Tuberculin Skin Test

The tuberculin skin test (TST) is given to identify individuals with latent tuberculosis infection (LTBI) who are at risk of developing tuberculosis disease. A TST is not used to diagnose tuberculosis disease.

Below is a step-by-step guide to performing a TST, with detailed instructions for health care professionals, including new learners.

For visual instructions, see Ottawa Public Health's TST YouTube video.

Preparation

Prior to gathering the necessary supplies for administration, determine if the patient can come back for the reading in 48 to 72 hours. If not, reschedule the TST for a time when the patient is available for both administration and reading.

The TST should be administered in a clean, safe, well-lit environment that protects the patient's privacy. Always obtain informed consent from the patient prior to administering the TST, as per your health care setting policy. Seat the patient comfortably, carefully explain the procedure and review the following:

- The purpose of the TST
- Risks and side effects of the TST, as per the product monograph
- Recommended follow-up

Next, gather the necessary supplies for administration.

The Tuberculin Purified Protein Derivative, also known as PPD, is ordered under the brand name Tubersol® from the Ottawa Public Health Vaccine Distribution Room and:

- Is supplied in one millilitre vials containing 10 doses of 0.1 millilitres; each vial is packaged in its own box.
- Must be stored at the appropriate cold chain temperature range of + 2 to + 8 degrees Celsius.
- Must be kept in the box, except when doses are actually being withdrawn from the vial, as PPD can be adversely affected by exposure to light.
- If the vial of PPD is not dated or you cannot confirm when it was opened, discard it and open a new vial.

You will also need:

- Sharps container
- Alcohol swabs
- Cotton balls
- 1 ml tuberculin safety syringes with permanent 27G ½" needle
- Alcohol-based hand sanitizer
- Anaphylaxis management kit, as per the latest edition of the Canadian Immunization Guide

Administration

Do not preload syringes for later use as the potency of the PPD may be diminished.

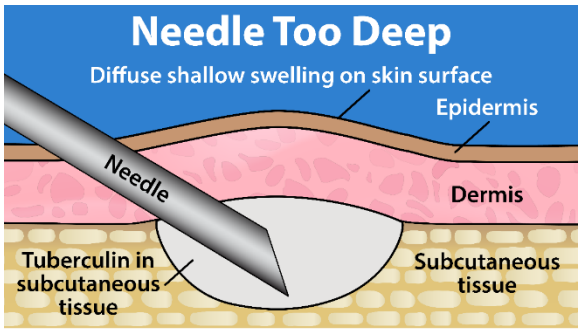
Before drawing up the PPD, perform hand hygiene.

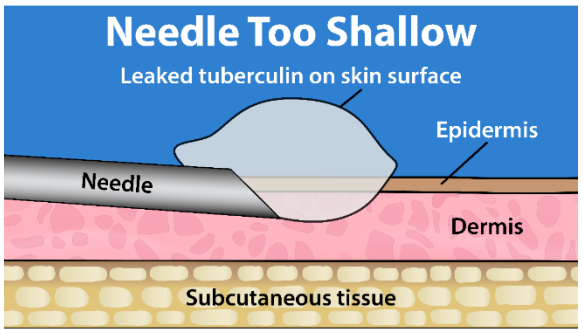
Draw up the solution just before injecting it.

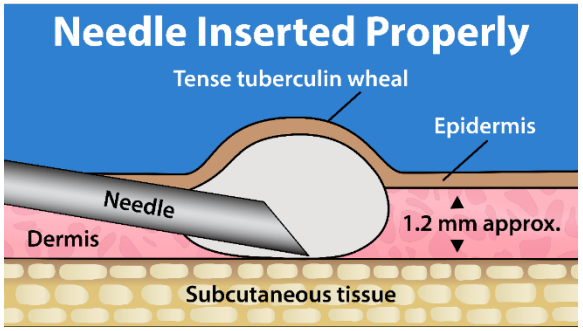
Check the vial of PPD for particulate matter, discoloration, and expiry date.

Cleanse the top of the vial of PPD with an alcohol swab.

- Draw up 5 tuberculin units, equivalent to 0.1 millilitres, of PPD in the 1 ml tuberculin safety syringe, tapping to remove any air bubbles.
- Use the inner aspect of the forearm, around 10 centimetres below the elbow. Avoid areas with abrasions or lesions, swelling, visible veins, rash, burns, or eczema. If neither inner aspect of the forearm is suitable, use the outside of the forearm or upper arm. Do not use local anesthetic cream, such as EMLA® cream, as the application of this product has been reported to cause localized edema, which could easily be confused with a positive TST result.
- Cleanse the area with an alcohol swab and let dry.
- Position the bevel of the needle so that the opening faces up.
- While holding the skin of the inner aspect of the forearm taut, insert the needle at a 5-to-15-degree angle to the skin without aspirating. The needle is inserted until the entire bevel is covered. The tip of the needle will be visible just below the surface of the skin.
- Slowly inject the 0.1 millilitre of PPD. Some resistance should be felt.
- Watch for the appearance of a definite, pale elevation of the skin, called a wheal, 6 to 10 millimetres in diameter. The size of the wheal is not completely reliable, but if a lot of PPD runs out at the time of injection or there is no wheal, repeat the injection on the opposite forearm, or on the same forearm, but at least 5 centimeters from the previous injection site. Poor injection technique, such as inserting the bevel of the needle too shallow or too deep may cause a false-negative TST.
- Engage the safety feature of the needle and dispose of it in the sharps container.
- Observe the injection site; a drop of blood may be seen, which is normal. Offer a cotton ball to remove the blood but advise the







patient not to push on the site in order to avoid squeezing out the PPD and disrupting the TST.

- Advise the patient that the PPD will be absorbed in approximately 15 minutes. The patient should not apply a bandage and should not scratch the site but can perform all normal activities.
- Advise the patient to wait for 15 minutes in the testing area in case of adverse reaction.
- Remind the patient to return for the reading of the test at the pre-arranged date and time, in 48 to 72 hours.
- Document the date, time, site of injection, PPD lot number, expiration date, and dose of PPD in the patient's file or on the consent form, as per your health care setting policy. Include any additional or unusual information such as, if the TST was not given or if the first attempt was unsuccessful.
- Perform hand hygiene and return the PPD to the refrigerator.

Reading

Reading of a TST must be done 48 to 72 hours after administration by a trained healthcare professional and never by the patient. If the TST has been given but is not read within 72 hours, it should be repeated. Whenever possible, the reading should be done in an environment that protects the patient's privacy. Gather the necessary supplies for the reading:

- A ballpoint pen to mark induration
- A TST ruler to measure induration
- Alcohol swabs to remove pen markings

Seat the patient comfortably. Review the patient's file to determine the TST site and the date and time of administration. Perform hand hygiene.

The forearm should be supported on a firm surface and slightly flexed at the elbow. Visually inspect the TST site, making sure it is the same as the site documented in the patient's file.

Palpate with fingertips to check whether induration is present as induration is not always visible. If there is induration, mark the border of the induration by moving the tip of a ballpoint pen at a 45-degree angle laterally toward the site of the injection. The tip will stop at the edge of the induration if present. Repeat the process on the opposite side of the induration. Disregard any erythema.

Measure the distance between the pen marks using a TST ruler. A caliper is recommended because readings will be more precise and the risk of a rounding error is reduced, however, a flexible ruler can also be used to carefully measure the induration.

Document the date and the result in millimetres in the patient's file. When no induration is present, it is documented as zero millimetres. Blistering, which can occur in 3 to 4

percent of persons, and any other serious reaction should be documented in the patient's file. Provide a record of the TST result to the patient, which should include:

- Dates the TST was given and read
- Measurement of the TST, in millimetres
- Any adverse reactions, such as blistering
- Name of the individual reading the test

Interpretation

Once the size of the TST has been documented, determine if it is positive or negative. A result of equal to or greater than 5 millimetres is considered positive if the TST was administered because the patient was identified as a contact of a person diagnosed with pulmonary tuberculosis disease.

A result of equal to or greater than 5 millimetres may also be considered positive for persons with the following risk factors:

- HIV infection
- Presence of fibronodular disease on chest x-ray, which indicates healed tuberculosis disease
- Organ transplantation, due to immune suppressant therapy
- TNF alpha inhibitors
- Other immunosuppressive drugs, such as corticosteroids, equivalent of ≥15 mg/day of prednisone for one month or more
- End-stage renal disease

Interpreting a TST for persons with these risk factors should be considered on a case-by-case basis by a healthcare professional who is knowledgeable in tuberculosis infection and disease.

A result of equal to or greater than 10 millimetres is considered positive if the TST was administered for screening purposes.

Do not assume that a positive TST is due to the BCG vaccine. BCG vaccination can be ignored as a cause of a positive TST under the following circumstances:

- If BCG vaccination was given in infancy, and the person is now aged 10 years or older.
- If there is a high probability of tuberculosis infection: contacts of a person diagnosed with pulmonary tuberculosis disease, Indigenous people from areas with high tuberculosis incidence, immigrants, or visitors from tuberculosis endemic countries.
- If there are risk factors that could increase the progression from tuberculosis infection to tuberculosis disease.

The following online tool can help to assist with TST interpretation: https://www.tstin3d.com/en/calc.html.

Follow-Up After a Tuberculin Skin Test (TST)

It is very important to provide proper teaching to the patient regarding the significance of the result.

If the TST is negative, advise the patient about repeat testing, if applicable.

If the TST is positive:

- Advise the patient that they should never have another TST.
- Provide teaching about LTBI.
- Reassure patient that they are not infectious and cannot transmit tuberculosis to others.
- Provide teaching about the signs and symptoms of tuberculosis disease and offer the patient a tuberculosis fact sheet.
- Provide teaching about the recommended medical follow-up, which includes a medical examination, a chest x-ray, and the consideration for treatment of LTBI once tuberculosis disease has been ruled out.
- Advise the patient that a referral for medical follow-up will be made to the patient's primary healthcare professional and if the patient does not have one, the referral will be made to the local tuberculosis clinic.

Be sure to include the following in your referral:

- Reason for the TST
- Date of administration
- Date of reading
- Result in millimetres

For those with no primary healthcare professional, the referral should be faxed to one of two tuberculosis clinics in Ottawa:

The Ottawa Hospital General Campus
Module G
501 Smyth Road, Ottawa, Ontario
K1H 8L6
Telephone: 613-737-8856
Fax: 613-737-8009

Children's Hospital of Eastern Ontario
Clinic C-1
401 Smyth Road, Ottawa, Ontario
K1H 8L1
Telephone: 613-737-2222
Fax: 613-738-483

LTBI is reportable to Ottawa Public Health. The reporting form (bilingual) is available on our website, along with information on how to order medications for LTBI (bilingual).

For questions regarding the TST, refer to the Canadian Tuberculosis Standards or call the Ottawa Public Health at 613-580-6744.