two-step PPD test if they haven’t been tested within the past year. This kind of test establishes a more accurate baseline reaction. The first injection creates what’s called a “booster effect,” meaning that the immune memory of the body’s cells is bolstered by the initial injection. If this test produces a reaction of 10 mm or less, a second test is administered 1 to 3 weeks later. This second test will produce a more accurate response.

**Selected reference**

Source: Skill Building: The fine art of TB skin testing, *LPN2006*, March/April. Take5 ©2007 Lippincott Williams & Wilkins

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The fine art of TB skin testing

Tuberculosis (TB) isn’t the widespread threat it was decades ago, but cases of the disease still occur. During 2004, 14,517 TB cases were reported to the Centers for Disease Control and Prevention, a 2.3% decrease from 2003.

If one of your patients is suspected of having TB, he’ll need a tuberculin skin test to confirm the diagnosis. The Mantoux test is the standardized procedure for determining whether an individual has been infected with the TB bacillus. This test should be performed only by health care providers who are trained to administer and interpret it. If your facility includes TB testing in your scope of practice, here’s what you need to know.

**Stick to procedure**
The proper injection technique is essential when testing for TB. The tubercle bacillus extract (tuberculin), purified protein derivative (PPD), is injected into the intradermal layer of the patient’s inner forearm about 4 inches from the elbow. You’ll use intermediate strength (5 T.U.) PPD in a tuberculin syringe that has a 1/2-inch, 26- or 27-gauge needle.

Make sure the bevel edge of the needle is facing up, and insert the needle beneath the skin (Figure 1). Then inject 0.1 mL.
of PPD to create an elevation in the skin, usually called a wheal or bleb, as seen in Figure 2.

Next, record the site, antigen name, strength, lot number, date, and time of the test. Results of the test will be read 48 to 72 hours after injection. Tests that are read after 72 hours tend to underestimate the true size of induration (firmness and elevation of the reaction). A delayed localized reaction indicates that the patient is sensitive to tuberculin.

A reaction occurs when both induration and erythema (redness) are present. After the health care provider inspects for erythema, she’ll lightly palpate across the injection site from the area of normal skin to the margins of the induration. The diameter (in millimeters) of the induration is measured at its widest part (Figure 3). Erythema without induration isn’t considered significant.

**Size does matter**
Accuracy of the TB skin test depends on the skill of the health care practitioner who interprets it. The size of the induration determines the significance of the reaction, so the practitioner must chart it correctly. Here’s what the various sizes mean:
- induration of 0 to 4 mm, insignificant
- induration of 5 mm, positive if the patient is a high-risk individual (HIV positive or otherwise immunocompromised)
- induration of 10 mm or more, positive in patients with diabetes, those with chronic kidney disease, some patients with cancer, immigrant workers, I.V. drug users, residents of long-term care facilities or correctional institutions, and employees and residents of hospital facilities
- induration of 15 mm or more, positive in any patient.

A significant reaction indicates that a patient has been exposed to *Mycobacterium tuberculosis* recently or in the past, or has been vaccinated with bacilli Calmette-Guérin vaccine, which is effective in up to 76% of those who receive it. Although the vaccine is used in Europe and Latin America, it’s not routinely used in the United States.

**Positive doesn’t mean active**
Keep in mind that a positive reaction to a TB skin test doesn’t necessarily mean that active disease is present in the body. In fact, more than 90% of patients who have tuberculin-significant reactions don’t develop clinical TB. But all significant reactors are candidates for active TB. In general, the more intense the reaction, the greater the likelihood of an active infection.

Likewise, a negative skin test doesn’t completely exclude TB infection—immunosuppressed patients can’t develop an immune response adequate to produce a positive skin test. This is referred to as anergy.

There are five classes of TB, which are determined by evaluating data from the history, physical examination, skin test, chest X-ray, and microbiologic studies. See Classification of TB for more information.

**Special considerations**
In older adult patients, TB may have atypical manifestations. Symptoms can include unusual behavior and altered mental status, fever, anorexia, and weight loss. Many older adults may have no reaction to the skin test, or they may have delayed reactivity of up to a week. In these cases, a second skin test should be done in 1 to 2 weeks.

Workers and residents in long-term care facilities may need a

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**Classification of TB**

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>no exposure, no infection</td>
</tr>
<tr>
<td>1</td>
<td>exposure; no evidence of infection</td>
</tr>
<tr>
<td>2</td>
<td>latent infection; no disease (for example, a positive purified protein derivative reaction but no clinical evidence of active TB)</td>
</tr>
<tr>
<td>3</td>
<td>disease; clinically active</td>
</tr>
<tr>
<td>4</td>
<td>disease; not clinically active</td>
</tr>
<tr>
<td>5</td>
<td>suspected disease; diagnosis pending</td>
</tr>
</tbody>
</table>