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Communicable Disease Control Manual

Chapter 4: Tuberculosis

APPENDIX A: TUBERCULIN SKIN TESTING PROCEDURE



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APPENDIX A: TUBERCULIN SKIN TESTING PROCEDURE

1. PRECAUTIONS

Acute allergic reactions, including anaphylaxis, angioedema, urticaria and/or dyspnea, have been very rarely reported following skin testing with Tubersol[®] (1). **These reactions can occur in people without a history of a TST.**

Nurses administering TSTs must follow the decision support tool [Management of anaphylaxis in non-hospital settings](#) (2).

Recipients of TB skin testing should remain under supervision for at least 15 minutes after the injection; regardless of whether they have had the particular product previously (2). Keep epinephrine hydrochloride solution (1:1000) and other appropriate agents available for immediate use in case an anaphylactic or other acute hypersensitivity reaction occurs.

2. CONTRAINDICATIONS AND SPECIAL CONSIDERATIONS

Review [Section 4\(b\) TB Screening DST](#) for Contraindications and Special Considerations prior to administering the TST.

Refer to the product insert/monograph for additional information. Consult TB Services when there is uncertainty as to whether TST should be given.

3. LIMITATIONS TO TUBERCULIN SKIN TESTING

Table A-1: Potential causes of false-negative and false-positive tuberculin skin tests (3)

Potential causes of false-negative results
Technical (potentially avoidable)
<ul style="list-style-type: none"> • Testing Solution <ul style="list-style-type: none"> ○ Improper storage of PPD (e.g., exposure to light or heat) ○ Contamination, improper dilution, or chemical denaturation • Administration <ul style="list-style-type: none"> ○ Injection of too little testing solution or injection made too deeply ○ Administration more than 20 minutes after drawing testing solution into the syringe • Measuring (reading) <ul style="list-style-type: none"> ○ Bias or inexperience ○ Error in recording (e.g., recording in centimeters instead of millimeters)
Biologic (not avoidable)
<ul style="list-style-type: none"> • Infections: <ul style="list-style-type: none"> ○ Active TB disease (especially if advanced) or other bacterial infection (e.g., typhoid fever, brucellosis, typhus, leprosy, pertussis) ○ HIV infection (especially if CD4 count is < 200 x 10⁶/L) or other viral infection (e.g., measles, mumps, rubella) ○ Fungal infection (e.g., blastomycosis) • Live injectable viral vaccination: e.g., measles, mumps, polio



- Immunosuppressive drugs: corticosteroids, tumour necrosis factor (TNF) inhibitors, and others
- Metabolic disease: chronic renal failure, severe malnutrition, stress (e.g., surgery, burns)
- Diseases of lymphoid organs: lymphoma, chronic lymphocytic leukemia, sarcoidosis
- Age: infants under six months, the elderly
- Recent infection with TB bacteria: it can take two to eight weeks after infection to respond reliably to tuberculin

Potential causes of false-positive results

Technical (potentially avoidable)

- Testing Solution
 - Use of PPD other than 5 TU
 - Injection of too much testing solution
- Measuring (reading)
 - Bias or inexperience (e.g., measuring redness instead of induration)
 - Error in recording (e.g., recording in centimeters instead of millimeters)

Biologic (not avoidable)

- Infection with nontuberculous mycobacteria (NTM)
- Prior Bacille Calmette Guerin (BCG) vaccination*

* BCG can be ignored as a cause of a positive TST > 10 to 15 mm if: the vaccination was given in infancy and the person tested is now 10 years of age or older; there is a high probability of TB infection (e.g., TB contacts, individuals from high TB incidence regions); or there is a high risk of progression from TB infection to active TB disease (3)

4. TESTING SOLUTION

Tubersol[®] 5 tuberculin units (5-TU, 0.1mL) of purified protein derivative – standard (PPD-S) is recommended in Canada for TST (1).

5. HANDLING OF TUBERSOL[®]

Refer to the product insert for additional information, if required.

- Store at 2° to 8°, but do not freeze. Discard solution if frozen.
- Store in the dark except when doses are actually being withdrawn from the vial as the solution can be adversely affected by exposure to light.
- Do not transfer the testing solution from one container to another (the potency could be diminished).
- Do not preload syringes for later use as the potency of the testing solution could be diminished. Draw up the testing solution just before injecting it.
- Label the vial of testing solution with the date of first puncture. Discard any remaining testing solution once the vial has been in use for **longer than 1 month**.
- Discard vials of testing solution that have been in use for an undetermined length of time (i.e. opened vials that are not labeled with the date of first puncture).

Note: See Appendix E – Management of Biologicals regarding recommendations for [Returning Biological Products](#) (4) in Chapter 2 of the Communicable Disease Control Manual.



6. ADMINISTERING THE TUBERCULIN SKIN TEST

A. Prepare the Client for Testing

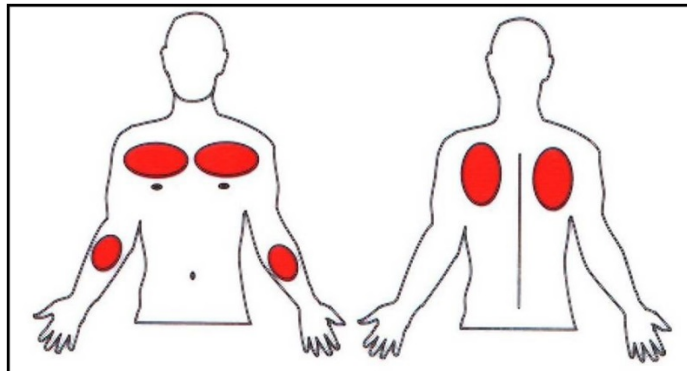
- Ensure the client is seated safely and comfortably.
- Explain the procedure.
- Obtain informed consent as per agency guidelines¹.
- Confirm with the client that s/he must be observed for 15 minutes after the injection and is required to have the test site read by a trained health care provider 48 to 72 hours later.
- Identify the test site, preferably the inner aspect of a forearm, about 5-10 cm (2-4 inches) below the elbow.

AVOID areas with:

- Abrasions or lesions
- Swelling
- Visible veins
- Localized edema, burns, rashes

If neither forearm is suitable, use an alternate test site (see [Figure A-1](#)).

Figure A-1, Sites for tuberculin skin test administration



- Clean the test site with an alcohol swab and let it dry.

NOTE: Do **not** apply EMLA® cream (or similar local anesthetic cream) to the test site. This may cause localized edema, which may be confused with a response to the testing solution.

¹ See also: Communicable Disease Control Manual, Chapter 2, [Appendix A : Informed Consent](#),
BC College of Nursing Professionals [Standard of Practice, Consent](#)



B. Prepare to Administer the Test

- Follow your facility's standard infection control precautions. Apply gloves if indicated.
- Prepare Tubersol[®] for administration:
 - Confirm the vial of Tubersol[®]:
 - Has been properly stored (see [Section 5](#))
 - Has been in use for less than 30 days (date of first puncture should be written on the vial)
 - Has not expired
 - If using a new vial, write the date on the vial.
 - **Do not** inject excess air into the vial (1).
 - Remove the testing solution from the vial under aseptic conditions, using a 0.6 to 1.3 cm (¼ to ½ inch), 26- or 27-gauge needle with a disposable plastic tuberculin syringe.
 - Withdraw a little more than 0.1 mL of testing solution into the syringe. Hold the syringe upright and lightly tap out the air, then expel one drop. Ensure that a full 0.1 mL of testing solution remains in the syringe.

C. Inject the Testing Solution INTRADERMALLY

- Position the bevel of the needle so that it opens facing upward.
- While holding the skin at the test site taut, insert the needle at a 5° to 15° angle to the skin. The tip of the needle should be visible just below the surface of the skin. Insert the needle just to the point where the entire bevel (opening) is covered.
- Do **NOT** aspirate. Slowly depress the plunger of the syringe until the entire 0.1 mL of testing solution has been injected.
- A discrete, pale elevation of the skin (a wheal) 6 to 10 mm in diameter should appear during the injection (see [Figure A-2](#)). The wheal will disappear within 15 minutes.



Figure A-2, Administration of a tuberculin skin test (3)



- If no wheal appears or if a lot of testing solution leaks from the site during the injection, the TST should be repeated (3). Repeat TSTs can be done immediately. Use the opposite forearm, or the same forearm, at least 5 cm from site of the previous TST.
- Remove the needle and lightly sponge the test site with dry gauze. **Do not** press on or massage the test site. **Do not** cover the test site with a bandage.
- Place used needles and syringes in appropriate puncture-resistant containers immediately after use.
- Discard gloves, if using, and wash hands.
- Document in the client record as per agency guidelines (e.g., date, dose, lot number, testing site).

Teaching points:

- Clients are to remain under supervision for at least 15 minutes after the injection and are to have the test site read by a trained health care provider 48 to 72 hours later.
- The test site should not be scratched. A small number of people (less than 5%) develop redness or rash at the test site in the first few hours after a TST. These are minor allergic reactions, and do not indicate TB infection. Advise clients to treat with cold compress and/or antihistamine (e.g., diphenhydramine) as per agency policy. If cold compress is used, wait until the PPD has been absorbed and wheal is no longer visible.
- Activities such as showering, bathing, swimming can be performed as usual, without special regard or care for the test site.

Practitioner Alert!

TSTs must be read **in person**, by health care providers trained in this skill. Self-reading and reporting of TST results, is **not** acceptable.



7. READING THE TUBERCULIN SKIN TEST

Examine the TST site 48 to 72 hours after the TST is administered. If the TST is not read within 72 hours, the result is invalid and must be repeated, unless there is 10 mm or more of induration present.

Repeat TST can be done immediately. Use the opposite forearm, or the same forearm, at least 5 cm from the site of the previous TST.

Procedure:

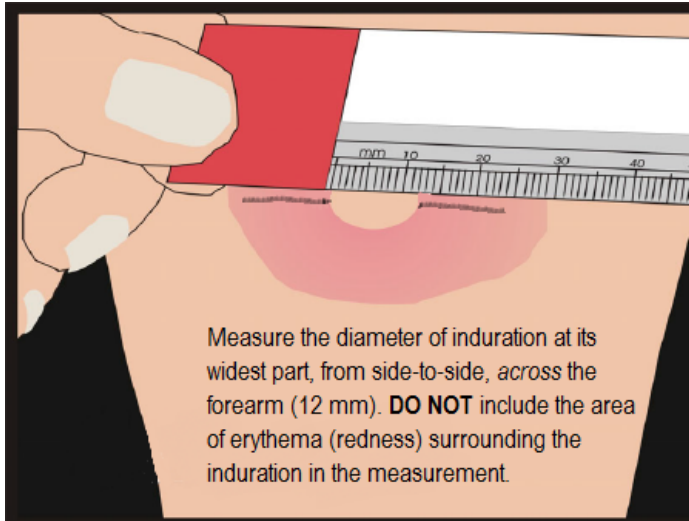
- Read the TST site in an area with good lighting.
- Ensure the client is seated with their forearm supported on a firm surface and slightly flexed at the elbow.
- Palpate the test site with your fingertips to check for firmness or swelling (induration). If any induration is felt, ask the client if you may temporarily mark their arm with a pen. Using a pen to locate and mark the edges of the indurated area allows for a more accurate measurement.
- Mark the left border of the indurated area by moving the tip of a pen at a 45° angle laterally toward the test site (see [Figure A-3](#)). The tip will stop at the edge of the induration. Repeat the process on the right side of the induration.

Figure A-3, Pen method for locating and marking edges of induration (3).



A. Measuring Induration

Figure A-4, Measurement of tuberculin skin test induration



- Use a caliper ruler to measure the distance between the pen marks, which will reflect the induration at its widest point, from side-to-side, across the forearm (see Figure A-4 above). If a caliper ruler is not available, a flexible ruler may be used (shown).
- When a measurement falls between demarcations on the ruler, use the smaller of the two numbers. For example, if the measurement is between 4 mm and 5 mm, the result is 4 mm.
- Remove pen marks from the client's arm by rubbing them lightly with an alcohol swab.

B. Documenting the TST Reading

On the client record, clearly document:

- Date the TST was read
- Print your name and sign in the 'read by' field (to identify the health care provider that read the TST)
- Size of induration in **millimetres** (mm):
 - If no induration is noted, record result as "0 mm".
 - DO NOT record measurements in centimetres. DO NOT record TST results as "positive" or "negative".

Adverse Events to TST:

If a significant adverse event following receipt of a TST occurs (e.g., anaphylaxis, severe blistering), document this in the client record and advise the client not to have any further TSTs. Report adverse reactions as per agency guidelines. An adverse reaction is a noxious and unintended effect to a health product. HCPs should report adverse reactions to medications to the BC Patient Safety and Learning System (BCPSLS), which reviews and forwards adverse drug reactions (ADR) to Health Canada on behalf of the health authorities. (5).



Hospitals: mandatory reporting of serious adverse drug reactions

A serious adverse reaction is defined in general terms as one which requires hospitalization or prolongation of existing hospitalization, causes congenital malformation, results in persistent or significant disability or incapacity, is life-threatening or results in death. Adverse reactions that require significant medical intervention to prevent one of these outcomes are also considered to be serious (5).

Mandatory reporting for hospitals is required under the [Protecting Canadians from Unsafe Drugs Act](#), known as Vanessa's Law. The mandatory reporting requirement applies to the facility (hospital) rather than individual health care professionals working in the hospital. For more information, go to [BCPSLS Central, Vanessa's Law](#).

8. TWO-STEP TUBERCULIN SKIN TESTING

Practitioner Alert!

The two-step TST protocol is **not** equivalent to the standard initial and 8-week post-exposure TST assessment in contacts, and **should not** be used in TB contact investigations.

Refer to [Section 4.4.1](#) for background information and indications for two-step TST.

Procedure:

- Complete a TST and document the results as per agency guidelines.
- If the result of the TST is less than 10 mm of induration, perform a second TST 1 to 4 weeks later.
- Administer the second TST on the opposite forearm, or the same forearm, at least 5 cm from the site of the previous TST. Use the same procedures for administering, reading and measuring two-step TST results as are used for single TSTs.
- Document the results of the two-step TST as per agency guidelines.

NOTES:

- A documented TST result of less than 10 mm of induration within the prior 12 months may be accepted as the first result (first step) of a two-step TST.
- When live virus vaccines are required as well as two-step TSTs, these should be administered on the same day as the **second** TST.



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