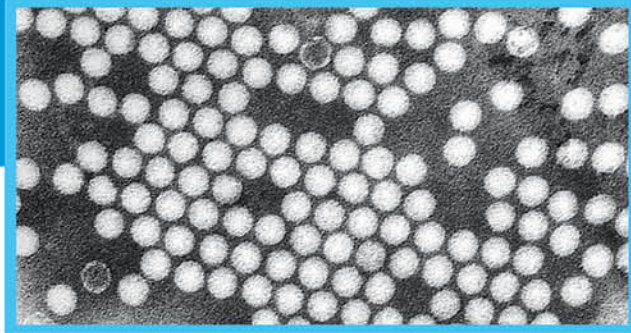
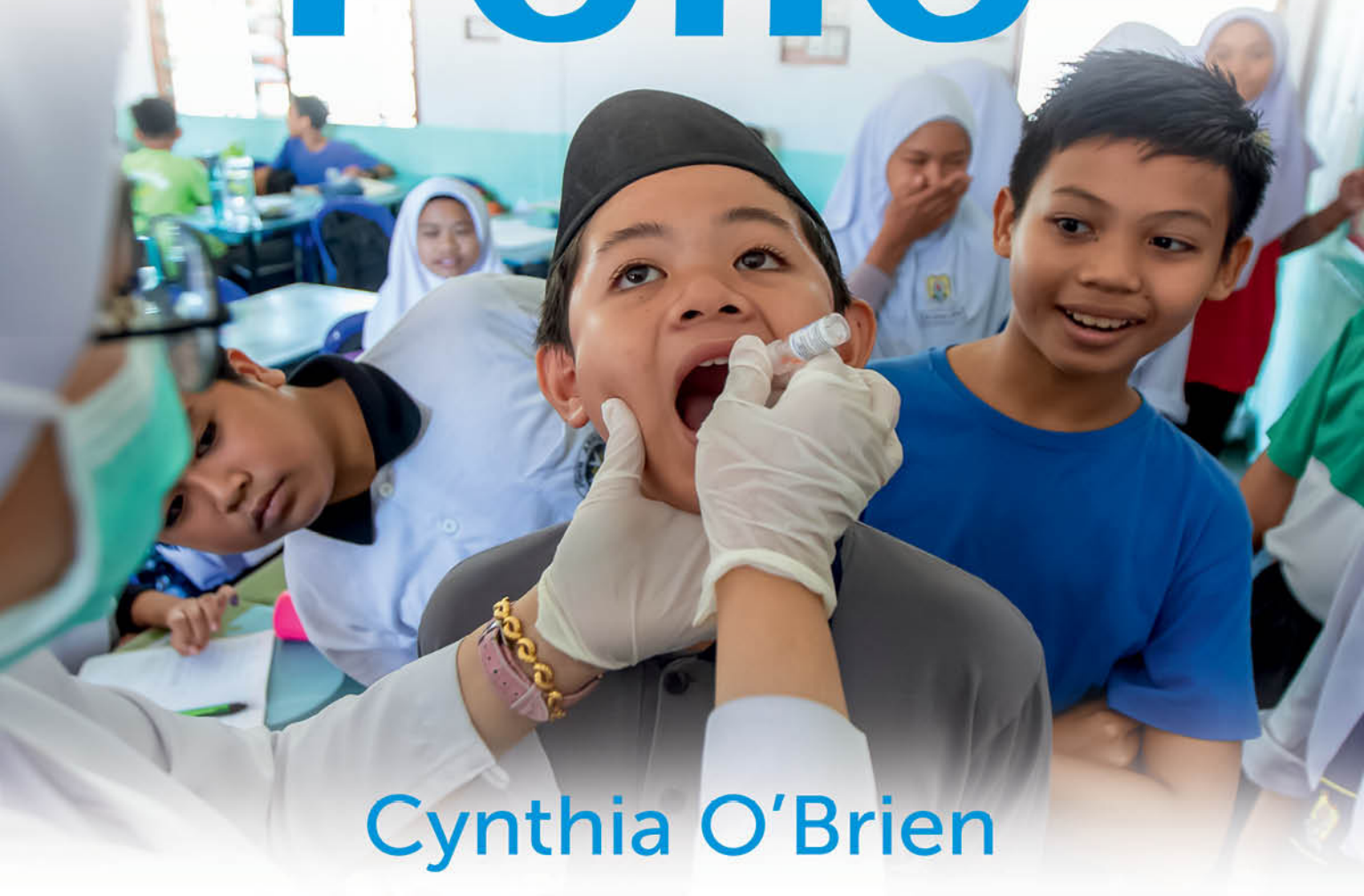


Wars Waged Under the Microscope



The War Against Polio



Cynthia O'Brien

Wars Waged Under the Microscope

The War Against Polio



Cynthia O'Brien



CRABTREE
PUBLISHING COMPANY
WWW.CRABTREEBOOKS.COM

Contents

The Enemy	4
The Battle Begins.....	6
Polio Attacks	8
Case Study: Roosevelt and the March of Dimes	9
Creating a Defense	10
Case Study: The Cutter Incident	11
An Invisible Threat	12
Under Attack	14
Studying the Enemy.....	16
Armed with Medicine	18
Taking It to the Front Line	20
Surviving Polio.....	22
Case Study: Post-Polio Syndrome	23
New Weapons.....	24
Future Warfare.....	26
Timeline	28
Glossary.....	30
Learning More	31
Index and About the Author	32

The Enemy

Poliomyelitis, or polio, is a serious, sometimes deadly, disease. It is caused by a **virus**—a tiny **organism** too small to be seen by the naked eye. There is no cure for polio, but it can be prevented. Although most of the world is now free of polio, in some countries, the battle to control the disease continues.

Infected by Polio

The poliovirus infects people's throats and **intestines**. It is very contagious, which means it spreads easily from person to person.

Many people have no symptoms, or signs of sickness, and do not know they have been infected with polio. Most often, the virus spreads when people come in contact with infected people's feces, or waste. For example, the infected feces can **contaminate** water that other people use. Sometimes, the virus can spread in droplets from an infected person's sneeze or cough.

The poliovirus can affect anyone, but children who are under five years old are most at risk. This is because young children are less likely to wash their hands properly. Handwashing is especially important after going to the toilet and before eating.



Polio, an Ancient Problem

Polio has been a problem for thousands of years—the first recorded cases of it date back to ancient Egyptian times. It is only in very recent times that people have been able to fight back against the disease with **vaccines**, which have drastically reduced polio **outbreaks** around the world.



These Kenyan children hold up their fingers, which are marked with a color to show they have been vaccinated against polio.

The last case of polio in the United States was reported in 1979. Canada's last case was in 1977. The **World Health Organization (WHO)** declared the Americas polio-free in 1994. In August 2020, Nigeria became the latest country to be declared free of polio. However, Pakistan and Afghanistan are still fighting the disease. As long as cases of polio exist, there is a threat that the virus will spread and create new outbreaks. That is why scientists around the world are working hard to take the fight to this life-changing disease and wipe it out forever.

*"As long as polio **persists** anywhere, it's a threat everywhere. We still have a lot of work to do to finish the job of **consigning** polio to the history books."*

Tedros Adhanom Ghebreyesus, Director-General, WHO, 2020

The Battle Begins

For centuries, people suffered from devastating **paralysis** or death caused by polio, but they did not know how to treat the disease. From 1800 to the mid-1900s, polio epidemics in Europe and North America caused widespread fear. Scientists around the world worked to find a way to fight the disease.

First Discoveries

In the mid-1800s, a German scientist named Jakob von Heine discovered that polio was different from other diseases that caused paralysis. Then, during a polio outbreak in Sweden in 1887, Karl Medin studied the differences in cases. Medin reported that patients who suffered **fevers** at two different stages were paralyzed after the second fever. Medin reasoned that the **central nervous system** was affected at this stage, and that led to paralysis.



*This image from ancient Egypt shows a man using a crutch to help him walk. His **disability** was likely caused by polio.*

Still, no one knew what caused polio until 1908, when Austrian scientists Karl Landsteiner and Erwin Popper proved that a virus causes the disease. Researchers began their studies into the virus as outbreaks of polio continued. By 1949, scientists identified the three types of polioviruses. This was a very important finding because any effective vaccine would have to work on all three types.

A Public Panic

Meanwhile, frightened parents blamed insects, **imported** food, swimming pools, and many other things for infecting their children. Nothing stopped the outbreaks, and thousands of people became sick each year. **Sanitation** improved in many areas, but polio outbreaks increased. One idea is that this happened because the cleaner conditions **kept** babies from becoming infected with poliovirus, so they did not develop **immunity** to it. Babies still had some immunity to the virus, passed **on** by their mothers. So if they caught the virus, they often did not even seem to be sick. When uninfected babies grew into older children or adults, then were exposed to the virus, they could become very sick.



Ivar Wickman carried out experiments during a polio outbreak in Sweden in 1905. Wickman discovered that people could be infected by polio and spread it, despite having no symptoms, or signs of illness.

UNDER THE MICROSCOPE

Landsteiner and Popper conducted their experiments during a polio epidemic in Vienna, Austria. They collected a **sample** from the **spinal cord** of a boy who had died of polio. They infected monkeys with the sample, and the monkeys developed the same disease. They went on to find the virus in other **tissues** in the throat and intestines.

Polio Attacks

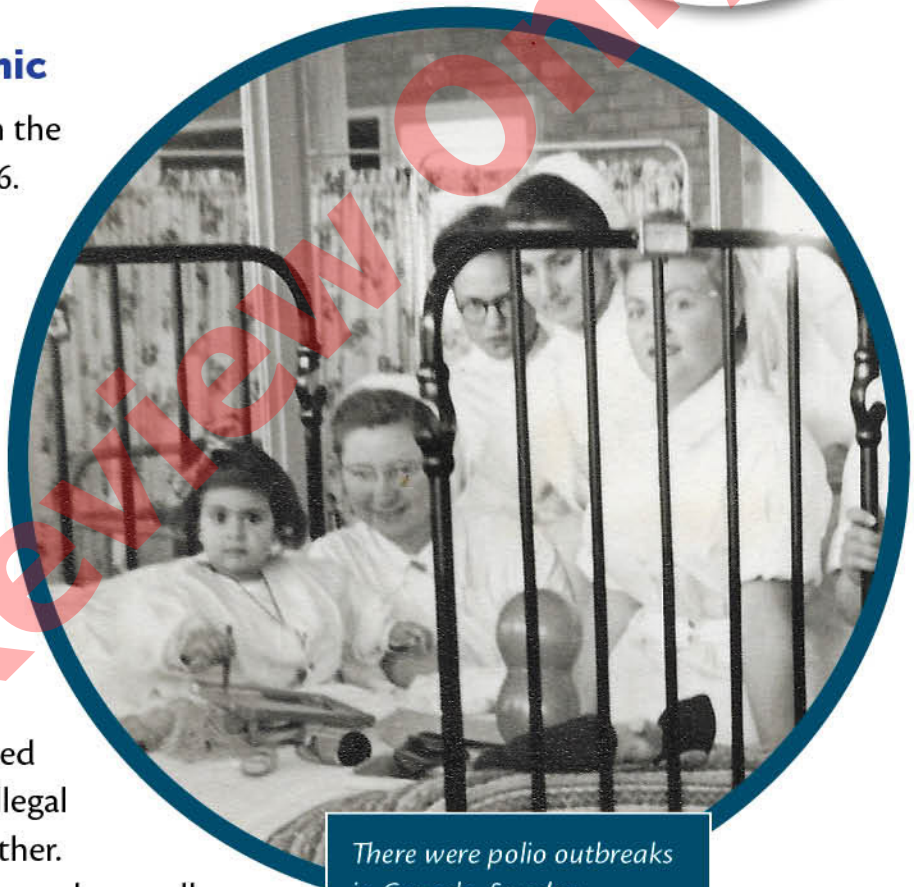
From the late 1800s, polio outbreaks struck regularly in summer months. This may have happened because the poliovirus spreads more easily in warmer weather. But some years were worse than others.



Dealing with an Epidemic

The first large polio epidemic in the United States happened in 1916. By that time, scientists knew that the poliovirus caused the disease, but there seemed no way to prevent it. That year, more than 27,000 people in the country contracted the virus, and 6,000 died.

Across the United States, people tried to find ways to keep themselves and their children safe. Some towns started banning events and making it illegal to travel from one place to another. Armed policemen patrolled the roads as well as bus and train stations. If someone became sick with polio, they had to **quarantine** at home. Polio patients in the hospitals were kept apart from all other patients. Today, these methods are still used to try to keep viruses from spreading.



There were polio outbreaks in Canada, Sweden, Australia, South Africa, and Denmark. The worst polio epidemic in Canada was in 1953. That summer, there were almost 9,000 cases and 500 deaths. This photograph was taken in a Canadian hospital at the height of the outbreak.

CASE STUDY: ROOSEVELT AND THE MARCH OF DIMES

The polio epidemics in the United States affected many thousands of people. One of them was Franklin Delano Roosevelt. In 1921, Roosevelt became paralyzed after a suspected poliovirus infection at the age of 39. Twelve years later, he became president of the United States. Polio outbreaks were still happening every year, so as president, Roosevelt held yearly fundraising events to raise money for research.

In 1938, Roosevelt founded the National Foundation for Infantile Paralysis (NFIP). The foundation's aim was to support polio research and treatment for people who were affected. It asked people, including children, to donate whatever they could afford, even if it was just a dime. Volunteers across the country went door to door to collect money in what was known as the "March of Dimes."

By the end of the first month, the March of Dimes collected 2,680,000 dimes, or \$268,000. That is the same as raising almost \$5,000,000 in 2020. The NFIP was able to fund medical research and help patients pay for treatments. The research led to the first polio vaccines and a huge victory in the war against polio.



Every January, across the United States, Birthday Balls for President Roosevelt's birthday were held. These helped raise money to fight polio.