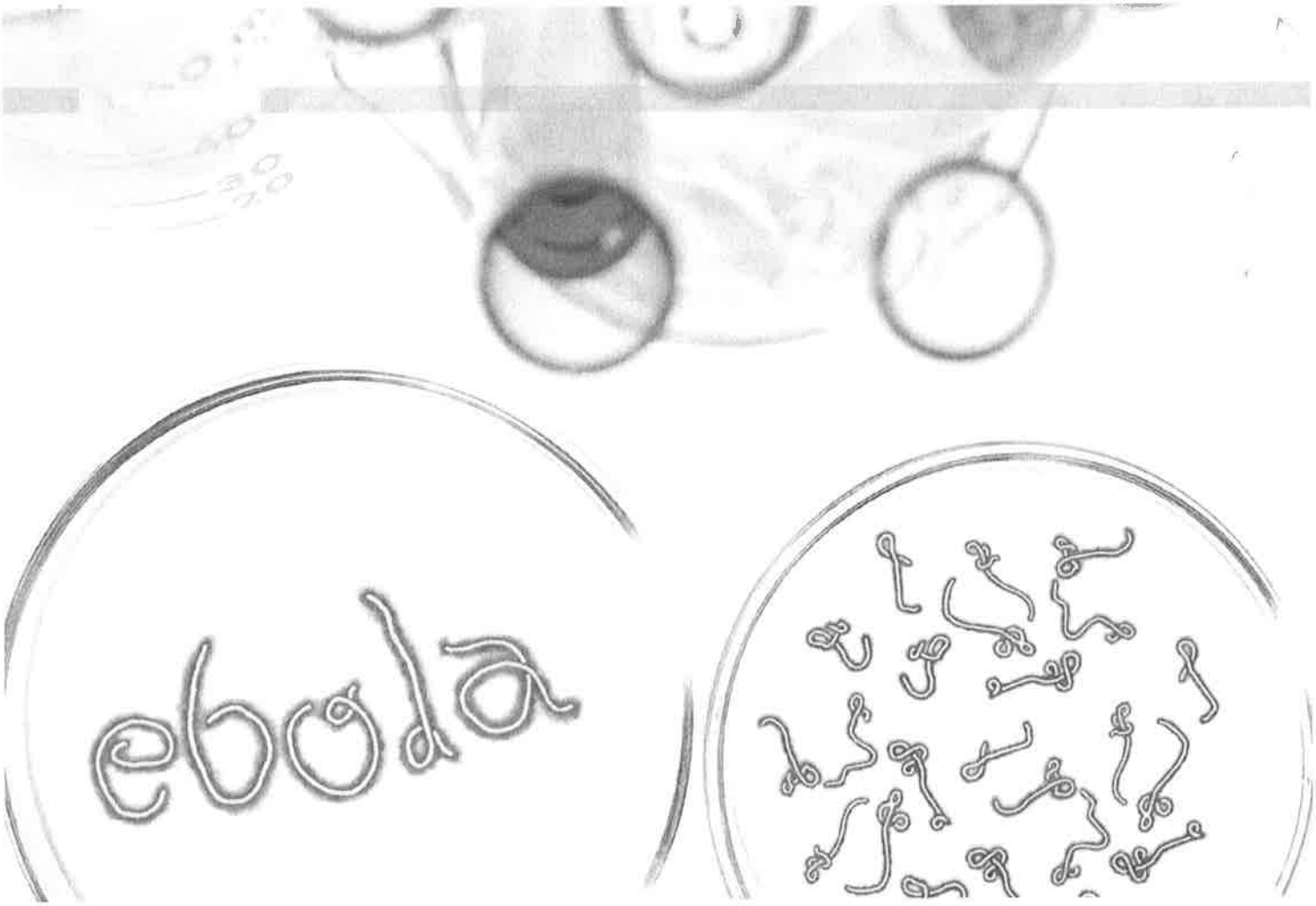

Emerging Infectious Diseases: Global to Local Implications

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Infectious disease remains among the leading causes of death worldwide. With easy mobility and air travel, pathogens can move quickly and silently to any place around the globe in a matter of days. The recent Ebola crises in West Africa clearly demonstrated the increased risk of emerging infections in our highly connected world. Legal nurse consultants are well-positioned to provide guidance on deciphering public health laws relevant to responding to infectious disease threats.

As the human immunodeficiency virus (HIV) disease pandemic surely should have taught us, in the context of infectious diseases, there is nowhere in the world from which we are remote and no one from whom we are disconnected. Consequently, some infectious diseases that now affect people in other parts of the world represent potential threats to the United States because of global interdependence, modern transportation, trade, and changing social and cultural patterns (Lederberg, Shope, & Oaks, 1992, p.v).

So begins the 1992 Institute of Medicine landmark report, *Emerging Infections: Microbial Threats to Health in the United States*. Today, more than two decades later, despite significant advances in better hygiene, diagnostics, antimicrobials, and vaccines, "the ease of world travel and increased global interdependence have added layers of complexity to containing these infectious diseases that affect not only the health but the economic stability of societies (Morens & Fauci, 2013 p. e1003467)." To find examples of the effect of emerging infectious diseases one need look no further than the recent World Health Organization's (WHO) declarations of "Public Health Emergency of International Concern," one in August 2014 in response to the Ebola crises in West Africa, and another in February 2016 in response to the mosquito-borne Zika virus outbreak in the Americas. Zika virus was introduced into Brazil from the Pacific Islands in early 2015 and has spread rapidly, with most countries in Latin America and the Caribbean reporting local transmission of the virus (Petersen, Jamieson, Powers, & Honein, 2016). Of grave concern is the growing association between prenatal Zika virus infection and adverse pregnancy and birth outcomes, especially fetal microcephaly (Petersen, Jamieson, Powers, & Honein, 2016). Notably, Zika is the first major infectious disease linked to human birth defects to be discovered in more than half a century (Petersen, Jamieson, Powers, & Honein, 2016).

WHAT IS AN EMERGING INFECTIOUS DISEASE?

An emerging infectious disease (EID) is an infectious disease that is newly recognized as occurring in humans (e.g., HIV/AIDS); one that historically has infected humans but is newly appearing in a different population or geographic area than previously affected (e.g., West Nile virus in the US); one that is newly affecting many more individuals; and/or one that has developed new attributes (e.g., drug resistant tuberculosis) (Fauci & Morens, 2012; Morens & Fauci, 2013). The majority of emerging infections in humans are caused by microbes that are established in animals and have crossed the species barrier, highlighting the central role that non-human reservoirs play in human infectious diseases (Fauci & Morens, 2012; van Doorn, 2014).

Such animal to human transmission is termed a zoonotic infection or zoonosis. In humans, for an infectious disease to emerge, something has to change in the relationships among humans, animals, and potential microbial pathogens, and these changes constitute the principal contributing factors to risk emergence (Fineberg & Wilson, 2010). Factors driving this change include: microbial adaptation and change, human susceptibility to infection, climate and weather, environmental change and land use, international travel, migration and commerce, changes in technology and industry, changes in demographics and behavior such as human intrusion into the natural habitats of animals, war and conflict, poverty, and breakdown in public health infrastructure (Lederberg, Shope, & Oaks, 1992; van Doorn, 2014).

In addition to Ebola virus and Zika virus there have been other EIDs that have taken the global community by surprise in the 21st century including, Severe Acute Respiratory Syndrome (SARS) in 2002, the H1N1 influenza pandemic (originally referred to as "swine flu") in 2009 and the Middle East respiratory syndrome coronavirus (MERS-CoV) first reported in Saudi Arabia in 2012 (Sands, Mundaca-Shah, & Dzau, 2016). Each of these has caused "global, societal and economic impact related to unexpected illnesses and deaths, as well as interference with travel, business, and many normal life activities" (Morens & Fauci, 2013 p. e1003467).

Simultaneously, each of these also brought forward a host of legal and ethical issues related to protecting population health and respecting individual rights of privacy, liberty, and freedom of movement (Price, 2015).

Other EIDs are "less catastrophic than these examples; however, they nonetheless may take a significant human toll as well as cause public fear, economic loss, and other adverse outcomes (Morens & Fauci, 2013 p. e1003467)." EIDs can arise anywhere and at any time, Ebola virus disease providing an excellent example of a critical global health issue with significant local implications.

EBOLA VIRUS DISEASE

Ebola virus disease (EVD) is a severe, often fatal disease in humans. It was first recognized in 1976 during 2 unrelated outbreaks in remote villages, near the tropical rainforests, one in southern Sudan, and the other in the Democratic Republic of Congo (WHO, 2016a). The latter occurred in a village near the Ebola River, from which the disease takes its name. Since that time there have been approximately 20 recognized outbreaks of EVD, all occurring in Africa among poor rural residents and the workers caring for them, with fatality rates up to 90% (Myers, Frawley, Goss & Kang, 2015). The Ebola outbreak that began in Guinea in March 2014 was the first to be seen in West Africa, and the first to affect major urban centers. The disease quickly spread across country borders, first to Liberia and then to Sierra Leone, ultimately causing significant loss of life, substantial economic loss and social disruption.

The outbreak became an unprecedented public health crisis with global impact, primarily because the three countries lacked the public health infrastructure, economic stability, and overall gover-

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nance to stem the spread. Public health surveillance was lacking resulting in significant lag time in identifying the outbreak in the community and raising alerts. Local health systems were overwhelmed by large numbers of severely ill patients, medical and non-medical supplies were limited, the numbers of medical personnel and caregivers were insufficient, and there was little regional experience and education about the disease. Additionally, the efforts of the many global governmental, inter-governmental and non-governmental organizations were not well coordinated. Ultimately, the global and local response focused on surveillance, isolation and quarantine, contact tracing, and travel advisories or restrictions. These responses, along with the "courage and commitment of medical staff and communities on the ground and a massive deployment of international resources" succeeding in containing the outbreak (Sands, Mundaca-Shah, & Dzau, 2016, p. 1281). In March 2016 the WHO announced an end of Ebola transmission in Guinea, Liberia, and Sierra Leone, noting that risk for development of sporadic cases remained. As of May 13, 2016 the epidemic in West Africa has resulted in 28,616 reported cases and 11,310 deaths, including numerous healthcare workers (WHO, 2016b).

Seven countries (Italy, Mali, Nigeria, Senegal, Spain, the United Kingdom, and the United States of America) reported a case or cases imported from a country with widespread and intense transmission (WHO, 2016b). In the US four cases of EVD have occurred (CDC, 2016a). The first case was travel-associated, diagnosed on September 30, 2014 in Thomas Eric Duncan who had traveled to Dallas, TX from Liberia. He was initially seen in an Emergency Department (ED) and discharged. Two days later he returned to the same ED and within 48 hours was tested positive for the Ebola virus. On October 8 he died from complications of the disease. Two nurses providing care for the Mr. Duncan subsequently tested positive for Ebola, each hospitalized at a US hospital with a biocontainment unit. Both recovered. The fourth case was diagnosed in New York City in a physician who had returned from Guinea having served with Doctors Without Borders. He also was hospitalized and recovered (CDC, 2016a).

Ebola is transmitted to humans through contact with the blood, secretions, organs, or other body fluids of infected animals in the rainforest (e.g., chimpanzees, gorillas, monkeys). It spreads among people predominately by contact of blood and body fluids with mucosal surfaces or broken skin (CDC, 2016b). The incubation period is 2 to 21 days, although symptoms usually develop 8 to 10 days after infection. Ebola infection is characterized by flu-like symptoms including, fever, severe headache, muscle pain, weakness, fatigue, diarrhea, vomiting, abdominal pain and unexplained bleeding or bruising. During severe illness, blood, sweat, feces, and vomit are highly infectious. People infected with Ebola are contagious only when they are ill and do not transmit the infection during the incubation period. Health care workers and other care providers who come in close contact with infected patients without proper personal protective equipment are at the highest risk for secondary infection. When available, patients with EVD in West Africa received supportive care with oral rehydration solutions, antiemetic agents, analgesics, and antibiotics (Uyeki et al., 2016). Patients with EVD in the US received state-of-the-art clinical care in bio-containment units. Currently there are fifty-five hospitals in the US designated as Ebola treatment centers (CDC, 2016c).

IMPLICATION FOR LEGAL NURSE CONSULTANTS

Legal nurse consultants are well-positioned to provide guidance in deciphering public health law and reviewing EID cases as related to travel history standard of care. Here are some ways to do so.

1. **Advance your EID knowledge.** Increase your EID awareness and knowledge by learning more about the problem. Read articles, subscribe to CDC-EID related scientific journals such as Emerging Infectious Diseases, and participate in educational opportunities (e.g., seminars, webinars). Contact the American Association of Legal Nurse Consultants (AALNC) and other nursing associations and encourage them to offer periodic updates on specific emerging infectious diseases and the associated local, state, national, and global legal challenges (Courtney, Sherman, & Penn, 2013). Learn with your colleagues by starting a journal club and make EIDs a frequent topic.

2. **Advance your knowledge of global and U.S. public health law.** Laws can greatly facilitate responses to public health emergencies, including communicable diseases. Health law includes a "broad array of statutes, regulations, and governmental agencies not traditionally grouped together (Price, 2015, p. 49)." Legal authority for global severe infectious disease threats (such as the Ebola virus outbreak) begins with international law, World Health Organization (WHO) governance, and the International Health Regulations (Price, 2015). The International Health Regulations, adopted in 2007 are "designed to help the international community to prevent and respond to acute public health risks that have the potential to cross borders and threaten people worldwide (Price, 2015, p. 52)." Visit the WHO website (www.who.org) for specific information about the Regulations.

   Countries, including the U.S., used two of the oldest public health tools in response to the Ebola crises, the SARS outbreak, and the H1N1 pandemic: isolation and quarantine. Legal authority to restrict the autonomy or liberty of persons who pose a public health threat can be found at the federal, state, and local levels (Fidler, Gostin, & Markel, 2007). The federal government derives its authority for isolation and quarantine from the Commerce Clause of the U.S. Constitution (CDC, 2016d). Under section 361 of the Public Health Service Act (42 U.S. Code § 264), the Secretary of the Department of Health and Human Services, as the lead for federal public health and medical responses to public health emergencies, is authorized to take measures to prevent the entry and spread of communicable diseases from foreign countries into the U.S. and between states (CDC, 2016d). The authority for carrying out these functions has been delegated to the Centers for Disease Control and Prevention (CDC, 2016d). Under 42 Code of Federal Regulations parts 70 and 71, CDC is authorized to detain, medically examine, and release persons arriving into the U.S. and traveling between states who are suspected of carrying these communicable diseases (CDC, 2016d). Visit the CDC website (www.CDC.org) for further details.

   States have police power functions to protect the health, safety, and welfare of persons within their borders. To control the spread of disease within their borders, states have laws to enforce the use of isolation and quarantine (CDC, 2016d). Visit specific state websites for specific laws and details.

   Until recently, judicial activity in U.S. public health has primarily been driven by the exercise of quarantine powers during epidemics, most notably tuberculosis (Fidler, Gostin, & Markel, 2007). During the recent Ebola crises the governors of New York, Illinois, and New Jersey ordered mandatory, involuntary quarantine of asymptomatic healthcare workers returning from West Africa after caring for Ebola patients, setting off a hailstorm of controversy. (Ed. Note: See Hickox, p. 17)

3. **Obtain and review travel history.** International travel has increased dramatically: from 25 million in 1950; 1.035 billion in 2012; 1.2 billion in 2015 and expected to be 1.8 billion by 2030 (UNWTO, 2016). Global travel on this scale exposes individuals to a range of health risks, including infectious diseases. Therefore, clinicians must obtain a patient's travel history with every clinical encounter. Organizations should have written protocols and a checklist that includes: travel dates, geographic regions visited, nature of travel (e.g., business, pleasure, volunteer), any illness during the journey, exposure to exotic diseases or bites/vectors/animals, and history of chemoprophylaxis (e.g., malaria) and vaccines.

4. **Review "febrile traveler" history.** Of the more than 80 million people who travel from industrialized to developing nations, up to 70% develop a travel-associated illness; between 5% and 19% of those seek medical attention within one month of return (Kotlyar & Rice, 2013). Determining possible infectious exposures and associated incubation periods can be particularly helpful in ruling out causes of fever. Clinicians should ask about

   - timing and sequence of illness/symptoms
   - types of food and water consumed

- places visited
- type/s of transportation
- lay-overs and intermediate stops
- specific activities undertaken during travel (Alp, Erdem, Rello, 2016).

Clinicians should practice standard precautions, with contact and respiratory/droplet precautions for all patients with undifferentiated fever after travel to the tropics, until potentially hazardous diseases are excluded (Kotlyar & Rice, 2013).

Clinicians should verbally communicate significant travel history findings to the health care team. The Dallas hospital caring for Thomas Eric Duncan (who was febrile) learned that the triage nurse collected critical travel information and recorded it in the electronic health record (EHR), but the emergency department staff did not verbally communicate. Viewing the data required the treating physician to look beyond the EHR standard patient assessment screen to access the travel history from the nursing assessment document (Upadhyay, Sittig, & Singh, 2014). This resulted in missing basic but key clinical information.

SUMMARY

History tells us that infectious diseases will continue to emerge and reemerge, leading to unpredictable disease outbreaks and epidemics across the globe. Pathogens can move quickly and silently around the globe in days. International travel has increased dramatically, potentially exposing people to a range of health risks, including exposure to infectious diseases. EID, or mutations of old ones, can have global and devastating consequences. It is important for legal nurse consultants to appreciate the many regulatory aspects of health law, especially as applied to the containment of infectious disease.

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