

Medicine by John Grauerholz, M.D.

The first horseman rides again

With an estimated 10 million infected with tuberculosis in the United States, and about 2 billion worldwide, the hoofbeats are getting louder.

As the "Reagan recovery" sweeps across the United States, a mounted figure follows in its wake. It is tuberculosis, the white plague, known in its heyday as "the first of the horsemen of death." This infection, which is caused by the organism *Mycobacterium tuberculosis* and had been declining steadily over the last century, has been given a new lease on life in the developed nations by the invisible hand and is now on the rise again.

From 1981 to 1984, reported cases of tuberculosis declined at an average of 1,706 cases per year for an average annual rate of 6.7% per year. In 1985, a total of 22,201 cases of tuberculosis were reported to the Centers for Disease Control, only 54 cases less than the 22,255 reported in 1984 and a decline of only 0.2%.

Since May 24, 1986, the number of TB cases reported to CDC has exceeded the number for comparable periods in 1985, and as of Dec. 13, 1986, there were 21,047 cases reported in the United States, compared to 20,594 on Dec. 14, 1985, and 20,707 on Dec. 15, 1984.

The major areas of increase have been in California, New York, Texas, Florida, Massachusetts, Georgia, Arkansas, and Illinois. Two factors are dominant in these areas: AIDS and extensive urban collapse.

In Florida, where significant numbers of AIDS patients are poverty-stricken ghetto dwellers without the usual "risk factors," 10% of AIDS patients have been diagnosed with TB. Likewise in New York, the presence

of AIDS has been strongly linked to an epidemic of tuberculosis primarily affecting black and Hispanic males living in the most economically devastated areas of the city. While the New York City cases are also strongly linked to drug abuse, in other areas the most significant factor appears to be the grinding poverty classically associated with this disease.

One striking example of this problem was reported in the July 19, 1985, issue of the *Morbidity and Mortality Weekly Report*, the weekly publication of the Atlanta Centers for Disease Control. This report concerned 26 cases of tuberculosis associated with three large shelters for the homeless in Boston. The epidemic was first recognized because of reports of a number of cases of tuberculosis caused by multiple-drug-resistant organisms occurring among the homeless.

A screening program using Mantoux tuberculin skin tests, sputum examinations, and chest x-rays was begun in November 1984. In addition to detecting infected shelter inmates, it was discovered that 13 of 84 employees at one 350-bed shelter had skin-test conversions, indicating recent exposure to tuberculosis.

Since that time, a total of 49 cases of tuberculosis, associated primarily with the 350-bed shelter, have been reported, 22 of which are resistant to isoniazid and streptomycin, the first line anti-tuberculosis drugs. In an article in the Dec. 18, 1986, *New England Journal of Medicine*, researchers from the Massachusetts Department

of Public Health and Harvard Medical School reported on some implications of these drug-resistant cases.

The most significant finding is that a number of these cases show a pattern of disease considered uncommon in the developed countries, but more typical of depressed areas characterized by high exposure to infected individuals. This pattern is known as exogenous reinfection. It occurs when a person who has previously been infected by the TB bacteria is exposed to another load of these organisms from another patient. These reinfected patients had extensive lung cavitation and numerous tuberculosis organisms present in smears of their sputum—features associated with contagiousness.

As opposed to endogenous reinfection, in which a patient reactivates his own previous infection (considered to cause most tuberculosis in the United States), exogenous reinfection is important in developing countries where tuberculosis is epidemic and where immune response to previous exposure is compromised by malnutrition, poor sanitation, and other environmental stresses.

The Boston study indicates that, under conditions of crowding, poor general health, and malnutrition, rapid transmission may occur not only to previously uninfected individuals but also to previously infected individuals with impaired immunity. These exogenously reinfected individuals are highly contagious, much more than persons infected for the first time, and can rapidly spread the disease to other individuals. Since this form of tuberculosis is resistant to isoniazid, the usual method of prophylaxis using this drug is ineffective, and since reinfection cannot be prevented by BCG vaccination, two major strategies for tuberculosis control are useless.