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# GUIDELINES *for the* CONTROL *of*

# TUBERCULOSIS *in* PRISONS

WORLD HEALTH ORGANIZATION

INTERNATIONAL COMMITTEE OF THE RED CROSS

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# GUIDELINES FOR THE CONTROL OF TUBERCULOSIS IN PRISONS

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# PREFACE

The World Health Organization (WHO) and the International Committee of the Red Cross (ICRC) have joined forces to produce these guidelines. The goal is to improve the control of tuberculosis in prisons and other institutions where people are incarcerated. The guidelines apply wherever people are in custody: prisons, police stations, remand centres, detention centres for asylum seekers, secure hospitals, penal colonies and prisoner of war camps.

Several international conventions (see Annex 1) guarantee the welfare of prisoners. Prisoners lose liberty but retain certain rights in prison. These include protection from harm and access to a standard of health care equivalent to that provided in the community. In practice, few prison authorities comply fully with these conventions. Low standards of general custodial care and of health care are common. Despite the often limited information available on the health of prisoners, there is increasing recognition of the health needs of prisoners, including the need to control tuberculosis. Contracting tuberculosis should not be part of a prisoner's sentence.

Tuberculosis is common in many prisons worldwide and treatment is often ill-informed and inadequate. Prisons form a reservoir of tuberculosis, including drug-resistant tuberculosis. Tuberculosis is a problem both inside prisons and outside in the wider community, since people enter, leave and re-enter prisons. There is therefore an urgent need to institute effective control of tuberculosis in prisons. Successful tuberculosis control in a country requires effective tuberculosis control in prisons. The WHO recommended strategy for tuberculosis control (known by the "brand name" of DOTS) relies on the detection and cure of tuberculosis patients, with a priority for the infectious cases. The specific features of prisons and of prisoners necessitate specific approaches to implementation of the DOTS strategy. The prison health services must implement the DOTS strategy in close collaboration with national tuberculosis control programmes.

Practical guidelines are necessary for prison authorities to be able to implement the DOTS strategy. Policy-makers and decision-makers may be unaware of the extent of the problem of tuberculosis in prisons, the potential for spread to the wider community, and the emergence of drug-resistance. The guidelines therefore also highlight to policy-makers and decision-makers the need to control tuberculosis in prisons. Several countries, usually with low tuberculosis prevalence, have developed their own guidelines. However, there is a need for global guidelines for use in any country with high tuberculosis prevalence populations. WHO's Global Tuberculosis Programme (GTB) and ICRC contribute to these guidelines expertise in tuberculosis control and in the welfare of prisoners.

The objectives of the guidelines are the following: a) to describe briefly the burden of tuberculosis in prisons; b) to highlight the specific difficulties in implementing effective tuberculosis control in prisons; c) to outline the benefits of improved control of tuberculosis in prisons; d) to guide administrators in establishing and running tuberculosis control services in prisons; e) to guide prison health service staff in the detection and cure of prisoners with tuberculosis.

The guidelines are primarily for prison authorities (administration, health staff), policy-makers and decision-makers in relevant ministries (e.g. justice, interior, health), NGOs and donor agencies, and National Tuberculosis Programme (NTP) staff. Part I provides background information on tuberculosis and prisons, of particular relevance to prison authorities and decision-makers in relevant ministries. Part II provides guidelines for the control of tuberculosis in prisons, of particular relevance to prison health staff. Part III gives guidance to national prison authorities and NGOs on how to establish a prison tuberculosis control programme.

These guidelines require field testing in different situations. Comments on the guidelines are welcome and will help to improve future editions. Please send any comments to theWHO Global Tuberculosis Programme.

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ICRC Public Information Division, 1202 Geneva, Switzerland.

# FOREWORD

Where figures are available it is clear that the prevalence of tuberculosis in prisons is higher, sometimes much higher, than in the general population of the country. This is not surprising. Many prisoners come from the more socially and economically deprived sections of the population. In prison they suffer much emotional, and sometimes physical, hardship. Frequently, overcrowding facilitates the spread of tuberculosis infection. Medical services are usually inferior to those for the general population. This may result in poor treatment of tuberculosis patients. Good treatment should cure the vast majority of patients. Poor treatment may keep patients alive but infectious. Worse still, poorly treated patients in prison may spread multidrug resistant bacilli to fellow prisoners and staff. When released, they may infect their families and the general population. There is often no coordination to ensure the continuation of treatment started in prison.

Particularly in high prevalence countries, tuberculosis in prisons is thus an important threat to public health. There is often a rapid turnover of prisoners on remand. They may be imprisoned long enough to develop disease, but not long enough to be effectively treated (even if good treatment is available). Many are then released and may infect others.

Theoretically, good treatment and good tuberculosis control should be easier in a closed, disciplined environment. In practice, this is often not the case. Tuberculosis poses a real threat to prisoners, staff and the general public. These guidelines, based on much recent experience, outline the many obstacles to effective diagnosis and treatment. They give useful guidance as to how to overcome these obstacles. Prison health services are not usually under the control of the national Ministry of Health. The guidelines highlight the importance of coordinating the two services.

We hope that politicians, administrators and doctors in the relevant Ministries, national and international bodies concerned with the problem, and indeed the general public in many countries will read these guidelines with alarm. We trust that the alarm will ensure that every effort is made to implement the recommendations. For many countries the alternative is that a very dangerous situation will become much, much worse.

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| AFB | ***A**cid-**F**ast **B**acilli* |
| AIDS | ***A**cquired **I**mmuno **D**eficiency **S**yndrome* |
| BCG | ***B**acille **C**almette-**G**uérin* |
| DOTS | ***D**irectly **O**bserved **T**reatment, **S**hort-course (the "brand name" for the WHO recommended strategy for tuberculosis control)* |
| FEFO | ***F**irst **E**xpiry, **F**irst **O**ut* |
| GTB | ***G**lobal **TuB**erculosis Programme* |
| HEPA mask | ***H**igh **E**fficiency **P**articulate **A**ir mask* |
| HIV | ***H**uman **I**mmunodeficiency **V**irus* |
| ICRC | ***I**nternational **C**ommittee of the **R**ed **C**ross* |
| IUATLD | ***I**nternational **U**nion **A**gainst **T**uberculosis and **L**ung **D**isease* |
| NGO | ***N**on-**G**overnmental **O**rganization* |
| NTP | ***N**ational **T**uberculosis **P**rogramme* |
| PTB | ***P**ulmonary **TuB**erculosis* |
| SCC | ***S**hort-**C**ourse **C**hemotherapy* |
| STD | ***S**exually **T**ransmitted **D**isease* |
| TB | ***TuB**erculosis* |
| UNAIDS | ***U**nited **N**ations Programme on HIV/**AIDS*** |
| WHO | ***W**orld **H**ealth **O**rganization* |

# PART I

# BACKGROUND INFORMATION ON TUBERCULOSIS AND PRISONS

## 1 TUBERCULOSIS: BASIC FACTS, GLOBAL BURDEN AND PRINCIPLES OF CONTROL

### 1.1 Tuberculosis

#### *Basic facts*

***Mycobacterium tuberculosis***

Tuberculosis is a bacterial disease, principally caused by *Mycobacterium tuberculosis*. Many people refer to the organisms which cause tuberculosis as tubercle bacilli (because they cause lesions called tubercles) or as acid-fast bacilli (AFB). When stained using the Ziehl-Neelsen method, tubercle bacilli look red under the microscope. This is because they are acid-fast (they have kept the red dye even after washing with acid and alcohol). Tubercle bacilli can remain dormant in tissues and persist for many years.

***Transmission of infection***

Transmission occurs by airborne spread of infectious droplets. The main source of infection is a person with tuberculosis of the lung (pulmonary tuberculosis) who is coughing. This person is usually sputum smear-positive. Coughing produces tiny infectious droplets. One cough can produce 3,000 droplets. Droplets dry out to form droplet nuclei. Transmission generally occurs indoors, where droplet nuclei can stay in the air for a long time. Ventilation removes droplet nuclei. Direct sunlight quickly kills tubercle bacilli, but they can survive in the dark for several hours. Two factors determine an individual's risk of exposure: the concentration of droplet nuclei in contaminated air and the length of time breathing that air.

***Risk of infection***

An individual's risk of infection depends on the extent of exposure to droplets and susceptibility to infection. The greatest risk of infection is from exposure to a person with sputum smear-positive pulmonary tuberculosis (PTB). The risk of transmission of infection from a person with sputum smear-negative PTB is low, and with extra-pulmonary tuberculosis is even lower.

Prisoners are at high risk of *M. tuberculosis* infection. Prison conditions often promote exposure to infection: overcrowding, delayed diagnosis and cure of infectious cases, poor ventilation, little sunlight. Prisoners are often particularly susceptible to infection in general, because of poor nutrition.

***Risk of progression of infection to disease.***

Once infected with *M. tuberculosis*, a person stays infected for many years, probably for life. In the absence of HIV infection, the vast majority (90%) of people who are infected with *M. tuberculosis* do not develop tuberculosis disease.

In these healthy, asymptomatic, but infected individuals, the only evidence of infection may be a positive tuberculin skin test.

Infected persons can develop tuberculosis disease at any time. Disease can affect most tissues and organs, but especially the lungs. The chance of developing disease is greatest within 1 - 2 years after infection and then steadily lessens as time goes by. Various physical or emotional stresses may trigger progression of infection to disease. The most important trigger is weakening of immune resistance, especially by HIV infection. In many countries, HIV infection, alcohol abuse, and malnutrition are more prevalent in prisoners than in the general population. These factors and the stressful prison environment promote progression from infection to disease.

***Natural history of untreated tuberculosis.***

Without treatment, after 5 years, 50% of PTB patients will be dead, 25% will be healthy and 25% will remain ill with chronic, infectious tuberculosis.

## *Pathogenesis of tuberculosis.*

***Primary infection***

Primary infection occurs on first exposure to tubercle bacilli. Inhaled droplet nuclei are so small that they avoid the muco-ciliary defences of the bronchi and lodge in the terminal alveoli of the lungs. Infection begins with multiplication of tubercle bacilli in the lungs. This is the Ghon focus. Lymphatics drain the bacilli to the hilar lymph nodes. The Ghon focus and related hilar lymphadenopathy form the primary complex. Bacilli may spread in the blood from the primary complex throughout the body.

The immune response (delayed hypersensitivity and cellular immunity) develops about 4-6 weeks after the primary infection. The size of the infecting dose of bacilli and the strength of the immune response determine what happens next. In most cases, the immune response stops the multiplication of bacilli, but a few bacilli may persist. A positive tuberculin skin test would be the only evidence of infection. The immune response in a few cases is not strong enough to prevent multiplication of bacilli, and disease occurs within a few months.

Following primary infection and the formation of the primary complex, there is usually (90% of cases) no clinical disease (but a positive tuberculin skin test). A few people develop hypersensitivity reactions, e.g. erythema nodosum. Pulmonary and pleural complications may occur e.g. tuberculous pneumonia, lobar collapse (bronchial compression), pleural effusion. Sometimes there is disseminated disease, e.g. lymphadenopathy (usually cervical), meningitis, pericarditis, miliary tuberculosis.

***Post-primary tuberculosis***

Post-primary tuberculosis occurs after a latent period of months or years after primary infection. It may occur either by reactivation or by reinfection. Reactivation means that dormant bacilli persisting in tissues for months or years

after primary infection start to multiply. This may be in response to a trigger, such as weakening of the immune system by HIV infection. Reinfection means a repeat infection in a person who has already previously had a primary infection.

Post-primary tuberculosis usually affects the lungs but can involve any part of the body. The characteristic features of post-primary PTB are the following: extensive lung destruction with cavitation; positive sputum smear; upper lobe involvement; usually no intrathoracic lymphadenopathy. The more common forms of extra-pulmonary tuberculosis are the following: pleural effusion, lymphadenopathy (usually cervical), spine, other bone and joint, central nervous system (meningitis, cerebral tuberculoma), pericarditis (effusion/constrictive), gastro-intestinal (ileocaecal, peritoneal). The less common forms of extra-pulmonary tuberculosis are the following: empyema, genital tract of male (epididymitis, orchitis) and female (tubo-ovarian, endometrium), kidney, adrenal gland, skin.

### *The impact of HIV on tuberculosis*

HIV is the most powerful risk factor for progression of *M. tuberculosis* infection to disease. A person dually infected with HIV and *M. tuberculosis* has about a 50% lifetime risk of developing tuberculosis. Tuberculosis may occur at any point in the progression of HIV infection. As HIV infection progresses, CD4 lymphocytes decline in number and function. The immune system becomes increasingly unable to stem the growth and local spread of *M. tuberculosis*.

Pulmonary disease remains the commonest form of tuberculosis in HIV-infected patients, with an increased proportion having sputum smear-negative disease. However, disseminated and extrapulmonary tuberculosis are more common than in non-HIV-infected patients. The presentation of PTB depends on the degree of immunosuppression. Early in HIV infection, with good immunity, the clinical picture often resembles post-primary disease. The sputum smear result is often positive, and the chest X-ray often shows cavities. As HIV infection progresses and immunity declines, local dissemination often occurs. The clinical picture often resembles primary disease, the sputum smear result is often negative, and the chest X-ray often shows infiltrates with no cavities. The commonest forms of extrapulmonary tuberculosis are the following: lymphadenopathy, pleural effusion, pericardial effusion, miliary disease, meningitis.

The impact of HIV on tuberculosis has consequences for tuberculosis case-detection and diagnosis. These include under-diagnosis of sputum smear-positive PTB and over-diagnosis of sputum smear-negative PTB.

## 1.2 The global burden of tuberculosis

### *Size of global burden*

One third of the world's population is infected by *M. tuberculosis*. Worldwide in 1995 there were about 8 million new cases of tuberculosis with 3 million deaths. These deaths comprise 25% of all avoidable adult deaths in developing countries. 95% of tuberculosis cases and 98% of tuberculosis deaths are in developing countries. 75% of tuberculosis cases in developing countries are in the

economically productive age group (15-50 years). About 15% of total tuberculosis cases worldwide are attributable to HIV. This proportion is increasing as the HIV pandemic spreads.

### *Reasons for global burden*

The main reasons for the increasing global tuberculosis burden are the following:

- poverty and the widening gap between rich and poor in various populations, e.g. developing countries, inner city populations in developed countries;
- neglect (inadequate case detection, diagnosis and treatment);
- changing demography (increasing world population and changing age structure);
- the impact of the HIV pandemic.

### *Failure of global tuberculosis control efforts so far*

Despite the discovery of the tubercle bacillus in 1882, and of anti-tuberculosis drugs since 1944, efforts to control tuberculosis globally have so far failed. The main reasons for failure include the following:

- inadequate political commitment and funding;
- inadequate organization of services;
- inadequate case management (failure to cure cases that were diagnosed);
- over-reliance on BCG.

### *Tuberculosis - a global emergency*

WHO has declared that tuberculosis is a global emergency because tuberculosis is out of control in many parts of the world. Tuberculosis programmes in many developing countries have failed in the past to control tuberculosis, because they have not cured enough tuberculosis patients, particularly the infectious (smear-positive) patients. The main reasons for this are the following:

- failure to ensure that tuberculosis patients have access to diagnosis and treatment;
- use of inadequate treatment regimens and failure to use standardised treatment regimens;
- failure to ensure that tuberculosis patients complete their treatment.

## 1.3 Principles of tuberculosis control

### Objectives of tuberculosis control

- To reduce mortality, morbidity and disease transmission.
- To prevent the development of drug resistance.

### The way to achieve tuberculosis control

The most cost-effective way of preventing disease transmission is to cure the infectious cases by anti-tuberculosis drugs. The way to achieve tuberculosis control is provide standardised short-course chemotherapy (SCC) to, at least, all identified smear-positive tuberculosis cases (the sources of infection). Treatment should be under direct observation at least during the initial phase of treatment.

### Impact of a high cure rate

A programme which achieves at least an 85% cure rate in patients with sputum smear-positive pulmonary tuberculosis has the following impact:

- tuberculosis prevalence and the rate of tuberculosis transmission both decrease immediately;
- tuberculosis incidence decreases gradually;
- there is less acquired drug resistance (which makes future treatment of tuberculosis easier and more affordable).

### Consequences of failure to cure the infectious cases

In many parts of the world, and in many prisons, health services fail to cure the infectious tuberculosis cases. This happens when some anti-tuberculosis drugs are available to treat tuberculosis patients, but the organization of services is inadequate to guarantee completion of standardised treatment. This has several consequences. Those patients who would have died without any treatment may survive, but often as chronic, still infectious cases. There is an increase in the pool of infectious cases and increased transmission of tuberculosis. Drug-resistance emerges. A treatable epidemic becomes an untreatable epidemic.

### The DOTS strategy to achieve tuberculosis control

In response to this global emergency, WHO has adopted the strategy for effective tuberculosis control known by the “brand name” DOTS. The organisational principles of this strategy are the following:

- availability of a decentralised diagnostic and treatment network;
- good programme management based on accountability and supervision of health care workers;
- an in-built evaluation system for case-finding of new cases and relapses and for full evaluation of treatment outcomes by cohort analysis.

## Policy package for tuberculosis control

The success of the DOTS strategy depends on the implementation of a five-point package:

- government commitment to effective tuberculosis control, usually through a National Tuberculosis Programme (NTP);
- case detection through case-finding by sputum smear microscopy examination of tuberculosis suspects in general health services;
- standardised short-course chemotherapy to, at least, all smear-positive tuberculosis cases under proper case management conditions;
- regular, uninterrupted supply of all essential anti-tuberculosis drugs;
- monitoring system for programme supervision and evaluation.

## Tuberculosis control in the face of the HIV epidemic

The impact of HIV exposes any weaknesses in tuberculosis control programmes. The HIV epidemic heightens the need to focus on the identification and cure of infectious tuberculosis patients. The principles of tuberculosis control are the same even when there are many HIV-infected tuberculosis patients. Tuberculosis control in the face of the HIV epidemic necessitates the following responses:

(a) strengthening of tuberculosis control services;
(b) strengthening of co-ordination and collaboration between tuberculosis control services, HIV/AIDS/STD services and general health services;
(c) reinforcing diagnostic criteria for pulmonary and extra-pulmonary tuberculosis.

## Suggestions for further reading

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# 2 PRISONS

## 2.1 Prisoners and prison society

### *Global prison population*

On any day, the estimated number of people incarcerated worldwide is about 10 million. These include mainly people in prisons, but also people in police stations, remand centres, detention centres for asylum seekers, secure hospitals, penal colonies and prisoner of war camps. The world's prisoner population is increasing. Since the turnover of prisoners is high, four to six times that number pass through prisons every year. Prison staff and visitors come and go, but are effectively part of the prison population while in the prison.

### *Prisoners*

Prisoners do not represent a cross-section of society. They are predominantly male, young (15-44 years), poorly educated and from socio-economically disadvantaged groups. They often belong to minority or migrant groups. Many have lived on the margins of society. However, depending on circumstances, any one of us could find ourselves in prison. People enter prison with a higher risk of ill health than the general population. Prison conditions often lead to ill health during imprisonment. Prisoners' increased risk of ill health and death continues after release.

### *Prison society and hierarchy*

Prison culture varies between countries, and within a particular country between prisons. The unofficial hierarchy of prisoners represents a power structure parallel to the official prison administration. This unofficial hierarchy may be as powerful as, or on occasion even more powerful than, the official authority. A prison administration may tolerate and condone the parallel power structure since it helps to maintain order. Power structures among prisoners are often unknown to the outside world and to the medical authorities. The rules and laws of the unofficial hierarchy have direct implications for the care of tuberculosis patients. For example, patients' position in the power structure may affect health care workers' decisions on which patients to treat and where to treat them.

### *Prison life*

The daily conditions of prison life often promote illness. Prisons are often overcrowded with low standards of hygiene. The general ethos is usually one of punishment and violence. Prisoners are often vulnerable. They may be vulnerable to the power of prison authorities and the police, and vulnerable to the sexual and other demands of other prisoners. The illegality of various forms of behaviour in prison often results in denial that the activities take place. However, despite being illegal, sex between men and use of drugs by injection are common. The daily conditions of prison life may promote the transmission of HIV infection. Prison conditions therefore promote tuberculosis transmission directly and indirectly through facilitating HIV transmission.

### Movement of prisoners

A prison is not a closed system. People circulate between prison society and the wider society. Imprisonment deprives prisoners of freedom, but usually for a limited period of time before they return to the community. A proportion of prisoners enter, leave and re-enter prisons. In many countries, it is common to move prisoners from one prison to another. Prison sentences can end suddenly in the event of amnesties or general pardons. People stay temporarily in remand custody and holding centres until transfer to prison or release. Prisoners circulate within prisons as authorities transfer prisoners from one part of the prison to another.

## 2.2 Prison administration

### Responsibility for prisons

The particular ministry responsible for the prison system varies from country to country, e.g. justice, interior, home affairs, state security. In the face of competing budgetary priorities, prison funding in many countries has a low priority.

### Responsibility for prison health services

With general under-funding of prisons, there is also under-funding of prison health services. Health care in prisons is usually the responsibility of the relevant ministry in charge of prisons, rather than the ministry of health. Health care in prisons is therefore often neglected and under-funded. The lack of data on the health of prisoners reflects this neglect. Assessment of health needs, evaluation of provision of services and health planning are impossible without health data.

With low pay and often little training, prison health staff may be poorly motivated. In some prisons, management may be ineffective and there may be little accountability. Under these circumstances it may be difficult to prevent the diversion of resources from the intended purposes. These problems compound the difficulties of providing an adequate level of health care for prisoners.

### Provision of tuberculosis care

Prisoners have a right to a standard of health care equivalent to that available outside prison. In most cases, prison health care is the responsibility of the prison authorities, rather than the national health services. Tuberculosis care therefore also falls under the responsibility of the prison health care service, without any link to the NTP. In many prisons the care of prisoners with tuberculosis is sub-standard. There is also little information about tuberculosis case-finding and treatment outcomes.

In some cases, prison health care is a part of the national health care system. Tuberculosis care therefore falls under the responsibility of the NTP. The standard of care of prisoners with tuberculosis reflects the standard of care which the NTP provides. The standard of information gathering on prisoners with tuberculosis reflects the standard of the NTP recording and reporting system.

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# 3 TUBERCULOSIS IN PRISONS

## 3.1 Extent of the problem of tuberculosis in prisons

### *Availability of information*

One of the consequences of neglect of health care in prisons is the lack of data on the health of prisoners. Few prisons systematically report tuberculosis case-finding and treatment outcomes. The recording of tuberculosis cases and the reporting of treatment outcomes represent a key element of the DOTS strategy to control tuberculosis. The starting point in instituting effective tuberculosis control is the collection of reliable information on case-finding and treatment outcomes. In the absence of routine recording and reporting, most of the information on tuberculosis in prisons comes from studies in particular places.

### *Reported surveys of tuberculosis in prisons*

Published tuberculosis case rates in prisons are among the highest ever recorded in any population. Table 1 shows published information on tuberculosis burden in prisons.

*Table 1. Published information on tuberculosis burden in prisons*

| LOCATION OF PRISON (YEAR) | NUMBER OF TUBERCULOSIS CASE NOTIFICATIONS | ANNUAL CASE NOTIFICATION RATE (ALL FORMS UNLESS OTHERWISE STATED) PER 100,000 |
|---|---|---|
| Siberia, Russia [1] (1993) | N/A | 820 |
| Tomsk, Russia [2] (1996) | N/A | 7,000 |
| Azerbaijan [3] (1994) | N/A | 4,667 |
| Moldova [4] (1996) | N/A | 2,640 |
| Jeddah, Saudi Arabia [5] (1993-1995) | 53 cases in 6,974 prisoners (mostly from high tuberculosis prevalence countries) in 20 months | 456 |
| Bouake, Cote d'Ivoire [6] (1990-1992) | 134 cases (including 108 sputum smear-positive) in 1,861 prisoners in 2 years | 7,200 (5,800 sputum smear-positive) |
| 11 out of 24 provinces in Cambodia [7] (1996-1997) | 12 new sputum smear-positive cases in 898 prisoners in 2 years | 668 sputum smear-positive |

| LOCATION OF PRISON (YEAR) | TUBERCULOSIS CASE-FINDING BY SCREENING | PREVALENCE (ALL FORMS) PER 100,000 |
|---|---|---|
| Zomba, Malawi [8] (1996) | 47 cases in 914 prisoners screened | 5,100 |

N/A = not available

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Not only are tuberculosis case rates extremely high in prisons, but tuberculosis case fatality is often also high. Tuberculosis case fatality in prisoners in Azerbaijan was 24%.[3] In a prison with a high tuberculosis case rate and a high case fatality rate, a prison sentence may become a death sentence.

## 3.2 Reasons why tuberculosis is common in prisons

### *Tuberculosis risk before, during and after imprisonment*

Many people enter prison from a disadvantaged socio-economic background. They therefore enter prison already with a high risk of infection with the tubercle bacillus or of tuberculosis. Because of prison conditions, imprisonment puts prisoners at high risk of acquiring infection and developing disease. Because prison health services often fail to implement effective tuberculosis control and guarantee cure of tuberculosis, prisoners are at high risk of leaving prison with tuberculosis. Because of sub-standard treatment, tuberculosis is not only common, but also often drug-resistant.

### *Transmission of tuberculosis*

The source of infection is the prisoner with sputum smear-positive PTB, including newly diagnosed and chronic, often drug-resistant, cases. The following factors increase the number of prisoners exposed to infection:

- late case-finding through delays in diagnosis (neglect of prisoners' health problems, inefficient prison health services, inadequate sputum smear microscopy facilities);
- failure of medical services in remand custody or holding centres to refer tuberculosis suspects for diagnosis or to initiate treatment (because of reluctance to start treatment of a chronic disease when prisoners may well be released);
- transfer of prisoners with infectious tuberculosis between and inside prisons;
- overcrowding (limited cell space per person and prolonged confinement inside cells);
- failure to separate the infectious cases from other prisoners;
- sub-standard treatment resulting in failure to cure patients and prolonged infectiousness.

Increased exposure to an infective dose of tubercle bacilli may arise from:

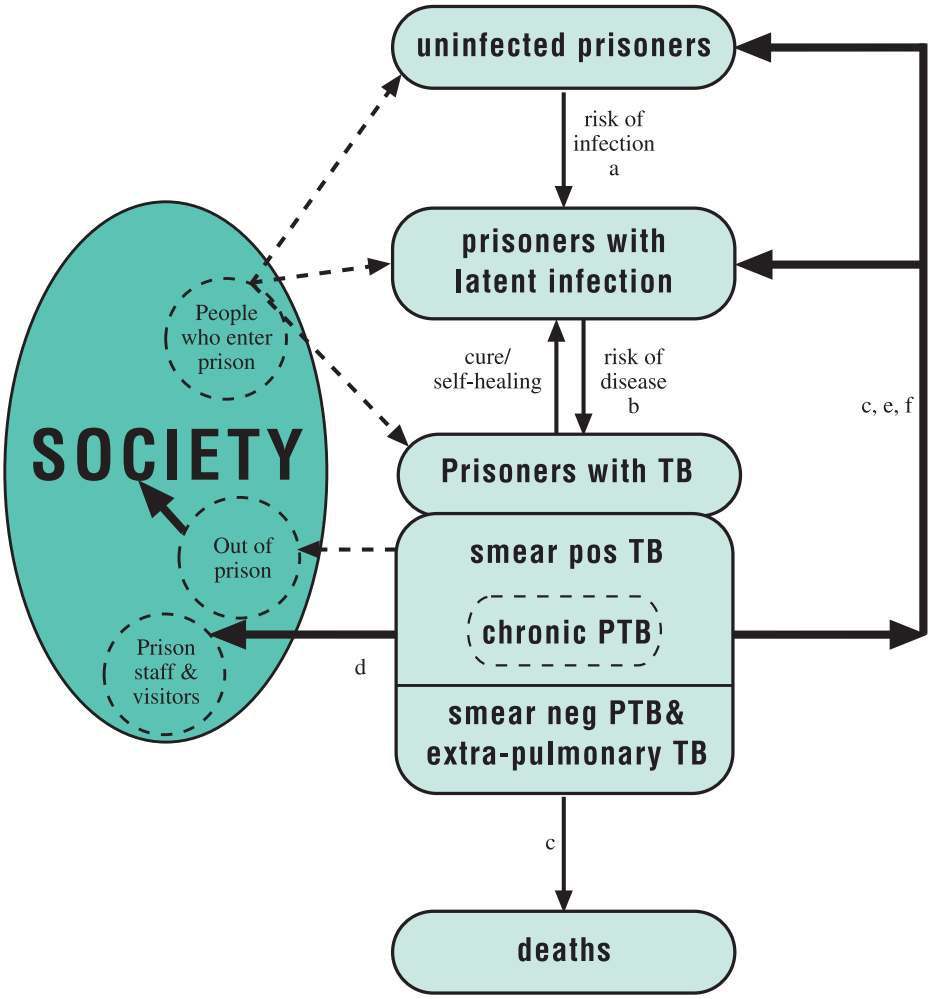
- poor ventilation (even where there are windows, prisoners may leave them closed or blocked to conserve heat when it is cold);
- failure of prisoners with infectious PTB to cover the mouth while coughing or to use sputum containers.

Prison conditions, e.g. poor nutrition, may promote reactivation of latent infection and progression to disease. Prisoners may be at high risk of malnutrition, from a pre-existing poor diet and a prison diet deficient in calories or of poor quality. Sometimes the prison diet is adequate, but some prisoners may barter, gamble or otherwise lose foodstuffs to other prisoners. Some prisoners may systematically deprive other vulnerable prisoners of their food.

Tuberculosis transmission may be a particular problem among unsentenced prisoners (those awaiting charge, trial or sentence), who may be released by the courts at any time. Facilities in remand prisons and holding centres are often poor and health care services limited or non-existent. Overcrowding is common. Delays in the judicial process often result in a prolongation of what should be a short stay. Where available, health care services may be reluctant to initiate tuberculosis case-finding and treatment.

The diagram shows the transmission of tuberculosis within and beyond prisons.

*Figure 1. Transmission of tuberculosis inside and beyond prisons*




**KEY**

movement of people
evolution of infection and disease
transmission of infection

a = prison conditions increase risk of TB transmission
b = disadvantaged socio-economic background, HIV infection, prison conditions (e.g. poor nutrition)
c = result of delayed diagnosis and treatment
d = lack of coordination between prison & general health services
e = overcrowding, poor ventilation, poor hygiene
f = transfer between & within prisons

## The prison health service response

Prison health services are often ill-equipped to respond to the challenge of implementing effective tuberculosis control. The health of prisoners is often not a priority for prison authorities and is often neglected. The budget allocation for prison health services is often inadequate. Recognition of tuberculosis as a specific health problem in prisons does not necessarily lead to action.

Prison health care staff who are poorly paid and poorly trained are often poorly motivated. The standard of medical record-keeping is often low. There is often little or no patient education. Diagnostic facilities for tuberculosis are often inadequate. Without reliable sputum smear microscopy, it is not possible to detect the infectious cases. There is often no health screening of prisoners on entry into prison. There may be inadequate facilities for the separation of infectious patients from other prisoners. Custodial staff may restrict prisoners' access to medical care, with opportunities for bribery and coercion. Untrained staff who are not health care workers may participate in selection of prisoners for access to health care.

The priority for tuberculosis control is the detection, treatment and cure of the infectious cases. Treatment in prisons often does not result in cure. This is because of erratic drug supplies, use of non-standardised treatment regimens and failure to ensure direct observation of treatment. Instead, the result may be more chronic cases, increased transmission of tubercle bacilli, and a worsening epidemic of often drug-resistant tuberculosis.

## Prison hierarchy and prisoner behaviour

The unofficial hierarchy of prisoners represents a power structure parallel to the official prison administration. This unofficial hierarchy may affect tuberculosis control in prisons. There may be discrimination in admission to the hospital ward, unfair selection of patients for treatment and misuse of anti-tuberculosis drugs. High status prisoners may not accept a low status prisoner in the same hospital ward.

Newly introduced anti-tuberculosis drugs, especially rifampicin, become very desirable when prisoners die for lack of treatment. Prisoners may try to hoard anti-tuberculosis drugs for their own use. A black market may develop in anti-tuberculosis drugs. Prisoners may use anti-tuberculosis drugs as an alternative prison currency. They may sell the drugs to the guards, give them to their relatives during family visits, or use them in gambling or paying debts. Either individually or under pressure from gang bosses, tuberculosis patients may try to keep their anti-tuberculosis drugs. They invent tricks to avoid swallowing their tablets under the observation of health staff. They smuggle the tablets back to their cells, and the tablets then circulate as currency.

The more influential prisoners can obtain the drugs by various means. One way of obtaining the drugs is to pressurise prisoners lower down the hierarchy who are receiving treatment to hand over their tablets. Another way is to get on a tuberculosis treatment programme, even without having tuberculosis. A prisoner may bribe a doctor for registration as a tuberculosis patient, or a laboratory technician for recording a positive sputum smear. A prisoner may exchange a

negative sputum sample with a positive sample from a prisoner with tuberculosis. Prisoners without tuberculosis may also try to join a tuberculosis treatment programme because it may offer certain benefits. These include better food and accommodation, less strict security, and better visiting rights.

### *Prisoners' motivation*

Many patients with tuberculosis who start treatment find it difficult to continue treatment once symptoms have subsided. A prisoner may find the motivation to complete treatment particularly difficult. Prison does not provide a supportive environment. A prisoner often has more immediate worries than the dangers of not receiving a full course of treatment. Some prisoners are concerned that evidence of active tuberculosis may hinder release from prison. They may try to present negative sputum samples obtained from other prisoners as their own.

## 3.3 HIV-related tuberculosis

### *The global burden of HIV/AIDS*

At the end of 1997, there were an estimated 30.6 million people worldwide living with HIV infection. Globally, the most common route of HIV transmission is by sex between men and women.

### *HIV/AIDS in prisons*

The HIV prevalence among prisoners is often higher than in the general population. Many HIV-infected prisoners come from sections of society with a higher than average HIV prevalence and therefore enter prison already HIV-infected. Imprisonment puts prisoners at increased risk of acquiring HIV infection.

### *HIV transmission in prisons*

The most common routes of HIV transmission in prison are by intravenous drug use and by sex between men, despite authorities trying to prevent these activities. Many countries penalise possession of, and trafficking in, illegal drugs by imprisonment. Drug users often try to continue to use drugs, including intravenously, in prison. Whether admitted by authorities or not, smuggling of drugs into prisons, drug use by prisoners and sex between men, all occur in prisons in many countries. Denying or ignoring these facts does not help prevent HIV transmission in prisons.

Drug use is common in many prisons, among those already with an established habit and those newly exposed to drugs in prison. Prisoners who inject drugs often share needles and syringes (or home-made injecting equipment) and can rarely sterilize them. Sharing of non-sterilised injecting equipment can readily transmit HIV.

Men in prison may have anal sex. Condoms are not generally available. The risk of HIV transmission by unprotected anal sex is high, especially if the sex is forced (rape). Prisoners are vulnerable, both to the power of prison authorities and often also to the demands (including sexual demands) of other prisoners, who may be violent. Factors which exacerbate this vulnerability include overcrowding, an atmosphere of punishment and violence, and sometimes systems of enslavement within prison hierarchies. Vulnerable prisoners are at increased risk of HIV transmission. There may also be sex between men and women in women's prisons where there are male prison staff.

Prison officers may also be at increased risk of HIV infection. Exposure to HIV infection may be through an accidental prick with a used drug-injection needle during searches or through sexual contact with prisoners. Since people regularly move in and out of prisons, HIV spreads to the wider community.

### *HIV-related tuberculosis in prisons*

HIV magnifies the tuberculosis epidemic where there is overlap between HIV- and *M. tuberculosis*-infected populations. Overlap means that many HIV-infected people have *M. tuberculosis* infection and many *M. tuberculosis*-infected people also have HIV infection. This is the case in many prisons, where the proportion of tuberculosis cases attributable to HIV is likely to be high.

## 3.4 Consequences of poor tuberculosis control in prisons

Tuberculosis is common among prisoners. Failure to control tuberculosis in prisons causes much suffering and death among prisoners. If untreated, and if mis-treated, prisoners with infectious tuberculosis infect other prisoners, relatives during visits and prison staff. Some prisoners gain release from prison before completion of treatment. Coordination is essential between prison and general health services for referral of a tuberculosis patient on release from prison to the general health services. Lack of coordination will result in non-attendance at the relevant general health facility and non-completion of treatment, with risk of tuberculosis spread in the community.

Failure of prison authorities to control a treatable and preventable disease can contribute to prisoners venting their anger against the prison system. This can lead to prison security problems.

Prison walls curtail the freedom of prisoners, but not the freedom of spread of tuberculosis. Prisons form a reservoir of tuberculosis which threatens not only prisoners but also prison staff, visitors, and the wider community. Sub-standard treatment practices in prison compound the risk of spread of tuberculosis inside and beyond prisons with the risk of drug-resistance. Failure to control tuberculosis in prisons today will result in a more difficult and more expensive to control epidemic in future. An effective NTP must include effective tuberculosis control in prisons.

## 3.5 Prison as an opportunity for effective tuberculosis control

Prison could be an ideal environment for tuberculosis control. In planning and implementing effective tuberculosis control, prison health services could take advantage of the special features of the prison environment. Prisoners are literally a captive population. This could facilitate identification of prisoners with tuberculosis, promotion of adherence to treatment and accurate recording and reporting. Some prisoners have had little access to health care in the community. For these people, a prison with effective health care services provides an opportunity for access to health care, including tuberculosis care.

Highlighting the problem of tuberculosis in prisons may make prison authorities more aware of the other common health problems in prisons. Mobilisation of resources for tuberculosis control could pave the way towards better funding of prison health services. Implementation of the DOTS strategy in prisons could therefore serve as the entry point for improved health services in general in prisons. The opportunity for effective tuberculosis control in prisons is also an opportunity to contribute to effective tuberculosis control in the wider community. A benefit of effective tuberculosis control in prisons is decreased transmission of tuberculosis, including drug-resistant tuberculosis, in the wider community.

### *Suggestions for further reading*

*World Health Organization and Joint United Nations Programme on HIV/AIDS. Report on a joint WHO/UNAIDS European seminar, Warsaw, Poland, December 1997. WHO, Copenhagen, Denmark, 1998. EUR/ICP/CMDS 08 02 15.*

*World Health Organization and Joint United Nations Programme on HIV/AIDS. Report on the Global HIV/AIDS epidemic. 1997, Geneva, Switzerland.*

*Joint United Nations Programme on HIV/AIDS. Prisons and AIDS. UNAIDS technical update. UNAIDS best practice collection. April 1997, Geneva, Switzerland.*

*WHO Global Programme on AIDS. WHO guidelines on HIV infection and AIDS in prisons. Geneva, Switzerland, 1993. WHO/GPA/DIR/93.3*

*Harding TW, Schaller G. HIV/AIDS policy for prisons or prisoners? In: Mann J, Tarantola DJM, Netter TW (Eds.) AIDS in the world, pp 761-769. Cambridge (MA): Harvard University Press, 1992.*

*Coninx R, Pfyffer GE, Mathieu C, et al. Drug resistant tuberculosis in prisons in Azerbaijan: case study. Br Med J 1998; 316: 1493-1495.*

# PART II

# CONTROL OF TUBERCULOSIS IN PRISONS

## 4 POLITICAL COMMITMENT TO TUBERCULOSIS CONTROL IN PRISONS

### 4.1 Why is political commitment necessary?

Political commitment to tuberculosis control in prisons is lacking in many high tuberculosis prevalence countries. Political commitment is necessary to bring about change and then to sustain the improvement in tuberculosis control. In 1997 in Baku, Azerbaijan, WHO and ICRC held a meeting on tuberculosis in prisons. The participants made a declaration urging government commitment to tuberculosis control in prisons (see Annex 2).

Without political commitment, tuberculosis will continue to be out of control in many prisons. Prisons will continue to be breeding grounds for tuberculosis and a source of transmission to the wider community. Often ill-informed and inadequate treatment will continue to generate drug-resistant tuberculosis, posing a threat for the whole community.

The commitment of politicians and decision-makers is necessary to ensure the special measures in implementing a prison tuberculosis programme. The ministry of health must recognise prison health care as a health priority. Coordination is necessary between the ministry of health and whichever ministry is responsible for prisons (e.g. justice, interior, home affairs, state security). Sufficient funding for prison health services, including staff salaries, diagnostic facilities and provision of drugs, is necessary to ensure adequate prison health care. There is an urgent need to improve prison conditions, particularly to decrease over-crowding and also to improve nutrition and hygiene.

Political commitment is necessary to ensure that the revised prison tuberculosis control programme is effective. This means ensuring treatment completion in order to guarantee a high rate of cure of tuberculosis patients. From the public health perspective, an ineffective tuberculosis programme is worse than having no tuberculosis treatment at all. An ineffective programme results in more chronic cases, with more disease transmission, and the emergence of drug-resistance. A treatable epidemic becomes an untreatable epidemic.

### 4.2 ADMINISTRATIVE IMPLICATIONS OF COMMITMENT TO ENSURING COMPLETION OF TREATMENT

#### *Countries with an effective NTP*

Effective treatment of all prisoners with tuberculosis is possible only when an effective tuberculosis control programme outside prison ensures treatment completion for released prisoners. Ideally, a prison tuberculosis control programme should be an integral part of an effective NTP. In this case, prisoners with tuberculosis released at whatever stage of their treatment will be able to complete treatment on transfer to a general health facility.

### Countries without an effective NTP

Some countries do not have an effective NTP. In those countries, it is therefore not possible to guarantee completion of treatment for those prisoners with tuberculosis who are released before the end of treatment. It is therefore advisable to register on a DOTS programme only those prisoners with tuberculosis whose sentence is longer than the duration of tuberculosis treatment.

### Unsentenced prisoners

Commitment to ensuring completion of treatment implies special considerations for unsentenced prisoners (those awaiting charge, trial or sentence). The period of detention in remand custody is unpredictable, but is often too short for the completion of tuberculosis treatment. Authorities must ensure completion of treatment of an unsentenced prisoner with tuberculosis whether released or sentenced to prison. The authorities responsible for unsentenced prisoners therefore need to develop close links with both the health authorities in the community and the prison health authorities. Ensuring completion of treatment of unsentenced prisoners is crucial. Otherwise the custodial system for unsentenced prisoners will be a source of transmission of tuberculosis in the prisons and the wider community.

### Prison transfers

Commitment to ensuring completion of treatment also implies special considerations for prisoners transferred within a prison or between prisons. The administration of a tuberculosis control programme is more straightforward when a tuberculosis patient starts and completes treatment at the same centre. Prison authorities should ensure that a tuberculosis patient completes at least the initial phase of treatment without transfer between prisons. When a tuberculosis patient in the continuation phase of treatment transfers to another prison, the prison authorities must ensure completion of treatment in the other prison.

## 4.3 Prison health as the responsibility of public health authorities

Experience of health care delivery has accumulated in a range of prison systems. Generally, public health authorities deliver health care in prisons more effectively than prison authorities. Making prison health the responsibility of public health authorities has an added advantage. This strengthens the link between health care in the community and in prisons. Government commitment to improved prison health may involve a crucial administrative change. This change is the transfer of responsibility for prison health from the ministry responsible for prisons to the ministry of health.

### Suggestions for further reading

*Reyes H, Coninx R. Pitfalls of tuberculosis programmes in prisons. Br Med J 1997; 315: 1447-1450.*

PART II

# 5 CASE-FINDING

## 5.1 Approaches to case-finding

There are two main approaches to case-finding: a) identifying tuberculosis suspects among prisoners presenting to health services and detecting those who have tuberculosis; b) screening prisoners for tuberculosis. The priority for tuberculosis control is detecting the infectious tuberculosis cases among the suspects, since this is more cost-effective than screening.

## 5.2 Diagnostic approach

The highest priority for tuberculosis control is the detection and cure of the infectious cases, i.e. patients with sputum smear-positive PTB. Therefore all patients with clinical features suspicious of PTB must submit sputum for diagnostic sputum smear microscopy. Most tuberculosis suspects are ambulatory. A few tuberculosis suspects are severely ill and/or bed-bound and therefore need investigation as in-patients.

Clinical screening of prisoners by assessment of symptoms (principally cough for more than 3 weeks) identifies PTB suspects. The most cost-effective method of detecting the infectious cases among PTB suspects in high-prevalence populations is by sputum smear microscopy. A suspect with a positive sputum smear has sputum smear-positive PTB. A prisoner with sputum smear-positive PTB needs registration, treatment and cure. In most cases, a chest X-ray is unnecessary.

In some countries the initial diagnostic test for a tuberculosis suspect is a chest X-ray. Tuberculosis suspects must always submit sputum for microscopy whether or not they have a chest X-ray. Routine sputum culture for diagnosis is not feasible or recommended.

The diagnosis of individual cases of sputum smear-negative pulmonary and extrapulmonary tuberculosis is a clinical activity. This depends on the diagnostic process of clinical history and examination and diagnostic tests.

In populations with a high tuberculosis prevalence, the tuberculin skin test is of little value in the diagnosis of tuberculosis in adults. A positive tuberculin skin test does not by itself distinguish *M. tuberculosis* infection from tuberculosis disease. Previous exposure to environmental mycobacteria may also result in a false-positive test result. Conversely, the tuberculin skin test result may be negative, even when the patient does have tuberculosis. Conditions often associated with a false-negative tuberculin skin test include HIV infection, severe malnutrition and miliary tuberculosis.

## 5.3 Clinical features of PTB

### *Symptoms*

The most important symptoms in the diagnosis of PTB are cough for more than 3 weeks, sputum production and weight loss.

Over 90% of patients with sputum smear-positive PTB develop a cough soon after disease onset. However, cough is not specific to PTB, especially in an unhealthy prison environment. Cough is common in smokers and in patients with acute upper or lower respiratory tract infection. Most acute respiratory infections resolve within 3 weeks. Therefore a patient with a cough for more than 3 weeks is a PTB suspect and must submit sputum samples for diagnostic microscopy.

Patients with PTB may also have other symptoms. These may be respiratory or constitutional (general or systemic). The most important respiratory symptoms are haemoptysis, chest pain and breathlessness. The most important constitutional symptoms are fever/night sweats, tiredness and loss of appetite.

### *Physical signs*

The physical signs in patients with PTB are non-specific. They do not help to distinguish PTB from other chest diseases.

## 5.4 Diagnostic sputum smear microscopy

### *Collection of sputum samples*

A PTB suspect should submit 3 sputum samples for microscopy. The chances of finding tubercle bacilli are greater with 3 sputum samples than with 2 samples or 1 sample. Secretions build up in the airways overnight. So an early morning sputum sample is more likely than a sample later in the day to contain tubercle bacilli. Usually a PTB suspect can submit sputum samples under supervision as an out-patient. An in-patient should provide 3 early morning sputum samples under supervision in hospital. A health worker should advise the PTB suspect to cough and clear the back of the throat, and then to give a good cough and bring up sputum. A PTB suspect should produce sputum samples in a well-ventilated area.

Prisoners without tuberculosis may try to join a tuberculosis treatment programme because it may offer certain benefits. Some prisoners may obtain a positive sample by coercion or subterfuge. Tricks may include concealing positive sputums obtained from other prisoners in their hand or even inside the mouth. Therefore staff must observe a prisoner producing and submitting sputum samples. It may also be necessary for prisoners to wash their hands and rinse their mouth before submitting sputums. Conversely, some prisoners with tuberculosis may want to leave, or not even join, a programme. For example, some may think that showing evidence of active tuberculosis may delay their release. In this case they may try to present negative sputums obtained from other prisoners.

### Smear microscopy

The IUATLD manual "Tuberculosis guide for low income countries" includes an excellent technical guide for diagnostic sputum smear microscopy for tuberculosis.

## 5.5 Chest X-rays in diagnosis

All PTB suspects must submit sputum samples for diagnostic smear microscopy. There are specific indications for a chest X-ray in some cases of sputum smear-positive PTB. When there is clinical suspicion of tuberculosis despite negative sputum smears, the tuberculosis suspect needs a chest X-ray.

### Indications for chest X-ray

*Patients with sputum smear-positive tuberculosis*

In those few cases of sputum smear-positive PTB when a chest X-ray is necessary, the indications are as follows:

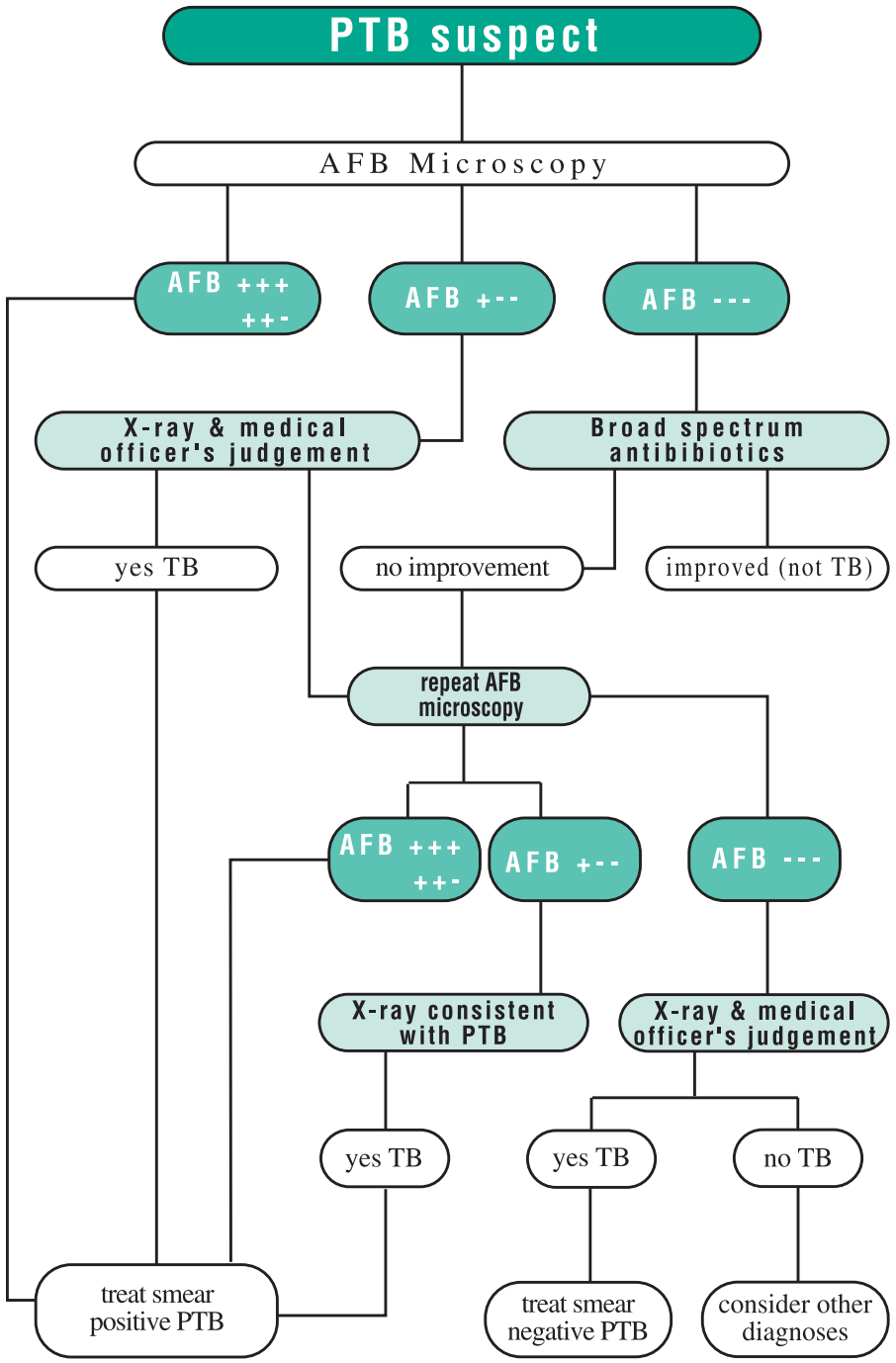
- suspected complications in the breathless patient, needing specific treatment, e.g. pneumothorax, (pericardial effusion or pleural effusion - positive sputum smear is rare);
- frequent or severe haemoptysis (to exclude bronchiectasis or aspergilloma);
- only 1 sputum smear positive out of 3 (in this case, an abnormal chest X-ray is a necessary additional criterion for the diagnosis of sputum smear-positive PTB).

*Tuberculosis suspects with negative sputum smears*

The patient who continues to cough despite a course of broad-spectrum antibiotic, and who has had 3 negative sputum smears, needs re-assessment. It is often worthwhile repeating the sputum smears after 2 weeks. If the clinician still suspects tuberculosis despite negative sputum smears, the patient needs a chest X-ray. The chest X-ray findings associated with PTB are non-specific. Diseases other than PTB can cause both the "classical" and the "atypical" chest X-ray findings.

## 5.6 Standardised management plan for PTB suspects

*Figure 2. The flow chart summarises the recommended diagnostic approach in PTB suspects.*



## 5.7 Extrapulmonary TB

The common forms of extrapulmonary tuberculosis are lymphadenopathy, pleural effusion, pericardial disease, miliary, meningitis, spinal. Patients usually present with constitutional features (fever, night sweats, weight loss) and local features related to the site of disease. Extrapulmonary tuberculosis is common in HIV-positive patients.

Since definitive diagnosis of extrapulmonary tuberculosis is often difficult, the diagnosis may be presumptive. This means excluding other conditions. The degree of certainty of diagnosis depends on the availability of diagnostic tools, e.g. specialised X-rays, biopsy procedures. Many patients with extrapulmonary tuberculosis also have co-existent PTB, so therefore also need sputum examination for AFBs and a chest X-ray.

## 5.8 Screening

The highest priority for tuberculosis control is the detection and cure of the infectious cases, i.e. prisoners with sputum smear-positive PTB. Identification of PTB suspects is by assessment of symptoms (principally cough for more than 3 weeks) in prisoners presenting to prison health services. The most cost-effective method of identifying the infectious cases among PTB suspects in high tuberculosis prevalence populations is by sputum smear microscopy.

Where resources and facilities are available, additional measures are useful to screen prisoners for PTB. The two main target groups are prisoners as they enter prison and the contacts of infectious cases. Contacts are those prisoners sharing the same accommodation as the index case. Initial screening of these two groups consists of asking about respiratory symptoms. For those with cough of 3 weeks or more, the minimum screening should be sputum smear microscopy. An additional screening measure may be chest radiography. Some high tuberculosis prevalence, middle income, countries may have the resources and facilities to screen all prisoners in these two groups by chest radiography. Tuberculin testing is of little value in the diagnosis of tuberculosis in adults in populations with a high tuberculosis prevalence.

### *Suggestions for further reading*

*Maher D, Chaulet P, Spinaci S, Harries A. Treatment of tuberculosis: guidelines for national programmes. Second edition. WHO/TB/97.220. Geneva: WHO, 1997.*

*Harries AD, Maher D. TB/HIV: A Clinical Manual. WHO/TB/96.200. Geneva: WHO, 1996.*

*Toman K. Tuberculosis. Case finding and chemotherapy. Geneva: WHO, 1979.*

*International Union Against tuberculosis and Lung Disease. Tuberculosis guide for low-income countries. Fourth edition. pmi Verlagsgruppe. Frankfurt, 1996.*

*Crofton J, Horne N and Miller F. Clinical Tuberculosis. The MacMillan Press Limited. 1992.*

PART II

# 6 STANDARDISED CASE DEFINITIONS AND TREATMENT CATEGORIES

## 6.1 Case definitions

The diagnosis of tuberculosis refers to the recognition of an active case, i.e. a patient with symptomatic disease due to lesions caused by *M. tuberculosis*. On making the diagnosis of tuberculosis, it is also necessary to define the type of tuberculosis case, i.e. to make a case definition.

The box shows the four purposes of making case definitions.

- for proper patient registration and case notification
- to evaluate the trend in the proportions of new smear-positive cases and smear-positive relapse and other retreatment cases
- to allocate cases to standardised treatment categories
- for cohort analysis

The box shows the three reasons for matching treatment to standardised category.

- to prioritise resource allocation to the treatment of sputum smear-positive cases
- to avoid under-treatment of sputum smear-positive cases and therefore to prevent acquired resistance
- to increase cost-effective use of resources and to minimise side-effects for patients by avoiding unnecessary over-treatment

The box shows the four determinants of case definition.

- site of tuberculosis
- severity of tuberculosis
- bacteriology (result of sputum smear)
- history of previous treatment of tuberculosis

## 6.2 Determinants of case definitions

### *Site of disease: pulmonary or extrapulmonary*

In general, recommended treatment regimens are similar irrespective of site (although, for example, some authorities recommend a prolonged continuation phase for tuberculous meningitis). The importance of defining site is for recording and reporting purposes.

Note:

- Pulmonary tuberculosis refers to disease involving the lung parenchyma. Therefore tuberculous intrathoracic lymphadenopathy (mediastinal and/or hilar) or tuberculous pleural effusion, without radiographic abnormalities in the lungs, constitute a case of *extra*-pulmonary tuberculosis.
- A patient with both pulmonary and extra-pulmonary tuberculosis constitutes a case of *pulmonary* tuberculosis.
- The case definition of an extra-pulmonary case with several sites affected depends on the site representing the most severe form of disease.

## Severity of tuberculosis

Bacillary load, extent of disease and anatomical site are considerations in determining tuberculosis disease severity and therefore the appropriate treatment. Involvement of an anatomical site results in classification as severe disease if there is either a significant acute threat to life (e.g. pericardial tuberculosis) or a risk of subsequent severe handicap (e.g. spinal tuberculosis), or both (e.g. meningeal tuberculosis).

The following forms of extra-pulmonary tuberculosis are classified as severe: meningitis, miliary, pericarditis, peritonitis, bilateral or extensive pleural effusion, spinal, intestinal, genito-urinary.

The following forms of extra-pulmonary tuberculosis are classified as less severe: lymph node, pleural effusion (unilateral), bone (excluding spine), peripheral joint, skin.

## Bacteriology (result of sputum smear)

The importance of defining the smear result in pulmonary cases is for the following:

- the identification of smear-positive cases (because they are the most infectious cases and they have an increased mortality);
- recording and reporting (smear-positive cases are the only cases for which bacteriological monitoring of cure is available).

### *Smear-positive pulmonary tuberculosis*

**EITHER:** a patient with at least two sputum specimens positive for acid-fast bacilli by microscopy;

**OR:** a patient with at least one sputum specimen positive for acid-fast bacilli by microscopy and radiographic abnormalities consistent with pulmonary tuberculosis;
and a decision by a physician to treat with a full curative course of anti-tuberculosis chemotherapy;

**OR:** a patient with at least one sputum specimen positive for acid-fast bacilli by microscopy, which is culture positive for *M. tuberculosis*.

***Smear-negative pulmonary tuberculosis***

**EITHER:** a patient who fulfils all the following criteria:
two sets (taken at least 2 weeks apart) of at least two sputum specimens negative for acid-fast bacilli on microscopy;
radiographic abnormalities consistent with pulmonary tuberculosis and a lack of clinical response despite one week of a broad-spectrum antibiotic;
a decision by a physician to treat with a full curative course of anti-tuberculosis chemotherapy;

**OR:** a patient who fulfills all the following criteria:
severely ill;
at least two sputum specimens negative for acid-fast bacilli by microscopy;
radiographic abnormalities consistent with extensive pulmonary tuberculosis (interstitial or miliary);
a decision by a physician to treat with a full curative course of anti-tuberculosis chemotherapy;

**OR:** a patient whose initial sputum smears were negative, who had sputum sent for culture initially, and whose subsequent sputum culture result is positive.

**N.B.** It is apparent from the above definitions that in the absence of culture, standard chest radiography is necessary to document cases of smear-negative PTB. Fluoroscopy examination results are not acceptable as documented evidence of PTB.

### *History of previous treatment: return after treatment interruption (default), treatment failure, relapse*

It is important for the following purposes to define a case according to whether or not the patient has previously received anti-tuberculosis treatment:

- the identification of patients at increased risk of acquired drug resistance and the prescription of appropriate treatment;
- epidemiological monitoring.

## 6.3 Definitions

***New case***

A patient who has never had treatment for tuberculosis or who has taken anti-tuberculosis drugs for less than four weeks.

***Relapse***

A patient who has been declared cured of any form of tuberculosis in the past by a physician, after one full course of chemotherapy, and has become sputum smear-positive.

***Treatment failure***

A 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 (T.A.I.) (previously known as return after default)***

A patient who interrupts treatment for two months or more, and returns to the health service with smear-positive sputum (sometimes smear-negative but still with active tuberculosis as judged on clinical and radiological assessment).

***Chronic case***

A patient who remained or became again smear-positive after completing a fully supervised retreatment regimen.

Note:

Smear-negative pulmonary cases and extra-pulmonary cases may also fail to respond to treatment or become relapses or chronic cases. However, this should be a rare event supported by pathological or bacteriological evidence.

## 6.4 Importance of case definitions for registration, notification, and treatment categories.

Case definitions are used for 3 purposes: registration of cases, notification (quarterly reports) and determination of treatment categories.

### Registration of cases

On diagnosis, every tuberculosis patient must appear in the register under one of the following 6 categories:

- new (smear positive, smear negative and extra-pulmonary)
- relapse
- failure
- treatment after interruption (default)
- transfer in (from another recording and reporting unit)
- other (e.g. chronic cases)

### Notification of cases

The prison tuberculosis coordinator notifies cases to the NTP by quarterly reports, prepared from the prison tuberculosis register, on the following patient categories:

- new (smear positive, smear negative and extra-pulmonary)
- relapse

### Treatment categories

For each tuberculosis patient, the recommended regimen depends on the treatment category (I, II, III or IV) determined by the case definition.

## 6.5 Standardised treatment categories

Based on case definition, a tuberculosis patient falls into one of four categories for treatment. The categories are in order of priority. The highest priority is to treat Category I patients. The lowest priority is to treat Category IV patients. The table below shows the patients belonging to each category.

| TB TREATMENT CATEGORY | PATIENTS |
|---|---|
| Category I | • new sputum smear-positive PTB<br>• newly diagnosed seriously ill patients with severe forms of tuberculosis |
| Category II | • relapse<br>• treatment failure<br>• return after treatment interruption (default) |
| Category III | • sputum smear-negative PTB with limited parenchymal involvement<br>• extrapulmonary tuberculosis (less severe forms) |
| Category IV | • chronic cases |

### *Suggestions for further reading*

*Maher D, Chaulet P, Spinaci S, Harries A. Treatment of tuberculosis: guidelines for national programmes. Second edition. WHO/TB/97.220. Geneva: WHO, 1997.*

*International Union Against Tuberculosis and Lung Disease. Tuberculosis Guide for Low Income Countries. Fourth edition. pmi Verlagsgruppe. Frankfurt, 1996.*

*Managing TB at District Level. A Training Course. WHO Global Tuberculosis Programme, Geneva, 1992. WHO/TB/96.211*

PART II

# 7 TUBERCULOSIS TREATMENT

## 7.1 Administrative commitment to ensuring completion of treatment

The ability to ensure completion of treatment is a prerequisite in establishing an effective prison tuberculosis control programme. In those countries with an effective, NTP, close liaison between the prisons and the NTP is necessary to ensure that prisoners with tuberculosis complete treatment after release. In those countries without an effective NTP, a prison DOTS programme should register only those prisoners with tuberculosis whose sentence is longer than the duration of tuberculosis treatment.

## 7.2 Standardised tuberculosis treatment regimens

The aims of anti-tuberculosis treatment are the following: to cure the patient; to prevent death from tuberculosis or from its late effects; to prevent relapse; to decrease transmission to others. There are many different possible anti-tuberculosis treatment regimens. However, WHO and the IUATLD recommend certain standardised anti-tuberculosis treatment regimens. It is important to follow recommended standardised treatment regimens in line with NTP policy. When properly applied, these standardised regimens fulfill the above aims of anti-tuberculosis treatment. The regimens are affordable. In fact, the World Bank recognises short-course chemotherapy (SCC) as one of the most cost-effective of all health interventions.

## 7.3 Tuberculosis treatment regimens

Treatment regimens have an initial (intensive) phase and a continuation phase.

### *New cases*

***Initial phase (2 months)***

During the initial phase, there is rapid killing of tubercle bacilli. Infectious patients become non-infectious within about 2 weeks. Symptoms improve. The vast majority of patients with sputum smear-positive PTB become sputum smear-negative within 2 months. Directly observed therapy is essential in the initial phase to ensure that the patient takes every single dose. This protects rifampicin against the development of drug resistance. The risk of drug resistance is higher during the early stages of anti-tuberculosis drug treatment when there are more tubercle bacilli.

***Continuation phase (4-6 months)***

Fewer drugs are necessary, but for a longer time, in the continuation phase. The drugs eliminate the remaining tubercle bacilli. Killing the persisters prevents relapse after completion of treatment. Directly observed therapy is always recommended when the patient receives rifampicin in the continuation phase. If local conditions do not allow directly observed therapy, the next best is as close supervision as possible, for example weekly supervision, of a non-rifampicin-

containing continuation phase. The risk of drug resistance is less during the continuation phase when there are fewer tubercle bacilli.

### Retreatment cases

The initial phase lasts 3 months and the continuation phase lasts 5 months. Direct observation of treatment is recommended throughout the whole retreatment regimen.

## 7.4 The essential anti-tuberculosis drugs

### Drugs and recommended doses

*Table 2. The essential anti-tuberculosis drugs and recommended doses.*

| ESSENTIAL ANTI-TB DRUG (ABBREVIATION) | RECOMMENDED DOSE (mg/kg) | | |
|---|---|---|---|
| | DAILY | INTERMITTENT 3X/WEEK | INTERMITTENT 2X/WEEK |
| isoniazid (H) | 5 | 10 | 15 |
| rifampicin (R) | 10 | 10 | 10 |
| pyrazinamide (Z) | 25 | 35 | 50 |
| streptomycin (S) | 15 | 15 | 15 |
| ethambutol (E) | 15 | (30) | (45) |
| thiacetazone (T) | 3 | not applicable | |

**N.B.** The available formulations and combinations of these drugs vary from country to country. It is important to follow recommended regimens in line with NTP policy.

***Intermittent use***

Thiacetazone is the only anti-tuberculosis drug not effective when given intermittently (2 or 3 times a week). The efficacy of intermittent ethambutol is not proven.

### Standard code for tuberculosis treatment regimens

There is a standard code for tuberculosis treatment regimens. Each anti-tuberculosis drug has an abbreviation (shown above). A regimen consists of 2 phases. The number before a phase is the duration of that phase in months. A number in subscript (e.g.$_3$) after a letter is the number of doses of that drug per week. If there is no number in subscript after a letter, then treatment with that drug is daily. An alternative drug (or drugs) appears as a letter (or letters) in brackets.

***Examples***

**2 EHRZ / 6 HE.** This is a common regimen.
The initial phase is 2 EHRZ. The duration of the phase is 2 months.
Drug treatment is daily (no subscript number, e.g.$_3$ after the letters), with ethambutol (E), isoniazid (H), rifampicin (R) and pyrazinamide (Z).

The continuation phase is 6 HE. The duration of the phase is 6 months.
Drug treatment is daily, with isoniazid (H) and ethambutol (E).

**2 EHRZ / 4 $H_3R_3$**. In some countries, resources are available to provide rifampicin in the continuation phase as well as in the initial phase. This 6 month regimen facilitates completion of treatment in prison.
The initial phase (2 EHRZ) is the same as before.
The continuation phase is 4 $H_3R_3$. The duration is 4 months, with isoniazid and rifampicin three times per week (subscript number$_3$ after the letters).

## 7.5 Recommended treatment regimens

There are several different possible regimens. The regimen recommended depends on the patient treatment category. Table 3 shows possible alternative regimens for each treatment category. It is important to follow recommended regimens in line with NTP policy.

*Table 3. Possible alternative treatment regimens for each treatment category*

| TB TREATMENT CATEGORY | TB PATIENTS | ALTERNATIVE TB TREATMENT REGIMENS | |
|---|---|---|---|
| | | INITIAL PHASE (DAILY OR 3 TIMES PER WEEK) | CONTINUATION PHASE |
| I | New smear-positive PTB; new smear-negative PTB with extensive parenchymal involvement; new cases of severe forms of extra-pulmonary TB. | 2 EHRZ (SHRZ)<br>2 EHRZ (SHRZ)<br>2 EHRZ (SHRZ) | 6 HE<br>4 HR<br>4 $H_3R_3$ |
| II | Sputum smear-positive: relapse; treatment failure; treatment after interruption. | 2 SHRZE / 1 HRZE<br>2 SHRZE / 1 HRZE | 5 $H_3R_3E_3$<br>5 HRE |
| III | New smear-negative PTB (other than in Category 1); new less severe forms of extra-pulmonary TB. | 2 HRZ<br>2 HRZ<br>2 HRZ | 6 HE<br>4 HR<br>4 $H_3R_3$ |
| IV | Chronic case (still sputum-positive after supervised re-treatment) | NOT APPLICABLE (Refer to WHO guidelines for use of second-line drugs in specialized centres) | |

**N.B.** Some authorities recommend a 7 month continuation phase with daily isoniazid and rifampicin (7 HR) for Category 1 patients with the following forms of tuberculosis: tuberculous meningitis, miliary tuberculosis, spinal tuberculosis with neurological signs.

## 7.6 HIV infection and prisoners with tuberculosis

### *Treatment in HIV-infected prisoners with tuberculosis*

The same criteria determine treatment categories for tuberculosis patients, irrespective of HIV status. Generally, anti-tuberculosis drug treatment is the same for HIV-infected as for non-HIV-infected prisoners with tuberculosis, except for the use of thiacetazone.

Thiacetazone is associated with a high risk of severe, and sometimes fatal, skin reaction in HIV-infected individuals. Patients with known or suspected HIV infection must receive ethambutol instead of thiacetazone. At present some countries do not have the resources to substitute ethambutol for thiacetazone. The most effective treatment available in some countries may still include thiacetazone. Where it is not possible to avoid the use of thiacetazone, it is essential to warn patients about the risk of severe skin reactions. Health staff must advise the patient to stop thiacetazone at once and report if itching or a skin reaction occurs.

It is not always possible to ensure adequate sterilisation of needles and syringes used for streptomycin injections. There is a risk of transmission of HIV and other blood-born pathogens between patients. Streptomycin injections are very painful in wasted HIV-infected tuberculosis patients. Therefore many NTPs now recommend the use of ethambutol in place of streptomycin.

### *Response to anti-tuberculosis treatment*

The case fatality of HIV-infected tuberculosis (TB/HIV) patients one year after starting anti-tuberculosis treatment is about 20%. This case fatality is greater than that in non-HIV-infected tuberculosis patients. The excess deaths in HIV-infected tuberculosis patients during and after treatment are partly due to tuberculosis itself and partly due to other HIV-related problems. Case fatality is less in TB/HIV patients treated with SCC than with the old standard regimen (2 SHT or SHE / 10 HT or HE). This is partly because SCC is a more effective anti-tuberculosis treatment. Also, rifampicin has broad-spectrum antimicrobial activity as well as anti-tuberculosis activity. This may decrease deaths due to HIV-related bacterial infections during anti-tuberculosis treatment.

Several studies have assessed the clinical, radiological, and microbiological response to SCC in HIV-positive and HIV-negative tuberculosis patients. Excluding patients who died, response rates were similar in HIV-positive and HIV-negative tuberculosis patients. The recurrence rate is similar in HIV-positive and HIV-negative tuberculosis patients who complete SCC. The relapse rate is higher in HIV-positive than in HIV-negative tuberculosis patients treated with the old standard treatment regimens.

### *HIV counselling and testing of prisoners with tuberculosis*

The link between HIV and tuberculosis is becoming increasingly well known to many people. A prisoner with tuberculosis may therefore be well aware of the possibility of also having HIV infection. It is important to offer counselling and voluntary HIV testing, if available, to prisoners with tuberculosis on account of the following possible benefits:

- prisoners may want the chance to know their HIV status;
- better diagnosis and management of other HIV-related illnesses;
- avoidance of drugs associated with a high risk of side-effects;
- avoidance of high-risk activities for HIV transmission.

Confidential counselling is essential before and after HIV antibody testing. The prisoner must understand what the test involves and the implications of testing and give explicit informed consent. The counsellor provides support. Counselling is a dialogue between the counsellor and the person who is counselled. The Joint United Nations Programme on HIV/AIDS (UNAIDS) is against compulsory HIV testing. A policy of compulsory HIV testing of prisoners with tuberculosis would be counter-productive. This policy would deter prisoners from seeking care, decrease HIV case-finding, and reduce the credibility of prison health services.

## 7.7 Symptom-based approach to adverse effects of anti-tuberculosis drugs

Most patients complete their treatment without any significant adverse effects of drugs. However, a few patients do develop adverse effects and therefore clinical monitoring of all tuberculosis patients for adverse effects is important during treatment. Routine laboratory monitoring is not necessary.

Prison health staff can monitor adverse effects of drugs in the following two ways. First, they can teach patients how to recognise symptoms of common adverse effects and to report if they develop such symptoms. Second, they can specifically ask about symptoms when patients report to collect drugs. Table 4 shows a symptom-based approach to adverse effects. Adverse effects are classified as minor or major. In general, a patient who develops minor adverse effects should continue anti-tuberculosis treatment, usually at the same dose but sometimes at a reduced dose. The patient also receives symptomatic treatment. If a patient develops a major side effect, the treatment or the offending drug is stopped. Further management depends on the nature of the adverse reaction and is shown in the table. Patients with major adverse reactions should be managed in hospital.

*Table 4. Symptom-based approach to adverse effects of anti-tuberculosis drugs*

| Side Effects | Drug(s) probably responsible | Management |
|---|---|---|
| **Minor** | | **Continue anti-tuberculosis drugs, check drug doses** |
| Anorexia, nausea, abdominal pain | Rifampicin | Give drugs last thing at night |
| Joint pains | Pyrazinamide | Aspirin |
| Burning sensation in the feet | Isoniazid | Pyridoxine 100 mg daily |
| Orange/red urine | Rifampicin | Reassurance |
| **Major** | | **Stop responsible drug(s)** |
| Itching of skin, skin rash | Thioacetazone (Streptomycin) | Stop anti-tuberculosis drugs |
| Deafness | Streptomycin | Stop streptomycin, use ethambutol |
| Dizziness (vertigo and nystagmus) | Streptomycin | Stop streptomycin, use ethambutol |
| Jaundice (other causes excluded) | Most anti-tuberculosis drugs (especially isoniazid, pyrazinamide and rifampicin) | Stop anti-tuberculosis drugs |
| Vomiting and confusion (suspect drug-induced acute liver failure) | Most anti-tuberculosis drugs | Stop anti-tuberculosis drugs. Urgent liver function tests and prothrombin time |
| Visual impairment | Ethambutol | Stop ethambutol |
| Shock, purpura, acute renal failure | Rifampicin | Stop rifampicin |

## 7.8 Adherence to treatment

A relationship of trust and confidence between the prisoner with tuberculosis and prison health staff promotes adherence to treatment. It is vital for prison health staff to be polite and considerate to the tuberculosis patient's needs at every contact with the patient. Adherence to treatment requires the patient's understanding of the disease and what is necessary for successful treatment and cure. At the time of registration of a patient starting treatment, it is important to set aside enough time to meet with the patient. This is an important opportunity to advise, counsel and educate the patient. Also, it is important to identify potential problems which the patient may face during the initial phase of treatment. A new meeting with the patient at the end of the initial phase of treatment enables explanation of progress and the need for the continuation phase.

Many tuberculosis patients receiving self-administered treatment will not adhere to treatment. Since it is impossible to predict who will or will not adhere to treatment, directly observed treatment is necessary to ensure adherence. Directly observed treatment means that a supervisor watches the patient swallowing the tablets. This ensures that a tuberculosis patient takes the right drugs, in the right doses, at the right intervals. If a prisoner with tuberculosis misses one attendance for directly observed treatment, it is necessary to find that patient and continue treatment. Prisoners with tuberculosis should ideally receive the whole treatment (initial and continuation phases) under direct observation. There is a risk that self-administration of treatment will lead to diversion of drugs to the prison black market.

Prison could be an ideal environment for ensuring direct observation of treatment. In practice, prisoners with tuberculosis may use various tricks to avoid swallowing their tablets. They may do this on their own initiative or under coercion from other prisoners more senior in the hierarchy. They can then smuggle the tablets back to their cells, from where the tablets enter the prison black market. Prison health staff may come under pressure to look the other way. Prison administrative authorities and health staff need to be aware of the problems in ensuring direct observation of treatment and maintain close supervision.

Direct observation of treatment means ensuring adherence to treatment by supporting prisoners throughout their treatment. It does not mean coercion, which has no place in the care of prisoners with tuberculosis.

## 7.9 Drug resistance

Often ill-informed and inadequate treatment in prisons will continue to generate drug-resistant tuberculosis, posing a threat for the whole community. It is of vital importance to prevent resistance to rifampicin, the most effective anti-tuberculosis drug. It is unlikely that a new anti-tuberculosis drug will become widely available in the near future. If rifampicin resistance becomes widespread, tuberculosis will be effectively untreatable. The best way to prevent the emergence of rifampicin resistance in prisons is to implement effective tuberculosis control. This includes ensuring direct observation of therapy. The use whenever possible of fixed-dose combination tablets helps avoid the danger of the use of rifampicin alone.

The definition of multi-drug resistance is resistance to at least isoniazid and rifampicin, the two most effective anti-tuberculosis drugs. Multi-drug resistant tuberculosis arises from failure to deliver anti-tuberculosis drug treatment properly. It represents failure of tuberculosis control. In many high tuberculosis prevalence countries, second-line drugs are prohibitively expensive and unavailable, e.g. ethionamide, cycloserine, kanamycin, capreomycin. Multi-drug resistant tuberculosis is therefore often untreatable. When faced with multi-drug resistant tuberculosis, the first priority is to devote time, effort and resources to improving tuberculosis control. In some countries, one or two specialist centres may have the specialist expertise and second-line drugs available to treat patients with multi-drug resistant tuberculosis.

## Suggestions for further reading

*Maher D, Chaulet P, Spinaci S, Harries A. Treatment of tuberculosis: guidelines for national programmes. Second edition. WHO/TB/97.220. Geneva: WHO, 1997.*

*International Union Against Tuberculosis and Lung Disease. Tuberculosis Guide for Low Income Countries. Fourth edition. pmi Verlagsgruppe. Frankfurt, 1996.*

*Managing TB at District Level. A Training Course. WHO Global Tuberculosis Programme, Geneva, 1992. WHO/TB/96.211*

*Harries AD, Maher D. TB/HIV: A Clinical Manual. WHO/TB/96.200. Geneva, 1996.*

*Joint United Nations Programme on HIV/AIDS. Prisons and AIDS. UNAIDS technical update. UNAIDS best practice collection. April 1997, Geneva, Switzerland.*

*International Union Against Tuberculosis and Lung Disease. Treatment regimens in HIV-infected tuberculosis patients. An official statement of the International Union Against Tuberculosis and Lung Disease. Int J Tuberc Lung Dis 1998; 2(2): 175-178.*

*Crofton J, Chaulet P, Maher D. Guidelines for the management of drug-resistant tuberculosis. WHO/TB/96.210 (Rev.1). Geneva: WHO, 1997.*

*Reyes H, Coninx R. Pitfalls of tuberculosis programmes in prisons. Br Med J 1997; 315: 1447-1450.*

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PART II

# 8 MONITORING OF PATIENTS' RESPONSE TO TREATMENT

## 8.1 Monitoring the response to treatment

It is necessary to monitor the treatment response of tuberculosis patients individually and collectively. Monitoring of individual sputum smear-positive patients by sputum smear microscopy enables documentation of progress towards cure. It is unnecessary and wasteful of resources to monitor the patient by chest radiography. Monitoring of the outcome of treatment of tuberculosis patients collectively by cohort analysis enables documentation of tuberculosis control programme performance. For patients with sputum smear-negative PTB and extra-pulmonary tuberculosis, clinical monitoring is the usual way of assessing response to treatment.

## 8.2 Monitoring the response of individual patients

### *New sputum smear-positive PTB patients (Category I)*

Table 5 shows when sputum smears should be performed in the six month and eight month treatment regimens. In general, two sputum specimens should be collected for smear examination at each follow-up sputum check. Negative sputum smears at the times shown in the table indicate good treatment progress, which encourages the patient and the health worker responsible for supervising the treatment.

*Table 5. Monitoring by sputum smear examination of patients with new smear-positive pulmonary tuberculosis*

| Sputum Smear Examination | Treatment Regimens | |
|---|---|---|
| | six month regimen | Eight month regimen |
| At end of initial phase | End of second month | End of second month |
| In continuation phase | End of fourth month | End of fifth month |
| At end of treatment | In the sixth month | In the eighth month |

If the sputum smears are positive at the end of the second month, the initial phase is prolonged for a third month. The patient then starts the continuation phase. If the sputum smears are still positive at the end of the 4th/5th month, this constitutes treatment failure. The patient is re-registered as a treatment failure and starts a full course of the retreatment regimen as a Category II patient.

### *Previously treated sputum smear-positive PTB patients (Category II)*

Sputum smear examination is performed at the end of the initial phase of treatment (at the end of the third month), during the continuation phase of treatment (at the end of the fifth month) and at the end of treatment (at the end of the eight month). If the patient is sputum smear-positive at the end of the third month, the initial phase of treatment with four drugs is extended by another month and sputum smears examined again at the end of the fourth month.

Where possible, if the patient still has positive smears at the end of the fourth month, sputum is sent to the laboratory for culture and sensitivity. The patient then starts the continuation phase. In some cases, the culture and sensitivity results subsequently show resistance to 2 or more of the 3 drugs employed in the continuation phase. Referral of these cases is advisable when possible to a specialized centre for consideration of treatment with second-line anti-tuberculosis drugs. Where there are no facilities for culture and sensitivity testing, the patient continues treatment right until the end of the re-treatment regimen.

### *New sputum smear-negative PTB patients (usually Category III)*

It is important to check sputum smears at the end of the second month. In the case of a positive smear, consider the following possibilities: an error at the time of initial diagnosis (i.e. a true smear-positive patient was misdiagnosed as smear-negative); non-adherence to treatment. Sometimes a patient who was initially diagnosed as sputum smear-negative and treated as a category III patient has a positive sputum smear at the end of the second month. In this case it is necessary to re-register the patient as a (previously treated) sputum smear-positive and start a full course of treatment as a Category II patient.

## 8.3 Recording standardised treatment outcomes

At the end of the treatment course in each individual patient with sputum smear-positive PTB, the prison tuberculosis coordinator records the treatment outcome in the prison tuberculosis register. Table 6 shows the standardized definitions of treatment outcomes. In smear-negative PTB and extra-pulmonary tuberculosis patients, cure and treatment failure cannot be assessed because these outcome indicators depend on sputum smear examination. However, outcome indicators such as treatment completion, death, default and transfer out should be recorded for these patients in the prison tuberculosis register.

*Table 6. Recording treatment outcome in smear-positive PTB patients*

| | |
|---|---|
| Cure | Patient who is smear-negative at, or one month prior to, the completion of treatment and on at least one previous occasion |
| Treatment completed | Patient who has completed treatment but in whom smear results are not available on at least two occasions prior to the completion of 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 2 months or more |
| Transfer out | Patient who has been transferred to another reporting unit and for whom the treatment outcome is not known |

## 8.4 Cohort analysis of treatment outcome in smear-positive PTB patients

The prison tuberculosis coordinator should perform cohort analysis of treatment outcome every quarter (i.e. 3 month period) and at the end of every year. A cohort of tuberculosis patients consists of all those sputum smear-positive PTB patients registered during a certain time which is usually a quarter of a year (i.e. 1 January to 31 March, 1 April to 30 June, 1 July to 30 September, and 1 October to 31 December). New and previously treated patients form separate cohorts. Evaluation of the end of treatment (6 or 8 months) outcome takes place about three months after all patients in the cohort have completed their course of treatment.

The prison tuberculosis coordinator sends the quarterly reports on treatment outcome to the NTP. The NTP verifies that the reports are correct, complete and consistent. The NTP compiles cohort analysis reports on all sputum smear-positive patients registered nationally. Cohort analysis is the key management tool used to evaluate the effectiveness of tuberculosis control programme delivery. It enables the identification of problems, so that those involved in tuberculosis control can institute appropriate action to overcome them and improve programme performance.

### *Suggestions for further reading*

*Maher D, Chaulet P, Spinaci S, Harries A. Treatment of tuberculosis: guidelines for national programmes. Second edition. WHO/TB/97.220. Geneva: WHO, 1997.*

*International Union Against Tuberculosis and Lung Disease. Tuberculosis Guide for Low Income Countries. Fourth edition. pmi Verlagsgruppe. Frankfurt, 1996.*

*Managing TB at District Level. A Training Course. WHO Global Tuberculosis Programme, Geneva, 1994. WHO/TB/96.211*

*Managing TB at National Level. A Training Course. WHO Global Tuberculosis Programme, Geneva, 1996. WHO/TB/96.203*

PART II

# 9 SUPPLY OF ANTI-TUBERCULOSIS DRUGS AND DIAGNOSTIC MATERIALS

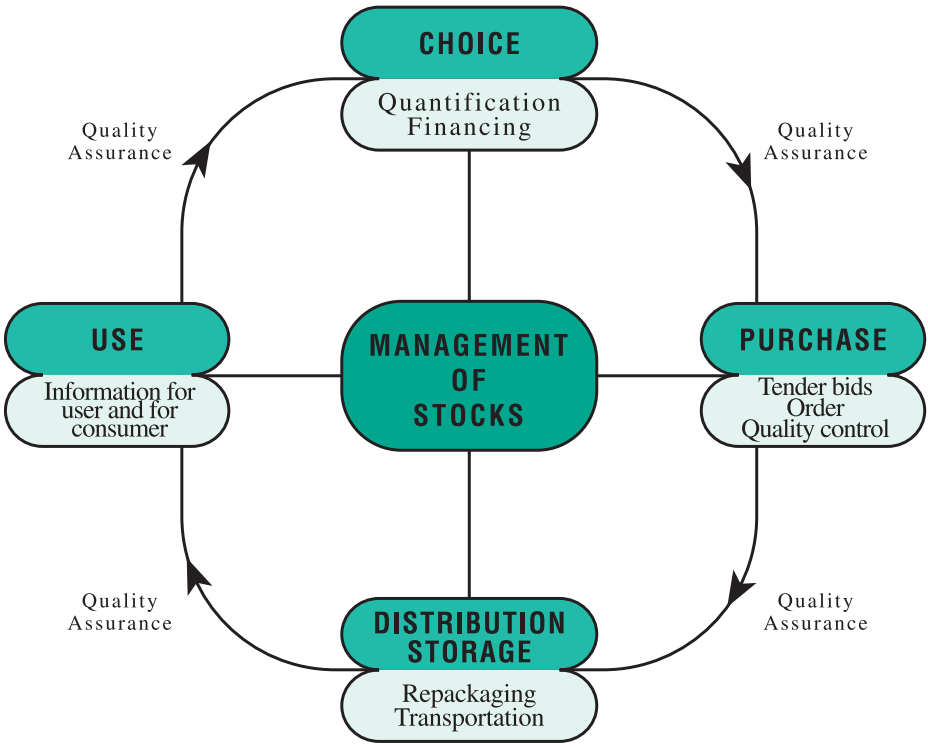
## 9.1 Coordination with national tuberculosis programme

Ideally, a prison tuberculosis control programme should be an integral part of an effective NTP. In this case, the supply of anti-tuberculosis drugs and diagnostic materials is through the NTP supply system.

A country without an effective NTP may want to start implementing effective tuberculosis control in prisons. The recommendation is to register on a DOTS programme only those prisoners with tuberculosis whose sentence is longer than the duration of tuberculosis treatment. Without an effective NTP, the prison tuberculosis control programme must assume responsibility for a regular supply of anti-tuberculosis drugs and diagnostic materials.

## 9.2 Supply of anti-tuberculosis drugs

Whether the supply of anti-tuberculosis drugs is through the NTP or the prison tuberculosis control programme, it is necessary to follow each step of the drug logistic cycle to ensure regular supplies. The figure shows the drug logistic cycle.



## 9.3 Determining the right quantities of each drug

Calculation of these quantities is based on the number of cases in the different treatment categories notified the previous year, the standardized treatment regimens used, and the existing stocks. It is essential to plan for a reserve prison stock of three months. The WHO training modules on tuberculosis management provide practical methods to quantify drug needs.

## 9.4 Distributing and storing anti-tuberculosis drugs

To avoid shortages, distribution of drug stocks to prisons should be every quarter rather than once a year. Storage of anti-tuberculosis drugs involves the following: ensuring proper storage conditions (temperature and humidity); management inside the stores (appropriate space for stocks, control of expiry date, implementation of FEFO principle, reserve stocks); implementation of a drug accounting system where the drugs are stored or administered.

## 9.5 Supply of diagnostic materials

The principles of the drug logistic cycle, of determining quantities, and of distribution and storage also apply to the supply of diagnostic materials.

### *Suggestions for further reading*

*Managing tuberculosis at district level. A training course.*
*WHO Global Tuberculosis Programme, Geneva, 1992. WHO/TB/96.211.*

*Managing tuberculosis at national level. A training course.*
*WHO Global Tuberculosis Programme, Geneva, 1996. WHO/TB/96.203.*

*WHO, 1995. Essential drugs. WHO Model List: revised in December 1995.*
*WHO Drug Information, Vol. 9, No. 4, 223-234.*

*WHO, 1995. WHO Technical Report Series, No.850, 1995. The use of essential drugs.*
*Sixth report of the WHO Expert Committee.*

*WHO, 1988. Guidelines for developing national drug policies.*
*(New edition in preparation). Geneva, Switzerland.*

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*Contribution to updating the WHO guidelines for developing national drug policies.*
*Geneva, Switzerland.*

PART II

# 10 PREVENTION OF TUBERCULOSIS

## 10.1 General measures for prevention of tuberculosis

General and specific measures may protect people in prisons from exposure to tuberculosis and decrease the risk of progression of *M. tuberculosis* infection to disease. There are two very important general measures for the prevention of tuberculosis in prisons. These are to improve prison conditions (particularly to decrease over-crowding and also to improve nutrition and hygiene) and to ensure access to improved prison health services.

## 10.2 Protection of people in prisons against exposure to tuberculosis

The prevalence of tuberculosis in prisons is high and prison accommodation is often crowded and badly ventilated. People in prisons (prisoners and prison staff) therefore face daily exposure to tuberculosis. There are specific measures that can protect people in prisons from exposure to tuberculosis.

### 10.2.1 *Case detection and cure*

Prompt case detection and cure of the infectious cases interrupts the chain of transmission. Therefore prompt detection and treatment of patients with sputum smear-positive PTB helps to reduce exposure to tuberculosis. An effective prison tuberculosis control programme is therefore crucial to prevention of tuberculosis in prisons. It is in the interest of prison staff to promote effective case detection and cure, to decease their own risk of exposure. Depending on the availability of resources, screening of prisoners on entry into prison may have a role in early case detection.

### 10.2.2 *Environmental control*

Good ventilation helps reduce tuberculosis transmission indoors. Sunlight is a source of ultraviolet light which can kill tubercle bacilli. So ideally, prison hospital wards should have large windows. In prison hospital wards, out-patient clinics, sputum collection rooms, and microbiology laboratories, a simple measure is to keep the doors closed and the windows open (weather permitting). Where resources permit, authorities should install an exhaust fan, blowing potentially contaminated air to the outside.

### 10.2.3 *Face-masks*

High efficiency particulate air (HEPA) masks provide protection against tuberculosis by filtering out droplet nuclei of diameter 1-5 µm. The use of HEPA masks provides protection for health care workers in close contact with tuberculosis patients. This is particularly important when the health worker is supervising a cough-inducing procedure, e.g.bronchoscopy, or sputum induction using nebulised hypertonic saline. However, the high cost limits their use in high tuberculosis prevalence countries.

Standard surgical face-masks prevent the exhalation of droplets. This decreases the risk that the person wearing the mask can infect other people. So a tuberculosis suspect or a tuberculosis patient, if possible, should wear a mask if moving from one part of a prison hospital to another. Some health workers wear a standard surgical mask for protection against tuberculosis, e.g. when working in the prison hospital. In fact, this provides little protection against inhaling other people's infectious droplets.

### 10.2.4 Patient education

Prison health staff should teach tuberculosis suspects and tuberculosis patients simple measures how to decrease the risk of transmitting tuberculosis. These include covering the mouth with the hand when coughing, and using sputum pots with lids. Printed education leaflets are a useful supplement to spoken advice. A clinician examining tuberculosis patients or suspects should ask them to turn their head to one side. This is to avoid the patient coughing directly at the clinician.

### 10.2.5 Separation of tuberculosis suspects and patients from other prisoners

In the majority of cases, PTB suspects attend the prison health services as out-patients for the diagnosis of tuberculosis. If it is necessary to admit PTB suspects to the prison hospital ward, they should be in a separate ward from other patients. If there are no facilities to separate PTB suspects from other patients, the PTB suspects should be in a part of the ward away from other patients. Some prisons are not yet providing any anti-tuberculosis treatment. In this case, the recommendation is to keep tuberculosis suspects separate from other prisoners.

In many prisons, sputum smear-positive PTB patients spend at least part, and often all, of the intensive phase of anti-tuberculosis treatment in hospital. Isolation of these patients in tuberculosis wards helps reduce the risk of tuberculosis exposure to other prisoners. It is important to admit a prisoner to the tuberculosis ward only after making the diagnosis of tuberculosis. Otherwise, admission of tuberculosis suspects to the tuberculosis ward results in exposure to tuberculosis of those prisoners who turn out not to have tuberculosis.

Some prisoners have drug-resistant tuberculosis. This may be either proven by culture and drug-susceptibility testing or suspected, e.g lack of response to a fully supervised retreatment regimen. Where possible, it is advisable to provide separate accommodation for these prisoners, in order to decrease the risk of transmission of drug-resistant tuberculosis. Some countries have a specialised centre for treatment of multidrug-resistant tuberculosis. It is advisable where possible to refer prisoners with multidrug-resistant tuberculosis to such a centre. HIV-infected individuals are particularly susceptible to infection with *M. tuberculosis* and the development of tuberculosis.

UNAIDS policy is against the isolation of prisoners on grounds of HIV status. HIV-positive prisoners are at high risk of developing tuberculosis. Where possible, it is advisable to keep known HIV-positive prisoners separate from PTB suspects and patients.

## 10.3 Decreasing the risk of progression of *M. tuberculosis* infection to disease

There are two main specific measures which can decrease in some groups the risk of progression of *M. tuberculosis* infection to disease. These are preventive treatment and vaccination with BCG (Bacille Calmette-Guérin).

### 10.3.1 *Preventive treatment*

The aim of preventive treatment is to prevent progression of *M. tuberculosis* infection to disease. A 6 month course of preventive treatment with isoniazid (300mg daily for adults) is effective. However, preventive treatment for all prisoners infected with *M. tuberculosis* is not a recommended tuberculosis control strategy. It is not feasible to try to identify all prisoners infected with *M. tuberculosis*. However, it is possible to identify certain groups at high risk of progressing from *M. tuberculosis* infection to tuberculosis disease.

There are three main target groups for preventive treatment in prisons: a) HIV-infected prisoners; b) contacts of prisoners with sputum smear-positive PTB; c) in women's prisons, infants of mothers with PTB. The priority for tuberculosis control in prisons remains case-detection and cure of the infectious cases. However, where resources permit, authorities should consider preventive treatment in these high-risk groups.

Controlled clinical studies have shown that isoniazid preventive treatment reduces the risk of tuberculosis in HIV-positive individuals also infected with *M. tuberculosis*. The evidence of *M. tuberculosis* infection is a positive tuberculin skin test. In HIV-positive individuals, the extra benefit of a reduced risk of tuberculosis may also be a reduced rate of progression of HIV infection. Prison health services may provide preventive therapy where resources are adequate to ensure satisfactory exclusion of tuberculosis disease, treatment compliance and patient monitoring for drug toxicity.

Prisons which effectively implement the recommended tuberculosis control strategy have a high cure rate and high case-finding rate. In this case, where resources permit, authorities should consider preventive treatment for contacts of an index case with sputum smear-positive PTB. Contacts sharing the same accommodation as the index case and who have a positive tuberculin skin test should receive 6 months' isoniazid treatment (300mg daily).

A breast-feeding infant has a high risk of infection from a mother with PTB, and a high risk of developing tuberculosis. A woman who is breastfeeding and has tuberculosis should receive a full course of anti-tuberculosis treatment. Timely and properly applied anti-tuberculosis treatment is the best way to prevent transmission of tubercle bacilli to her baby. All the anti-tuberculosis drugs are compatible with breastfeeding and a woman taking them can safely continue to breastfeed her baby. The mother and infant should stay together. The mother should breastfeed the infant in the normal way. The infant should receive 6 months' isoniazid treatment (5mg/kg daily), followed by BCG vaccination.

### 10.3.2 Role of BCG in preventing tuberculosis

BCG is a live attenuated vaccine derived originally from *Mycobacterium bovis*. In high tuberculosis prevalence countries, WHO recommends a policy of routine BCG vaccination for all neonates shortly after birth. The benefit of BCG is in protecting young children against disseminated and severe tuberculosis. BCG has little or no effect in reducing the number of adult cases of PTB. There is therefore no role for BCG vaccination of prisoners.

## 10.4 Decreasing HIV transmission in prisons

Since HIV is common in prisons and fuels the tuberculosis epidemic, ways of decreasing HIV transmission can contribute to the prevention of tuberculosis. It may be difficult for authorities to implement practical and effective measures to decrease HIV transmission in prisons. The behaviours mainly responsible for HIV transmission in prisons are injecting drug use and sex between men. These behaviours are unacceptable to the legal and political authorities, and to most social, cultural and religious opinion in many countries. Authorities may deny that these activities take place. This denial is a barrier to even starting to discuss ways to decrease HIV transmission in prisons.

The usual prison policy of banning injecting drug use and sex between men has generally failed. Denial does not solve the problem of HIV transmission in prisons and beyond prisons into the wider community. Responding to the challenge of HIV transmission in prisons means firstly that prison authorities must acknowledge the occurrence of intravenous drug use and sex between men. All prisoners and prison staff should receive education and information on HIV/AIDS. Secondly, authorities need to implement practical measures. This response is often difficult in a climate of public opinion opposed to measures seen as promoting these behaviours rather than preventing HIV transmission.

The possible measures for decreasing HIV transmission as a consequence of injecting drug use are controversial. They include the following: providing substitution therapy (e.g. methadone for heroin addicts) or medically supervised detoxification; enabling prisoners to sterilize injecting equipment by providing full-strength liquid bleach; providing sterile needles and syringes in exchange for used ones; educating prisoners about HIV and drug-injecting (e.g. through the use of fellow prisoners or outreach workers who are themselves injectors or previous injectors).

Prison authorities have a duty to try to decrease the risk of sexual transmission of HIV. Reducing the atmosphere of violence helps to decrease violent attacks on prisoners, including sexual abuse and rape. Prison staff training should include how to avoid unnecessary force or brutality, and how to respect the rights, dignity and well-being of prisoners. Prisoners and staff need education about the risks of unprotected sex and should have access to counselling and voluntary HIV testing. A controversial measures for protecting prisoners who have sex in prison is the provision of condoms.

## *Suggestions for further reading*

*Harries AD, Maher D, Nunn P. Practical and affordable measures for the protection of health care workers from tuberculosis in low-income countries. Bulletin of the World Health Organization 1997; 75 (5): 477-489.*

*WHO. Global Programme for Vaccines and Immunisation. Immunisation Policy. Geneva, 1995.*

*WHO/IUATLD. Tuberculosis preventive therapy in HIV-infected individuals. A joint statement of the WHO Tuberculosis Programme and the Global Programme on AIDS, and the International Union Against Tuberculosis and Lung Disease (IUATLD). Weekly Epidemiological Record 1993; 68: 361-364.*

*O'Brien RJ, Perriens JH. Preventive therapy for tuberculosis in HIV infection: the promise and the reality. AIDS 1995; 9: 665-673.*

*World Health Organization and Joint United Nations Programme on HIV/AIDS. Report on a joint WHO/UNAIDS European seminar, Warsaw, Poland, December 1997. WHO, Copenhagen, Denmark, 1998. EUR/ICP/CMDS 08 02 15.*

*Joint United Nations Programme on HIV/AIDS. Prisons and AIDS. UNAIDS technical update. UNAIDS best practice collection. April 1997, Geneva, Switzerland.*

# PART III

# ESTABLISHING A PRISON TUBERCULOSIS CONTROL PROGRAMME

## 11 IMPLEMENTING A PRISON TUBERCULOSIS CONTROL PROGRAMME

### 11.1 Role of government, NGOs and International Agencies

A government may decide to implement effective tuberculosis control in prisons in collaboration with NGOs and/or international agencies (e.g. ICRC, WHO). NGOs which collaborate in implementing prison tuberculosis control programmes should work within the general public health system of the relevant country. An intervention should be appropriate to the level of a country's economy and should not constitute a separate health system. There should be at least coordination between the prison and local district tuberculosis control programme. In countries where there is an effective NTP, the prison tuberculosis control programme should be integrated with the local district tuberculosis control programme. Tuberculosis control policies must be in line with current international (WHO and IUATLD) recommendations.

### 11.2 Prerequisites before implementing a prison tuberculosis control programme

A prison tuberculosis programme must ensure that the necessary means for effective tuberculosis control are available before starting to register and treat patients. A baseline evaluation of available resources (financial, human and material) is therefore necessary before implementing a programme.

Certain basic conditions must be met before planning to implement a prison tuberculosis control programme: a) a minimum standard of health care provision; b) commitment to a long term investment in tuberculosis control; c) consensus on prison tuberculosis control policy among parties involved, with written policy guidelines.

### 11.3 Planning a prison tuberculosis control programme

It is necessary to perform an initial evaluation, set out the programme targets and objectives and describe the strategies to fulfill the objectives and achieve the targets. The plan must describe the implementation steps and include the budget and financing. Evaluation of the programme is essential to monitor programme performance and indicate areas where improvement is necessary.

#### 11.3.1 *Initial evaluation*

The aim of the initial evaluation is to have a baseline assessment of the tuberculosis problem and the resources (financial, human and material) available to tackle it. The assessment of the tuberculosis problem provides a baseline for judging progress in reaching the targets. In most prisons without an effective

tuberculosis programme, there is little accurate information on the number of cases and the outcomes of treatment. However, it is useful to collect what information is available from prison health records. Country-specific estimates of tuberculosis incidence are available from WHO. The assessment of available resources provides the starting point for planning to meet the objectives.

### 11.3.2 Targets and objectives

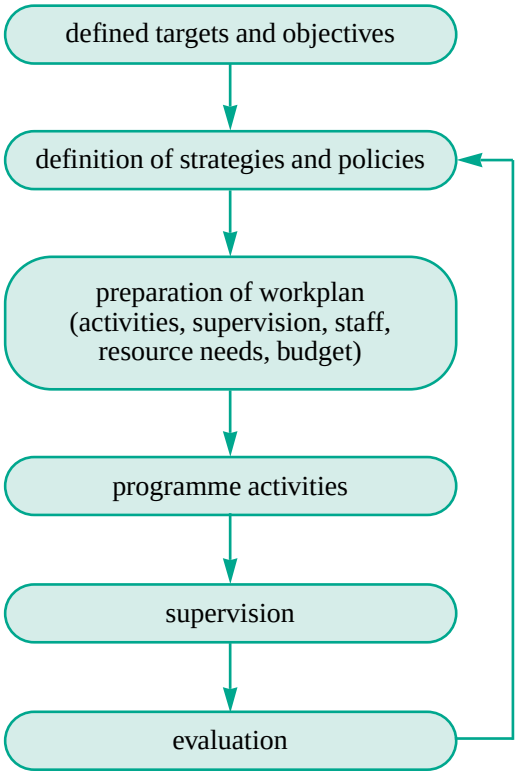
WHO has set targets for tuberculosis control. These are to cure 85% of detected new cases, and to detect 70% of existing cases, of sputum smear-positive PTB. It is necessary to fulfill certain objectives in order to achieve the targets. These objectives are the following: improve prison health services, preferably by integrating prison health services with general health services; establish an effective and quality-controlled sputum smear microscopy service; maintain a regular drug supply to ensure standardised SCC for at least all smear-positive PTB cases; establish an effective system of programme monitoring, evaluation and supervision; develop a regular training system.

### 11.3.3 Implementation steps

- identify the lead agency, e.g. national tuberculosis programme, NGO
- secure commitment to financing
- identify the prison tuberculosis coordinator
- prepare the budget
- equip laboratory for sputum smear microscopy
- print the documents for recording and reporting
- print the prison tuberculosis control policy guidelines
- identify secure drug storage facilities
- procure anti-tuberculosis drugs
- prepare supervision plan
- train staff
- introduce prison tuberculosis register and recording and reporting forms

## 11.4 Planning cycle

Evaluation of the programme is part of the annual planning cycle shown in the figure.




### *Suggestions for further reading*

*World Health Organization. Global Tuberculosis Programme. Global Tuberculosis Control. WHO Report 1998. Geneva, Switzerland, WHO/TB/98.237*

*Médecins Sans Frontières. Tuberculosis Control Programmes. 2nd edition, 1997. Paris, France.*

PART III

# 12 MONITORING AND EVALUATION OF PROGRAMME PERFORMANCE

## 12.1 Information management system

Monitoring of programme performance requires accurate record keeping and regular reporting of case-finding and treatment outcomes. Evaluation of programme performance is by analysis and interpretation of data on case-finding and treatment outcomes. Feedback to all staff involved in tuberculosis control in prisons enables improvement in programme performance in the identified problem areas.

## 12.2 Record forms and registers

Annex 4 contains sample forms and registers used for tuberculosis control activities:

- request for sputum examination
- tuberculosis laboratory register
- tuberculosis patient treatment card
- prison tuberculosis control programme register
- quarterly report on tuberculosis case-finding (new and relapse cases)
- quarterly report on results of treatment of smear-positive PTB cases

## 12.3 Laboratory evaluation

The sputum smear microscopy laboratory should routinely report the following information:

- number of sputum samples examined and proportion positive
- number of new smear-positive PTB patients diagnosed
- results of regular quality assurance tests

## 12.4 Evaluation of prison tuberculosis control programme performance

There are three stages in evaluating a tuberculosis programme:

- case-finding
- cohort analysis of results of sputum smear conversion at 2/3 months
- cohort analysis of results of treatment outcome

### 12.4.1 Case-finding

The prison tuberculosis coordinator must compile and submit the 3 monthly report on case-finding (see form 5, Annex 4) to the NTP. This reports the numbers of new cases (smear-positive and, smear-negative PTB and extrapulmonary) and relapse cases (smear-positive PTB). In general, sputum-smear positive PTB cases constitute about 50% of the total tuberculosis cases in a population. The remainder are sputum smear-negative pulmonary (30%) and extrapulmonary (20%). If smear-positive cases form less than 50% of the total number of tuberculosis cases detected by a programme, it is necessary to find out why. The common explanation is that the programme is probably under-detecting smear-positive cases and/or over-detecting smear-negative and extrapulmonary cases.

### 12.4.2 Cohort analysis of results of sputum smear conversion at 2/3 months

The sputum smear conversion rate at 2 or 3 months is the proportion of the sputum smear-positive patients registered in one quarter who have become sputum smear-negative 2 or 3 months respectively after starting treatment. The expected rate should be more than 80%. The prison tuberculosis coordinator calculates this rate from the laboratory register during supervisory visits to the laboratory. The sputum smear conversion rate is available 6 months after the start of a particular quarter and is the earliest available indicator of programme performance.

### 12.4.3 Cohort analysis of results of treatment outcome

The prison tuberculosis coordinator reports the results of cohort analysis for the two groups of sputum smear-positive cases (new and retreatment cases) on the quarterly treatment outcome report form (see form 6, Annex 4). The results are available 12-15 months after the start of a particular quarter.

## 12.5 Supervision

A system of supervision is necessary to support the prison tuberculosis coordinator and maintain effective prison tuberculosis control programme performance. The person providing support to the prison tuberculosis coordinator may work at the provincial/regional level of the NTP. The provincial/regional tuberculosis coordinator should visit the prison tuberculosis coordinator at least quarterly. The purpose is to assess the quality of programme performance, identify problems and appropriate solutions, and take the necessary action to overcome these problems.

## 12.6 Identifying problems and taking action

The information management system provides a tool for supervision. The quarterly reports on case-finding and cohort analysis reveal unsatisfactory performance due to problems in programme implementation. Prison tuberculosis coordinators must work with NTP staff to identify the cause of these problems. Table 7 shows some possible causes of problems in programme implementation and possible solutions.

*Table 7. Some problems, causes and possible solutions.*

| IF THERE WERE TOO MANY ..... | AND THE CAUSE WAS ..... | THEN THE POSSIBLE SOLUTIONS ARE ..... |
|---|---|---|
| Failures. | Trading in drugs. | Investigate thoroughly and improve staff supervision. |
| | Concealment of drugs by prisoners. | Teach prison health staff about prisoners' tricks to conceal tablets and improve the direct observation of treatment. |
| | Poor quality medications may be being used. | Review the tendering and procurement procedures. |
| | Patients do not take all the medications. | Investigate if there is a black market in anti-tuberculosis drugs. Make sure that there is 100% direct observation of treatment. |
| | High level of primary resistance to both rifampicin and isoniazid. | Consider a local protocol with rigorous evaluation, e.g. give all previously treated patients (irrespective of duration of previous treatment) Category II treatment. |
| | Retreatment patients wrongly receiving the regimen for new patients. | Improve supervision of the prison health staff. Check that the prison health staff know the right regimens for each patient treatment category. Check the regimen prescribed in the register and on the patient treatment card. |
| Patients who interrupted treatment. | Inadequate health education. | Make sure that patients receive proper health education on a continuous basis, and that the health messages are relevant and understandable. Help authorities understand the importance of the diagnosis and treatment of tuberculosis. |
| | Unfriendly behaviour of the health staff. | Pay attention to staff morale and enhance training. |
| | Failure to follow up patients who interrupt treatment. | Make sure staff understand the importance of tracing patients. Improve procedures for tracing patients who interrupt treatment, especially those who have sputum smear-positive PTB. |
| | Failure to ensure referral of patients on release or transfer. | Improve supervision of staff. Review procedures for coordination between the prison health authorities, the NTP and community health services. |
| Deaths. | High prevalence of HIV. | Implement multiple interventions to minimize HIV transmission. |
| | Late diagnosis of tuberculosis. | Make sure health workers properly assess symptoms in prisoners attending prison health services, identify tuberculosis suspects and send sputum for smear microscopy. Identify any barriers to access to health services and ways to overcome them. |

## Suggestions for further reading

*Maher D, Chaulet P, Spinaci S, Harries A. Treatment of tuberculosis: guidelines for national programmes. Second edition. WHO/TB/97.220. Geneva: WHO, 1997.*

*International Union Against Tuberculosis and Lung Disease. Tuberculosis Guide for Low Income Countries. Fourth edition. pmi Verlagsgruppe. Frankfurt, 1996.*

*Managing TB at District Level. A Training Course. WHO Global Tuberculosis Programme, Geneva, 1994. WHO/TB/96.211*

*Managing TB at National Level. A Training Course. WHO Global Tuberculosis Programme, Geneva, 1996. WHO/TB/96.203*

ANNEX 1

## INTERNATIONAL CONVENTIONS GUARANTEEING THE WELFARE OF PRISONERS

- The Universal Declaration of Human Rights
- The International Covenant on Economic, Social and Cultural Rights
- United Nations Standard Minimum Rules for the Treatment of Prisoners (1955)
- Body of Principles for the Protection of all Persons under any Form of Detention or Imprisonment
- Principles of medical ethics relevant to the role of health personnel, particularly physicians, in the protection of prisoners and detainees against torture and other cruel, inhuman or degrading treatment or punishment. United Nations General Assembly Resolution 37/194, 1982

ANNEX 2

# THE BAKU DECLARATION

**We,** the participants at the Baku Tuberculosis in Prisons Meeting

**Recognizing** that tuberculosis has become a major health threat to prisoners, and

Observing that often-incurable, drug resistant forms of tuberculosis are increasing in prisons, and

**Further observing** that the spread of HIV within prisons increases the risk of death from tuberculosis, and

**Noting** that tuberculosis in prisons easily spreads into the community from infectious prisoners and infectious prison staff, and

**Acknowledging** that adequately funded and staffed prison health services are essential to address the problem of tuberculosis in prisons

## CALL UPON

Governments, through Ministries of Justice and Interior and State Security and Health, to work together toward providing prisoners with adequate health care, and the means to cure tuberculosis, and

Prison Health Services to implement DOTS (Directly Observed Treatment, Short-course), and Ministries of Health to strengthen National Tuberculosis Programmes through application of the DOTS strategy

## AND WARN

that if there is no response to our call for action, incurable tuberculosis will increase death among prisoners and their families, and prison staff and the community.

ANNEX 3

# USEFUL ADDRESSES

## INTERNATIONAL AGENCIES

### *International Committee of the Red Cross*

**HEALTH AND RELIEF DIVISION**
**INTERNATIONAL COMMITTEE OF THE RED CROSS**
19, Avenue de la Paix
CH-1202 Geneva, Switzerland
Telephone: (41 22) 734 60 01
Facsimile: (41 22) 733 20 57

### *Offices of the World Health Organization*

**HEADQUARTERS**
**WORLD HEALTH ORGANIZATION**
20, Avenue Appia
CH-1211 Geneva 27
Switzerland
Telephone: (41 22) 791 21 11
Facsimile: (41 22) 791 07 46

**WHO REGIONAL OFFICE FOR AFRICA**
**MEDICAL SCHOOL, C WARD**
Parirenyatwa Hospital
Mazoe Street
PO Box BE 773
Belvedere, Harare
Zimbabwe
Telephone: (263 4) 70 56 19
Facsimile: (263 4) 79 12 14

**WHO REGIONAL OFFICE FOR THE AMERICAS /**
**PAN AMERICAN SANITARY BUREAU**
525, 23rd Street N.W.
Washington, D.C. 20037, USA
Telephone: (1) 202 861 3200
Facsimile: (1) 202 223 5971

**WHO REGIONAL OFFICE FOR THE EASTERN MEDITERRANEAN**
P.O. Box 1517
Alexandria 21511, Egypt
Telephone: (203) 482 0223
Facsimile: (203) 483 8916

**WHO REGIONAL OFFICE FOR EUROPE**
8, Scherfigsvej
DK-2100 Copenhagen 0
Telephone: (45) 39 17 17 17
Facsimile: (45) 39 17 18 18

**WHO Regional Office for South-East Asia**
**World Health House**
Indraprastha Estate
Mahatma Gandhi Road
New Delhi-110002
India
Telephone: (91) 11 331 7804
Facsimile: (91) 11 331 8607

**WHO Regional Office for the Western Pacific**
PO Box 2932
Manila 1099
Philippines
Telephone: (632) 522 9800
Facsimile: (632) 521 1036

## SUPPLIERS OF ANTI-TUBERCULOSIS DRUGS

**Action Medeor**
**Deutches Medikamenten-Hifswerk**
St Töniser Strasse 21
D-4154 Toenisvörst 2, Germany
Fax: (49) 21 56 80632

**ECHO (ECHO International Health Services Limited)**
**Ullswater Crescent**
Coulsdon, Surrey CR5 2HR, United Kingdom
Fax: (44)181 6680751

**IAPS (International Association for Procurement and Supply)**
Rode Kruisstraat 20
PO Box 37 030
1030 AA Amsterdam, The Netherlands
Fax: (31) 20 6343401

**IDA (International Dispensary Association)**
PO Box 37098
1030 AB Amsterdam, The Netherlands
Fax: (31) 20 4031854

**The Medical Export Group**
PO Box 598
4200 AN Gorinchem, The Netherlands
Fax: (31) 18 3634650

**KCR International**
45, rue de la Libération
78350 Jouy-en-Josas, France
Fax: (33) 1 39565355

**ORBI-PHARMA**
Van Trierstraat 40
B 2018 Antwerp, Belgium
Fax: (32) 3 2169897

***For a recent copy of the UNICEF Essential Drugs Price List, write to:***

**UNICEF**
**UNICEF PLADS**
Freeport
DK-2100
Copenhagen
Denmark
Fax: (45) 269421

***For the International Drug Price Indicator Guide, write to:***

**MANAGEMENT SCIENCES FOR HEALTH**
**DRUG MANAGEMENT PROGRAMME**
1655 North Fort Myer Drive
Suite 920
Arlington, VA 22209
USA

ANNEX 4

# SAMPLE FORMS AND REGISTERS USED FOR TUBERCULOSIS CONTROL ACTIVITIES

- Request for sputum examination.
- Tuberculosis laboratory register.
- Tuberculosis patient treatment card.
- Tuberculosis register.
- Quarterly report on tuberculosis case-finding (new and relapse cases).
- Quarterly report on results of treatment of smear-positive PTB cases.

FORM 1

## REQUEST FOR SPUTUM EXAMINATION

Treatment Unit _____ Date _____

Patient's Name

Age _____ Sex: (M/F) _____

Address (precise) _____

_____

_____

Reason for examination: diagnosis _____ follow-up examination _____

Signature of person requesting examination

## RESULTS (to be completed in laboratory)

Laboratory Serial No. _____

| Date | Specimen | Appearance* | Result (check one) | | | | |
|---|---|---|---|---|---|---|---|
| | | | neg | 1-9 | + | ++ | +++ |
| | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |

* visual appearance of sputum (blood-stained, muco-purulent, saliva)

Date _____ Examined by (Signature) _____

The completed form (with results) should be sent promptly to the treatment unit

TUBERCULOSIS PROGRAMME

## TUBERCULOSIS LABORATORY REGISTER

Year _____

| Lab serial No. | Date | Name | Sex M/F | Age | Name of treatment unit | Address – new patients | Reason for examination* | | Results of specimen | | | Signature | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | diagnosis | follow up | 1 | 2 | 3 | | |
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* Check the appropriate category from the *Request for Sputum Examination*

FORM 2

TUBERCULOSIS PROGRAMME

# TUBERCULOSIS TREATMENT CARD

District TB No. _____

Name:

Address:

Treatment Centre _____ Age _____ Sex (M/F) _____

**Type of Patient:** (check)

Pulmonary ___ Extrapulmonary ___ (site) _____

New ___ Relapse ___

Failure ___ Transfer in ___

Return after default ___

Other (specify) _____

## I. INITIAL INTENSIVE PHASE

Date _____

Prescribed regimen and number of tablets:

| Cat. I RHZE | | | Cat. II SRHZE | | | | Cat. III RHZ | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| {RH} | Z | E | {RH} | S | Z | E | {RH} | Z |

S = streptomycin; {RH} = rifampicin/isoniazid;
E = ethambutol; Z = pyrazinamide

| Month | Date | smear result | weight (kg) | Date next appoint-ment |
|---|---|---|---|---|
| 0 | | | | |
| 2 | | | | |
| 5 | | | | |
| 7 | | | | |
| >7 | | | | |

| Day / Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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Enter X on day when medications were swallowed under direct observation

please turn over

**II. CONTINUATION PHASE**

number of tablets:

regimen:

| | | | |
|---|---|---|---|
| new cases | | | |
| 4RH or 6HE | | | |

| retreatment | | | |
|---|---|---|---|
| 3 times a week (5 months) | {RH} | E | H |

| Day / Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
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Enter X on day of supervised administration or when medications are collected. Draw a horizontal line through the days to indicate number of days' supply given.

Remarks:

## QUARTERLY REPORT ON TUBERCULOSIS CASE-FINDING

| | |
|---|---|
| Name of prison _____ | Tuberculosis Coordinator _____ |
| Patients registered in ____ quarter of 19 ____ | Signature _____ Date _____ |

ALL CASES REGISTERED IN THE QUARTER

| SMEAR-POSITIVE | | | | SMEAR-NEGATIVE | | EXTRA-PULMONARY | TOTAL |
|---|---|---|---|---|---|---|---|
| New cases | Relapses | Failures | Return After Default | < 15 yrs | 15 + yrs | | |
| | | | | | | | |

NEW SMEAR-POSITIVE CASES ONLY

| Age group (years) | | | | | | | | | | | | | | TOTAL | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–14 | | 15–24 | | 25–34 | | 35–44 | | 45–54 | | 55–64 | | 65+ | | | | |
| M | F | M | F | M | F | M | F | M | F | M | F | M | F | Male | Female | Total |
| | | | | | | | | | | | | | | | | |

*Definitions to use when completing the form:*

Quarters
- 1st quarter – 1 January to 31 March
- 2nd quarter – 1 April to 30 June
- 3rd quarter – 1 July to 30 September
- 4th quarter – 1 October to 31 December

## QUARTERLY REPORT ON THE RESULTS OF TREATMENT OF SMEAR POSITIVE CASES OF PULMONARY TUBERCULOSIS REGISTERED IN THE QUARTER ENDING 15 MONTHS EARLIER

| | |
|---|---|
| **Name of prison** _____ | **Tuberculosis Coordinator** _____ |
| Patients registered in _____ quarter of 19 _____ | Signature _____ Date _____ |

| Type of case | Regimen | Smear negative (cured) | Smear not done (treatment completed) | Smear positive (failure) | Died | Defaulted | Transferred | Total* |
|---|---|---|---|---|---|---|---|---|
| **New smear positive** | | | | | | | | |
| **n° enrolled*** _____ | | | | | | | | |
| **Smear positive retreatment** | 2SRHZE/1RHZE/5$R_3H_3E_3$ | | | | | | | |
| **n° enrolled*** _____ | | | | | | | | |

* from *Quarterly Report on Tuberculosis Case-finding* for that quarter

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Printer: Tipografia Ferrero - Romano Canavese - Italy

FORM 4

TUBERCULOSIS REGISTER

| Date registered | TB Registration No. | Name in full | Sex M/F | Age | Adress in full | Treatment Unit | Treatment start date | Regimen* | Disease Site P/EP | Category of patient** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | new | relapse | failure | RAD | transfer in | other |
| | | | | | | | | | | | | | | | |
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***new cases or retreatment**

****New:** never previously treated for as much as 1 month
**Relapse:** previously treated and declared cured, returns smear positive

**Failure:** positive smear 5 or more months after starting treatment, put on retreatment
**RAD:** return after default (treatment interruption)
**Transfer in:** registered and started treatment in another district

Year_____

| Result of sputum smear examination according to the duration of treatment | | | | | | | | Result of treatment*** and date of the result | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-treatment | | 2 months | | 5 months | | 7/8 months | | smear result at completion: | | | | | | |
| result | lab no. | result | lab no. | result | lab no. | result | lab no. | negative (cured) | not done (treatment completed) | positive (failure) | died | defaulted (interrupted treatment) | transferred | remarks |
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*** **smear negative:** negative smear at last month of treatment and on one previous occasion
**smear not done:** no bacteriological examination in last month of treatment
**smear positive:** positive smear at 5 months or later during treatment

**died:** died from any cause during treatment
**defaulted:** failed to collect medications for more than 2 months after date last seen
**transferred:** sent to another district for continuation of treatment