Model Standing Orders for Tuberculin Skin Testing

Current as of 2 January 2024

***All standing orders should be reviewed with respect to the most recent recommendations prior to signing them. These orders may be revised by the clinician signing the order (initial revisions).***

# Tuberculin Skin Testing

Testing for tuberculosis (TB) infection is indicated for persons or groups at risk for tuberculosis infection or disease and who would benefit from treatment of latent tuberculosis infection (LTBI), if detected. Persons with increased risk for developing TB disease include those who are recently infected with *Mycobacterium tuberculosis,* and those who have clinical conditions associated with increased risk for progression from latent TB infection to active TB disease.

The Mantoux tuberculin skin test (TST) is a standard method of identifying persons with TB infection. Multi-puncture tests (*e.g.,* tine test) are not recommended and should not be used. An interferon-gamma release assay (IGRA) may be substituted for a TST in some cases. For example, an IGRA is preferred over the TST for patients two years of age and older with a history of BCG vaccination or who are from countries where BCG vaccination is routinely practiced. Guidance for the use of IGRA has been provided by the Centers for Disease Control and Prevention:

<https://www.cdc.gov/tb/publications/factsheets/testing/igra.htm>

**Order for Tuberculin Skin Testing:**

Check that the vial being used as the source of the skin test reagent is labeled “tuberculin purified protein derivative (PPD) antigen 5 tuberculin units (TU) per 0.1 mL”.

**Administer the Mantoux tuberculin skin test by intracutaneous (intradermal) injection of one-tenth milliliter (0.1 ml) of standardized solution (5TU) into the volar surface of the forearm, two to four inches below the elbow.**

Alternate sites, such as the thigh, upper back, or shoulder may be used when the arms are not suitable.

The injection is administered using a single-dose disposable tuberculin syringe that has a one-quarter to one-half inch, 25 to 27-gauge needle with a short bevel.

Administer the intradermal injection by stretching taut the selected area of skin between the thumb and forefinger; inject at a 5-to-15-degree angle, needle bevel facing upward, just under the top (superficial) layer of skin. ***A tense, pale wheal 6 to 10 mm in diameter should appear over the needle bevel as the 0.1ml of PPD solution is injected. The test is only effective if a wheal is obtained. If a wheal is not obtained, repeat the procedure in another area*.**

**Document, in writing, the PPD reagent used for the test (product and lot number) and the location of administration**. Indicate in which arm the reagent was placed.

1**.** **EDUCATION**

1. Discuss why the tuberculin skin test is being done.
2. Discuss what is involved in the procedure. Remind the patient to not scratch the test site.
3. Indicate when the patient should return for the tuberculin skin test to be read. Explain that the patient must return within 48-72 hours after the test is administered to have the test read; the test **cannot** be read by a non-trained person.

2. **ACTUAL TESTING**

1. If testing multiple individuals at the same time, test everyone on the same arm to avoid confusion.
2. **Do not prefill syringes more than 30 minutes before administering the test**.
3. Do not place an adhesive bandage over the site of the tuberculin skin test after administration.

3. **CONTRAINDICATION**

1. **Do not** administer a tuberculin skin test if individual has a previously documented positive reaction unless that reading is in question.
2. **Do not** administer a tuberculin skin test if individual has a previously documented history of bacteriologically-confirmed tuberculosis.
3. **Do not** administer a tuberculin skin test if individual has had a live virus vaccine (MMR, varicella, yellow fever, etc.) within the last 4-6 weeks. The tuberculin skin test can be administered on same day as live virus vaccine or administered 4-6 weeks after, or the live virus vaccine may be administered on the day the tuberculin skin test is read.
4. **Do not** administer a tuberculin skin test if the individual has a history of immediate hypersensitivity or anaphylaxis to latex or a previous tuberculin skin test.
5. **VACCINATION CONSIDERATIONS**
6. Live Virus Vaccination
	* Testing for TB infection with one of the immune-based methods, either the tuberculin skin test (TST) or an interferon gamma release assay (IGRA), should be done before administration of a live virus vaccine if possible.
	* This includes the JYNNEOS vaccine for the prevention of smallpox and mpox disease. <https://www.cdc.gov/tb/publications/letters/2022/JYNNEOS-vaccine.html>
	* Given that the JYNNEOS vaccine can be administered as an intradermal injection to the volar surface of the arm, the vaccine should be administered on the opposite arm on the day the TB skin test is read.
	* If administration of a live virus vaccine has already occurred, consider deferring TST placement until 4-6 weeks after vaccination.
7. COVID-19 mRNA Vaccination
	* Data are currently limited regarding the interaction of mRNA vaccines and tests of TB infection.
	* The CDC no longer recommends delaying tests of TB infection following COVID-19 mRNA vaccination. <https://www.cdc.gov/tb/publications/letters/2021/covid-mrna-followup.html>
	* Given that the effect of mRNA vaccines on tests of TB infection are uncertain and in order to avoid possible confounding of test results by the systemic immune response to mRNA vaccination, MDPH recommends administering the vaccine 4-6 weeks prior to TST placement, or at the time a TST is read, if possible.

4. **INDICATIONS FOR TUBERCULIN SKIN TESTING:**

Targeted tuberculin testing should be conducted only among groups at high risk and discouraged in those at low risk for TB infection. Testing low risk populations results in a higher proportion of false positive tests. Infected persons who are at high risk for developing active TB should be encouraged to receive treatment for latent TB infection, irrespective of age. Please refer to the Clinical Advisory for expanded information at <https://www.mass.gov/clinical-advisory/latent-tuberculosis-infection-testing-and-treatment-for-high-risk-populations>.

5. **INTERPRETATION:**

1. Patients should not read their own tuberculin skin test; the test MUST be read and recorded by a trained provider.
2. Read tuberculin skin test 48-72 hours after administration.
3. Person verifying the reading should visually inspect the test site.
4. Keep the arm slightly flexed at the elbow and measure induration (swelling, not erythema) across the transverse diameter of the arm (perpendicular to the long axis). The basis of reading the tuberculin skin test is the presence or absence of induration, which is a hard, dense, raised swelling. Erythema is to be ignored; only induration should be measured.
5. Palpate the site with your fingertips to determine if there is induration; it may be helpful to mark the margins of the induration with a pen.
6. Use a millimeter ruler or a caliper designed for tuberculin skin test reading to measure the diameter of the induration; if the margins of induration are irregular, mark and measure the longest diameter across the forearm.
7. Record the reaction as millimeters (mm) of induration measured (no matter what size, including “0 mm”).
8. Positive tests: Refer to the chart below for TST interpretation

|  |  |  |
| --- | --- | --- |
| Induration > 5 mm | Induration > 10 mm | Induration > 15 mm |
| Persons with HIV infectionRecent contact to someone with infectious TBPersons receiving immunosuppressive therapyPersons with abnormal chest X-ray consistent with old TB | Persons with a history of travel to or residence in TB endemic regionsResidents and employees of congregate settingsPersons with a history of injection drug use | Persons 5 years of age or older without any risk factors |

* Persons who have HIV infection, or are receiving immunosuppressive therapy, or have had recent close contact with persons with infectious TB, or have abnormal chest radiographs consistent with prior TB are considered **positive at 5 mm of induration**.
* Individuals with a history of travel to or residence in TB endemic regions; residents and employees of high-risk congregate settings (including health care workers with potential for exposure to TB); mycobacteriology laboratory personnel; persons with a history of injection drug use; persons with clinical conditions such as: silicosis, diabetes mellitus, chronic renal failure, leukemia and lymphoma, carcinoma of the head, neck and lung, weight loss of > 10% ideal body weight, gastrectomy and jejunoileal bypass; children younger than 4 years of age; and children and adolescents exposed to adults in high-risk categories are considered **positive at 10 mm of induration**.
* For low-risk persons who have had tuberculin skin testing, a reaction is considered **positive at 15mm induration**.
1. Tuberculin Skin Test “Conversion”:

An *increase in induration* of greater than or equal to 10 mm within a 2-year period is classified as a conversion to a positive test and the individual is considered recently infected with *Mycobacterium tuberculosis*. This is used to define a high-risk category of persons (“TST converters”) who are more likely to progress from LTBI to TB disease unless treated. See <https://www.cdc.gov/tb/publications/factsheets/testing/skintestresults.pdf>

6. **SPECIAL CONSIDERATIONS – BOOSTER EFFECT AND 2-STEP TESTING**

In most individuals infected with TB, tuberculin skin test (TST) sensitivity persists for many years after infection. However, over time in the absence of re-exposure to tuberculosis or to tuberculin, the size of the TST reaction may decrease or disappear because of waning immune memory.

If the TST is administered to TB-infected individuals with faded immune memory, the reaction (induration) may be small or absent; i.e., falsely negative. However, this TST may restore (or boost) immune memory and there may be a recall response on repeat testing resulting in a positive reaction. This reaction, now positive on the second test, reflects immune sensitization from the prior TB infection.

* Because waning takes time, boosting is more common among older persons, especially those more than 55 years of age.
* Boosting usually is evident within one week after the initial TST.

While administration of a TST can similarly “boost” an IGRA response, boosting is not considered in interpreting IGRA results.

If an initial TST result is negative, a two-step TST procedure may be required to “boost” a potential reaction that has waned over time to establish a reliable baseline. This is important for persons who will undergo periodic (serial) skin testing (e.g., health care workers who may be required to undergo annual testing) and for residents in long-term care facilities, i.e., nursing homes and rest homes. In the two-step method, a person with a negative initial TST, who has not had a TST within the past year, undergoes a second TST 1-4 weeks after the first.

Repeated skin testing with PPD will not induce a positive skin test reaction in individuals who have no hypersensitivity to the antigens in PPD. That is, a repeat TST does not produce a false positive reaction.

7. **ADVERSE REACTIONS:**

1. Reactions in some instances may be severe; advise individual (beforehand) to:
* Avoid scratching the reaction site.
* Apply ice to any itchy or severely inflamed area.
1. Unusual reactions, such as ulceration, should be evaluated by a physician or at a clinic.
2. Suspected adverse reactions may be reported to the Food and Drug Administration (FDA) MEDWATCH Program at 1-800-332-1088 or <http://www.fda.gov/medwatch>

8. **EVALUATION:**

Refer positive reactors to their own health care provider or to a State-supported TB outpatient service provider (<https://www.mass.gov/service-details/massachusetts-tb-outpatient-services>) for a chest radiograph and further clinical evaluation to rule out active TB and evaluate for treatment of latent TB infection, as indicated.

9. **DOCUMENTATION:**

Write and date the brand, lot number of test reagent, location of test placement, date of administration and interpretation of the test result, and the exact measurement in millimeters of induration on the patient’s record. Provide the patient with a copy of the results.

10. **STORAGE AND HANDLING OF PPD REAGENT**:

1. On opening a new vial of purified protein derivative (PPD) of tuberculin skin test reagent, write the date and your initials on the label to indicate when the vial was opened and who opened it.
2. Discard open vials **30 days** after opening because oxidation and degradation may reduce potency.
3. To avoid reduced potency of the tuberculin skin test reagent, store PPD inside a refrigerator so that it remains between 35 and 46 degrees Fahrenheit (2 and 8 degrees Celsius).
4. Store and transport the tuberculin skin test reagent in the dark as much as possible and avoid exposure to light.
5. PPD reagent should be contained in a cold pack during transport.

11. **REPORTING:**

Cases of latent tuberculosis infection, as determined by tuberculin skin test or other test for determining the presence of tuberculosis infection, are reportable in Massachusetts to the Massachusetts Department of Public Health (105 CMR 300.180 (A)) in a written or electronic format, as designated by the Department. When available, name, date of birth, age, sex, race/ethnicity, address, place of employment, and school (as applicable) must be included in each report. The LTBI reporting form (with instructions) is available at: <https://www.mass.gov/how-to/report-a-case-of-tuberculosis-disease-or-latent-tb-infection>.