

BUBONIC PLAGUE FORGOTTEN BUT NOT GONE

The Black Death is, to put it mildly, a nasty disease. It was given its name in the Middle Ages because it changed the color of its victims' skin, as well as making their lymph nodes swell and causing large growths (or "buboes") usually in the groin, neck or armpit. Left untreated, it kills about six victims out of ten. And the plague itself is far from dead.

After its first recorded appearance in 547, it hung around for about 200 years and killed perhaps 100m people in the Middle East, Europe and Asia. It returned for its second world tour in 1347--this time striking Europe, India and China. The second pandemic lasted several centuries and left millions of people dead in Europe alone. The third began in the Hunan province of China in 1865 and is only now winding down. Perhaps as a consolation for its earlier suffering, Western Europe is one of only two places (the other one is Australasia) where the plague is not found today. On all other continents it still exists in a variety of wild animals.

These animals continue to transmit the disease to people. In the past decade 19 countries reported a total of nearly 8,000 cases of human plague to the World Health Organization. Over 80% of the most recent cases occurred in Africa, notably Tanzania and Congo. But it is not limited to developing countries. Recently there have been 10 to 15 cases reported per year in America, down from a peak of 40 in 1983. Last year was only the second since 1973 during which nobody in America died of it.

The plague is caused by a bacterium, *Yersinia pestis*. This microbe first appeared in America in 1899, arriving almost simultaneously at the ports of San Francisco, New York and Port Townsend, Washington. Since that time the organism has been found in the bloodstreams of several hundred species of indigenous animals in all of the Pacific and south-western states. Dr. Allan Barnes at the Center for Disease Control in Fort Collins, Colorado, is charged with the job of watching the plague in America and trying to control it. It is a job in which there is still much to learn.

One of the mysteries is why the disease seems to ebb and flow. In quiet periods, *Y. pestis* finds a home in animals that are resistant to the usual effects of plague. But in certain conditions the infection explodes, erupting out of these rodents and into successive populations of susceptible animals. Stranger still, such outbreaks often occur

simultaneously all over the world, even though each continent has an independent reservoir of infection.

The type of plague most commonly found today is sylvatic plague, in which bacteria from a resistant animal are carried by fleas to other wild animals such as rock squirrels, prairie dogs, rabbits, chipmunks, or field mice. The fleas acquire the bacteria when feeding on the blood of their infected host. Once inside the flea, the bacteria multiply and plug up the flea's proboscis. As the starving flea goes searching for food, it becomes less choosy about its host, and will readily attack any humans it encounters. While trying to feed, the flea regurgitates the bacteria into its new host's bloodstream.

Urban plague is the sort that caused large numbers of deaths in medieval epidemics. To spread, it uses rats and other rodents that live near people. Once infected by wild animals, the plague-ridden rat population starts to die out, and the rat fleas are forced to turn to people for food. The disease can also be acquired by domestic pets that eat infected rodents. Pets provide a potential source of human infection in towns.

Dr. Barnes points out that the transmission of plague to people depends on several things. Not all species of flea, for example, are adept at transporting *Y. pestis*, and many of them do not find people tasty. Not all places have animal colonies or semiarid weather that the fleas like, and the ability of rats to develop immunity after repeated exposure can help to slow the spread.

Still, three trends in developed countries are increasing the risk of exposure to infected animals: more pets, moving to rural areas and the popularity of outdoor activities in general. The threat of urban plague is particularly worrisome. Effective control requires the monitoring of plague in wild animals, the control of rats and the use of flea pesticides.

Although plague is easily treated with antibiotics if it is diagnosed in time, is so rare that it is often misdiagnosed as influenza. For that reason, over the past decade 16% of Americans who caught the plague have died of it--the highest rate in the world.

