Screening for tuberculosis: Updated recommendations

Each of the available testing methods has advantages and disadvantages. An individual's age, level of risk, and other personal factors help determine the best screening option.

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Tuberculosis (TB) remains a significant public health problem worldwide with an estimated 10.4 million new cases and 1.7 million deaths having occurred in 2016.[1] In that same year, there were 9287 new cases in the United States—the lowest number of TB cases on record.[2]

TB appears in one of 2 forms: active disease, which causes symptoms, morbidity, and mortality and is a source of transmission to others; and latent TB infection (LTBI), which is asymptomatic and noninfectious but can progress to active disease. The estimated prevalence of LTBI worldwide is 23%,[3] although in the United States it is only about 5%.[4] The proportion of those with LTBI who will develop active disease is estimated at 5% to 10% and is highly variable depending on risks.[4]

In the United States, about two-thirds of active TB cases occur among those who are foreign born, whose rate of active disease is 14.6/100,000.[2] Five countries account for more than half of foreign-born cases: Mexico, the Philippines, India, Vietnam, and China.[2]

Who should be tested?

A major public health strategy for controlling TB in the United States is targeted screening for LTBI and treatment to prevent progression to active disease. The US Preventive Services Task Force (USPSTF) recommends screening for LTBI in adults age 18 and older who are at high risk of TB infection.[4] This is consistent with recommendations from the Centers for Disease Control and Prevention (CDC), although the CDC also recommends testing infants and children at high risk of infection, as well as all those at high risk for progression to active disease (**TABLE 1**[4-6]).[5]

Two types of testing are available for TB screening: the TB skin test (TST) and the interferon-gamma release assay (IGRA). There are 2 IGRA test options: T-SPOT.*TB* (Oxford Immunotec) and QuantiFERON-TB Gold (Qiagen). The TST and IGRA each has advantages and disadvantages. The TST must be placed intradermally and read correctly, and the patient must return for the interpretation 48 to 72 hours after placement. Test interpretation depends on the patient's risk category, with either a 5-mm, 10-mm, or 15-mm induration being classified as a positive result (**TABLE 2**[7]).

IGRA is a blood test that needs to be processed within a limited time frame and is more expensive than the TST. The USPSTF lists the sensitivity and specificity of each option as follows: TST, using a 10-mm cutoff, 79%, 97%; T-SPOT, 90%, 95%; QuantiFERON-TB Gold In-Tube, 80%, 97%.[4]

Which test to use?

Recently the CDC, the American Thoracic Society, and the Infectious Diseases Society of America jointly published revised recommendations on TB testing:[8]

- For children younger than 5 years, TST is the preferred option, although IGRA

If the risk is high for TB infection, but not for disease progression, test with an interferon-gamma release assay, particularly if the patient has been vaccinated or is unlikely to return for skin test interpretation.

is acceptable in children older than 3 years of age.

- For individuals at high risk of infection but not at high risk of disease progression, IGRA is recommended if they have received a bacille Calmette-Guerin vaccine or are unlikely to return for TST interpretation.
- For others at high risk of infection but not at high risk of disease progression, IGRA is preferred but TST is acceptable.
- For those who have both a high risk of infection and a high risk of disease progression, evidence is insufficient to recommend one test over another; either type is acceptable.
- For those with neither high risk of infection nor high risk of disease progression, testing is not recommended. However, it may be required by law or for credentialing of some kind (eg, for some health professionals or those who work in schools or nursing homes). If this is the case, IGRA is suggested as the preferred test. If the test result is positive, performing a second test is advised (either TST or an alternative type of IGRA). Consider the individual to be infected only if the second test result is also positive.

TABLE 1

Screen these individuals for tuberculosis infection[4-6]

Those at high risk of acquiring latent infection
• Household contacts and others in close contact with an individual who has active tuberculosis
• Mycobacteriology laboratory personnel
• Immigrants from countries with high rates of tuberculosis*
• Residents and staff of high-risk congregate settings (homeless shelters and correctional facilities)
• Populations determined to be at high risk by local or state health departments
Infected individuals at high risk of progressing to active disease
• Patients infected with HIV or another condition that weakens the immune system (eg, silicosis, diabetes mellitus)
• Patients receiving immunosuppressive therapy (including chemotherapy and tumor necrosis factor–alpha inhibitors) and recipients of organ transplants
• Children <5 years
• Those with chest x-ray findings consistent with old tuberculosis
• Users of injectable illicit drugs

HIV, human immunodeficiency virus.

*The World Health Organization maintains a list of countries with high rates of tuberculosis. See http://www.who.int/tb/publications/global_report/en/.

If a TB screening result is positive, confirm or rule out active TB by asking about symptoms (cough, fever, weight loss) and per-

TABLE 2

How to read results of the tuberculin skin test[7]

An induration of ≥5 mm is considered positive in:
• HIV-infected individuals
• Those who have had recent contact with an individual with TB disease
• Individuals with fibrotic changes on chest radiograph consistent with prior TB
• Patients who have had organ transplants
• Those who are immunosuppressed for other reasons (eg, taking the equivalent of >15 mg/d of prednisone for one month or longer; taking TNF-alpha antagonists)
An induration of ≥10 mm is considered positive in:
• Recent immigrants (<5 years in the United States) from high-prevalence countries
• Injection drug users
• Residents and employees of high-risk congregate settings
• Mycobacteriology laboratory personnel
• Individuals with clinical conditions that place them at high risk
• Children <4 years of age
• Infants, children, and adolescents exposed to adults in high-risk categories
An induration of ≥15 mm is considered positive in:
• Any individual, including one with no known risk factors for TB. (However, targeted skin testing should only be conducted among high-risk groups.)

HIV, human immunodeficiency virus; TB, tuberculosis; TNF, tumor necrosis factor.

forming a chest x-ray. If the radiograph shows signs of active TB, collect 3 sputum samples by induction for analysis by smear microscopy, culture, and, possibly, nucleic acid amplification and rifampin susceptibility testing. Consider consulting your local public health department for advice on, or assistance with, sample collection. Report LTBI to the local health department and seek advice on the appropriate tests and treatments.

Expanded treatment selections

With LTBI there are now 4 treatment options for patients and physicians to consider:[9] isoniazid given daily or twice weekly for either 6 or 9 months; isoniazid and rifapentine given once weekly for 3 months; or rifampin given daily for 4 months. Factors influencing treatment selection include a patient's age, concomitant conditions, and the likelihood of bacterial resistance. Free treatment for LTBI may be available; again, check with your local health department. JFP

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