
During 1990 and 1991, nosocomial transmission of multidrug-resistant tuberculosis (MDR-TB) was documented in four hospitals in New York and Florida (1,2). Subsequently, additional MDR-TB outbreaks have been investigated by CDC. This report summarizes preliminary results of an investigation of transmission of MDR-TB in a correctional facility in New York.

From June 17 through August 8, 1991, four inmates from a state correctional facility (SCF) in New York died from tuberculosis (TB) at one hospital. Mycobacterium tuberculosis strains isolated from these inmates were reported to be resistant to isoniazid (INH), rifampin (RIF), pyrazinamide (PZA), ethambutol (EMB), streptomycin (SM), kanamycin (KM) and ethionamide (ETH). In a retrospective epidemiologic investigation covering the period from January 1 through November 16, 1991, eight persons (including the above four) were identified at the SCF as having MDR-TB. Seven were inmates, all of whom had positive human immunodeficiency virus (HIV)-antibody tests and CD4+ T-lymphocyte counts (CD4 counts) of less than or equal to 60 cells/uL. One was a correctional facility worker who had been recently treated for cancer with radiation therapy and whose CD4 counts were less than or equal to 110 cells/uL. All eight patients with MDR-TB died within a mean of 25 days (range: 3-42 days) from the date of collection of their first culture-positive sputum.

For seven (including the correctional facility worker) of the eight patients, primary isolation and identification of M. tuberculosis strains were performed at local laboratories, and drug-susceptibility testing was performed at the state laboratory. Confirmatory drug-susceptibility testing on these seven isolates at CDC indicated all seven were resistant to INH, RIF, EMB, SM, KM, ETH, and rifabutin and susceptible to PZA. The specimen for the eighth patient, sent to a laboratory in another state for primary isolation, identification, and susceptibility testing, was reported as resistant to INH, RIF, and SM and susceptible to EMB. Confirmatory drug-susceptibility test results by CDC for this specimen are pending. The mean duration from collection of sputum specimens to identification of the isolates as resistant to first-line TB drugs was 13 weeks (range: 9-16 weeks). The mean duration from collection of sputum specimens to notification of the referring hospital that the isolates were multidrug resistant was 18 weeks (range: 13-23 weeks).

Restriction fragment length polymorphism (RFLP), a method of DNA analysis used to identify genetic similarities between M. tuberculosis strains, was identical for isolates from seven of the eight patients. The RFLP result for the eighth patient is pending.

Two patients were inmates who had been transferred from other state correctional facilities housing an inmate identified in a prior outbreak at a hospital in New York City (2) as having MDR-TB with the same
drug resistance and RFLP pattern. Both were clinically ill at the time of arrival at the SCF but refused evaluation by the infirmary staff. They were incarcerated with the general prison population for 4-5 weeks before they sought medical care and were isolated from other inmates. One of these two inmates had been assigned to the same cell block as two of the other inmates who later developed MDR-TB. When the latter two inmates became ill, they were guarded at the hospital by the correctional facility worker who subsequently became a patient.

Preliminary results of the ongoing contact investigation at the SCF have identified 51 inmates with documented tuberculin skin test (TST) conversions during June 1990-November 1991. Twenty-six (51%) had TST conversions while at the SCF, of whom 22 (85%) had documented exposure to MDR-TB; for eight of these, the sole known TB exposure was to inmates with MDR-TB. All recent TST converters were counseled to have HIV tests performed. Of the 22 with known exposure to MDR-TB, two were HIV-positive, 15 were HIV-negative, and five refused HIV testing.

While definitive guidelines for management of contacts of patients with MDR-TB are being developed by CDC, the New York State Department of Corrections (NYSDC), in conjunction with the New York State Department of Health (NYSDH), has offered a prophylactic regimen of PZA and ofloxacin to the 22 inmates with known exposure to MDR-TB.

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**Editorial Note**

Editorial Note: Although transmission of MDR-TB in health-care settings has been described previously, this is the first documentation of transmission in a correctional system. The epidemiologic and laboratory findings in this investigation strongly suggest that the transfer of clinically ill inmates resulted in both the spread of MDR-TB between correctional facilities and transmission of MDR-TB within the SCF. Factors that probably contributed to this outbreak include 1) transfer of inmates who were clinically ill but not yet identified as having TB, 2) length of time required to identify and isolate inmates with active TB from the general prison population, 3) length of time required for identification of M. tuberculosis and the performance of drug-susceptibility tests, and 4) occurrence of MDR-TB infection in patients with HIV infection and other conditions characterized by immunodeficiency.

The difference, if any, in risk for TB infection between persons with and without HIV infection is not known. However, the rapid progression of TB among the patients in this report is consistent with previous reports of increased susceptibility of immunocompromised persons, particularly those with HIV infection, to develop clinical symptoms more rapidly following infection with M. tuberculosis (3-5). Moreover, the death rate for persons in this report underscores the risk for a fatal outcome in immunosuppressed persons who become newly infected with M. tuberculosis.

No effective drug regimen was identified to treat the patients in this outbreak. Anti-TB drugs available to treat multidrug-resistant strains of M. tuberculosis have substantially lower rates of cure than regimens that include INH, RIF, and other first-line agents. This lower effectiveness emphasizes the need to develop additional anti-TB drugs and to test M. tuberculosis against a broader spectrum of available drugs, including quinolones, among populations in which MDR-TB has been identified.
The findings in this outbreak investigation underscore the need to 1) develop more rapid methods for identification and drug-susceptibility testing of M. tuberculosis; 2) perform HIV testing for persons exposed to TB or likely to have latent TB infection, and perform anergy and TB testing for those with HIV infection to identify persons at high risk for rapid progression to clinical disease and a potentially fatal outcome; and 3) develop and implement comprehensive guidelines for the management of all MDR-TB patients and their contacts. CDC has recently developed guidelines for the management of persons exposed to MDR-TB (6). Health practitioners encountering such cases are encouraged to notify local health departments and CDC.

In response to this outbreak, the NYSDC and the NYSDH have instituted special TB-control measures throughout the NYSDC. These include restriction of transfers of inmates with respiratory symptoms; mandatory annual TSTs for all previously tuberculin-negative inmates and staff; use of anergy panels with TSTs for all contact investigations (7); encouragement of HIV testing for anergic inmates and/or inmates with positive TSTs; modification of patient rooms in prison infirmaries to provide for full capacity for acid-fast bacillus isolation and use of these rooms for all suspected TB cases; directly observed therapy for treatment of active TB cases and for preventive therapy for persons with positive TSTs; and drug-susceptibility testing on isolates of M. tuberculosis from all patients with culture-positive TB.

References


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