Guidelines for tuberculosis contact tracing in Pacific Island countries and territories

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List of Abbreviations

BCG	Bacille Calmette-Guérin
CDC	Centers for Disease Control and Prevention
DOTS	Directly Observed Treatment Short-course
HIV	Human immunodeficiency virus
IGRA	Interferon gamma release assay
INH	Isoniazid
IPT	Isoniazid preventive therapy
ISTC	International Standards for Tuberculosis Care
IUATLD	International Union Against Tuberculosis and Lung Disease
LTBI	Latent tuberculosis infection
MDR-TB	Multidrug-resistant tuberculosis
PICTs	Pacific Island countries and territories
PPD	Purified protein derivative
TST	Tuberculin skin test
TB	Tuberculosis
WHO	World Health Organization
XDR-TB	Extensively drug-resistant tuberculosis

Table of Contents

Foreword

Tuberculosis (TB) continues to be a public health issue of major significance around the world. The World Health Organization (WHO) estimates that globally in 2007 there were 9.27 million new cases of TB, of which 44% (or 4.1 million) were infectious.[1]

TB is spread through the air from infectious patients to people in close proximity. After exposure to an infectious case, 1–2% of contacts will develop TB, one third will be infected with TB (but won't have TB disease) and two thirds will remain uninfected. Of the one third who are infected, 5–10% will develop TB disease at some stage during their lifetime, with the highest risk in the first two years after exposure. The risk of developing active TB is significantly higher for children under five years of age and for people who have HIV or another condition that suppresses immunity.

Where adequate resources exist and when most TB cases are being successfully treated, contact tracing is important. Through this activity, it is possible to identify people with active TB disease early and offer curative treatment, and to prevent additional cases of TB by offering preventive therapy to people who may have been recently infected.

Although contact tracing can be a resource intensive process, a common approach is to focus on those most at risk of contracting TB and developing severe forms of TB. It is this approach that is the focus of these guidelines. It relies on clinical assessment to identify new cases of TB and the provision of isoniazid preventive therapy (IPT) to people who have been infected, and is consistent with WHO recommendations and the International Standards for Tuberculosis Care.[2 3 4] For countries that have access to and expertise in tuberculin skin testing and chest x-ray, additional recommendations are made on how to implement contact tracing activities using these tools to facilitate identification of cases of active and latent TB.

In National TB Programmes that are functioning effectively, the addition of contact tracing to the programme's activities can increase TB case detection and prevent further cases of TB in people most at risk. These guidelines provide guidance on how National TB Programmes can integrate contact tracing into their TB programme to further decrease the impact of TB on individuals and communities in the Pacific Island region.

1. Introduction

The primary focus of all National Tuberculosis (TB) Programmes is to detect infectious cases early and to supervise their treatment with the aim of curing the patient and minimising the extent to which the infection is transmitted. A National TB Programme that is functioning effectively and uses the international recommended TB control strategy Directly Observed Treatment, Short-course (DOTS) is essential to underpin this objective. Investigation of the closest contacts of a person with infectious TB is the next priority, as this process can identify a significant number of new cases of TB in an accessible group where high rates of recent infection are expected.

Despite recommendations to implement contact tracing activities, many National TB Programmes do not do so. In many cases the reasons relate to limited resources and a lack of trained staff. Other issues that can make it more difficult to implement a contact tracing programme include difficulties in detecting active TB in the early stages (particularly in children), the imprecision of tuberculin (mantoux) skin testing in detecting recent TB infection in a population vaccinated with Bacille Calmette-Guérin (BCG) and the extended duration of isoniazid preventive therapy.

A TB contact tracing workshop involving participants from Pacific Island countries and territories (PICTs) was held in 2007 in Noumea, New Caledonia.[5] Workshop participants agreed on a set of recommendations to guide the introduction of contact tracing in selected areas (Appendix 1). Participants also identified the need to develop guidelines for contact tracing that would be appropriate to the Pacific context. At this meeting, an effectively functioning DOTS programme and in-country training were highlighted as the key prerequisites to implementing contact tracing activities.

Following on from this workshop a number of Pacific Island countries and territories have indicated their readiness to incorporate TB contact tracing activities into their own National TB Programme. Formal training in TB contact tracing has been conducted in five PICTs to date and a number of other National TB Programmes are implementing contact tracing activities. A formal evaluation of contact tracing activities is planned for the region in 2010.

2. Rationale

The World Health Organization (WHO), the International Union Against Tuberculosis and Lung Disease (IUATLD) and the International Standards for Tuberculosis Care (ISTC) recommend as a minimum:

- screening household and close contacts of smear positive pulmonary tuberculosis cases to detect new TB cases; and
- for children under five years of age and for all people with HIV without symptoms suggestive of TB, providing isoniazid preventive therapy (IPT).[2 3 4 7]

In addition, it is important to closely follow up contacts of patients with multidrug-resistant tuberculosis (MDR-TB) or extensively drug-resistant tuberculosis (XDR-TB) in order to prevent further spread of drug-resistant TB.[2] If resources exist in an effectively functioning and well-resourced DOTS programme, then screening can be more extensive to determine and treat other close contacts.[2]

Part of the rationale for these recommendations is to detect additional cases of TB, as a way of preventing ongoing transmission of TB, both in the household and in the community. In addition, young children living in the same household as a person with smear positive pulmonary TB are more susceptible to being infected with TB and subsequently developing severe forms of TB disease such as meningitis. Infected children under five years of age, in particular those in the first year of life, have a high risk of progression to TB disease.[7] The use of preventive therapy has been shown to be effective in significantly limiting the risk of future disease.[8] People with HIV infection have a significantly higher risk of progressing from latent to active TB than those who are HIV negative, and isoniazid can decrease the risk of progression from latent to active TB by as much as 33%.[9]

A systematic review of contact tracing activities in low and middle-income countries showed that when an average of 4.4 household contacts per index case were investigated, 4.5% of all evaluated household contacts had active TB.[10] The implication of this finding is that, to identify one case of active TB, contacts in approximately five households need to be screened. In the same study, latent TB infection was found in just over half (51.4%) of all contacts evaluated and the median number of contacts evaluated to find one case of latent TB was two. The highest proportion of active TB was found in children under five years of age, which supports the recommendation to prioritise contact tracing in this age group (Table 1).

The results of this review suggest that contact tracing in low and middle-income countries is an important strategy to detect additional cases of TB.

Table 1: Yield of contact tracing by age group in low- and middle-income countries

Age group	TB* (%)	Latent TB infection^ (%)
< 5 years	8.5	30.4
5–14 years	6.0	47.9
All < 15 years	7.0	40.4
Adults (>15 years)	6.5	64.6

Notes

* Proportion of examined contacts with clinical and confirmed TB

^ Proportion of examined contacts with latent TB infection

Source: Morrison et al. 2008. Tuberculosis and latent tuberculosis infection in close contacts of people with pulmonary tuberculosis in low-income and middle-income countries: a systematic review and meta analysis. Lancet Infectious Diseases 8: 359–368.

3. Transmission of TB

Mycobacterium tuberculosis is an airborne pathogen that is transmitted from someone with infectious TB to susceptible contacts via shared air.[11] When a person with infectious TB coughs or sneezes they expel tubercle bacilli in airborne droplet nuclei into the air, which can then be inhaled by those in close contact with the case.[11]

The risk of acquiring TB infection is related to the intensity and duration of exposure to a person with infectious TB.[2] Therefore, close contacts of people with infectious TB, particularly contacts who live in the same house, are at the highest risk of acquiring TB infection.[2 4] For this reason the focus of these guidelines is on screening household contacts of infectious TB cases although in some situations other contacts outside of the household may also be at risk of developing TB due to their exposure to the index case. Each case needs to be assessed on an individual basis and contacts beyond the household may need to be screened if their contact was close and prolonged.[3]

4. Assessing Infectiousness

In settings with limited resources, contact tracing is limited to highly infectious cases only. Cases with a high degree of infectiousness have one or more of the following:

- sputum smear positive pulmonary TB;
- symptoms suggestive of TB, with a cough;
- cavities on the chest x-ray (usually these people have a positive sputum smear as well); and/or[2]
- laryngeal TB.

Contact tracing for less infectious cases (i.e. sputum smear negative pulmonary TB) is not recommended in settings with limited resources.

5. Definitions of Index Case and Contacts

The person who has infectious TB is called the **index case**. More specifically, for the purpose of these guidelines, an index case is a person with sputum smear positive pulmonary TB. This includes new and retreatment cases.

People identified as having been in close contact with an index case are called **contacts**. Within this category are two more specific groups:

- A **household contact** is someone who has lived in the same household as the index case during the infectious period, especially in the three months before treatment began.
- A **close contact** is someone who has had close and prolonged contact with the index case during the infectious period. Close contacts may not live in the same household as the index case on a permanent basis but they have spent significant amounts of time with the index case during the infectious period. There is no precise amount of time used to define a close contact and the international literature contains little information on this point. To determine the threshold for duration of exposure, consider the characteristics of the index case, the setting and the risk factors in the contact.[2]

6. Decision to Initiate Contact Tracing

At a national level, the decision to initiate contact tracing is based first on the ability of the National TB Programme to undertake contact tracing activities in addition to the essential tasks of identifying TB cases and treating them successfully. Once this decision has been made, a decision to initiate contact tracing for any individual TB case is based on the level of infectiousness of the index TB case and the characteristics of the contacts.[3]

If the index case is a child aged under 10 years, contact tracing is not recommended as children of this age rarely transmit TB.[3] If, however, the child has sputum smear positive TB then contact tracing should be carried out.[3] A diagnosis of TB in a child usually indicates there has been transmission from an infectious adult; therefore the objective of contact tracing for index cases who are children may be to find the source of the child's infection. This is sometimes referred to as a **source case** investigation and involves asking household and other close contacts if they have signs and symptoms of TB, in an attempt to find the person who may have infected the child.[12 13]

7. Determining the Infectious Period

- It is important to determine the infectious period of the index case so that all contacts who may have been infected with TB can be identified.
- The infectious period should begin three months prior to the commencement of TB treatment. In some circumstances (i.e. prolonged infectiousness due to lack of Directly Observed Therapy (DOT), non-adherence or drug resistance), use an earlier start date.
- The infectious period ends three weeks after the initiation of TB treatment, if TB symptoms have improved.

8. Identification of Contacts

To identify household and other close contacts, interview the index case soon after diagnosis (within one week is recommended). Conduct the interview in hospital or the patient's home depending on the context. If resources permit and the patient agrees, staff might also visit the patient's home as a means of assessing the environment and potentially identifying additional contacts who may be at risk of acquiring TB.

Ideally, the person interviewing the index case should be familiar with the social and cultural context of the index case. Results of the interview should be accurately recorded on a standardised form.

During the interview, it is crucial to maintain confidentiality at all times, with respect to both the identity of the index case (if required) and the details of the contacts. The interview focuses on gaining the details of household contacts who have lived with the index case in the infectious period. In addition, if other non-household contacts have a similar level of exposure, these contacts may also be part of the contact tracing investigation.

9. Assigning Priorities to Contacts

The International Standards for TB Care state that priorities for contact investigation are determined by establishing the likelihood that a contact:

- has undiagnosed TB;
- is at high risk of developing TB if infected;
- is at risk of having severe TB if the disease develops; and
- is at high risk of having been infected by the index case[2] (Table 2).

Therefore, the highest-priority household contacts are:

- people with signs and symptoms suggestive of TB;
- children aged under five years;
- contacts with known or suspected immune-compromising conditions (in particular HIV infection, but certain other conditions are also a high priority); and
- contacts of patients with MDR or XDR-TB[2] (Table 3).

Other household and/or close contacts can be screened, but have a lower priority than contacts in the four groups identified as highest priority. If resources do not permit any wider screening, these four groups remain the priority.

National TB Programme staff should evaluate contacts with symptoms suggestive of TB as a priority. As noted in Section 2, an analysis of contact tracing studies in low and middle-income countries showed that 4.5% of household contacts of an infectious TB case also had active TB.[9] Diagnosing and effectively treating active TB in close contacts of an index case should reduce ongoing transmission of TB, both in the household and in the wider community.

Children aged under five years are another priority group for contact tracing. They are prioritised because they are at substantially higher risk of more severe (and sometimes fatal) forms of TB disease as a result of recent TB infection.[2347]

People with immune-compromising conditions are also at greater risk of progressing from TB infection to TB disease.[9] In particular, people with HIV have a significantly higher risk of progressing from latent TB infection to active TB disease. HIV is the most powerful factor known to increase the risk of TB and people with HIV have approximately a 50% lifetime risk of developing active TB.[9] Other groups with any condition that compromises immunity (e.g. cancer, diabetes mellitus) are another priority for contact tracing and should be screened as a matter of priority. In the Pacific context where HIV prevalence is low, other groups with immune-suppressing conditions (e.g. diabetes mellitus) can be part of routine contact tracing activities, if there are sufficient resources.

National TB Programme staff should closely evaluate contacts of patients with MDR- and or XDR-TB to determine if there are other additional cases of active TB that may also be drug resistant. Contact tracing for drug-resistant cases is the highest priority; in particular, index cases with XDR-TB represent an emergency for which contact tracing is of utmost urgency.

Table 3: International Standards for TB Care: Standards for public health: Standard 18

ISTC: Standard 18
All providers of care for patients with tuberculosis should ensure that persons (especially if symptoms suggestive of TB, children under 5 years of age, persons with HIV infection, and contacts to MDR/XDR) who are in close contact with patients who have infectious tuberculosis are evaluated and managed in line with international recommendations. The determination of priorities for contact investigation is based on the likelihood that a contact: 1. has undiagnosed TB 2. is at high risk of developing TB if infected 3. is at risk of having severe TB if the disease develops 4. is at high risk of having been infected by the index case.

Source: Tuberculosis Coalition for Technical Assistance. 2009. International standards for tuberculosis care.

Table 3: Priorities in contact tracing: people at greatest risk of acquiring TB infection and developing TB disease

At greatest risk of acquiring TB infection
• Close contacts of smear positive pulmonary index cases • People with HIV infection • People who are highly exposed
At greatest risk of developing active TB
• Children < 5 years of age • People with HIV infection • People with other conditions that suppress immunity

Source: Tuberculosis Coalition for Technical Assistance. 2009. International standards for tuberculosis care.

10. Evaluation of Contacts

Ideally, all contacts will be identified and evaluation will commence within 14 days after diagnosis of the index case.[3]

The scope of contact tracing will differ in different settings. In some Pacific Island countries and territories, tuberculin skin testing is used routinely, while in others this method is not available. Even within a country or territory, areas or provinces may vary in the methods used and resources that are available for contact tracing. The local context will dictate whether and where to use tuberculin skin testing and other tests for latent TB infection (such as interferon gamma release assays). In addition, chest x-ray facilities may be available in some areas and not in others.

A minimum standard for contact tracing will occur in settings where the tuberculin skin test and/or chest x-ray are not available or it is not feasible to use them because staff are not trained to do so. In these settings, contact tracing will rely on: identification of contacts; clinical assessment to determine if any contacts have TB; and offering isoniazid preventive treatment to the most susceptible contacts to prevent progression from TB infection to TB disease (once active TB has been excluded).

To apply the minimum standard for contact tracing, health programme staff should take the following steps:

- Carefully assess all household members for signs and symptoms suggestive of TB disease.
- To identify TB cases, use TB suspect criteria according to the National TB Programme protocol. A definition of a TB suspect is provided in Appendix 4.
- Refer TB suspects for further investigation in line with the National TB Programme TB suspect protocol. Collect sputum samples from TB suspects in line with the National TB Programme protocol. If resources permit, also take a chest x-ray.
- Where any contact is identified as having TB disease, register them with the National TB Programme and treat them with a standardised treatment regimen in accordance with National TB Programme treatment guidelines.
- Carefully assess children under five years of age and people who are HIV positive for any signs and symptoms suggestive of active TB. Once active TB has been excluded, recommend children under five years of age and people with HIV infection for isoniazid preventive therapy, once daily for six to nine months (Table 4). It is recommended that children receive isoniazid preventive therapy for six months, and people with HIV infection for six to nine months (depending on National TB Programme policy).[2 4] Approximately 5 mg/kg/day of isoniazid (up to a maximum of 300 mg/day) is the correct dose. For more information on isoniazid dosages by weight of the patient, refer to Table 5.

- The principles of preventive treatment with isoniazid are as follows:
  - Directly observe all treatment.
  - Monitor the patient monthly to assess for adherence and monitor for side effects.
  - Follow up the patient to ensure that they complete the course of isoniazid preventive therapy.
- Diagnosing active TB in children is often difficult due to non-specific symptoms and the difficulty of confirming cases in the laboratory. Therefore, consider referral for urgent paediatric assessment (including a medical history, physical examination and chest x-ray) in all cases of children suspected of having TB.[14]
- If resources permit the use of chest x-rays in contacts, take chest x-rays for all children under five years of age irrespective of whether they have signs and symptoms of TB.
- For all contacts who have no signs and symptoms suggestive of TB, educate them on signs and symptoms of TB and the need to seek medical advice urgently should they develop these symptoms in the future.

Table 4: International Standards for TB Care: Standards for public health: Standard 19

ISTC: Standard 19
Children < 5 years of age and persons of any age with HIV infection who are close contacts of an infectious index patient and who, after careful evaluation, do not have active tuberculosis should be treated for presumed latent TB infection with isoniazid.

Source: Tuberculosis Coalition for Technical Assistance. 2009. International standards for tuberculosis care.

In some Pacific Island countries and territories, tuberculin skin testing is used to assess close contacts for latent TB infection once active TB has been excluded. In these settings, health programme staff should take the following steps:

- Offer tuberculin skin testing to all HIV negative household and/ or close contacts of infectious TB cases who are five years of age and above and who have had active TB excluded.
- In general, do not administer tuberculin skin tests to contacts unless the National TB Programme can offer isoniazid preventive therapy to tuberculin skin test positive contacts and monitor this treatment.
- Any contact with a history of previous treatment for TB does not require a tuberculin skin test (as the result will likely be positive). Instead, check these contacts for signs and symptoms suggestive of TB.
- In Pacific Island countries and territories where tuberculin skin testing is available there is no need to administer a tuberculin skin test to children and infants under five years of age who are close contacts of an infectious case. If it has been established that these children do not have active TB, give them six months of isoniazid preventive therapy, on the assumption that they have been infected by the index case.
- Similarly there is no benefit in administering a tuberculin skin test to a contact with HIV infection who has no signs and symptoms suggestive of TB as the decision to treat with isoniazid preventive therapy will not be changed by the result of the tuberculin skin test (even if negative). In addition, tuberculin skin testing may be falsely negative in people with HIV infection.[3]
- For all other HIV negative household and close contacts aged five years of age and above with a tuberculin skin test ≥ 5 or ≥ 10 mm (irrespective of BCG status and dependent on local policy), consider giving six months of isoniazid preventive therapy (depending on National TB Programme policy), provided that TB disease has been excluded.

10.1 Interpreting the tuberculin skin test result

- Appendix 6 provides information on administering, measuring and reading the tuberculin skin test. Measure and read the tuberculin skin test between 48 and 72 hours after administration.
- A National TB Programme should be guided by its national policy to determine the cut-off for a positive tuberculin skin test (either ≥ 5 or ≥ 10 mm).[2] Some Pacific Island countries and territories use the following cut-offs (irrespective of BCG status) to determine if a tuberculin skin test is positive:
  - **≥ 5mm** – positive in immune-suppressed contacts (e.g. people with HIV, malnourished people, diabetics); and
  - **≥ 10mm** – positive in all other contacts.

Over time, local epidemiology will inform the appropriate cut-off points for a positive tuberculin skin test. Consequently, it is important for National TB Programmes to collect information on results of tuberculin skin testing and subsequently to use this information to inform contact tracing policy.

11. Isoniazid Preventive Therapy

Once active TB has been excluded, isoniazid preventive therapy may be given to contacts with presumed or diagnosed latent TB infection. In these circumstances the following principles apply:

- Give isoniazid preventive therapy to the following contacts of infectious TB cases:
  - children under five years of age;
  - people with HIV infection;
  - people with other immune-compromising conditions; and
  - HIV negative people aged five years and above with a positive tuberculin skin test who have no contraindications to receiving isoniazid.[2 3]
- Directly observe treatment (i.e. through a DOT programme, if possible) according to the National TB Programme guidelines.
- Give a dose of isoniazid of 5 mg/kg body weight (up to a maximum of 300mg/day) once each day. (Refer to Table 5 for dosages of isoniazid by weight.)[15]
- Give a total of six months (180 doses) of isoniazid preventive therapy.
- Give pyridoxine (vitamin B6) once each day to contacts on isoniazid preventive therapy and give it free of charge to contacts at higher risk for side effects to isoniazid (e.g. people with diabetes, HIV, malnutrition, chronic alcohol dependence, pregnant women or breastfeeding mothers and those with renal failure).[15] The recommended dose of pyridoxine is 10 mg a day.[15]
- Ideally give children isoniazid every day for nine months, although six months is considered acceptable, and may be more feasible in most Pacific Island countries and territories.[1]
- Six to nine months of isoniazid preventive therapy is recommended for people with HIV infection.[2 4]
- In some Pacific Island countries and territories, isoniazid syrup is available. This is the preferred formulation for infants and children.
- There are certain groups of people (e.g. those with prior allergic reactions or severe unstable liver disease) for whom isoniazid preventive therapy may be contraindicated
- Before starting isoniazid it is important to identify the patient's co-morbidities and other medications they are taking. Isoniazid can inhibit the metabolism of certain medications (e.g. anticonvulsants) which can make them toxic.[15]

Table 5: Daily dose of isoniazid for isoniazid preventive therapy (using 100 mg tablets)

Weight range	< 10 kg	10–20 kg	21–30 kg	31–40 kg	41–50 kg	> 50 kg
Isoniazid dose (number of 100mg tablets)	50 mg (1/2 tab)	100 mg (1 tab)	200 mg (2 tabs)	200 mg (2 tabs)	250 mg (2.5 tabs)	300 mg (3 tabs)

11.1 Follow-up of contacts on isoniazid preventive therapy

- A physician should review contacts on isoniazid preventive therapy on a monthly basis
- If feasible, undertake baseline liver function tests for all contacts started on isoniazid preventive therapy. However, such tests **must** be undertaken for the following patients:
  - people who are HIV positive;
  - people with a history of liver disease and/or heavy alcohol use; and
  - pregnant women.
- Conduct further liver function tests if the patient develops symptoms suspicious of liver toxicity, such as loss of appetite, general malaise, jaundice, and/or dark urine.
- If the patient reports any severe adverse reactions to treatment, advise them to stop treatment and refer them to a physician immediately.

12. Special Situations

12.1 Contacts of an index case with MDR- or XDR-TB

Contact tracing for index cases with multidrug-resistant TB (MDR-TB) or extensively drug-resistant TB (XDR-TB) is an urgent priority. Although many of the principles remain the same as for drug susceptible cases, there are some key differences in contact tracing for MDR and XDR-TB cases. These differences are described below and are summarised in Table 6.

Household contacts of MDR-TB cases who develop TB disease, especially children, are likely to have MDR-TB also.[16] Early detection of these cases provides the best chance of cure and limits morbidity, mortality and further transmission of drug-resistant TB.

The World Health Organization has made the following key recommendations for contact tracing of drug-resistant index cases:[16]

- Contact investigations for multidrug-resistant TB should be given high priority, and National TB Programmes should regard cases of extremely drug-resistant TB as an emergency requiring urgent contact investigation.
- Close contacts of drug-resistant TB patients should receive careful clinical follow-up.

Obtaining results of drug susceptibility testing can take many weeks in some Pacific settings. For this reason, contacts of suspected MDR-TB cases should be treated with the same degree of urgency as contacts of confirmed MDR-TB cases.[3]

Index cases with MDR or XDR-TB may have prolonged periods of infectiousness because they may:

- have a long period of infectiousness prior to diagnosis and/ or a history of prior TB treatment; and

- require a longer time to become non-infectious after treatment has been commenced. A patient with MDR-TB is considered to have become non-infectious after treatment has commenced and the sputum cultures have become negative, regardless of the length of time on treatment.[3]

Therefore when identifying at risk contacts it is important to remember that the period of infectiousness may extend to many months.

National TB Programme staff should evaluate contacts of all cases of pulmonary and pleural and laryngeal MDR-TB (regardless of sputum smear result), due to the serious nature of a diagnosis of MDR-TB.[3] This procedure is different to that for drug susceptible TB where only sputum smear positive pulmonary TB cases are contact traced.

The method for evaluating contacts of MDR- and XDR-TB cases is the same for drug susceptible cases. However, contacts should be investigated with a greater sense of urgency due to the serious nature of a diagnosis of MDR- or XDR-TB, and to prevent ongoing transmission of drug-resistant strains in the community.[3]

Contacts of MDR- and XDR-TB cases may have been evaluated previously if the index case has had a prior diagnosis of TB. If this is the case:
- evaluate these contacts again; and
- evaluate any additional contacts not part of this initial investigation.[3]

When screening household and close contacts who have had contact with an MDR-TB index case, the following actions are advised:
- Assess all contacts carefully for signs and symptoms suggestive of TB disease.
- Investigate TB suspects for MDR-TB and send sputum to a reference laboratory for culture and drug susceptibility testing.
- Where close contacts have no suspicious features of TB disease, monitor them carefully for at least two years. In particular, careful and close follow-up is recommended for infants and children under five years of age.[3]
- For all contacts who have no signs and symptoms suggestive of active TB, educate them about the signs and symptoms of TB, about their contact with an index case with MDR-TB and about the importance of seeking treatment urgently if they develop signs and symptoms of TB disease.
- If TB disease develops in previously well contacts, start MDR-TB treatment promptly and send the sputum to a reference laboratory for culture and drug susceptibility testing. The treating physician should be provided with the drug susceptibility results of the index case.

When TB disease is suspected in a contact of an MDR-TB case, seek expert advice immediately from a physician who has expertise in the treatment and management of MDR-TB cases. SPC and the Centers for Disease Control and Prevention (CDC) provide free advice from expert physicians on the management of MDR-TB cases and their contacts. The email addresses for these services are:
1. tbcenter@nationaltbcenter.ucsf.edu (Francis J. Curry National Tuberculosis Center/ Centers for Disease Control and Prevention); and
2. tb-support@lists.spc.int (Secretariat of the Pacific Community).

At this time, there is no proven regimen of preventive treatment for contacts of MDR-TB cases. The use of second-line drugs for this purpose is not generally recommended by the WHO. [14 3 16] WHO does not recommend treating MDR-TB contacts with regimens tailored to the susceptibility pattern of the presumed source case because no evidence based data exist. [16] But many experts would agree that the treatment of MDR latent tuberculosis infection may be appropriate and feasible in some circumstances. Factors to be considered in the decision to

treat MDR-TB contacts include the likelihood of infection with an MDR strain, the risk of progression to active disease once infected, and availability of resources to implement treatment and monitoring.

For further information on the management of MDR-TB contacts, see the WHO publication: Guidelines for the programmatic management of drug-resistant tuberculosis: emergency update 2008. WHO/HTM/TB/2008.402 and the SPC publication: Framework to address multi drug-resistant TB in the Pacific Island countries and territories 2010.

Table 6: How contact tracing for a drug susceptible index case differs from contact tracing for an MDR- or XDR-TB index case

Aspect of contact tracing	Drug susceptible index case	MDR or XDR-TB index case
Urgency	Urgent	Very urgent for MDR-TB – should take priority over drug susceptible cases Emergency for XDR-TB
Index case definition	Sputum smear positive pulmonary TB (including laryngeal TB)	All pulmonary TB including sputum smear positive and negative, and pleural and laryngeal TB
Period of infectiousness	Three months prior to commencement of TB treatment to three weeks after commencement of TB treatment if TB symptoms have resolved	Three months prior commencement of TB treatment to negative cultures*
Drug susceptibility test results pending	Not applicable for (presumed) drug susceptible TB index cases	Contacts of MDR and XDR-TB suspects are screened as confirmed MDR and XDR-TB pending confirmation of drug susceptibility testing. Therefore contacts of suspected and confirmed MDR-TB are treated in the same (urgent) manner.
Preventive therapy	Isoniazid for six to nine months	No proven regimen
Follow-up time for contacts with no symptoms suggestive of TB	No recommended follow-up time	At least two years, especially for children

Note:
* Take care when determining the start of the infectious period in patients with drug-resistant TB as they may have had a previous course of TB treatment and therefore they may have been infectious for as long as three months before this first course of treatment.

12.2 Newborn baby in contact with a mother with infectious TB

The newborn baby of a mother with smear positive pulmonary TB is at high risk of developing TB. A paediatrician should conduct a careful clinical assessment of the baby for evidence of TB disease. Tuberculin skin testing to detect recent infection is unreliable in infants under six months of age and should not be used in this age group. Supervised treatment (i.e. DOT) of the mother will rapidly reduce her infectiousness over a two- to three-week period.

For the apparently healthy newborn, WHO and the Stop TB Partnership recommend:

- providing isoniazid preventive therapy, 5 mg/kg once daily for six months (Table 5);
- deferring the BCG vaccination until isoniazid preventive therapy has been completed; and
- maintaining breastfeeding throughout the infant's treatment, with the mother wearing a mask during breastfeeding while she is infectious. [6 7]

13. Implementing a Contact Tracing Programme

The decision to implement contact tracing in a National TB Programme will depend on the quality and functionality of the DOTS programme, available resources and skills of the programme's staff. There is regional consensus that a sound DOTS programme, in-country training, available staff and written guidelines are the key pre-requisites to implementing a high-quality contact tracing programme. WHO recommends that a National TB Programme should only undertake contact tracing activities if it has a treatment success rate consistently above 85%.[3]

If a National TB Programme decides to incorporate contact tracing activities into its role, it should begin those activities with reference to the local epidemiological and environmental context. The programme should decide where to start contact tracing activities and which tools to use. If resources are limited, it may need to prioritise areas with a higher proportion of sputum smear positive pulmonary TB cases. For example, if the highest proportion of sputum smear positive pulmonary TB cases live in the urban centre and resources permit the use of tuberculin skin testing and chest x-ray, then staff can use these tools to commence contact tracing activities in the urban area.

It is important to pilot such an approach and assess it's effectiveness. It is therefore advised that contact tracing activities commence in a small selected area within the urban centre, such as one village or 10 households in a district with a high TB burden, or one district. Once contact tracing activities are well established and running smoothly in the small selected area, the programme can then gradually extend contact tracing to other parts of the urban centre and the main island.

In contrast, in an outer island setting where the incidence of TB may be lower and there is a lack of trained staff to carry out contact tracing activities, the use of tuberculin skin testing will not be recommended. Here contact tracing may be limited to searching for additional cases of active TB and giving isoniazid to well children under five years of age and people with HIV with no signs and symptoms suggestive of active TB.

In some outer island settings, resources may not exist to give isoniazid. Here contact tracing may consist of screening household contacts for signs and symptoms suggestive of TB only.

Each Pacific Island country and territory should carefully consider its local context before embarking on contact tracing. A recommended initial step in undertaking these activities is to develop a national contact tracing plan.

In implementing contact tracing activities, a National TB Programme should have the support of policies and/or guidelines that:

- clearly define the index case and contacts;
- outline procedures for identifying and evaluating contacts;
- outline a policy for treating and managing presumed and/or diagnosed latent TB infection; and
- provide recommendations on monitoring contact tracing activities.

Given that the resources and skills available may be limited, the initial focus of a contact tracing programme should be on facilitating investigation and treatment for high-risk household contacts of all sputum smear positive pulmonary TB cases. These activities would be undertaken with the aim of:

- detecting additional cases of active TB; and
- offering isoniazid preventive therapy to children under five years of age and immune-suppressed people with no signs and symptoms of active TB.

13.1 Training

Education and training of selected National TB Programme staff to an appropriate standard is essential if the programme is to implement contact tracing effectively. Formal training provides the necessary knowledge and skills in the core principles and practices of contact tracing.

The key areas covered by training should include:

- the basics of TB and the DOTS strategy;
- the rationale behind contact tracing;
- definitions of an index case and contacts;
- procedures for conducting a contact investigation – in particular, making the decision to initiate contact tracing, interviewing the index case, evaluating contacts, and making the decision to expand a contact tracing investigation;
- specific training in the administration, measurement and interpretation of the tuberculin skin test (if appropriate);
- treatment of contacts with IPT and management of other contacts;
- recording and reporting (including recording and reporting tools);
- developing a national contact tracing plan and written guidelines; and
- monitoring and evaluation.

14. Recording and Reporting

If a National TB Programme wishes to commence contact tracing activities, it is recommended that it develops a written protocol for contact tracing, including a contact tracing plan.

The programme should complement the written protocol with standardised recording and reporting forms, which may include the following:

1. **Index case questionnaire**. Use this form when interviewing the index case with the aim of collecting information on the index case and determining the infectious period. Complete one of these forms for each sputum smear positive case.
2. **High risk contact form**. Use this form to record information about the household contacts of an index case. Complete one of these forms for each index case.
3. **TB contact screening card**. Use this form to record the screening process for household contacts. Complete one of these forms for each contact and keep it with the high risk contact form.
4. **IPT register**. Use this register to record the outcome of contacts commenced on isoniazid preventive therapy. Keep one register for each DOTS centre (or basic management unit).

Examples of these forms are included in Appendix 7 and electronic versions are available from the TB Section of the Secretariat of the Pacific Community. Other forms are also available upon request.

A National TB Programme should analyse its TB contact tracing data at least once a year to monitor and evaluate contact tracing activities. It should choose a set of data and/or indicators for such monitoring. These data can include:

1. Total number of household contacts of a smear positive pulmonary TB case
   – adults and children (of all ages)
   – children under five years
2. Total number who were screened
   – adults and children (of all ages)
   – children under five years
3. Total number who were recorded as TB suspects
   – adults and children (of all ages)
   – children under five years
4. Number of children under five years who were diagnosed with TB and their treatment outcome
5. Number of adults and children (of all ages) who were diagnosed with TB and their treatment outcome
6. Number of asymptomatic children under five years started on IPT
7. Number of asymptomatic children under five years who completed IPT
8. Where tuberculin skin testing is available and utilised in contact tracing activities:
   – results of tuberculin skin testing
   – number of adults and children (all ages) who started on IPT
   – number of adults and children (all ages) who completed IPT

Table 7 sets out two internationally recommended contact tracing indicators. A National TB Programme can use these indicators to monitor its contact tracing activities.[17] In addition, it should evaluate these activities periodically and could assess them as part of its formal programme reviews or as a separate process, depending on the local context.

Table 7: Indicators to measure TB contact tracing activities as part of a National TB Programme

Indicator definition	Numerator	Denominator	Frequency of measurement*	Tools for measurement
Number of contacts of smear positive TB patients screened for TB according to national policy	Number of contacts screened for TB	Number of contacts identified	Annually	TB contact tracing recording and reporting tools
Number of new smear positive TB patients reported to the national health authority among TB contacts	Number of smear positive TB cases detected	Number of contacts screened for TB	Annually	TB contact tracing recording and reporting tools and TB Register

Note: * Can also be measured every three months if resources permit
Source: Global Fund to Fight AIDS, TB and Malaria. 2009. Monitoring and evaluation toolkit.

15. Conclusion

These guidelines provide practical recommendations for contact tracing in Pacific Island countries and territories.

At its minimum level, contact tracing should involve:

- assessing all adult and childhood household contacts (aged 5 years and above) of an infectious TB case for TB by asking whether they have a persistent cough and other signs and symptoms suggestive of TB; and
- conducting sputum smear microscopy for those who do.
- for children under 5 years of age and people living with HIV, it is important to conduct a more thorough assessment for TB, including, if possible, an assessment for extra pulmonary TB. If the assessment shows they are unwell, evaluate them for TB. For those who are healthy, isoniazid preventive therapy for six to nine months is recommended.

Pacific Island countries and territories who have access to tuberculin skin testing and chest x-ray can implement a more comprehensive form of contact tracing, as described in this guideline.

Contact tracing activities can help to increase case detection and to prevent additional cases of TB. A National TB Programme should consider incorporating such activities into its role provided that its DOTS programme is functioning well and staff are resourced and trained to conduct contact tracing. If resources permit and treatment success is consistently above 85%, contact tracing can prevent additional cases of TB, ongoing transmission of TB and TB related deaths. Where a programme is unable to conduct targeted contact tracing, it misses a potential opportunity for TB control. Intensified efforts to introduce contact tracing in the Pacific Island region are needed as part of the work towards optimising TB control efforts and reducing the burden of TB in the Pacific Islands region.

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Glossary

Case (of tuberculosis): A patient in whom a diagnosis of TB has been confirmed bacteriologically or a patient in whom a presumptive diagnosis of active TB is made on the basis of radiological or other evidence and whom a physician decides to treat with a full course of anti-TB therapy.

Contact: A person who has been exposed to *M. tuberculosis* by sharing air space with a person with infectious TB.

Directly Observed Therapy (DOT): A component of the DOTS strategy (see below) and a method to enhance adherence to a course of TB medication. DOT involves a health care worker or other trained person watching a patient swallow each dose of TB medication to ensure that all medication is taken.

Directly Observed Treatment Short-course (DOTS): The TB control strategy recommended by WHO for ensuring high cure rates in TB patients. It has five components: government commitment to a sustainable National TB Programme; passive case detection through sputum smear microscopy; administration of standardised short-course chemotherapy under direct observation; regular supply of reliable drugs; and standardised recording and reporting to facilitate assessment of treatment outcome.

Exposure: The condition of being exposed to something, in this case *M. tuberculosis*.

Erythema: The redness in the tuberculin skin test reaction. This usually extends beyond the borders of the induration and is not recorded when recording a tuberculin skin test reaction.

Extensively drug-resistant tuberculosis (XDR-TB): TB that is resistant to any fluoroquinolone, and at least one of three injectable second-line drugs (i.e. capreomycin, kanamycin and amikacin), in addition to MDR-TB (i.e. resistance to at least isoniazid and rifampicin).

Household contact: A person who lives in the same home as the TB case and therefore is at risk of being infected with *M. tuberculosis*.

Index case: The first TB case that comes to attention as an indicator of a public health problem, and in this case a contact investigation.

Induration: The firmness in the tuberculin skin test reaction. It is usually smaller than the zone of erythema (but not always). It is measured by palpation and the result is recorded in millimetres (mm).

Infection: The entry and development or multiplication of an infectious agent (in this case *M. tuberculosis*) in the body of a human or an animal. Infection with *M. tuberculosis* may or may not progress to active TB disease.

Infectious: Having the potential to cause transmission of the bacteria causing the TB disease of either the lungs or the throat (larynx) to other people.

Isoniazid (INH): A highly active first-line TB drug that is a basis for treatment of active TB disease and latent TB infection.

Isoniazid preventive therapy (IPT): Treatment with isoniazid aimed at preventing TB infection from progressing to TB disease.

Latent TB (infection): The presence of live but inactive *M. tuberculosis* organisms without clinical or radiologic evidence of disease. The person usually has a positive tuberculin skin test and the latent infection has the potential to develop into active (tuberculosis) disease later.

Mantoux test (also called tuberculin skin test): A skin test and diagnostic aid for determining if someone has *M. tuberculosis* infection. A small dose of tuberculin (or **purified protein derivative** – PPD) is injected just beneath the surface of the skin and the area is examined for induration by palpation 48–72 hours after the injection. Such a response is indicative of infection with *M. tuberculosis.*

Multidrug-resistant TB (MDR-TB): TB disease that is caused by a strain of *M. tuberculosis* that is resistant to at least isoniazid and rifampicin. Treatment with second-line TB drugs is required.

***Mycobacterium tuberculosis*:** A bacterium from the *Mycobacterium* family that is responsible for most cases of tuberculosis in humans.

Preventive treatment (also called chemoprophylaxis): Treatment that aims to prevent TB infection from progressing into TB disease.

Pulmonary TB (PTB): TB disease that involves the lung parenchyma.

Pulmonary smear positive TB: Patient with pulmonary TB in whom micro-organisms can be seen directly under a microscope. A person with smear positive pulmonary TB is infectious and contact tracing can be implemented.

Purified protein derivative (PPD): An extract of *M. tuberculosis*, the bacterium that causes tuberculosis in humans. It is used to test if a person has been exposed to tuberculin protein from exposure to a person with infectious TB.

Smear: A laboratory technique used for preparing specimens so that TB bacteria can be seen microscopically.

Sputum: Mucus containing secretions coughed up from within the lungs. Tests of sputum can confirm pulmonary TB.

Symptomatic: A patients who has symptoms suggestive of a disease, in this case TB. See Appendix 4 for a list of these symptoms.

Tuberculin skin test: See **Mantoux test**.

Tuberculosis disease (TB): A clinically active disease caused by a member of *M. tuberculosis* complex. Most frequently in humans it is caused by *M. tuberculosis.*

Tuberculosis suspect: A person who presents with signs and symptoms suggestive of TB; in particular a cough of long duration (i.e. more than two weeks). (See Appendix 4 for more details.)

Appendix 1: Recommendations from the TB Contact Tracing Regional Workshop, Noumea: 2007

1. Contact tracing must not impede on the TB DOTS or other public health programmes.

2. Countries who have identified they are not in a position to expand their programme to include contact tracing focus on strengthening the implementation of DOTS.

3. The *Guidelines and Recommendations for Contact Tracing in the Pacific Island Countries and Territories (PICTs)* are implemented in a planned manner with careful consideration of addressing the identified challenges.

4. Development of a schedule with a timeline, for the provision of country training in line with the country reporting of readiness to introduce contact tracing.

5. Whenever possible, simultaneous training of clinicians at all levels should be provided when embarking on implementing contact tracing.

6. Countries should not expand their programmes to include contact tracing without further training and assessment, particularly Mantoux training.

7. Implementation of Mantoux training with a 'train the trainer' focus to facilitate training of new staff and reassessment of staff skills.

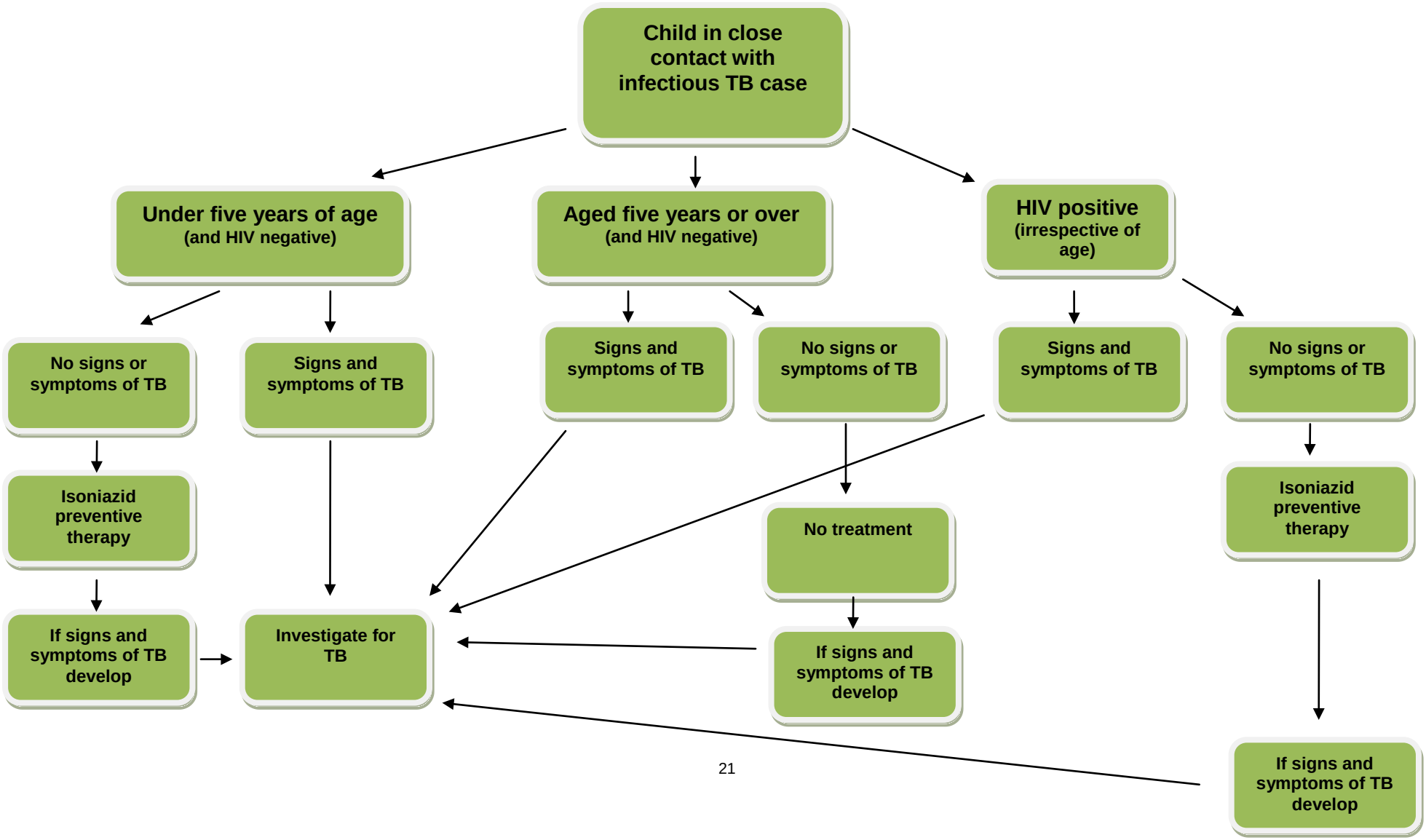
8. Pilot of contact tracing forms and register in countries already doing contact tracing with feedback to SPC.

9. Monitoring of the contact tracing programme, with achievement of key performance indicators to guide extension of contact tracing programme.

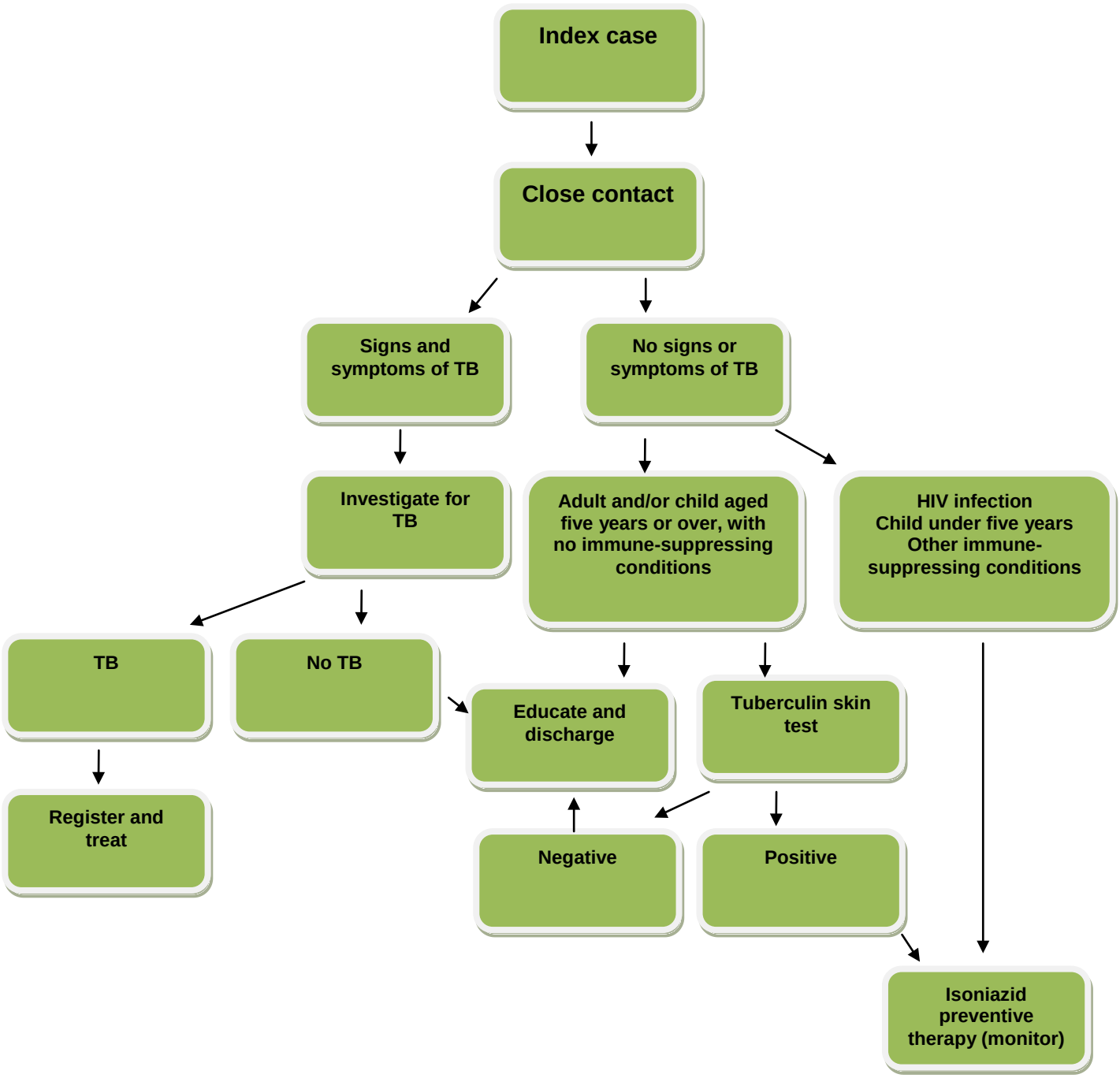
10. Refinement of the contact tracing workshop methodology and course outline with consideration of the feedback from the country representatives and the faculty.

11. Future contact tracing workshops to include a refresher on the clinical aspects of TB.

Appendix 2: How to Manage Children under Five Years of Age Who Are in Contact with a Case of Infectious TB



Appendix 3: Recommendations for Contact Tracing for Contacts of a Sputum Smear Positive Pulmonary TB Case



Appendix 4: Who is a TB Suspect?

A tuberculosis suspect is defined as:

> Any person who presents with signs or symptoms, suggestive of TB. The most common symptom of pulmonary TB is a **productive cough for more than two weeks** which may be accompanied by respiratory symptoms (shortness of breath, chest pain, haemoptysis (i.e. coughing up blood)) and or constitutional symptoms such as **loss of appetite, weight loss, fever, night sweats and fatigue**.[2]

The specific definition of a TB suspect will also depend on local factors such as the age and HIV status of the suspect and the prevalence of TB and HIV in the local population.[2]

The diagnosis of TB in children can be challenging. For an accurate diagnosis, it is necessary to make a careful and thorough assessment of all the evidence derived from careful history-taking, clinical examination and relevant investigations, such as tuberculin skin test, chest x-ray and sputum smear microscopy.[1] The presence of three or more of the following strongly suggests a diagnosis of TB:

- chronic symptoms suggestive of TB;
- physical signs highly of suggestive of TB;
- a positive tuberculin skin test; and/or
- chest x-ray suggestive of TB.[1]

Appendix 5: Adverse Effects of Isoniazid

Isoniazid is generally well tolerated if given in the recommended doses.

However, the following adverse effects can occur:

- systemic or cutaneous hypersensitivity reactions during the first weeks of treatment;
- mild nausea;
- sleepiness/lethargy;
- peripheral neuropathy (tingling feeling in hands and feet);
- hepatitis, characterised by dark urine, yellowish skin and eyes, loss of appetite, and nausea and vomiting (patients can also have asymptomatic rise of serum concentration of hepatic transaminases at commencement of treatment, which often resolves spontaneously);
- other neurological disturbance (less common), such as optic neuritis, toxic psychosis and convulsions, which can develop in people who are susceptible, particularly in the later stages of treatment; and/or
- rarely, lupus-like syndrome, pellagra, anaemia and arthralgias. [1]

Appendix 6: Tuberculin (Mantoux) Skin Test

All health care workers who conduct the tuberculin skin test (TST) should be trained in how to administer, measure and interpret and document results.

Administration

1. Locate injection site:

- Identify 10 cm below the elbow joint.
- Place forearm palm side up on a firm, well-lit surface.
- Select an area free from dermatitis, sores and visible veins.

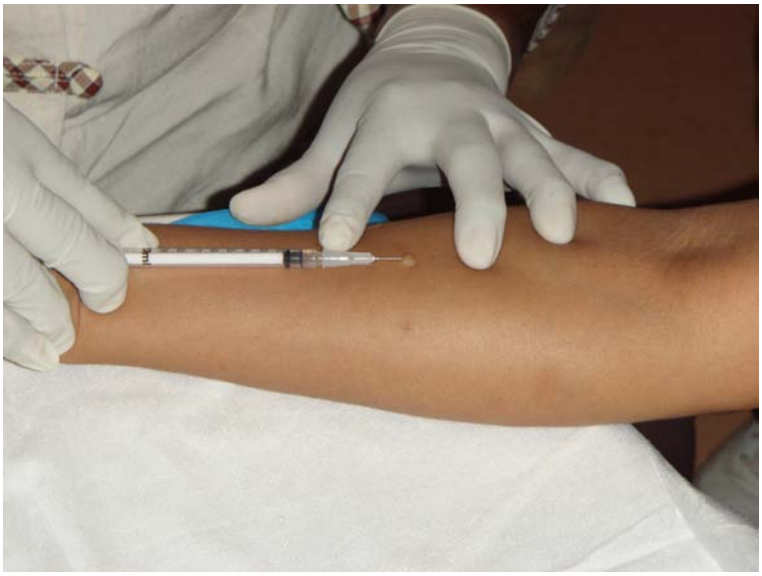
2. Prepare syringe:

- Check the expiry date on vial and ensure vial contains tuberculin 0.1 ml (5 TU).
- Use a single-dose tuberculin syringe with a 27-gauge needle with a short bevel.

3. Inject tuberculin:

- Hold the skin of the forearm taut and insert the needle (bevel facing up) at an angle almost parallel to the skin surface (Photo 1).
- Administer 0.1 ml (5TU) of tuberculin by slow intra-dermal injection to produce a discrete bleb.

Photo 1: Injecting tuberculin into forearm to produce discrete bleb



4. Check skin test site:

- A pale bleb (wheal) that is 5–10 mm in diameter should be produced.
- Cover the site with cotton wool and tape loosely.
- Instruct the patient to remove the covering after 30–60 minutes and leave the site uncovered. Instruct the patient on care of the site and give written information on TST if available.

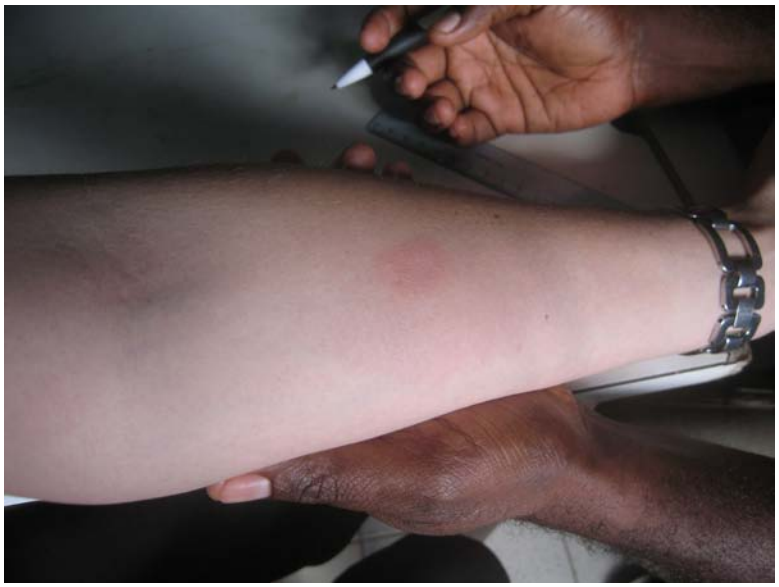
5. Record Information:

- Document the procedure according to requirements in National TB Programme recording and reporting tools.

Measurement
Measure the results of the tuberculin skin test between 48 and 72 hours after administering it.

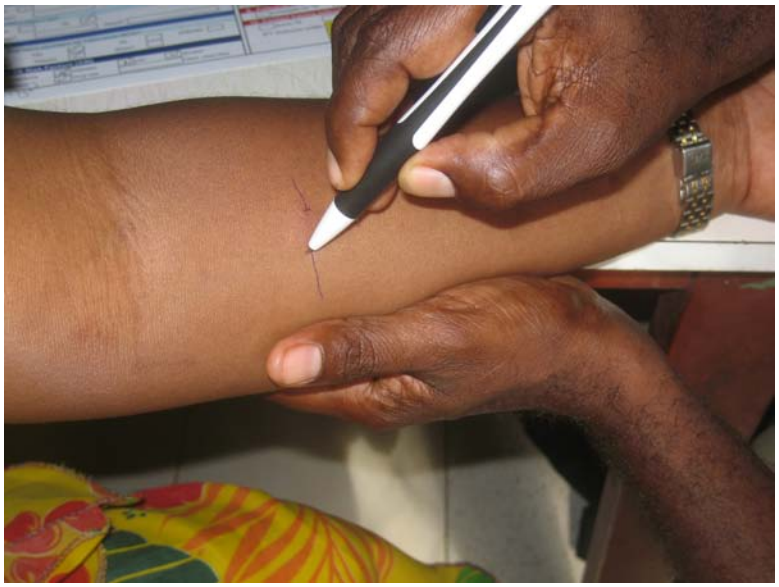
1. Inspect the site:
- Visually inspect the site under good light (Photo 2).
- Identify erythema (reddening of the skin) visually but do not measure this.
- Identify induration – firm raised area, which is the area to measure.

Photo 2: Inspecting the site after tuberculin skin testing



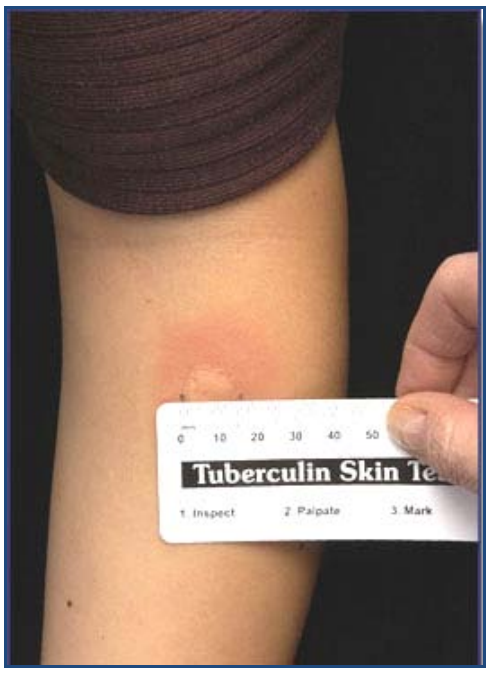
2. Palpate and mark induration (not erythema):
- Hold the skin firmly and find the borders of induration across the forearm.
- Make markings on the borders of the induration using a fine pen (Photo 3).

Photo 3: Marking the borders of a tuberculin skin test prior to measurement



- Measure the diameter of the induration in millimetres (mm) with a flexible plastic ruler (Photo 4).

Photo 4: Measuring the diameter of induration of a tuberculin skin test



3. Record measurement
- Record the diameter of induration in millimetres (rather than as positive or negative).
- Record erythema without induration as 0 mm.

Tuberculin purified protein derivative solution
Information will depend on the brand of purified protein derivative (PPD) used. Staff should consult the product information for more detail.

Storage
- Keep the solution refrigerated at 2–8°C.
- Throw away frozen tuberculin PPD (human).
- If the tuberculin PPD (human) is exposed to sunlight or fluorescent light for an extended period, its potency may be reduced. In this case, discard the solution.
- Transport the solution following the recommendations for vaccines in PICTs.
- Discard unused tuberculin PPD solution 30 days after opening.
- Do not use PPD after expiration date.

Aftercare advice
After administration of the tuberculin the nurse should use cotton wool to cover the site and instruct the patient to remove it after 1 hour.

The nurse should instruct the patient on care of the injection site, including in regard to:
- common reactions following the TST (e.g. redness and induration);
- uncommon reactions (e.g. skin blistering and/or ulceration);
- not applying creams or lotions to TST site;
- not scratching the TST site – if it itches, apply a cold pack; and
- showering and bathing as usual.

Disposal of needles and syringes
Place disposable needles and syringes in appropriate puncture-resistant containers immediately after use.

Spills
For PPD splashes on the skin, thoroughly wash the area with water and soap. For eye exposure, irrigate with running water for at least 15 minutes and seek medical attention.

Use of PPD in pregnancy
No teratogenic effects of testing during pregnancy have been documented.

Pregnancy should not be considered a contraindication to use tuberculin skin testing when there has been exposure to an infectious TB case

Appendix 7: Contact Tracing Recording and Reporting Tools

1. Index case questionnaire

Index Case Questionnaire

DEMOGRAPHICS

Surname

Given names

Nickname / Alias

Sex | DOB

Marital Status | Single Married Widowed Divorced

Address

Address

Home Phone | Work

Occupation

Employment Address

Next of kin

Address

Phone

Country of Birth

Language spoken

Recent travel | Y N

Previous places of residence

HIV INFECTION

Tested | Y N

Date

Result | Negative Positive

OTHER TB RISK

Health worker | Y N

Renal disease | Y N

Diabetes | Y N

Other immsup | Y N

HISTORY OF INDEX CASE CONTACT WITH TB

Who does the Index Case know who has had TB?

Relationship

When was the contact with TB?

Is anyone in the Index case's household sick now? | Y N

If yes, who?

MEDICATIONS

Current medications

Previous TB Treatment | Y N

If yes, When?

Where

Describe treatment

DIAGNOSIS

When did the patient become sick

Cough | Y N

Date started

Hemoptysis | Y N

Weight loss | Y N

Fevers | Y N

Date fevers commenced

Night sweats | Y N

Date night sweats commenced

Patient seek medical help? | Y N

Who

When

Chest x-ray | Y N

Result

Sputum smear | Y N

Result

Treatment (Non TB) | Y N

TB treatment commenced | Y N

Date commenced

Admitted to hospital | Y N

Date admitted

Date discharged

DOTS provider

Is the patient still considered infectious | Y N

Any houshold contact immunosuppressed | Y N

CALCULATE INFECTIOUS PERIOD

Start date (first symptom - 3months)

Finish date (start treatment + 3 weeks)

Interviewers name

Date

2. High risk contact form

High Risk Contact Form

Index Case Information

❶ Contact Investigation Information		❷ Index Case Information		❸ Index Case Treatment details		❹ Index Case Results			
Date of Interview		TB Reg No		Diagnosis Date		Smear Date		Res ✦	
Interviewer		First Name		Treatment Start Date		CultureDate		Res ✦	
Address		Last Name		Comments		✦ Positive		PE Pending	
						Negative		ND Not Done	

Household Contacts Information — Contact tracing outcome

ID	Surname	Given Name	Address/Phone	DOB/Age	Health Status	Sex (M/F)	Relationship to Index Case	Date of last contact with Index case	Active TB	Eligible IPT	Added to IPT Reg	✦ IPT Out-come
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

✦ IPT Outcome		
C Complete	SE Not complete: side effects	
D Died	N Not complete: Default	NA Not Applicable

2. TB contact screening card

TB Contact Screening Card

Index Case TB Reg Number

1. Demographic Data

Surname

Given Name/s

DOB | Age | Sex M F

Address 1

Address 2 | Ph

Country of Birth

2. TB Contact History

Have you ever been in contact with a person who received treatment for Tuberculosis? Yes No

If yes, name of person if known

When were you in contect with the person with TB?

Have you ever had Tuberculosis in the past? Yes No

If yes, when?

What treatment did you have?

Have you ever had a skin test (mantoux test) for Tuberculosis? Yes No

If yes, when? | Result?

Have you had a chest x-ray? Yes No

If yes, when? | Result?

BCG

Have you ever had a vaccination for Tuberculosis (BCG)? Yes No Unkown

BCG Scar? Present Absent

3. Other TB Risk Factors (Y/N)

Pregnancy | Diabetes | HIV | Smoker

Alcohol | Drug use | Other (describe)

4. Current Health

Do you have a cough? Yes No

If yes, describe

Do you have a fever? Yes No

If yes, describe

Have you lost weight recently? Yes No

Current weight KG

Assessment of children

Failure to thrive/grow? Yes No

Other illness, lymph nodes? (Describe)

5. Skin Test Administration Information

	Initial test	Retest
Date		
Batch Number		
Signature		

6. Skin Test Results

Reading Date		
Result (mm)		
Signature		

7. X-ray results

X-ray Date | Normal | Abnormal

Notes

8. Mantoux window period

Date last contact with Index Case

Date end of Mantoux window period (last contact plus 10weeks)

9. Followup (Y/N)

Investigate for TB | Eligible fo IPT | No Action Required

10. Contact tracing outcome (Y/N)

Active TB | Eligible IPT | IPT Reg | IPT Outcome

IPT Outcome codes

C	Complete	N	Not complete: Default
D	Died	NA	Not applicable
SE	Not complete: Side effects		

4. Isoniazid Preventive Therapy (IPT) Register

IPT Register

								Contact tracing outcome data					
ID	Index Case TB Reg No.	Surname / First Name	Address	Phone	DOB	Sex (M/F)	Relationship to Index Case	Active TB	Eligible IPT	✦ IPT Out-come	IPT Start	IPT Finish	Isoniazid Dose / Number of
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

✦ IPT Outcome					
C	Complete	SE	Not complete: side effects		
N	Not complete: Default	D	Died	NA	Not Applicable

Appendix 8: Practical Recommendations for Contact Investigations around Tuberculosis Cases in the French Pacific Countries

Last updated: 21 January 2009

1. Introduction

Early detection and direct observation of treatment for cases of infectious tuberculosis are the top priority of tuberculosis control programmes so as to reduce transmission and achieve the goal of elimination of the disease. The second priority is the active identification and management of cases of active tuberculosis or latent tuberculosis infection in people in close contact with patients suffering from infectious tuberculosis.

In the Pacific Island Countries and Territories, only the tuberculosis control programmes in the French territories of New Caledonia, French Polynesia and Wallis and Futuna systematically perform active screening of the contacts of tuberculosis cases as part of investigations around detected cases.
Each of these French Pacific territories, however, has its own approach to investigative activities around cases of tuberculosis, with varying policies and protocols.

A workshop was organised in Noumea from 24 to 27 November 2008 for the purpose of improving and harmonising contact investigation strategies and protocols around tuberculosis cases in the French Pacific territories.

2. Methods

This workshop brought together the main personnel involved in tuberculosis control programmes in the French territories and facilitators from the SPC and the InVS.
The main objectives of the workshop were to:

1. Address the current strategies and protocols in use in the French Pacific territories;
2. Discuss the main difficulties and constraints arising in contact investigation work and identify gaps and priorities;
3. Analyse and discuss the data available on contact investigation results in terms of effectiveness and comprehensiveness;
4. Put forward recommendations to harmonise practices and enable the health professionals concerned to perform contact investigations offering real effectiveness in public health terms;
5. Analyse and discuss the systems and tools for contact investigation programme monitoring and evaluation; and
6. Discuss the indication for tests based on interferon gamma release assays.

The workshop produced the consensus set out below, for use as a basic reference document by programmes seeking to review and update their contact investigation strategies and protocols around tuberculosis cases.

3. Contact investigation strategy

3.1 General organisation

The basic principles :

- Trained personnel
- Public health examination protocol to be formalised
- Recontact programme staff at D + 15 to check that the investigation has started
- Formalise investigation plan
- Standardise collection of information on contacts
- Feedback on the completion and the results of the investigation to the health watch services, attending physician and/or notifying doctor
- A single centre has responsibility, even if the investigation is decentralised over more than one territory.
- Communication strategies in place

3.2 Types of investigations

Only two types of investigation are defined:

Type 1 investigation: Around a potentially contagious case:

- Patients positive on direct examination (AFB+) of at least one respiratory specimen, whatever the degree of positivity and the type of specimen (sputum, gastric aspiration, broncho-alveolar washing) [1] [2] [3] [4] [5] [6] [7] [8]
- Patients with confirmed laryngeal tuberculosis[9]
- Patients with active cavity image from lung x-ray[10] [11] [12]

Type 2 investigation: Around other cases (seemingly non-contagious)

A. Strategy for an investigation around potentially contagious cases (Type 1 investigation)

A.1: Objectives of the investigation

- Identify and treat tuberculosis cases
- Identify and treat infections in subjects at the most risk of developing tuberculosis
- Identify tuberculosis and administer preventive treatment to children under the age of 5 years and the immuno-depressed: HIV, those on immune-suppressing treatments, etc.

A.2: Period for contact tracing

Three months before the onset of clinical signs or, if not feasible, three months before the beginning of treatment.

A.3: Type of contact

Contact selection is based on a chart defining priority contacts, bearing in mind:

- Closeness of contact to the index case
- Environmental characteristics
- Duration of exposure and whether or not repeated
- Contact's own predisposition

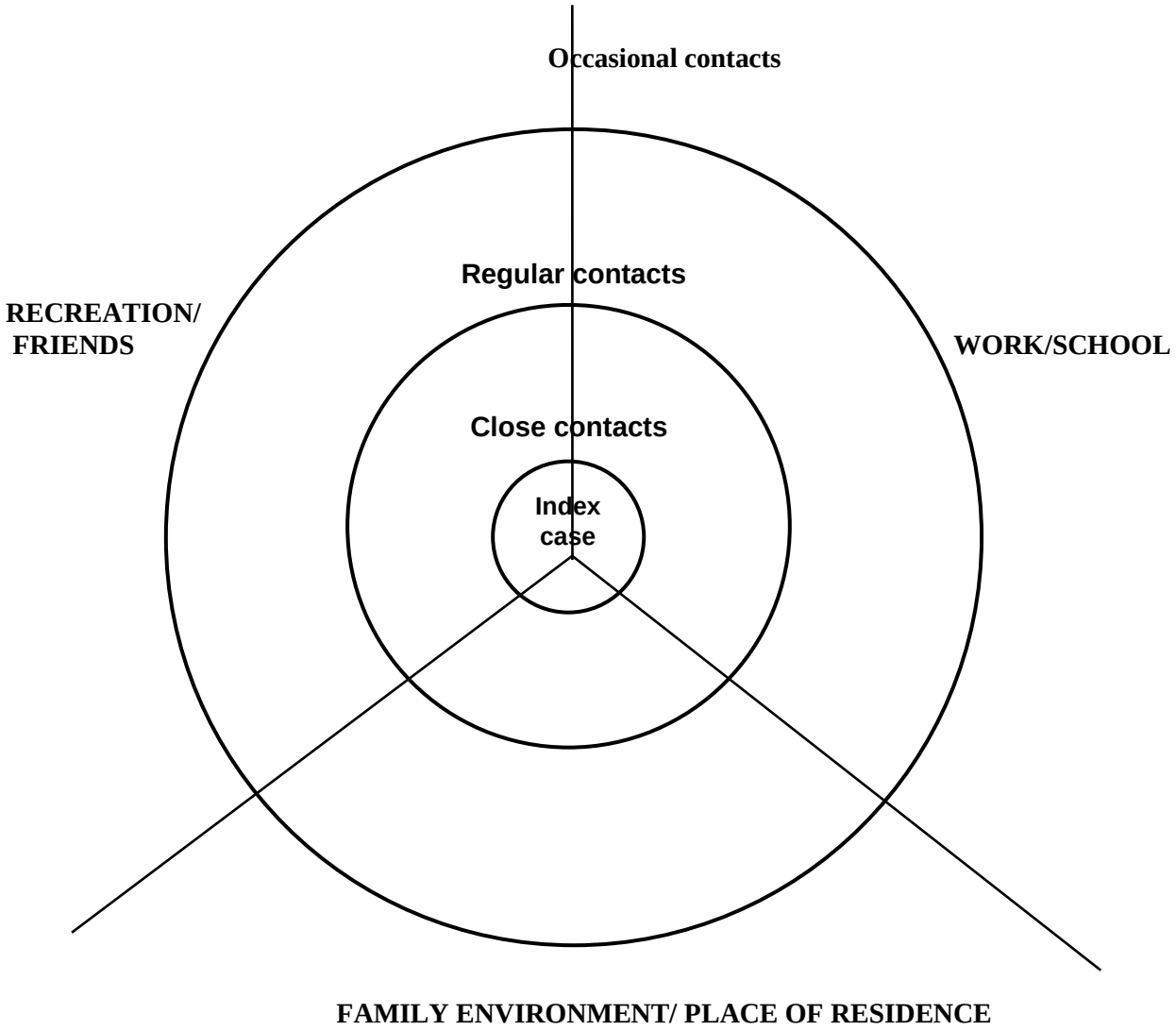
In the event of in-flight contact, refer to WHO recommendations[13]

Table 1: Defining priority contacts for tracing [14]

	1 point	**0 point**
Duration	≥2 hours	< 2 hours
Repeated	≥2 / week	< 2 / week
Proximity	≤ 1 metre	> 1 metre
Environment	Confined space	Open or ventilated space
Vulnerable pre-disposition	Yes	No

A priority contact is one totalling 3 points or more.
A regular and/or occasional contact is one totalling 2 points or fewer.

Figure 1: Target system for grading contacts [14 21]



A.4: Investigation extension strategy

An extension of the investigation should be considered if the priority contacts include more than 1% with disease-status TB and/or more than 10% to 30% of latent tuberculosis infections (LTBI)

A.5: Diagnostic tools

1. TST
- In favour of LTBI if:
  - Increase of more than 10 mm since last TST
  - Higher than or equal to 15mm [15] [16] [17] [18]
  - Skin-blistering
- Not in favour of LTBI if < 10 mm
- Indeterminate between 10 and 14 mm: use of IGRA can be considered

2. Lung X-ray from front: double reading recommended
3. Clinical +/- sputum testing for KB

A.6: Tools for preparing an investigation plan

Tracing period
Interview with index case

A.7: Strategy at M0
- Start preventive treatment
- No systematic intubation at any age
- Contact under 16 years: clinical examination, X-ray and systematic TST,
- Contact 16 years and over: systematic clinical examination and X-ray,
- TST to be considered depending on results of X-ray and clinical examination if the contact person ≥ 16 years is diabetic, suffering from kidney failure, on dialysis, on long-term corticotherapy (>15 mg/j), or intravenous drug user

A.8: Strategy at M3

Same examinations as at M0.
If the investigation begins at M3 no subsequent examinations.

A.9: Strategy at M6: Closure of investigation, to be classified as 'complete or incomplete'

Begin individual monitoring of contacts receiving treatment and untreated suspected contacts.

A.10: Treatment of LTBI cases
- INH&RMP bitherapy [1] [2] for a duration of 3 months, Directly Observed Treatment (DOT).
- Treatment to be reviewed possibly depending on the resistance profile of the index case strain.
- Initial conclusions to be reviewed in subjects at risk of complications, but not essential in children.

B. Investigation strategy around apparently non-contagious cases (Type 2 investigation)

B.1: Definition of apparently non-contagious cases
Patients not meeting the criteria for Type 1 investigations.
If the context is favourable to intensified transmission, the investigation may be converted into a Type 1 investigation.

B.2: Objectives of the investigation
Among the close contacts:
- If index case aged 16 or over**:** Trace symptomatic contacts,
- If index case aged under 16: Trace contaminators

And identify LTBI cases among close contacts under 16 if no contaminator found

B.3: Index case assessment
Assessment of social context, presence of young children among close contacts or risky medical acts.

B.4: Type of contact
Contacts are identified using a table (see Table 1) defining close contacts on the following basis:
- Proximity between the contact and the index case
- Environmental characteristics
- Duration of exposure

A close contact is a contact totalling 3 points or more.
A regular and/or occasional contact is a contact totalling 2 points or fewer.

B.5 : Diagnostic tools
Standardised interview of index case and close contacts to identify clinical signs in these people

TST in the under-16s who are close contacts of an index case under 16 years if no contaminator found

If clinical signs in contact mentioned in interview:
- Clinical examination
- X-ray
- Test for AFB in sputum

B.6: Period for contact tracing
One year before the case of tuberculosis is diagnosed.
The communication strategy takes on particular importance in this type of investigation.

B.7: Strategy M0
The interview and possible tracing work take place at the beginning of the investigation, no further examinations scheduled.

B.8: Strategy M3
Closure of investigation and classification as: ‘complete or incomplete’.
Commencement of individual monitoring of contacts receiving treatment and untreated suspected contacts.

C. Investigation strategy around an LTBI

In adults: if recent infection demonstrated: Type 2 investigation
In under-16s: Type 2 investigation

4. Monitoring and evaluation of contact investigation activities

In order to ensure good programme management and in particular to measure performance, achieve quality and effectiveness, progress towards specific objectives and identify both problems and solutions, it is essential to follow a monitoring and evaluation plan. The variables to be collected to perform optimum monitoring and evaluation of investigation activities are set out in Table 2.[1]

Table 2: Variables to be collected for the monitoring and evaluation of investigation activities

Variable	Type of contact investigation	
	Type 1	Type 2
Number of notified cases		
Number of investigations initiated		
Number of investigations closed		
Number of investigations closed and completed	All contacts investigated (seen) at at least month 3	All seen
Number of investigations closed and incomplete		
Number of contacts identified (total number)		
Number of contacts identified aged from 0 to 5 yrs		
Number of contacts identified aged from 6 to 15 yrs		
Number of contacts identified aged 16 yrs and +		
Number of contacts investigated (total number)		
Number of contacts investigated aged from 0 to 5 yrs		
Number of contacts investigated aged from 6 to 15 yrs		
Number of contacts investigated aged 16 yrs and +		
Number of cases of tuberculosis identified		
Number of LTBI detected		
Number of collective briefings (≥ 2 persons) organised		
Number of LTBI treatments initiated		

5. Interferon Gamma Release Assay (IGRA)

5.1 Performances of assays in investigations

For the diagnosis of LTBI, IGRAs are at least as sensitive as TST[22 23 24 25 26 27]
IGRAs are more specific than TST for the diagnosis of LTBI and tuberculosis particularly in areas with high BCG coverage[22 23 24 25 26 27]

- Reading less subjective than with TST

- At our present levels of understanding, IGRAs are not predictive of the development of LTBI into disease status [28] [29]
- Performances not yet totally assessed in certain population groups (young children, the immune-depressed, some ethnic groups, etc.) [27]

5.2 Recommendations

Despite the value of these assays in areas of low TB incidence where the BCG is obligatory, the operational restrictions and the current status of knowledge do not militate in favour of recommending the use of IGRAs in public health programmes outside the scope of scientific research.

Within individual indications, the use of IGRAs is possible as part of the following indications:

- Contributes to the diagnostic exclusion of TB in difficult cases, extra-pulmonary TB in particular;
- Contributes to the diagnosis of LTBI in adults (over 15 years) as part of investigations around cases and in under-16s with indeterminate IDR;
- Exclusion of LTBI before starting anti-TNF-alpha treatment.

These positions will be reassessed annually as knowledge progresses.

5.3 Current consensual international indications

- Contributes to the diagnostic exclusion of the TB disease in difficult cases, extra-pulmonary TB in particular;
- Contributes to the diagnosis of LTBI in adults (over 15 years) as part on investigations around cases;
- To exclude LTBI before starting anti-TNF-alpha treatment.

5.4 Operational restrictions

- Pre-analytical phase requires trained staff (specimen-taking technique and transport method);
- Laboratory with trained staff familiar with the Elisa technique;
- Cost per assay estimated at between CFP 15 000 and 25 000;
- Gains flowing from better performance by IGRAs?

6. Conclusion

This document is the fruit of discussions between tuberculosis experts from the 3 French Pacific territories as based on their experience and on the data from the most recent literature.

Its purpose is to put forward recommendations that will enable each territory to adapt and review its handbook and investigation protocols around tuberculosis cases.

These recommendations will be updated regularly. They may also be used as a model for the other countries of the Pacific whose tuberculosis control programmes are at various stages of implementation of investigative activities around tuberculosis cases.

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8. List of terms and abbreviations used

AFB	Acid-fast bacillus
BCG	Bacille Calmette-Guérin (vaccine)
Cavity	Cavity-type lesion of the lung parenchyma; identified by radiography, it is an important factor in the contagiousness of the index case
Contact subject	Any person having been exposed to the risk of infection by M. tuberculosis by sharing the same space as a case of contagious tuberculosis
DOT	Direct Observation Treatment
HIV	Human Immunodeficiency Virus
IGRA	Interferon Gamma Release Assay
Index case	Initial case of tuberculosis from which the contact-tracing process begins
INH	Isoniazid
InVS	*Institut de Veille Sanitaire* (Health Watch Institute)
KB	Koch's Bacillus
LTBI	Latent Tuberculosis Infection
M0	First month following the start of anti-tuberculosis treatment on the index case
M3	3 months after the start of anti-tuberculosis treatment on the index case
M6	6 months after the start of anti-tuberculosis treatment on the index case
RMP	Rifampicin
Secondary case	New case of tuberculosis attributed to recent transmission since an index case, as part of an investigation
Source case	Contagious case of tuberculosis leading to other cases, and may correspond to the index case
SPC	Secretariat of the Pacific Community
TST	Tuberculin Skin Test