You have learned in Chapter 18 that infection with certain strains or types of bacteria can cause serious disease. Some people can carry and transmit infectious diseases without realizing it because they don’t exhibit any symptoms. Such individuals are called carriers.

**TYPHOID FEVER: AN URBAN SCOURGE**

Typhoid fever is caused by infection with *Salmonella typhi*, a bacterial pathogen of humans. Typhoid bacteria are transmitted when people ingest contaminated food or water, or when contaminated sewage gets into water used for drinking or washing food. In the body, *S. typhi* inhabits the intestines and is shed in the feces. If the shedder doesn’t practice good hygiene, such as washing the hands after using the toilet and before handling food, he or she can spread the bacteria to others. Once *S. typhi* is ingested, it quickly spreads to the blood, producing headaches, upset stomach, and very high fever that can lead to death.

**THE CASE BEGINS**

At the turn of the 20th century, infectious diseases such as cholera and typhoid fever were the leading cause of death in the United States, particularly among the urban poor. This was largely due to poor sanitation: clean water was at a premium in the crowded tenements of poor city neighborhoods. Guidelines on hygiene—washing hands, especially before handling food—were slow to reach poor people. However, public health officials had begun to understand the importance of proper sanitation, and were focused on improving the water supply and educating the public on personal hygiene.

In 1906, an outbreak of typhoid fever among six members of a wealthy family was reported to authorities. The Warren family had spent the summer visiting friends on Long Island. Cases of typhoid among the wealthy were unusual, particularly in affluent summer communities. Investigators made a thorough search of the home and grounds but failed to find a source of contamination. Further questioning revealed that the family had become ill several weeks after hiring a new cook—and that the cook had left their employ shortly after the outbreak began. The cook was described as a healthy Irish woman around 40 years old by the name of Mary Mallon.

Mary Mallon was born in 1869 in Ireland, and immigrated to the United States when she was 14 or 15. Like many Irish immigrant girls of that time, Mary first found work as a maid. She had a gift for cooking and, noting that a cook’s wages were higher than a maid’s, she became a cook. Between 1900 and 1906 she worked as a cook for eight families. As investigators later learned, members of six of the eight families became ill with typhoid fever after Mary came to work for them; one of them, a young girl, had died.

**THE INVESTIGATION**

George Soper, the epidemiologist investigating the Warren household outbreak, was convinced that Mary Mallon was an otherwise healthy carrier of typhoid. In the spring of 1907, he located Mary, who now was cooking for another family. Soper approached Mary without warning and somewhat abruptly: he showed up at the kitchen door where she worked, briefly explained that she was spreading disease through her cooking, and informed her that she had to furnish blood and stool samples immediately. Mary, understandably shocked and probably frightened, chased him out of the house with a carving fork. A similar scenario ensued when the next city health official arrived at Mary’s kitchen door. The
official then returned with five police officers. Armed with her carving fork, Mary ran out of the house and hid nearby. After a search of several hours they found Mary hiding under a stairway. Cornered, she became even more violent, and it took all five policemen to restrain her. She was then transported to an isolated quarantine facility. A large part of Mary’s reaction resulted from her firm belief that they had the wrong person. She maintained that she had never had typhoid, so she could not be a carrier, refusing to accept the possibility that she had probably once had a very mild case and had not realized it. However, weekly tests conducted over several months on her blood and stools showed that she harbored a large population of *S. typhi*. Soper later recalled how the results supported his hypothesis of how Mary had transmitted the disease:

From October 16, 1907, to February 5, 1908, weekly examinations of the stools gave . . . from 25 to 50 per cent typhoid-like colonies on the culture plates . . . The cook was virtually a living culture tube in which the germs of typhoid multiplied and from which they escaped in the movements from her bowels. When at toilet her hands became soiled, perhaps unconsciously and invisibly so. When she prepared a meal, the germs were washed and rubbed from her fingers into the food. No housekeeper ever gave me to understand that Mary was a particularly clean cook . . . the infectious matter is believed to have been carried from the cook’s hands to the people who were later taken sick by means of ice cream containing cut-up peaches. Mary prepared this herself. In this instance no heat sterilized the washings from her hands.

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**QUARANTINED FOR LIFE**

Nicknamed “Typhoid Mary” by the newspapers, Mary remained in quarantine for three years. She was released in 1910 on condition that she never work again handling food. At first she adhered to this, but in 1915, using a false name, she took a cooking job at a hospital. Her identity was discovered when 25 people became ill and two died in a typhoid outbreak there. Seized again by authorities, Mary was returned to quarantine, where she remained until her death in 1937 from complications of a stroke. Throughout her life, Mary adamantly maintained that she had never had typhoid fever.

Answer the following questions on a separate piece of paper.

1. Describe the investigation of the Long Island outbreak in the language used to outline the steps of the scientific method.

2. Do you think that carriers are a greater public health threat than people who are ill? Why or why not?