Session #5 Practicum: Placing and Measuring TST

INTRODUCTION

In this session, participants will have hands-on practice with placing intradermal injections (saline) and measuring standardized TST reactions on model arms. Participants will practice these essential TST tasks under the supervision of the class instructor and, in some cases, assistant instructors. The practicum will include information about how to prepare and educate clients for TST and how to utilize universal precautions. Finally, participants will learn how to properly document TST placement and measurement.

MATERIALS SUPPLIED FOR THIS SESSION

- Guidelines and outline for trainers
- Participant workbook (1 reproducible master copy)

MATERIALS YOU NEED TO SUPPLY

- Duplicate participant workbooks
- Poster paper, chalkboard, or dry-erase board
- Poster pens, chalk, or dry-erase markers
- Practicum supplies for intradermal (saline) practice (see list on page 5)
- Practicum supplies for measurement (model arm) and documentation practice (see list on page 8)

Material in this session is adapted from:

- *Mantoux Tuberculin Skin Test* (video). Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2003.
- *Tuberculin Skin Testing: A Model for Trainers.* San Francisco, CA: Francis J. Curry National Tuberculosis Center; 2001.
- *Tuberculosis Fundamentals and Mantoux Tuberculin Skin Testing: Train-the-Trainer Course.* Presented by the New Jersey Medical School National Tuberculosis Center on June 12, 2000, in Newark, New Jersey.

Practicum Guidelines and Outline for Trainers

35 min **Opening activities**

Practicum agenda
Review with participants. Your agenda may be customized with other items or additional details. Consider presenting the agenda on poster paper or displaying it on a chalk- or dry-erase board as a visual reference throughout the session.

- o Pre-test (if applicable; see page 2 of *Participant's Workbook)*
- o Review of agenda and learning objectives
- o Review of key concepts from Sessions 3 and 4
- o Practicum: Intradermal (saline) injection
- o Practicum: Measuring (model arms) and documenting TST results
- o Review questions or post-test
- o Participant evaluation

Learning objectives
Review with participants. Refer participants to page 1 of their workbooks.

Upon completion of this training session, participants will be able to:

1. Identify the supplies/equipment needed for TST and explain how to use them.
2. Prepare a client for TST.
3. List the steps for handling tuberculin and syringes for TST injection.
4. Correctly perform an intradermal injection (saline).
5. Accurately measure a TST reaction.
6. Correctly document TST placement and measurement.

Review of key concepts from Sessions 3 and 4
Review with participants the key concepts from the topics covered in Sessions 3 and 4. If possible, arrange a second viewing of key scenes from the CDC video, Mantoux Tuberculin Skin Test. *Consider organizing the discussion around the following questions.*

1. What are the three main steps of the Mantoux method?
2. List the supplies needed to perform TST.
3. Describe how tuberculin should be handled.
4. What are examples of "universal precautions"?
5. How does a history of BCG vaccination affect TST?
6. What skills contribute to good communication with clients?
7. What is an open-ended question?
8. What are the most important pieces of information to relay to clients receiving TST?
9. What are some of the questions most frequently asked by clients? How would you respond to the questions?

10. What are ways that people may culturally identify themselves?
11. How can you learn more about a specific culture and health beliefs?
12. What barriers to health care are faced by clients who are homeless or use substances?
13. What local community resources exist for clients who are homeless or use substances to address their non-TB-related needs?

Practicum guidelines and outline for trainers

This session differs from previous sessions in this curriculum because participants will have hands-on practice with intradermal injections (using saline solution) and measuring and documenting TST results (using model arms).

Preparing for the practicum

Physical layout of the training space

1. Allow adequate space for up to 15 participants to safely move around.

2. Close proximity of hand-washing facilities is ideal. Some participants may choose not to use chemical hand-washing products.

3. Adequate lighting is essential for practicum activities.
   a. If training space has inadequate lighting, bring in floor lamps or move to another room with brighter lights.
   b. If no adequately lighted room is available, consider moving the practicum activity outdoors (weather permitting).

Class size and use of assistant instructors

1. Class size should be limited to no more than 15 participants.
   a. Fewer participants increases quality of individual learning.
   b. Fewer participants promotes questions and enables instructor to provide more individual attention.

2. If class is larger than 5 participants, assistant instructors (staff experienced in TST) should be utilized. Divide participants into groups of equal size (no more than 5 per group.) Assign an assistant instructor to each small group.
   a. Clarify roles and expectations with assistant instructors prior to the practicum; review curriculum and learning objectives.
   b. Ask assistant instructors to establish a relaxed atmosphere within their small groups to reduce anxiety.
   c. Emphasize the importance of a positive attitude and ready praise.

3. Organize practicum activities with two types of "stations"—one in which intradermal injections are practiced, the other in which TST measurement and documentation are practiced.
    a. If class size is five students or less: begin the practicum with intradermal injections, followed by measuring and documenting TST results.
    b. If class size is larger than five students: divide the large group into small groups of equal numbers, each assigned to an assistant instructor; half of the small groups will begin at intradermal injection stations, and the other half will begin at the measuring/documenting stations.

Expectations of participants

1. Each participant will be expected to perform two intradermal injections under observation.
    a. If a participant is unable to place the injection properly after two attempts, he/she should continue to practice until at least two successful injections have been achieved.
    b. Some participants may need extra instruction and attention from the instructor. Encourage participants to watch and learn from each other.

2. Each participant is expected to *receive* two saline intradermal injections. It is important that the instructor introduce the practice of the injections with a positive tone.
    a. Assure participants that the injected saline is sterile; use unopened bottles of saline at each class. Do not use sterile water or sterile diluent from MMR vaccine packages; these are painful for those receiving the injection.
    b. Participants need to sign a disclaimer before beginning the injection practice (see Appendix A for a sample disclaimer). Occasionally, a participant may have medical reasons or other personal reasons for refusing to be injected; however, he/she should be allowed to continue to participate in the practicum.

100 min I. **Intradermal injection practicum**

Instructor(s) will demonstrate and verbally describe the procedure for intradermal injection. Although saline will be used in the practicum, all the steps normally taken when tuberculin is injected will be practiced.

Supplies needed for the injection practicum "station"
Note: For maximum convenience, instructors are encouraged to make pre-packaged kits of all needed supplies to place at each "injection station" before the practicum begins.

1. Sterile saline bottles
2. Tuberculin syringes and needles, preferably ¼" to ½" 27-gauge needle with a short bevel (small gauge needles are best)
3. Cotton balls or gauze
4. Alcohol swabs/alcohol
5. Gloves (if your program's policy requires gloves)
6. Needle/sharps disposal container within easy reach
7. Small trash basket to hold paper and waste
8. Small paper drapes for clean field are desirable (but not essential)
9. Client education materials and appointment cards
10. If hand-washing facilities are not nearby, hand-washing solution or towelettes

A. Preparing the client for intradermal injection
Refer participants to page 3 of their workbooks.

1. Seat the client and sit across from him/her. Young children may sit on an adult's lap.
2. Explain why the test is being performed.
3. Explain how the procedure will be done.
4. Verify that you are testing the correct client.
5. Make sure the client is available for follow-up appointment in 48-72 hours; if not, reschedule the TST placement.
6. Ask client to complete consent form and any other necessary paperwork.
7. Ask client if he/she has any questions.

B. Preparing for the injection

1. Infection control
   a. Wash hands.
      Review steps for appropriate hand washing, including the use of hand wash solution when soap and water is unavailable.
   b. Put on gloves, if indicated by your program's policies.
   c. Follow any other infection control procedures practiced at your facility.

2. Select the injection site
   a. Examine the inside of the client's arm (palm-side-up) on a firm surface, with the elbow slightly bent.
   b. Consult your program's policy for which arm (left or right) to test.
   c. Aim the injection approximately 4 inches below the elbow. Avoid:
      - Sites too close to the elbow
      - Sites too low on the forearm
      - Sites directly over veins, scars, rashes, or sores
      - Sites on the hairy surface of the forearm
      - If the client has any of these features at the injection site, use the other arm or a standard alternative site (often the shoulder) chosen by your program.
   d. Clean the area of the injection site with an alcohol swab by circling from the center of the site outward. Allow the site to dry completely before the injection.

3. Prepare the tuberculin and syringe
   Review with participants the names and functions for parts of the tuberculin syringe, including the bevel, needle gauge, syringe calibration, plunger, *etc.*
   Note: Although saline, not tuberculin, will be used in the practicum, review the following steps involved in handling tuberculin.

   a. Remove tuberculin vial from refrigerator or cooler. (Tubersol and Aplisol are two available brands of tuberculin.)
   b. Check the tuberculin vial to make sure it is the correct solution.
   c. Check the expiration date and the date the vial was opened. If you open the vial, write the date on it. Discard expired vials or vials open for more than 30 days.
   d. Wipe the top of the tuberculin vial with an alcohol swab. Make sure alcohol has dried before proceeding.
   e. If using a safety needle, twist the needle hub into the syringe to set the needle; remove needle guard.
   f. Pull back on the plunger and draw in 0.1 cc of air.
   g. The needle bevel should be perpendicular to the flange of the syringe.
   h. Place the tuberculin vial on a flat surface; hold the vial between the thumb and fingers; insert needle through the neoprene stopper.
   i. Inject air into empty space.
   j. Invert the vial while keeping a firm hold on the syringe and plunger.
   k. With the needle tip below the fluid level in the vial, draw in slightly more than 0.1 cc of tuberculin solution into the syringe.
   l. Remove the needle from the vial. Hold syringe in an upright position.
   m. Draw back slightly on the plunger. Gently tap barrel to break up any air bubbles.
   n. Expel all air and excess solution until exactly 0.1 cc remains.
   o. Return the tuberculin to the refrigerator/cooler.

C. Injection

1. Place needle bevel facing up (good lighting is important) with syringe flange parallel to the forearm.
2. Stretch skin taut over injection site. There are a few techniques for pulling the skin taut. Here, we will demonstrate 3 techniques:
   a. Stretch skin between your index finger and thumb, or
   b. Grasp the client's dorsal forearm and gently pull it to tighten the ventral skin; i.e., pull the client's skin from under his/her arm.
   c. Pull skin toward the wrist with your thumb.
3. Hold needle almost parallel to the skin, at a 5- to 15-degree angle. Make sure the needle bevel stays upward.
4. Insert the needle through the epidermis (the superficial layer of skin) approximately 3 mm so the entire bevel is covered and lies just under the skin. You should be able to see the tip of the needle through the top layer of skin.
5. Release the stretched skin and hold the syringe in place. (Note: During this maneuver, the released skin retracts, and by holding syringe in place, the bevel may be exposed, and when injecting, fluid comes out.)
6. Stabilize the hub of the syringe before pushing on the plunger. (Although the needle may be inserted correctly, a common mistake is to push too deeply when trying to inject the solution.)
7. Using your thumb to press on the plunger, slowly inject the solution. A tense, pale wheal, 6 to 10 mm in diameter, should appear over the needle bevel.
8. Do not press or massage the area.
9. Discard the syringe in the designated needles disposal container. If using a safety needle, engage the safety-needle mechanism before discarding.
10. To prevent needlestick injuries, used needles should not be:
    a. Recapped
    b. Purposely bent or broken
    c. Removed from disposable syringes
11. If a drop of blood appears at the injection site, let it dry (the blood forms a plug and if one rubs it off, more blood comes.) Then place a swab or cotton ball on top. Do not use alcohol or a bandage. Properly dispose of the pad or ball.
12. To determine if the test was correctly placed, measure the wheal at its maximum size with a millimeter ruler. If wheal is less than 6 mm:
    a. Needle bevel may have been inserted too deeply
    b. An inadequate dose may have been administered
13. If wheal is less than 6 mm, another test must be administered. Immediately fill a *new* syringe and place two inches away from original site or on other arm.
14. Wash your hands.
15. Complete paperwork on client's medical record or designated form. Record:
    a. Date and time
    b. Arm or area of skin test placement
    c. Brand name, lot #, and expiration date of PPD solution
    d. Any other details required by your program

16. Client education
    a. Inform client about what to expect in the period after injection
        - Mild itching, swelling, or irritation may occur; these are normal and do not require treatment; ice can relieve itching.
        - Avoid scratching the site; keep the site clean and dry; avoid putting lotions or bandages on it; water is OK, but do not scrub it.
        - Caution patient that if a more severe reaction occurs, call back or see a physician because blistering or even infection may occur.
    b. Remind client about follow-up appointment in 48-72 hours; provide appointment card.
    c. Provide client with the TB/TST educational material used by your program.

When participants have successfully placed two saline injections, they may proceed to the measurement/documentation station.

80 min II. **Measurement/documentation practicum**

*Instructor(s) will demonstrate and verbally describe the procedure for measuring (reading) indurations and documenting results. Model arms with standardized indurations will be used in the practicum; all the steps normally taken when measuring TST results will be practiced **except** for the pen technique and alcohol swab, which will be discussed but not practiced.*

Supplies needed for the measurement/documentation practicum "station"

1. Blank forms for participants to record measurements from model arms
2. Small (6") flexible rulers, clear plastic with millimeter (mm) increments
3. Sets of two model arms with standardized indurations (one set for each measurement/documentation practicum station).* Allow sufficient space between the arm models so that participants can work comfortably.
4. Answer key listing the standardized induration readings
5. Your program's form for documenting client TST results
6. Client education materials

A. Practicing measurement
Refer participants to page 6 of their workbooks.

1. Although this practicum utilizes model arms, when real clients are involved, it is important to take the following steps *before* TST measurement takes place:
    a. Wash hands.
    b. Introduce self to client and explain procedure.
    c. Verify that you have the correct client.

* Model arms can be borrowed from your local chapter of the American Lung Association, or can be purchased from suppliers such as: http://www.enasco.com or http://www.healthylungs.org/programs_services/infectious/TBArms.htm

d. Verify from record which arm received skin test.
e. Place client arm in relaxed, palm-up position. Support arm and slightly flex it at the elbow.

2. Palpation – finding the induration
   a. It is the presence or absence of induration (the hard, raised formation) that is measured; not the redness (erythema) of the site.
   b. To find the induration and its edges, feel the site with your fingertips, lightly sweeping a 2-inch diameter of the area, in all four directions, with the pads of your fingers. (Fingernails should not protrude beyond the finger.)
   c. Do not push or prod with the fingers; gently sweep in a zigzag fashion to locate the margins of the induration.
   d. Avoid confusing the edge of an induration with a margin of muscle on the forearm by raising the client's arm to a 45-degree angle and palpating again.
   e. Once the induration, if any, has been identified, its diameter will be measured across the forearm, from the thumb side of the arm to the little finger side, or vice versa. Another way to remember this is to visualize the direction a watch band lies across the arm.

3. Marking the induration
   NOTE: Participants will NOT be marking the model arms with pen, but do discuss how to place marks on real clients. You may wish to demonstrate with a participant's arm or replay the segment of the CDC's Mantoux TST *video that demonstrates marking the induration.*

   a. Swab the injection site with alcohol.
   b. Place your finger pad onto client's arm and move it toward the injection site.
   c. Rest one fingernail firmly against the induration edge on one side and mark the edge lightly with a fine dot of ink.
   d. Repeat with the opposite side of the induration.
   e. Inspect dots, repeat finger movements towards site, adjust dots if needed.
   f. If the margins of the induration are irregular, mark and measure the longest diameter across the forearm.
   g. Make sure the dots lie across the forearm.

4. Measuring the induration
   a. Place the zero ruler line inside the left dot (or on model arms, the left edge of the induration) and read the ruler line inside the right dot (or edge).
   b. If the measurement falls between two values on the ruler, record the lower mark.
   c. Measurements should always be recorded in millimeters and never as "positive" or "negative." If no induration is present, the measurement should be recorded as "0 mm."

5. Recording the induration (practicum)
   - *Distribute blank forms for participants to record measurements from model arms.*
   - *Ask participants to measure each induration on the model arms and record their measurements on the blank form.*
   - *Assess the forms privately and circle the readings that are not within 1 mm of the standard reading found on the answer key. Ask the participant to repeat any incorrect measurements.*

6. Documenting measurements (with real clients)
   Distribute and discuss the documents used in your program for recording TST results. Demonstrate how and where TST dates and measurements should be recorded, as well as any other details (presence of blisters, other adverse effects, etc.)

7. Client education
   a. Client educational materials
      Distribute and discuss any client educational materials distributed by your program to clients after their TST measurements.

   b. Frequently asked questions
      If time allows, consider reviewing the FAQs covered in Session 4 of this curriculum.
      1. What are appropriate responses to the clients who ask, "What does my measurement mean? Am I positive?"
      2. Explain to clients how and when they will be notified and counseled about their TST results.

25 min **Closing activities**

Review questions or post-test

The following questions can be used for a group discussion to review the session's main points, *or they can be utilized as a post-test for participants (see page 8 in* Participant's Workbook.)

1. Name three things to say to or ask a client in preparation for TST.
2. List three universal precautions to take during TST.
3. When administering a TST, what is the correct amount of tuberculin to use?
4. What is the standard injection site used by the local program?
5. True or false: When administering a TST, the bevel should be facing down.
6. If the wheal created by the TST injection measures less than 6 mm, what should you do?
7. How long after a TST is administered should it be read?
8. When measuring a TST reaction, you measure the _____, NOT the _____.
9. In what direction (across the arm or down the arm) should the TST reaction be measured?
10. True or false: A 0 mm TST reaction should be recorded as "negative."

Participant evaluation

Ask participants to share their feedback about this practicum session on the evaluation form (see page 9 in Participant's Workbook.)

APPENDIX A

TST PRACTICUM

DISCLAIMER

I understand that I am being asked to participate in a TST practicum as part of today's course. The practicum will involve the injection of either PPD (purified protein derivative) or saline solution under the skin of the instructor(s) and/or the course participants. I understand that I can decline to have practice tests performed on me. If I elect to have this procedure practiced on me, I will hold _____ harmless for any personal damages that may result from this undertaking.

o I agree to have this procedure practiced on me.

o I choose *not* to have this procedure practiced on me.

If I participate in the practicum by giving injections to others, by signing this disclaimer I agree to hold _____ harmless for any personal damages that may result from my use of the needles to inject solution under the skin of others in the class.

_____ _____

signature *date*

_____

print name

WITNESS:

_____ _____

signature *date*

_____

print name