

B. Testing Method

Tuberculin skin testing using the Mantoux method is not difficult, but it needs to be done with precision. The method for administering tuberculin skin testing follows (CDC, 1991):

SUPPLIES

Testing

- TB syringes and needles (26 gauge steel/27 gauge platinum)
- 5 TU PPD solution-Kept refrigerated at 36-46° F (**not** on door of refrigerator to avoid temperature fluctuations)
- Alcohol swabs and cotton swabs
- Patient education materials
- Sharps container for needle disposal
- Appointment cards
- Insulated cool container for PPD storage during mass testing

Reading

- Record-keeping forms
- Tuberculin skin testing ruler or ruler with millimeter measure
- Rolling ballpoint pen
- Patient education materials

Preparation

(before bringing child into room for testing)

- Ask child or responsible parent / guardian for tuberculin skin testing history or check medical record on file
- Select a well lighted, disturbance-free work area for testing
- Obtain skin testing supplies and set up test equipment
- Check expiration date on vial
- Swab vial top with alcohol
- Check that alcohol swabbed vial has dried before proceeding

Administering skin test

- Fill syringe individually prior to each administration (do not draw up more than one syringe at a time) to slightly above the 0.1 cc line; gently tap syringe to dislodge any air bubbles.
- Expel air and excess tuberculin and assure the presence of **0.1 cc** of tuberculin
- Return PPD vial back to refrigerator; store in cool container only if doing mass testing
- Make child feel comfortable
- Find inner aspect of mid-forearm; use left arm, if possible, to provide universality and consistency
- Avoid areas with veins, rashes, or other skin-surface irregularities
- Alcohol swab arm site, preferably volar surface
- Allow arm to dry
- Place needle bevel up
- Stretch skin with index finger and thumb to insert needle intradermally
- Inject just below the surface of the skin forming a 6-10 mm wheal. If no wheal forms or it is less than 6 mm, immediately fill new syringe and place 2 inches away from original site on the same arm or other arm

- If minor bleeding occurs, use a cotton swab to dab (not press) the injection point; do not use alcohol or bandage
- Dispose of needle in Sharps container
- Record date, time, your name, arm of skin test placement, brand name of PPD solution (e.g., Tubersol or Aplisol), lot number, and expiration date of PPD solution in patient's medical record or designated form

Education

- Inform child of care for injection site-child should not scratch or put bandage on injection site; ice may be used if itching occurs
- Give written information on skin test and answer any questions
- Inform child of importance of returning for reading within 48-72 hours (2-3 days)
- Give written appointment for reading

Reading-48 to 72 hours later*

- Make child at ease, arm in relaxed position
- Read in good light
- Palpate gently

* Positive reading may be detected up to 7 days later but readministration is highly recommended if there is no induration or induration is too small to be interpreted as positive.

Measurement

- Measure the induration (raised, hardened area) **NOT** the erythema (redness) or bruise
- Feel with your fingertips, do **NOT** measure just what you see (often the induration is not clear enough to see)
- Measure the diameter of the induration perpendicular to the long axis of the arm
- Use a ballpoint pen to mark the edges of induration
- Use a tuberculin skin testing ruler or a ruler with millimeters to measure the distance between the two points
- If unsure of result ask a trained co-worker or local health department to assist you

Recording/Documentation

- Note in child's medical record when the skin test was placed
- Record the **measurement in mm of induration** (interpretation of reading will vary depending on individual child (e.g., 5 mm is considered positive in an HIV-positive person) *NOTE: Reading that is recorded as only "positive" or "negative" is unacceptable and may result in child having to repeat skin test. Record no induration as 0 mm.*
- Record who read the skin test
- Record date and time of reading

Follow-up

- Know interpretation guidelines for your community and the individual child
- Direct child for follow-up if indicated (*i.e. chest X-ray if skin test result is positive*)

Education

- Explain that a positive skin test result means infection with the TB germ
- Explain what a negative skin test result means
- Provide appropriate written materials and documentation (*See following section.*)
- Answer any questions

C. Documentation

Just as you require proper documentation for skin testing history, you must also provide proper documentation of TST results.

Figure 2 shows a sample recording form that can be used for recording skin test results (*See Appendix B*).

Fig. 2 Documentation - TST Using the Mantoux Method

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE _____

SKIN TEST INFORMATION _____

ADMINISTRATOR NAME _____

DATE ADMINISTERED _____ TIME _____

ARM OF SKIN TEST PLACEMENT (CIRCLE ONE) LEFT OR RIGHT

BRAND NAME OF PPD SOLUTION _____

LOT # _____ EXPIRATION DATE OF PPD SOLUTION _____

RESULTS: INDURATION = _____ mm DATE OF READING _____ TIME _____

NAME OF READER _____

SIGNATURE _____

D. Interpretation of Results

The millimeter reading of induration is extremely important in determining a positive or negative result. Not all induration is considered positive. The child's

risk factors are important too. Table 2 indicates measurement and factors used to determine the significance of the result.

Table 2. Interpretation of Induration Measurement ¹

MEASUREMENT OF INDURATION	INTERPRET AS POSITIVE & REFER TO CLINICIAN IN FOLLOWING SITUATION
≥5 mm	Close contact to an infectious case, abnormal CXR, immunosuppression, HIV infection
≥10 mm	All others

¹ Check with your local/state guidelines to interpret results. Some areas use different guidelines.

If a child has a positive reading, refer him/her for a chest X-ray (CXR) and physical exam to check for both pulmonary and extrapulmonary TB. Any questionable results, or children with unclear risk factors should be referred to a clinician. Your school district may have an agreement with the local health department, TB control program, or hospital. If the CXR is normal, the child should be evaluated for treatment of latent TB infection and can remain in school (Connelly, 1993).

A CXR is used to evaluate individuals with risk factors for TB disease such as recent skin test conversion, symptoms, or exposure. In the past, a CXR was recommended

yearly for those who had positive skin test histories. **This is no longer recommended.** The CXR is not a screening tool for TB and is only useful in confirming manifest pulmonary disease (CDC, 1994-a).

If the CXR shows disease, treatment must begin. In addition, the local health department will determine whether a contact investigation should occur and whether anyone should be tested. If it is determined that individuals within the school must be tested, your assistance may be needed (CDC, 1995-a).

It is most likely that the child contracted TB infection or disease from an infectious adult or adolescent. The child is not likely to have spread bacilli to others. Therefore, looking for the adult/adolescent source is critical if the child is very young (Connelly, 1993). In the rare case that the clinician determines a child is infectious, individuals in close contact with the child may need to be tested. The local health department will make this determination (CDC, 1995-a).

E. BCG vaccine

A recurring concern is how to TST children who have received the bacille Calmette-Guérin (BCG) vaccine. It was once thought

that BCG vaccine would protect individuals from TB for a lifetime. However, it has been proven that this is not true. The protection provided by the vaccine varies sharply and wanes over time. In fact, most children who received BCG vaccine, test tuberculin-negative.

BCG vaccine is not a contraindication for receiving tuberculin skin testing. When there is a history of BCG vaccine and the tuberculin skin test is positive, the reaction should be attributed to latent TB infection and the child should be treated accordingly. (CDC, 1996)

TUBERCULOSIS

TREATMENT

Treatment

TB infection and TB disease are treated differently (*See Table 3*). There are five first-line drugs used in TB treatment:

- Isoniazid (INH)
- Rifampin (RIF)
- Pyrazinamide (PZA)
- Ethambutol (EMB)
- Streptomycin (SM)