Complete Summary

GUIDELINE TITLE

Controlling tuberculosis in the United States. Recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America.

BIBLIOGRAPHIC SOURCE(S)

Taylor Z, Nolan CM, Blumberg HM. Controlling tuberculosis in the United States. Recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America. MMWR Recomm Rep 2005 Nov 4;54(RR-12):1-81. [441 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Tuberculosis

GUIDELINE CATEGORY

Diagnosis
Prevention
Risk Assessment
Screening
Treatment

CLINICAL SPECIALTY

Family Practice
Infectious Diseases
Internal Medicine
Pediatrics
Preventive Medicine
Pulmonary Medicine

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Health Care Providers
Nurses
Physician Assistants
Physicians
Public Health Departments
Respiratory Care Practitioners
Utilization Management

GUIDELINE OBJECTIVE(S)

To improve the control and prevention of tuberculosis in the United States and to progress towards its elimination

TARGET POPULATION

People in the United States who are at risk for tuberculosis

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Chest radiograph
2. Tuberculin skin test
3. Acid-fast bacilli (AFB) smear/culture
4. *Mycobacterium tuberculosis* genotyping
5. Laboratory services and testing

Prevention/Screening/Risk Assessment

1. Identification of persons at high risk for tuberculosis, contacts, and persons with latent tuberculosis infection (LTBI)
2. Contact investigation
3. Infection-control measures in high risk settings
4. Tuberculosis training and education
5. Targeted testing and timely reporting
6. Human immunodeficiency virus (HIV) testing

Treatment

1. Chemotherapy (isoniazid, rifampin, ethambutol, and pyrazinamide)

2. Directly observed therapy

Management

Planning for TB control among specific populations, including children and adolescents, foreign-born persons, HIV-infected persons, homeless persons, and detainees and prisoners, and in high-risk settings, including health-care facilities

MAJOR OUTCOMES CONSIDERED

- Cases of tuberculosis detected through screening
- Rates of tuberculosis
- Morbidity and mortality caused by tuberculosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Quality of Evidence

I. Evidence from at least one randomized, controlled trial
II. Evidence from 1) at least one well-designed clinical trial, without randomization; 2) cohort or case-controlled analytic studies; 3) multiple time-series; or 4) dramatic results from uncontrolled experiments
III. Evidence from opinions of respected authorities, on the basis of cumulative public health experience, descriptive studies, or reports of expert committees

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

This statement was drafted, after an evidence-based review of the subject, by a panel of representatives of the three sponsoring organizations. The American Academy of Pediatrics (AAP), the National Tuberculosis Controllers Association (NTCA), and the Canadian Thoracic Society were also represented on the panel.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Strength of Recommendation

A. Highly recommended in all circumstances
B. Recommended; implementation might be dependent on resource availability
C. Might be considered under exceptional circumstances

Note: No rating was assigned to recommendations that are considered to be standard practice **(SP)** (i.e., medical or administrative practices conducted routinely by qualified persons who are experienced in their fields).

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions of the strength of the recommendations (A-C) and quality of evidence (I-III) are provided at the end of the "Major Recommendations" field.

Note: No rating was assigned to recommendations that are considered to be standard practice (**SP**) (i.e., medical or administrative practices conducted routinely by qualified persons who are experienced in their fields).

Recommendations for Tuberculosis (TB) Laboratory Services

- Laboratorians, clinicians, and public health officials should work together to develop an integrated system that ensures timely laboratory testing and flow of information among laboratorians, clinicians, and TB controllers **(AIII)**.
- Public health laboratorians should take a leadership role to develop the laboratory system and assure that essential laboratory tests for TB control are available, accessible, standardized, reproducible, and with high sensitivity and specificity **(AII)**.
- Public health laboratories should educate laboratory staffs, health-care providers, and public health officials about the most effective uses of clinical microbiologic laboratory services. Such activities might include education programs, development of web-based or written materials, or direct consultation (standard practice [**SP**]).
- All microbiology laboratories should subscribe to specified turnaround times (Box 2 in the original guideline document) from date of specimen collection to date when the following results are reported:
    - Acid-fast microscopy: $\leq$24 hours
    - Growth detection of mycobacteria in culture: $\leq$14 days
    - Identification of *Mycobacterium tuberculosis* complex: $\leq$21 days
    - Drug susceptibility testing: $\leq$30 days (**AII**)
- The following laboratory results should be reported immediately (preferably by electronic or fax transmission) by the testing laboratory to the responsible clinician and to the jurisdictional TB control program:
    - A positive smear for acid-fast bacilli (AFB) and the subsequent growth detection (culture) result of that specimen
    - Identification of *M. tuberculosis* complex in any specimen
    - Drug susceptibility test results, especially when isolates are drug resistant **(AII)**; and
- Clinical microbiologic laboratories should include, as part of quality improvement, a plan for identification and review of possible false-positive results. Any false-positive result should trigger an inquiry and a plan of correction (Maurer et al., 1984) **(SP)**.

Recommendations for TB Case Detection

- Steps recommended by Institute of Medicine (IOM, 2000) to improve public knowledge and awareness about the risk factors for TB, symptoms of TB, and the implications of the diagnosis of latent infection should be undertaken by TB-control programs, community-based organizations representing populations at high risk, and academic health sciences institutions. Targeted education of populations at high risk might be particularly effective in neutralizing the stigma associated with TB among foreign-born populations on the basis of cultural beliefs in their country of origin. Programs for patient education should always be designed with input from the targeted community **(AII)**.
- Because nonpublic health medical practitioners most often conduct the initial evaluation on persons who have symptoms related to TB, health

departments, academic institutions, and medical professional organizations should provide continuing education about TB to their constituent health-care providers. These efforts should be focused on clinicians serving populations at high risk for TB on the basis of local or regional trends in TB epidemiology **(AIII)**.

- Jurisdictional public health agencies should ensure that clinicians who evaluate persons with suspected TB have access to current, accurate, and timely diagnostic services **(SP)**.
- Guidelines for detection of TB cases in clinical settings should be followed by primary care, emergency department (ED), and hospital-based practitioners (see table below titled "Guidelines for the Evaluation of Pulmonary Tuberculosis (TB) in Adults in Five Clinical Scenarios").
- Screening for TB cases during contact and outbreak investigations and during the evaluation of immigrants and refugees with Class A/B1/B2 TB notification status has a high yield of finding cases (Table 6 in the original guideline document) and should be given high priority as a method for TB case detection **(AII)**.
- Public health programs should identify other opportunities for screening for TB disease on the basis of the local epidemiology of TB, such as in congregate settings, homeless shelters, and correctional facilities in which the consequences of an undiagnosed case are severe. All case detection activities should be evaluated periodically to determine their usefulness **(AII)**.

Table. Guidelines for the Evaluation of Pulmonary Tuberculosis (TB) in Adults in Five Clinical Scenarios

Patient and Setting	Recommended Evaluation	Evidence Rating
Any patient with a cough of ≥2 to 3 weeks' duration, with at least one additional symptom, including fever, night sweats, weight loss, or hemoptysis	Chest radiograph: if suggestive of TB*, collect three sputum specimens for acid-fast bacilli (AFB) smear microscopy and culture	**AII**
Any patient at high risk for TB** with an unexplained illness, including respiratory symptoms of ≥2 to 3 weeks' duration	Chest radiograph: if suggestive of TB, collect three sputum specimens for AFB smear microscopy and culture	**AIII**
Any patient with HIV infection and unexplained cough and fever	Chest radiograph, and collect three sputum specimens for AFB smear microscopy and culture	**AII**
Any patient at high risk for TB with a diagnosis of community-acquired pneumonia who has not improved after 7 days of treatment	Chest radiograph, and collect three sputum specimens for AFB smear microscopy and culture	**AIII**
Any patient at high risk for TB with incidental findings on chest radiograph suggestive of TB even if symptoms are minimal or absent***	Review of previous chest radiographs if available, three sputum specimens for AFB smear microscopy and culture.	**AII**

*Infiltrates with or without cavitation in the upper lobes or the superior segments of the lower lobes. SOURCE: Daley CL, Gotway MB, Jasmer RM. Radiographic manifestations of tuberculosis: a primer for clinicians. San Francisco, CA: Francis J. Curry National Tuberculosis Center: 2003; 1-30.

** Patients with one of the following characteristics: recent exposure to a person with a case of

Patient and Setting	Recommended Evaluation	Evidence Rating
infectious TB; history of a positive test result for *M. tuberculosis* infection; HIV infection; injection or noninjection drug use; foreign birth and immigration in ≤5 years from a region in which incidence is high; residents and employees of high-risk congregate settings; membership in a medically underserved, low-income population; or a medical risk factor for TB including diabetes mellitus, conditions requiring prolonged corticosteroid and other immunosuppressive therapy, chronic renal failure, certain hematological malignancies and carcinomas, weight >10% below ideal body weight, silicosis, gastrectomy, or jejunoileal bypass. *** Chest radiograph performed for any reason, including targeted testing for latent TB infection and screening for TB disease.		

Recommendations for Contact Investigations and for Outbreak Prevention and Response

- Contact investigations are a critical component of TB control, following only TB case detection and treatment in priority **(AIII)**.
- State and local health departments should establish a comprehensive contact investigation program to ensure that contacts of infectious TB cases are identified, access to adequate care is provided, and therapy is completed **(AIII)**.
- TB-control programs should develop a protocol for conducting contact investigations that identifies persons responsible for each step of the investigation and outline processes to maximize the efficiency of the process within the framework of available resources **(AIII)**.
- TB-control programs should have procedures for voluntary human immunodeficiency virus (HIV) counseling and testing of contacts. Those procedures should set priorities for HIV counseling and testing of contacts on the basis of locally derived data on the risk for HIV infection among contacts or, alternatively, on the local epidemiology of TB and HIV infection **(BIII)**.
- Tuberculin skin testing of contacts should establish as first priorities those contacts who are at highest risk for progressing from latent tuberculosis infection (LTBI) to TB disease on the basis of transmission risk assessment and the presence in contacts of risk factors for progression (e.g., age <5 years, HIV infection, and other immunocompromising conditions ("Targeted tuberculin testing," 2000) **(AII)**.
- Directly observed therapy (DOT) for LTBI should be considered for all contacts. High risk contacts should receive highest priority for directly observed treatment **(AIII)**.
- TB-control programs should apply existing communicable disease laws that protect the health of the community to contacts who fail to comply with the examination requirements **(BIII)**.
- TB-control programs should develop guidelines, in conjunction with the program legal office and in compliance with Health Insurance Portability and Accountability Act (HIPAA) rule, for release of confidential information related to conducting contact investigations **(BIII)**.
- TB-control programs should evaluate the effectiveness and impact of contact investigations and develop interventions to improve performance when indicated **(BIII)**.
- TB-control programs should develop outbreak response plans for their jurisdictions. These plans should include indications for initiating the plan, notification procedures, composition of the response team, source of staffing, plan for follow-up and treatment of contacts, indications for requesting assistance from CDC, and a plan for evaluating the outbreak response **(BIII)**.

Recommendations for the Public Health Aspects of Targeted Testing and Treatment of LTBI

- When a TB-control program is prepared to develop strategies for targeted testing and treatment of LTBI (i.e., the program satisfies national objectives for management of TB cases and contacts [Table 4 in the original guideline document]), it should begin by identifying populations and communities at high risk for LTBI within its jurisdiction and establish priorities for intervention **(AIII)**.
- Populations and communities should be categorized on the basis of the expected impact and efficacy of targeted testing in the setting. Tier 1 groups (see "Priority Population Subpopulations and Sites for Targeted Testing and Treatment of Latent Tuberculosis [TB] Infection" below) should receive the highest priority, followed by groups in Tier 2 and Tier 3 **(AII)**.
- Once the targeted population or community has been identified, strategic and operational decisions should be made on how best to establish the targeted testing and treatment program. Questions to decide include where to locate the program, how to identify and allocate resources, what training is needed for practitioners and patients, and what data-management needs exist. Focus groups, influential community leaders, associations and community action agencies, religious organizations, coalitions, block organizations, and informal community groups all can contribute to these decisions **(AII)**.
- Public health agencies that establish targeted testing and treatment programs should maximize patient convenience and acceptance through strategies such as employing, when possible, staff members from the populations being served, medical translation, cultural awareness and sensitivity, flexible clinic hours, outreach services for patient transport, and the use of incentives and enablers. All services should be free of cost to patients **(AII)**.
- Targeted testing programs established in the community (e.g., at community health centers, schools, prisons, jails, substance abuse centers, and homeless shelters) should receive full support from the jurisdictional public health agency. Such support might be decisive in the success of nonpublic health targeted testing and treatment programs. Types of support should include training and education of providers, patient education materials, provisions of medication, radiographs and other laboratory services, clinical consultation, and design of tracking and data management systems **(AII)**.
- Targeted testing programs should be routinely and systematically evaluated for their effectiveness, efficiency, and impact. Programs that are not effective should be improved or discontinued **(AIII)**.

Priority Population Subpopulations and Sites for Targeted Testing and Treatment of Latent Tuberculosis (TB)

Tier 1

- Persons working in or served by clinics or community health organizations providing care to HIV-infected persons
- Prisoners
- Legal immigrants and refugees with Class B1 and B2 TB notification status
- Recently-arrived refugees
- Other well-defined groups in congregate living facilities

- Persons enrolled in substance abuse treatment programs*

Tier 2

- Jail detainees
- Persons working or living in homeless shelters
- Immigrants reporting for adjustment of status

Tier 3

- Other foreign-born persons at high risk (i.e., those that immigrated ≤5 years from countries with a high incidence of TB)

*Persons enrolled in substance abuse treatment programs should be considered a transition group between Tier 1 and Tier 2, depending on the local epidemiology of tuberculosis.

Recommendations for TB Control Among Children and Adolescents

Case Detection and Primary Prevention Strategy

- Timely reporting of suspected cases of infectious TB is crucial to the prevention of TB among children **(AII)**.
- Contact investigation of adults with infectious TB is the most important activity for early detection of TB among children, identification of children with LTBI who are at high risk for progressing to primary TB and its sequelae, and determination of the drug susceptibility pattern of the *M. tuberculosis* isolate causing TB disease or LTBI in a child. Contact investigations should be timely and thorough, and adequate resources for them should be made available. This should be one of the highest priority goals of any TB-control program **(AII)**.
- Children aged <5 years who have been identified as contacts of persons with infectious TB should receive a clinical evaluation, including a tuberculin skin test and chest radiograph, to rule out active TB. Once active TB has been ruled out, children with positive tuberculin skin test results should receive a full course of treatment for LTBI. Those who have negative skin test results should also receive treatment for presumed LTBI. This intervention is especially critical for infants and toddlers aged <3 years but is recommended for all children aged <5 years. A second tuberculin test is then placed at least 3 months after exposure to infectious TB has ended. If the second test result is positive, treatment should be continued for a full course of treatment for LTBI. If the second test result is negative, treatment may be stopped **(AII)**.

Case Management

- DOT should be the standard of care for treatment of TB disease among children and adolescents **(AII)**.
- As adherence to treatment is no better for children than for adults, all efforts should be made to support children and families through treatment of TB through comprehensive case management **(AIII)**.

Contact Investigation

- Infants and younger children with primary TB disease are rarely if ever contagious. They do not need to be excluded from activities or isolated in health-care settings **(AII)**.
- Children and adolescents of any age with characteristics of adult-type TB (i.e., productive cough and cavitary or extensive upper lobe lesions on chest radiograph) should be considered potentially contagious at the time of diagnosis **(AII)**.
- Infants with suspected or proven congenital pulmonary TB should be considered contagious and effective infection-control measures should be undertaken **(AII)**.
- Adults who accompany and visit children with TB in health-care settings should be evaluated for TB disease as soon as possible to exclude the possibility that they are the source case for the child. These adults should have a chest radiograph to rule out pulmonary TB and to prevent the possibility of transmission within the healthcare setting **(AII)**.
- Testing of the contacts of children aged <4 years with LTBI is recommended for persons sharing a residence with the child or those with equally close contact. Such investigations may be performed by public health agencies or primary health-care providers **(BII)**.

Targeted Testing and Treatment of LTBI

- Contact investigations of adults with TB and targeted tuberculin skin testing of foreign-born children from countries with a high incidence of TB are the best and most efficient methods for finding children with LTBI **(AII)**.
- Because foreign birth in a country with a high prevalence of TB is the greatest attributable risk factor for LTBI, children born in or with extensive travel to such countries should be targeted for testing for LTBI. This includes foreign-born adopted children. Testing for LTBI among children with low risk for infection should be avoided **(AII)**.
- A risk assessment questionnaire can be used to identify children with risk factors for LTBI who should undergo a tuberculin skin test **(AI)**.
- A decision to place a tuberculin skin test is a commitment to arrange evaluation and treatment for LTBI **(SP)**.
- A tuberculin skin test should always be placed, read, and interpreted by specifically trained persons **(SP)**.
- In general, foreign-born children with LTBI should be treated with isoniazid unless information exists linking them to a specific case of isoniazid-resistant TB **(AIII)**.
- DOT should be considered strongly as the means of treatment for newborns and infants, contacts of persons with recent cases, and immune-compromised children and adolescents with LTBI because they are at greatest risk for progression to TB disease **(AIII)**.

<u>Recommendations for TB Control Among Foreign-Born Persons</u>

Surveillance

- Public health agencies in states and communities with a substantial number of TB cases among foreign-born persons should develop enhanced surveillance

methods in order to gain a detailed understanding of the local epidemiology of TB among foreign-born persons. This is important for program planning and to ensure that recently arrived immigrants, refugees, and other foreign-born persons at high risk have access to medical and public health services **(AIII)**.
- Imported cases of TB present at the time of entry should be distinguished from incident cases, i.e., those that arise during residence in the United States **(AIII)**.
- Cases of TB among persons granted temporary entry to the United States as visitors, students, and temporary workers and unauthorized aliens (see Table 7 in the original guideline document) should be distinguished from those among foreign-born permanent residents **(AIII)**.
- Cases identified as a result of targeted testing activities should be distinguished from those identified by noting symptoms of active TB **(AIII)**.
- For TB control along the U.S.-Mexico border to be facilitated, a binational TB case definition and TB registry system should be adopted and evaluated **(AIII)**.

Case Detection

- Jurisdictional public health agencies responsible for TB control should undertake or engage community groups to undertake education campaigns for foreign-born persons at high risk. These campaigns should communicate the importance of TB as a personal and public health threat, the symptoms to look for, how to access diagnostic and targeted testing services in the community, and the concept of LTBI. The purpose of this education is to destigmatize the infection, acquaint the population with available medical and public health services, and explain the approaches used to treat, prevent, and control TB **(AIII)**.
- Public health agencies conducting TB-control programs should establish liaisons with primary care physicians, community health centers, hospital emergency departments, and other organizations that provide health care for foreign-born populations at high risk to provide TB publications and guidelines and education about the local epidemiology of TB **(AIII)**.
- Public health agencies conducting TB-control programs should establish liaisons with civil surgeons within their jurisdictions. They should also ensure that civil surgeons have access to recent TB publications and guidelines and that they promptly report all suspected cases of TB **(AIII)**.
- CDC should provide standardized education and training programs with a formal certification process for panel physicians and civil surgeons. As part of the certification, continuing education programs should be required **(AIII)**.
- Federal, state, and local public health agencies should assign high priority to the follow-up of immigrants with a Class A TB waiver and Class B1 and B2 TB notification status **(AII)**.

Case Management

- Culturally appropriate case management should be instituted, including readily available professional translation and interpretation services, for all foreign-born persons. If possible, outreach workers should be from the patient's own cultural background **(AII)**.

Contact Investigation

- Local and state jurisdictions should assign high priority to contact investigations of foreign-born persons with TB because of the high likelihood of identifying persons with LTBI as well as secondary TB cases **(AII)**.
- Culturally sensitive and appropriate contact investigation protocols should be established **(AIII)**.

Targeted Testing and Treatment of LTBI

- In jurisdictions where foreign-born persons constitute a major proportion of the TB burden, targeted testing and treatment of LTBI for foreign-born persons at high risk ("Targeted tuberculin testing," 2000) should be implemented as a primary means of preventing TB in the community. The tiered approach (see "Priority Population Subpopulations and Sites for Targeted Testing and Treatment of Latent Tuberculosis [TB]," above), which is based on access to the target populations and likelihood of implementing a successful program, should be employed **(AII)**.
- In developing the plan for targeted testing and treatment of LTBI among foreign-born persons at high risk, TB-control programs should collaborate with health-care providers, neighborhood health centers, and community advocacy groups that serve and work with the target populations **(AII)**.
- The testing of immigrants and refugees with a Class A TB waiver and Class B1 and B2 TB notification status for LTBI as well as for active TB should always be prioritized **(AII)**.
- Targeted testing and treatment of foreign-born children at high risk aged <15 years should be a priority **(SP)**.
- When resources permit, DOT for LTBI should be used to ensure high completion rates **(BII)**.
- Jurisdictional public health agencies should work with local colleges and universities to develop targeted testing protocols for foreign-born students at high risk and assist with treatment of LTBI **(BIII)**.

Recommendations for TB Control Among HIV-Infected Persons

HIV Counseling and Testing

- Voluntary HIV counseling and testing is recommended for all patients with TB and should be considered the standard of care. In extreme circumstances, if establishing priorities is necessary as a result of resource constraints, patients aged 25-44 years should receive highest priority **(SP)**.
- Clinic staff members at sites where patients with TB are followed should receive up-to-date education and training on the most current concepts and methodology of voluntary HIV counseling, testing, and referral. If on-site HIV testing is not feasible, TB facilities should have well-established arrangements for referral to other testing sites **(SP)**.
- Voluntary HIV counseling and testing should be offered routinely to contacts of HIV-infected TB cases **(AII)**.
- Voluntary HIV counseling and testing should be offered to all contacts that are members of populations with a prevalence of HIV infection $\geq$1% (CDC, 2001). In other communities and settings, the decision of whether to routinely offer voluntary HIV counseling and testing to contacts of persons with infectious TB should be based on the local epidemiology of HIV infection and TB. In communities or settings where populations at risk for TB are also known to

have high rates of HIV infection (e.g., injection drug users [IDUs] in inner cities [Selwyn et al., 1989]), all contacts should be routinely offered voluntary HIV counseling and testing. In communities and settings in which the HIV seroprevalence likely approaches that of the general U.S. population (<0.1%), a risk-factor assessment for HIV infection should be included in the evaluation of contacts of infectious cases, and contacts with clinical or behavioral risk factors for HIV infection (CDC, 2001) should receive voluntary HIV counseling and testing **(AII)**.

- Persons with LTBI who are members of populations with a prevalence of HIV infection >1% should be routinely offered voluntary HIV counseling and testing (CDC, 2001). Otherwise the decision of whether to routinely offer HIV counseling and testing to persons with LTBI should based on the local epidemiology of HIV infection and TB. In communities or settings where populations at risk for TB are also known to have high rates of HIV infection (e.g., intravenous drug users in inner cities), routine counseling and testing among patients with LTBI is indicated. In other communities and settings the HIV seroprevalence is likely to approach that of the general U.S. population (<0.1%), a risk-factor assessment for HIV infection should be included as a standard part of the initial evaluation for all persons diagnosed with LTBI. Persons with clinical or behavioral risk factors should receive HIV counseling and testing **(AII)**.
- Routine periodic cross-matches of jurisdictional HIV and TB case registries should be conducted to ensure completeness of reporting of both diseases **(SP)**.

Case Detection

- Physicians who provide primary care to persons with HIV infection or populations at increased risk for HIV infection should maintain a high index of suspicion for TB. Every patient in whom HIV infection has been newly diagnosed should be assessed for the presence of TB or LTBI. This should include a history for symptoms compatible with TB (e.g., cough of $\geq$2 to 3 weeks' duration, fever, night sweats, weight loss, or hemoptysis, or unexplained cough and fever [see table above titled "Guidelines for the Evaluation of Pulmonary Tuberculosis (TB) in Adults in Five Clinical Scenarios"]) and of exposure to persons with TB. Physical examination should include examination of extrapulmonary sites such as lymph nodes, and a chest radiograph should be taken to check for findings of current or previous TB. Testing for *M. tuberculosis* infection by using the tuberculin skin test should be conducted, and patients with $\geq$5 mm of induration be considered to have a positive test and should receive, in addition to chest radiography, a clinical evaluation to rule out TB ("Targeted tuberculin testing," 2000) **(SP)**.
- Public health agencies conducting TB-control activities should maintain close contact with HIV control programs, medical practitioners and clinics, community-based organizations, homeless shelters, correctional facilities, and housing facilities that serve persons with HIV infection to ensure that a high index of awareness of TB is maintained by persons who provide services at those sites and by their HIV-infected patients **(AIII)**.
- Health-care facilities, social service agencies, and work sites that serve patients with HIV infection should establish firm lines of referral for patients with respiratory symptoms **(AIII)**.

Case Management

- Public health agencies conducting TB-control activities should have access to consultants with expertise in managing HIV related TB **(SP)**.
- Management of TB and HIV infection should be effectively integrated and should include a multidisciplinary team of providers and supportive care **(AIII)**.
- Comprehensive case management, including DOT, is strongly recommended for persons with HIV infection who have TB **(AII)**.
- HIV-infected patients with TB and a CD4 count <100 cells/microliter should receive DOT daily or three times per week **(AI)**.

Contact Investigation

- Contact investigations of persons with TB and known or suspected HIV infection and those conducted in any circumstance in which HIV-infected persons could have been exposed to a person with infectious TB should have the highest priority and be completed without delay **(AII)**.
- Persons with known or suspected HIV infection who have contact with a patient with infectious pulmonary TB should be offered a full course of treatment for LTBI regardless of the initial result of tuberculin skin testing once active TB has been ruled out **(AII)**.

Targeted Testing and Treatment of LTBI

- Targeted testing and treatment for LTBI are strongly recommended at the time the diagnosis of HIV infection is established **(AII)**.
- For HIV-infected persons whose initial tuberculin skin test is negative, repetitive testing is recommended (at least yearly) if the local epidemiologic setting indicates an ongoing risk for exposure to TB **(AII)**.
- An HIV-infected patient who is severely immunocompromised and whose initial tuberculin skin test result is negative should be retested after the initiation of antiretroviral therapy and immune reconstitution, when CD4 cell counts are greater than 200 cells/microliter) **(AII)**.
- HIV-infected persons who receive a diagnosis of LTBI should receive high priority for DOT **(BIII)**.

Institutional Infection Control

- HIV-infected persons should be advised that certain occupations and activities increase the likelihood of exposure to TB. These include employment and volunteer work in certain health-care facilities, correctional institutions, and shelters for the homeless, as well as in other high-risk settings identified by jurisdictional health authorities. The decision about continuing employment or volunteer activities in a high-risk setting should be made in consultation with a health-care professional and be based on factors such as the person's specific duties in the workplace, prevalence of TB in the community, and the degree to which precautions are taken to prevent TB transmission in the workplace **(AIII)**.

Recommendations for TB Control Among Homeless Persons

Surveillance and Case Detection

- Information on whether the person is homeless should be included for each reported TB case to determine the importance of homelessness in the TB morbidity in the state or community. This is particularly important for communities that provide shelters or other congregate living facilities that are conducive to the transmission of TB **(AII)**.
- In designing programs for control and prevention of TB in homeless persons, public health agencies should work closely with providers of shelter, housing, primary health care, treatment for alcoholism or substance abuse, and social services to ensure a comprehensive approach to improving the health and welfare of this population **(AIII)**.
- Public health agencies should closely monitor the location, mode (i.e., screening or symptomatic presentation), and timeliness of diagnosis of TB in homeless persons in their community and use such data to develop more effective control strategies **(AIII)**.
- Public health agencies should identify providers of medical care for homeless persons and facilities that serve homeless persons (e.g., hospital emergency departments and correctional institutions) to ensure that practices and procedures are implemented to readily detect and report suspected cases of TB **(AIII)**.
- Providers of primary health care for homeless persons should be knowledgeable about how to diagnose (see table above titled "Guidelines for the Evaluation of Pulmonary Tuberculosis [TB] in Adults in Five Clinical Scenarios"), isolate, and report suspected cases of TB **(AIII)**.
- Public health agencies should have ready access to an inpatient facility for the isolation and induction phase of therapy of homeless patients with infectious TB **(AII)**.
- Public health agencies should be prepared to conduct activities to detect TB among persons without symptoms and enhance TB case detection as part of a plan for TB control among homeless persons (see Table 6 in the original guideline document). Indications for screening for TB disease include 1) a documented outbreak, 2) an increase in incidence of TB in the homeless population, and 3) evidence of current transmission of TB in the population. Shelters should always be suspected as sites of transmission **(AII)**.

Case Management

- Case management for homeless persons with TB should be structured to encourage adherence to treatment regimens by making TB treatment a major priority for the patient. It should include provision of housing, at least on a temporary basis; an increasing number of models have demonstrated the importance of a housing incentive in successful treatment of TB in homeless persons. Case management should also include establishing linkages with providers of alcohol and substance treatment services, mental health services, and social services **(AII)**.

Contact Investigation

- Health departments should regularly evaluate their methods for contact investigation for cases of TB among homeless persons to identify barriers and develop alternative strategies, such as shelter- or other location-based

contact investigations oriented to possible sites of transmission. Factors to evaluate should include timeliness of completing contact investigations, number of contacts identified and evaluated per case, proportion of evaluated contacts with LTBI and TB disease, and completion of treatment of LTBI among contacts **(AII)**.

Targeted Testing and Treatment of LTBI

- Targeted testing and treatment of LTBI should be a priority for homeless populations because studies from throughout the United States have demonstrated high rates of transmission of *M. tuberculosis* in this group. This epidemiologic situation, causing a high ongoing risk for acquiring LTBI and TB disease, might necessitate repetitive testing for *M. tuberculosis* infection among homeless persons **(AII)**.
- When high rates of transmission of *M. tuberculosis* are documented among homeless persons, those with a positive test for *M. tuberculosis* infection should be presumed to be recently infected and treated for LTBI **(AIII)**.

Institutional and Environmental Controls

- Organizations that provide shelter and other types of emergency housing for homeless persons should develop institutional TB-control plans. Guidelines to facilitate this process are available from CDC (Kaplan, Masur, & Holmes, 2002) and the Francis J. Curry National TB Center (Hammett, Harmon, & Rhodes, 1997) **(AII)**.

Recommendations for TB Control Among Detainees and Prisoners

Case Detection and Case Management

- All jails and prisons should conduct a TB case detection program for detainees and prisoners entering the facility as well as for those who become ill during incarceration to ensure prompt isolation of contagious cases of TB **(AII)**.
- Strategies for case detection for incoming detainees and prisoners include symptom surveys **(BIII)**, testing for *M. tuberculosis* infection followed by chest radiography **(BIII)** for those with a positive test, and universal chest radiography in jails **(BII)**. In each setting, the adopted strategy should receive ongoing evaluation.
- Each correctional facility's health-care program for inmates and staff should ensure that training in the clinical and public health aspects of TB and other diseases of public health significance is provided in an ongoing manner **(SP)**.
- Detainees and prisoners with signs and symptoms of TB should be placed in respiratory isolation on-site or off-site until infectious TB is ruled out **(SP)**.
- Case-management strategies including DOT and incentives should be used to assure completion of therapy of detainees and prisoners with TB **(BII)**.
- When detainees and prisoners receiving therapy for TB are transferred to another facility or released from detention, responsibility for continuation of the treatment plan should be transferred to the appropriate facility or agency, and the jurisdictional TB-control program should be notified **(SP)**.

Contact Investigation

- Contact investigations of infectious TB cases in corrections facilities should receive equal priority as effective case detection as the primary means of aborting TB outbreaks. Facilities should have written procedures for contact investigations and have adequate staff to ensure prompt and thorough contact investigations. They should also consult with the jurisdictional public health TB-control program **(AII)**.

Targeted Testing and Treatment of LTBI

- Prisons should implement a treatment program for prisoners with LTBI as part of the effort to prevent the transmission of *M. tuberculosis* within their walls and to contribute to the overall goal of TB elimination **(AII)**.
- Treatment programs for LTBI in jail detainees should be undertaken only if it is possible to develop a successful plan for community follow-up of released persons on treatment **(AII)**.
- Reducing the length of treatment for LTBI is more likely to lead to completion of treatment in correctional facilities; 4 months of rifampin is recommended as an alternative for the treatment of LTBI ("Targeted tuberculin testing," 2000; CDC & American Thoracic Society, 2003). Correctional health providers need to consider the costs and benefits of this regimen compared with the standard 9-month course of isoniazid in each individual case **(BIII)**.

Institutional Infection Control

- Jails and prisons should implement effective infection-control programs including risk assessment, staff training, screening and treatment of LTBI, isolation of inmates with infectious forms of TB, treatment and discharge planning, and contact investigation **(AII)**.
- HIV-infected detainees and prisoners should not be housed together in a separate facility unless institutional control programs following current guidelines have been established and proved to be effective in preventing the transmission of *M. tuberculosis* **(AIII)**.

Recommendations for TB Control in Health-Care Facilities and Other High-Risk Settings

- All health-care institutions and other sites at high risk for transmission of *M. tuberculosis* should have in place a TB infection control program; they should implement and enforce procedures to promptly identify, isolate, and either manage or refer persons with suspected and confirmed infectious TB **(AII)**.
- All health-care institutions that care for persons with TB and other sites that are at risk for transmission should implement TB infection-control measures based on a hierarchy of administrative controls, engineering controls, and respiratory protection. Administrative controls and early recognition of persons with TB are the most important parts of an airborne infection control program for TB **(AII)**.
- Employees who have first contact with patients in settings that serve populations at high risk for TB should be trained to detect persons who could have infectious TB. Patients should be routinely asked about exposure to *M. tuberculosis*, previous TB infection or disease, current symptoms suggestive of TB, and medical conditions that increase the risk for TB. The medical

evaluation should include an interview conducted in the patient's primary language, with the assistance of a medical interpreter if necessary **(AIII)**.

- The index of suspicion for TB should be very high in health-care settings located in geographic areas where TB is prevalent and those serving patients at high risk for TB. Guidelines exist for conducting an evaluation for suspected pulmonary TB in adults at high risk (see table above titled "Guidelines for the Evaluation of Pulmonary Tuberculosis [TB] in Adults in Five Clinical Scenarios") **(AIII)**.
- Among persons suspected of having TB, arrangements should be available for the diagnosis to be promptly established and standard therapy initiated **(AII)**.
- Health-care workers (HCWs) and employees in other high-risk settings should be tested for *M. tuberculosis* infection upon employment. Subsequent testing should be based on risk assessment **(AIII)**.
- Health-care facilities and other high-risk institutions should conduct a risk assessment to determine the frequency of testing for *M. tuberculosis* infection among employees, as a component of the proper level of TB infection control measures **(AIII)**.
- For health-care workers and employees in other high-risk settings with no other risk factors for TB, a cut-off of 15 mm of induration (rather than 10 mm) on the tuberculin skin test should be used to define a positive baseline test at the time of initial employment. An increase of $\geq$10 mm in reaction size is generally accepted as a positive test result on subsequent testing unless the worker is a contact of a TB case or has HIV infection or is otherwise immunocompromised, in which case a result of $\geq$5 mm is considered positive **(AIII)**.
- Employees with *M. tuberculosis* infection should have a chest radiograph performed to exclude TB disease and should be evaluated for treatment of LTBI, based on current recommendations **(AII)**.
- Health-care workers and employees in other high risk settings with an indication for treatment of LTBI should be encouraged to initiate and complete treatment **(AII)**.
- Residents admitted to long-term care facilities should be tested for *M. tuberculosis* infection upon admission (with a two-step test if using tuberculin skin testing) and should receive a history and physical examination to detect symptoms and signs of TB. Residents with *M. tuberculosis* infection should be offered treatment if indicated ("Targeted tuberculin testing," 2000; CDC & American Thoracic Society, 2003), with careful monitoring for drug toxicity **(BII)**.
- Jails and prisons should develop and implement effective infection-control programs including risk assessment, staff training, screening for TB among incoming detainees and prisoners, isolation of inmates with infectious forms of TB, treatment and discharge planning, and prompt and thorough contact investigations **(AII)**.
- In jails and prisons, HIV-infected inmates should not be housed together in a separate housing unit unless institutional control programs following current guidelines have been established and proved to be effective in preventing the transmission of *M. tuberculosis* **(AII)**.
- Organizations that provide shelter and other types of emergency housing for homeless persons should develop institutional TB-control plans. Guidelines to facilitate this process are available from the Francis J. Curry National TB Center (Hammett, Harmon, & Rhodes, 2002) **(AII)**.

- TB-control programs should remain aware of the possibility of TB disease as a result of current transmission when conducting epidemiologic surveillance and contact investigations. *M. tuberculosis* genotyping should be immediately available to any program that is investigating possible transmission of *M. tuberculosis* **(AII)**.
- In an era of declining rates of TB in the United States, expertise in the recognition, diagnosis and treatment of TB is likely to decline, especially in areas in which incidence is low (Jereb, 2002). Because the risk for spread of *M. tuberculosis* increases when the diagnosis is not promptly made, institutional education programs for health-care workers, including physicians in training, should be made a continuing priority **(AIII)**.

Definitions:

Strength of Recommendation

A. Highly recommended in all circumstances
B. Recommended; implementation might be dependent on resource availability
C. Might be considered under exceptional circumstances

Quality of Evidence

I. Evidence from at least one randomized, controlled trial
II. Evidence from 1) at least one well-designed clinical trial, without randomization; 2) cohort or case-controlled analytic studies; 3) multiple time-series; or 4) dramatic results from uncontrolled experiments
III. Evidence from opinions of respected authorities, on the basis of cumulative public health experience, descriptive studies, or reports of expert committees

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Reduced morbidity and mortality caused by tuberculosis (TB) by 1) preventing transmission of *Mycobacterium tuberculosis* from persons with contagious forms

of the disease to uninfected persons and 2) preventing progression from latent tuberculosis infection (LTBI) to tuberculosis disease among persons who have contracted *M. tuberculosis* infection

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

References to non-Centers for Disease Control (CDC) sites on the Internet are provided as a service to Morbidity and Mortality Weekly Report (*MMWR)* readers and do not constitute or imply endorsement of these organizations or their programs by CDC or the U.S. Department of Health and Human Services. CDC is not responsible for the content of these sites. URL addresses listed in *MMWR* were current as of the date of publication.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

The original guideline document contains detailed recommendations on the implementation of measures for tuberculosis (TB) control and prevention, including:

- Principles and practice of TB control
- Recommended roles and responsibilities for TB control
- Essential components of TB control in the United States
- Control of TB among populations at high risk
- Control of TB in health-care facilities and other high-risk environments

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Taylor Z, Nolan CM, Blumberg HM. Controlling tuberculosis in the United States. Recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America. MMWR Recomm Rep 2005 Nov 4;54(RR-12):1-81. [441 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

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GUIDELINE DEVELOPER(S)

American Thoracic Society - Medical Specialty Society
Centers for Disease Control and Prevention - Federal Government Agency [U.S.]
Infectious Diseases Society of America - Medical Specialty Society

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Centers for Disease Control and Prevention (CDC) Web site.

Print copies: Available from the Centers for Disease Control and Prevention, MMWR, Atlanta, GA 30333. Additional copies can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325; (202) 783-3238.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

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