

GUIDELINES FOR THE CONTROL OF TUBERCULOSIS

**Through DOTS Strategy
in Pacific Island Countries**



**World Health Organization
Regional Office for the Western Pacific**

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Acronyms

AFB	-	acid-fast bacilli
DOT	-	directly observed treatment
DOTS	-	directly observed treatment short-course
EPTB	-	extrapulmonary tuberculosis
FDC	-	Fixed Dose Combination
kg	-	kilogram
mg	-	milligram
NTP	-	National Tuberculosis Program
PTB	-	pulmonary tuberculosis
TAI	-	treatment after interruption
TB	-	tuberculosis
WHO	-	World Health Organization

DRUGS

E	-	Ethambutol
H	-	Isoniazid
R	-	Rifampicin
S	-	Streptomycin
Z	-	Pyrazinamide

Foreword

Globally, every year, almost 9 million people develop tuberculosis and 3 million people die from the disease. More people are dying of tuberculosis today than ever before. Almost one third of the global total of infectious cases is detected in the Western Pacific Region, where the number of cases has almost doubled in the last decade to 900 000 cases.

About half a million people die from tuberculosis each year in the Region. The tuberculosis burden is even heavier in the small Pacific island countries, where, in 1998, the average notification rate in 17 of these countries was 73 per 100 000 population, which is much higher than the regional average.

If the control mechanisms are maintained at the current levels, it is projected that the number of tuberculosis cases and related deaths will increase considerably in the next few years. However, this trend can be reversed if the WHO recommended tuberculosis control strategy, the directly observed treatment short course (DOTS), is implemented. The DOTS strategy has been shown to be highly effective in all settings, even during conflicts. A full course of anti-TB drugs, sufficient to cure one patient, costs less than US\$40, making the DOTS strategy one of the most cost-effective health interventions. Therefore, the potential to significantly reduce the size of the tuberculosis epidemic already exists, if governments are committed to providing continuous political and financial support.

Implementation of the DOTS strategy is still much lower in the Pacific island countries than in the Region as a whole. Health staff in small countries and remote islands are isolated and lack the necessary information and tools to adequately address the problem of tuberculosis. Therefore these guidelines have been developed to facilitate the introduction and expansion of DOTS in such countries.

The guidelines have been produced in collaboration with professionals who have worked in Pacific island countries. Other international experts

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have also contributed. The guidelines will help national officers, physicians and health workers, as well as patients and community leaders, to implement DOTS effectively. The resulting improvement in tuberculosis care will lead to a reduction of tuberculosis cases and related deaths, reversing the current negative and alarming trend.

I am sure that this publication will be very helpful in curing tuberculosis patients in Pacific island countries, in facilitating their resumption of a more productive life and in reducing the suffering of their families and communities.



*Dr Shigeru Omi
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Preface

The World Health Organization Western Pacific Region comprises 36 countries and areas with a population of 1 641 million. The Region contains large countries such as China and Japan, which together contribute to 83% of the total population, and small South Pacific countries, most with a population of less than 200 000.

Reliable information from small island countries is often scarce. Therefore, little is known on the epidemiological situation of tuberculosis in these Pacific island countries. Despite the limited information, available data indicate that tuberculosis is common and the treatment of the detected patients is poor and inadequate.

Each of the small Pacific island countries has its own characteristics that need specific approaches in the implementation of DOTS strategy. The available tuberculosis guidelines are often too complex and too difficult to adapt. So health managers and health workers of these small countries need to have operational guidelines that are practical and simple to assist them in implementing an effective tuberculosis control programme based on the WHO recommended DOTS strategy.

The main objectives of the guidelines are as follows:

- to guide tuberculosis programme managers in the implementation of DOTS strategy and the control of tuberculosis;
- to guide health workers and community leaders in identifying and referring suspect cases; and
- to guide health workers, patients and their families towards achieving a cure.

As the guidelines are tested in a variety of different situations in the field, comments would be welcome and will help to improve future editions. Comments can be sent to WHO Regional Office for the Western Pacific, Tuberculosis Programme, Chronic Communicable Disease Unit.

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It is acknowledged that the definitions used, the flow chart for the diagnosis of TB in adults in Figure 1, as well as the symptom-based approach to adverse effects of TB drugs in Annex 4 are from *Treatment of Tuberculosis: Guidelines for National Programmes*; Second Edition 1997, WHO.

In small Pacific island countries, there are often great distances between islands and even villages. Within the same island the population lives in scattered villages and within the villages in isolated households. Communications are usually limited and it is diffi-

TABLE 1:
Geographical setting and health system in South Pacific island countries

<i>Types of islands in the same country</i>	Geographical setting	Population occupancy*	Health system
<i>Big islands (usually with DOTS Centre)</i>	Usually one or two islands (seldom three or four islands).	About 60%-70% of the country's population.	General hospital in capital with microscope service available.
	Accessible with regular transportation within the same island.		Health centres operated by nurses (or doctors) existing in some cases with/without microscopes. Functional villages aid post may/may not exist.
<i>Small islands surrounding the big ones (usually without DOTS Centre)</i>	Difficult to reach. Regular boat, seldom. Need aircraft sometimes.	At least 30%-40% of the country's population.	Aid post operated by nurse/ midwife may exist, but not always. Microscopic service not available.

* Distribution of populations living in different islands in the same country

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cult for people living in remote areas to reach the main towns where most of the services are located and delivered.

The limited health services are, usually, concentrated in the capital in the main island where there might be a general hospital with laboratory and X-ray services. At village level, a health facility, with paramedical workers delivering primary health care services, is the most common situation. Some remote villages may not even have any health facilities at all.

Table 1 describes the main geographical and health system characteristics of the South Pacific island countries.

National Tuberculosis Programme (NTP): structure, staff and functions

Small countries do not have the usual three- or four-level administrative structure common in larger countries. Government, political and administrative functions are carried out at the Ministry of Health. The hospital is, usually, the only health service where diagnostic services are available. Therefore, the hospital with the attached public health department, represents the reference centre where DOTS strategy can, realistically, be implemented. Only very basic health services are delivered at lower levels.

Ministry of health (administrative function)

This level has policy and administrative functions. A public health worker with expertise in tuberculosis control and administrative skills should be appointed as National Tuberculosis Programme (NTP) manager with the following responsibilities:

- defining the national strategy, including diagnosis and treatment policies, preparation and updating of the tuberculosis control guidelines;
- planning, implementing and evaluating the NTP activities, including preparation of budget and action plans;
- ensuring that high priority is given to the NTP by allocation of adequate financial, human and material resources;
- coordinating with the laboratory to ensure that a sputum smear microscopy service is in place;
- ensuring regular supply of anti-TB drugs, laboratory reagents and other materials;
- supervising quarterly the DOTS Centres and ensuring adequate training of health workers; and
- consolidating and evaluating quarterly reports on notified cases and outcomes of treatment.

FUNCTIONS OF A DOTS CENTRE

- Referral TB centre for diagnosis mainly using microscope
- Hospitalization for smear-positive cases for intensive phase
- Monitor DOT
- Sputum examination follow-up
- Maintain and update the TB register

DOTS Centre (clinical function with microscope service)

Sputum microscopy service is available at this level, where the actual diagnosis of TB is made and the patient TB register is kept. This level is also the tuberculosis referral and reporting unit. The DOTS Centre should be located at the hospital. A public health worker trained in TB control and DOTS strategy should be appointed as DOTS Coordinator.

Responsibilities of the DOTS Coordinator are:

- ensuring that the diagnosis of pulmonary TB is based on sputum smear microscopy;
- ensuring that daily Directly Observed Treatment (DOT) is applied for the sputum smear positive cases;
- keeping the tuberculosis register up to date, preparing and sending to the NTP manager the quarterly reports on notified cases and outcomes of treatment;
- ensuring that the patients receive adequate information on the nature of disease and its treatment;
- supervising, training and motivating the health workers of the DOTS Centre as well as those operating at village level.

Community or village level

This is the level where a primary health care facility may exist but without sputum microscopy service. Health staff, at this level, have the following responsibilities:

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- identifying and referring TB suspects to the DOTS Centre for sputum smear examinations and other investigations; or, when appropriate, transferring of the sputum container;
- referring smear-positive patients for sputum and X-ray follow-up at the end of treatment;
- delivering daily DOT for pulmonary sputum smear-positive patients during the continuation phase and recording the intake of treatment in the patient treatment card;
- delivering weekly medications for pulmonary sputum smear-negative and extrapulmonary cases and recording the intake of treatment in the patient treatment card;
- tracing of absentees and administering basic TB information to the patients, their family and community; and
- supervising community volunteers in charge of daily DOT and providing them with weekly supplies of anti-TB drugs.

Objectives, targets and strategy

General objectives:

- Reduce TB mortality and morbidity, and the transmission of the infection; and
- Prevent the development of drug resistance.

Specific targets:

- Achieve a treatment success rate* of 85% of detected new sputum smear-positive TB cases; and
- Detect 70% of existing sputum smear-positive TB cases.

Strategy:

To achieve objectives and targets, DOTS strategy is adopted.

DOTS strategy consists of the simultaneous implementation of the following five elements:

- government and political commitment to fund and sustain NTP;
- microscopy services for detecting sputum-smear positive cases;
- regular and uninterrupted supply of anti-TB drugs;
- direct observation of standardized short-course treatment for sputum-smear positive; and
- standardized recording and reporting system to monitor patients' progress and to assess treatment outcomes.

All five components of DOTS should be in place before starting DOTS operations. First start DOTS in a demonstration and pilot area. When the pilot centre has achieved 85% treatment success rate, then DOTS can be expanded to other areas. The pilot centre will function as a training centre for the new areas into which DOTS will be expanded.

* Treatment success rate is the sum of the percentage of cases cured and that of cases who completed treatment.

Case finding

The processes of case finding and tuberculosis diagnosis are influenced by specific situations such as considerable distances from a diagnostic service and difficult communications as well as limited diagnostic tools.

Pulmonary tuberculosis (PTB)

The most important way of finding cases of pulmonary tuberculosis (PTB) is to identify suspect people. The most common symptom of PTB is a persistent cough lasting for three weeks or more, usually with expectoration. A person with this symptom is categorized as a suspect.

Persistent cough for three weeks or more may be accompanied by one or more of the following symptoms:

- expectoration;
- weight loss;
- coughing up sputum with blood;
- fever;
- tiredness;
- night sweats;
- chest pain;
- shortness of breath; and
- loss of appetite.

Extrapulmonary tuberculosis (EPTB)

A person with extrapulmonary TB (EPTB) may have the following general symptoms: weight loss, fever and night sweats. Other symptoms and signs depend on the organs affected, for example: swelling, occasionally with pus drainage when lymph nodes are affected, or pain and swelling when joints are involved. Headache, stiffness of the neck and drowsiness could be present in cases of TB meningitis (usually children). All these symptoms are only suggestive and tools for the selection of EPTB suspect cases.

Identification and referral of suspect cases

Health workers are responsible for identifying suspect cases encountered by health services. Suspect cases should be referred to the DOTS Centre for further investigation. However, for suspect cases living in remote islands with regular domestic flights, the three sputum samples could be sent to the DOTS Centre by air. In this case the sputum should be sent in a hermetic container within seven days after collection.

The DOTS Centre is usually located at the hospital where the diagnosis of TB is made, primarily using microscopes. The community at large, through its leaders, also has a responsibility to identify and refer suspect cases to the nearest health facility or, in its absence, directly, to the DOTS Centre.

Diagnosis of tuberculosis

The definite diagnosis of tuberculosis depends on the diagnostic tools available. In small countries the diagnosis of pulmonary tuberculosis should be based mostly on the sputum smear examination and in a few cases on chest X-ray examinations as well as on physical examination by an experienced clinician. Clinical examination by an experienced physician is even more important for the diagnosis of the extrapulmonary type of the disease, especially in children, since cultural and histological services are usually not available in small countries.

Pulmonary Tuberculosis:

The main tool for the diagnosis of pulmonary tuberculosis is the sputum smear examination by direct microscopy for acid-fast bacilli (AFB). Therefore, a case of suspected pulmonary TB should be referred to the DOTS Centre for sputum examination. He/she should submit three sputum samples in the following way:

Day 1: first sample on the spot at the time of the consultation under supervision of a health worker; at this time a sputum container is given to the suspect for a second early morning collection.

Day 2: the suspect brings the early morning sample to the health facility.

Day 2: the third sample is collected on the spot under supervision when the suspect brings the early morning sample to the health facility.

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According to the result of sputum smear examinations (see Figure 1), pulmonary TB is classified as:

- Pulmonary tuberculosis sputum-smear positive;
- Pulmonary tuberculosis sputum-smear negative.

Extrapulmonary Tuberculosis:

A suspect of extrapulmonary TB should also be referred to the DOTS Centre. The diagnosis of extrapulmonary TB is made on strong clinical evidence of active tuberculosis and a decision by a physician to start anti-TB treatment. The decision is made by taking account of clinical assessment, radiological findings (pleural or pericardial effusion, bone and joint TB, renal TB), biological abnormalities (in pleural, peritoneal and cerebro-spinal fluid), positive tuberculin test (and, sometimes, AFBs in caseum from superficial abscess, lymphadenitis, or in urine).

A patient with both pulmonary and extrapulmonary TB is classified as pulmonary tuberculosis.

TB Classifications

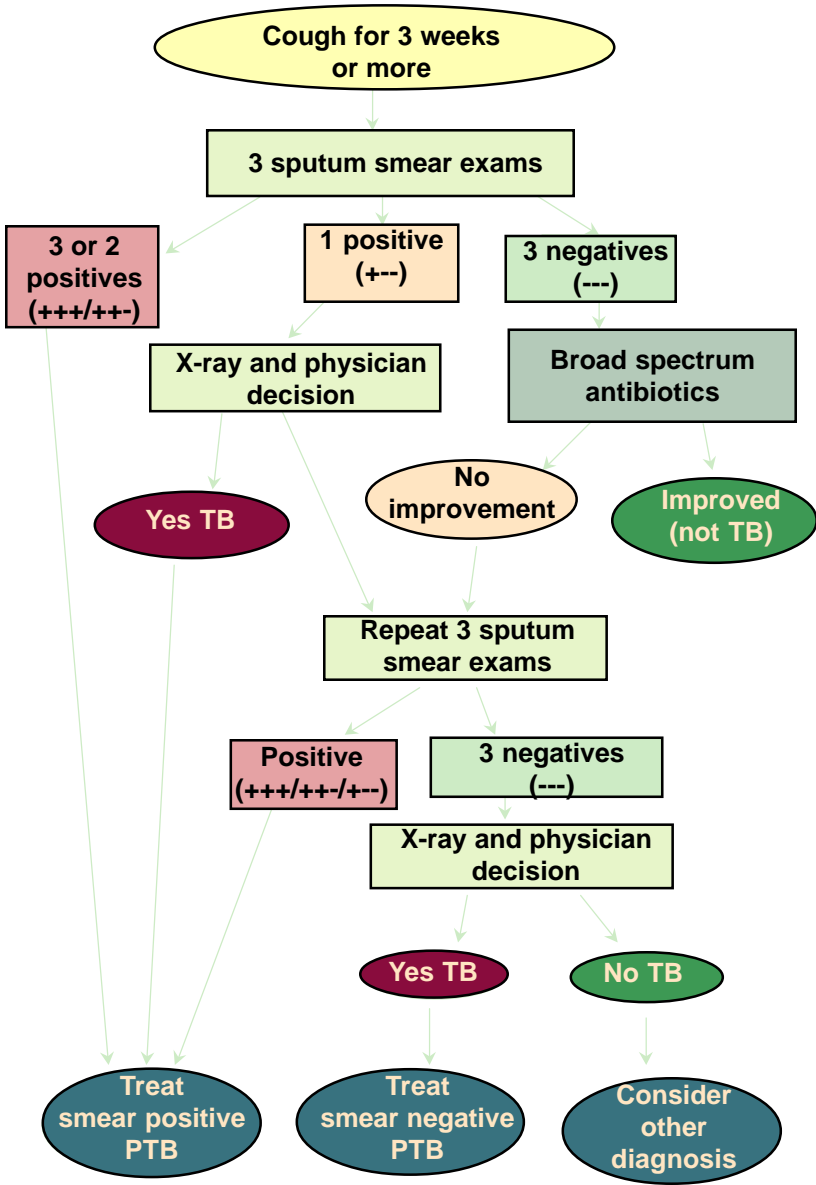
Pulmonary TB (PTB):
tuberculosis affecting the lungs:

Sputum smear-positive;
Sputum smear-negative.

Extrapulmonary TB (EPTB):
tuberculosis affecting organs other than the lungs.

For the diagnosis of pulmonary tuberculosis follow the steps as indicated in Figure 1.

FIGURE 1: The road towards the diagnosis of adult pulmonary tuberculosis



Case finding

Case definitions and classification, types of patients and treatment outcomes

Case definition determines what is a case of tuberculosis. Classification refers to the site affected and the result of the sputum examination. Types of patients refers to the history of previous treatment. Treatment outcomes refers to the result of the patient treatment. The following boxes summarize the definitions needed for recording, reporting and allocation of treatment.

CASE DEFINITIONS AND CLASSIFICATION

Pulmonary smear-positive

Two out of three sputum smear-positive for AFB by microscopy
or

one out of three sputum smear-positive with

- chest X-ray consistent with PTB and
- decision to treat made by a physician.

Pulmonary smear-negative

First set of three sputum smear negative for AFB.

Lack of clinical response despite two weeks of a broad-spectrum antibiotic.

Second set of three sputum smears still negative, taken at least two weeks apart from the first set.

X-ray consistent with PTB.

Decision to treat made by a physician

or

Severely ill patient with three sputum smear-negative for AFB
and

X-ray consistent with extensive PTB
and

decision to treat made by a physician.

Extrapulmonary tuberculosis

Strong clinical evidence of active extrapulmonary TB and a decision by a physician to start anti-TB treatment.

TYPES OF PATIENTS

New

A patient who has never been treated for TB or who has taken anti-tuberculosis drugs for less than four weeks.

Relapse

A patient who has been declared cured of any form of TB after taking a full course of chemotherapy but he/she reports back with sputum smear-positive.

Treatment failure

A previously sputum smear-positive patient who, while on treatment, remained or became again smear-positive five months or later after commencing treatment. It is also a patient who was initially smear-negative before starting treatment and became smear-positive after the second month of treatment.

Treatment after interruption (TAI) (default)

A patient who has taken at least four weeks of treatment but has subsequently interrupted treatment for two months or more, and returns to the health service with smear-positive sputum.

Transfer in

A patient who has been transferred into the reporting unit from another reporting unit.

Other

Cases that do not fit any of the above definitions.

TREATMENT OUTCOMES

Cured

Patient who was smear-positive at diagnosis and became smear-negative at, or one month before, the completion of treatment and on at least one previous occasion.

Treatment completed

Smear-positive patient who has completed treatment but without proof of cure as determined by smear examinations or smear-negative patient who has completed treatment.

Treatment failure

Patient who remains or becomes again smear-positive at five months or later during treatment.

Died

Patient who dies for any reason during the course of treatment.

Treatment interrupted (default)

Patient whose treatment was interrupted for two months or more.

Transfer out

Patient who has been transferred to another reporting unit and for whom the treatment outcome is not known.

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Anti-TB drugs, treatment categories and regimens

Tuberculosis is a contagious disease caused by *mycobacterium tuberculosis*. The main source of the infection is a person with TB of the lungs, usually a sputum smear-positive case, who coughs, sneezes or spits infectious droplets of the bacteria in the air.

Anyone who breathes in infected droplets is at risk of acquiring the infection and, later, 10% of infected people will develop the disease. Left untreated, a patient with TB of the lungs will infect between 10 and 15 persons a year. Without treatment, after five years, 50% of pulmonary patients will die. If poorly treated, TB patients become chronic cases that will live longer but spread the infection for a longer time with bacilli often resistant to one or more anti-TB drugs.

Therefore, once the decision to start TB treatment has been made, it is an absolute necessity to ensure that the patient completes the full course of treatment.

The treatment of TB for new cases consists of a two-month intensive phase and four-month continuation phase. For retreatment cases, the intensive phase lasts three months and the continuation phase five months.

Essential anti-TB drugs and recommended daily doses	
Anti-TB drugs (abbreviation)	Doses in mg/kg (range)
Isoniazid (H)	5 (4-6)
Rifampicin (R)	10 (8-12)
Pyrazinamide (Z)	25 (20-30)
Streptomycin (S)*	15 (12-18)
Ethambutol (E)**	15 (15-20)

* Streptomycin should not be given to pregnant women; for patients more than 50 years old, 750mg should be given.

** Ethambutol should not be given to children under six years old.

Treatment categories and regimens

There are currently several treatment regimens that are all effective in curing the different types of the disease. However, to facilitate field operations and drugs management given the specific situation of the South Pacific countries, only three treatment regimens are recommended (see table on next page). For each treatment regimen corresponds a treatment category that includes a specific group of TB patients.

Treatment category I includes the new PTB sputum-smear positive and other severe forms of the disease. For this reason, category I should have the highest priority. Category III includes new PTB sputum-smear negative and extrapulmonary cases, both less severe types of the disease and, therefore, this treatment category should have the lowest priority.

The anti-TB drugs are safe and most patients complete their treatment course without any significant side effects. However, a few patients do develop adverse effects to the drug taken. A symptom-based approach to the most common adverse effects of anti-TB drugs is given in Annex 3.

Anti-TB drugs

Recommended treatment categories by type of patients, regimens and their phases

TB treatment category	Types of patient	Intensive phase		Continuation phase	
		Drugs	Duration	Drugs	Duration
I	New pulmonary smear-positive New pulmonary smear-negative with extensive parenchymal involvement New cases of severe forms of extrapulmonary TB*	2HRZE**	2 months	4HR	4 months
			daily		daily
			.		.
			.		.
			.		.
II	Retreatment cases smear-positive Relapse Failure Treatment after interruption (TAI)	2SHRZE/ 1HRZE	3 months	5HRE	5 months
			daily with		daily
			S given only		.
			for first two		.
			months		.
III	New pulmonary smear-negative (other than in category I) New less severe forms of extrapulmonary TB	2RHZ	2 months	4RH	4 months
			daily		daily
			.		.
			.		.
			.		.

* TB meningitis, miliary, pericarditis, peritonitis, bilateral or extensive pleurisy, spinal, intestinal and genitourinary disease.

** The number before the abbreviation of the drugs indicates the duration in months of their administration.

Treatment doses for adults and children

Whenever possible, to prevent drug resistance and improve patient compliance, the fixed-dose combinations (FDCs) of anti-TB drugs should be used. Examples of different FDCs for the three treatment categories, for children and adults, are given in Annex 2. If loose drugs are used, examples of daily dosages for children and adults are given in the following tables.

Treatment Category I for new case adults (use the same doses for new case adults Category III but without Ethambutol)

Adult	Intensive phase (2 months daily)				Continuation phase (4 months daily)	
	Rifampicin 300mg	Isoniazid 300mg	Pyrazinamide 400mg	Ethambutol 400mg	Rifampicin 300mg	Isoniazid 300mg
30-37	1	1/2	2	1 1/2	1	1/2
38-54	1 1/2	1	3	2	1 1/2	1
55-70	2	1	4	3	2	1
71-90	2 1/2	1 1/2	5	3 1/2	2 1/2	1 1/2

Treatment Category II for retreatment case adults (relapses, failures, treatment after interruption/default)

Adult	Intensive phase (3 months daily)					Continuation phase (5 months daily)		
	Rifampicin 300mg	Isoniazid 300mg	Pyrazinamide 400mg	Ethambutol 400mg	Streptomycin* 1g	Rifampicin 300mg	Isoniazid, 300mg	Ethambutol 400mg
30-37	1	1/2	2	1 1/2	0.5	1	1/2	1 1/2
38-54	1 1/2	1	3	2	0.75	1 1/2	1	2
55-70	2	1	4	3	1	1	1	3
71-90	2 1/2	1 1/2	5	3 1/2	1	2 1/2	1 1/2	3 1/2

* Streptomycin is given only for the first two months of the intensive phase and 0.75g should be given to patients over 50 years.

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Treatment Category I for new case children (use the same doses for new case children Category III, but without Streptomycin)

Paediatric	Intensive phase (2 months daily)				Continuation phase (4 months daily)	
	Rifampicin 100mg	Isoniazid 100mg	Pyrazinamide 400mg	Streptomycin 1g	Rifampicin 150mg	Isoniazid 100mg
Up to 7**	1/2	1/2	1/2	0.25	1/2	1/2
8-9	1/2	1/2	1/2	0.25	1/2	1/2
10-14	1	1/2	1	0.25	1	1/2
15-19	1	1	1	0.5	1	1
20-24	1 1/2	1	1 1/2	0.5	1 1/2	1
25-29	2	1 1/2	1 1/2	0.5	2	1 1/2

** Doses may be calculated ad hoc by using syrup or granules formulation.

Operational aspects of case detection, case management and monitoring

As is the case for all other aspects of DOTS implementation, case detection, patient management and monitoring are influenced by the specific situation of each of the small island countries: long distances, poor communication, limited development of health services and of health workers.

The following table summarizes the general principles and the operational aspects for case detection and treatment according to the two most frequent situations: big islands with DOTS Centre and small islands without DOTS Centre.

TABLE 2:
General principles and operational aspects on case detection and treatment

Activity	General principles	Operational aspects for different islands within same country	
		Islands with DOTS Centre	Islands without DOTS Centre
Case detection	<p>Mainly sputum smear examination through DOTS Centre for tuberculosis suspects.</p> <p>See flow chart on page 16 for guidelines.</p>	<p>Refer TB suspects to DOTS Centre in general hospital in the same island for microscopic examination.</p>	<p>Refer TB suspects to DOTS Centre in general hospital as much as possible (by boat or aircraft).</p> <p>If, in remote islands, regular flights or boats are not available, sending of three sputum samples may be considered.</p>
Treatment	<p>Intensive phase: hospitalization of all smear-positive patients for initial two (or three) months and self administered treatment for smear-negative or extrapulmonary TB (see Table 3).</p> <p>Continuation phase: outpatients or home treatment for four (or five) months.</p> <p>See Table 3 for mechanisms for DOT by type of patients and treatment phase.</p>	<p>Treatment kit (see page 28) to be kept preferably in outpatient clinics in the same hospital or given through the patients to other health facility near to patients' residence.</p> <p>At the end of treatment, all sputum-positive patients, bring treatment cards to DOTS Centre for sputum and X-ray examinations, final clinical consultation and updating the TB register.</p>	<p>Patients referred back from general hospital after two months of hospitalization to original place with "treatment kit".</p> <p>Treatment kit to be given through patients to nurses or midwives in aid post at village level (or community volunteer, village/religious leaders, etc, if aid post not existing) for proper supervision.</p> <p>Referral of patients from general hospital to small island can be relayed to aid post by radio telephone whenever available.</p> <p>At the end of treatment, all sputum positive patients, bringing treatment cards in treatment kit, need to visit DOTS Centre for sputum and X-ray examination, final clinical consultation and updating the TB register.</p>

New sputum smear-positive pulmonary cases

Patients are hospitalized for the whole duration of the intensive phase of two months, at the end of which a sputum smear examination is conducted. If the patients have become sputum smear-negative they will start the continuation phase.

If the patients are smear positive at the end of the second month, the intensive phase, as well as the hospitalization stay, is prolonged for a third month. At the end of this, another sputum smear examination is conducted but the patient starts the continuation phase irrespective of the result of the smear examination. If the patients are negative, they are discharged from the hospital and continue the next phase as an out-patient or from home. If the sputum smear is still positive at the end of the fifth month, the patient is classified as a treatment failure and should start the retreatment regimen afresh.

During the hospital stay, a health worker observes the patients swallowing the medications every day and records the drugs intake in the calendar of the patient treatment card. The continuation phase is carried out at the health facility close to the patient home and treatment partner observes daily the intake of the medications. Under exceptional circumstances, some patients may be permitted to take the medications of the intensive phase as an out-patient or from home. However, these exceptions should not exceed 10% of the new pulmonary smear-positive cases.

Retreatment cases sputum smear-positive: relapse, failure, treatment after interruption

Patients in these categories are also hospitalized for the three months of the intensive phase. The intensive phase as well as the hospitalization stay is extended to a fourth month if the patient is smear-positive at the end of the intensive phase.

During the hospital stay, a health worker observes the patients swallowing the medications every day and records the drugs intake in the calendar of the patient treatment card. The continuation phase is carried out at the health facility close to the patient's home and a treatment partner observes daily the intake of the medications.

New sputum smear-negative pulmonary and extrapulmonary cases

These patients are treated from home as out-patients, except for those who are severely ill and require a short period in hospital. Their treatment, using a weekly supply of medications, is self-administered during the intensive and continuation phases. However, the first dose of the weekly supply should be directly observed by the treatment partner who will also monitor the entire treatment course.

Treatment kit

The treatment kit contains all the medications necessary to complete the intensive and the continuation phases of treatment. It also contains the patient treatment card, two sputum cups, patient information sheet and instruction sheet for the treatment partner.

A treatment kit (box) is prepared and allocated in the DOTS Centre to each patient that is diagnosed with tuberculosis. For hospitalized cases, the kit is given to hospital doctors or nurses. Patients that continue

Treatment Kit

The treatment kit is a box kept at the health facility that includes the following:



- medications for intensive and continuation phase;
- two sputum cups;
- patient information sheet;
- treatment card; and
- instruction sheet for treatment partner.

treatment in a health facility as out-patients or from home are provided with a treatment kit for the continuation phase. The kit is kept at the health facility under the responsibility of the health worker. However, if the patient lives very far from the health facility, the kit may be kept by a community volunteer or outreach health workers. It will facilitate proper easy case management from the first day of treatment until patients are declared as cured by a physician.

Treatment partner

The treatment partner is responsible for observing that patients swallow their medicines as prescribed. The treatment partner may be a health worker or a community volunteer (religious or government leader, a teacher or other influential community leader). A treatment partner is assigned to all TB patients, in particular smear-positive cases. If the treatment partner is a trained community member, he or she is supervised by and is accountable to the health worker.

If patients live less than one hour's travel from the DOTS Centre or health facility where they are taking the treatment, they may take the medications at the DOTS Centre or at the health facility. In this case, the treatment partner is a health worker of the DOTS Centre or of the health facility. If the patient lives more than one hour away from the DOTS Centre or health facility, the treatment may be delivered at the patient's home by an outreach health worker or, alternatively, by a trained community volunteer.

In the case of a community volunteer being chosen as treatment partner, the health worker will provide the weekly supply of TB medications to the treatment partner (community volunteer).

The treatment partner delivers the daily medications to the sputum smear-positive patients, observes the patients swallowing the drugs and records this in the patient treatment card.

For the sputum smear-negative and extrapulmonary patients, the medications are delivered every week and the first dose of the weekly supply is supervised by the treatment partner.

Sputum smear examinations to monitor patient progress and cure

One sputum sample should be routinely examined for each follow-up of sputum positive cases at the following intervals:

New cases sputum positive	Retreatment cases sputum positive
End of the second month of the intensive phase.	End of the third month of the intensive phase.
During the sixth month of treatment.	During the eighth month of treatment.

When treatment is complete, the sputum smear-positive patients are referred for final assessment to the DOTS Centre where they were originally diagnosed.

Pulmonary TB sputum smear-negative cases do not need sputum follow-ups as routine during their course of treatment. However, if the patients do not improve or their situation deteriorates, they should be referred to the DOTS Centre where clinical and bacteriological examinations should be carried out again.

TABLE 3: Summary of the mechanisms of DOT according to the different treatment categories and types of patient

Treatment Categories and Types of Patient	Regimen	Routine sputum follow-ups	Drugs administration		Treatment partner
			Intensive phase	Continuation phase	
CATEGORY I New cases pulmonary smear-positive	2HRZE/ 4RH	End of second month. During the sixth month. At DOTS Centre.	DOT daily as inpatient for two months If patient is positive at the end of the second month, the intensive phase in hospital is extended for one more month.	DOT daily* • Outpatient (patient within one hour of health facility). • Patient at home (> than one hour).	Health worker for outpatients; Outreach health worker or community volunteer for home treatment.
CATEGORY II Pulmonary smear-positive • relapse • failure • treatment after interruption (default)	2RHZES/ 1RHZE/ 5RHE	End of third month. During the eighth month. At DOTS Centre.	DOT daily as inpatient for three months. If patient is positive at the end of the third month, the intensive phase in hospital is extended for one more month.	DOT daily. • Outpatient (patient within one hour). • Patient at home (> than one hour).	As above.
CATEGORY III New cases pulmonary smear negative (other than in Cat. I) New less severe forms of extrapulmonary CATEGORY I Pulmonary smear neg. with extensive parenchymal involvement Severe extrapulmonary forms	2RHZ/ 4RH or 2RHZE/	None as routine.	Self administered with weekly drug supply. First dose must be administered under direct observation. Severely ill cases should be hospitalized for a short period. Outpatients: for patient living within one hour of health facility. Treatment at home: for patient living more than one hour away from health facility.		As above.

* DOT should be at least five days in a week but the patient should take seven days medication in a week.

Annex 1

List of essential anti-TB drugs for daily use

WHO model list of essential anti-TB drugs for daily use	
Drug	Type, dosages and strengths
Streptomycin	Powder for injection, S g (as sulfate) in vial
Rifampicin	Capsule or tablet, R 150mg , R 300mg
Isoniazid	Tablet, H 100mg , H 300mg
Pyrazinamide	Tablet, Z 400mg
Ethambutol	Tablet, E 100mg , E 400mg
Isoniazid + Ethambutol	Tablet, H 150mg + E 400mg
Rifampicin + Isoniazid	Tablet, R 150mg + H 75mg , R 300mg + H 150mg
Rifampicin + Isoniazid + Pyrazinamide	Tablet, R 150mg + H 75mg + Z 400mg

WHO Ad Hoc Committee Meeting on fixed dose combinations formulation from August 1998	
Drug	Type, dosages and strengths
Rifampicin + Isoniazid	Tablet, R 60mg + H 30mg *
Rifampicin + Isoniazid + Pyrazinamide	Tablet, R 60mg + H 30mg + Z 150mg *
Rifampicin + Isoniazid + Pyrazinamide + Ethambutol	Tablet, R 150mg + H 75mg + Z 400mg + E 275mg

* for paediatric use

E=Ethambutol, H=Isoniazid, R=Rifampicin, S=Streptomycin, Z=Pyrazinamide

Annex 2

Standardized treatment categories using different fixed dose combinations (FDCs) for adults and children

Two drugs-FDC for new case adults Category I (use the same dose for new case adults Category III, but without Ethambutol)

ADULT Weight (kg)	Initial phase (2 months daily)			Continuation phase (4 months daily)
	RH 150mg + 75mg	Z 400mg	E* 400mg	RH 150mg + 75mg
30-37	2	2	1½	2
38-54	3	3	2	3
55-70	4	4	3	4
71-90	5	5	3½	5

Three drugs FDCs for new case adults Category I (use the same doses for new case adults Category III but without Ethambutol)

ADULT Weight (kg)	Initial phase (2 months daily)		Continuation phase (4 months daily)
	RHZ 150mg + 75mg + 400mg	E 400mg	RH 150mg + 75mg
30-37	2	1½	2
38-54	3	2	3
55-70	4	3	4
71-90	5	3½	5

* Ethambutol should not be given to children under six years old.

** Streptomycin is given only for the first two months of the initial phase. For patients over the age of 50, 750mg are given and Streptomycin should not be given to pregnant women.

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Four drugs FDCs for new case adults Category I

ADULT Weight (kg)	Initial phase (2 months daily)	Continuation phase (4 months daily)
	RHZE 150mg + 75mg + 400mg + 275mg	RH 150mg + 75mg
30-37	2	2
38-54	3	3
55-70	4	4
71-90	5	5

Four drugs for retreatment case adults Category II (relapses, failures and treatment interruptions)

ADULT Weight (kg)	Initial phase (2 months daily)		Continuation phase (4 months daily)	
	RHZE 150mg + 75mg + 400mg + 275mg	S** 1g	RH 150mg +75mg	E 400mg
30-37	2	0.5	2	1½
38-54	3	0.75	3	2
55-70	4	1	4	3
71-90	5	1	5	3½

Three FDCs, tablets or packs of granules for new case children Category I (use the same doses for new case children Category III, but without Streptomycin).

PAEDIATRIC Weight (kg)	Initial phase (2 months)		Continuation phase (4 months)
	RHZ 60mg + 30mg + 150mg	S** 1g	RH 60mg + 30mg
Up to 7	1	0.25	1
8-9	1½	0.25	1½
10-14	2	0.25	2
15-19	3	0.50	3
20-24	4	0.50	4
25-29	5	0.50	5

Annex 3

Symptom-based approach to adverse effects of TB drugs

Adverse effects are classified as minor and major. In general, a patient that develops minor adverse effects should continue the same anti-TB treatment and may also receive symptomatic treatment. If a patient develops a major side effect, the treatment is stopped and the patient is referred to hospital.

Symptom-based approach to adverse effects of TB drugs

Side effects	Drugs probably responsible	Management
Minor		
Anorexia, nausea, abdominal pain	Rifampicin	Continue anti-TB drugs Check drug doses Give drugs last thing at night
Joint pain	Pyrazinamide	Aspirin
Burning sensation in the feet	Isoniazid	Pyridoxine 100mg daily
Orange/red urine	Rifampicin	Reassure
Major		
Itching of skin, skin rash	Streptomycin	Stop responsible drugs Stop anti-TB drugs
Deafness	Streptomycin	Stop Streptomycin and use Ethambutol
Dizziness (vertigo and nystagmus)	Streptomycin	Stop Streptomycin and use Ethambutol
Jaundice (other causes excluded)	Most anti-TB drugs (especially Isoniazid, Pyrazinamide and Rifampicin)	Stop anti-TB drugs
Vomiting and confusion (suspect drug-induced liver failure)	Most anti-TB drugs	Stop anti-TB drugs. Urgent liver function test and prothrombin time
Visual impairment (other causes excluded)	Ethambutol	Stop Ethambutol
Shock, purpura, acute renal failure	Rifampicin	Stop Rifampicin

Annex 4

Patient information sheet

- 1) Tuberculosis is a contagious disease caused by a germ. The infection is transmitted from a sick person who is sputum positive after a microscopic examination. The germs are spread in the air when a patient sneezes, coughs or spits. People in close contact can become infected when they breathe the air containing these germs.
- 2) Prevent the spreading of the germs by covering your mouth when coughing and sneezing, and by avoiding spitting in public places.
- 3) A patient taking regular treatment rapidly stops being infectious and is not a risk to others.
- 4) Tuberculosis is a curable disease if the patient takes the medicines regularly for six months. The number of pills will be much reduced after the first two months.
- 5) The medicines are safe and are the only means of curing the disease. However, sometimes they can cause minor problems such as sleepiness, nausea, abdominal discomfort, pain in the joints and a burning sensation in the feet. These effects usually stop after a few days.
- 6) Rifampicin makes the urine red-orange but this does not cause problems.
- 7) To achieve a cure, the best way is to take the medicines under the direct observation of a health worker or another responsible person.
- 8) If you were sputum positive at the microscopic examination, at the end of your treatment go back to your DOTS Centre for a final evaluation of your health status. When doing this, bring your treatment card with you.

Treatment partner instruction sheet

(Community volunteer)

- 1) In agreement with the supervisor of your health centre, find a suitable way and place when you need to be refilled with the weekly supply of medicines for your patient.
- 2) In agreement with your patient, find a convenient way and place where you can observe your patient swallow the medicines.
- 3) Make sure that the **sputum positive patient** swallows the medicines in your presence every day or at least five days in a week, but in this case, give to the patient the medicines for the other two days.
- 4) If a patient is **sputum negative or extrapulmonary**, observe the patient swallowing the first dose of the weekly supply. Give the patient the remaining six days' supply of medications to take home.
- 5) Record with an X in the calendar of the treatment card each time that you observe the patient swallowing the medicines. Draw a horizontal line through the days to indicate the number of days' supply given to the patient for self administration.
- 6) If the medicines cause minor problems such as sleepiness, nausea, abdominal discomfort, pain in the joints or burning sensation in the feet, reassure the patient by telling him or her that the problems should stop in few days.
- 7) If the symptoms persist or the medicines cause major and more serious problems to your partner, refer him or her to the nearest health facility or to your supervisor.
- 8) If the patient fails to take the medicines, investigate the reasons and inform your supervisor if the patient does not resume treatment.
- 9) If your patient was sputum positive at the microscopic examination and has completed treatment, refer him or her to the DOTS Centre for final evaluation. At this time, give your patient the treatment card to bring to the DOTS Centre.

Tuberculosis information system

The following records, registers and reports should be used to evaluate patients' progress and programme performance:

- TUB 01** - Request form for sputum examination (stays at all health facilities).
- TUB 02** - Tuberculosis laboratory register (stays at the laboratory where the sputum smear is carried out).
- TUB 03** - Patient tuberculosis register (stays at the DOTS Centre).
- TUB 04** - Referral and transfer form (stays at all health facilities).
- TUB 05** - Tuberculosis treatment card (one copy stays with the patient and another with the treatment partner).
- TUB 06** - Quarterly report on tuberculosis cases (stays at the DOTS Centre and is prepared by DOTS coordinator).
- TUB 07** - Quarterly report on the outcomes of the treatment (stays at the DOTS Centre and is prepared by DOTS coordinator).

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