

chest x-ray, smear-positive sputum) should be considered infectious and contact investigation undertaken.

The longer the shared airspace (exposure) between the source case and contacts is directly related to the possibility of transmission or contracting TB. For example, a crowded home would have more contaminated airspace than an outdoor soccer field or hockey rink.

Transmission is rarely thought to occur outdoors; however, indoor environments that are poorly ventilated, dark and damp can lead to increased concentration and survival of *M. tuberculosis*.

The vulnerability of the contacts is also a factor contributing to transmission of disease. Children and those with immune compromising diseases are more susceptible to contracting TB. Source-case identification/investigation is recommended for children under 5 years old with a diagnosis of active TB disease. In infected contacts that are vulnerable because of young age (under 5 years), HIV or other causes of significant immune suppression, infection may progress quickly to active disease. Therefore early diagnosis often depends on good contact follow-up.

## Prioritization of Contact Follow-Up

Prioritization of contact follow-up is recommended by the infectiousness of the source case, extent of exposure and immunologic vulnerability of those exposed. Thus, the greatest effort is put into reaching contacts who are most at risk of being infected and/or most at risk of developing active TB disease if infected.

Interviews with the infectious case to identify contacts should include questions about locations/activities of potential exposure as well as specific named contacts.

**The classic concentric-circle approach to contact follow-up is no longer recommended.**

This approach does not take into account contacts who may have less extensive exposure but, if infected, are immunologically vulnerable to rapid development of active TB. It can lead to long delays in appropriate contact follow-up when the index case is already known to be highly infectious. A fundamental difficulty is that transmission can be very difficult to evaluate when the background rate of positive TST results is unknown or is high. Rather, the initial follow-up should include non-household contacts from the outset when case infectiousness and contact vulnerability warrants it.

Contacts may be grouped as follows:

- **High priority** – household contacts plus close non-household contacts who are immunologically vulnerable, such as children under 5 years
- **Medium priority** – close non-household contacts with daily or almost daily exposure, including those at school and work
- **Low priority** – casual contacts with lower amounts of exposure

Cases that are sputum smear-positive or have cavitory disease on chest x-ray are significantly more infectious than smear-negative or non-cavitory cases. Coughing, sneezing and singing also increase the risk of transmission. Therefore, for **smear-positive/cavitory/laryngeal TB**, it is recommended that the initial contact follow-up include both high- and medium-priority contacts. If there is evidence of transmission within these two groups, consideration should be given to expanding contact follow up to casual contacts. For laryngeal TB, also consider including any casual contacts (social/recreational groups, etc.) from the outset.

For **smear-negative, non-cavitary pulmonary TB**, the initial contact follow-up should be for high-priority contacts only. In both situations, contact investigation is iterative: it should be expanded if the initial follow-up results indicate that transmission has occurred.

A single evaluation at least 8 weeks after the end of exposure (with TST and symptom assessment) is recommended in most non-household contact settings, in order to maximize participation and minimize over diagnosis of “conversion” related to boosting. **Initial plus 8 week post-exposure TST is recommended for household and other high-priority contacts.** Two-step TST is not recommended in the setting of a contact investigation.

TST is no longer recommended as a primary assessment tool in the contact follow-up of **elderly residents in long-term care**, in whom it is less reliable and for many of whom the risks of treatment of LTBI in old age will outweigh any benefit. The focus for these individuals should be on early detection of secondary cases

Contact investigation often demands considerable time, expertise and coordination. It is usually best carried out by public health/TB control personnel in collaboration with treating clinicians and other providers. Anxiety, stigma and lack of knowledge about TB among those exposed may be major issues. Provision of clear, credible and consistent information about TB and the contact follow-up plan is crucial for success.

## Steps in a Contact Investigation

Below are the steps in conducting a **contact investigation**:

### Step 1: Confirm the diagnosis of the case

- Provide appropriate medical evaluation (i.e. history for risk factors, clinical assessment, CXR, culture results)

### Step 2: Determine infectiousness of case

- Determine the type of TB (i.e. respiratory, miliary, laryngeal)
- Consider associated risk factors for infectiousness (i.e. age, cough, etc.)
- Obtain microbiological testing results

### Step 3: Determine likely duration of infectiousness

Cases of pulmonary TB are generally considered to become infectious at the time of onset of cough or worsening of a baseline cough.

- If patient is *coughing*, estimate time of onset of infectiousness at time of onset of cough
- If patient is *not coughing but symptomatic or smear positive*, estimate time of onset of infectiousness by the following:
  - Patient is infectious for 3 months prior to symptom onset OR since first positive finding consistent with TB disease – whichever comes first
- If patient is *asymptomatic with negative smear and no cavities on CXR*, estimate time of onset of infectiousness by the following:
  - Patient is infectious since 4 weeks before the date that TB was suspected