

RX FOR SURVIVAL

A GLOBAL HEALTH CHALLENGE

Deadly Diseases

Plague

"... [N]ever send to know for whom the bell tolls; it tolls for thee." Poet John Donne wrote these lines in his "Meditation XVII" as the feared Black Death ravaged his native London in 1624.

The plague seems like a disease of a distant century, conjuring up the rat-infested cities of medieval Europe. The word that terrified whole regions of the Earth is now commonly used in its metaphorical sense, meaning any bothersome thing.

Yet the highly infectious disease borne of the bacterium *Yersinia pestis* still persists. From 1,000 to 3,000 cases of plague are reported each year globally, 10 to 15 of them in the western United States.

The plague bacterium is carried to humans in the bite of a flea that has first feasted on an infected rodent. Initial symptoms — sudden fever, headache, muscle pain, nausea — are indistinguishable from other illnesses. As it advances, however, the dreaded bubonic plague causes painful swellings (buboes) in the lymph nodes. Septicemic plague infects the bloodstream. Pneumonic plague, which can be passed from human to human, occurs when the bacillus moves into the pulmonary system, choking off breathing.

Infection in all forms can be fatal unless treated immediately with antibiotics, such as streptomycin. Mortality rates for treated individuals range from 1 percent to 15 percent for bubonic plague to 40 percent for septicemic plague. In untreated victims, the rates rise to about 50 percent for bubonic and 100 percent for septicemic. The mortality rate for untreated pneumonic plague is 100 percent; death occurs within 24 hours.

In the 1330s, bubonic plague broke out in China and was transported back to Europe by traders. The disease struck swiftly there. The Italian writer Boccaccio said that its victims "ate lunch with their friends and dinner with their ancestors in paradise." In Italy, the plague killed more than any war ever had. The cities of Venice and Pisa lost three-quarters of their populations, wiping out entire extended families.

In England, the plague took on the name Black Death, because of the characteristic spots that started under the skin as a deep red and turned black. As fleas reappeared each spring, so did the plague, killing one-third of Europe's people — 25 million — in five years.

Without any medical explanation for the scourge, people appealed to God for deliverance. When their prayers went unanswered and the plague persisted, they sought scapegoats, such as women, lepers, and Jews, claiming that they deliberately spread the disease, or at least brought it on as God's vengeance on them.

The plague remained a constant, though diminished, presence over the next two centuries. But in 1665, it returned to England. This single yearlong outbreak, known as the Great Plague, claimed the lives of 100,000 Londoners — one person in every five died.

The children's song "Ring Around the Rosy," of unknown origin, is believed by many to capture the experience of having the plague. A "rosy"

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is the initial reddish skin spot. "Pocketful of posies" refers to the sweet flowers that victims carried inconspicuously to cover the stench of their disease. "Ashes, ashes" indicates impending death, or the cremation of dead bodies. In England, this line is generally sung as "A-tishoo, a-tishoo," a reference to the uncontrollable sneezing that was also symptomatic of the disease. "We all fall down" indicates death itself. (Others disregard the interpretation, citing the song's many versions and publication date centuries later as proof that the song is nothing more than an innocent children's rhyme and schoolyard game.)

The plague is a local phenomenon in some parts of Africa and Asia, with fairly recent outbreaks occurring in Vietnam and India. There is no commercially available vaccine at the moment, since the risk of acquiring plague from a flea bite is low. Treatment, however, is highly effective using the antibiotic tetracycline, and virtually all cases can be cured if treated early enough. Of global concern, though, is the threat of *Y. pestis* becoming a bioterror weapon, particularly if the bacteria can be turned into an aerosol, actually an exceedingly difficult and unlikely prospect.

Hundreds of animals can host the plague bacillus, including cats, dogs, rabbits, and squirrels. This vast reservoir of infection in the animal world ensures that the plague, which has killed almost 200 million people and perhaps caused more fear than any other infectious disease, will almost certainly never be eradicated from the planet.

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