

Guidance for National Tuberculosis Programmes on the  
management of tuberculosis in children  
CHAPTER 4 IN THE SERIES

## Chapter 4: Childhood contact screening and management

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### SUMMARY

Young children living in close contact with a case of smear-positive pulmonary TB (PTB) are at particular risk of *Mycobacterium tuberculosis* infection and TB disease. Screening of the household contacts of an infectious source case is therefore recommended to identify children with TB and enable their prompt treatment, and to provide children who do not have TB with isoniazid preventive treatment. Isoniazid preventive treatment (IPT) is particularly beneficial in the case of children who are infected with the human immunodeficiency virus (HIV). A breastfeeding infant has a particularly high risk of infection from a mother with smear-positive pulmonary TB, and a high risk of developing TB. The infant should receive 6 months of IPT, followed by BCG vaccination.

Breastfeeding can be safely continued in children during this period. The organisation of a system for comprehensive child contact screening depends on collaboration between the National TB Programme (NTP) and all child health providers. Close contacts of multidrug-resistant (MDR) TB patients should receive careful clinical follow-up for at least 2 years. If active disease develops, prompt initiation of treatment with a regimen designed to treat MDR-TB is recommended. On the basis of the currently available evidence, the World Health Organization does not recommend second-line drugs for chemoprophylaxis in MDR-TB contacts.

**KEY WORDS:** child; TB; contact; screening; management

NUMEROUS STUDIES have found that contact investigations are a valuable means of identifying new tuberculosis (TB) cases, and contact investigations are recommended as a strategy by the International Union Against Tuberculosis and Lung Disease and the World Health Organization (WHO).<sup>1</sup> This chapter will describe how it can be done practically, in a variety of settings, with the resources that are available. It is recommended that all National Tuberculosis Programmes (NTPs) screen household contacts for symptoms of disease, and offer isoniazid preventive therapy (IPT) to children aged <5 years and to all human immunodeficiency virus (HIV) infected children who are household contacts. Some NTPs screen and provide IPT to

all children and adults who are household contacts. As such individuals are at risk of infection and disease, this strategy is desirable where it is feasible.

Young children living in close contact with a case of smear-positive pulmonary tuberculosis (PTB) are at particular risk of *Mycobacterium tuberculosis* infection and TB disease. If this case causes infection or disease in a contact, the case is referred to as a 'source' case. The risk of infection is greatest if the contact is close and prolonged, such as the contact between an infant or toddler and a mother or other care givers in the household. The risk of developing disease after infection is much greater for infants and young children aged <5 years than it is for children aged ≥5. If disease does develop, it usually does so within 2 years of infection, but in infants the time-lag can be as short as a few weeks. Daily isoniazid (INH) for at least 6 months as preventive therapy for young children with infection who have not yet developed disease will greatly reduce the likelihood of developing TB during childhood. IPT is often referred to as 'isoniazid prophylaxis'.

The best method to detect TB infection is using the tuberculin skin test (TST). Chest X-ray (CXR) is the best method to screen for TB disease among con-

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**Table** Definitions used in contact screening

Source case	A case of PTB that results in infection or disease among contacts (i.e., a sputum smear-positive PTB case)
Contacts for screening	All children aged <5 years (whether sick or well), and children aged ≥5 years if symptomatic, who are in close contact with a source case
Close contact	Living in the same household as a source case (e.g., the child's care giver) or in frequent contact with the source case

PTB = pulmonary tuberculosis.

tacts. These tests should be used where available to screen exposed contacts. However, this may not be possible when tuberculin solution is unavailable, as is often the case in low-resource settings. If TST and CXR are not readily available, this should not preclude this activity. Contact screening and management can be conducted on the basis of simple clinical assessment. The Table shows the definitions used in contact screening.

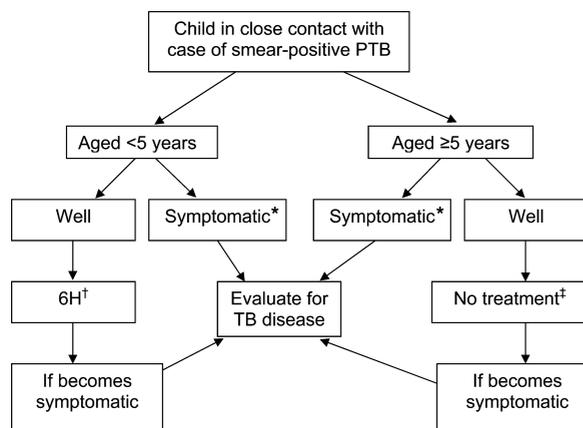
The main purposes of childhood contact screening are to:

- 1 identify symptomatic children (i.e., children of any age with undiagnosed TB disease)
- 2 provide preventive therapy for susceptible individuals (i.e., asymptomatic children aged <5 years in close contact with smear-positive PTB cases).

## ASSESSMENT AND MANAGEMENT

Clinical assessment alone is sufficient to decide whether the contact is well or symptomatic. Routine assessment of exposed contacts does not require routine CXR or TST (see Figure 1).

This approach applies to contacts of smear-positive PTB cases, but screening should also be available for



**Figure 1** Approach to contact management when CXR and TST are not readily available. \* If TB is suspected, refer to the guidelines on diagnosis of childhood TB; † isoniazid 5 mg/kg daily for 6 months; ‡ unless the child is HIV-infected (in which case isoniazid 5 mg/kg daily is indicated). PTB = pulmonary tuberculosis; H = isoniazid; CXR = chest X-ray; TST = tuberculin skin test; HIV = human immunodeficiency virus.

contacts of smear-negative PTB cases. If the contact of a source case with smear-negative PTB is symptomatic, the diagnosis of TB needs to be investigated as above, whatever the contact's age. If the contact is asymptomatic, further investigation and follow-up will depend on national policy and practice.

Recommended treatment for a healthy contact aged <5 years is INH 5 mg/kg daily for 6 months. Follow-up should be at least every 2 months until treatment is complete. If TB is suspected at initial assessment or at subsequent follow-up, refer to chapter 1 of this series on diagnosis of childhood TB. Referral to a district or tertiary hospital may be necessary when there are uncertainties about the diagnosis. Contacts with TB disease should be registered and treated according to TB treatment guidelines.

## SPECIAL CIRCUMSTANCES

### *Child contact is known to be HIV-infected*

If the child contact is HIV-infected and otherwise well, consider IPT for all ages, including those aged ≥5 years. As with other contacts, active disease should be ruled out, and only HIV-infected children who are healthy should be offered IPT. HIV-infected children who have symptoms should be carefully evaluated for TB, and if found to have TB disease, they should be referred to the NTP for registration and initiation of treatment.

### *Suspected HIV infection of source case and contact*

In HIV-endemic countries where HIV prevalence is high among cases with smear-positive PTB, if the source case is a parent, his/her children may be at risk for both TB and HIV infection. It is important to ask whether the HIV status of the source case and child contact is known, and consider HIV counselling and testing.

In high HIV prevalence settings, i.e., in generalised HIV epidemics or in defined subpopulations in which HIV is concentrated, TB contact investigations can be an important opportunity for both TB and HIV case finding. In countries with generalised HIV epidemics, NTPs may wish to consider joint TB-HIV contact investigations.

### *Child contacts of infectious multidrug-resistant tuberculosis cases*

The only chemoprophylaxis regimens to have been studied are based on INH and, to a lesser extent, rifampicin. Since by definition multidrug-resistant (MDR) TB is resistant to both of these drugs, it is unlikely that using them to treat latent infection caused by an MDR-TB strain will prevent the development of active TB disease. Close contacts of MDR-TB patients should receive careful clinical follow-up for at least 2 years.<sup>2</sup> If active disease develops, prompt initiation of treatment with a regimen designed to treat MDR-TB is recommended. On the basis of the currently avail-

able evidence, the WHO does not recommend second-line drugs for chemoprophylaxis in MDR-TB contacts.

#### *Management of a baby born to mother diagnosed with infectious PTB*

Once a pregnant woman has been on treatment for at least 2–3 weeks, she is generally no longer infectious. If a pregnant woman with TB has been on treatment for TB for several weeks before delivery, it is less likely that the baby will become infected. The risk is highest if a mother is diagnosed at the time of delivery or shortly thereafter. If a pregnant woman is found to have pulmonary TB shortly before delivery, then the baby, and if possible, the placenta, should be investigated for evidence of congenital TB infection and, if found, the baby should be treated.

A breastfeeding infant has a high risk of infection from a mother with smear-positive PTB, and has a high risk of developing TB. The infant should receive 6 months of IPT, followed by BCG immunisation.<sup>3</sup> Breastfeeding can be continued safely during this period. An alternative policy is to give 3 months of IPT, then perform a TST. If the test is negative, INH should be stopped and BCG vaccination given. If the test is positive, INH should be continued for another 3 months, after which it should be stopped and BCG given.

### **MANAGING CHILD CONTACTS WITHIN THE NTP**

Close contact screening and management is recommended by most NTPs, but rarely happens in low-resource settings, where the majority of childhood TB occurs—although for the majority of child contacts assessment can be a straightforward procedure that simply requires clinical evaluation. In addition to lack of resources, the other major obstacle is that there is usually no provision for the management of contacts within the NTP structure, e.g., children started on IPT are not usually registered.

There is no need to create a separate structure for contact screening and management. It is possible to work within the existing NTP structure and with existing specialist support. It is useful to establish a ‘contact clinic’, i.e., a set time and place each week where child contacts can be assessed clinically. This clinic can be at first referral level, whether district hospital, TB management unit or health centre, depending on the local situation.

It would be best if responsibility for contact tracing and subsequent management lay with the same health care worker who registers and/or supervises the treatment of the source case. This health care worker could then also provide IPT or treatment to the children. This is likely to be more convenient for the household or family and to improve compliance by all concerned. As a way of alerting the health worker to request that all eligible children come for screening, it may be helpful to

Name	Age in years	TB symptoms Y/N	TB treatment Y/N	INH preventive therapy Y/N	TB registration number	Treatment outcome	HIV status

**Figure 2** Sample prophylaxis register. TB = tuberculosis; Y = yes; N = no; INH = isoniazid; HIV = human immunodeficiency virus.

add an information box to the reverse side of the current TB treatment card. Children recommended for IPT should then be registered separately and have their own IPT card. A prophylaxis register can be used to keep track of contacts (Figure 2).

#### *Establishing contact screening and management within the NTP*

In consultation with stakeholders, the NTP should decide the means of introducing and monitoring contact screening and management that will be most effective in its setting. For most programmes, it is likely that this will be a new initiative, so a step-wise approach, starting with a limited number of districts and then progressively scaling up over time, may be a sensible approach. Certain criteria for staffing levels, an established directly observed treatment (DOT) approach and satisfactory outcome measures for all TB cases should be met before the programme is ready to proceed with the addition of contact screening and management. The process will also require education of TB health care workers to explain the rationale and potential benefit of contact tracing as well as appropriate management of contacts. Categorisation by age into at least two groups (0–4 years and 5–14 years) is useful for monitoring practice and outcome and for drug ordering.

Performing monitoring and analysing outcome data are critical, both from a patient management perspective and to identify possible shortfalls in the system that could be addressed and corrected. Important information could be gathered locally, then sent to central office for analysis:

- 1 Number of children screened, categorised by age group
- 2 Number treated for TB and outcome
- 3 Number given IPT and outcome, including treatment completion
- 4 Adverse reactions to medications.

Each child (on whatever treatment) should have an individual card on which is also recorded the details of the source case. The information could be kept at the local level and provided to central office with the quarterly case-finding report. It would be useful to have a separate registration book for children on IPT. Once the process has started, there should be regular dissem-

ination of information relating to contact management by the NTP to paediatricians, government health departments and district health and district TB officers.

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### R É S U M É

Les jeunes enfants vivant en contact étroit avec un cas de tuberculose pulmonaire (TBP) à bacilloscopie positive encourent un risque particulièrement élevé d'infection et de maladie dues à *Mycobacterium tuberculosis*. Le dépistage des contacts au domicile des cas-index contagieux est dès lors recommandé pour identifier les enfants atteints de TB et permettre un traitement rapide, et pour fournir aux enfants non atteints de TB un traitement préventif à l'isoniazide (IPT). L'IPT est particulièrement utile dans le cas d'enfants qui sont infectés par le VIH. Un enfant nourri au sein encourt un risque particulièrement élevé d'infection quand sa mère est atteinte d'une TBP à bacilloscopie positive et il encourt un risque élevé de développement de la TB. Les nourrissons devraient recevoir un IPT pendant 6 mois suivi d'une immunisa-

tion par le BCG. Pendant cette période, l'allaitement peut être poursuivi sans risques chez les enfants. L'organisation d'un système de dépistage complet des contacts infantiles dépend de la collaboration entre le programme national de TB et tous les pourvoyeurs de soins aux enfants. Les contacts étroits avec les patients multirésistants (MDR) devraient bénéficier d'un suivi clinique soigneux pendant au moins 2 ans. Si une maladie active apparaît, on recommande la mise en route rapide du traitement par un régime choisi pour traiter la TB-MDR. Sur la base des faits actuellement disponibles, l'Organisation Mondiale de la Santé ne recommande pas les médicaments de seconde ligne pour la chimioprophylaxie chez les contacts des patients TB-MDR.

### R E S U M E N

Los niños pequeños que viven en contacto estrecho con un caso de tuberculosis pulmonar (TBP) bacilífera corren un riesgo importante de infección y enfermedad por *Mycobacterium tuberculosis*. Por esta razón, se recomienda la detección sistemática de los contactos domiciliarios de un caso contagioso, con el objeto de descubrir los niños con TB y hacer posible su tratamiento oportuno y suministrar un tratamiento preventivo con isoniazida (IPT) a aquellos niños que no presentan la enfermedad. El IPT es particularmente útil en los niños con infección por el virus de la inmunodeficiencia humana (VIH). Durante la lactancia materna, el hijo de una mujer con TP bacilífera presenta un riesgo considerablemente alto de enfermedad TB. El lactante debe recibir IPT durante 6 meses, seguido por la vacuna BCG. La lactancia

materna puede continuarse sin riesgo durante este período. La organización de un sistema exhaustivo de detección de los contactos pediátricos se basa en la colaboración entre el Programa Nacional de Tuberculosis y todos los proveedores de atención de salud pediátrica. Los contactos cercanos de pacientes con TB multidrogoresistente (TB-MDR) precisan un seguimiento clínico cuidadoso, por lo menos durante 2 años. En caso de aparición de enfermedad activa, se recomienda iniciar rápidamente el tratamiento con una pauta específica para TB-MDR. La Organización Mundial de la Salud, con base en los datos científicos actuales, no recomienda la utilización de medicamentos de segunda línea en la quimioprophilaxis de los contactos de casos de TB-MDR.