

APPENDIX C

TUBERCULIN SKIN TESTING (TST)

Precautions and contraindications to TST are described in detail in Section 7.2.1. In general, TST is usually very well tolerated, with limited potential for side effects. It is safe for use during pregnancy and breastfeeding, and there are no risks associated with repeat testing (even on the same day) unless a previous TST was associated with a severe reaction.

1. How to Perform a TST

NOTE: The Mantoux technique (described here) is the only internationally recommended method for administering TSTs¹.

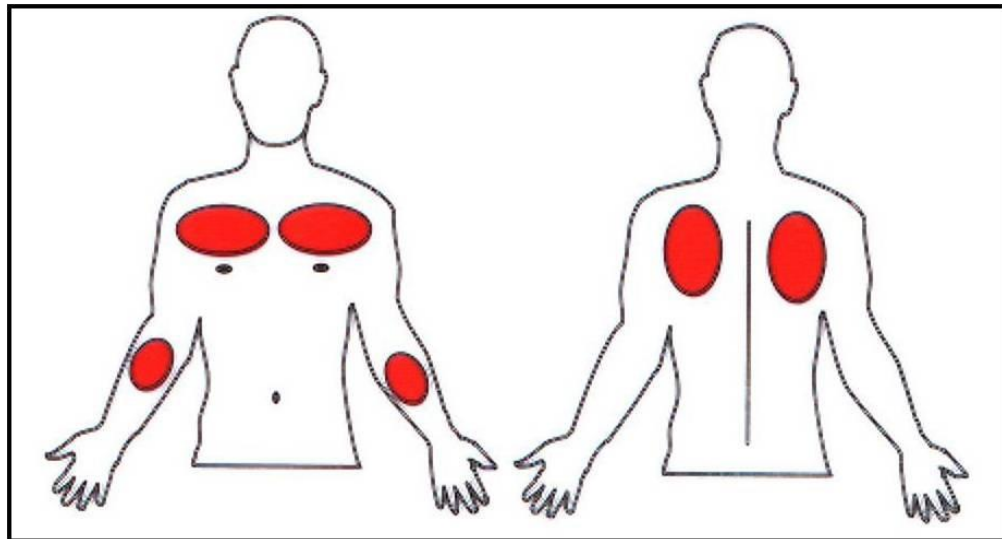
Prepare to Administer the Test

- Wash your hands and put on gloves.
- Prepare the testing solution:
 - Ensure that the tuberculin solution has been properly stored, has been in use for less than 30 days (date of first puncture should be written on the vial), and has not expired. If using a new vial, write the date on the vial.
 - Do not inject air into the vial.
 - Remove the testing solution from the vial under aseptic conditions, using a 0.6 to 1.3 cm (1/4 to 1/2 inch), 26 or 27 gauge needle with a disposable plastic tuberculin syringe.
 - Withdraw a little more than 0.1 mL of testing solution in to 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.

Prepare the Client

- The client should be seated with the forearm being used for the test resting on a flat surface. The palm of his/her hand should be facing upward.
- Explain the procedure. Make sure the client understands that s/he must be observed for 15 minutes after the injection and is required to return to have the test checked in 48 to 72 hours or else the test will need to be repeated.
- Decide where to place the TST. **The best site is on the inner aspect of the forearm, about 10 cm below the elbow.** Avoid areas with abrasions, swelling, visible veins, scars or lesions that could make the TST difficult to read. If neither forearm is suitable, use the outside of the forearm or the upper arm or an alternate site ([Figure C-1](#)).

Figure C-1, Tuberculin skin testing sites

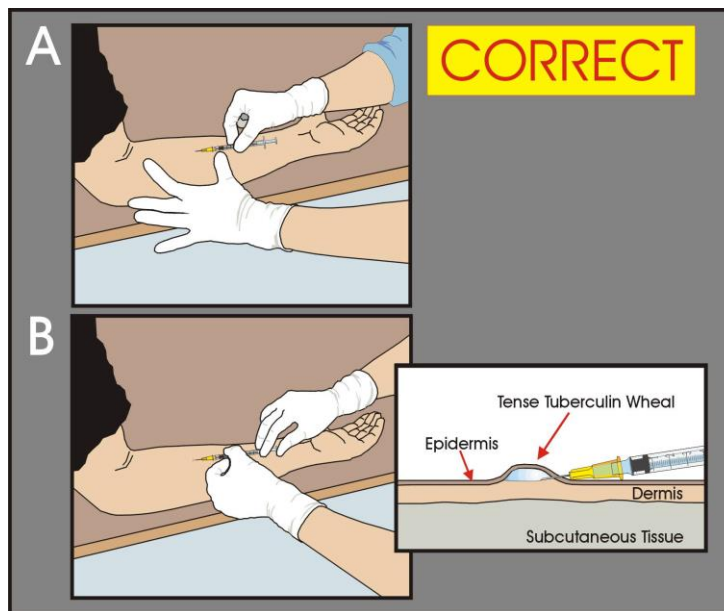


- Clean the injection site with an alcohol swab. Allow to air dry.
- **DO NOT** prepare TST sites with EMLA® cream (or similar local anesthetic cream). Reactions to these products can make it difficult to read the TST.

Inject the Testing Solution INTRADERMALLY

- Position the opening (bevel) of the needle so that it is facing upwards.
- Hold the skin at the testing site taut and insert the needle at a 5° to 15° angle to the skin ([Figure C-2](#)), just to the point where the entire bevel is underneath the skin.

Figure C-2, Correct method for intradermal injection of tuberculin testing solution²



- **DO NOT ASPIRATE.** Slowly begin to depress the plunger of the syringe and check for leakage.
- If the bevel is not inserted far enough under the skin, the testing fluid will leak from the site. If this happens, slide the bevel in a tiny bit further and try again.
- If there is no leakage, continue to slowly inject the solution until the full 0.1 mL of testing solution has been administered, and then quickly withdraw the needle.
- A pale bump (a wheal) should appear while the testing solution is being injected (see [Figure C-2](#)).

If the needle is angled too deeply into the skin, the wheal will not appear and the TST should be repeated. If solution leaks from the

site during the injection and the resulting wheal measures than 6 mm, the TST should be repeated³. TSTs can be repeated right away, at least 5 cm from the previous injection site, or on the opposite forearm.

- Lightly sponge the injection site with a dry gauze to remove any blood or testing fluid that might have leaked from it. **DO NOT** press on or massage the site. **DO NOT** cover the site with a bandage.
- Place used needles and syringes in appropriate puncture-resistant containers immediately after use.
- Discard gloves and wash hands.
- Complete documentation in Part 2 of the ***Tuberculosis Screening Program*** form, noting the location of the testing site.

Client Education

- Remind the client to remain under supervision for at least 15 minutes after the injection and to return 48-72 hours later to have the test checked.
- The wheal usually disappears within a few minutes.
- The site does not have to be kept dry. Showering, bathing, and swimming are fine.
- The test site should not be scratched. Cold compresses and/or topical anti-itch creams can be used if necessary.
- Some 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 and are not a contraindication to future TSTs
- Some people (less than 5%) with positive TST reactions develop blistering at the test site. **Blistering is a contraindication to future TSTs.**

2. How to Read, Measure, and Record a TST Result

TSTs should be read by health professionals trained in this skill; self-reading and reporting of TST results is NOT acceptable even for health care workers.

Time Frame for Reading: 48 to 72 hours after application

Reading the TST Result

- Read the site of the TST in good light with the forearm supported on a firm surface and the elbow slightly flexed.
- Run your fingers lightly over the testing site, to feel for swelling (induration). Redness (erythema) and bruising should be ignored.
- If you feel any induration, use a ballpoint pen held at a 45° angle to draw a line from the outer edge of the arm inward toward the edge of the induration. Make a mark where the pen hits against the border of the induration. Repeat the process on the other side ([Figure C-3](#)).

Figure C-3, Ballpoint pen method for identifying TST induration⁴

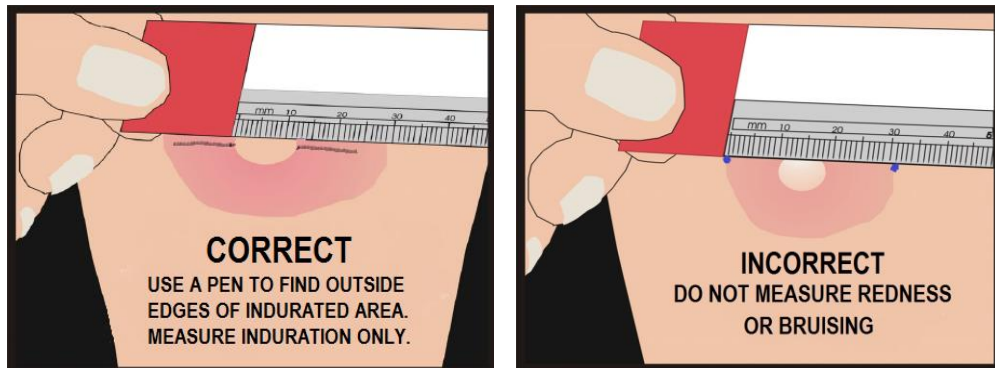


Measuring the TST Result

- Using a caliper ruler, measure the distance between the two pen marks ([Figure C-4](#)). A flexible ruler can be used (shown) if a caliper rule is not available.

- **DO NOT** measure redness or bruising.
- If the measurement falls between demarcations on the ruler (e.g., between 4 and 5 mm), the smaller of the two numbers should be recorded.
- Remove pen marks from the client's arm by scrubbing them lightly with an alcohol swab.

Figure C-4, Correct and incorrect methods of measuring induration⁵



Documenting the TST Result

- Complete documentation (date the TST was read, name of the person who read the test, and size of induration in millimetres [mm]) on the *Tuberculosis Screening Program* form.
- **DO NOT** record results as “positive” or “negative”. **DO NOT** record results in centimetres or with decimal points.
- If no induration is noted, record result as “0 mm.”
- If blistering is present, this should be noted on the TST record. **Blistering is a contraindication to future TSTs.**

Follow-Up of TST Results

Refer to Section 7.2 and Table 7-2 for TST result cut-points for various risk groups.

3. How to Perform a Two-Step TST

The schedule in [Figure C-5](#) outlines the timing for giving and reading TSTs when a two-step TST is required.

The same procedures used for giving, reading, measuring, and recording single TSTs should be followed for two-step TSTs. After a person has had a negative two-step TST, all future tests can be a single 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 (i.e., Visit 3, day 7 to day 21 after the initial TST was planted).

Figure C-5, Procedure for giving and reading two-step tuberculin skin tests

Visit 1 –TST #1

- Place the TST.
- Remind client to return in 48 to 72 hours to have TST checked.

Visit 2 – 48 to 72 hours later

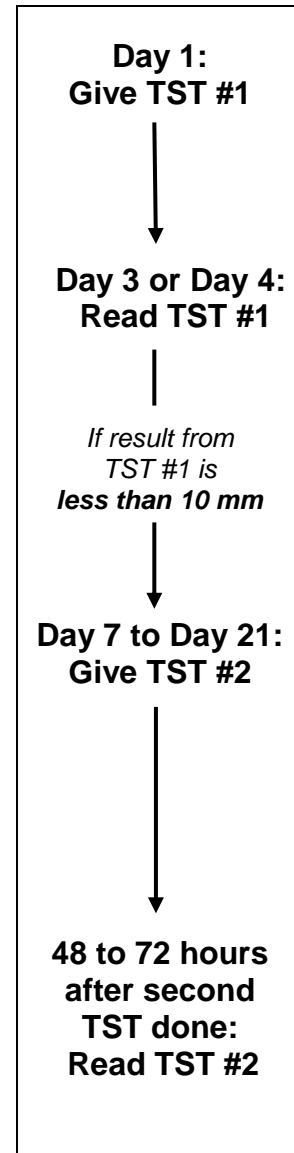
- Read, measure, and record TST result.
- If the TST result is **10 mm or more**, manage client as described in Section 7.2.6.
- If the TST result is **less than 10 mm** of induration, arrange with client to return in 7 to 21 days to have a second TST done.

Visit 3 – 1 to 3 weeks after Visit 1/TST #1

- Place the second TST on **opposite arm**.
- Remind client to return in 48 to 72 hours to have TST checked.
- Live virus vaccines can be administered on the same day as the second TST of a two-step TST.

Visit 4 – 48 to 72 hours later

- Read, measure, and record TST result.
- If the TST result is **10 mm or more**, manage client as described in Section 7.2.6.



REFERENCES

1. Pai M, Kunimoto D, Jamieson F, Menzies D. Diagnosis of latent tuberculosis infection. In: Menzies D. ed. *Canadian Tuberculosis Standards* (7th edition). Canada: Canadian Lung Association, 2014;63-95.
2. Adapted from: Curry International Tuberculosis Center. *How Should a Tuberculin Skin Test be Read?* March 2004. Accessed March 8, 2014 from: http://www.currytbcenter.ucsf.edu/abouttb/tb_control_faq.cfm
3. The New York City Department of Health and Mental Hygiene. *Mantoux Tuberculin Skin Test: A Guide for Providers*. Accessed March 25, 2014 from: <http://www.nyc.gov/html/doh/downloads/pdf/tb/tb-hcp-tst-guide.pdf>
4. Pai M, Kunimoto D, Jamieson F, Menzies D. Diagnosis of latent tuberculosis infection. In: Menzies D. ed. *Canadian Tuberculosis Standards* (7th edition). Canada: Canadian Lung Association, 2014;63-95.
5. Adapted from: Curry International Tuberculosis Center. *How Should a Tuberculin Skin Test be Read?* March 2004. Accessed March 8, 2014 from: http://www.currytbcenter.ucsf.edu/abouttb/tb_control_faq.cfm