TITLE: Diagnosis of Active Tuberculosis Disease October 11, 2013

Purpose: A complete medical evaluation for active TB disease includes a medical history, a physical examination, a tuberculin skin test (TST) and/or interferon gamma release assay (IGRA), a chest radiograph and any appropriate bacteriologic or histologic examinations.

1. Medical History
   a. The symptoms of pulmonary TB may include an unexplained/prolonged cough, chest pain or hemoptysis. Systemic symptoms include fever, chills, night sweats, fatigue, loss of appetite or weight loss. TB should be considered in persons who have these symptoms.
   b. The symptoms of extrapulmonary TB depend on the site affected. They may include the systemic symptoms listed above, in addition to signs and symptoms relate to the site of disease. For example: TB of the spine may cause back pain and/or spinal deformities. TB of the kidney may cause hematuria and/or pyuria. TB of the lymphatic system may cause swollen lymph nodes. Extrapulmonary TB should be considered in the differential diagnosis of ill persons who have systemic symptoms and who are at high risk for TB.
   c. Pulmonary or extrapulmonary TB disease may also present without any clinical symptoms.
   d. It is important to ask persons suspected of having TB about their history of exposure, history of TB infection and treatment and history of TB disease and treatment.
   e. It is also important to screen for other factors which would increase a patient’s risk for exposure to TB or for progression to TB disease if infected (see policy “Treatment for Latent TB Infection”, Candidates for LTBI Treatment, numbers 1 through 6).

2. Physical Examination
   a. A physical examination is an essential part of the evaluation of any patient. It cannot be used to confirm or rule out TB, but it can provide valuable information used in the process of arriving at a diagnosis and treatment plan.
   b. Patients being evaluated for TB at OCPHS will receive a physical examination from a physician in the TB Clinic.

3. Determination of Infection with TB
   a. TST and IGRA can determine infection with TB. They cannot determine TB disease.
   b. TST and/or IGRA are administered in order to help determine whether the patient has been infected with M. tuberculosis.
   c. The preferred method of tuberculin skin testing is the tuberculin skin test. Refer to CDC’s “Core curriculum on Tuberculosis”, 6th edition, for guidance on the proper placement and reading of
the TST. Refer also to Chapter 3, Testing for Tuberculosis Infection and Disease, for further information on the interpretation of skin test results.

d. A negative reaction to the TST or a negative/indeterminate IGRA does not exclude the diagnosis of active TB disease, especially for patients with severe illness, HIV infection or other immunosuppressive state.

e. False negative reactions may be caused by anergy, recent TB infection, very young age (< 6 months old), live-virus vaccination, overwhelming TB disease and immunosuppressive state.

f. False positive reactions to TST may be caused by nontuberculous mycobacteria and BCG vaccination.

g. An alternative to the TST is IGRA. This can be considered to exclude TST reactions to most atypical mycobacteria and/or prior BCG vaccination. It can also be used in situations where the logistics and or interpretation of the TST reaction are problematic.

   ♦ Mycobacterium marinum, szulgai, kansasii infections can give false positive IGRA tests.

4. Radiographic Examination

   a. Chest films, including both PA and lateral views, should be obtained as part of the work up for diagnosis of pulmonary and/or extrapulmonary TB disease. In some cases, other studies (e.g. CT scans) may be necessary.

   b. In reactivation pulmonary TB, chest radiograph abnormalities often occur in the apical and posterior segments of the upper lobe or in the superior segment of the lower lobes. However, lesions may appear anywhere in the lungs and vary in size, shape, density and cavitation, especially in HIV-infected and other immunosuppressed patients. Primary pulmonary TB infection may involve mid- and lower-lung fields.

   c. Abnormalities on chest radiographs may be suggestive of, but are not necessarily diagnostic of, TB disease. However, chest radiographs are useful in ruling out pulmonary TB disease in a person who has a positive TST and is asymptomatic.

5. Chest X-rays will be provided for the following patients:

   a. Patients who receive a TST from OCHPS staff and return with a positive reaction receive an IGRA at OCHPS that is also a positive result.

   b. Patients with untreated LTBI who agree to follow-up in the TB Clinic for LTBI therapy.

   c. Current LTBI patients as ordered by a TB Clinic physician.

   d. Patients with a positive TST or IGRA who present with signs or symptoms of active TB disease which may include any of the following: cough, increased sputum production, fever, night sweats, hemoptysis, anorexia, weight loss or unexplained adenopathy.

   e. Patients with a documented positive TST or IGRA within the last 2 years who have not received follow-up chest x-rays.
f. Current class 3 and class 5 (active TB) patients as ordered by TB Clinic physician.

g. Chest x-rays will not be routinely provided for immigration physicals, employment screenings or screening required for nursing or other healthcare programs (unless client agrees to follow-up in the TB Clinic for LTBI therapy and has not already completed therapy previously.

h. Chest x-rays will be performed by TB Clinic staff who are certified x-ray operators by the Minnesota Department of Health.

i. Chest x-rays will be interpreted by Mayo Clinic radiologists and by the physicians staffing the TB clinic. Whenever abnormalities consistent with possible active TB are present, the Mayo Clinic radiologist will immediately and directly notify the TB Clinic physician.

j. Patients will be notified of their chest x-ray results by the TB nurse case manager or by a TB Clinic physician as appropriate.

6. Diagnostic Microbiology

a. Persons with suspected pulmonary or laryngeal TB disease should submit at least three induced sputum specimens. These should be collected in the early morning if possible and each should be collected on different days.

b. All three should be tested for AFB smear and Mycobacterium culture. The first and third specimens should also be submitted for Nucleic Acid Amplification test (NAA). If the first specimen in NAA positive and the acid fast smear is positive, the third specimen does not need to repeat this test.

c. Refer to the OCPHS Laboratory Procedure Manual regarding procedures for the proper collection of induced sputum samples.

d. If the patient is unable to produce a sputum sample, the physician may consider a bronchoscopy in order to obtain specimens for testing, particularly if a diagnosis of TB is considered likely. Gastric aspiration in pediatric patients will require hospitalization to allow first morning recumbent specimens.