Environmental Case Study

Ebola Hemorrhagic Fever: Outbreak: Ebola Hemorrhagic Fever

In mid-April, 1995, a 36-year-old laboratory technician named Kimfumu checked into the medical clinic in Kikwit, Zaire (now the Democratic Republic of Congo) complaining of a severe headache, stomach pains, fever, dizziness, weakness, and exhaustion. Surgeons did an exploratory operation to try to find the cause of his illness. To their horror, they found his entire gastrointestinal tract was necrotic and putrefying. He bled uncontrollably, and within hours was dead. By the next day, the five medical workers who cared for him, including an Italian nun who assisted in the operation, began to show similar symptoms, including high fevers, fatigue, bloody diarrhea, rashes, red and itchy eyes, vomiting, and bleeding from every body orifice. Less than 48 hours later, they, too, were dead, and the disease was spreading like wildfire throughout the city of 600,000.

As panicked residents fled into the bush, government officials responded to calls for help by closing off all travel—including humanitarian aid-into or out of Kikwit, about 400 km (250 mi) from Kinshasa, the national capital (fig. 9.1). Fearful neighboring villages felled trees across the roads to seal off the pestilent city. No one dared enter houses where dead corpses rotted in the intense tropical heat. Boats plying the adjacent Kwilu River refused to stop to take on or discharge passengers or cargo. Food and clean water became scarce. Hospitals could hardly function as medicines and medical personnel became scarce.

Deadly tropical fevers are an unfortunate fact of life in Central Africa but rarely are they this contagious or lethal. The plague that afflicted Kikwit was Ebola hemorrhagic fever, a viral disease for which there is no known treatment. Within a few weeks, about 400 people in Kikwit had contracted the virus and 350 were dead. Where a 10 percent mortality rate is considered high for most infectious diseases, Ebola kills up to 90 percent of its victims, usually within only a few days after exposure.

The Kikwit Ebola outbreak was neither the first nor last appearance of this dread disease. The first recognized Ebola epidemic occurred in 1976 in Yambuku, Zaire (near the Ebola River, after which the virus was named), where at least 280 people died. Three years later, 22 patients died in Sudan from a slightly different and less virulent form of Ebola. In 1996, about 100 people were killed by Ebola in two separate episodes in Gabon, and in 1999 an outbreak in the gold mining town of Durba in the Democratic Republic of Congo killed at least 63 people.

Ebola is one of two members of a family of RNA viruses called the Filoviridae (fig. 9.2). The other filovirus causes Marburg fever, an equally lethal and contagious hemorrhagic disease, named after a German town where it was first contracted by laboratory workers who handled imported monkeys infected with the virus. Together with members of three other families (arenaviruses, bunyaviruses, and flaviviruses), these viruses cause a group of terrible, episodic diseases including Lassa fever, Rift Valley fever, Bolivian fever, and Hanta or Four-Corners fever (named after the region of the southwestern United States where it was first reported).

The viruses associated with most of these emergent, hemorrhagic fevers are zoonotic. That means a reservoir of viruses naturally resides in an animal host or arthropod vector. No host or vector is known for Ebola but we know that monkeys and other primates can contract related diseases. Why viruses remain peacefully in their hosts for many years without causing much more trouble than a common cold, but then erupt sporadically and unpredictably into terrible human epidemics is a new and growing question in environmental health and risk assessment. In this chapter we will look at some of the changes humans are bringing about in our environment as well as how a variety of environmental factors affect our health. While you're not likely to encounter Ebola unless you venture into the African jungle, studying this material should give you some ideas about what we might do to ensure a safer environment and how you can adopt a healthier lifestyle.