Winnipeg Regional Health Authority / Office régional de la santé de Winnipeg *Caring for Health* / *À l'écoute de notre santé*	**Clinical Practice Guideline**	

TITLE: INTERPRETATION OF TST RESULTS

APPROVED BY:				TARGET REVIEW DATE	PAGE
	Date		**Date**		1
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		✓ TB working group	April 2015		
		☐ Population and Public Health			

PURPOSE:
To promote consistency and competency in the interpretation of tuberculin skin test (TST) results.

SCOPE & GOAL:
Public Health Nurses (PHNs) will consistently and accurately interpret tuberculin skin test (TST) results.

DEFINITIONS

1. **Positive Reactions:** A TST is considered positive based on the size, the positive predictive value, and risk of disease if the individual is infected
2. **Size –** the size of the induration in millimetres at the TST test site
3. **Induration** – A localized reaction to tuberculin purified protein derivative (PPD) that results in a raised, firm area with clearly defined margins around the TST injection site. Induration must differentiated from erythema, which is not measured as a reaction to the PPD.
4. **False Negative Reactions:** A TST result that is nonreactive even though the individual is infected with *M. tuberculosis*.
   4.1 The cause of a false negative reaction may include, but is not limited to, the following technical and biologic factors:
   - Immune suppression associated with age
   - Corticosteroid therapy (minimum 15 mg/day of prednisone for at least one month)
   - Cancer treatments
   - HIV infection (especially with CD4 cell count less than 500 x 10^6 /L)
   - Use of tumor necrosis factor alpha inhibitors medications
   - Malnutrition, especially with weight loss
   - Severe illness (including active TB disease)
   - Major viral illness (e.g., mumps, measles, mononucleosis; does NOT include a common cold)

- Immunization with measles, mumps, rubella, varicella, or yellow fever in the previous four weeks
- Infants less than six months of age – validity of TST is not known
- poor injection technique

5. **False Positive Reactions:** A TST result that is reactive, even though the individual is not infected with *M. tuberculosis*. The causes of a false positive reaction may include, but is not limited to, the following: (CDC website in recommended reading).
    - Inaccurate interpretation of reaction
    - Infection with nontuberculous mycobacteria (NTM). In Canada reactions greater than 10 mm of induration are rarely caused by NTM
    - Vaccination with Bacille Calmette-Guérin (BCG) vaccine
    - Incorrect TST administration, including incorrect antigen used

BACKGROUND

The TST is the standard method of detecting *M. tuberculosis* infection in Manitoba; however the test is neither 100% sensitive nor 100% specific and TST results must be interpreted carefully, based on individual circumstances.

PROCEDURE

6. **Interpretation of a positive TST result must take into consideration**:
    6.1 The size of the reaction
    6.2 Whether the TST was administered within a contact investigation
    6.3 BCG history

Table 1: TST Interpretation (Taken from CTS, 2013 p.75)

TST result	Situation in which reaction is considered positive [Table 1 - Footnote A]
Table 1 - Footnote A The goal of testing for LTB is to identify individuals who are at increased risk for the development of tuberculosis and therefore would benefit from treatment of LTB. Only those who would benefit from treatment should be tested, so a decision to test presupposes a decision to treat if the test is positive (refer to text).	
0-4 mm	In general this is considered negative, and no treatment is indicated
	Child under 5 years of age and high risk of TB infection
≥5 mm	HIV infection
	Contact with infectious TB case within the past 2 years
	Presence of fibronodular disease on chest x-ray (healed TB, and not previously treated)
	Organ transplantation (related to immune suppressant therapy)
	TNF alpha inhibitors
	Other immunosuppressive drugs, e.g. corticosteroids (equivalent of ≥15 mg/day of prednisone for 1 month or more; risk of TB disease increases with higher dose and longer duration)
	End-stage renal disease
≥10 mm	All others, including the following specific situations: TST conversion (within 2 years) Diabetes, malnutrition (<90% ideal body weight), cigarette smoking, daily alcohol consumption (>3 drinks/day) Silicosis Hematologic malignancies (leukemia, lymphoma) and certain carcinomas (e.g. head and neck)

Table 2: Interpretation of TST Results in the Context of a Contact Investigation, According to Previous TST Results (Adapted from CTS, 2013 p.78)

Prior Documented TST Result	TST Reaction Size Considered Positive
No documented history of previous TST results	TST result of **5 mm of induration or more** on the first test or at least 8 weeks after last exposure is considered positive
Previous TST documented as less than 5 mm induration	TST result of **10 mm of induration or more** on the first test or at least 8 weeks after the last exposure is typically considered positive. The circumstances of the contact must be considered. For example, if the source case is highly infectious, if there was close or extended contact, if the contact is less than 5 years of age, or if the contact has impaired immunity. Under these circumstances, an increase of 6 mm from the previous TST may be considered a conversion.
Previous documented TST between 5 mm and 9 mm of induration, no history of treatment for TB disease or LTBI	The TST should be repeated. An increase of **at least 6 mm of induration** is considered a positive result, either on the initial TST or on the second test done at least 8 weeks after the last contact.
Previous documented TST result of 10 mm or more or history of treatment for TB disease or LTBI	Contacts with a documented previous positive TST or history of treatment for disease or LTBI should not undergo post-exposure TST. Contacts should be assessed for active TB disease and results of the clinical evaluation should guide treatment decisions. Repeat treatment may be considered for very high risk, immunocompromised individuals who are re-exposed.

6.4 BCG history

6.4.1 BCG vaccination can be ignored as a cause of a positive TST if

6.4.1.1 given in the first year of life and the person is now age 10 years or more

6.4.1.2 The risk of infection with *M. tuberculosis* is high and the person is

6.4.1.2.1 a close contact to someone with infectious TB disease

6.4.1.2.2 an Aboriginal Canadian from a high risk community

6.4.1.2.3 an immigrant from a high incidence country

6.4.2 BCG should be considered as the likely cause of a positive TST if the BCG vaccine was given after 12 months of age AND the individual is

6.4.2.1 born in Canada and not Aboriginal OR

6.4.2.2 an immigrant from a country with a low incidence of TB

VALIDATION

Accurate interpretation of the TST can contribute to the early identification of those infected with *M. tuberculosis*. For populations at increased risk of TB and its transmission, public health agencies are responsible to prevent transmission and outbreaks of TB by screening for new cases and early diagnosis.

RECOMMENDED READING

Centre for Disease Control and Prevention
http://www.cdc.gov/tb/publications/factsheets/testing/skintesting.htm

Huebner, R.E. Schein, M.F., Bass, J.B (1993) The tuberculin skin test. *Clinical Infectious Diseases* 17(6) 968-975. Retrieved from
http://cid.oxfordjournals.org/content/17/6/968.full.pdf%2Bhtml?ijkey=27867dbb5d24f597ed

Manitoba Communicable Disease Control Branch (2009). *Tuberculosis Communicable Disease Management Protocol,*
http://www.gov.mb.ca/health/publichealth/cdc/protocol/tb.pdf

Public Health Agency of Canada (2013) *Canadian tuberculosis standards 7*th Ed.
http://www.phac-aspc.gc.ca/tbpc-latb/pubs/tb-canada-7/index-eng.php