Indications for tuberculin skin testing (TST)

- To diagnose tuberculosis TB infection in persons at increased risk for progression to active disease

Who should be tested

- Contacts of persons recently diagnosed with active pulmonary TB
- Foreign-born persons and visitors from TB-endemic countries, especially those <50 years old and those who have arrived in the last two years
- All refugees, between the ages of 30 and 65, from countries with a high incidence of TB, as seen recently, after their arrival in Canada
- All other adult immigrants if they have risk factors that increase the risk of active tuberculosis
- People who are at increased risk of progression to active TB disease
- People with radiographic evidence of active TB and no history of treatment
- Health care workers at risk for occupational exposure to TB
- Staff and residents in communal care, including correctional facilities, long-term care, and shelters/services for homeless/unhoused
- Persons from Aboriginal communities with high rates of TB
- Travellers to countries with high TB incidence

Tuberculin testing is generally discouraged for those with an elevated risk of infection with TB and no known risk factors for progression to active TB disease.

Risk factors for development of active tuberculosis in those with latent TB infection (LTBI)

High risk – screen at any age

- Acquired immunodeficiency syndrome (AIDS)
- Human immunodeficiency virus infection (HIV)
- Immunosuppressive therapy or treatment of hematologic malignancies (leukemia, lymphoma) and certain hematologic malignancies (leukemia, lymphoma) and certain hematologic
- Chronic renal failure requiring hemodialysis
- Carcinomas (e.g., head and neck)
- People with radiographic evidence of old, healed TB and no history of treatment
- People with radiographic evidence of old, healed TB and no history of treatment
- Health care workers at risk for occupational exposure to TB
- Residents in communal care, including correctional facilities, long-term care, and shelters/services for homeless/unhoused
- Persons from Aboriginal communities with high rates of TB
- Travellers to countries with high TB incidence

Moderate risk: increased risk screen ≤ 65 years

- Treatment with HIV inhibitors
- Diabetes mellitus
- Treatment with glucocorticoids equivalent to prednisone (≥ 5mg/day)
- Young age when infected (≤ 4 years)
- History of alcohol abuse (≥ 1 drink/day)
- Underweight (≤ 80% ideal body weight, generally BMI ≤ 18.5)
- Cigarette smoking (1 pack/day)
- Abnormal chest x-ray (granulomatous)

Low risk ≤ 50 years

- Person with positive TST, no known risk factors, normal chest x-ray (‘low risk reactor’)

Contraindications for tuberculin skin testing

- Documented positive skin test or active tuberculosis in the past
- Tuberculosis reactions that have severely blunted in the past
- Clear past history of treatment for TB infection or disease
- Extensive burns at the usual test site
- Other site
- Major skin infections or live-virus vaccinations in the past 4 weeks (e.g., measles, mumps, varicella or yellow fever)

Additional Information: Tuberculosis Gamma Release Assays (IGRAs)

- Two types of IGRA are approved by Health Canada for use: QuantiFERON-TB Gold In-Tube (QFT) and TSPIT.

Websites

- www.totallab.com
- www.ebolas.org
- www.phac-aspc.gc.ca
- www.cdc.gov/tb
- www.nhi.ca
- www.onlung.ca

For more information or to order more copies:

Toronto Public Health
416-338-7600
toronto.ca/health

November 2013

THE LUNG ASSOCIATION

416.338.7600
toronto.ca/health

Reference:


Causes of false-positive TST
• Infection with non-tuberculous mycobacteria (i.e., environmental mycobacteria)
• Prior BCg vaccination

BCC
• May have been acquired by population groups including:
  • Persons born in developing countries or TB-endemic countries and many European countries
  • Aboriginal persons from communities with high rates of TB
  • Persons born in Canada prior to 1989, particularly health-care workers (detailed information available on PHAC website)

BCC vaccination and relationship to TST results

<table>
<thead>
<tr>
<th>Received in infancy</th>
<th>Unlikely to cause a tuberculin reaction of 10 mm or greater after 10 years of age or older.</th>
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</thead>
<tbody>
<tr>
<td>Received at 1 to 5 years of age</td>
<td>15-16% will have a positive TST up to 25 years later.</td>
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<tr>
<td>Received at 6 years or older</td>
<td>40% chance of having persistently positive TST later in life.</td>
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</table>

Ignored prior history of BCC vaccination for:
• Close contacts of an active case
• Immigrants from countries with a high burden of TB – BCG World Atlas available online at www.OrderByDescending()
• Persons from Aboriginal communities with high rates of TB
• BCG vaccination in infancy and person tested in now age 10 years or older
• Immunocompromised, including HIV and renal failure
• Diabetes
• Chest x-ray is not consistent with old healed inactive TB

Two-step test
• Should be performed only for people who will be getting serial TSTs at regular intervals (e.g., health care workers and correctional service workers)
• Distinguishes a booster effect (due to previous infection) from a conversion due to Mycobacterium Tuberculosis – results may be available anywhere from 2–3 months to 6 months.
• Decide for tuberculosis patients with high prevaence for prolonged tests
• If the first test is negative, do a second skin test 1 week to 4 weeks later

Management for positive TST
• All persons with a positive TST should be reported to your local public health department
• Persons with a positive TST should be further evaluated to rule out active TB disease

This evaluation should include the following: Clinical picture, interpretation of radiographic findings and sputum collection, if necessary.

1. Clinical picture
• Many patients with pulmonary tuberculosis have a normal physical exam, even if symptomatic
• The most common symptom of pulmonary TB disease is a new or worsening cough of at least 2 weeks duration
• Cough is initially dry and may become productive after several weeks.
• Fever and night sweats may be absent in the very young and elderly
• Hemoptysis, general malaise, weight loss and chest pain are generally seen in more advanced disease

Note: A TST can occur in any of the body with at least symptomatic. Lymph node TB is the most common extra-pulmonary site.

2. Interpretation of radiographic findings
• Chest x-rays should always be interpreted in the context of clinical and laboratory findings.
• The interpretation of chest x-rays is highly variable between readers.
• 10% of persons with HIV infection and active TB disease will have a normal chest x-ray.

Source: CTS, 2012, p. 11A

3. Sputum collection and timelines for results

Sputum collection
• Collect 3 sputum specimens (either spontaneous or induced). The specimens can be collected on the same day, at least 1 hour apart (early morning collection not essential).
• Collect 5 to 10 cc of sputum per specimen.
• If immediate delivery (<1 hour) is not possible, protect specimens from light in a paper bag and refrigerate at 4°C pending transport to the lab. Deliver the lab to the lab as soon as possible to avoid overgrowth of normal flora

Note: Instructions for patient sputum collection can be obtained from your local health department.

Public health lab timelines and results
• smear for Acid Fast Bacilli (AFB) – results are available in 1 business day from arrival at the lab.
• Amplified Mycobacterium Tuberculosis Direct (AMTD) distinguishes between TB and other non-tuberculous mycobacteria, for example, Mycobacterium Avium Complex (MAC). AMTD is performed automatically on AFB smear positive specimens from new patients – results are available in 2-3 business days from arrival at the lab.
• Culture for Mycobacterium Tuberculosis – results may be available anywhere from 4 days to 1 month.
• Sensitivity testing for susceptibility to first-line antituberculosis drugs (i.e., 10 to 21 days after organism has grown in culture), is done automatically on all positive cultures – final results are available in 3-12 business days. Full panel second-line drug sensitivity testing is automatically done if resistance is detected to Rifampin or 2 or more drugs – results are available in 6-12 business days
• Contact the public health lab in your area for any questions related to tests, timelines and results.

Contacts who are HIV- or are age 5 or are age 18 or have a positive TST
• Contacts who are <5 years of age or are HIV+ should be assessed by a specialist. Window prophylaxis is strongly recommended pending the TST at 8-10 weeks post-exposure.
• Treatment for LTBI should be initiated as soon as active disease is ruled out
• Children do not require baseline liver function tests unless they have known or suspected liver disease and are taking hepatotoxic drugs.
• Patients and family members should be educated about symptoms indicative of adverse reactions and signs of hepatotoxicity.
• Consider Directly Observed Prophylactic Therapy (DOTP) by the local public health department

Evaluation
• Clinical picture (history, risk factors, and physical examination for signs and symptoms of active TB disease).
• Cough, x-ray, and laboratory findings. Various tests for conalbumin or AFB smear of sputum and晨can be collected on the same day, at least 1 hour apart.

Quick reference

Treatment of latent tuberculosis infection (LTBI)

Approximately 10% of persons infected with TB will go on to develop active TB disease: 5% within 2 years of infection and 5% for the remainder of life.

Treatent of LTBI reduces an individual’s risk of developing active TB. Before starting treatment for LTBI, rule out active TB first!

Decision to start latent TB infection (LTBI) treatment – should be based on:
1. Interpretation of TST in context of patient’s history:
• Size of the reaction (induration), in mm
• Preditive value of the test (considering likelihood of true exposure, false-negative, false-positive reactions)
• Risk of progression to active disease
• Refer to online TST interpreter – http://www.tsti.ca
2. Medical Contraindications (see table below). Patients under 65 years old with no comorbidities have low rates of hepatotoxicity
3. Likelihood of adherence to full length of LTBI treatment
• Patient ability and commitment
• Provider ability to continue monthly follow-up for adherence, side effects, etc.
• Discussion of risks/benefits with patient
5. Active TB has been ruled out (history, risk factors, and physical examination; negative sputum cultures if patient is symptomatic, has abnormal CXR or is being treated with rifampin).

Source: CTS, 2013, chpt. 4, 6.

Recommendations for treatment of LTBI

Medications are free when ordered through your local public health department.

<table>
<thead>
<tr>
<th>First-Line Regimen</th>
<th>Interval &amp; duration</th>
<th>Oral dosage</th>
<th>Criteria for completion</th>
<th>Comments</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isoniazid (INH)</td>
<td>Daily for 9 months</td>
<td>Adult: 5 mg/kg/day to a maximum of 300 mg/day</td>
<td>9 months is equivalent to 270 doses</td>
<td>• Recommended treatment regimen</td>
<td>Assuming good adherence to treatment:</td>
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<td>Completing ≥270 doses within 12 month period can be considered adequate treatment</td>
<td>• Provides optimal protection in preventing progression toward active disease</td>
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<td></td>
<td></td>
<td></td>
<td>• For children, especially those &lt;5 years old, consult a specialist</td>
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<tr>
<td>Vitamin B6 (Pyridoxine)</td>
<td>Daily with INH</td>
<td>25 mg</td>
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<table>
<thead>
<tr>
<th>2nd-Line/Alternative Regimen</th>
<th>Interval &amp; duration</th>
<th>Oral dosage</th>
<th>Criteria for completion</th>
<th>Comments</th>
<th>Effectiveness</th>
</tr>
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<tbody>
<tr>
<td>Isoniazid and Rifampin (RIF-MP)</td>
<td>Daily for 4 months</td>
<td>Adult: 900 mg/day to a maximum of 1200 mg/day</td>
<td>A minimum of 120 doses completed within 6 months can be considered adequate treatment</td>
<td>Use this regimen in consultation with a specialist – consider collecting sputum and testing for culture results prior to initiation to avoid inducing drug resistance</td>
<td>Published efficacy rates 60% (continued)</td>
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<tr>
<td></td>
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<td>• Use this regimen in consultation with a specialist – this is the recommended duration of treatment</td>
<td>Alternating regimens for:</td>
<td></td>
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<td></td>
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<td>• Who are contacts of RIF-resistant TB</td>
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<td></td>
<td></td>
<td></td>
<td>• Children who are contacts of INH-resistant TB</td>
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<thead>
<tr>
<th>3rd-Line Regimen</th>
<th>Oral dosage</th>
<th>Comments</th>
<th>Effectiveness</th>
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<tr>
<td></td>
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<td>• Use this regimen in consultation with a specialist – Consult a specialist prior to initiating therapy</td>
<td>Published efficacy rates 60% (continued)</td>
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<td>• Follow-up and retesting after 6 months can be considered adequate treatment</td>
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<td>• The preferred 4 months of INH has been shown to be adequate treatment with a published efficacy of 90%</td>
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Source: CTS, 2013, chpt. 5, 6.