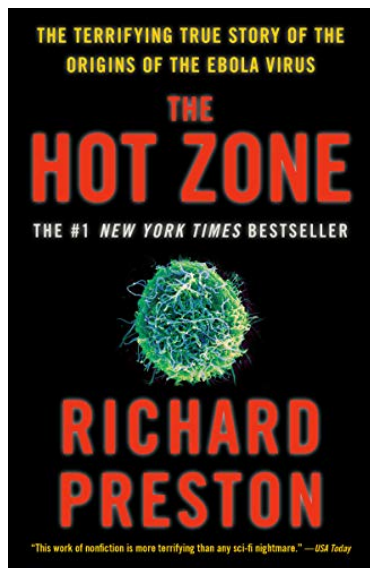


The Hot Zone Book Summary, by Richard Preston (archive)

by Allen Cheng

<https://www.allencheng.com/the-hot-zone-summary-richard-preston/>



The Ebola virus is greatly feared, but not well understood. Ebola virus has appeared only a handful of times and, despite being highly infectious, it has never spread to become a full-blown epidemic. However, ****Ebola's brutal attack on victims' bodies, astronomical kill rates, and ability to mutate make it a constant potential threat. ****

The Hot Zone explores how Ebola and its family of viruses affect humans, the history of known outbreaks, and the possibility of a future epidemic.

1-Page Summary of The Hot Zone

Viruses hide among all living things—some are harmless, and some have the potential to wipe out huge swaths of people.

The Ebola virus's sister virus, Marburg, first appeared in the 1960s. Marburg and Ebola have only

emerged a handful of times since, but **most of the victims and communities hit with Marburg or Ebola have been devastated by the viruses' brutal physical attacks, high infectiveness, and astronomical kill rates.**

We'll discuss the known outbreaks of Ebola and Marburg, as well as the potential for future outbreaks. But first, let's talk about what the virus is and does.

The Filovirus Family

Ebola belongs to a family of viruses named filoviruses, meaning "thread viruses," because they look like threads or ropes under a microscope.

There are four viruses in the filovirus family:

1. Marburg, the mildest strain, with a kill rate of 1 in 4
2. Ebola Sudan, with a kill rate of about 1 in 2
3. Ebola Zaire, the deadliest strain, with a kill rate of 9 in 10
4. Ebola Reston, the most recently discovered strain, which we'll get to later

(Shortform note: Since the book's publication, three more filoviruses have been identified, all of which are strains of Ebola: Bundibugyo, Tai Forest, and Bombali.)

Viruses are parasites. They lie dormant until they can latch onto another cell, at which point they use the cell's materials to replicate ceaselessly, until the cell either bursts or is exhausted and destroyed.

The Ebola virus targets its host's immune system, preventing the host's body from fighting off the disease. But viruses need a living host to survive, so when a victim dies, the virus must jump hosts. **Ebola is transmitted through exposure to the blood or bodily fluids of an infected victim or corpse.**

With the exception of Ebola Reston, **filoviruses don't appear to discriminate between people and animals, and they can jump easily from one to the other.**

Scientists still don't know what the filoviruses' hosts are—whether insects or animals—but the viruses can be transmitted to primates or duikers, a type of antelope. Nor do scientists know where the hosts live, but most cases originated in the region around Mount Elgon, on the border of Kenya and Uganda, not far from Sudan. Specifically, a few cases trace back to Kitum Cave, on the eastern slope of Mount Elgon.

(Shortform note: Scientists still don't know the hosts of filoviruses, but [evidence points to fruit- and insect-eating bats as major carriers](#)—though that doesn't rule out the possibility that an insect or rat is the original host and simply infected the bats through a bite. Scientists also suspect there could be multiple hosts.)

Marburg Virus

Marburg virus attacks organs, intestines, skin, and connective tissue through the body. Its symptoms include:

- Blood clots throughout the body, from organs to extremities
- Hemorrhages from every orifice
- Black vomit, a mixture of arterial blood and black specks that indicate hemorrhage
- Impairment of the central nervous system
- Destruction of the brain, leading to personality changes, memory loss, and an expressionless face

(Shortform note: Besides the kill rate, there are no major identifiable differences between Marburg and Ebola. [Scientists don't know why Ebola is deadlier than Marburg.](#))

Marburg first appeared in several Ugandan villages around Mount Elgon in the early 1960s, but the “microbreaks” went relatively unnoticed. Then, **in 1967, the virus killed 31 people in Marburg, Germany.**

The virus arrived through a shipment of Ugandan monkeys to a vaccine factory in Marburg. There could have been as few as two or three sick monkeys among several hundred—and they may have been in the incubation period, during which they wouldn't have had any visible symptoms.

Ebola Sudan

The first known case of Ebola was in 1976 in southern Sudan, about 500 miles from Mount Elgon. The first victim unknowingly spread the virus to coworkers, who then spread it to friends, families, and a nearby hospital. ****The hospital's practice of reusing dirty needles caused the number of cases to explode.**

With a 50 percent kill rate, Ebola Sudan killed hundreds of people in central Africa.

Ebola Zaire

Just two months after the Ebola Sudan outbreak, Ebola Zaire appeared 500 miles away, at a rural hospital in northern Zaire.

****Ebola Zaire is the most aggressive of the filoviruses. **The virus digests victims' organs and tissues until they liquefy into a slime of replicated virus particles.**

Ebola Zaire's effects include:

- **Excessive internal blood clots**, which clog the bloodstream, causing organs and tissues to die from lack of blood supply
- **Inability to clot blood leaving the body**, causing incessant bleeding through every orifice
- **Sloughing off of skin** and the linings of the tongue, windpipe, and intestines
- **Breakdown of brain functions** as dead blood cells clog the brain. As a result, victims experience personality changes and often suffer strokes and seizures.

As in Sudan, **the Zairean hospital's reuse of dirty needles spread the virus like wildfire, igniting simultaneous outbreaks in 55 surrounding villages.**

When one member of the hospital staff contracted the virus, she went to a hospital in the country's capital, Kinshasa. Doctors at that hospital recognized that her symptoms were similar to Marburg, so they sent samples of her blood and liver to national laboratories in Belgium and England.

The head of the Special Pathogens Branch at the American Centers for Disease Control also got his hands on a sample and realized the virus wasn't Marburg—it was something new. He named it Ebola, after Zaire's Ebola River.

Ebola Appears in the U.S.

In 1989, monkeys in a facility in Reston, Virginia began dying mysteriously. The facility held imported monkeys before sending them elsewhere in the U.S., and it belonged to Hazleton Research Products, a company that imported and sold lab animals.

All the dying monkeys arrived in a shipment from a facility in the Philippines. Infected monkeys developed glazed facial expressions, lost their appetites, and died soon after. **Within a month, 29 of the 100 monkeys were dead. **

When the company's veterinarian, Dan Dalgard, dissected the corpses, he found the monkeys' spleens were swollen and there was blood in their intestines. Seeking a second opinion, **Dalgard sent samples from the monkeys to a virologist at the United States Army Medical Research Institute of Infectious Diseases (USAMRIID), **which developed vaccines and studied how to contain outbreaks from weaponized or naturally occurring biological threats.

When researchers at USAMRIID viewed the infected monkey samples under a microscope, they saw the signature rope-like shape of the filovirus family. News quickly spread up the chain of command.

The Army officials had to be extremely cautious to contain the threat of an outbreak while also avoiding a public panic. They worked with CDC officials to develop a plan.

There are only three ways to stop a virus:

1. Vaccines, but none existed for Ebola
2. Drug treatments, but none existed for Ebola
3. Biocontainment, which would be their only option

With permission from Dalgard and Hazleton, the Army would euthanize every monkey in the monkey house and sterilize the entire facility.

The Army Sterilizes the Monkey House

**The Army assembled a biohazard SWAT team to tackle the monkey house mission. **With the virus on the loose inside the monkey house, they considered the facility a Biosafety Level 4 hot zone—an area contaminated with the most dangerous category of viruses, which have no vaccines or cures.

The team had to wear biosafety space suits that encased their entire bodies and take every safety

precaution to prevent the virus from getting out of the building. They dealt with the monkeys in five steps:

1. **Making the monkeys unconscious** with injections of a general anesthetic and a sedative
2. **Taking a blood sample** from the unconscious monkeys
3. **Euthanizing the monkeys**
4. **Collecting samples** of the monkeys' livers and spleens
5. **Bagging the corpses** and placing them in biohazard containers

It took a few days for the biohazard SWAT team to euthanize all 450 monkeys. Then the decontamination team scrubbed every surface of the facility with bleach and gassed the building with formaldehyde.

The Virus Returns

After the Army was confident that the building was sterile, they returned it to Hazleton. The company resumed importing monkeys from the same supplier in the Philippines, and, within a month, the Reston facility had another outbreak.

During the second outbreak, an employee at the monkey house cut himself while performing a necropsy on an infected monkey. The scalpel was covered in virus-laden monkey blood, and it cut into his thumb and mixed with his own blood. He was surely infected.

But, as time passed, the employee appeared to be fine.

In fact, **all four animal caretakers** from the Reston facility tested positive for the virus, but none ever broke with symptoms.

Since the virus didn't appear to affect people, the Army, CDC, and Hazleton agreed to isolate the monkeys inside the building and let the virus work through them—instead of bringing the Army back in for another sterilization mission.

Based on how the virus was moving through the monkey house and affecting the monkeys, **the virus seemed to have mutated** since the month prior, indicating it could to quickly adapt to new hosts and survive significant changes in its environment.

The Monkey House Virus Is Novel

USAMRIID researchers determined that this virus was a new form of Ebola. They named it Reston.

This virus was so similar to Ebola Zaire that it was hard to distinguish them in microscopic images. But **two things were significantly different about Ebola Reston**.

First, **Ebola Reston appeared to be airborne**. While the virus spread through the monkey house, it infected monkeys in different rooms that never interacted. Additionally, two of the Reston employees who tested positive hadn't been exposed through any cuts or blood contact, so they must have contracted the virus through the air.

Second, ****unlike the other filoviruses, Ebola Reston didn't appear to affect people. ****

Still, researchers remained cautious. Considering how quickly the virus appeared to adapt, they couldn't eliminate the possibility that **one small mutation could make Ebola Reston lethal to humans—and its airborne transmission would make the threat even deadlier.**

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Did researchers fear a large-scale outbreak? On one hand, the close contact required for transmission and the relatively successful containment of filoviruses relieved some fear of a major epidemic or pandemic. On the other hand, all the questions that still remained about the filoviruses—including their hosts, where they originate, and how and why they emerge—amplified the fear of future outbreaks.

(Shortform note: Since the book's publication in 1995, there have been Ebola outbreaks every few years, the majority of which have been Ebola Zaire. Most have been fairly small (less than 100 cases) and centered in Western Africa, but one was a far outlier: From 2013-2016, Ebola Zaire spread across 10 countries, infecting more than 28,000 people and killing more than 11,000.)

Full Summary of The Hot Zone

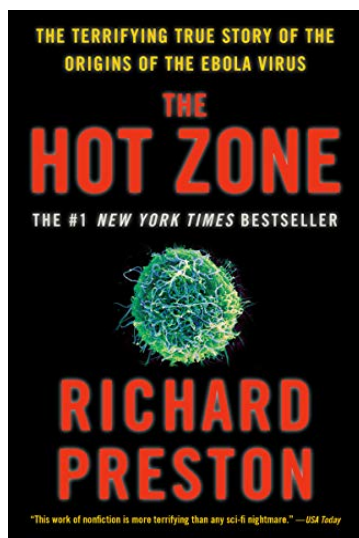
Part 1: Deadly Viruses Emerge in Africa

In the 1960s, the export of primates for medical research became a big business in Africa. Inevitably, some of the monkeys were sick when they were caught from the wild. As different monkey species were held in close quarters and shipped to industrialized countries around the world, it created prime conditions for viruses to jump species and then cross borders.

****Some experts believe the monkey export business led to the international spread of AIDS and other viruses, including the deadly Ebola virus and its sister virus, Marburg. ****

Scientists still don't know what the filoviruses' hosts a...

---End of Preview---



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Here's what you'll find in the **full The Hot Zone summary**:

- 1-Page Summary
- Part 1: Deadly Viruses Emerge in Africa
 - 1962-1976: The First Outbreaks
 - 1980: The Case of Charles Monet
 - 1983: U.S. Army Ebola Experiments
 - 1987: The Case of Peter Cardinal
- Part 2: 1989—Ebola Appears in the U.S.
 - The Reston Virus Spurs the Army to Action
- Part 3: The Army Sterilizes the Monkey House
 - A New Filovirus: Ebola Reston
- Part 4: 1993—Visiting Kitum Cave
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