



Decision Support Tool: Tuberculin Skin Testing (TST) for Tuberculosis (TB) Screening

Decision support tools are evidence-based documents used to guide the assessment, diagnosis and treatment of client-specific clinical problems or conditions. When practice support tools are used to direct practice, they are used in conjunction with clinical judgment, available evidence, and discussion with colleagues. Nurses also consider client needs and preferences when using decision support tools to make clinical decisions.

Distributed: January 2010

The Nurses (Registered) and Nurse Practitioners Regulation:	<p>6 (1) (e) administer (iii) purified protein derivative by injection, for the purpose of tuberculosis screening.</p> <p><u>CRNBC Limit/Condition:</u> <i>Registered nurses who administer purified protein derivative for the purpose of TB screening must possess the competencies established by BCCDC and follow a decision support tool established by BCCDC.</i></p>
For use by:	<p>Registered nurses and/or nurse practitioners who are facilitating TB screening services:</p> <ul style="list-style-type: none"> • Public health nurses, communicable disease nurses, community health nurses, nurse practitioners, and other RNs working in various practice settings.
Indications:	<p>For TST Skin Testing:</p> <ul style="list-style-type: none"> • Contacts of a patient with a recent diagnosis of active infectious TB. • Household contacts of a patient diagnosed with extra-pulmonary TB. • Reverse contact tracing of a child diagnosed with active TB (to determine source of infection). • Screening individuals prior to starting tumor necrosis factor (TNF) inhibitors (also known as 'biologicals'). Examples: Enbrel, Remicade, Humira. • HIV positive individuals and individuals at high risk for HIV infection (e.g., Intravenous drug users (IVDU)). • International travelers who will be residing in countries where TB is endemic (base-line TST encouraged). • Travelers returning from visits to endemic areas. • Community-wide screening to determine prevalence of infection. (Applies to identified First Nations communities – See TB Manual, <i>Appendix E</i>). • Specific populations at risk (See TB Manual, Surveillance and Screening Section and <i>Appendix E</i> for targeted screening in First Nations communities). • Individuals with signs and/or symptoms of active TB. (A negative TST does not exclude a diagnosis of active TB. Collect three sputa for AFB and culture on three consecutive days and call TB Control for further advice.)

<p>Indications continued ...</p>	<p>Note; HIV positive individuals should have a base-line chest x-ray (CXR) regardless of TST result. Please see <i>TB Screening Decision Support Tool</i> for CXRs.</p>
<p>Related Policies:</p>	<p>Provincial Tuberculosis Manual (2009), BC Centre for Disease Control.</p>
<p>Related Standards:</p>	<p>Scope of Practice for Registered Nurses: Standards, Limits, Conditions. Acting without an Order.</p>
<p>Definitions:</p>	<p>Acid Fast Bacilli: The majority of these bacilli in patients' sputums are mycobacteria. Species may be mycobacterium tuberculosis (MTB) or species other than MTB referred to as MOTT.</p> <p>Active Tuberculosis disease: This denotes the presence of current active tuberculosis, most often on the basis of positive bacteriology.</p> <p>Active Infectious Tuberculosis: A person with pulmonary or laryngeal TB with a positive sputum smear for acid fast bacilli.</p> <p>BCG Vaccine: Bacille Calmette-Guerin vaccine that is an attenuated strain of Mycobacterium bovis and is used to protect against severe forms of TB.</p> <p>Booster Effect: An increase of 6 mm or more in a TST response from a previous TST in the absence of contact with an active case.</p> <p>Cell-Mediated Immunity: A type of immune reactivity in which T lymphocytes participate.</p> <p>Contact: A person identified as having come in contact with someone who is diagnosed with active pulmonary TB which means there is a possibility of transmission.</p> <ul style="list-style-type: none"> • <u>Type 1</u> = Household contact. Share the same air space for greater than 4 hours per week • <u>Type 2</u> = Non-Household contact. Share the same air space for 2-4 hours per week • <u>Type 3</u> = Casual Contact. Share the same air space for less than 2 hours per week. <p>Delayed hypersensitivity: A type of cell-mediated immune response that occurs when T cells encounter their specific antigen and lymphokines are released.</p> <p>Induration: The area of palpable firmness or swelling that surrounds the site of TST injection. This induration is what is read and should be recorded in millimeters. See the TB Manual for more information on reading TSTs.</p> <p>Mycobacterium tuberculosis: The microorganism causing TB.</p> <p>Positive tuberculin skin test (TST): Reaction to TST with the purified protein derivative (PPD) which suggests the person has been infected with tubercle bacilli. When interpreting a positive TST, the size, positive predictive value and risk of disease should be considered for each client.</p> <ul style="list-style-type: none"> • 5-9 mm reaction is considered a positive TST if the client is HIV infected; a close contact of active TB, abnormal chest X-ray with fibronodular disease, other immune suppression (TNF-alpha inhibitors, chemotherapy, IVDU). • Greater than or equal to 10mm is considered a positive TST. <p>Preventative Treatment: The treatment, usually isoniazid, given to individuals infected with <i>M. tuberculosis</i> but without active disease. Also known as chemoprophylaxis or treatment of latent TB infection.</p>

Definitions continued ...	<p>Tubercle bacilli: A collective term to refer to organisms in the Mycobacterium tuberculosis complex or to <i>M. tuberculosis</i>.</p> <p>Tuberculin convertor: Any person with a tuberculin reaction which has converted from a “negative” to a “positive” reaction.</p> <p>Tuberculosis (TB): A chronic bacterial infection due to Mycobacterium tuberculosis, characterized pathologically by the formation of granulomas. The most common site is the lung (pulmonary TB), but other organs may be involved (extra pulmonary TB).</p> <p>Tuberculin Skin Test (TST): Intradermal injection of PPD derived from Mycobacterium tuberculosis bacteria to identify whether a person has a delayed-type hypersensitivity reaction to tuberculin antigens.</p>
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Contraindications

- Persons who have had an allergic response or severe reaction to a previous TST should not be given a skin test. These people should be followed by CXR and symptoms.
- Severe eczema or broken skin covering most of the skin surface. If client has broken or open skin, the TST may be placed on another area of the body such as upper arm or thigh – but this need to be documented appropriately (in the nursing notes) as the nurse who plants the skin test may not be the nurse who performs the skin test reading.
- Persons who have a documented history of a previous positive reaction (10 mm or greater) or blistering to tuberculin testing.
- Persons who have documentation of previous active tuberculosis.
- Persons with major viral infections or live-virus vaccinations in the past 4 weeks to avoid false negative reactions. A TST may be done on the same day or 4 weeks after a live-virus vaccine is given.

Note 1: When an individual reports a previous TST that was not documented a TST can be administered if they cannot provide a clear description of the positive response such as extensive swelling, especially with blistering. When a clear description of a positive response is given the individual may be referred to the Chest Xray DST.

Note 2:

- A history of a BCG vaccine is not a contraindication for a TST.
- Pregnancy is not a contraindication for a TST.

Note 3: The diagnosis of active TB never depends on a positive TST. In a small percentage of active TB cases (20 – 30%) the tuberculin hypersensitivity may decrease or disappear temporarily.

Assessment

The Tuberculosis Screening Form (HLTH 939) provides a guideline to assess a client for a TST.

History:

- Previous active TB, treatment of active TB, when & where was TB diagnosed and treated, was treatment completed?
- Previous latent TB or previous positive skin test, where was the previous skin test administered? If treated for latent TB, was treatment completed - when & where?
- Previous contact with an active case of TB - when & where? TST result from the contact?
- BCG vaccination, when & where, BCG scar?
- Any allergy to components in the PPD or severe reaction to a previous TST?
- Travel to an endemic country – when, where, for how long?

2. Indication:

- Reason for tuberculin skin test.
- TST appropriate for this client?

3. Contact:

- Type 1 – Household or share the same air space for greater than 4 hrs/wk.
- Type 2 – Non-household or share the same air space for 2 – 4 hrs/wk.
- Type 3 – Casual or share the same air space for less than 2 hrs/wk.

4. Risk factors for developing **active** TB among persons infected with *Mycobacterium tuberculosis*;

High Risk

- HIV/AIDS
- Transplantation (related to immunosuppressant therapy)
- Chronic renal failure requiring hemodialysis
- Carcinoma of head & neck
- Recent TB infection (less than 2 years)

Increased Risk

- Treatment with glucocorticoids or any other immunosuppressive agent
- TNF inhibitors
- Diabetes
- Underweight (less than 90% ideal body weight or a BMI less than 21)
- Young age when infected (≤ 5 years old)
- IVDU/Homeless

5. Symptoms of **active** tuberculosis:

- Cough > 3 weeks
- Sputum production
- Blood in sputum (hemoptysis)
- Night sweats
- Fever
- Fatigue
- Weight loss

- Anorexia/decreased appetite
- Chest pain
- Other symptoms will depend on the site of disease

Note 1: Collect sputum for AFB X3 from all clients with a productive cough lasting greater than 3 weeks.

Note 2: Ensure TB Control @ BC Centre for Disease Control is “cc’d” on requisitions screening for TB.

Diagnosis: Screening for Tuberculosis

Interventions:

Administration of a TST and an accurate measure of the skin test.

Injection Process:

- The TST is administered intradermally on the anterior forearm, 2-4 inches below the elbow.
- A tuberculin syringe with a 26 or 27 gauge needle 0.6cm to 1.3 cm in length.
- Cleanse the skin with isopropyl alcohol and allow to dry.
- The skin of the forearm should be held taut with one hand.
- The syringe should be held at a 5 degree angle, with bevel up.
- Insert the needle just underneath the first layer of skin and slowly inject 0.1ml of tuberculin. (You should be able to see the tip of the needle underneath the skin and should feel resistance when you inject).
- A wheal or bleb 6-10mm in diameter should appear.
- If an elevated wheal does not appear, repeat the skin test 20mm below the original site or the other arm (if you change sites, be sure to document the TST site in the nursing notes).
- Band-aids are not recommended, but if used should be removed 20 minutes after the tuberculin is administered.
- Instruct client to remain in the clinic area for 15 minutes after the injection to ensure they do not have an allergic reaction to the PPD.

Reading the Tuberculin Skin Test:

- A tuberculin skin test should be read 48-72 hours after administration by a health care professional trained in this skill. Self-reading of skin test results by the client is not acceptable.
- It is the induration that is gently palpated and measured that determines the size of the reaction, not the redness of the area.
- Results are read horizontally across the induration and should be recorded in (mm), not as positive or negative.

Note 1: Negative skin test reactions show no mark or a small bruise around the injection site. Some skin test reactions will show an area of erythema (redness) around the injection site, but no induration can be palpable at the site, the reaction should be recorded as 0mm.

Note 2: Large skin test reactions will show an inner indurated area, which may be blistered and surrounded by erythema. Only the inner indurated area should be measured. The presence of blistering at the site should also be recorded.

Interpretation of the Tuberculin Skin Test:

- The interpretation of the tuberculin skin test depends on; (1) the measurement in millimeters of the reaction, (2) the individual's risk of being infected, (3) the individual's risk of developing disease if infected, and (4) the reason for testing.
- 5mm or greater skin test reaction is considered positive for the following groups:
 - Contacts of an active case of TB
 - Immunocompromised individuals
 - Individuals with HIV infection (known or at risk)
 - Individuals with Chest X-rays compatible with previous TB disease
 - IV drug users
- 10mm or greater skin test reaction is considered positive for all other groups
- Individuals with a positive skin test reaction should be referred for a chest X-ray. The Tuberculosis Screening Program form (HLTH 939) is completed which acts as the chest X-ray requisition form. See Decision Support Tool for Chest X-ray.

Intended Client Outcomes:

- Receives an appropriate and properly administered TST.
- Receives a correctly read and interpreted TST.
- Receives information for follow-up to the TST.
- Understands the result of the TST.
- Understands when and how to get any further follow-up test that is required.

Unintended Client Outcomes:

Anaphylaxis

- Follow the BC Centre for Disease Control Immunization Program's Protocol for Emergency Treatment for Anaphylaxis.
- Document in client's record.
- Informs the local Medical Health Officer (MHO) and TB Control.

Severe Reaction

A severe reaction is one with excessive swelling, pain or discomfort, or progression to the stage of vesiculation and sloughing of tissue. Severe reactions sometimes are associated with inflammation of the lymphatics draining the area (red streaks in the arm) and with soreness or swelling of the glands in the axilla. This is almost always a sensitivity reaction and should not be confused with secondary infection. At the discretion of the nurse or NP may refer client to personal physician.

Advise client to apply a sterile, dry dressing to any open or sloughing area. Cortisone ointment has not been found to be helpful although medications such as Benadryl may be useful if the TST site is pruritic. Reassure client about early resolution though some red-purple discoloration may persist for several weeks.

Client Education:

Provide the client with information about:

- The reason the TST is being done.
- How the test is done.
- What a negative TST means.
- What a positive TST means and not to have the TST done again.
- The difference between TB infection and TB disease.
- A positive TST does **not** exclude them from work or school unless they have signs and/or symptoms of active TB.
- The individual risk factor(s) that could increase their risk of developing TB disease.
- The signs and symptoms of TB disease and to contact their health care provider if symptoms occur.

Available hand-outs can be found on-line at www.bccdc.ca

1. BC Health Files – Tuberculosis (TB) Skin Test
2. TB Control Pamphlet – What Does a Positive Tuberculosis Skin Test Mean?
3. Tuberculosis Services for Aboriginal Communities pamphlets

Documentation:

1. Complete Tuberculosis Screening Program (HLTH 939) form www.bccdc.ca
2. Tuberculin skin test result must be recorded in millimeters.
3. Complete documentation as per individual health agency guidelines. Record batch number of PPD in case of unusual reactions.

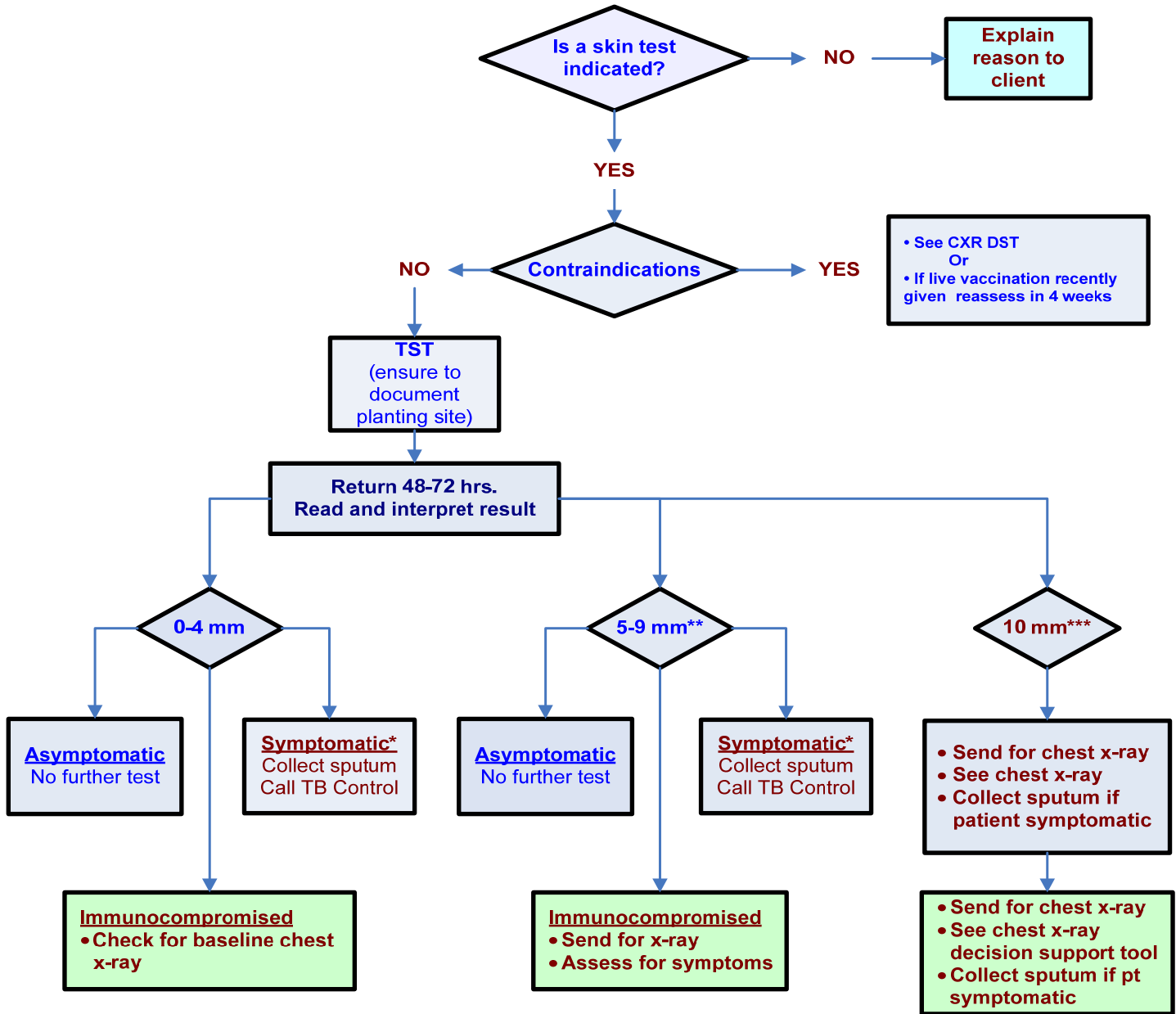
References:

Canadian Tuberculosis Standards 6th edition (2007), Public Health Agency of Canada.

Tuberculosis Manual (2010), BC Centre for Disease Control.



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NOT A CONTACT**



***TB Signs and Symptoms**

- Cough > 3 weeks
- Fever
- Night sweats
- Chest Pain
- Blood in sputum
- Weight loss
- Fatigue

**** 5mm or greater TST considered positive for the following groups:**

- Contacts of an active case of TB
- Immunocompromised individuals
- Individuals with HIV infection
- Individuals with chest x-rays compatible with previous TB disease