## Health Care Provider Information

NOTE: This page is a resource for Whatcom County clinicians dealing with tuberculosis: recognizing active disease and screening for and treating latent infection. The Whatcom County Health Department provides this as a tool/resource in our collaboration with community clinicians, and we welcome feedback and suggestions for additions and changes that improve its usefulness. (Contact Info)

## Distinguishing Active TB Disease from Latent Infection

***TB life cycle/Transmission:*** Tuberculosis (TB) is a disease caused by bacteria (*Mycobacteria tuberculosis,* or **Mtb**) transmitted from people with active pulmonary or laryngeal TB disease as aerosolized particles that are suspended in air. Other people may inhale these infectious particles and become infected with Mtb. In the vast majority of cases, their immune system responds to the infection and walls it off, resulting in a **latent tuberculosis infection** with no disease (and not contagious). When the infected person is immunosuppressed (e.g., HIV/AIDS) or has an immature immune system (young child), the infection may progress to primary active disease without latency.

***Immune response:*** The asymptomatic, noncontagious cases are identified by measuring their immune response to tuberculosis, using a TB skin test (**TST**) or a blood test (interferon gamma release assay, or **IGRA**).

***Progression to disease:*** About 5% of those with latent infection progress to active tuberculosis disease in the first two years after becoming infected. The risk for progression after that is about 0.1% per year (1% per decade of remaining lifetime). The risk of progression increases with conditions that suppress the immune system. This progression can occur with initial infection (primary disease) or after a latent period (reactivation disease). About one third of the world's population has latent tuberculosis infection. People with evidence of TB infection and without active disease are often treated for latent infection to reduce the risk of progression to active disease.

***Diagnosis of TB disease:*** **Active pulmonary tuberculosis** is diagnosed with chest radiographs, looking for evidence of TB pneumonia and lymphadenopathy, and microbiological tests of sputum, which involve AFB stains, molecular tests, and cultures (with speciation by molecular tests of isolates). People with evidence of tuberculosis infection (positive TB skin test or IGRA) are given a chest radiograph to look for signs of TB pneumonia or fibrosis that would indicate current or prior TB disease, and if the chest x-ray is abnormal, sputum is tested for active disease.

***TB Overview References:*** These CDC references provide an orientation to tuberculosis, diagnosis, treatment, and control. CME credit is currently available for the *Core Curriculum* and *Self-Study Modules* 1-5. ***Latent Tuberculosis Infection: A Guide for Primary Health Care Providers*** **is a short, concise guide to the diagnosis and treatment of latent TB infection and is highly recommended for all clinicians who treat and/or test for latent TB or screen for active TB.**

Latent Tuberculosis Infection: A Guide for Primary Health Care Providers
Core Curriculum on Tuberculosis: What the Clinician Should Know
Self-Study Modules on Tuberculosis

## Testing for immune response to *M. tuberculosis*

Prior to the development of interferon-gamma release assays (**IGRA**), the tuberculin skin test (**TST**) was the only test available for identifying an immune response to infection with tuberculosis. Both can be used to screen for latent TB infection. Although the IGRA is more specific, does not react to BCG vaccine, and may be more sensitive than the TST, "Limited data exist on [IGRA] use in groups such as children younger than 5 years of age, persons recently exposed to TB, immunocompromised persons, and those who will be tested repeatedly (serial testing)." Reference

Only the Mantoux method for tuberculin skin testing should be used. The tine test is not a reliable test. TST should only be applied and read by health care providers trained and proficient in it. For details, see Appendix C in the *Guide for Primary Health Care Providers*. **TST results should always be recorded in specific millimeters of induration,** with "0 mm" indicating no induration. They should not be recorded as a range (e.g. "<10 mm" or "10-15 mm").

The interpretation of a TST result (positive or negative) depends on the exposure history and clinical status of the patient as well as the induration in response to intradermal tuberculin (PPD). See **"Classification of tuberculin skin test reactions"** in *Latent Tuberculosis Infection: A Guide for Primary Health Care Providers*, pp 9-10.

## Suspecting active disease

Because the incidence of active disease is low in the United States (3.2/100,000 in 2012), diagnosis may be delayed as it is not considered in the differential diagnosis. Because it can present in many forms (classic TB pneumonia, pleural effusion, disseminated (miliary) tuberculosis, scrofula (lymphadenitis), renal, intestinal, CNS, and other extrapulmonary sites), it is important to consider it i**n patients with a history of TB or latent infection, with risk factors for having been infected, and with risk factors that increase the risk of progression if infected**

Although most people with active tuberculosis will have a positive TST or IGRA, **a negative test result does not rule out active disease**. The reason a person may progress to active disease may be due to decreased immunity, which may diminish the response to PPD or to TB antigen in an IGRA, in addition to allowing a latent infection to reactivate. TST and IGRA are key to screening asymptomatic patients for latent TB infection, but are not necessary for diagnosing active disease.

In settings where screening for active pulmonary disease is a priority (medical facilities, correctional facilities, and homeless shelters), symptom and risk factor review should be done on arrival, and suspected cases isolated and evaluated as soon as possible.

If contagious pulmonary tuberculosis is suspected,

- Infection control should be initiated
- Chest **radiography** should be obtained,
- Sputum should be collected for **AFB smear and culture**, and
- The health department TB program should be **notified** immediately

The Whatcom County Health Department will review and assure appropriate isolation measures are taken, can assess contacts, and can access advanced diagnostic testing through the state and CDC public health laboratories, if indicated. The nucleic acid amplification test (**NAAT)** done at the WA State Public Health Lab, is more sensitive than AFB smears, detects Mtb and *M. avium*, controls for interfering substances, and is run twice weekly, providing confirmation of diagnosis often weeks before culture results are available.

**Risk Factors for TB Exposure and for Progression to Active Disease**

from *Latent Tuberculosis Infection: A Guide for Primary Health Care Providers (2013) (p.7)*

Persons at risk for exposure to persons with TB disease include the following:

- Known close contacts of a person with infectious TB disease
- Persons who have emigrated from TB-endemic regions of the world (see Appendix B, p. 28)
- Persons who work or reside in facilities or institutions with people who are at high risk for TB, such as hospitals that care for TB patients, homeless shelters, correctional facilities, nursing homes, or residential facilities for patients with HIV infection/AIDS

Also at risk are those with certain conditions and other factors associated with progression from LTBI to TB disease. These conditions and factors include the following:

- HIV infection
- Injection drug use
- Radiographic evidence of prior healed TB
- Low body weight (10% below ideal)
- Other medical conditions such as
  - — silicosis
  - — diabetes mellitus
  - — chronic renal failure or on hemodialysis
  - — gastrectomy
  - — jejunoileal bypass
  - — solid organ transplant
  - — head and neck cancer
  - — conditions that require prolonged use of corticosteroids or other immunosuppressive agents such as TNF-$\alpha$ antagonists

• Recent TST converters (that is, persons with baseline testing results who have an increase of 10 mm or more in the size of the TST reaction within a 2-year period)
• Infants and children under the age of 5 who have a positive TB test result
*Of note, the risk of progression is greatest in the first 1 or 2 years after infection.*

**Signs and symptoms of active pulmonary/laryngeal and extrapulmonary disease**

From *Latent Tuberculosis Infection: A Guide for Primary Health Care Providers (2013)-Table 1 (p.8)*

• Symptoms may include one or more of the following: fever, cough, chest pain, weight loss, night sweats, hemoptysis, fatigue, and decreased appetite.

• TST or IGRA result usually positive.

• Chest radiograph is usually abnormal. However, may be normal in persons with advanced immunosuppression or extrapulmonary disease.

• Respiratory specimens are usually smear or culture positive. However, may be negative in persons with extrapulmonary disease or minimal or early pulmonary disease.

• May spread TB bacteria to others.

• Needs treatment for TB disease.

**Preventing transmission**

First of all, **only active pulmonary or laryngeal tuberculosis is contagious**. Latent tuberculosis is not contagious, and extrapulmonary tuberculosis is not contagious, unless the infectious material is mechanically aerosolized (e.g., use of bone saws with tuberculous bone disease.) Mtb is sensitive to ultraviolet light, and is not transmitted by contact with skin or mucus membranes.

The key elements in preventing transmission from active contagious cases include:

1) Masking of patient (surgical mask, not N-95) when necessary, in order to catch respiratory droplets before they dry and become aerosolized respiratory nuclei.

2) Use of N-95 respirators or PAPR with HEPA filters for health care personnel providing treatment to contagious cases.

2) Engineering to reduce concentration of infectious particles (ventilation with high rate of air exchange, treatment with UV, negative pressure to prevent airborne spread beyond patient's room). Outdoor exposure is not a risk, as UV and dilution are effective in reducing concentration of viable Mtb to safe levels.

For details, see *Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in*

*Health-Care Settings, 2005*. MMWR 2005;54(No. RR-17)

**Treating infection to prevent disease**

Treatment of latent TB infection reduces the risk of progression to active tuberculosis disease. A 6-month course of isoniazid is about 70% effective in preventing progression, and a 12-month course is about 90% effective. Further study showed that a 9-month regimen is almost as effective as the 12-month regimen, the basis for the current recommendation of 9-months as the optimal course. (See figure 1 in http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4906a1.htm )

A summary **of treatment options** is found in the *Guidelines for Primary Care Providers*. Isoniazid is used most often because of it is the best studied and does not have as many drug interactions as rifampin. The major adverse reaction is hepatoxicity, whose risk is increased with age and with pregnancy and post-partum period. A 4-month course of rifampin is used in those who do not tolerate isoniazid, or in whom it is contraindicated, and as a relatively liver-sparing alternative. Weekly rifapentine-isoniazid for 12 weeks is the shortest regimen, and the most expensive, and requires directly-observed treatment (**DOT**).

**Symptoms and compliance** should be monitored during treatment. Our department refills medication monthly, assuring that a symptom review is done before providing additional medication, and pill counts help in evaluating compliance. Patients at high risk of progression to active disease (young children, especially those who are close contacts to active cases, and severely immunosuppressed patients) should have DOT (sometimes referred to as directly-observed preventive treatment (**DOPT**) to differentiate it from DOT for active TB disease.)

Documentation of diagnosis and treatment are an important part of a patient's permanent health record, and by assuring that the patient has a detailed summary, future unnecessary testing and treatment can be avoided. The CDC provides **templates** for testing and treatment documentation in Appendix E of the *Guidelines for Primary Care Providers*

**Role of community clinicians and of health department**

Treatment of uncomplicated LTBI is often done by primary care and other clinicians. In our community, WWU Student Health Center has been screening and treating its students with LTBI for several years. The WCHD TB Program is working to provide resources to support the medical community in treating uncomplicated LTBI (those without risk factors for rapid progression to active TB disease, and who tolerate isoniazid or rifampin).

Beginning in 2014, the WCHD TB Program will begin working to provide resources to support the medical community in treating uncomplicated LTBI (those without risk factors for rapid progression to active TB disease, and who tolerate isoniazid or rifampin).

We will provide local training in assessing for active TB disease and screening and treatment for LTBI, maintain and revise this TB program web page with clinical references, forms, and templates, provide clinical case consultation, and accept referrals of complicated LTBI cases for ongoing treatment.

## Legal issues: isolation, compliance

Clinicians in Washington State are legally **required to report suspected or confirmed cases** of active tuberculosis to their local health department. **Reporting of latent tuberculosis is not required.** Treatment of latent tuberculosis is not legally mandated, as it is not contagious and not an immediate threat to public health.

In addition, the health department must be notified of **the intended discharge of hospitalized patients** with tuberculosis, in order to assure ongoing treatment and appropriate isolation measures. (See WCHD and PeaceHealth TB Hospital Discharge Plan)

The health department provides treatment of active TB disease, including DOT, coordinates contact investigation (and source investigation in pediatric cases), and if a patient does not follow instructions to prevent transmission to others, the Health Officer may issue health orders and go to Superior Court to assure the safety of the public.

## Administrative testing for TB infection

Some testing for tuberculosis infection is currently legally required even when not indicated according to the targeted testing and treatment guidelines. Clinicians are often asked to provide TB skin tests or IGRA tests to childcare providers, people applying to be foster parents, and others. A report may be required for administrative purposes, and should not contain more information than needed to meet the requirements.

## References


Latent Tuberculosis Infection: A Guide for Primary Health Care Providers
http://www.cdc.gov/tb/publications/ltbi/
http://www.cdc.gov/tb/publications/ltbi/pdf/TargetedLTBI.pdf

Core Curriculum on Tuberculosis: What the Clinician Should Know
http://www.cdc.gov/tb/education/corecurr/index.htm

Self-Study Modules on Tuberculosis
http://www.cdc.gov/tb/education/ssmodules/default.htm

Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health-Care Settings, 2005. MMWR 2005;54(No. RR-170)
http://www.cdc.gov/mmwr/pdf/rr/rr5417.pdf

Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection. MMWR 2000;49(No. RR-06)
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4906a1.htm
http://www.cdc.gov/mmwr/PDF/rr/rr4906.pdf

www.currytbcenter.ucsf.edu/

CDC – Tuberculosis
http://www.cdc.gov/tb/

WA DOH – Tuberculosis Services Manual
http://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/Tuberculosis/ProviderMaterials/TBServicesManual.aspx

The Mantoux Tuberculin Skin Test (NYC Health)
http://www.nyc.gov/html/doh/downloads/pdf/tb/tb-hcp-tst-guide.pdf

CDC Fact Sheet on Interferon Gamma Release Assays (IGRA)
http://www.cdc.gov/tb/publications/factsheets/testing/igra.htm

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