



**Decision Support Tool:  
Chest X-ray for Tuberculosis 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.

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<b>The Nurses (Registered) and Nurse Practitioners Regulation:</b>	<p><b>6 1 (j.1) in the course of assessment, issue an instruction or authorization for another person to apply, to a named individual,</b> <b>(ii) X-rays for diagnostic or imaging purposes, except X-rays for the purpose of computerized axial tomography</b></p> <p><b><u>CRNBC Limit/Condition:</u></b> <i>Registered nurses who order chest X-ray for the purpose of tuberculosis screening must possess the competencies established by the B.C. Centre for Disease Control (BCCDC) and follow decision support tools established by BCCDC</i></p>
<b>For use by:</b>	<p><b>Registered nurses and/or nurse practitioners who are facilitating TB screening services;</b></p> <ul style="list-style-type: none"><li>Public health nurses, communicable disease nurses, community health nurses, nurse practitioners, and other RNs working in various practice settings.</li></ul>
<b>Indications:</b>	<p><b>To evaluate individuals for radiological evidence of inactive or active TB disease in the following circumstances:</b></p> <ul style="list-style-type: none"><li>TST (10 mm or greater) on general screening</li><li>Contact of an active case of TB who has a skin test equal or greater than 5 mm</li><li>Children 5 years of age and under who are close contacts (Type 1/2) of an active case of infectious TB. These children require a chest x-ray regardless of the TST</li><li>HIV positive clients with no previous chest x-ray should have a base-line chest x-ray</li><li>Immunosuppressed individuals (e.g. HIV positive, anti-TNF inhibitors, chemotherapy) who have a TST equal or greater than 5 mm</li><li>Immigration medical surveillance requirements (directed by TB Control)</li><li>Suspect case with signs and/or symptoms of active TB</li><li>Individuals requiring TB screening who have had previous documented positive TST</li><li>Individuals requiring TB screening who have had documented tuberculosis</li><li>Prior to starting preventative therapy for latent TB infection (within the last 6</li></ul>

<p><b>Indications continued ...</b></p>	<p>months)</p> <ul style="list-style-type: none"> <li>• Admissions over the age of 60 years to Adult Licensed Residential Community Care Facilities (preferably within one month of admission)</li> <li>• Urgent admission to Detox/Drug &amp; Alcohol Treatment Programs</li> </ul>
<p><b>Related Policies:</b></p>	<p><b>Provincial Tuberculosis Manual, BC Centre for Disease Control (2009)</b></p>
<p><b>Related Standards:</b></p>	<p><b>Scope of Practice for Registered Nurses: Standards, Limits, Conditions. Acting without an Order</b></p>
<p><b>Definitions:</b></p>	<p><b>Acid Fast Bacilli:</b> 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><b>Active Tuberculosis disease:</b> This denotes the presence of current active tuberculosis, most often on the basis of positive bacteriology.</p> <p><b>Active Infectious Tuberculosis:</b> A person with pulmonary or laryngeal TB with a positive sputum smear for acid fast bacilli.</p> <p><b>Anti Tumour Necrosis Factor (TNF) Inhibitors:</b> Biologics that suppress the action of the inflammatory cytokines (TNF) and have been shown to increase reactivation tuberculosis.</p> <p><b>BCG Vaccine:</b> Bacille Calmette-Guerin vaccine is an attenuated strain of Mycobacterium <i>bovis</i> and is used to protect against severe forms of TB.</p> <p><b>Booster Effect:</b> An increase of 6mm<math>\leq</math> of a TST in comparison to a previous TST in the absence of contact with an active case.</p> <p><b>Cell-Mediated Immunity:</b> A type of immune reactivity in which T lymphocytes participate.</p> <p><b>Contact:</b> 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"> <li>• <u>Type 1</u> = Household contact. Share the same air space for greater than 4 hours per week</li> <li>• <u>Type 2</u> = Non-Household contact. Share the same air space for 2-4 hours per week</li> <li>• <u>Type 3</u> = Casual Contact. Share the same air space for less than 2 hours per week.</li> </ul> <p><b>Delayed hypersensitivity:</b> A type of cell-mediated immune response that occurs when T cells encounter their specific antigen and lymphokines are released.</p> <p><b>Induration:</b> 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><b>Mycobacterium tuberculosis:</b> The microorganism causing TB.</p> <p><b>Positive tuberculin skin test (TST):</b> 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"> <li>• 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).</li> <li>• Greater than or equal to 10mm is considered a positive TST.</li> </ul> <p><b>Preventative Treatment:</b> The treatment, usually isoniazid (INH), given to individuals infected with <i>M. tuberculosis</i> but without active disease. Also known as chemoprophylaxis or treatment of latent TB infection.</p> <p><b>Tubercle bacilli:</b> A collective term to refer to organisms in the Mycobacterium tuberculosis complex or to <i>M. tuberculosis</i>.</p> <p><b>Tuberculin convertor:</b> Any person with a tuberculin reaction which has</p>

<b>Definitions continued ...</b>	<p>converted from a “negative” to a “positive” reaction.</p> <p><b>Tuberculosis (TB):</b> A chronic bacterial infection due to <i>Mycobacterium tuberculosis</i>, 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><b>Tuberculin Skin Test (TST):</b> Intradermal injection of PPD derived from <i>Mycobacterium tuberculosis</i> bacteria to identify whether a person has a delayed-type hypersensitivity reaction to tuberculin antigens.</p>
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## Precautions / Special Considerations

Pregnant women, during the first and second trimesters, should avoid chest x-rays if possible. In these situations, a TST and sputum testing may be utilized for the diagnosis of tuberculosis. If the chest x-ray is essential, shielding should be used. If concerns, contact TB Control.

## Assessment

Use the Tuberculosis Screening Form (HLTH 939) to document following assessment.

### 1. History:

- Previous active TB, treatment of active TB – if yes, when & where was it diagnosed and treated? Was treatment completed?
- Previous latent TB or positive skin test - where was previous skin test administered? Was treatment completed for latent TB - when and where?
- Previous contact with a TB case, when & where? TST result from the contact
- BCG vaccination, when & where, BCG scar?
- Allergy or severe reaction to a previous TST
- Last chest x-ray - was it less than 6 months ago -where was it done? Results?
- History of travel to an endemic country – when, where and for how long?

### 2. Indications:

- Reason for chest x-ray is to screen for TB
- Previous result → did the TST result indicate a need for a chest x-ray

### 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 immune suppressive agents

- Treatment with tumor necrosis factor (TNF) inhibitors
- Diabetes
- Underweight (less than 90% ideal body weight/ BMI less than 21)
- Young age when infected (5 years and under.)
- Intravenous Drug User (IVDU)
- Homeless

#### 5. Symptoms of active tuberculosis

- Cough for more than 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 the disease

**Note 1:** Collect sputum X 3 for AFB if client has had a productive cough for greater than 3 weeks.

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

#### 6. Other:

- If the client is pregnant or possibly pregnant please consult with TB Control for direction regarding chest x-ray

### **Diagnosis: Screening for Tuberculosis**

#### **Interventions:**

After an appropriate assessment and interpretation of a TST, the Tuberculosis Screening Program (HLTH 939) form is completed.

- Advise the client the need for a chest x-ray if indicated and why
- Give the HLTH 939 form and instruct the client where to go to get a chest x-ray.
- Provide the client with information on receiving results of the chest x-ray.

#### **Intended Client Outcomes:**

- Receives an appropriate TB screening chest x-ray.
- Understands why a chest x-ray has been ordered.
- Receives the result of the chest x-ray and is advised of any further follow up.

#### **Client Education:**

Provide client with the following information:

- The difference between TB infection and TB disease.
- The meaning of a positive TST.

- 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-out at [www.bccdc.ca](http://www.bccdc.ca)

1. What Does a Positive Tuberculosis Skin Test Mean?
2. Preventive Treatment for Tuberculosis.
3. TB Services for Aboriginal Communities pamphlets

### **Documentation:**

1. Complete Tuberculosis Screening Program (HLTH 939) form. This form is the patient's chest x-ray requisition.
2. Complete documentation as per individual health agency guidelines.

### **Availability of Chest Radiograph Services;**

Stationary Chest Clinics:

New Westminster  
53 - 6th St  
V3L 2Z3

Vancouver  
655 W 12th Ave  
V5Z 4R4

Victoria  
1952 Bay St  
V8R 1J8

For clients residing in the Victoria area living in First Nations Communities, they should be sent to a local radiology facility with a completed HLTH 939 form.

In areas not serviced by stationary clinics, complete HLTH 939 form and send it with the client to a local hospital or private radiology clinic for chest x-ray.

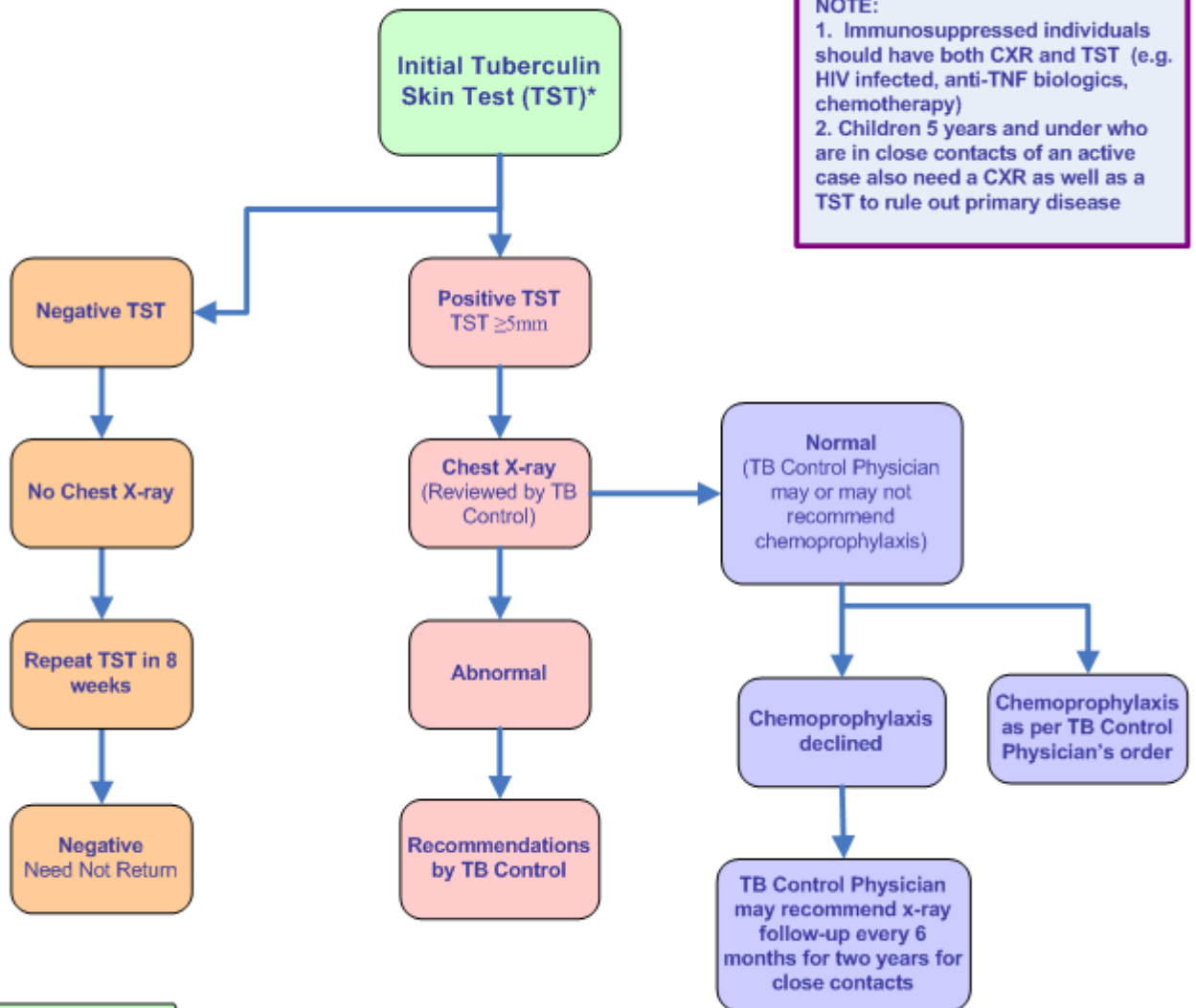
### **References:**

Canadian Tuberculosis Standards 6<sup>th</sup> edition (2007), Public Health Agency of Canada

Tuberculosis Manual (2009), BC Centre for Disease Control

## Decision Support Tool: Chest X-ray for Tuberculosis Screening CONTACT TO AN ACTIVE CASE

**NOTE:**  
 1. Immunosuppressed individuals should have both CXR and TST (e.g. HIV infected, anti-TNF biologics, chemotherapy)  
 2. Children 5 years and under who are in close contacts of an active case also need a CXR as well as a TST to rule out primary disease



\*If the initial TST is done after 8 weeks from the contact with the case then 2<sup>nd</sup> TST is NOT required