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Current Trends Prevention and Control of Tuberculosis in Correctional Institutions: Recommendations of the Advisory Committee for the Elimination of Tuberculosis

These recommendations are designed to assist federal, state, and local correctional officials in controlling tuberculosis (TB) among inmates and staff of correctional facilities (e.g., prisons, jails, juvenile detention centers). This document addresses issues unique to correctional institutions; more general information about TB is available in the official American Thoracic Society (ATS)/CDC statements referenced in this document.

BACKGROUND

TB remains a problem in correctional institutions (1-8), where the environment is often conducive to airborne transmission of infection among inmates, staff, and visitors. In a survey of TB cases reported during 1984 and 1985 by 29 state health departments, the incidence of TB among inmates of correctional institutions was more than three times higher than that for nonincarcerated adults aged 15-64 years (CDC, unpublished data). Since 1985, 11 known TB outbreaks have been recognized in prisons in eight states (CDC, unpublished data). In addition, in some large correctional systems, the incidence of TB has increased dramatically. Among inmates of the New York State system, TB incidence increased from an annual average of 15.4 per 100,000 population during 1976-1978 to 105.5 per 100,000 in 1986 (1). In New Jersey during 1987, the incidence of TB among state inmates was 109.9 per 100,000--a rate 11 times that of the general population in New Jersey that year (New Jersey State Department of Health, unpublished data). In a survey of California Department of Corrections facilities, the TB incidence among inmates during 1987 was 80.3 per 100,000--a rate nearly six times that of California's general population for that year (California Department of Health Services, unpublished data).

Human immunodeficiency virus (HIV) infection among prisoners in a number of geographic areas heightens the need for TB control among inmates (9,10). According to a National Institute of Justice (NIJ) survey, as of October 1988, a cumulative total of 3136 confirmed acquired immunodeficiency syndrome (AIDS) cases had been reported among U.S. inmates since 1981--2047 cases by 44 of 51 state and federal systems and 1089 cases by 26 responding city and county jail systems. These reported AIDS cases represent a 60% increase since a similar survey was conducted in 1987. The incidence of AIDS among prisoners has been reported as markedly higher than that among the total U.S. population (9). During 1988, the incidence of AIDS in the U.S. population was 13.7 per 100,000 (11).* During the same year, the estimated aggregate incidence for state/federal correctional systems was 75 cases per 100,000.** Rates for individual systems ranged from 0 to 536. Although more than half the states have rates less than or equal to 25, eight state systems have rates greater than or equal to

100. The aggregate rate for 26 responding city/county jail systems was 183 per 100,000. However, rates in city/county jails were described by NIJ as "extremely suspect" because of rapid turnover of population (9).

HIV infection in persons with latent tuberculous infection appears to create a very high risk for development of TB (12-14). One review of AIDS cases among inmates in selected New York correctional facilities found TB in 22 (6.9%) of 319 persons with AIDS (3).

Transmission of TB in correctional facilities presents a health problem for the institutions and may also be a problem for the community into which inmates are released. Each year, more than 8 million inmates are discharged from local jails (15) and more than 200,000 from state and federal prisons (16). Because the median age of inmates on release is relatively young--27 years (17)--the total lifetime risk for TB in persons infected during incarceration is considerable. GENERAL GUIDELINES

Control of TB is essential in correctional health care. Each correctional institution should designate an appropriately trained official responsible for operating a TB prevention and control program in the institution. A multi-institutional system should have a qualified official and unit to oversee TB-control activities throughout the system. These responsibilities should be specified in the official's job performance plan. The basic activities to be followed are surveillance, containment, and assessment.

Surveillance refers to identification and reporting of all TB cases in the system or institution and identification of all inmates and staff who are infected with TB (i.e., those with positive skin tests). New cases and newly infected persons must be quickly identified, and appropriate therapy begun.

Containment refers to ensuring that transmission of tuberculous infection does not occur. Appropriate diagnostic, treatment, prevention, and laboratory services must be available. Environmental factors conducive to the spread of TB, such as poor ventilation, should be corrected. Prison officials must ensure that persons undergoing treatment or preventive therapy be carefully monitored for compliance and drug toxicity and complete an appropriate course of treatment.

Assessment refers to prison officials' responsibility for knowing whether the surveillance and containment activities are being carried out effectively. SURVEILLANCE Diagnosis

The intracutaneous Mantoux tuberculin test (not multiple puncture tests) should be used to identify persons infected with tubercle bacilli. Generally, for correctional institution staff and inmates, a tuberculin skin-test reaction greater than or equal to 10 mm induration is considered positive. However, a reaction of greater than or equal to 5 mm is considered positive in persons who have had close recent contact with an infectious person and in persons who have an abnormal chest radiograph consistent with TB (18). In addition, infected persons who are immunosuppressed for any reason may show little or no reaction to the tuberculin test (19). Therefore, a tuberculin skin-test reaction in a person known to be infected with HIV should be considered positive if induration is greater than or equal to 5 mm (20). Skin testing of inmates and staff should be carried out at entry or on employment, respectively (21). Each skin test should be administered and read by appropriately trained personnel and recorded in mm induration in the personal medical record. All inmates and staff should participate, except those providing documentation of a previous positive reaction to the tuberculin test.

In jails with a rapid turnover of inmates, authorities may decide not to tuberculin test new detainees who are unlikely to remain in the system or in that facility for greater than 7 days. However, provision must be made for appropriate diagnostic measures (e.g., sputum smear and culture and/or chest radiograph) for all persons who are symptomatic (18,20). (See Containment, below.)

In most correctional institutions, skin-test-negative inmates and employees having contact with inmates should have repeat skin tests at least annually. If data from previous screening and TB casefinding are available, the frequency for repeat skin testing should be determined based on the need for timely surveillance information. Observed risk of new tuberculous infection is the most useful evaluation criterion to consider. In institutions with a historically low risk of tuberculous infection (e.g., less than 0.5% of persons with skin-test conversions annually), an increase in AIDS cases or TB cases should be viewed as indicating a need for more frequent skin

testing and intensified TB casefinding activities.

Persons with positive skin-test reactions and all persons with symptoms suggesting TB (e.g., cough, anorexia, weight loss, fever) should receive a chest radiograph within 72 hours of skin-test reading or identification of symptoms. Correctional health-care personnel should be aware of the often atypical signs and symptoms of TB in persons with HIV infection (20). Inmates with abnormal chest radiographs and/or symptoms compatible with TB should also have sputum smear and culture examinations. Sputum should be submitted for smear and culture examination from persons with pneumonia or bronchitis symptoms that fail to abate promptly after initiation of antibiotic treatment. Three specimens should be collected, preferably once daily on 3 consecutive days. In the absence of spontaneous production of sputum, aerosol induction in a properly ventilated area should be used to obtain specimens.

Tuberculin skin-test anergy may be a relatively late development in the progression from HIV infection to AIDS (22); consequently, inmates with known or suspected HIV infection (including those with nonreactive tuberculin tests) should receive a chest radiograph as part of initial screening, regardless of tuberculin skin-test status. Case Reporting

Whenever TB is suspected or confirmed among inmates or staff, this information should be immediately entered into the TB-control records at the institution and at the headquarters level, if in a multi-institutional system. The local or state health department should also be notified, as required by state and local laws or regulations. Contact Investigation

Because TB is transmitted by the airborne route, persons at highest risk for acquiring infection are "close contacts" (e.g., persons who sleep, live, work, or otherwise share air with an infectious person through a common ventilation system). When a person with suspected or confirmed TB appears to be infectious (e.g., has pulmonary involvement on chest radiograph and cough, and/or positive sputum smear), close contacts must be skin tested unless they have a documented history of a positive tuberculin test (21). Close contacts with a positive tuberculin reaction or a history of a previous positive test and symptomatic persons, regardless of skin-test results, should receive immediate chest radiographs to detect evidence of pulmonary TB.

Depending on the ventilation in an institution, close contacts could include all cellmates, all inmates and staff on a tier, or all inmates and staff in a building. Health department staff should be consulted to determine who should be tested. When tuberculin converters are found among the close contacts, other persons with less contact may need to be examined. Every effort should be made by medical and nonmedical staff to ensure the confidentiality of persons with TB.

Close contacts with positive tuberculin reactions but without TB should be given at least 6 months' preventive therapy (see Preventive Therapy, below) unless medically contraindicated (21). Close contacts who do not have a positive tuberculin reaction and who are asymptomatic should have a repeat tuberculin test 10-12 weeks after contact has ended.

Contacts with known or suspected HIV infection should be considered for a 12-month course of preventive therapy, regardless of skin-test results, if evidence indicates that the source patient was infectious.

A patient with clinical TB may have negative sputum smears or cultures, especially if recently infected. Close contacts of such persons should also be examined to detect a source case and other newly infected inmates or staff. CONTAINMENT Isolation

Persons with suspected or confirmed TB who have pulmonary involvement on chest radiograph, cough, and/or a positive sputum smear should be immediately placed in respiratory isolation (e.g., housed in an area with separate ventilation to the outside, negative air pressure in relation to adjacent areas, and at least four to six room air exchanges per hour) (23). It may be necessary to move a patient to another facility or hospital with a respiratory isolation facility.

Respiratory isolation should continue until patients are on appropriate therapy and at least three consecutive daily

negative sputum smears indicate that respiratory precautions may be removed. No special precautions are needed for handling patients' dishes, books, laundry, bedding, or other personal items.

Inadequate or interrupted treatment for TB can lead to drug-resistant TB and transmission of infection. Therefore, after effective medications have begun, it is of utmost importance to keep the patient on medication until completion of therapy, unless signs or symptoms of an adverse reaction appear. Arrangements must be made with the health department for continued medication and follow-up before an inmate with TB is released. Similar arrangements should be made before the release of inmates on preventive therapy.

Because crowding and poor ventilation are conducive to transmission of TB, improvements in housing conditions can help prevent outbreaks. Installing ultraviolet lights may be helpful in prisons where transmission of tuberculous infection has been a problem (24). Although the effectiveness of ultraviolet lights in decreasing TB transmission in such settings has not been confirmed by epidemiologic studies, ultraviolet lights have been used to reduce transmission of TB in hospitals and shelters for the homeless (23,25). When ultraviolet lights are used, proper installation and maintenance is essential (24). Treatment ATS/CDC recommendations should be followed for treatment and management of persons with confirmed or suspected TB (20,26). Each dose of medication should be administered by a designated ancillary medical staff person who watches the inmate swallow the pills. The medication may be given twice weekly (with appropriate change in dosage) after 1-2 months of daily medication (26). To ensure continuing compliance, if a patient is to be discharged before completion of therapy, the health department should be notified before the inmate is released.

Persons with positive smears or cultures at the beginning of therapy should be monitored by repeat sputum examinations for treatment response until they become smear-negative. Treatment failure is usually due to patient noncompliance with therapy but may be due to the presence of drug-resistant organisms.

All patients must be monitored by trained personnel for signs and symptoms of adverse reactions during chemotherapy (20,26). Expert medical consultation regarding monitoring and/or treatment of patients with complications (e.g., AIDS, drug resistance, adverse reactions, pregnancy, nonpulmonary TB) should be sought when necessary. Special emphasis should be placed on close supervision and care of TB patients infected with drug-resistant organisms.

Inmates with TB should be routinely offered testing with appropriate counseling for HIV infection. The presence of HIV infection necessitates longer treatment for TB and continued close observation for adverse drug reactions, treatment failure, and relapse (20). Preventive Therapy

All inmates and staff with positive tuberculin reactions who have not previously completed an adequate course of preventive therapy should be considered for preventive therapy unless there are medical contraindications (20,26). Eligible inmates include those who will be incarcerated long enough to complete at least 1 month of continuous therapy; provisions should be made before release for the health department to oversee completion of at least 6 months of appropriate therapy (unless HIV infected; see below).

HIV-antibody testing should be offered to all known tuberculin-positive inmates. Tuberculin-positive persons with concurrent HIV infection appear to be at very high risk for TB and have highest priority for preventive therapy, regardless of age. Efforts should be made to encourage persons with known or suspected HIV infection to complete 12 months of therapy.

Each dose of preventive therapy should be administered by a designated ancillary medical staff person who watches the patient swallow the pills. Since daily supervised therapy is often not feasible, twice-weekly supervised therapy is a satisfactory alternative.

Most experts believe twice-weekly intermittent preventive therapy (using isoniazid (INH) 900 mg) is effective, although it has not been studied in controlled clinical trials. Medication should not be given to an inmate without direct observation of drug ingestion.

All persons on preventive therapy must be monitored by trained personnel for signs and symptoms of adverse

reactions during the entire treatment period (26). Some prison inmates will have underlying liver disease related to previous alcohol or narcotic abuse (27-29). Although chronic liver disease is not a contraindication to INH preventive therapy, such patients should be carefully monitored (26).

Persons for whom TB preventive therapy is recommended but who refuse or are unable to complete a recommended course should be counselled to seek prompt medical attention if they develop signs or symptoms compatible with TB. Routine periodic chest radiographs are generally not useful for detecting disease in the absence of symptoms; chest radiographs should be reserved for persons with symptoms, especially a persistent cough. ASSESSMENT

Inmates are transferred frequently. Thus, record systems for tracking and assessing the status of persons with TB and tuberculous infection in the prison facilities are essential. These systems must be maintained by using current information on the location, treatment status, and degree of infectiousness of these persons. Prompt action must be taken to assure reinstitution of drug therapy should treatment lapse for any reason.

The record systems should also provide data needed to assess the overall effectiveness of TB-control efforts, and the following information should be reviewed at least every 6 months:

1. Tuberculous infection prevalence and tuberculin conversion rates for inmates and staff within each institution; 2.Case numbers and case rates; 3.Percentage of TB patients recommended for therapy who complete the prescribed 6-month course of directly observed therapy in 6-9 months (goal is greater than or equal to 95%); 4.Percentage of patients with culture-positive sputum that converts to culture negative within 3 months of starting treatment (goal is greater than or equal to 90%); 5.Percentage of persons placed on INH preventive therapy who complete at least 6 months of directly observed therapy (goal is greater than or equal to 90%). In multi-institutional systems, these data should be compiled for individual institutions and for the system as a whole, with results provided to corrections and health department officials. ROLE OF THE HEALTH DEPARTMENT

Health departments should assist correctional institutions in developing and updating policies, procedures, and record systems for TB control. The health department should also provide access to expert TB medical consultation. A specific health department contact person should be designated to provide epidemiologic and management assistance to correctional facilities, and this responsibility should be an element in the designated person's job performance plan. This responsibility may require considerable initial onsite consultation and subsequent semiannual evaluation for correctional institutions.

Health department staff should assist in developing programs to train correctional institution staff (e.g., to perform, read, and record tuberculin skin tests; identify signs and symptoms of TB; initiate and observe therapy; monitor for side effects; collect diagnostic specimens; educate inmates; maintain record systems). Health or corrections departments may wish to grant certification to correctional staff completing this training.

Health departments should also provide consultation for contact examinations within correctional institutions and assure appropriate examinations for nonincarcerated contacts of persons with TB who are identified in these institutions.

In addition, health departments should cooperate with correctional staff in arranging continuing treatment for inmates released while receiving TB treatment or preventive therapy.

Health departments have a responsibility to maintain TB registries with updated medical information on all current TB cases within their jurisdictions, including those in correctional institutions. Records should be assessed quarterly, and necessary revisions in policies or procedures should be recommended. In addition, health departments should periodically assess the impact of correctional institution- acquired TB and tuberculous infection on the community as a whole.

Because inmates may have both TB and HIV infection, health department officials should assist correctional institutions in developing and implementing HIV prevention programs. Such programs include strategies to

identify persons practicing high-risk behaviors, to counsel those infected with HIV, and to reduce high-risk behaviors among all inmates.

As circumstances change, these recommendations will be periodically revised. They are not intended to discourage new and innovative approaches for dealing with TB prevention and control in prisoners. The recommendations should be used instead to enhance the quality of medical care for persons in correctional institutions.

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approximated from a point prevalence as follows: (AIDS patients in the system at the time of the survey - current inmate population of the system) x 100,000. Data on number of cases by year reported are not available for most correctional systems. The method used may underestimate the actual annual incidence in a correctional system.

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