

# The Mantoux test

Administration, reading  
and interpretation



# Administration

The standard Mantoux test in the UK consists of an intradermal injection of 2TU of Statens Serum Institute (SSI) tuberculin RT23 in 0.1ml solution for injection.

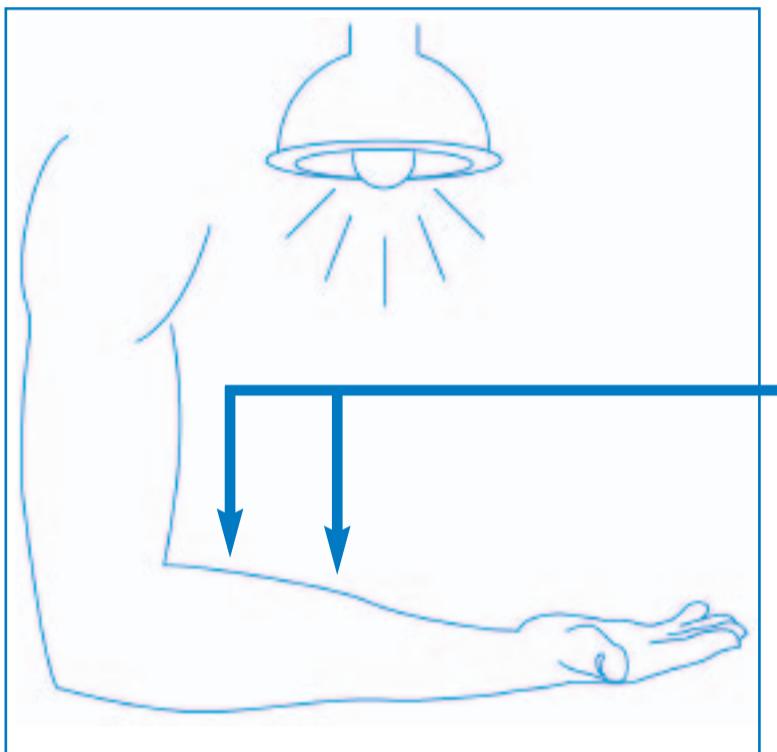
The Mantoux test is used to detect latent TB infection, to detect recent infection (as shown by conversion of

the Mantoux from negative to positive) and as part of the diagnosis of TB disease.

Mantoux testing is not recommended for people who have had a past Mantoux reaction of 15 mm or greater or in people who have had previous TB disease.

1

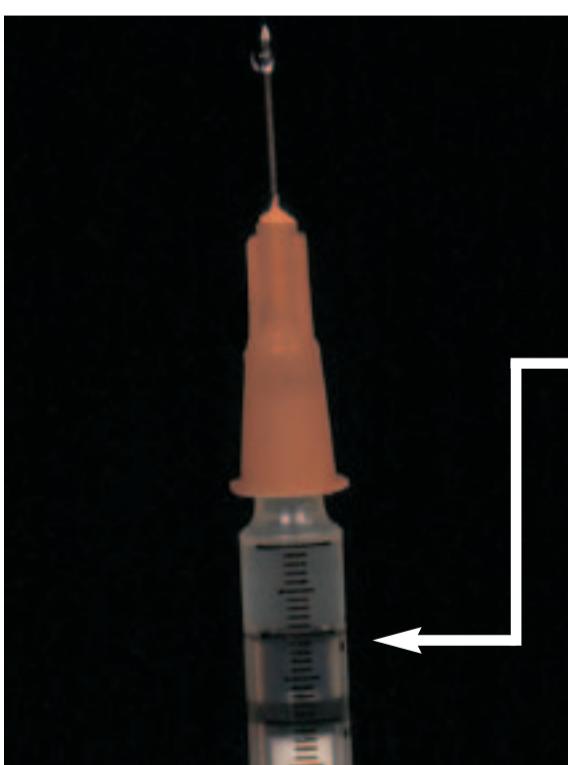
## Provide patient education and locate the injection site



- Collect necessary supplies and explain why the Mantoux test is given and what is involved in the procedure
- Explain that 48 to 72 hours after the test is administered, the patient must return to have the induration measured and interpreted
- Place the forearm palm side up on a firm, well-lit surface and select an area of healthy skin 5 to 10 centimetres below the elbow joint which is free of muscle margins, heavy hair, veins, sores, or scars
- Only visibly dirty skin needs to be washed with soap and water

2

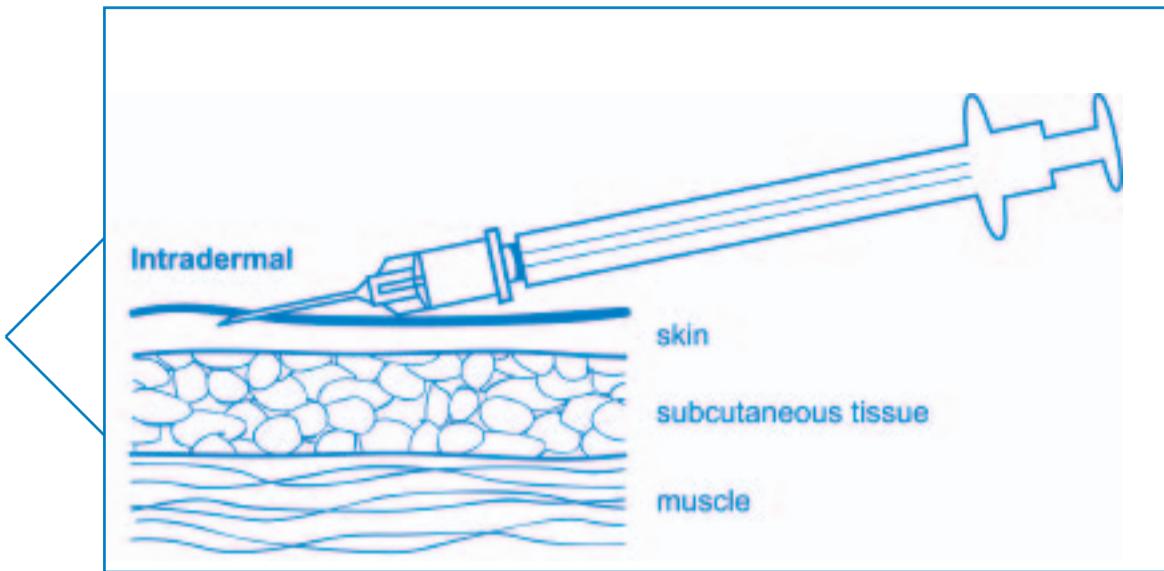
## Prepare the syringe



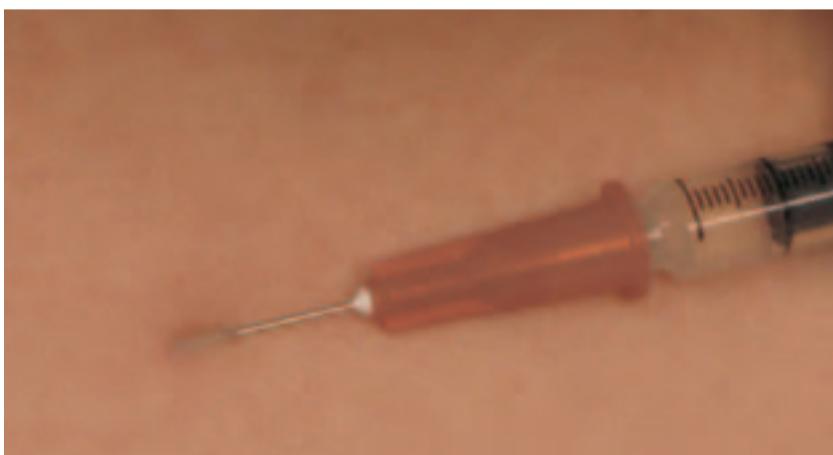
- Check expiry date and ensure that the vial contains SSI tuberculin 2TU in 0.1ml
- Securely fasten an appropriately sized (21G green) needle to a 1ml graduated syringe and draw up just over 0.1ml of tuberculin
- Safely dispose of the needle used to draw up the tuberculin and securely fasten a 26G short bevel needle
- Expel air and excess tuberculin to leave exactly 0.1ml of tuberculin

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## Inject 0.1ml of tuberculin (SSI 2TU)



- Stretch taut the selected area of skin between the thumb and forefinger
- Insert the needle slowly, bevel upwards, at an angle of 5 to 15 degrees



- Advance the needle through the epidermis approximately 3mm so that the entire bevel is covered and visible just under the skin

- Release the stretched skin and, holding the syringe in place on the forearm, slowly inject the tuberculin solution

If the needle is inserted correctly you should feel quite firm resistance as the tuberculin enters the skin to form a tense, pale wheal 6 to 10 mm in diameter.

## Check the skin test, record information and confirm return appointment



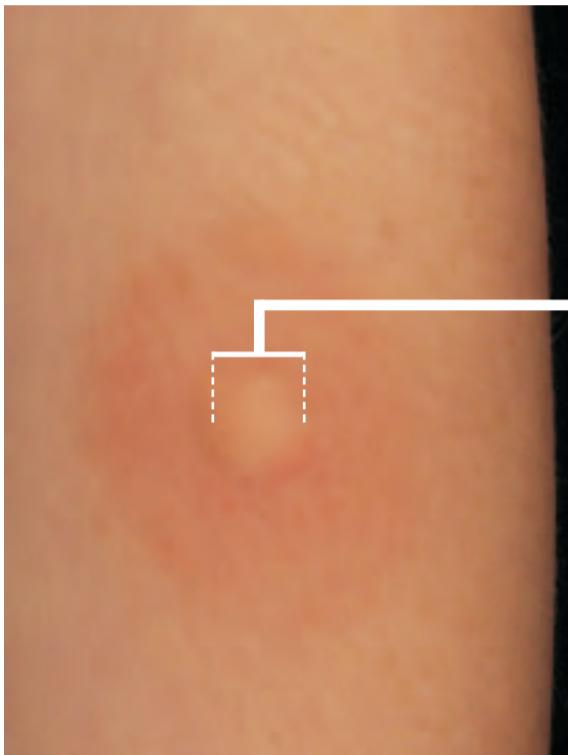
- If the wheal is less than 6mm in diameter the test should be repeated at a site at least 5cm (50mm) from the original site
- Explain that mild itching, swelling, or irritation may occur and that these are normal reactions that do not require any treatment
- Tell the patient to avoid scratching the site, keep the site clean and avoid putting creams, lotions, or adhesive dressings on it
- Record all required information and provide an appointment card for the patient to return and have the test read

# 2 Reading

The Mantoux skin test should be read between 48 and 72 hours after administration. The basis of reading the skin test is to measure and record the presence or absence of induration. Reliable reading of the Mantoux

skin test requires standardisation of procedures, training, supervision, and practice. This may also include periodic standardised reliability testing.

## 1 Inspect the site



- Visually inspect the site on a firm, well-lit surface
- Only the induration, which is a hard, dense, raised formation, is measured, even if there is soft swelling or redness (erythema)

## 2 Palpate induration



- Induration is not always visible or present and can only be determined by palpation with the fingertips
- Using a light, gentle motion, sweep the fingertips over the surface of the forearm in all four directions to locate the margins or edges of induration

continued over

## 2 Reading continued

### 3 Mark induration



- The diameter of the induration is measured across the forearm, from the thumb side of the arm to the little finger side
- Use fingertip as a guide to mark lightly with a fine dot at the widest edges of induration across the forearm
- If the margins of induration are irregular, mark and measure the longest diameter across the forearm

### 4 Measure induration



- Measure the diameter of the induration using a plastic flexible millimetre (mm) ruler
- Place the zero ruler line inside the left dot edge and read the ruler line inside the right dot edge
- If the measurement falls between two divisions on the millimetre scale, record the lower mark

### 5 Record measurement of induration in mm

- Record the exact measurement in millimetres (mm) of induration
- If there is no induration, record as 0mm
- Do not record results as 'positive' or 'negative'
- Record the date and time the test was read, the name and signature of the person who read the skin test, and the presence or absence of adverse effects

Always follow local infection control procedures.

# 3 Interpretation

The Mantoux test does not measure immunity to TB but the degree of hypersensitivity to tuberculin. There is no correlation between the size of induration and likelihood of current active TB disease but the reaction size is correlated with the future risk of developing TB disease.

The interpretation of the test result will depend on all relevant clinical circumstances. In the absence of specific risk factors for TB, an induration of between 6 and 15mm is more likely to be due to previous BCG vaccination or infection with environmental mycobacteria than to TB infection. Where there is a higher probability of TB infection, such as recent contact with an infectious case, a high occupational risk or residence in a high prevalence country, then an induration of 6mm or greater is more likely to be due to TB.

A reaction of 6mm or greater, indicates a response of the immune system due to either TB infection, infection with environmental mycobacteria or previous BCG vaccination (BCG vaccinated persons normally become tuberculin positive after 4-8 weeks). There is no correlation between the size of post-vaccination Mantoux reactions and protection against TB disease and routine post-BCG Mantoux testing serves no purpose.

Reactions larger than 15mm are unlikely to be due to previous BCG vaccination or exposure to environmental mycobacteria.

Viral infections, especially HIV, can cause false negative reactions. Other factors that can weaken the Mantoux reaction include severe TB disease, renal failure and diabetes, treatment with immunosuppressive drugs, old age or newborn infants and improper storage, insufficient dose and inadvertent subcutaneous injection.

## The booster effect

'Boosting' is mainly seen in adults and elderly persons who have been sensitised to mycobacteria many years earlier and now have too few sensitised lymphocytes in circulation to produce a significant local response to the Mantoux test. A repeat test can result in a larger response due to boosting of the immune response by the first test. The second boosted reaction is correct. Boosting can occur up to two years after the first Mantoux test and can therefore be confused with Mantoux conversion.

## Two-step-testing

In persons who may be liable to boosting in whom it is important to establish a true baseline Mantoux response a second Mantoux test can be administered one week after the first. Two-step-testing is not necessary for contacts of infectious cases who will have already been re-sensitised if transmission has occurred, or for anyone who has been Mantoux tested in the previous two years.

## Mantoux conversion

This is defined as when the second of two Mantoux tests increases by 10mm or greater over the first test. This is most useful in providing evidence of infection in exposed contacts but does not apply if vaccination takes place in the meantime. If a person is exposed to infectious TB who has a documented Mantoux test result within the past 12 months, then only one test is necessary to detect conversion. People who demonstrate Mantoux conversion should be investigated for latent TB infection or active disease.

## Mantoux reversion

This is defined as a reduction in Mantoux response following a previous test and, while rare, is most common in elderly people and in those who had an induration of 15mm or greater following a previous test.