

TUBERCULOSIS CONTROL *in* PRISONS



A MANUAL *for* PROGRAMME MANAGERS



WORLD HEALTH ORGANIZATION



INTERNATIONAL COMMITTEE
OF THE RED CROSS

TUBERCULOSIS CONTROL IN PRISONS

A Manual for Programme Managers

Angie Bone

Communicable Diseases Programme
World Health Organization
Geneva, Switzerland

Ann Aerts

International Committee of the Red Cross
Geneva, Switzerland

Malgosia Grzemska

Communicable Diseases Programme
World Health Organization
Geneva, Switzerland

Michael Kimerling

University of Alabama
at Birmingham, USA

Hans Kluge

World Health Organization
Moscow, Russia

Michael Levy

Corrections Health Service
New South Wales, Australia

Françoise Portaels

Institute of Tropical Medicine
Antwerp, Belgium

Mario Raviglione

Communicable Diseases Programme
World Health Organization
Geneva, Switzerland

Francis Varaine

Médecins Sans Frontières
Paris, France



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LIST OF ACRONYMS AND ABBREVIATIONS



AFB	<i>Acid Fast Bacilli</i>
AIDS	<i>Acquired ImmunoDeficiency Syndrome</i>
BCG	<i>Bacille Calmette-Guérin</i>
DOT	<i>Direct Observation of Treatment</i>
DST	<i>Drug Susceptibility Test</i>
FDC	<i>Fixed-Dose Combinations</i>
HIV	<i>Human Immunodeficiency Virus</i>
ICRC	<i>International Committee of the Red Cross</i>
IUATLD	<i>International Union Against TB and Lung Disease</i>
MDR	<i>MultiDrug-Resistant</i>
MOH	<i>Ministry of Health</i>
NGO	<i>Non-Governmental Organization</i>
NTP	<i>National Tuberculosis Programme</i>
TB	<i>TuBerculosis</i>
TST	<i>Tuberculin Skin Test</i>
UN	<i>United Nations</i>
UNAIDS	<i>United Nations Programme on HIV/AIDS</i>
UNDP	<i>United Nations Development Programme</i>
UNHCHR	<i>United Nations High Commissioner for Human Rights</i>
WHO	<i>World Health Organization</i>
ZN	<i>Ziehl-Neelsen (staining of sputum smears)</i>



Ill-health thrives in settings of poverty, conflict, discrimination and disinterest. Prison is an environment that concentrates precisely these issues. TB is a major cause of sickness and death in prisons, along with HIV, malnutrition, mental illness and violence. Directly or indirectly, these threats apply, not only to prisoners, but to all who come into contact with prisons and ultimately the community as a whole.

Prisoners very often originate from the most vulnerable sectors of society – the poor, the mentally ill, those dependent on alcohol or drugs. These groups already have an increased risk of diseases such as TB. In prison, these problems are amplified by poor living conditions and overcrowding. A prison climate of violence and humiliation aggravates the situation, creating obstacles in accessing health care and promoting unhealthy behaviours. Prisoners are eventually released back into society, bringing with them the illness and behaviours generated and worsened by their incarceration.

Prison health is often forgotten or given a low priority. Prisoners are stigmatised, hidden and rendered voiceless. The public is often ambivalent about providing quality care to those accused or convicted of wrongs against society, particularly where national resources are scarce. Different authorities are responsible for the health of an individual arrested, detained and eventually released, with little co-ordination between them. Too often prisoners and former inmates fall through the gaps in the provision of health care.

The problem of TB and poor health of prisoners will not stay confined to prisons. Prison health must be the concern of society, if only for the purposes of enlightened self-interest. Nevertheless, the issue strikes much deeper than this. States have a duty to ensure that no-one is subjected '*to cruel, inhuman or degrading treatment or punishment*' and that prisoners receive an equivalent standard of health care to that of the general community.

Health problems in prison, such as TB, are the result of a complex interaction between poverty, imprisonment and disease. Our response needs to look at the problem as a whole. Interventions, such as universal access to the DOTS strategy, must be implemented urgently, but also be put in the broader perspective of the factors that promote and perpetuate disease in prison. These include reducing overcrowding through penal reform, promoting the respect, protection and fulfilment of fundamental human rights and co-ordinating health systems to ensure continuity and equivalence of care. In achieving these goals, we must build partnerships with professionals from other disciplines.

Improving prison health brings with it so many opportunities. The benefits to the health of those who live and work in prison, as well as society as a whole are clear. However health can also be a tool to strengthen respect of human rights and address inequities. Let us grasp these opportunities.

Dr Gro Harlem Brundtland
Director-General, World Health Organization

Mr Jakob Kellenberger
President, International Committee of the Red Cross



Key messages

- A comprehensive package of medical and administrative interventions is necessary to control tuberculosis in prisons.
- Tuberculosis control in prisons must be incorporated into national control strategies with the integration of tuberculosis services on both sides of the prison walls.

The need to effectively address tuberculosis (TB) control in prisons in all countries is becoming increasingly understood by governments, National Tuberculosis Programmes (NTP's), international organizations and donors.

This follows the recognition that:

- TB does not respect man-made boundaries, be they prison walls or international frontiers
- high levels of TB in prisons have a significant impact on the levels of TB in the community at large
- conditions within prison encourage the transmission of TB, often turning prisons into reservoirs of the disease
- governments have a duty to protect prisoners from harm and to provide access to a standard of health care at least equivalent to that in the community.

The 1998 WHO/ICRC book, *'Guidelines for the Control of Tuberculosis in Prisons'*, provides useful information concerning the technical implementation of the WHO recommended DOTS strategy (see section 2.3) for TB control in prisons.

However, since its publication it has become clear that an expanded management policy is required to address the many structural and administrative aspects of prison systems that affect TB control. These include:

- the effects of high incarceration rates and poor living conditions on the epidemiology of TB
- access to diagnosis and effective treatment for all prisoners with TB and
- continuity and equity of care between civilian and prison sectors.

TB control in prisons must not be undertaken as an isolated technical programme. It should form part of an integrated and comprehensive effort to improve health inside and outside prisons.

The objective of this manual is to provide a practical tool for health workers considering embarking on TB control programmes in prisons, covering structural and administrative, as well as medical issues. It is intended to be applicable for TB specialists who may have little knowledge of the prison context and for prison health professionals who may have less specialized knowledge of TB. It is primarily designed for use in settings where there is a high incidence of TB and limited resources.

The manual uses lessons learnt in the field of the practical difficulties of managing TB in prisons and offers recommendations to be used by all authorities and institutions



implementing such programmes. However, there are still many issues that need to be resolved and in some instances a lack of data with which to draw conclusions or derive policies at the current time. These issues include the efficacy, feasibility and cost-effectiveness of strategies for the active management of MDR-TB, active case-finding and occupational protection. Where possible, suggestions are made for field evaluation and, as more information comes to light, it is likely that more concrete recommendations can be provided in the future.



2.1 KEY MESSAGES

- Tuberculosis is an infectious disease transmitted in the air.
- Tuberculosis is reported to be up to 100 times more common in prison than in civilian populations.
- The spread of tuberculosis is made worse by the late diagnosis and treatment of infectious cases, and poor prison living conditions such as overcrowding.
- HIV infection dramatically increases the chance of developing active tuberculosis. HIV in a population therefore significantly increases the number of tuberculosis cases.
- Tuberculosis can be effectively treated with DOTS-based strategies. However, badly managed tuberculosis treatment does not cure patients, prolongs transmission of infection and promotes multidrug-resistant tuberculosis.
- Multidrug-resistant tuberculosis is caused by incorrect treatment of tuberculosis. Treatment for multidrug-resistant tuberculosis is expensive, difficult and prolonged.
- Reducing rates of incarceration through penal reform is fundamental to improving tuberculosis control and prison health.

2.2 WHAT IS TUBERCULOSIS?

Tuberculosis (TB) is an infectious disease caused by the bacterium, *Mycobacterium tuberculosis*. TB can affect any organ of the body, but most commonly attacks the lungs (pulmonary TB).

TB is spread through the air by droplets produced by a person suffering from pulmonary TB by coughing, sneezing or speaking. Patients who produce sputum in which the bacteria can be seen with a light microscope are the most infectious and are called '**smear-positive**'.

It is estimated that after *infection*, only 10% of infected healthy individuals will develop active TB *disease* throughout their lifetime, the majority within the first two years after infection. However, co-existing infection with the human immunodeficiency virus (HIV) significantly increases the chance of a person developing active TB (see section 2.5).

The risk of infection, and the development of subsequent disease, depend on factors associated with the bacteria (viability, transmissibility, virulence, the size of infecting dose), the host (strength of immune system, genetic susceptibility, length and intensity of exposure, previous exposure) and the host-bacteria interaction (site of involvement, severity of disease).

In general, people who have been infected with *Mycobacterium tuberculosis* are thought to be less susceptible to subsequent infections, although re-infection can occur and result in disease [1] [2].

2.3 TUBERCULOSIS IN THE WORLD

TB is the leading cause of death from infectious diseases in adults and responsible for an estimated 2 million preventable deaths each year. In 1997, there were an estimated 7.96



million new cases of TB [3]. 95% of the cases and deaths from TB occur in developing countries. Prisoners are at particular risk of TB (see section 2.8).

Although anyone can develop TB by inhaling infectious particles, the disease particularly attacks young adults in economically disadvantaged populations. The loss of income due to illness and discrimination, coupled with relatively high costs for diagnosis and treatment in many parts of the world, can lead to greater poverty.

However, cost-effective treatment is available through the WHO recommended strategy, DOTS. DOTS is a strategy of five components:

1. A **political commitment** by the government at all levels to **comprehensive and sustained** TB control activities.
2. **Case detection** by sputum smear **microscopy** among symptomatic patients self-reporting to health services.
3. **Standardized** short course chemotherapy using **regimens of six to eight months**, for at least all confirmed smear-positive cases. Good case management includes **directly observed therapy (DOT)** during the intensive phase for all new sputum smear-positive cases, the continuation phase of rifampicin-containing regimens and the whole re-treatment regimen.
4. A **reliable** and uninterrupted supply of all essential **anti-tuberculosis drugs**.
5. A **standardized recording and reporting system** that allows assessment of case-finding and treatment results for each patient and of the TB control programme performance overall.

In 1998, only 21% of all estimated TB patients were treated in DOTS-based programmes [4]. Those without access to DOTS-based programmes are at risk of receiving either no treatment, or erratic and incomplete therapy.

Incorrect treatment of TB has serious consequences. Poor TB treatment leads to more sickness and deaths from TB, persistent spread of the infection and the development of drug-resistant forms of the disease.

In addition to the limited access of TB patients to DOTS, TB control faces two major challenges – the emergence of drug-resistant TB and the co-existing HIV epidemic.

2.4 DRUG-RESISTANT TUBERCULOSIS

Drug-resistant TB is TB that is resistant to the drugs used to treat the disease. **Multidrug-resistant tuberculosis (MDR-TB)** is TB that is resistant to *at least rifampicin and isoniazid*, the most important anti-TB drugs (see Glossary for specific definitions).

Resistance of *Mycobacterium tuberculosis* to anti-TB drugs occurs naturally through spontaneous genetic mutations. Where there is no exposure to anti-TB drugs, there are only very few naturally drug-resistant bacteria, compared to many drug susceptible forms.

¹Anti-TB treatment should always be administered under DOT in prisons (see section 13.5)



However, inadequate treatment can lead to selective pressure on drug-resistant mutants allowing them to replicate and replace the drug susceptible forms. This acquired resistance occurs through exposure to incorrect doses, combinations, duration or quality of anti-TB drugs as a result of:

- *programme or system failure* such as interrupted drug supplies, poor prescribing or barriers for patients to access health care
- *non-adherence to correct treatment* by patients.

Once created, drug-resistant TB can be spread to others in the same way as other *M. tuberculosis* strains.

Multidrug-resistant TB is therefore a man-made problem created by health care providers and patients, in situations where some rifampicin and isoniazid treatment can be obtained and used erratically or incorrectly. The presence of multidrug-resistant TB is a marker of poor TB control.

Multidrug-resistant TB is much less likely to respond to the 'first-line' drugs used in DOTS. Successful treatment for such cases has been reported with 'second-line' drugs, but this treatment is very expensive, complicated and prolonged [5, 6]. Therefore, it is extremely important to prevent the further development of MDR-TB by the widespread application of DOTS and other measures such as health education, strengthened case-finding and respiratory isolation of infectious drug-resistant cases (see Chapters 11-16).

Where MDR-TB has become established, factors that led to its creation must be addressed as a matter of urgency. It must be noted that merely providing new drugs will not tackle the underlying causes. If these factors persist, acquired resistance to second-line drugs will be generated, creating a genuinely untreatable global threat.

2.5 TUBERCULOSIS AND THE HUMAN IMMUNODEFICIENCY VIRUS

The emergence of HIV has had a serious amplifying effect on the global TB epidemic. High levels of HIV seen in prisons have a significant impact on prison-seated TB epidemics (see section 2.10). In several countries the numbers of TB cases have quadrupled in the last 10 years as a result of HIV. In some areas, 75% of TB patients are HIV-positive [7]. TB is the single biggest killer of people infected with HIV.

HIV infection is the most important risk factor for the development of TB disease. HIV weakens the immune system leading to the reactivation of latent TB infection and the rapid progression to disease in those recently infected with TB.

The risk of TB disease in the HIV-infected, compared with those who are not immunosuppressed, is significantly higher. There is also evidence that TB may increase the speed of replication of HIV, thus making the progression to AIDS more rapid [8]. With more and more TB cases being created by the synergy between the two infections, transmission of TB is inevitably enhanced, increasing the risk of infection for everyone. The combination of HIV and MDR-TB in a population is therefore potentially disastrous.



The clinical presentation of HIV-related TB disease depends on the degree to which the patient's immune system is damaged. Smear-negative pulmonary and extrapulmonary disease are more common forms of TB with more advanced HIV disease.

TB treatment in people living with HIV is important as it increases their quality and length of life and reduces transmission of infection, benefiting individuals, families and communities as a whole. Fortunately, TB in HIV-infected patients responds as well to treatment as in the non-HIV-infected, although there is a higher case fatality, partly due to TB itself and partly due to other complications of HIV disease.

HIV is mainly transmitted through sexual intercourse, injections with contaminated equipment, contaminated blood transfusions, and from mother to infant. There is no evidence that HIV is transmitted through everyday contact, food or drink, or by the bites of insects.

2.6 PRISONS

The term 'prison' is used to mean any place of detention. The term therefore includes pre-trial or remand centres, labour colonies, reformatories, prisoners of war camps, immigration centres, police stations and other sites where people are deprived of their liberty.

Prisons are often the responsibility of several government ministries within a country most usually the Ministries of Justice, Interior, Security or Defence. There may also be different levels of government responsibility at federal, state or local levels. There are usually facilities for different categories of prisoner – juveniles, women, first offenders, recidivists, life-sentenced, political prisoners, etc. Each administration may have its own rules and regulations, security problems, medical services, etc. However, there may be little co-ordination between these ministries, although the same prisoners will pass through a number of different centres through the judicial process. Sometimes administrations may even be competing because of scarcity of resources or for political reasons.

Regimes and conditions vary within and between countries and may have a significant impact on the health of prisoners and those charged with their care. Prisoners usually return to society after serving their sentence, or earlier because of pardons or amnesties. However there is often little collaboration between detaining authorities and the civilian sectors responsible for health care delivery or social welfare.

2.7 PRISONERS

Despite efforts for penal reform and the use of alternative punishment systems, prison populations continue to rise throughout the world [9]. It is estimated that on any given day the number of people in prison in the world is 8 to 10 million. As many are detained for short periods and the rates of admissions and releases are almost equivalent [9], the actual numbers passing through prisons each year is potentially 4-6 times higher [10].

**TABLE 2.1 PRISON POPULATION RATES 1998** [11]^(a)

Country	rate per 100 000 population ^(b)	Country	rate per 100 000 population ^(b)
England & Wales ^(c)	126	Netherlands ^(h)	75
Northern Ireland	91	Norway ^(d)	56
Scotland ^(d)	117	Poland	153
Austria ^(c)	85	Portugal	144
Belgium ^(d)	77	Russia ^(e)	690
Czech Republic ^(e)	215	Spain ^(e)	111
Denmark	63	Sweden	60
Finland ^(f)	55	Switzerland	79
France ^(g)	89	Australia ^(d)	98
Germany	95	Canada ⁽ⁱ⁾	109
Greece	68	Japan	42
Hungary ^(e)	142	New Zealand ^(j)	143
Ireland (Eire)	71	South Africa ^(d)	327
Italy	87	U.S.A. ^(k)	668
Luxembourg	91		

^(a) at 1st September, unless otherwise stated

^(b) based on estimates of national population

^(c) at 31st August

^(d) average daily population

^(e) at 31st December

^(f) at 1st January

^(g) metropolitan and overseas departments

^(h) at 30th September

⁽ⁱ⁾ annual average by financial year (1st April – 31st March)

^(j) annual average

^(k) at 30th June

Prisoner populations are composed predominantly of men aged 15-44 years. There is usually an over-representation of marginalized groups within the civilian community, such as ethnic minorities, illegal immigrants, substance abusers, the mentally ill and the poor.

Living conditions inside prisons are often appalling [12, 13]. In any country where resources are scarce, those considered 'criminals' may become the lowest priority for funds.

Prisoners are often housed in overcrowded facilities with inadequate ventilation, hygiene and sanitation. Food that is provided can be unappealing and nutritionally inadequate. Health services may be weak or absent. Illegal behaviour such as the use of alcohol, drugs or sexual activities (with or without consent) may continue unchecked. Such conditions are ripe for the outbreak of epidemic diseases, including TB and HIV.

As a result of poor conditions inside prisons many prisoners rely on assistance provided by family members outside the prison walls. Gambling, trading in drugs or other 'commodities', prostitution and violence are realities in many prisons world-wide and in some instances may be part of an internal system which prisoners use to obtain their basic needs.

Given the background, conditions and the very nature of incarceration, it should not be surprising that internal groups develop in prison, adapting the criminal social order to the closed environment or establishing a new one along religious, ethnic or other criteria. This



unofficial hierarchy may be extremely powerful and a prisoner's position in this hierarchy is crucial for access to basic needs and protection from violence. This includes his ability to access health care and therefore impacts on TB control.

Prisoners are often very resentful of the society that imprisoned them and may have little respect for figures that represent it, including prison health staff. Behavioural norms and respect for others may not necessarily apply and should not be assumed. Unwritten laws and coded behaviour are not always apparent, but easily slighted or misunderstood by the unaware.

It is the State's responsibility to ensure that those imprisoned are kept in conditions compatible with health (Annex 1). Serious illness that develops as a result of poor prison conditions or lack of access to appropriate medical treatment may be considered a violation of international human rights law [14, 15].

Reducing the rate of incarceration through penal reform is fundamental to improving prison health. By decreasing overcrowding, transmission of infectious disease can be reduced, living conditions can be substantially improved and some of the violence and deterioration in mental health associated with prison relieved. In addition, fewer prisoners can mean greater resources to improve prison conditions both for prisoners and staff.

2.8 TUBERCULOSIS IN PRISONS

Prisons have often been cited as possible reservoirs of TB, although in fact there is limited concrete data. There are many reasons for this lack of data, but they often reflect the low priority attached to the problem (see Chapter 5) and to data collection.

However, where data are available, much higher levels of active TB disease are reported from prisoner populations compared to that reported from the civilian population.

TABLE 2.2 Rates of active tuberculosis in prisoner and civilian populations

Country [study]	Year	Prison cases per 100,000	Civilian cases per 100,000 – all forms [16]
Brazil [17]	1992-3	5,714 (pulmonary TB) n = 350	55.9 (1992)
Georgia [18]	1997-8	5995 (smear/culture-positive) n = 7,437	155 (1997)
Iran [19]	Not available	122 (pulmonary TB) n = 1634	17.7 (1997)
Malawi [20]	1996	5142 (pulmonary TB) n = 914	209.5 (1996)
Rwanda [21]	1996-8	3363 (all forms) n = 57,961	79.3 (1997)
Spain (Madrid)[22]	1993-4	2283 (all forms) n = 9461	24 (1993)
China (Taiwan) [23]	1997-8	259 (pulmonary TB) n = 38,593	Not available
USA (New York) [24]	1991	156.2 (all forms) n = 109,475	10.4 (1991)



Although, strict comparison between prison and civilian data above is not possible because of differences in data collection methods, the table does serve to illustrate the magnitude of the TB problem in prisons.

Reasons why such high levels of TB are found in prison populations are:

- A disproportionate number of prisoners are derived from population groups already at high risk of TB infection and disease [25] (e.g. those addicted to alcohol or illicit drugs, the homeless, the mentally ill, former prisoners), who often do not have access to adequate treatment in civilian life.
- Prisons promote transmission of TB infection through prolonged and repeated exposure to *Mycobacterium tuberculosis* as a result of:
 - Late case detection, and the lack of respiratory isolation and inadequate treatment of infectious cases
 - High turnover of prisoners through repeated transfers within the prison system, release and recidivism
 - Overcrowding
 - Poor ventilation.
- Prisoners are also at risk of rapid progression to TB disease following recent infection or reactivation of latent infection through:
 - Co-existing pathology, particularly HIV and intravenous drug use
 - Poor nutritional status
 - Physical / emotional stresses.

This concentration of risk factors can ignite TB epidemics that are not restricted to the confines of a prison. If TB in prisons is to be controlled effectively, all of these factors must be acknowledged and addressed wherever possible.

2.9 DRUG-RESISTANT TUBERCULOSIS IN PRISONS

Unfortunately, some prison programmes have reported very high levels of drug-resistant TB.

TABLE 2.3 Reported rates of multidrug-resistant tuberculosis (MDR-TB) in imprisoned tuberculosis patients

Country [study]	Year	Rate of MDR-TB
Azerbaijan [26] (n = 131)	1997	23.0%
Georgia [18] (n = 276)	1997-8	13.0%
Russian Federation (Mariinsk) [27] (n=164)	1998	22.6%
Spain (Madrid) [22] (n = 203)	1994	5.9%
USA (New York) [24] (n = 116)	1991	32%



Regrettably, there are only scarce data on levels of MDR-TB in comparable civilian populations, although high levels have been documented in other regions and countries of the former Soviet Union [28].

MDR-TB may be more common in prison settings as factors that encourage transmission of regular TB will enhance the spread of MDR-TB. In addition, various prison aspects may particularly enhance the development of MDR-TB. These include:

- fewer resources and weaker health care provision than for the society in general, leading to erratic drug supplies and inadequate treatment
- access to uncontrolled anti-TB drugs through the prison black-market, staff and visitors
- pressures on prisoners to self-treat:
 - inaccessibility of health services because of economic, physical and cultural barriers
 - failure to complete supervised treatment courses through repeated inter-prison transfer where treatment completion is not assured
 - release during treatment when TB services are not accessible, associated with recidivism, so bringing drug-resistant TB back into the prison environment
- hidden defaulting through coercion by other prisoners or a desire to remain a 'TB patient' and receive better living conditions
- diversion of treatment obtained inside prison to support family members in the community.

These factors must be addressed as a priority to prevent the development of drug-resistant TB. This is even more the case in prisons where MDR-TB has become established and specific treatment programmes are considered with 'second-line' anti-TB drugs.

2.10 PRISON, TUBERCULOSIS AND HIV

HIV exacerbates the already increased risk of TB in incarcerated populations. In one study in Brazil [17] the incidence of active TB in incarcerated women was found to be 9.9 per 100 person-years for the HIV-infected as opposed to 0.7 per 100 person-years in those uninfected with HIV.

HIV is reported in many of the world's prisons, although there is little data available. There are many reasons for this including:

- fear of discrimination against those found to be HIV-infected and the general lack of confidentiality in the prison environment which discourages HIV testing
- the fact that HIV and its risk factors are often officially denied by prison authorities.

Nevertheless, where rates of HIV in civilian and detained populations have been compared, up to 75-fold increases in prevalence have been reported [29], [30].

**TABLE 2.4** Reported HIV seroprevalence in prison inmates

Country [study]	Year	Prevalence of HIV in inmates
Brazil (Sao Paulo) [31] n = 693	1995	14.4%
Ethiopia (Dire Dawa) [32] n = 450	1988	6.0%
India (Delhi) [33] n = 249	Not available	1.2%
Scotland (Glasgow) [34] n = 978	1994	0.9%
USA [35] n = 9,080	1988-9	4.1%

TABLE 2.5 Reported HIV seroprevalence in prison inmates with active TB

Country [study]	Year	HIV prevalence in detained TB cases
Brazil (Rio de Janeiro) [36] (n = 289)	1998	16.6%
Ivory coast (Bouake) [37] (n = 30)	1992	30%
Spain (Madrid) [22] (n = 192)	1994	84%
USA (New York) [24] (n = 100)	1991	95%

Both tables (2.4 and 2.5) contain data collected by various methods and therefore the data cannot be compared. However, the tables serve to illustrate the high prevalences of HIV infection reported from some prisons.

Prison presents a high concentration of risk factors for the transmission of HIV infection. These include the facts that:

- a disproportionate number of inmates come from, and return to, backgrounds where the prevalence of HIV infection is high
- risk behaviours such as intravenous drug use and unsafe sexual practices (with or without consent) commonly occur in prisons
- risk behaviours and HIV may not be officially acknowledged so hindering efforts at education regarding safer practices (injecting and sexual)
- interventions to reduce risk of HIV infection (such as the provision of clean injecting equipment or condoms) may be restricted or considered unacceptable
- there may be a high frequency of tattooing using unsterilized equipment
- other sexually transmitted diseases (e.g. syphilis) are common in prisons and encourage the transmission of HIV.



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CONSIDERING A TUBERCULOSIS CONTROL PROGRAMME IN PRISONS

This chapter outlines the steps that are required before decisions are made to initiate, prepare and implement a TB control programme in prison. These will be discussed in greater detail in the forthcoming chapters.

3.1 INITIATION

Before a TB control programme in prisons is considered:

- TB should be recognized as a serious problem within the country's prisons
- there should be genuine political will from the authorities responsible for prisoners and health to control TB in an integrated and comprehensive manner
- there should be civilian TB services present in the form of a NTP or similar
- those responsible for TB control should be granted access to all places of detention
- there should be guarantees that financial and institutional support will be made available.

3.2 SITUATION ANALYSIS

To prepare a programme adequately, a detailed situation analysis should be performed (see chapters 8 and 9). This should include:

- the collection of epidemiological data on the TB problem, e.g. prevalence, case notification and mortality rates, population demographics, treatment outcomes, risk factors etc. from representative prisons
- an examination of structural and administrative aspects that impact on TB control, e.g. existing health service provision, management and co-ordination of prisons, rules and regulations, availability of food, accommodation, etc.

3.3 PREPARATION

Preparation will be guided by the outcome of the situation analysis. ***The importance of good preparation cannot be overemphasized.*** Once a programme starts, day to day management becomes very time-consuming leaving little opportunity to tackle issues that could have been addressed before starting. In addition, problems will always arise once the programme is running that could not have been foreseen. Good preparation takes time and should not be rushed or curtailed.

Many different and complex issues need to be addressed before commencing a programme, including organization and integration of diagnostic and treatment services, technical policies for case-finding and treatment, education and training, infection control and programme evaluation. These topics will be discussed in detail in later chapters.



3.4 PRE-REQUISITES BEFORE IMPLEMENTATION

Before enrolling patients in a prison TB control programme, the following are essential pre-requisites:

- Preparation of all aspects detailed above in a progressive and step-wise manner (figure 3.1).
- A written and comprehensive programme plan, signed and endorsed at the highest level by all authorities responsible for prisoners and the civilian TB services, including:
 - Identification of a lead agency or coalition
 - Detailed responsibilities and obligations of each partner
 - Clear lines of responsibility with the names and job descriptions of those responsible, including an overall prison TB co-ordinator
 - A standardized and obligatory technical protocol for case-finding, diagnosis and case management according to international recommendations
 - A directive that all case-finding, diagnosis and treatment will be free of charge
 - Regulation of anti-TB drugs and restriction of their use to designated treatment sites
 - Infection control procedures and policies
 - A plan for regular programme and agreement evaluation
 - Programme budget
 - Time frame
 - A plan for progressive hand-over of responsibilities if an external agency is involved.
- Availability of fundamental necessities for all prisoners: shelter, water, food, sanitation, unrestricted access to basic medical care, respect of human rights.
- Guaranteed funds.



TABLE 3.1 PLANNING FOR A TB CONTROL PROGRAMME IN PRISONS

Planning steps for a TB control programme in prisons		Implement plan	
<p>Secure plan in a written agreement:</p> <p>Disseminate to parties</p> <p>Obtain legal endorsement</p> <p>Achieve consensus</p> <p>Budget</p> <p>Workplan and time frame *</p> <p>Document plan and secure funds:</p> <p>Continuous system of programme evaluation</p> <p>Internal and independent system of supervision</p> <p>Epidemiological and programmatic</p> <p>Define organization of operations and resource needs:</p> <p>Staff - recruitment, job descriptions, salaries, training</p> <p>Supplies - laboratory needs, drugs, programme documentation, transport</p> <p>Organisation of treatment services</p> <p>Provision of laboratory services and links to reference network</p> <p>Infection control policy and occupational health procedures</p> <p>Education and training programmes</p> <p>Treatment and monitoring protocols, notification and follow-up of patient transfers</p> <p>Case finding techniques, screening policy, laboratory procedures and quality control</p> <p>Programme targets and objectives</p> <p>Define technical policies:</p> <p>Identify lead agency; define respective roles and lines of responsibility for all sectors</p> <p>Establish or strengthen integration of TB services between prison and civilian sectors</p> <p>Financial support for the project is available</p> <p>The provision of shelter, food, water, hygiene is acceptable</p> <p>Structural and administrative context</p> <p>Epidemiological situation</p> <p>Government</p> <p>Finance</p> <p>Health</p> <p>Prisoners</p> <p>Gain political commitment from authorities for:</p>	<p>Secure plan in a written agreement:</p> <p>Disseminate to parties</p> <p>Obtain legal endorsement</p> <p>Achieve consensus</p> <p>Budget</p> <p>Workplan and time frame *</p> <p>Document plan and secure funds:</p> <p>Continuous system of programme evaluation</p> <p>Internal and independent system of supervision</p> <p>Epidemiological and programmatic</p> <p>Define organization of operations and resource needs:</p> <p>Staff - recruitment, job descriptions, salaries, training</p> <p>Supplies - laboratory needs, drugs, programme documentation, transport</p> <p>Organisation of treatment services</p> <p>Provision of laboratory services and links to reference network</p> <p>Infection control policy and occupational health procedures</p> <p>Education and training programmes</p> <p>Treatment and monitoring protocols, notification and follow-up of patient transfers</p> <p>Case finding techniques, screening policy, laboratory procedures and quality control</p> <p>Programme targets and objectives</p> <p>Define technical policies:</p> <p>Identify lead agency; define respective roles and lines of responsibility for all sectors</p> <p>Establish or strengthen integration of TB services between prison and civilian sectors</p> <p>Financial support for the project is available</p> <p>The provision of shelter, food, water, hygiene is acceptable</p> <p>Structural and administrative context</p> <p>Epidemiological situation</p> <p>Government</p> <p>Finance</p> <p>Health</p> <p>Prisoners</p> <p>Gain political commitment from authorities for:</p>	<p>Implement plan</p>	
	<p>Define management structure:</p> <p>Identify lead agency; define respective roles and lines of responsibility for all sectors</p> <p>Establish or strengthen integration of TB services between prison and civilian sectors</p> <p>Financial support for the project is available</p> <p>The provision of shelter, food, water, hygiene is acceptable</p>	<p>Define management structure:</p> <p>Identify lead agency; define respective roles and lines of responsibility for all sectors</p> <p>Establish or strengthen integration of TB services between prison and civilian sectors</p> <p>Financial support for the project is available</p> <p>The provision of shelter, food, water, hygiene is acceptable</p>	
	<p>Confirm:</p> <p>Financial support for the project is available</p> <p>The provision of shelter, food, water, hygiene is acceptable</p>	<p>Confirm:</p> <p>Financial support for the project is available</p> <p>The provision of shelter, food, water, hygiene is acceptable</p>	
	<p>Perform and evaluate situation analysis:</p> <p>Structural and administrative context</p> <p>Epidemiological situation</p> <p>Government</p> <p>Finance</p> <p>Health</p> <p>Prisoners</p>	<p>Perform and evaluate situation analysis:</p> <p>Structural and administrative context</p> <p>Epidemiological situation</p> <p>Government</p> <p>Finance</p> <p>Health</p> <p>Prisoners</p>	
	<p>Gain political commitment from authorities for:</p> <p>Government</p> <p>Finance</p> <p>Health</p> <p>Prisoners</p>	<p>Gain political commitment from authorities for:</p> <p>Government</p> <p>Finance</p> <p>Health</p> <p>Prisoners</p>	

*Include plan and timeframe for handover of responsibilities if external agency involved



4.1 KEY MESSAGES

- The goals of TB control programmes are to reduce morbidity and mortality, to prevent the development of multidrug-resistant TB and to ultimately stop transmission of infection.
- The main strategies for achieving these goals are the early diagnosis of TB cases and their prompt and effective treatment.
- Penal reform and improvement in prison living conditions are also important strategies for achieving these goals.

4.2 GOALS OF TUBERCULOSIS CONTROL PROGRAMMES

TB control programmes have three main goals. These are to:

1. reduce morbidity and mortality from TB
2. prevent the development of drug-resistant TB
3. reduce and ultimately stop the transmission of TB infection.

The most effective strategy to achieve these three goals is to provide:

1. early diagnosis of TB (case-finding)
2. effective treatment of TB until cure.

Such a strategy should be accessible to all TB cases. However, where resources are limited, the strategy must ***prioritize the diagnosis and treatment of infectious cases*** (patients with smear-positive, pulmonary TB). This is because these cases transmit infection (drug-susceptible and drug-resistant) and therefore ultimately produce more morbidity and mortality.

These are the fundamental principles of the WHO recommended DOTS strategy.

4.3 EARLY DIAGNOSIS (CASE-FINDING)

Late TB case-finding and delays in commencing treatment are common problems in many prisons [1, 2]. They are important causes of TB morbidity, mortality and transmission, as well as the creation of drug-resistant TB.

Firstly, late treatment for active TB leads to greater tissue destruction, a weaker nutritional status and a greater likelihood of poor outcomes from treatment [1, 3].

Secondly, diagnostic and treatment delays may pressure patients into seeking their own 'solutions' through treatment obtained through visitors or the prison black market. Such erratic, unsupervised treatment promotes the development of MDR-TB.



Thirdly, delaying diagnosis and treatment of highly infectious, smear-positive, pulmonary cases exposes other individuals who come into contact with the patient to TB infection.

A method of detecting cases is required that:

- is focused on detecting infectious cases early in order to have the greatest impact on TB control
- can be used for screening at entry to the prison system and to detect cases that develop after imprisonment
- is inseparably linked to the effective treatment of detected cases (ideally within 24 hours of diagnosis) and
- is affordable and feasible.

Infectious cases can only be diagnosed through laboratory investigations that demonstrate TB bacteria in an individual's sputum. The more bacteria present, the more infectious a case is likely to be. The most infectious cases are TB patients who produce sputum in which TB bacteria are visible in stained sputum smears using a light microscope. These are named smear-positive TB cases.

Light microscopy of sputum smears is quick, inexpensive and relatively easy to establish and implement (see Chapter 10). **Laboratory services are therefore fundamental to the control of TB.**

4.4 EFFECTIVE TREATMENT

Effective treatment reduces morbidity and mortality and prevents the development of drug resistance. As smear-positive cases usually become non-infectious within 2-3 weeks of starting effective treatment [4] (if the patient is harbouring drug-susceptible bacilli), transmission of TB infection is rapidly reduced.

Effective treatment means providing treatment with the correct combination of anti-TB drugs for the duration necessary to ensure cure and reduce the risk of relapse. It also means guaranteeing that the treatment is properly taken, its impact is monitored and the treatment is actually completed (see Chapter 13).

Therefore, effective treatment requires:

- an uninterrupted supply of the correct drugs, in the correct quantities and of good quality
- prescription of the correct drugs, in the correct dosages, for the appropriate duration of treatment
- patient supervision and support to ensure that the treatment prescribed is taken properly (using various methods including DOT)
- monitoring of treatment efficacy through clinical and laboratory measurements
- an effort to ensure treatment is completed and the outcome of treatment known and reported - a point where many prison TB programmes currently falter.



4.5 ACCESS TO EARLY AND EFFECTIVE DIAGNOSIS AND TREATMENT

All infectious TB cases should have the same level of access to early and effective diagnosis and treatment of TB whether they are inside or outside of the prison walls. In the same way, all prisoners should have the same level of access to TB care regardless of their gender, crime or prison regime. As well as being important from an individual ethical and human rights point of view, this principle is also an essential component of TB control in any population.

If one group of infectious TB cases is excluded from treatment, TB morbidity, mortality and transmission, as well as the possible creation of drug-resistant TB, persist. These risks are not limited to this group only as transmission of infection to others continues through shared facilities, prisoner transfers and releases, and through staff and visitors.

4.6 TARGETS FOR TUBERCULOSIS CONTROL PROGRAMMES

Given that international conventions specify that the standard of health care in prisons should be at least equivalent to that of society as whole, broad targets for TB control in prisons should follow those currently used in the community, namely:

- 1) at least 85% of all detected smear-positive cases should be successfully treated**
- 2) at least 70% of the estimated new smear-positive cases should be detected.**

The World Health Organization adopted these targets after disease modelling suggested that achieving these targets [5, 6] would result in a considerable drop in the prevalence of active TB in a population (where there was a steady incidence without any intervention).

High transmission environments, such as prisons, are associated with a rising yearly incidence of TB. Therefore, achieving the targets above in prisons will result in a much lower rate of decline in prevalence. They should therefore be considered minimum targets for TB control programmes in prison. In addition, these targets should not be taken to mean that only 70% of new smear-positive cases need be detected or only 85% of those detected need be cured.

4.7 EQUIVALENCE OR EQUITY IN TUBERCULOSIS CARE?

'Equivalence' of care means that prisoners have the right to the same standard of health care as the state provides for the general community [7]. The United Nations [8] and the Council of Europe [9] support the concept of equivalence of care. For example:



Recommendation No R (98) 7 of the Committee of Ministers of the Council of Europe [9] states that:

“respect for the fundamental rights of prisoners entails the provision to prisoners of preventive treatment and health care equivalent to those provided to the community in general”

The principle of ‘equity’ of care considers that avoidable disparities in health status among individuals and groups are unacceptable and that the provision of preventive and curative health care should be based on need [10, 11]. Therefore, there is a strong argument that as prisons are often reservoirs of poor health and disease, comparatively more resources should be directed towards raising the health status of prisoners to that of the community at large.

In any case, regardless of financial arrangements for obtaining TB care in the community, it is absolutely essential that diagnosis and treatment for TB are provided free of charge to prisoners [12].

Equivalent health care can be seen as the very minimum level of care that should be provided and that progressive steps must be taken towards achieving equitable health status within and outside prison walls.

4.8 PRISON LIVING CONDITIONS AND PENAL REFORM

Prison living conditions such as overcrowding, poor ventilation and inadequate nutrition have a significant impact on the transmission of TB and the subsequent morbidity and mortality from the disease [1, 13, 14]. Strategies to control TB are therefore not complete without addressing these issues wherever possible.

Minimum standards for prison living conditions are set by the United Nations [15] and the Council of Europe [16] and should be applied.

However, steadily increasing prison populations globally due to sociological, economic or legal changes have led to gross overcrowding and deterioration in conditions in many prisons. Overcrowding promotes epidemic disease [17], violence [18] deterioration in mental health [19] and may increase the risk of recidivism [20]. The more prisoners, the more resources must be directed towards prisons.

Extending the prison system is unlikely to offer a long-term, sustainable solution to the problem. Rather overcrowding and its consequences should be addressed through penal reform, the fundamental principle being that deprivation of liberty should be considered a measure of last resort. Non-custodial measures and adapted sentencing policies are suggested by the Council of Europe [21] and penal reform specialists such as the International Centre for Prison Studies [22, 23], and Penal Reform International.



Penal reform is fundamental to the control of communicable diseases such as TB in prisons and must be addressed as a priority. For the purposes of effective TB control, attention should be focused particularly on reducing overcrowding and improving aspects such as nutrition, ventilation, access to exercise and hygiene. Existing procedures should be examined locally to see what improvements to prison conditions and the organization of health services might be made.

Linking TB control with penal reform has provided encouraging results [24]. It is important that those working on TB control in prisons widen their collaboration to include specialists in penal reform.

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5.1. KEY MESSAGES

- TB control in prisons faces a number of obstacles. These may include weak health care provision, a lack of continuity and equivalence of care between civilian and prison health services, the high mobility of the population, corruption, violence and legislation that can have a negative impact on TB control.
- Overcoming these obstacles is challenging but possible. A multisectoral, comprehensive approach is necessary.
- Attention must be particularly focused on integrating prison and civilian TB services, decentralizing diagnosis and treatment, improving education and training in TB and human rights, rationalising resource use to infectious TB cases and strengthening health service provision generally.
- TB control in prison also brings with it opportunities. These include a reduced level of risk to staff, visitors and the community as a whole; the provision of health promotion and health care to a population group often difficult to reach; and a means of establishing improved communicable disease control generally.

5.2. HEALTH CARE PROVISION IN PRISONS

5.2.1 *Responsibility for health care and co-ordination between authorities*

Health care in prison usually falls under the responsibility of the health services of the ministry in charge of the prison. This is often a completely separate entity from the services responsible for civilian health.

Responsibility for the health care of former inmates once they have been released may not be clear. The responsibility for paying costs of on-going investigation and treatment after patient transfer to another service may be disputed.

Management of case-finding and treatment may be carried out independently and different authorities may use differing procedures. Lack of standardization may result in interruptions in TB investigations or treatment, over or under treatment of cases and inequities in the standard of care between different services.

- A policy of standardized TB care in all institutions responsible for TB patients should be adopted in the form of a fully integrated TB programme (see Chapter 6).
- The political commitment to integrated TB care of a number of different administrations must be obtained.
- Co-operation and communication between civilian and prison health authorities is fundamental.



5.2.2 Conflicts of interest

Health is rarely a priority for prison administrations who are more concerned with prison security and discipline. The health needs of individual prisoners or the prison population may come into direct conflict with security, judicial or legal requirements. An example would be the transfer of a prisoner with TB to a place where continuation of treatment cannot be assured.

In some situations, health staff may also be required to act as security staff. This creates many conflicts of interest between priorities for security and health. Such conflicts damage the patient-carer relationship, impact negatively on patient confidentiality and often place prison health staff in a very difficult position.

The standards of confidentiality are generally much lower in prison than civilian society. Custodial staff may screen and limit requests to see medical personnel. General prison staff may have access to prisoners' medical records, violating the right to medical confidentiality.

- Prison administrations should be encouraged to prioritize health. Healthy prisons are easier to manage, reduce the risks to staff and visitors and fulfil the rights of prisoners to health protection and care.
- Prison administrations should be made aware of the impact administrative decisions may have on an individual's and the populations' health.
- Prison health staff must be considered professionally independent of any security responsibility.
- Clinical decisions should be based solely on health criteria.
- Only health staff should have access to a prisoner's medical records.

5.2.3 Health services

Health services in prison are often badly under-funded. Access to health care is therefore restricted because of lack of resources – accommodation, equipment, transport and staff, but also infrastructure and consumables such as diagnostic materials or medicines.

Diagnostic and treatment procedures are often out of date, poorly applied or unnecessarily costly. Certain services such as medical screening may be abandoned because of broken equipment, without consideration of alternatives. Disease surveillance and reporting is often weak or non-existent. Prison health statistics are almost never reported with national statistics and if they are, are not identifiable as such.

Prison health staff may be poorly motivated because of a lack of resources and the consequent poor prognosis of patients, salaries that are late and/or low, lack of training and access to up to date medical literature and the hazards and stigma of prison work. Many prison health staff are isolated from their peers or forgotten by training programmes.



Centralized services, such as TB colonies, may make treatment inaccessible for certain groups of prisoners such as women, juveniles, those awaiting sentence or those detained under strict regimes, because facilities do not comply with penal regulations for their accommodation. In addition, the physical and emotional support provided by relatives may be damaged by moving a prisoner away from his/her area of residence and may make it difficult to arrange the continuation of treatment should the prisoner be released.

Conversely, unregulated TB diagnosis and treatment may be carried out in a number of prisons, without adequate supervision. Prisoners may be incorrectly diagnosed or treated, and cases may not be reported. Some prisons may not have health personnel. If diagnosis and treatment are not available or erratic, prisoners may seek their own solutions through the prison black market or through visitors. The same pressures act where first-line anti-TB drugs are no longer effective because of multidrug-resistance, resulting in the potential for the inappropriate use of second-line drugs.

Administrative problems often compound the physical limitations of providing appropriate and timely TB treatment. These include delays in reporting laboratory results, lengthy administrative procedures to arrange transfer and admission to a place of treatment, poor communication and record keeping procedures, missing medical records, etc.

Lack of diagnostic and treatment services for other illness can also impact on TB control. HIV and other communicable diseases e.g. hepatitis, psychological and psychiatric disease, skin diseases, substance abuse are more prevalent in prisons and either enhance transmission or complicate TB diagnosis and treatment.

- Prison health service funding should be prioritized. Funds could be released by penal reform, lobbying of the ministry responsible for the penal system budget and/or by securing external financial aid.
- Prison health services should be integrated with those of the community, ensuring continuity of care, avoiding duplication of resource use and achieving standardization of procedures. An agreement between civilian and prison health authorities to make use of civilian hospital wards and laboratory services could be considered.
- The use of resources should be rationalized. TB diagnosis and treatment should be prioritized to infectious pulmonary cases that are transmitting the infection.
- Prison health personnel should be enabled to perform correctly and effectively. The training of prison health personnel should be linked to civilian training programmes, necessary resources should be provided and staff should receive appropriate and timely salaries.
- TB services should be decentralized within the prison system as much as is feasible, ensuring correct diagnosis, treatment and reporting at all times and maintaining an adequate level of supervision. All categories of prisoner should be able to access health and TB services.
- Health services should be available and consistent in all prisons. Consider frequent and regular visits of medical personnel for case-finding, medical investigations and organization of treatment where full time health staff are not available.



- As information is essential to guide policy and strategy, disease surveillance and reporting systems must be strengthened. Ensure prison disease statistics are reported with national statistics and are identifiable as such.
- Prison health services should be improved generally, whilst establishing good TB control.

5.3 MOBILITY OF THE POPULATION

Once arrested, a prisoner is likely to be held first in a police station before transfer to a pre-trial centre. During the trial and investigation process, the prisoner can be held in another centre to ensure that no illegal contacts are made that influence the outcome of the trial. Depending on the result, the prisoner may be released or sent to a prison to serve the sentence passed. At each stage the individual may be moved repeatedly because of security problems, a pressure to find bed space or a regulation that requires rotation or separation of groups of prisoners. Depending on the prisoner's behaviour, changes may be made to his/her security status resulting in a move to a higher or lower security level prison. Whilst serving a sentence, a prisoner may be amnestied through presidential decree or sent for re-trial following an appeal. Once released, former inmates have a greater chance of re-arrest.

A prisoner's risk of being infected with TB or developing active disease will be affected by living conditions and the presence of active TB in co-prisoners at each stage. The chance of active TB disease being detected, treated and that treatment completed depend on the availability of strong TB services at each centre and the communication between them. The presence of such services will depend ultimately on the commitment of the authorities to TB control.

Patient mobility is one of the biggest risk factors for incomplete treatment inside or outside prisons. Incomplete treatment leads to a lower chance of cure and therefore increased transmission of TB.

Patients who move are five times more likely to default from TB treatment in civilian populations and patients that are diagnosed in prison are up to 45 times more likely to move than patients treated in civilian programmes, according to one study [1]. In another, a prisoner subsequently found to have TB was transferred 14 times during an 18 month study period [2] and in another, 52% of prisoner-patients were released whilst on TB treatment [3].

Decisions to transfer, release or amnesty are often made and implemented within hours by politicians or administrators without the knowledge of health staff. Poor registration and record keeping procedures can make the tracing of prisoner-patients difficult. Therefore, even if there is a TB service in the next sector, it is often difficult to notify this service or to prepare a thorough, planned discharge.

In any event, a diagnosis of TB or incomplete TB treatment must never be used to delay trial, release or amnesty.



- ***TB services should be available at every judicial level and integrated with civilian services*** (see Chapter 6).
- Health staff must be thorough in recording and reporting and need to maintain a very high level of communication with colleagues in other prisons and in the civilian health services. A rigorous information system for transfers in and out of prison must be in place (see Chapter 13). Attention should be paid to maintaining the confidentiality of medical records.
- Transfers of prisoners with TB should be planned wherever possible in collaboration with health personnel and transfers should be to sites designated for TB cases by the next administration if necessary.
- Prisoners should be made aware at diagnosis and the start of treatment of the importance of treatment completion and of how to obtain treatment should transfer or release occur without warning.
- Prisoners under investigation for TB should not be moved until the diagnosis is confirmed or excluded, so that appropriate action can be taken.
- If the usual practice is to temporarily transfer a prisoner to a separate location for trial or appeal, a means of continuing supervised TB treatment must be found. An alternative would be to have judicial personnel come to the prisoner, as long as this does not result in greater delays in the judicial process.
- The number of transfers for all prisoners should be minimized to avoid the risk of an undiagnosed TB case spreading the infection to other centres.

5.4 CORRUPTION

In some prisons many things are for sale as long as the prisoner can pay or has influence [4]. Unofficial markets exist using a variety of ‘currencies’ – money, cigarettes, alcohol, drugs and sex. In some instances, transfer to an area with better living conditions, access to health care, contact with visitors or even assistance with escape can be bought [5]. Because of lack of access to basic essentials, survival may be dependent on external help from friends or relatives. Those without such help may have to work for other inmates or resort to theft, prostitution, gambling or violence.

TB programmes may also be open to corruption. Prisoners may want to enter a TB programme because of real or perceived benefits or leave because they fear a diagnosis of TB will deny them early release or family contact. Trading in fresh or dried sputum may occur and medical and laboratory staff may be pressured into providing false results. Anti-TB drugs may also be used as currency or patients may deliberately default from treatment to maintain their position in a TB treatment centre [6].

In some cases, access to TB care may be constrained by a prisoner’s limited means. Although payments are officially forbidden, unofficial payment systems for services may exist between prisoners or between prisoners and staff. Multiple payments may be required to obtain attention from a medical professional, to undergo diagnostic tests, be transferred to a place of treatment, to receive treatment and to be in a position to complete it. It is important to recognize that this issue goes further than the questionable practice of staff obtaining extra income from prisoners. For the prisoner faced with this situation, self-treating an illness by obtaining medicines on the prison black market or from visitors may be the cheaper option.



The presence of unofficial payment systems is not surprising in situations where prison staff are not regularly paid or receive salaries that have not kept up with the standard of living. Poor staff training and a lack of respect in the community often compound the situation.

- Access to health care and TB programmes should be based on sound medical criteria and all medical investigations and treatment should be free of charge [7].
- Collection of sputum specimens and the administration of anti-TB treatment should be directly observed from the beginning to the end of treatment.
- If TB treatment is carried out in a special institution, care should be taken that conditions are not superior to those of the rest of the prison system. A diagnosis of TB should not bring any extra advantage or disadvantage for the prisoner.
- Prison staff and inmates should be educated about how the early and effective diagnosis and treatment of infectious cases protects others from infection.
- Prison staff salaries and conditions of service should reflect the important role they provide for society.
- Prison staff should be carefully selected and correctly trained in codes of conduct and the importance of professional integrity.
- The unregulated sale and use of both first and second-line anti-TB drugs, on both sides of the prison wall, should be addressed with appropriate legislation.

5.5 VIOLENCE AND HUMAN RIGHTS ABUSES

Prisons are violent places. Prisoners often come from violent backgrounds and aggressive behaviour is worsened by prison conditions such as overcrowding and inadequate supplies of essential needs. The power imbalance between the custodial staff and the prisoners may be significant in either direction and the potential for human rights abuses is huge.

Prisoner hierarchies and gangs are based on violence and a prisoner's position may influence his ability to gain health care. Lower level prisoners particularly have difficulty accessing health care because of their lack of influence, the low-esteem in which they are held or the fact that they are providing a particular service (e.g. cleaning) and therefore 'cannot' be treated. Violence may also be used to obtain false sputum samples or anti-TB treatment from other prisoners. The fear of violence may lead prisoners to leave TB programmes.

Custodial staff may delay access to TB care as a form of punishment for a prisoner's misdemeanour or find the right to medical care 'affected' by the nature of the crime of which the prisoner is accused or convicted. Some may even punish a prisoner by deliberately housing him/her with infectious TB cases. 'TB' may be given as a cause of death to hide human rights violations [8]. HIV co-infection, or another co-existing pathology, may also be used incorrectly as a reason for withholding TB treatment.



These attitudes are often the result of a lack of understanding of the mechanisms of TB transmission and that the benefits of effectively treating infectious individuals extend to the prison society as a whole – prisoners, staff and visitors.

- Prison staff should be aware of the international prohibition on torture and cruel, inhuman or degrading treatment. Training of staff in human rights and international penal law should be strengthened.
- Health personnel must be aware of the internal prisoner hierarchy to ensure that the weakest groups have equitable access to health care.
- Collection of sputum and the administration of medicines must be directly observed at all times. Staff should be aware of the methods used by prisoners to hide tablets or provide false sputum samples.
- Prison staff and inmates should be educated about how early and effective diagnosis and treatment of infectious cases protects others from infection.
- The commitment of key members of the prisoner hierarchy for co-operation and support of TB control procedures should be sought.
- TB should not be used for punishment either by obstructing access to care or deliberately exposing inmates to the infection.

5.6 LEGISLATION AND REGULATIONS

Health legislation or regulations in prisons may need updating so that they protect public health and the rights of individuals. This is particularly important where there have been major economic upheavals that make complying with existing legislation impossible, hazardous or wasteful of resources. Other legislation may also have a direct or indirect impact on TB control and may need to be reassessed.

- Prison health legislation should focus on policies that are relevant, demonstrated to be effective and feasible.
- Policies should be compatible with public health, protect individuals from discrimination on grounds of health status and fulfil international human rights obligations.
- Such legislation should be monitored and mechanisms put in place for its enforcement.

A new WHO document ‘*Good practice in legislation and regulation for TB control: An indicator of political will*’ [9] should be referred to when reviewing legislation.

5.7 OPPORTUNITIES

As well as the many challenges faced by prison TB programmes, there are also opportunities. As prisoners are a captured population, ***it is possible to detect and treat prisoners with TB to the point of cure***, as long as there are strong integrated health care systems, a comprehensive technical protocol for case-finding and treatment and rigorous registering and tracing procedures.



TB control inside prisons is also good for the community at large. Fewer inmates will be released into the community with infectious TB, as well as the reduced risks to staff and visitors. Also, as prisoners tend to come from populations that are difficult for civilian health services to reach, time inside prison can be used effectively for health promotion and treatment of illness or addictions. An improved health status obtained inside prison may enhance self-respect and assist reintegration into society on release.

TB control programmes can also attract attention and funds to prison health and penal reform. Improvements in health services and living conditions can be stimulated and the respect for human rights strengthened. Healthy prisons are also likely to be easier to manage and can improve staff morale.

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INTEGRATED TUBERCULOSIS CONTROL PROGRAMMES

6.1. Key messages

- For TB control strategies in prisons to be effective, TB services need to be integrated both among different judicial and administrative layers of the prison system and between prison and civilian TB services.
- Integration of services can bring many benefits to all sectors responsible for TB patients including continuity and equivalence of care.
- The structure of an integrated service and its mechanisms of operation must be decided in each country or region, taking into account the relative strengths and roles of each sector. Attention must be focused on access to diagnosis and treatment for all infectious TB cases. A rigorous system to ensure continuity of care for transfers in and out of prison and between prisons must be developed.

6.2 THE NEED FOR INTEGRATED TUBERCULOSIS CONTROL

In this context, integrated TB control means TB services that are completely interconnected throughout prison and civilian societies to create one overall cohesive and co-ordinated service. This service should be responsible for every aspect of TB care for both populations through a network of diagnostic and treatment centres.

Three of the major obstacles to effective TB control in prisons are the number of administrations likely to be involved, the high mobility of the population leading to incomplete treatment and the inequity of access to TB care. Integrating TB control services is an important step towards:

- ensuring correct patient follow-up from case detection through to the completion of treatment following arrest, transfer or release
- promoting access to TB care for all prisoners from all prisons
- ensuring cohesive policies and equal standards of training, diagnosis and treatment in all sectors
- clarifying responsibility for TB control in prisoners and former inmates
- easing the detection and appropriate medical follow-up of relatives, visitors and staff who are at risk of contracting TB
- making the most effective use of resources and utilising valuable experience from all sectors
- ensuring that prison TB statistics are incorporated in national TB reports and are identifiable as such, so that the burden of disease is accurately assessed and conveyed.



6.3 THE ROLE OF CIVILIAN SERVICES IN TUBERCULOSIS CONTROL IN PRISONS

Prison and civilian health services are administratively separate in many countries. Action is often taken independently and there may be little contact or collaboration between the services on either side of the prison walls. Prison health data is rarely reported to the authorities responsible for community health and, if they are, may not be identifiable as such. Civilian TB services are not always informed of the release of prisoners on TB treatment [1]. Conversely, prison health services are rarely informed if a TB patient being treated by the civilian services is arrested.

Whether civilian health services have a role in prison health is often debated [2, 3]. Most consider that civilian health services ought to have some involvement in prison health. The Committee of Ministers of the Council of Europe [4] recommends that:

“Health policy in custody should be integrated into, and compatible with, national health policy”

“A clear division of responsibilities and authority should be established between the ministry responsible for health or other competent ministries, which should co-operate in implementing an integrated health policy in prison”

For TB control specifically, the involvement of civilian services is an important issue. Prison-seated TB epidemics may have an important impact on TB control in the community. The spread of TB originating inside prison but extending into the community has been quite clearly demonstrated [5, 6, 7] and occurs as a result of releases, amnesties or prisoner transfers, plus the regular contact through staff and visitors.

Ex-prisoners may also account for a significant proportion of community cases. For example, of 800 TB cases in males aged 16-61 diagnosed in the community between 1972–1977 in Arkansas, 9.6% had spent time in prison [6]. Approximately 13,000 cases of TB are released from prisons in Russia each year [8].

For these reasons, it is clearly in the interest of a civilian TB service to actively seek good TB control in prison. As prisoners come from and return to populations that may be very difficult for civilian health services to reach (e.g. the homeless), and given that TB cases originating in prison regularly enter the community and transmit their disease, civilian TB services cannot afford to ignore the prison problem. In the same way, prisons cannot ignore TB problems in the community.

The benefit of the involvement of the civilian TB services must also be considered from the prison administration's perspective, which may be anxious about 'outsiders' working within its jurisdiction.

Firstly, the experience of the civilian TB services in establishing TB control in the community may be invaluable. Many systems and procedures could be copied or used by the prison system. Such systems would include the procurement and storage of anti-TB



drugs and laboratory materials; staff training programmes; an established laboratory network for quality control, access to drug susceptibility testing etc; registration, recording and reporting procedures; and patient educational packages. Unnecessary expenditure could be reduced and the standardization and equivalence of care encouraged.

Secondly, in the interests of TB control in prison, it is imperative that prisoners released on treatment are given the possibility to complete it in the community. This is important for individuals to ensure their cure, but also for the prison administration as these cases may well be re-arrested in the future and bring their uncured or drug-resistant TB back with them to prison society. Accurate rates for recidivism are not always known but a 1991 survey of US prisoners indicated that 60% had been incarcerated in the past, while 45% had 3 or more prior sentences [9]. Likewise, given the subculture often associated with crime, it is conceivable that inadequately treated ex-prisoners may transmit their TB to future offenders.

The involvement of a well-functioning National TB Programme (NTP), or similar, is fundamental to the success of prison based TB control programmes [10]. Such involvement is likely to be mutually beneficial to both sectors. Not only will it help ensure treatment completion in released prisoners, but it will also bring to prison services a wealth of experience in the management of TB programmes. Similarly, prison health services have extremely valuable knowledge of managing what can be a difficult and manipulative population and the potential structural and administrative pitfalls of establishing effective TB control in prisons.

6.4 CAN INTEGRATION OF TUBERCULOSIS SERVICES BE ACHIEVED?

Where an NTP or similar exists, integrated tuberculosis services certainly can be developed. With the collaboration and co-operation of the authorities responsible for prisoners, national tuberculosis management policies can be expanded to include the control of tuberculosis in prisons. Procedures can be created to facilitate standardization and equivalence of care and to communicate patient movements and needs.

Nevertheless, there are some reports from some countries indicating difficulties in establishing integrated services [2, 11]. These include the problems of achieving consensus when a number of authorities are involved, conflicting rules and regulations making standardization of procedures difficult, logistic or resource limitations, communication problems or security issues, etc.

Having one authority with overall responsibility for TB control for all prisoners, former inmates and civilian society may provide the best solution. It would mean that the same authority was required to care for all patients from disease detection until completion of treatment, regardless of their location. This would ensure standardization of procedures, equivalent care and the most efficient use of financial, logistic and human resources.

In many places the most appropriate authority would be the NTP as this is the agency with the broadest and most wide-reaching responsibility for a country's TB control. A secondary benefit would be that NTP staff operating in prisons would remain completely independent of any custodial role and avoid the resultant conflict of interests. Norway is



one country where civilian health authorities have been made completely responsible for prison health and this is reported to have contributed to improved health services and to the strengthening of the respect of human rights of prisoner-patients [12].

However, this must be balanced against the likely concerns of detaining administrations about others operating in areas of their responsibility. Clearly, a high degree of trust and mutual co-operation is required. In addition, consideration must be given to the fact that prison TB may come last on the priority list of an already stretched NTP, so leading to less than adequate care in the prison context.

6.5 FRAMEWORK FOR INTEGRATED TUBERCULOSIS CONTROL

The planning of an integrated service must be carried out in a co-ordinated and participatory manner, under the leadership of a the most appropriate authority, usually the NTP.

TB control policy and appropriate programme responsibilities across all parties must be identified and accepted. The relative strengths and weaknesses of each party should be taken into account, whilst ensuring that all responsibilities are fulfilled and there are no gaps in the service provided.

Attention must be focused on access to diagnosis and treatment and the effective management of transfers of TB patients into and out of prison and between prisons. Legislation may need to be reviewed and the management system, technical policy, programme work-plan, monitoring and evaluation procedures formalized in writing and endorsed as in Chapter 3. Responsibility for the payment of services provided by both sectors must also be addressed and the necessary budget planned.

A framework for TB control is given in table 6.1. It identifies the major responsibilities that must be addressed and proposes areas to be the prison and civilian sectors respectively. The purpose is to provide a model, although decisions must be taken nationally or regionally as to the structure of an integrated service and its mechanisms of operation.


TABLE 6.1 FRAMEWORK FOR INTEGRATED TUBERCULOSIS CONTROL SERVICES

Area of responsibility	Prison	Civilian
Political commitment	Shared and equal commitment to TB control and determination to create integrated services (see chapter 7).	
Technical policy	Additional aspects for prisons – active case-finding and screening on entry policies (see chapter 12).	Responsible for national TB technical policy for case-finding, treatment, recording and reporting. To be used in every sector (see chapters 12 and 13).
Diagnostic facilities	Provision of level 1 laboratories accessible to all prisons. Transport of specimens.	Provision of level 2 and 3 laboratories accessible to analysis of samples originating in prison system. Delivery of results.
Treatment facilities	Provision of basic treatment facilities accessible to all prisoners with infectious TB (chapter 13).	Provision of hospital services for the severely ill.
Management of transfers	Establishment of rigorous system of notification for transfers into and out of prison and between prisons (chapter 13).	
Recording and reporting	As for civilian system. Cohort analysis and quarterly reports to be submitted to civilian sector.	Collection of prison data. Reporting of prison data that is identifiable as such with national statistics.
Staff	Staff recruitment, employment conditions and job descriptions. Training in management of transfers. Provision of security rules and training. Human rights and penal law training.	Training in TB technical policy – case-finding, treatment, recording and reporting. Occupational health and safety standards.
Supplies	Ordering, storage, end-point distribution and monitoring. Direct observation of all TB treatment.	Procurement, transport, storage, distribution and monitoring of drug, laboratory and stationary supplies (forms and registers). Assurance of quality.
Education	Prison specific educational materials for staff and inmates (see chapter 14).	General educational materials for TB patients and families.
Management and supervision	Day to day management and supervision of the programme.	Overall responsibility for management and supervision.
Prison living conditions	Provision of all prisoners basic needs – including suitable accommodation, nutrition ventilation hygiene, general health care and promotion, respect of human rights.	Governmental or non-governmental monitoring of compliance to voluntary codes and UN Minimum Standards.



6.6 LINKS WITH OTHER INITIATIVES AND PROGRAMMES

Co-ordination with other organizations and programmes can provide support to TB control programmes in prisons and rationalize the use of resources. Many of these organizations will already be working with the Ministry of Health or the prison authorities and may be national or international agencies, governmental or non-governmental institutions. These may include:

- Social support services for prisoners, their families and former inmates.
- A national AIDS programme or UNAIDS.
- Health in Prisons Project (WHO European office).
- Programmes to address problems of substance abuse – e.g. alcohol, narcotics.
- Mental health programmes.
- Violence and injury prevention programmes.
- The Essential Drugs Programme for procurement, storage and distribution of anti-TB and other drugs.
- The Expanded Programme on Immunization (BCG for children – see section 15.6.2).
- Legal bodies for health legislation guidance.
- National/international human rights organizations or UNCHR, UNDP.
- Penal reform initiatives or organizations.

6.7 WHAT IF INTEGRATION OF TUBERCULOSIS SERVICES IS NOT POSSIBLE?

Where civilian TB services are non-functional decisions must be made about the appropriateness of commencing TB control programmes in prisons. The most important consequence is the inability of patients to complete treatment following release or amnesty. This may account for up to 62% of cases on treatment [13]. Evidently, this becomes especially important if treatment for MDR-TB is implemented as this problem is magnified by the much longer duration of treatment.

If functional TB services are not present in the general community, serious consideration should be given to the wisdom of establishing TB services inside prison. Priority should be placed on developing community TB services and addressing conditions inside prisons that promote the spread of TB. If a prison TB service is to go ahead without the involvement of civilian services an effective mechanism to ensure that patients can complete treatment, if they are released, must be found that is both acceptable and feasible.

Previous recommendations stated that if civilian TB services were unavailable, patient-prisoners should be excluded from TB treatment if their remaining sentence was shorter than the duration of treatment (6 months) [10]. This recommendation is no longer considered appropriate because of the consequences of excluding patients in need of treatment who are continuing to transmit infection, as well as the difficulties in predicting future detention (e.g. pre-trial prisoners, amnesties). Moreover, shortened treatment regimens have been demonstrated to increase the likelihood of relapse, but have not been demonstrated to create MDR-TB, unless followed by anarchic treatment.



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7.1. KEY MESSAGES

- The sustained political commitment of all authorities responsible for prisons and health is fundamental to the success of TB control programmes.
- These authorities must be appropriately supported by national, regional and local governments and any involved external institutions.
- Political commitment must be demonstrated through the:
 - creation and maintenance of integrated TB control services between prison and civilian authorities
 - development of a technical policy and implementation plan that conforms to international standards
 - appropriate direction of resources towards TB control in prisons
 - reform of structural and administrative factors that promote TB and impact negatively on its control.
- Political commitment may be enhanced through advocacy, the creation of alliances with other specialists in prison health and reform, and support from high-level governmental and non-governmental organizations.

Sustained political commitment is **fundamental** at all stages of the initiation, planning, implementation, maintenance and evaluation stages of a TB programme. Such political commitment must be translated into action. Without the genuine political will to control TB within a country's prisons, programmes will be hindered by lack of interest, lack of funds, lack of co-ordination, etc. and are unlikely to be successful or sustainable. They may even do more harm than good, if treatment is made available in an erratic manner, thus promoting the development of MDR-TB. As the 1998 WHO Report on the Global Tuberculosis Epidemic states, '*Our greatest challenges in controlling tuberculosis are political rather than medical*', [1]. This also applies to the prison context.

7.2 WHAT COMMITMENT IS REQUIRED?

A determination to create and maintain integrated tuberculosis services between all authorities responsible for prisoners and health under a defined leadership.

The benefits of integrated tuberculosis services are enormous in terms of standardized, co-ordinated care for prisoners and former inmates and to make the most efficient use of resources (see Chapter 6). All authorities must demonstrate a clear commitment to this goal.

This should include:

- a willingness to collaborate and co-operate with all authorities involved in the care of prisoners and civilians with TB



- a readiness to recognize and support one authority as the lead agency for TB control in prisons
- transparency regarding prison issues which impact on the TB epidemic and resources available to tackle it
- responsibility and accountability for the effective control of TB in prisons.

A commitment to the development of a formal technical and structural TB control policy, supported by appropriate legislation

Such a policy should be:

- created in collaboration with all parties involved in its implementation and integrated into the national TB control policy
- consistent with internationally recommended DOTS-based guidelines
- formally endorsed at the highest governmental level
- equivalent and standardized in all sectors, and considered obligatory
- regularly evaluated.

Tuberculosis in prisons must be acknowledged as a priority for resource allocation

This includes:

- the adequate and sustained financing of structural and medical interventions necessary for the effective control of TB
- the required numbers of well-trained, adequately paid health and laboratory staff
- logistic support for drug and laboratory supplies and storage, transport, programme administrative needs, training materials etc.
- realistic expectations of the time required to prepare and effectively implement TB control programmes.

Tuberculosis in prisons must be acknowledged as a priority area for administrative and structural reform

Effective TB control requires a commitment to adaptations and improvements of prison infrastructure and administrative arrangements in the interests of reducing the transmission of TB. These include:

- improvements in prison living conditions, particularly measures to reduce overcrowding and improve ventilation and nutrition
- consideration and limitation of the negative impact of administrative decisions, such as prisoner transfers, on the control of TB
- greater autonomy and professional independence of prison health personnel.

7.3 WHOSE COMMITMENT IS REQUIRED?

An effective TB control programme in prisons needs to involve many agencies. These include the government ministries responsible for prisons and for health as well as those responsible for their financing. In addition, there may be several external players such as other governments, international agencies, non-governmental organizations (NGO's) or



donors providing assistance to TB programmes. Specific roles for each party will need to be defined within each country's context. Their full commitment to achieving the objectives of TB control programmes is imperative. Moreover, the prisoners themselves, as a group, must consent to co-operate with TB control strategies.

7.3.1 *Civilian tuberculosis services*

Civilian TB services are usually organized through a NTP. Although civilian health services are usually administratively separate from those present in prisons, there are a number of reasons why it is essential that civilian TB services play a role in the control of TB in prisons (see Chapter 6). The commitment of civilian TB services to the management of TB within, as well as without, prison walls is essential to effective national TB control.

7.3.2 *Ministries responsible for prisons*

There are often a number of different governmental authorities with overall responsibility for prisons within a country. An equal commitment from all authorities to structural and administrative improvements in the interests of reducing the transmission of TB and supporting a TB control programme is necessary for such control efforts in prisons to be successful. However, in order for these ministries to be able to put their support behind TB control, commitment at a higher governmental level may need to be sought and obtained. This will necessarily include the ministry responsible for their financing.

7.3.3 *External humanitarian aid organizations*

External humanitarian aid organizations often express interest in TB control programmes, as TB is frequently cited as a serious health problem in many countries. Their role should be to assist in the implementation of TB control policies in co-ordination with the NTP.

However, such organizations may have limited experience in TB control, in working in prisons, or both. They may also have difficulty obtaining resources for long-term programmes, particularly if their donor-base is orientated to emergency relief work. External humanitarian aid organizations need to be able to make the commitment necessary in terms of time, personnel and financial resources, agreed in full consultation with the authorities. A plan for the progressive hand-over of responsibilities to the authorities should be incorporated in any project proposal. The long-term substitution of governmental roles and responsibilities by external agencies should be avoided.

7.3.4 *Donors*

TB control programmes may require external aid from donors. Donors must be made aware of programme needs and priorities, so that they may be able to provide appropriate



resources for an appropriate length of time. It is particularly important to emphasize that the provision of drugs alone is not enough for an effective programme and may, in fact, be dangerous without proper monitoring. Should a donor decide to partially fund a particular programme, it must be fully aware that due to the length of treatment and the complexities of the prison context, planning needs to be made several months (and in the case of MDR-TB years) in advance. It must also be aware that prison programmes may be particularly labour intensive because of the degree of supervision that is required. Most importantly, it must be aware of the implications of a sudden withdrawal of funds.

7.4 HOW IS POLITICAL COMMITMENT OBTAINED?

Obtaining political commitment is fundamental to the success of a programme, but often difficult to achieve. Advocacy, networking and lobbying are the most effective tools. There are many methods available and some of these are discussed below. Techniques employed will be very dependent on the particular context.

7.4.1 Advocacy

Advocacy is a broad term for communication that draws attention to the problem of TB and its solutions. Campaigns should be targeted to any individual or group who can influence the use of resources and health policy. This is, in fact, everybody – from the highest government official, through actual policy makers, to the media, prisoner bosses and human rights organizations. It may also include other external entities not directly associated with TB such as diplomats, international bodies (e.g. UN agencies, Council of Europe), donors or private business ventures.

Advocacy is one of the most effective tools for gaining political commitment, but is often overlooked or underestimated. Careful preparation, appropriate targeting, good timing and the clear presentation of selected messages that are both local and relevant are essential to its success.

Effective advocacy brings with it an acknowledgement, firstly of the problem and secondly that there are cost-effective solutions. It can mobilize groups to take ownership of a programme and find solutions in consultation, rather than have inappropriate programmes imposed by external groups, which risk being damaging and unsustainable.

However, when advocating TB control in prisons, caution should be used to ensure that messages do not inadvertently promote discrimination or stigma against prisoners, former inmates, their families or TB cases generally.

There are several good documents available on advocacy for TB and health that should be considered key reading [2-4]. These documents contain numerous ideas for tailoring methods, messages, presentations, etc. However, there is little that has been specifically



written concerning TB control in prisons. Some messages that could be used in this context include:

- Cases of TB in prisons may account for a disproportionate amount of a country's burden of TB disease e.g. 26% of the estimated infectious TB cases present in Georgia resided in prison in 1998 [5]. In 1999, one third of TB cases registered in the Russian Federation were prisoners.
- Prison conditions such as overcrowding, poor ventilation and weak nutritional provision encourage the transmission and development of TB.
- The high levels of HIV infection seen in many prisons accelerate the development and spread of TB.
- TB does not respect the barrier of prison walls. TB or MDR-TB, originating in prison can be easily brought into the civilian population through release and transport of prisoners suffering from TB. Staff and visitors are at risk of catching the disease. Prisons act as a reservoir for TB, pumping the disease into the community at large.
- Improving TB control has benefits that extend beyond those of the individual, reducing risks of transmission to the general community, visitors and staff. Failure to manage health issues appropriately may lead to security problems [6].
- TB is an avoidable consequence of incarceration and can be controlled through improvements in prison conditions and the application of DOTS-based programmes [7-12].
- According to many international conventions, prisoners have the right to adequate medical care, including care for TB. Catching TB is not part of a prisoner's sentence. Controlling TB in prison is an important step in improving prisoner access to human rights.
- Drawing attention and resources to the problem of TB in prisons is likely to lead to an overall improvement in prison conditions and the health of inmates.

7.4.2 Create alliances with other prison specialists

There are many organizations active in the prison context, but not specifically for TB control. However, improvements in other aspects of prison life, structure, health, nutrition and conditions will ultimately lead to improvements in TB control and may have an even more powerful effect than medical interventions.

Alliances need to be forged between health workers, penal reform specialists, human rights groups, non-governmental organizations, international institutions and supranational government bodies in order to collaborate and co-operate to produce a coherent message for policy makers with the same aim of improving prison conditions and thus indirectly improving TB control.

TB is bad for health; TB is bad for the management and security of prisons. That is why prison authorities must engage TB control as a management priority.



7.4.3 Support and commitment from the highest governmental level

Often, obtaining political commitment from all governmental agencies with a role in TB control in prisons is extremely difficult, because of different agendas and priorities or diverse perceptions of the problem or its resolution. Commonly, despite lengthy negotiation, there is no alternative but to take the issue to a higher governmental level than those who will be responsible for implementing the programme. In many parts of the world a presidential decree or similar will be required to oblige ministries to address TB in prisons in a concerted and comprehensive fashion.

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8.1. KEY MESSAGES

- A situation analysis provides information for programme planning, monitoring and evaluation purposes and should be used as a tool to guide these activities.
- Information is gathered from a variety of sources – interviews with authorities and prison staff, visits to representative prisons and reviews of current programme activities and documentation.
- Information is gathered on the organizational aspects of prisons and health services, the burden of TB disease and the existing care of TB patients.

A thorough situation analysis is necessary so that:

- an understanding of the context and the existing services and networks is gained
- obstacles to effective TB control can be identified and addressed where possible
- resource needs can be effectively planned and priorities set
- baseline data are available to monitor the effect of TB control interventions
- data collected can be used as an advocacy tool, to help increase political commitment and attract funds.

There are several references for reviewing TB services in a civilian setting, which should be referred to for background information [1, 2]. The following is a brief overview of the basic principles of conducting a situation analysis adapted for the prison context and the specific information that should be sought.

At the initial stages, most information will be gained through interviews with ministers and prison and civilian TB staff, through prison visits and by consulting medical registers and records. Remember that interviews may often provide very subjective information and that verification must be sought. Bear in mind that interviews with prisoners in the presence of witnesses (prison staff or other prisoners who may be employed as informers) may not yield valuable information due to fear of reprisal. If international reviewers are involved, translation services may be required.

Record keeping may well be very weak or confusing and it may be difficult to establish estimates of disease burden. In some cases it may be necessary to perform a formal prevalence survey of active TB disease, or to define the prevalence of drug-resistant TB if there are indications that this is likely to be a problem. However, before such a decision is made, as much information as possible should be collected from interviews and routine health information systems. Aspects of preparing and implementing cross-sectional surveys will be discussed in Chapter 9.



8.2 FUNDAMENTAL PRINCIPLES

- The needs assessment should be planned and performed with the full agreement and participation of the prison and health authorities of the country, as well as any other interested parties, e.g. NGO's, international agencies.
- A committee should be created, composed of experts in as many of the following fields as possible: civilian TB services and the DOTS strategy, laboratory services, prison medical and custodial services, logistics and penal reform. All prisons must be accessible to the committee.
- The purpose, objectives and scope of the analysis should be clearly defined and understood. All stages of the survey should be thoroughly planned and budgeted before commencing.
- The sites surveyed should be representative of all layers of the prison system, including facilities for pre-trial and sentenced prisoners and centres with 'strict' and 'soft' regimes.
- Data collected should be objective, consistent and credible. The need for transparency should be emphasized. It may help if the specific dates of visits to prisons are unannounced.
- The findings of the analysis should be presented in a written report and disseminated to all involved parties. Recommendations for action should be made and prioritized, with an associated timeframe.
- Press releases of the activity (as advised in reference [2]) should only be made with the informed consent of all parties and should be handled with sensitivity so as not to undermine collaboration between authorities or jeopardize national security.
- The situation analysis should form the basis of further monitoring and evaluation.

8.3 STRUCTURAL AND ADMINISTRATIVE ASPECTS OF DETENTION AND HEALTH CARE

8.3.1 *Structural and administrative aspects of detention*

The first step should be to define the organizational context of the prison authorities and those responsible for health.

It is useful to examine the organizational structure by drawing a hierarchical chart of all the ministries involved, including the Ministry of Finance and higher authorities. This chart should also record the authorities' responsibilities (pertaining to prisoners and TB) with the names and levels of the key policy makers indicated. Any existing links between them should be demonstrated. The position of the NTP should be marked. External agencies such as international institutions, NGO's, donors or other political bodies should also be added with an indication of where their particular interest lies. Such a chart is important to demonstrate the existing political structure, lines of responsibility and highlight gaps in co-ordination.



Interviews with the key policy makers and their staff should first establish the authority's perception of the TB problem - its scale, causes and what they consider feasible solutions. An indication of a commitment to TB control and willingness to collaborate with other authorities (see Chapter 7) is necessary before the situation analysis can proceed.

Specific information should then be sought:

- *A description of how the prison system functions* – which prisons hold which types of prisoners, procedures for transfers and releases, movement of prisoners through the system, whether prisoners are held near their homes, rates of recidivism, structure and function of internal hierarchy.
- *Total population* of each prison and official capacity.
- *Legislation* – rules and regulations for each regime, minimum and maximum sentences, maximum pre-trial detention permitted, regulations for compassionate release and appeal, restrictions on mixing of different categories of prisoner, rules in punishment cells, an indication of how much the regulations are enforced.
- *Budget* requested, pledged and received. Sources of funding national, regional or federal. Departments responsible. Value of any external aid secured.
- *Resources and limitations* - custodial and administrative staff and salaries, accommodation (type, space per prisoner) provision of essential needs (food, hygiene materials, water, clothing, heating, kitchen facilities, toilets, showers), transport of supplies and prisoners.
- *Conditions* – identify best and worst case centres in terms of overcrowding, nutrition, hygiene, access to medical care, security problems, presence of unofficial markets – existing or potential.
- *Penal reform efforts* – past experiences with amnesties, future plans for improving conditions and likelihood of their realization (e.g. impending amnesties, plans for new prisons, new sentencing policies, projections of future prison populations).



8.3.2 Operational aspects of health care in detention settings

The next step is to define what medical resources are available:

- *Treatment facilities* – locations, capacity, population served, facilities specifically designated for TB patients, facilities for respiratory isolation of infectious cases, links with other services, utilities (power, water, etc.).
- *Diagnostic facilities* – location, type (laboratory – microbiology, biochemistry, etc., radiology – X-Ray, fluorography), capacity, population served, facilities specifically designated for TB patients, safety procedures and maintenance, links with other services, utilities.
- *Transport facilities* – for patients, medical supplies and laboratory samples.
- *Staff* – numbers, type (doctor, nurse, laboratory technicians, paramedics), training, location, population served, salaries, rotation of staff between prisons.
- *Supplies* (anti-TB and other drugs, laboratory materials) - source, importation and customs regulations, pharmaceutical regulation, use of fixed-drug combinations, storage, stock management procedures, frequency of stock ruptures and reasons, distribution to facilities, means of administration to patients.
- *Existing links between prison and civilian services* for any of these activities.

One way to document all this information is to turn it into a diagram. An organizational chart of all places of detention can be produced, with the assistance of the institutions and people identified. It may need to be completed and verified at a later stage by visits to particular sites.

The chart should demonstrate the links between pre-trial and sentenced centres and the civilian population. Links between laboratory and treatment facilities should also be clearly marked. As much information about each centre should be included on this chart, particularly:

- Name of responsible authority, and chief administrator of each centre.
- Population size – current and official capacity.
- Type of regime and category of prisoner held (first offenders, recidivists, women, juveniles etc.).
- Conditions.
- Presence of medical services and if so, their components (staff, beds, diagnostic and treatment facilities, pharmacy), name of responsible staff member.

8.4 ESTIMATING THE BURDEN OF TUBERCULOSIS DISEASE

The next step is to estimate the burden of TB disease, using population, morbidity and mortality data.



8.4.1 Population data

A description of the demographics of the entire detained population is very important and provides denominators for per capita TB rate calculations.

The following data should be collected for each place of detention. Where possible data for the previous 10-20 years should be gathered to observe trends:

- *Census date population* (or average daily population) per year.
- *Number of new admissions* per year.
- *Number of discharges* (transfers out, releases, amnesties) per year.
- *Number of deaths* from all causes per year.

8.4.2 Tuberculosis morbidity data

TB morbidity data will usually be limited to case notification records – information on true incidence or prevalence of TB disease is unlikely to be available.

Case notification data should first be gathered from the referral TB hospital(s), TB clinics and the laboratory(s) if they exist. Care must be taken to understand local classification of cases, even if WHO recommendations are followed. If records are unhelpful, the referral hospital(s) and laboratory(s) can be visited for a defined period (e.g. 1-2 months) and cases notified in that period recorded as below and extrapolated. Although this information may be imprecise it will provide a guide on hospital referrals.

However it must be recognized that the referral hospital or TB clinics may not accurately represent the true burden of disease, as the hospital may be inaccessible to many cases for physical or economic reasons, or simply due to a lack of space. Efforts should be made to assess the burden of disease outside the referral hospital in representative sites – at least in terms of numbers and rates of suspected TB cases.

From the data gathered, estimates of both incidence and prevalence within the prison system should be made if at all possible. There are various methods available for deriving estimates of these morbidity indicators [3]. The method used, and the reliability of the result will, of course, depend on the type and quality of data locally available.

If possible data should be collected on:

- The *total number of TB cases* notified per year.
- The *source population* (e.g. the combined census day (or average daily) population of all the prisons that refer to that hospital)² per year.

² The high turnover of the prison population makes a proper denominator difficult to obtain. Census date or average daily populations are proposed for simplicity, although it should be noted that this will lead to inflation of rates if periods of detention are short and vice versa.



Thus a case notification rate per 100,000 head of population can be calculated:

$$\frac{\text{Total number of TB cases notified in a year}}{\text{Source population in the year}} \times 100\,000$$

If possible, such information should be gathered for the preceding 10-20 years, so that the trend can be examined. This information can be further examined by age and gender distribution if the information is available.

An indication should be made of how many cases come from each prison, so that the distribution of cases can be estimated. Thus, the data should be analysed to determine:

- *The total number of TB cases notified from each prison per year per 100,000 prisoner population.*

For example:

$$\frac{\text{Total number of TB cases notified from prison A in a year}}{\text{Census day population of prison A in that year}} \times 100\,000$$

It should be acknowledged that detention centres that appear to have a low burden of disease might just have less accessibility to the hospital.

If possible the total case notification data should be broken down further to examine the disease distribution into:

- *Total number of smear (and/or culture) positive pulmonary TB cases per year.*
- *Total number of other pulmonary TB cases diagnosed per year by:*
 - radiography
 - clinical assessment (where radiography and laboratory facilities are not available).
- *Total number of extra-pulmonary TB cases per year.*

Rates out of the total number of TB cases detected can then be calculated. As case-finding should prioritize the detection of infectious cases, the proportion of smear-positive cases out of the total number of TB cases detected each year is a very valuable measure (see Chapter 13).

It is also very important to analyse by WHO case classification, particularly as an indicator of possible drug-resistant TB. If the information is available, one should record:

- *Total number of pulmonary TB cases registered who have never had treatment for TB or took anti-TB drugs for less than one month / per year (New cases).*
- *Total number of pulmonary TB cases registered who have received previous anti-TB therapy for more than one month / per year (Re-treatment cases).*



If large proportions of TB cases are reported to have previously received anti-TB treatment, particularly if they are known to be smear-positive, this should warrant additional investigation because of the concomitant risks of drug-resistant forms of the disease (see Chapter 9). Similarly, if any drug susceptibility testing has been performed in the past, the presence of drug-resistant strains, in particular those resistant to rifampicin and isoniazid (MDR) or polydrug-resistant, should raise immediate concerns.

TB infection or disease in custodial, administrative, medical or laboratory staff is also very important. The information available will depend very much on what occupational health procedures are in place. The following information should be gathered for the referral hospital staff:

- *Number of staff in each category of worker* (health, custodial and housekeeping personnel).
- *Number of staff of each category of worker diagnosed with 1) TB disease or 2) new infection*
- *Total number of years worked* by all staff in each category.

This is most often expressed as x cases per 100 person-years.
For example:

$$\frac{\text{Prison guards with active TB}}{\text{Combined years of prison work of all guards}} \times 100$$

8.4.3 Tuberculosis case fatality data

Data on deaths from TB should also be collected. Thus:

- *Total number of deaths attributed to TB per year.*

The case fatality rate can then be calculated.
For example:

$$\frac{\text{Total number of deaths from TB in a year}}{\text{Total number of TB cases notified in that year}} \times 100$$

Data from previous years is again useful for examining trends. The proportion of all prison deaths attributable to TB can also be calculated from deaths from all causes. If this information can be further subdivided into age and gender distribution and by prison, as for morbidity data, so much the better.

If a large proportion of TB deaths occur at any site, but particularly in the prison hospital, this should warrant further investigation as to the underlying cause (ineffective treatment, late referral, co-existing disease, etc).



It should be remembered that prisoners who are terminally ill are often released on compassionate grounds. This may lead to a gross underestimation of case fatality rates. If possible data should also be collected on the numbers of prisoners released on compassionate grounds because of end-stage TB.

8.4.4 Co-existing pathology

Co-existent disease may have a significant impact on the TB epidemic in prison and the ability of a programme to manage the problem. Therefore, estimates (or data if available) of morbidity and mortality from other diseases in the prison population should be gathered. Information of particular pertinence to prison and TB includes:

- The proportion of prisoners with *HIV infection*
- The proportion of prisoners who are *malnourished* (BMI \leq 18.5).
- The proportion prisoners who are *substance abusers* (e.g. alcohol, opiates).
- The proportion of prisoners with *infectious hepatitis*

Again this data should be collected from the prison referral hospital(s) and from representative prisons. Establishing the HIV prevalence should follow UNAIDS guidelines [4] (see also Chapter 12).

8.4.5 Corresponding community data

When all the prison information on the burden of TB disease has been gathered it is useful to compare it with what is known in the corresponding community.

8.5 ASSESSING THE EXISTING TUBERCULOSIS CARE PROVIDED

This information should again be available from records at the level of the referral hospital(s) and laboratory(s) for TB. Information on case-finding, treatment, reporting and education practices should be obtained through records and interviews with staff. If there are written policy statements or guidelines, these should be obtained. The site should be visited for a defined period as above to obtain more information if necessary.



8.5.1 Case-finding and diagnosis

Existing methods of TB case-finding should be determined, including the presence or absence of any screening programme for TB.

- *Case-finding sites* – all or selected places of detention.
- *Selection process for screening* – entry or exit screening, and/or periodic mass screening of all inmates. Staff responsible for selecting cases.
- *Definition of a TB suspect and a confirmed TB case.*
- *Methods used for case-finding* – e.g. symptoms, radiography, bacteriology, tuberculin skin testing. Staff responsible for implementation.
- *Total number of cases identified by smear microscopy and/or culture in a year out of total number diagnosed* (may be different from case notifications).
- *Capability of laboratory services* – location of each activity, details of methods used, referral and supervision network.
- *Number of laboratory staff and level of training.*
- *Total number of slides examined per year and proportion smear-positive.*
- *Reliability of results* – quality control procedures and results.
- *Total number of cases found by active versus case-finding through self-referral.*
- *Total number of cases found by screening upon entry.*
- *Total number of cases detected at post-mortem.*

8.5.2 Treatment

The existing TB treatment practices are important to determine. Information collected should include the following:

- *Case definitions* – by site and severity of disease, bacteriology and by previous treatment as per WHO classification.
- *Chemotherapy regimens* – standardized, individualized, duration, case categorization.
- *Average delay* between symptom onset and diagnosis; and diagnosis and commencement of treatment.
- *Total number of cases treated* in one year by case classification (may be different from notifications).
- *Methods of ensuring adherence to treatment* – use of direct observation of treatment (DOT) and method of implementation, other incentives and enablers.
- *Patient monitoring* – use of interim outcome measures, definitions and results.
- *Treatment outcome definitions.*
- *Treatment outcomes* – results of cohort analysis for standard WHO outcomes (see Chapter 16).
- *Policies for the management of individuals at the end of treatment* for each treatment outcome category.
- *Presence and nature of TB prevention policies.*
- *Infection control policies* – administrative, environmental, personal; occupational health procedures.



8.5.3 Registration, recording and reporting procedures

As many details on the existing health information system should be obtained:

- *Patient and laboratory register* – site, information recorded, responsible staff member, completion, consistency.
- *Individual treatment cards or records, laboratory request and result forms.*
- *Communication of data* between laboratory and those responsible for patient care.
- *Quarterly reports of case notifications and treatment outcomes*
- *Notification to the civilian TB services* – and if so, whether they are identifiable as cases originating in prison. Inclusion of prison data in national statistics. *Notification to prison services of civilian TB cases that are arrested.*
- *Documentation provided to patients transferred or released. Communication procedures between TB services. Proportion of patients released on TB treatment that attend civilian services.*
- *Registry for collection and use of drugs provided by family and friends.*

8.5.4 Tuberculosis education policy

As well as discovering what education policy is in place, the knowledge, behaviour and attitudes of the prisoners, staff and educators should be determined, including the value attached to education.

- *Information imparted.*
- *Providers* – doctors, nurses, prisoners, use of peer educators (see Chapter 14).
- *Methods* – ad hoc or formal programme, lectures, posters, leaflets, etc.
- *Target groups* – patients, visitors, medical and non-medical staff.

8.5.5 Programme management

- *Staff training* in TB – number trained, type of training (DOTS, non-DOTS procedures), supervision.
- *Systems for overall programme supervision, monitoring and evaluation.* Method, frequency, staff responsible. Dissemination, application and perceived value of process and findings.



8.6 ADDITIONAL INFORMATION

Once as much information as possible has been collected, the data should be analysed. At this stage it will be clearer what information is missing or inadequate and whether a formal epidemiological survey is necessary or desirable (see Chapter 9).

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9.1 KEY MESSAGES

- Formal epidemiological surveys provide useful information for programme planning and monitoring. However such surveys should only be considered if the information to be collected is unobtainable elsewhere, resources are available, and there is a clear intention to start a TB control programme.
- Surveys should focus on infectious (smear-positive) cases as these are the cases that control efforts will be directed towards. Therefore laboratory involvement is fundamental.
- Surveys should be carefully planned following strict protocols for: sampling strategy and sample size, enrolment into the survey, identification of cases, sputum collection, smear examination, documentation and survey analysis.
- Surveys should follow strict ethical principles including informed consent and confidentiality. Surveys must result in a direct and significant benefit to the population studied.

9.2 PURPOSE OF EPIDEMIOLOGICAL SURVEYS

Surveys should be considered if:

- Data collected from case notifications are weak making reasonable estimates of incidence or prevalence impossible.
- Reports from central and peripheral prisons suggest a high burden of undetected, untreated disease.
- There are no data for bacteriologically confirmed disease.

Epidemiological surveys have two main objectives:

- To provide information on the burden of TB disease in the population for resource planning and priority setting.
- To provide baseline information on the burden of TB disease in the population against which the impact of the programme can be measured.

Two examples of possible surveys are considered:

- A survey to determine the prevalence of smear-positive pulmonary TB in the incarcerated population.
- A survey to determine the prevalence and locally predominant profiles of drug-resistant *M. tuberculosis* in patient-prisoners suffering from bacteriologically confirmed pulmonary TB.

However, epidemiological surveys should only be performed after all available information has been collected from the situation analysis. As such surveys use resources – time, staff, materials and funds - those responsible for the programme must be convinced of the value and the necessity of such a survey and be certain that the information is not available elsewhere.



Such epidemiological studies should only be performed if there is a clear intention to start a TB control programme.

9.3 BASIC PRINCIPLES

The fundamental principles for situation analysis stated in Chapter 8 also apply to an epidemiological survey. It is of the utmost importance that the aim of the survey is clear from the outset and that the objectives are as precisely defined as possible.

The operational requirements for these surveys include:

- an appropriate sample size and sampling strategy to permit standard epidemiological analyses
- strong laboratory capability and the use of internationally recommended standardized laboratory methods
- a standardized questionnaire to collect basic essential information on those enrolled
- a written protocol for the implementation of the study
- adequate funding to ensure completion of the study
- specific training for those implementing the study on enrolment, data collection and entry and laboratory methods
- reliable logistical support for supplies of materials – sputum containers, laboratory materials, questionnaires; transport of staff and specimens; administration issues
- a computerized data management system, e.g. Epi Info [1]
- a system of quality control and supervision of sampling, questionnaire completion and laboratory results
- an information campaign prior to the onset of the survey targeted to prisoners and prison staff
- documentation and dissemination of the results of the survey with the agreement of all authorities concerned.

For background information and details of planning and implementing surveys generally, an epidemiological text should be consulted, e.g. *'Manual of Epidemiology for district health management'* [2].

9.4 PREVALENCE SURVEY OF SMEAR-POSITIVE PULMONARY TUBERCULOSIS

Few prevalence surveys of pulmonary TB in prisons have been performed [3, 4]. However, those studies have provided important information on the burden of previously undetected infectious TB in prisons.

Methodologies vary and should relate to the local context, needs and resources. To get a completely accurate view of TB prevalence in the incarcerated population, all prisoners in



all prisons should be surveyed. This would include all centres for pre-trial prisoners and for those sentenced, all levels of regime, all facilities for minority groups such as women or juveniles, etc. In some countries this may run into many tens of thousands. In fact, it is not feasible or necessary to survey all prisoners to obtain a reliable estimation of TB prevalence and a survey of a representative sample of the population will be adequate.

9.4.1 Sample size and sampling strategy

The method chosen will depend on the degree of precision required, the time available and the feasibility of conducting a particular survey in a particular context. The capacity and ability of the laboratory to handle the specimens is particularly important to consider.

9.4.1.1 Reference population

The reference population is the population that is studied and is the first aspect that needs to be determined.

A distinction should be made between the population group that is admitted to the prison system during the survey and the population already incarcerated at the start of the survey. The former will give an indication of the prevalence of TB in the socio-economic group of the general population from which prisoners are derived and the latter an indication of the prevalence of TB in the incarcerated population. Either or both groups could be studied, but it should be possible from the data collected to distinguish between them. For the purposes of this section, we will concentrate on those already incarcerated.

Ideally, all prisons would be surveyed. However, in large countries or because of political, resource or logistic difficulties this may not be possible and the reference population needs to be more selected by:

- Actively choosing either the sentenced, or the pre-trial, population only.
- Randomly selecting prisons to survey out of all the available sites.
- Actively selecting sites thought to be representative of different risk factors e.g. regime, time spent in prison, number of prison admissions, substance abuse, standard of living conditions, etc.

In deciding on limited sites to survey, the information obtained will be less representative of the incarcerated population as a whole. Active selection is likely to be less representative than random or systematic selection, but may provide more information on best and worst case scenarios if selection is based on risk factors. The need for information that is as representative as possible must be balanced against the time and resources required and available.



9.4.1.2 Sampling strategy

To obtain the true prevalence of TB in the reference population (the entire population or the pre-selected detention sites) every person in the reference population should be tested. However this is often not feasible in terms of time or resources so that a further sample is taken to represent this population.

In the prison context, various issues need to be taken into account when deciding whether to survey 100% or a sample of the reference population.

- Whether taking a sample will be considered acceptable to prisoners or staff or whether it will be perceived as unjust or discriminatory.
- The likelihood of a sampling strategy being corrupted by substitution of prisoners because of perceived or real advantages and disadvantages of being identified as a TB case.
- Whether any benefit or harm might accrue to individuals identified as TB cases, e.g. provision of treatment, isolation.
- The scale of the difference in size between the reference population and the necessary sample size.

If a decision is made that sampling of the reference population is acceptable and feasible, great care must be taken in selecting that sample. It must be carried out in such a way that *each member of the reference population has an equal chance of being selected for the study*, so avoiding biases that would make the survey outcome unrepresentative. Every member of the reference population should be included in this sampling strategy; it is unacceptable to exclude any group of prisoners within the reference population for any reason.

There are two main methods of selecting a sample – systematic (where, for example, every 5th person on a list is selected) or randomized (for example by using a random number table). Either of these sampling strategies could be used if it is decided to survey one or a few prisons.

If all prisons in a country (or large region) are to be surveyed, cluster sampling should be considered. This is a particular strategy where sampling is weighted by the relative population size of the prisons (a known risk factor for TB) and the reference population includes all the country's or region's prisoners (see Annex 2a for details).

9.4.1.3 The sample size

If sampling of the reference population is to be used, sample size calculation should be based on the estimated prevalence of smear-positive pulmonary TB (e.g. 6% [3]) and a confidence interval of 95%. The bigger the sample size the more representative of the reference population. A sample size frame for different expected prevalences and levels of relative precision is given in Annex 2b.



If cluster sampling is the chosen strategy, the sample size (e.g. those given in Annex 2) should be multiplied by 2 to account for the 'design effect' of that strategy. The calculated sample size should be increased by 5-20% to cover for potential losses (e.g. due to prisoner transfer, or refusal) during the study [5].

9.4.2 Methods

Once the reference population, the sampling method and the sample size have been determined, details of how the survey is to be implemented must be established.

9.4.2.1 Enrolment

In enrolling prisoners for such a survey, a number of things should be considered.

- If a sample of the reference population is used, ensure that enrolment is based on random selection – not through selection of those prisoners thought to have TB.
- Enrolment into the study should not be coerced. Each candidate should be informed of the study purpose and methods, as well as what action will be taken with the results. Informed consent to participate in the study must be provided by the prisoner.
- Measures to reduce the possibility of corruption of the enrolment procedures by substitution between prisoners should be established (e.g. use of photographs, objective measurements such as height or weight).
- Procedures should be in place for action if prisoners selected for enrolment into the study are unavailable (e.g. family visit, community service, trial, parole) or unwilling.
- Enrolled prisoners should be given a unique study number to reduce confusion over similar names and care should be taken so that prisoners are not enrolled twice if they are transferred between centres during a survey, etc.

9.4.2.2 Questionnaire

A simple questionnaire should be submitted to each member of the entire sample. The purpose is to collect basic information about the sample for later analysis.

In addition, the information obtained can be used later to design a questionnaire to identify TB suspects for case-finding that will be appropriate to the local context (see Chapter 12). An example is given in Annex 3a.

The questionnaire **must be adapted to the local situation**. Any modifications must be made before starting the survey and additional information collected should be reliable, relevant and useful from a programme perspective. However, the form should be kept as simple as possible and the amount of data collected manageable. The same information



should be collected on all those enrolled. Care must be taken that there is no change of meaning when it is translated into the local language.

Those administering the questionnaire should be carefully trained in interview techniques and accurate completion of questionnaires. The need for a standardized and comparable approach must be emphasized. The questionnaire should be pilot tested with a small group of people to detect ambiguities or misunderstandings.

9.4.2.3 *Identifying TB cases*

Patients with TB are identified by the presence of TB bacilli in stained sputum smears examined under direct microscopy. As the sample size required for a TB prevalence survey inside many prison systems is relatively small, it is feasible to collect sputum from every member of the sample. This is also the most accurate way of determining the prevalence of smear-positive TB in the population.

However, if a large sample is chosen or a decision is made to survey an entire prison, consideration should be given to screening the population first (e.g. by radiography) to identify suspects and then to take sputum samples only from these individuals (as for active methods of case-finding in Chapter 12). This reduces laboratory workload but may also reduce the sensitivity of the survey as some cases may not be detected with this method. The use of radiography also increases cost and such investment should only be considered if resources are available and X-ray is to be used for long-term active case-finding.

Whichever method is chosen, a prevalence survey is likely to provide extremely useful information for later active case-finding and it is suggested that Chapter 12 also be referred to when planning a prevalence survey.

9.4.2.4 *Sputum sample collection and examination (see also Chapters 10 and 12)*

The whole sample, or those identified as TB suspects (depending on the method chosen in section 9.4.2.3) should provide sputum specimens on consecutive days. Sputum should be provided in the early morning as respiratory secretions collect in the lungs over night making the provision of samples easier. Although the WHO usually recommends 3 samples for case-finding, 2 are considered acceptable for the purposes of a prevalence survey. It must be recognized that when the whole sample is to provide sputum, a significant number of randomly selected prisoners will have no respiratory symptoms and may not be able to provide sputum.

It is essential that the collection of specimens is directly observed (see Annex 5 for suggested protocol). Even in a survey, prisoners may perceive advantages or disadvantages to being registered as sputum positive so may attempt to provide false sputum samples. Similarly, it is important to ensure that the same prisoners are attending for sputum collection on successive days and substitution has not occurred. Direct observation also ensures that adequate samples are collected. The importance of direct observation and the need for adequate samples should be emphasized to those collecting sputum.



Once samples are collected, it is important that they be correctly labelled (lid and container) and that they are safely and securely transported to the laboratory. Storage, preparation and examination of smears should be performed according to internationally recommended guidelines [6].

9.4.2.5 *Confirmed tuberculosis cases*

WHO requires two positive sputum smears for an individual to be identified as a 'smear-positive' case (see Chapter 12). Those with one or no positive smears who are thought to have TB should have the diagnosis confirmed or excluded by repeat smear examinations, sputum culture, or radiography and review by a medical officer as in Chapter 12. Cases confirmed to have smear-negative pulmonary TB should be reported separately from smear-positive cases.

9.4.2.6 *Documentation*

All documentation required should be prepared before commencing the study and adequate numbers of forms produced. The minimal necessary documentation for each patient includes:

- the questionnaire (Annex 3a)
- the laboratory request and result forms for each sputum sample (Annex 4).

The importance of clear and correct completion of these documents should be emphasized. Staff should sign their names against entries to facilitate checking and encourage accuracy.

9.4.2.7 *Data management*

Data from the survey can be managed by hand or electronically using a database such as Epi Info [1]. Data entry should be limited to one or two people and the accuracy of entries should be double-checked or double entered.

For the determination of rates, care must be taken over the denominator. The denominator should only include those who have completed full investigation according to the survey procedures. Those excluded from the denominator should however be reported separately, along with the reasons for their exclusion.

9.5 **PREVALENCE SURVEY OF DRUG RESISTANCE**

Such a survey is important if there is strong suspicion of significant levels of polydrug- or multidrug-resistant (MDR-TB) inside prison for surveillance purposes and the planning of



treatment programmes for such cases. The following are suggestive of a high prevalence of MDR-TB in prisons:

- recorded level of MDR-TB in civilian community >3% among new cases
- failure rate > 5-10% in a DOTS programme in prison or civilian community
- < 70% treatment success (cure + completion) rate inside or outside prison
- >10% notified cases have received any previous treatment
- repeated stock ruptures or the use of poor quality anti-TB medicines
- recent erratic or unregulated treatment practices.

Standardized guidelines for the surveillance of drug resistance in TB have been published by the World Health Organization and the International Union Against Tuberculosis and Lung Disease [7]. These guidelines can be easily adapted to the prison context.

Points to note are:

- the importance of the involvement of a supranational reference laboratory belonging to the WHO/IUATLD network for advice, training, supervision and quality control
- the need for a laboratory capable of reliably preparing cultures and performing drug susceptibility tests
- an adequate sample size from a reference population of bacteriologically confirmed pulmonary cases (see Annex 2b)
- clarity in defining the reference population (e.g. those already detected as TB cases and in the reference hospital or attending TB clinics, or those not yet detected)
- the importance of establishing the difference between resistance among new cases and among previously treated cases (see Glossary)
- analysis of the data by mutually exclusive categories of resistance (resistance to different combinations of drugs) and previous history of treatment³.

9.6 ETHICAL CONSIDERATIONS

Whatever type of epidemiological survey is considered, it is extremely important to take into account the ethical impact of the study.

According to the Committee of Ministers of the Council of Europe [8] :

“Persons deprived of their liberty may not undergo medical research unless it is expected to produce a direct and significant benefit to their health.”

“Ethical principles concerning research on human subjects must be strictly applied, particularly in relation to informed consent and confidentiality. All research studies carried out in prisons should be subject to approval by an ethical review committee or to an alternative procedure guaranteeing these principles”.

“Research on the prevention, treatment and management of transmissible diseases in prison populations should be encouraged provided that such research yields information not available from studies in the community.”

³ For example see Annex 6 of ‘Guidelines for surveillance of drug resistance in tuberculosis’ [7]



Thus, a survey should not be carried out if the population studied will not ultimately benefit from it. Publication and communication of such studies must ensure absolute confidentiality about the identity of prisoners who have participated in such surveys. Further recommendations are detailed in the World Medical Association Declaration of Helsinki [9] and the UN Principles of Medical Ethics [10].

Great care must also be taken over real or perceived benefits to individuals studied to avoid discrimination or selection bias.

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10.1. KEY MESSAGES

- The laboratory is a fundamental component of a TB control programme as infectious cases can only be identified by laboratory techniques. The most important investigation is the direct examination of stained sputum smears.
- Laboratory services should be arranged as a network with peripheral basic laboratories being accessible to all prisons and supervised by more centralized higher level laboratories.
- Supervision and quality control are an essential component of laboratory activities.
- Laboratory safety procedures and equipment must be correctly installed, operated and maintained for them to be effective.

Within the framework of an effective TB control programme, the identification and treatment of infectious cases of pulmonary TB is the highest priority. The laboratory is therefore the focal point of the entire programme.

There have been several books published on laboratory services, notably the WHO 'Laboratory Services in Tuberculosis Control' series [1] and IUATLD publications [2, 3], which should be referred to by programme and laboratory managers.

10.2 THE ROLE OF LABORATORY SERVICES

Laboratory services have a number of fundamental roles in TB control including:

- case detection
- information for the categorization of patients and the selection of treatment protocols
- individual patient monitoring to assess clinical progress, infectiousness and treatment outcomes
- co-ordination and liaison with health personnel caring for patients
- programme management and evaluation through the registration of results and the production of quarterly reports
- quality control of their activities
- epidemiological surveillance for drug resistance.



10.3 WHAT LABORATORY TESTS ARE PERFORMED?

10.3.1 *Direct smear microscopy of sputum using acid-fast stains*

For most programmes, the direct microscopy of sputum smears to detect TB organisms is the only laboratory test required. The examination of up to three consecutive sputum smears using standardized techniques is currently the most cost-effective method used for detecting and monitoring TB. It is relatively quick, inexpensive and easy and can be performed by appropriately trained laboratory technicians or para-medical workers.

The ability of this test to detect infectious cases depends on the quality of the specimen, the type of pulmonary lesion, the staining technique, the facilities available and the person performing the microscopy. The examination of two specimens detects, on average, 90% of infectious cases.

Sputum smears are stained in such a way as to make any TB bacilli present visible when viewed under a microscope. TB bacteria retain the stain, even after exposure to decolourising acid-alcohol; hence the alternative term 'acid-fast bacilli' (AFB) which is often used for TB bacilli. Staining of smears is most often performed with Ziehl-Neelsen (ZN) staining, as the subsequent microscopy requires only daylight or electric light.

There is an alternative procedure – fluorochrome staining – which requires a different illumination system with a quartz halogen lamp, so it therefore has higher capital and running costs. The advantages of this second technique is that lower magnification is required to examine the slides. Slides can be examined more quickly, which may be important if a large population is screened, for example in active case-finding in prisons (see Chapter 12).

However, such a stain has a higher false positivity rate, meaning that slides identified positive by this method should be confirmed through ZN staining if few organisms are identified, creating additional work. In addition, slides stained with the fluorochrome method should be examined within 24 hours of staining or re-stained, making the organization of quality control more difficult.

10.3.2 **Culture**

Culture of clinical specimens is considered the 'gold standard' for the diagnosis of TB. It is more sensitive than microscopy and may detect pulmonary TB cases that are smear-negative. However, this must be balanced by delays in producing results (up to 8 weeks), the increased costs in materials and equipment, and the higher level of training required for staff to perform it.

For programmes where there is little drug resistance, it is recommended that culture should only be used for the diagnosis of smear-negative patients where there is strong clinical or radiological suspicion of TB or for the follow-up of patients who have failed standard re-treatment therapy.



However, where a treatment programme for drug-resistant TB is to be implemented, culture must be used systematically for patient assessment through treatment and to define cure, because of its increased sensitivity and specificity.

10.3.3 Drug susceptibility testing (DST)

Testing of *M. tuberculosis* isolates to determine the susceptibility of the bacteria to first-line anti-TB drugs is an established practice for the surveillance of drug resistance. It should also be considered for the investigation of patients failing standard first-line drug regimens, particularly where there is a high prevalence of MDR-TB (see Chapter 13).

In prisons where MDR-TB is established, first-line drug susceptibility testing according to internationally standardized procedures [4] is important for surveillance purposes to detect changes in rates of resistance. It may be useful in high prevalence settings with high resistance rates to help detect re-infection, amplification of resistance or possible provision of false samples if serial drug susceptibility tests are performed through treatment. First-line and probably second-line drug susceptibility tests are also necessary to define appropriate treatment protocols if specific treatment programmes for multidrug- or polydrug-resistant strains are considered [5, 6].

However, the use of drug susceptibility testing increases further the costs and expertise required.

10.3.4 More specialized tests and alternative methods

In recent years much research has been directed to new diagnostic techniques for *M. tuberculosis* and to develop faster methods for determining antibiotic susceptibility.

This has become more urgent in an era where TB has reached epidemic proportions globally and diagnostic and treatment services are struggling to cope. In addition, the HIV epidemic presents new diagnostic challenges with the increased burden of smear-negative/culture positive disease. In terms of MDR-TB treatment, faster results of drug susceptibility tests are required to hasten the initiation of effective therapy.

Some of the current methods are directed towards:

- improving the sensitivity of smear microscopy through centrifugation [7] and other processing techniques
- the use of new media or new indicators to identify the growth of TB in culture more rapidly, to increase the volume of cultures examined and to hasten the availability of antibiotic susceptibility results
- genetic amplification techniques to identify TB and rifampicin resistant strains more rapidly.

However, more operational research and cost-effectiveness studies are required before these techniques can be generally recommended.



10.3.5 Biochemical tests on serum samples

In treatment programmes for polydrug and multidrug-resistant disease with second-line drugs biochemical tests are suggested to assess possible side-effects. These include serum levels of liver transaminases and bilirubin, creatinine, electrolytes and thyroid stimulating hormone. Given the prison context of poor nutrition and high rates of substance abuse, these investigations are recommended when second-line drugs are used.

In programmes using only first-line drugs, biochemical tests are not required and are wasteful of resources.

10.4 WHEN ARE SPUTUM SAMPLES EXAMINED?

Sputum samples are examined to confirm diagnosis in a TB suspect and then during the course of a patient's treatment, depending on his treatment protocol (see Chapter 13).

This has important implications for the laboratory workload and supplies. In particular, care must be given at the start of the programme to stagger the initiation of treatment of patients. This means that the laboratory has a constant workload rather than periods when it is overloaded with work, which may have a negative impact on the quality of results provided.

The laboratory needs to define how many samples it can realistically handle each day and to inform and liaise with health personnel requesting the tests. For example, one microscopist should not read more than 20 smears per day, to avoid deterioration in quality of work because of visual or mental fatigue.

10.5 SPUTUM COLLECTION

As respiratory secretions build-up over night, early morning specimens are preferable. The sputum collection protocol given in Annex 5 is recommended.

Prisoners have many reasons why they may try to provide false sputum specimens. These include fear that a diagnosis of TB will delay release, a desire to move to a different department or prison for 'business' reasons or to avoid abuse, a belief that entering a TB programme will mean better living conditions etc. Tricks can include hiding dried or fresh sputum under fingernails, in mouths, in the ends of hollowed out cigarettes or in containers. Attempts can also be made to tamper with specimens after collection.

In prisons, **the collection of sputum must be directly observed** and specimens must be stored and transported securely to avoid corruption of specimens. Staff responsible for sputum collection should protect themselves from infection by collecting sputum outside or in well-ventilated areas, standing away from the patients and wearing appropriate masks (see Chapter 15 and Annex 5). Health or laboratory staff may collect sputum, but if non-laboratory staff are responsible for the task they should be guided by laboratory staff as to the quality of the sample required.

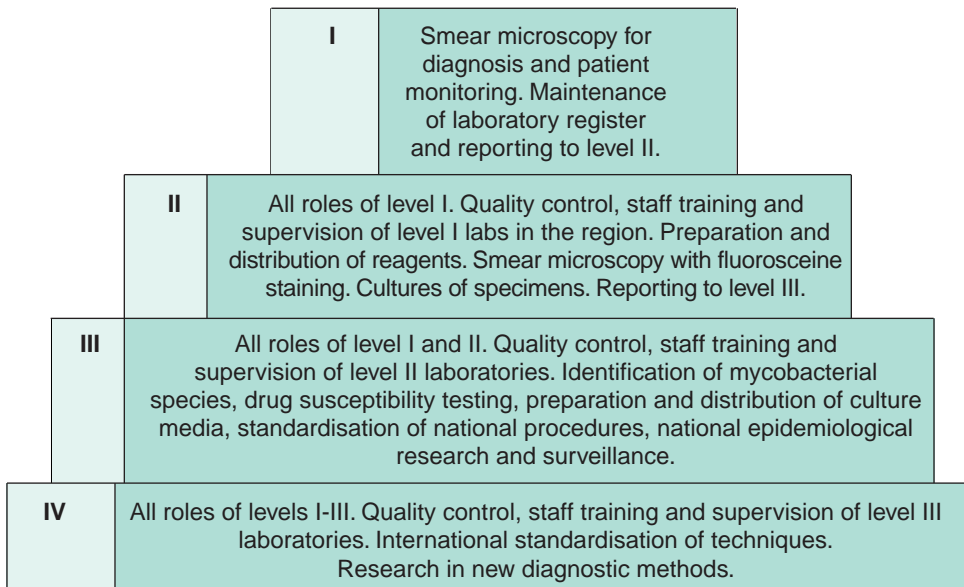


10.6 THE IMPORTANCE OF A LABORATORY NETWORK

The organization of laboratory services requires a network of laboratories with each layer having progressively more sophisticated services, supervising and supporting the layer beneath. This is illustrated in figure 10.1.

Whether these services should be within or outside prisons is a question that often arises and has to be decided in each setting, integrating services as much as possible as to standardize procedures, ensure equivalence of service and rationalize resource use (Chapter 6). Consideration should be given to the existing infrastructure, transport requirements, expected workload and staff capacity and that prisoners wanting a false result may have less influence over external laboratory staff.

FIGURE 10.1 LABORATORY NETWORK PYRAMID



10.6.1 Level 1 - the Peripheral Laboratory (PL)

Level 1 laboratories should be capable of ZN staining of sputum smears and microscopy for diagnosis and patient monitoring in DOTS programmes. They should also be able to maintain a TB laboratory register and report results to the Regional Reference laboratory.

Every prison should have access to a level 1 laboratory for TB case-finding in prisoners held there. This could be situated within the prison or linked to a civilian level 1 laboratory that could serve either one or a cluster of prisons. Alternatively, a fixed or mobile prison-based laboratory unit could serve a group of prisons.



10.6.2 Level 2 - the Regional Reference Laboratory (RRL)

This level of laboratory is more likely to be found in a secondary or tertiary public health hospital in a regional centre and could serve a prison TB treatment centre for culture and more sophisticated analyses when necessary. Alternatively such a laboratory could be created in a prison TB treatment centre, accepting referrals from peripheral centres.

At this level more advanced technical procedures may be carried out as well as competency in the activities carried out by the PL. This might be the appropriate site for fluorochrome staining and a halogen lamp microscope for the screening of prisoners suspected of TB through active case-finding in detention centres in the area. Such a lab should also be able to perform cultures of clinical specimens reliably. Where drug-resistant TB is a significant problem, level 2 laboratories might be promoted to perform first-line drug susceptibility testing.

Level 2 laboratories also have the responsibilities of monitoring the activities of the PLs in its jurisdiction, training and supervising staff and performing quality control. They may also prepare and distribute reagents for peripheral laboratories.

10.6.3 Level 3 - the National Reference Laboratory (NRL)

National Reference Laboratories are more likely to be found in specific TB or pulmonary medicine hospitals or research institutions. Depending on the size of the country there may be one or several such laboratories. This is the laboratory that should serve treatment programmes for cases with polydrug- or multidrug-resistant TB.

Such laboratories should be capable of all activities performed by lower levels and undertake supervision, training and quality control for level 2 laboratories. They also perform identification of mycobacterial species, drug susceptibility testing, prepare and distribute culture media, and standardize national procedures. Another important role is national epidemiological research and surveillance.

10.6.4 Level 4 - the Supranational Reference Laboratory (SNRL)

Supranational Reference Laboratories are at the highest level and part of an international network. They perform quality control, supervision and training for National Reference laboratories. They are also responsible for research and international standardization. It is essential that this level be involved if specialized treatment for drug-resistant patients is planned.



10.7 LABORATORY TECHNIQUES

Laboratory techniques will not be elaborated here as several manuals already provide useful information on specific laboratory techniques for microscopy and culture, notably the 'IUATLD Tuberculosis Guide for Low Income countries' [2] and the 'WHO Laboratory Services in Tuberculosis Control series' [1].

There is no WHO guideline book for drug susceptibility testing as this remains the domain of highly specialized laboratories. The IUATLD publication, 'The Public Health Service National Tuberculosis Reference Laboratory and the National Laboratory Network' [3] is suggested.

It is important to emphasize that standardized laboratory techniques and definitions be used in all TB programmes.

10.8 SUPERVISION AND QUALITY CONTROL

General supervision is usually carried out by more experienced staff from a higher level laboratory through on-site visits. Evaluation should include laboratory hygiene and safety methods, laboratory techniques, consistency of laboratory records and documentation, stock management, equipment maintenance and quality control.

Quality control involves monitoring of the work performed by a laboratory against defined standards of performance. It ensures that the data produced by a laboratory is of an acceptable standard and once achieved is maintained. It is an aspect of laboratory services that is extremely important and should be given a high priority and not neglected. Examples of quality control techniques can be found in the recommended laboratory manuals [1, 8].

Supervision and quality control tests will, of course, only be of use if the information obtained is fed-back to the laboratory and remedial action recommended and applied, as necessary.

10.9 RESOURCE NEEDS

10.9.1 Infrastructure

Where possible, laboratory tests for TB should be performed in a separate room from other laboratory services to reduce health worker exposure and cross-contamination risks. Adequate space is extremely important for safe working conditions and there should be a logical flow of work from 'clean' areas to less 'clean areas'.



For a level 1 laboratory, the minimum that is required is separate areas (but not necessarily separate rooms) for:

- stock and the completion of documentation
- the reception of specimens
- smear preparation
- microscopy.

A clean water supply is essential, gas and electricity non-essential but helpful. If electricity is unreliable or unavailable, there should be sufficient daylight for microscopy.

At level 2, where cultures are performed, a reliable electricity supply for incubators, etc. is essential. A gas supply is not always necessary, depending on the type of equipment available to sterilize inoculation loops, etc. As cultures are more likely to be performed where drug-resistant-TB is prevalent, environmental measures such as properly placed and maintained biological safety cabinets must be used and personal respiratory protection worn.

At level 3, a separate room for the preparation of culture media is mandatory to reduce the inadvertent contamination of media.

10.9.2 *Equipment and Materials*

A list of the materials and equipment required for the direct microscopy (using ZN-staining) of 4000 slides is available in Book 2 of the WHO Laboratory Services for Tuberculosis Control series.

Note that ethanol is required for staining and decolourization of slides, and as fuel for spirit lamps. However, alcohol is forbidden inside prison. This problem can be solved by using denatured alcohol with acetone or ether for spirit lamps and by preparing solutions that contain alcohol (e.g. acid-alcohol for decolourization) outside the prison.

Book 3 of the WHO Laboratory series contains a list of equipment and supplies needed to culture 6000 specimens using Modified Petroff decontamination and Lowenstein-Jensen medium. Note that culturing requires higher capital and running costs including centrifuges, inspissators, incubators and autoclaves.

For drug susceptibility testing more equipment and materials are needed, depending on the method chosen. Requirements for the recommended proportion method of Canetti include an analytical scale and a supply of pure antibiotic powders to make up the correct stock solutions. However, drug susceptibility testing should only be initiated upon the advice and under the supervision of experts trained in these procedures.



10.9.3 Staff

The number of staff required is clearly dependent on the workload and the facilities.

The general rule of a maximum of 20 slides per laboratory technician per 8-hour working day should be applied, which will include the time necessary for documentation, preparation of slides, staining, stock management, hygiene, etc. Although, there are no strict recommendations published for staff performing culture and DST's – a similar value of preparing a maximum of 15 cultures or DST's per day⁴ is reasonable.

10.9.4 Transport and storage of specimens

If there is no laboratory in the prison where the sputum specimen is collected, it must be transported to the laboratory designated to receive specimens from this centre. If transport on a daily basis is not feasible, then they may be transferred twice weekly and kept cool or refrigerated in the meantime. Care should be taken that the specimens are not tampered with. Days for transfer should be co-ordinated with the laboratory, which should consider its workload from other sites.

Packaging of specimens should follow recommended or required national or international specifications to reduce the risks of exposure to infected material through accidental leakage, breakage, etc. If specimens are to be transported by air, the International Air Transport Association (IATA) regulations must be followed.

Specimens and request forms should be clearly labelled with the patients' identification details, the test requested and the date the samples were collected.

10.9.5 Laboratory safety

Safe working conditions are extremely important in laboratories where the risks of health worker exposure are high, particularly where MDR-TB and HIV is a problem. Attention must be paid to minimising the risks of aerosolization of infective particles through laboratory procedures, inhalation of such particles and accidental inoculation or ingestion of infectious material. The risks of blood-borne viruses such as hepatitis B or C and HIV, which may be highly prevalent in prison populations, should also be taken into account and universal precautions used (see section 15.7.1).

Correct working procedures, adequate space, a calm atmosphere and good technique are the most important safety measures. Entry to the laboratory should be restricted to laboratory staff because they are familiar with the equipment, materials and potential risks. Masks, gowns and disposable gloves should be provided and used. The

⁴ Culture preparation requires centrifugation of sputum specimens. The limiting factor is the number of specimens the centrifuge holds and the time for centrifugation.



laboratory should be kept scrupulously clean and bactericidal soap and disinfectant active against TB, (e.g. 5% phenol), accessible. Measures detailed in Chapter 15 should be applied.

As the laboratory is a high-risk area for TB transmission, the application of environmental controls should be prioritized here, including good ventilation (with air currents flowing away from laboratory staff) and possibly ultra-violet germicidal irradiation (UVGI) –see Chapter 15.

In terms of specific safety equipment, a Biological Safety Cabinet (BSC) should be installed in all laboratories if feasible but is considered **essential** where cultures are performed. A BSC is basically a cabinet within which laboratory work is carried out which has a high efficiency particulate air (HEPA) filter in its air exhaust and/or air supply systems. The BSC should apply international standards (class I or II), be used correctly and well maintained. It should be placed far from the door, away from air currents, and air extracted should be discharged at a level of at least 3-m above ground level.

It should be noted that without proper installation, operation and maintenance, a Biological Safety Cabinet (or other piece of safety equipment) can do more harm than good and may create a false sense of security.

Laboratory safety is the responsibility of everybody. Procedures should be established for managing laboratory accidents. Written instructions should be easily visible and this should be an integral part of staff training.

10.9.6 Safe waste disposal

The basic principle is that no infected material should leave the laboratory unless destined for another laboratory and safely packed. All clinical waste and contaminated equipment should be disinfected or sterilized before being discarded or re-used.

10.10 LABORATORY DOCUMENTATION AND REPORTING

Accurate labelling of specimens, registration and reporting of results is extremely important, not just so that individuals can be correctly treated and monitored, but also that the effectiveness of the programme itself can be evaluated.

Records should be standardized to ensure that all the necessary information is recorded to reduce the risk of errors. Documentation, however, should be kept as simple and practical as possible. As individual results may affect the way individual patients are managed, reports of investigations should be sent to the patient carers as soon as possible. Although laboratory results are sent to the TB health personnel, records should be kept in the laboratory in case of loss of results or to verify results thought to be errors of transcription.



WHO standardized laboratory documentation includes:

- TB laboratory register that is kept in the laboratory that records patient-identifying information and smear results (TB04 – Annex 4).
- TB laboratory request and results forms that are sent with the specimens and contain patient identifying information and specimen details (TB05 – Annex 4).

Adaptations can be made to these standardized documents to fit the needs of the prison context (e.g. sending specimens immediately for better security instead of waiting to collect all 3 sputa) or to record extra information (e.g. where there are high levels of MDR-TB).

Documentation of laboratory procedures also assists with internal laboratory quality control. In documenting results, inconsistencies or peculiarities can be identified and thus stimulate the checking for errors in techniques or records. Quarterly reports should detail the number of sputum samples examined and the number identified as positive, as well as reporting the number of new smear-positive patients diagnosed in each quarter. Results of quality control assessments should be included.

Culture laboratories should report the number of smear-positive specimens cultured and the number found to be culture positive, culture negative or contaminated. They should also report the number of smear-negative samples cultured and the number found to be positive, negative or contaminated.

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ORGANIZATION OF TUBERCULOSIS SERVICES IN PRISONS

11.1 KEY MESSAGES

- Organizational models vary from fully centralized to fully decentralized TB care. Countries/regions must decide on the most appropriate system in their own context.
- Partial decentralization with case-finding occurring in all prisons and treatment restricted to selected sites may provide the best combination of models.
- In planning TB services many issues must be taken into consideration. These include controlling the spread of infection integrating prison and civilian services, ensuring all categories of prisoners may access services and operational issues (e.g. supplies, transport, staff requirements).

11.2 ORGANIZATIONAL MODELS FOR TUBERCULOSIS SERVICES IN PRISONS

The organization of TB services varies in different contexts. There is a spectrum of organizational models with fully centralized and fully decentralized services at either end of the range. In some instances, diagnostic and treatment services may be provided by the civilian TB services.

In the centralized model of care, prisoners with suspected TB are sent to a facility specifically for TB patients for diagnosis and the duration of their subsequent treatment. In the decentralized model, prisoner-patients are diagnosed and treated in their prisons of origin. Both models have positive and negative aspects as shown in Table 11.1. A partially decentralized service with case-finding in all prisons and treatment in selected sites or centralization of the intensive first treatment phase and decentralization of the continuation phase may have the best combination of advantages and disadvantages.

Countries or regions must decide for themselves how best to organize prison TB control services, taking into consideration the relative advantages and disadvantages of different models. Decisions must take into account the:

- importance of early diagnosis and prompt initiation of effective treatment (Chapter 3) and the technical policy for case-finding (Chapter 12), case management (Chapter 13) and infection control (Chapter 15)
- importance and benefits of integrating prison and civilian services (Chapter 6)
- accessibility of services to all categories of prisoner (Chapter 5)
- potential for corruption of procedures with different models (Chapter 5)
- situation analysis and its recommendations (Chapter 8)
- existing infrastructure and service capacity
- operational requirements of the models considered (accommodation, transport supplies, staff and budget)
- requirements for adequate supervision of and continued training within programme sites.

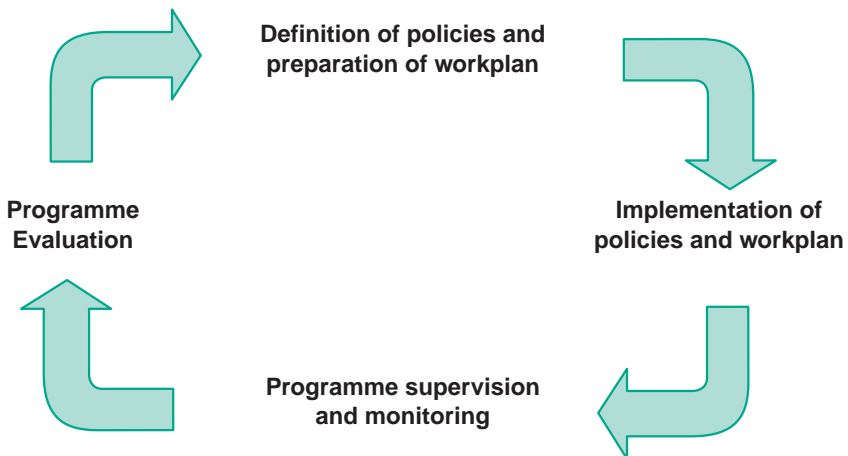
**TABLE 11.1 CENTRALIZED & DECENTRALIZED TB CARE – ADVANTAGES & DISADVANTAGES**

Model	Description	Advantages	Disadvantages
Centralized	Diagnosis and treatment in one facility.	Supervision, management and medical supply at one site easier. TB patients separated from rest of imprisoned population thus controlling transmission once disease suspected, space in treatment facility available and transport arranged. Patients can be separated into departments by infectious status and treatment phase.	Facility may not be accessible to all categories of prisoner (see section 11.5). Capacity may not be adequate for all TB cases leading to delays in diagnosis and treatment and uncontrolled transmission of infection. Transport of patients to and from site required for diagnosis and treatment. Possible pressures for corruption of procedures: facility may be better or worse than current conditions of detention or may be a long distance from area of origin. Liaison with civilian services of entire country necessary if patient released whilst on treatment. Concentration of large numbers of infectious cases increases risks of exposure for staff and visitors.
Decentralized	Diagnosis and treatment in prison of origin.	No delays in finding treatment space or transport. No transport of patients required. No change in conditions of detention therefore fewer pressures to corrupt procedures. Separation of infectious cases possible by holding cases in separate block. Liaison with civilian service responsible for patients released on treatment easier. Fewer cases in each site may lower risk to staff and visitors.	Difficulties supervising, managing and supplying every prison. Increased risk of erratic treatment and stock ruptures. More costly procedures (X-ray, culture) for diagnosing smear-negative and extrapulmonary cases unlikely to be available (see table 12.2). True separation of infectious cases may not be possible.

11.3 PROGRAMME MANAGEMENT AND SUPERVISION

Whatever model is chosen, strong programme management and supervision are necessary to ensure programme success. In planning, priority must be given to the organization of services that are compatible with the technical policies for case-finding, case management and infection control. The services must be organized to ensure that adequate monitoring, supervision and evaluation is possible and implemented (see figure 11.1). Weakness in any of these aspects can lead to inadequate treatment, persistent transmission of infection and the creation of multidrug-resistant TB.

FIGURE 11.1 THE PROGRAMME PLANNING CYCLE



Where the treatment of polydrug- and multidrug-resistant cases is undertaken, more centralized, highly supervised treatment sites are necessary because of the clinical and laboratory expertise required and the need for strict controls on the use of second-line drugs.

11.4 INFECTION CONTROL

The best method of infection control is the early diagnosis of infectious cases and the prompt initiation of effective treatment.

It is standard infection control practice in hospitals for patients with infectious TB to be separated from other patients until treatment has rendered them non-infectious (see Chapter 15). In most cases this takes about two weeks from the start of effective treatment [4]. Similarly, prisoners suffering from infectious TB should be housed separately from other prisoners until they are non-infectious.

However, it must be made clear to all staff, visitors and prisoners that separation of prisoners by infectious status should not, in any way, be seen as punishment or discrimination.



Separate housing does not necessarily mean an entirely separate facility. However, a separate building or room should be allocated for infectious cases if at all possible. Care should be taken to avoid contact between infectious cases and other prisoners in bathing, dining or recreational rooms and punishment cells.

If a centralized treatment facility is used, it is recommended to create separate departments (preferably units with non-shared air/ventilation) for patients:

- being assessed for TB disease (diagnostic unit)
- with smear-positive TB
- with smear-negative pulmonary and extrapulmonary TB and those who have become smear-negative through treatment (if they are not to be transferred back to their prisons of origin)
- who refuse or default from treatment
- with chronic TB (see table 13.1).

This separation is useful for operational reasons where there are large numbers of patients and may reduce the risk of re-infection or super-infection. Where polydrug- or multidrug-resistant disease is common, separation of infectious cases from other prisoners is extremely important because of the difficulties and expense of treating these forms. Separate housing should be maintained at least until smear negativity is confirmed [5].

Under no circumstances should a prisoner be deliberately placed with smear-positive or drug-resistant cases for punishment. Family visits should not be restricted because of a diagnosis of infectious TB, but precautions should be taken to limit transmission of infection (advise prisoner-patients to wear surgical masks and observe cough etiquette, ensure meetings take place in well ventilated areas).

If designated treatment facilities are used, consideration should be given to returning patients to their prisons of origin once they are non-infectious (Chapter 15). This will free treatment places for patients awaiting treatment. However, rigorous direct observation of treatment (DOT) and smear monitoring must be assured until the completion of treatment.

If patients are kept at the treatment facility during both phases of treatment they should be transferred upon successful completion of treatment either to their original prison or a separate facility if the authorities require that they continue to be separated from other prisoners. However, they should not, under any circumstances, block treatment places for infectious cases awaiting treatment.

11.5 ENSURING ALL CATEGORIES OF PRISONER MAY BE TREATED

According to international conventions, pre-trial prisoners should not be held with prisoners who are convicted [1-3], as they have not been found guilty of any crime. Women must also be held in separate institutions or entirely separate parts of institutions as must juveniles [1]. Prisoners may be segregated by virtue of the number of offences they have committed or by the severity of their crime. However, none of these groups should be denied medical treatment.



Arrangements will depend on the burden of disease in each prisoner sector and this must be examined in the local context. For example, high security regimes may be found to have a relatively high burden of TB disease, as opposed to centres for women and juveniles. Decisions must then be made as to the feasibility of segregated areas for special groups in a centralized facility or whether to decentralize treatment to these other sectors.

11.6 ACCOMMODATION

Improving living conditions in prisons designated for TB treatment is important, but this must be coupled with improving living conditions in all prisons. If conditions are, or are perceived to be, of a much higher (or much lower) standard than general prisons, case-finding and treatment procedures risk being corrupted (Chapter 5).

11.7 LABORATORY SERVICES

The issues surrounding the provision of laboratory services for case-finding and treatment are discussed in Chapter 10.

11.8 OPERATIONAL ISSUES

In the centralized or partially decentralized model, several things should be considered when designating prisons as TB treatment sites:

- the number of likely patients as established from the situation analysis or survey and that projected for the future (e.g. expected changes in prison population, incidence of TB once effective control procedures are in place)
- the type of prisoner who may be held there
- the location of the prison, its transport and communication links
- the means of transport of prisoners, laboratory specimens, supplies etc
- the means of linking with the civilian TB service and laboratory networks
- infrastructure and capacity of the facility itself.

Designating prisons near regional centres as TB treatment centres will facilitate transfers, supply, staff training, supervision systems and family visits, because of better transport and communication links. It will be easier to encourage staff to live in these areas because of the proximity of other services and facilities for them and their families. Establishing links with civilian services is also likely to be easier. It serves no purpose to create TB facilities a long way from population centres for inappropriate reasons of public safety, as the risks to the community at large will ultimately be greater if there are stock ruptures, inadequate supervision, transport difficulties and staff shortages.



11.9 BUILDINGS, UTILITIES AND MAINTENANCE

All prisons should have rooms dedicated for medical screening and examination of patients by health personnel. There should also be a designated area for the collection of sputum (ideally outside) away from other prisoners or living areas.

In prisons where TB treatment is carried out, there should be a room designated for the direct observation of treatment and administration of injections. Health personnel also require offices in which to interview and examine patients, as well as to prepare the necessary documentation for each patient and to complete registers.

Each TB centre should have a secure pharmacy, stocked with anti-TB medication, drugs for treatment of side-effects and complications, and basic medicines for other conditions likely to occur in such a population that are locally appropriate, e.g. skin conditions, mental illness, gastritis etc. Medicines should be kept in appropriate conditions of temperature and humidity. The pharmacy should be located away from the prisoners' accommodation and must be locked. However, emergency treatment should always be accessible to health staff.

A morgue, or similar, may be necessary. Autopsy is an extremely high-risk procedure in individuals who died suffering from active TB and should be avoided if at all possible. If autopsy is legally necessary, high levels of staff protection and engineering controls must be in place. As TB may have been undetected before death, these precautions should be used whenever an autopsy is performed.

All prisons must have a good utility supply – at the very least, safe drinking water and good sanitation. In cold climates, an adequate level of heating is necessary, thus gas and/or electricity is essential, especially if prisoners are to be encouraged to open windows for ventilation.

Prisons inevitably generate a lot of waste; TB diagnostic and treatment services create a certain amount of potentially infectious clinical waste – sputum, pleural and abdominal exudates, needles and syringes, etc. Clinical waste from TB programmes should be incinerated where possible by mixing it with drier waste to balance the moistness of sputum or exudates. The presence of an incinerator is therefore fundamental, even if it is a basic model made from an oil drum. Manuals such as *'Safe management of waste from health care activities'* [6] should be referred to for the appropriate disposal of clinical waste.

Attention should be paid to keeping buildings and utilities in good physical condition and working order.

11.10 HEALTH PERSONNEL

Regardless of the model of TB care provided, trained health personnel should be present in every prison and capable of identifying TB suspects and implementing the procedures defined to assure early diagnosis of infectious cases and the prompt initiation of effective treatment.



In facilities where TB treatment is provided, trained health staff should be available to categorize smear-positive patients to the appropriate treatment protocol, observe treatment doses and manage minor side-effects. They should be able to manage stock, complete the necessary programme documentation and implement health education. In addition, they should be able to manage transfers of patients between prisons and between the prison and civilian sectors, and follow-up final treatment outcomes for as many 'transfers out' as possible (see Chapter 13).

In most instances, nurses and medical assistants should be able to perform these roles with adequate training. Such staff perform extremely important roles and should not be undervalued. However, physician opinion is necessary for the diagnosis of pulmonary smear-negative and extrapulmonary cases (see table 12.2). If resource limitations mean that a physician cannot be employed full-time in a prison facility, arrangements should be made for regular visits by physicians to these sites.

Programme management staff are required to supervise and support implementing staff and ensure technical and operational policies are followed. Regional prison TB co-ordinators should be identified to monitor case-finding and treatment in the region, identify problems and find appropriate solutions. They should also be responsible for analysis, evaluation and reporting of programme activities in the region. Regional prison co-ordinators should liaise with prison administrations and report to the national TB co-ordinator and central prison health services. If possible regular reviews of programmes should be performed by independent consultants to ensure that international recommendations and programme performance standards are achieved and maintained.

Exact roles and responsibilities for all management, clinical and laboratory staff should be defined in written job descriptions, applicable to each context and ensuring all necessary tasks are incorporated between them. They should receive pre-employment and in-service training to be able to perform competently the tasks expected of them (Chapter 14). Performance evaluations for each staff member should be carried out on a regular basis. Salary payments should reflect the valuable service staff provide for prisoners and the community as a whole.

11.11 SUPPLIES OF CONSUMABLES - MEDICINES, LABORATORY MATERIALS, STATIONERY

Where civilian TB services are established, utilising their supply system in co-ordination with them is far more desirable than establishing a system in parallel. However, if the decision is taken to start a prison TB programme in the absence of a civilian programme, the prison authorities must establish a supply system to ensure the complete treatment of prisoners with TB within their jurisdiction and for those who are released or transferred to another jurisdiction.

Guidance on centralized procurement, estimation of requirements, quality assurance, distribution and storage of medicines, laboratory and stationery materials is given in the WHO publication "*Tuberculosis Handbook*" [7].



11.11.1 Stock management

Good stock management ensures:

- that diagnosis and monitoring of cases is not interrupted by lack of laboratory materials
- that inaccuracies in interpretation of tests because of incorrect or expired materials are avoided
- that stock ruptures of anti-TB drugs do not occur, leading to partial or incomplete treatment, thereby reducing the chance of cure and promoting the development of drug resistance
- that drugs are kept in correct conditions so that they retain their effectiveness and do not contribute to the development of drug resistance
- that drugs and materials are not wasted by being inadvertently allowed to expire
- that forms and registers are available so that correct information is recorded and vital individual and programme information is less likely to be lost
- that accountability for drug use is open and transparent.

Achieving good stock management entails:

- designating and training staff specifically for this role
- developing a reliable method for estimating requirements for the complete management (from start to finish) of cases expected to be admitted into the programme between each order (dependent on the number of cases expected to be detected and treated during that time and the proportion of cases expected to follow each treatment protocol)
- having a regular ordering, supply and transport system (e.g. every three months) with an indication of the time from placing the order to delivery of the supplies
- appropriate storage of materials throughout the supply network (to ensure that drugs and materials are kept securely, both from the risk of theft and from inappropriate environmental conditions of extreme temperature, light, humidity, pests, etc)
- accurate inventory and accounting systems (drugs and materials easily located and clearly labelled, documentation of all deliveries, withdrawals and resultant stock balances, frequent stock checks, application of the 'first in, first out' principle to reduce the risk of drug and laboratory material expiry)
- creation of a reserve or 'buffer' stock of equal size to that estimated to be required for the programme for at least 3 months, in case of inadvertent shortfalls in estimates or unforeseen delivery problems
- regular and timely monitoring and reporting of drug and material usage and reassessment of requirements
- regular supervisory visits to ensure that procedures are adhered to
- procedures to collect and destroy expired drugs and materials.



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12.1. KEY MESSAGES

- Early finding of infectious TB cases *when linked* with the prompt initiation of effective treatment reduces morbidity and mortality, the transmission of infection and the creation of multidrug-resistant TB.
- Case-finding must focus on detecting infectious cases (i.e. pulmonary smear-positive cases) as these account for the spread of infection to other prisoners, staff and visitors and spread to the community at large. Laboratory tests, especially sputum smear examination are the only way to detect infectious cases and their services are therefore indispensable.
- Case-finding through self-referral (where individuals with symptoms seek diagnosis and treatment) must be coupled with active case-finding (where cases are actively sought by TB services) to improve access to diagnosis, reduce delays to obtaining treatment, and control TB in prison settings.

12.2 CASE-FINDING STRATEGIES

There are three main strategies for finding TB cases – case-finding through self-referral, screening on entry to prison and active case-finding in the imprisoned population. These strategies are complementary to each other and should be established in parallel as early as possible. ***Using one strategy in isolation is unlikely to effectively detect TB cases in prisons.***

12.2.1 Case-finding through self-referral

Case-finding through self-referral involves patients with respiratory or other symptoms seeking medical attention. Health personnel must therefore be alert to the possibility of TB, be able to correctly identify TB suspects and must then organize the correct investigations. This can be an effective way of detecting cases as it has been demonstrated that the majority of infectious cases have symptoms [1]. The diagnosis must be confirmed with the direct microscopic examination of sputum as not all individuals with respiratory symptoms have TB. However for such case-finding to be effective, patients must be aware that symptoms may mean TB and that it can be treated, must be willing to seek diagnosis and treatment, and must be able to access correct TB care.

Case-finding through self-referral may have limitations inside prison. Prisoners may fear the repercussions of a diagnosis of TB (stigma, transfer to another facility, delayed release) and therefore try to hide or deny symptoms or may have difficulty accessing correct care (weak TB services, corruption, violence, etc.). In addition, symptoms alone as a means of suspecting cases may be less reliable in some populations [2].



Education of staff and prisoners about TB and the benefits of early diagnosis and prompt treatment for everyone plus the strengthening prison health services can overcome some of these challenges. Case-finding may be improved by the use of a 'cough register'. This is a register kept by a prisoner 'cell chairman' or member of the prison staff of those with a cough for more than 3 weeks. Those with prolonged coughs can then be brought to the attention of the medical services for assessment and sputum analysis if necessary. However, this system may be considered unacceptable by prisoners or staff, or be open to abuse. Thorough training and close supervision are necessary for it to be effective.

For case-finding to be fully effective in prisons, strengthened case-finding through self-referral should be coupled with active case-finding in the form of screening for TB at entry to prison and the search for existing cases in the imprisoned population.

12.2.2 Screening at entry to prison

Medical screening at entry to prison for every prisoner is recommended by the Council of Europe [3] and the United Nations [4, 5]. This medical examination should include whether the prisoner is suspected of active TB and the initiation of appropriate investigations to confirm or exclude the diagnosis (see section 12.3).

Medical screening at entry to the prison system is essential, as many prisoners will have come from backgrounds where the prevalence of TB is already high [6]. Strong co-operation with civilian TB services is required so that prison health staff are notified if a previously identified TB patient is imprisoned.

The prisoner should not enter the body of the prison population until verified clear of infectious TB. As this procedure may take some time, the intake area should provide some separate overnight accommodation. Confirmation or exclusion of a TB diagnosis should be performed as quickly as possible.

Whether screening is performed at each subsequent transfer between prisons must be decided in the local context and could be limited to transfers from particularly high-risk prisons. Ideally, screening for TB should also be carried out upon release from prison, but it may not be realistic to expect prison personnel to thoroughly examine individuals who will soon be no longer their responsibility. Liaison with civilian health services is therefore extremely important for the medical follow-up of released prisoners.

12.2.3 Active case-finding in the imprisoned population

Active case-finding means systematically searching out cases of TB in a population, using one of the methods described below (section 12.3). This is of most value to address the existing reservoir of prevalent TB cases in the imprisoned population. It can have an important impact on the transmission of TB in prisons if it is linked to prompt, effective treatment of the detected cases by removing the bulk of infectious sources.



However, screening the entire prison population is very resource consuming. One complete and thorough cycle of screening the entire population is considered adequate to detect the majority of prevalent cases. Screening at entry can prevent re-filling of the reservoir; strong case-finding through self-referral then used to detect any existing cases missed in the process and the fewer incident cases that subsequently arise. This could be coupled with TB screening as part of an annual general medical check-up of all inmates (e.g. on the anniversary of their admission to prison).

For an active case-finding cycle to be effective and equitable, all prisoners must be screened. Therefore, a complete list of prisoners in each prison must be obtained and every one screened for TB. The order in which prisons are screened should be decided in the local context, but should prioritize prisons with a higher risk of TB (e.g. high-density population, strict regime, high prevalence detected in a survey). As case detection must be tightly linked to treatment, it may be most practical to screen facilities designated for treatment first.

The procedure also raises awareness of TB among prisoners, staff and policy makers, and provides an opportunity for education of prisoners and staff on risk reduction for TB infection and disease, the risks of erratic treatment and the benefits of prompt, correct treatment.

In areas where there is a high prevalence of polydrug- and multidrug-resistant TB, active case-finding remains of value, even if more effective second-line treatment is unavailable because of resource limitations. Firstly, even in these contexts the majority of cases will have disease that is susceptible enough to respond to first-line drugs and secondly, those that fail first-line regimens can be placed in respiratory isolation, thus preventing transmission of the disease in the general prison population.

However, respiratory isolation must absolutely not be equated with punishment or solitary confinement and conditions in areas used for holding prisoners with infectious drug-resistant TB should be no worse than for the incarcerated population generally.

12.3 CASE-FINDING METHODS

Case-finding methods must be directed towards identifying infectious TB patients if the epidemic is to be controlled. Patients who produce sputum in which the TB bacteria can be seen in stained sputum smears under a light microscope (pulmonary, smear-positive cases) are the most infectious and the detection of these cases must be the priority.

However, the method of identifying which prisoners should submit sputum for examination is less established. Various methods have been reported [7, 10], and more operational research is required.

This section presents guidelines for case detection methods with underlying principles and indications of the advantages and disadvantages of different ways of identifying TB suspects. Whichever method is chosen, it should be used for all case-finding strategies in each context to assure consistency and equivalence of care and to reduce confusion.



12.3.1 **Basic principles**

- The method of identifying TB suspects must be determined in each setting depending on the local context. However, ***all TB suspects must have their sputum for examined for confirmation of the diagnosis.***
- The laboratory is a fundamental component of case-finding and the service needs to be adequately resourced in terms of materials, equipment and staff for the correct diagnosis of infectious cases and the accurate and timely reporting of the results. The capacity of the laboratory services should match the needs for case detection and the subsequent monitoring of detected cases whilst on treatment.
- Confirmed cases must be treated as soon as possible after diagnosis, ideally within 24 hours. Therefore treatment must be available for the detected cases either in their prison of origin or at a nearby facility designated for that purpose (see also Chapter 11 and 13).
- Case-finding must be accompanied by health education for prisoners and prison staff to explain its purpose and to promote measures to reduce TB transmission and the development of TB disease and drug-resistant forms of TB (see Chapter 14). The campaign should be preceded by a needs assessment to ascertain existing knowledge, attitudes, behaviours and practices. The case-finding procedure should be explained as well as the fact that self-treatment may cause false-negative results, thus making genuine cases undetectable by the process. The action that will be taken with the results should be made clear. The process must be acceptable to the prisoners and to the prison administration.

12.3.2 **Identifying tuberculosis suspects**

The method of identifying pulmonary TB suspects must be sensitive enough to correctly detect likely TB cases, without missing a significant proportion of genuinely infectious TB cases, i.e. the method should have a low false-negative rate. However, it must also be specific enough to correctly exclude prisoners without TB, so that large numbers do not unnecessarily go through laboratory investigations for TB, i.e. it should have a low false-positive rate. This is a delicate balancing act between the need to detect as many infectious cases as possible and the need to conserve resources.

Two methods to identify pulmonary TB suspects are presented in table 12.1 with their advantages, disadvantages and some remarks about each strategy.



TABLE 12.1 POSSIBLE TECHNIQUES TO IDENTIFY PULMONARY TB SUSPECTS REQUIRED TO SUBMIT SPUTUM SAMPLES

<i>Method</i>	<i>Remarks</i>
<p><i>Radiography specificity Chest X-rays (CXR) or Mass Miniature X-rays (MMR)</i></p>	<p>Sensitivity reported to be up to 95% [11] and reported to be up to 96% [1]. However, sensitivity reported to be as low as 73% and specificity as low as 69% [12].</p> <p>[NB. Reported sensitivity and specificity results carried out on radiographic tests of populations already selected by symptom screen.]</p> <p>Sensitivity and specificity dependent on quality of films and observer. Also dependent on risk of pulmonary disease mistaken for TB, or normal radiographic appearance in the presence of TB, e.g. in HIV prevalent contexts.</p> <p>High capital and running costs and regular maintenance of equipment required (cost of one CXR Malawi USD 2.82 in 1995 [12]).</p> <p>High degree of training necessary and significant inter and intra- observer variation in radiographic interpretation [1].</p>
<p><i>Questionnaire (Annex 3a)</i> based on symptoms, previous TB history, Body Mass Index (BMI)</p>	<p>Inexpensive, but low predictive value positive [Aerts personal communication]. Recommended where resources are limited.</p> <p>Symptoms develop soon after the onset of disease and are present in 90% of cases with infectious TB [1]. Respiratory symptoms for TB may not be specific where there is a high burden of non-tuberculous disease, e.g. smoking related illness, asthma.</p> <p>Identifies a large proportion of the incarcerated population as TB suspects (38.4% Georgia). Prisoners quickly learn which are the 'right' answers, so reducing the specificity.</p> <p>Simple to implement, but must be administered by trained personnel to reduce inaccurate or incomplete results.</p>



A combination of questionnaire and radiography is probably the best method, if resources are available. However, the questionnaire can be used alone where resources are limited as it provides a high degree of sensitivity, is much less expensive than radiography, does not require special equipment and is easy to implement. The questionnaire's major disadvantage is that the predictive value of a positive test (the probability of smear-positive TB occurring among those identified as suspects) is likely to be low, resulting from a high false-positive rate for the questionnaire.

The questionnaire in Annex 3a is an example only and will need to be adapted to each setting. Adaptations should be made before starting case-finding and additional information should be limited to that which is relevant and useful from a programme perspective and can be obtained reliably. Care must also be taken that there is no change of meaning if translation is necessary. The questionnaire should be piloted, for example during an initial prevalence survey (see Chapter 9), so that problems, ambiguities or misunderstandings can be resolved.

Case-finding staff should be trained in interview techniques and the correct completion of the questionnaire. A standardized approach should be emphasized and staff should avoid guiding a prisoner to one answer or another. Merely giving the questionnaires to the prisoners for self-completion is unacceptable.

12.3.3 Confirming tuberculosis cases

Prisoners identified as TB suspects should provide up to three⁵ sputum specimens on consecutive days for direct microscopy (see Chapter 10).

Sputum specimens should be collected in the early morning. The collection should be directly observed to reduce the risk of prisoners providing false specimens. Staff who recognize the prisoners should participate as substitution between prisoners in case-finding procedures has been reported. If necessary, more objective tools to correctly identify prisoners (weight, height or photographs) can be considered.

A laboratory must be designated to receive specimens for examination from each prison. Ideally, each prison will have access to a peripheral level 1 laboratory for case detection. Fresh specimens are more difficult to transport, have an increased risk of leakage, should be kept cool and must be fixed within a week. Therefore fixing specimens on slides on the spot could ease transport and storage difficulties, if appropriate training and supervision was provided. Nevertheless, samples should be transported to the laboratory as soon as is feasible, as delays lengthen the time infectious cases are not treated (see Chapter 10). It should be remembered that fixed, unstained smears are still infection risks and care should be taken in handling and transportation.

TB cases are defined as in table 12.2. Therefore, pulmonary TB suspects who provide two positive sputum specimens during any of the case-finding strategies are defined as smear-positive and should be immediately referred for treatment. Suspects who provide one positive

⁵ If a large population is to be screened rapidly, one sample can be considered adequate to detect the majority of cases for the purpose of reducing laboratory workload. However, patients who provide one positive sputum should provide a second for confirmation of their diagnosis.



sputum sample should provide a total of three specimens for examination. If they remain negative, further investigation is required as in table 12.2 for them to be defined as an infectious case.

However, cases that are pulmonary smear-negative or are much less infectious and case-finding should not focus on their detection. Further investigation of TB suspects who provide two negative smears (as in table 12.2) should be reserved for those where there is a very high suspicion of TB. Where resources are limited, detecting too many smear-negative cases may divert attention from the priority smear-positive cases thus denying their treatment and resulting in persistent transmission of infection and the generation of more cases. Smear-positive cases must therefore represent at least 80% of the TB cases detected in case-finding during initial stages of the programme.

TABLE 12.2 STANDARDIZED DOTS DEFINITIONS BY SITE OF DISEASE AND BACTERIOLOGY

a) Pulmonary tuberculosis, sputum smear-positive patient (PTB+)

- TB in a patient with **two** or more initial sputum smear examinations positive for AFB by direct microscopy

Or:

- TB in a patient with **one** sputum smear examination positive for AFB **and** radiographic abnormalities consistent with active pulmonary TB as determined by a clinician

Or:

- TB in a patient with **one** sputum specimen positive for AFB **and** sputum culture positive for *M. tuberculosis*.

b) Pulmonary tuberculosis, sputum smear-negative patient (PTB-)

- A case of pulmonary tuberculosis which does not meet the above definition for sputum smear-positive TB.

Note: In keeping with good clinical and public health practices, diagnostic criteria should include:

- at least three sputum smear examinations negative for AFB through direct microscopy, **and**
- radiographic abnormalities consistent with active pulmonary tuberculosis, **and**
- no response after 1 week of a broad spectrum antibiotic⁶; **and**
- a decision by a physician to treat with a full course of anti-TB chemotherapy.

c) Extra-pulmonary tuberculosis

- Tuberculosis of organs other than the lungs e.g. (pleura, lymph nodes, bones and joints, genito-urinary tract, abdomen, skin, pericardium, meninges etc.). Diagnosis should be based on one culture positive specimen, or histological or strong clinical evidence consistent with active extra-pulmonary tuberculosis, followed by a decision by a clinician to treat with a full course of anti-TB chemotherapy.

Any patient diagnosed with both pulmonary and extra-pulmonary tuberculosis should be classified as pulmonary tuberculosis.

⁶Not rifampicin or any antibiotic with activity against *M. tuberculosis*.



12.3.4 Arranging treatment

The laboratory should return sputum results of the individuals tested to the prison as soon as possible. Once this information is received, the goal should be to start treatment of cases within 24 hours. Case management is discussed in Chapter 13.

Depending on the organization of the medical services (see Chapter 11), cases may stay in their prison of origin or be transferred to a facility designated for TB cases. Transfer is often organizationally difficult in practice and dependent on regulations, space and resources, so a plan for how this should be managed must be made. In addition, substitution between prisoners at this stage may also occur, so measures need to be implemented to ensure that those detected are the prisoners that are actually treated.

12.3.5 Documentation

Case-finding requires rigorous documentation if cases are not to be lost to follow-up and so treatment outcomes can be assessed. The most important tools are:

- *Individual questionnaires* (Annex 3a) recording the information collected and the action taken; these can follow the patient to the treatment centre and act as a referral form.
- A *screening register* to be kept at each prison (Annex 3b). This should record unique patient identifying information, the date the prisoner was evaluated for TB, whether the prisoner was identified as a TB suspect, smear results, the date confirmed cases were started on or transferred for treatment. If prisoners are transferred or released during investigation for TB, the date and destination of the patient should be recorded so that they can be traced.
- A *laboratory register* (TB04) and *specimen request and result forms* (TB05) – Annex 4.

Each prison should provide quarterly reports of its case-finding activities to the regional TB co-ordinator (see Chapter 16).

12.4 HIV SCREENING

If HIV screening is to be performed this should follow UNAIDS/WHO policy [13]:

“Compulsory testing of prisoners for HIV is unethical and ineffective, and should be prohibited.”

“Voluntary testing for HIV infection should be available in prisons when available in the community, together with pre- and post-test counselling. Voluntary testing should only be carried out with the informed consent of the prisoner. Support should be available when prisoners are notified of test results and in the period following.”



“Test results should be communicated to prisoners by health personnel who should ensure medical confidentiality.”

“Unlinked anonymous testing for epidemiological surveillance should only be considered if such a method is used in the general population of the country concerned. Prisoners should be informed about the existence of any epidemiological surveillance carried out in the prison where they are, and the findings of such surveillance should be made available to the prisoners.”

All these points are reinforced by the Committee of Ministers of the Council of Europe [3].

TB is often the first disease presentation in HIV-positive individuals, who may not know but may guess their underlying HIV status. Voluntary and confidential counselling should be offered including the issues surrounding an HIV test.

Unfortunately, understanding of the nature of HIV disease, its means of transmission and appropriate control strategies is still poor in many prisons and educational efforts must be intensified urgently. A diagnosis of HIV that is not fully confidential may open a prisoner to stigma or abuse at the hands of other inmates or staff. Where confidentiality cannot be assured and understanding of HIV and its management is weak, it may be more expedient to simply advise all patients of the potential of HIV infection in prison and of ways to reduce risks to themselves and others.

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13.1. KEY MESSAGES

- DOTS case management includes:
 - identifying patients for treatment in order of priority (infectious and severely ill first)
 - categorising patients using standardized case classifications into different treatment protocols
 - ensuring adherence to a complete course of treatment through direct observation of treatment, education, incentives and enablers, and accessible services
 - ensuring patients who are released or transferred to another prison can complete treatment
 - tracing and managing patients who interrupt treatment
 - documenting treatment, progress towards cure, and outcome
 - monitoring the effectiveness of programme management in terms of individual and combined patient outcomes.
- Treatment for multidrug-resistant TB is complex, expensive and prolonged. In settings where drug-resistant TB is established, programmes must urgently address the underlying causes and implement a widely accessible DOTS programme through strengthened case-finding and decentralization of well-supervised services.
- Treatment for TB cases with co-existing HIV infection is as effective as that in the HIV-negative and is important for reducing overall transmission of TB.

13.2 THE IMPORTANCE OF USING UNIFORM DEFINITIONS AND PROCEDURES

Uniform procedures and definitions are particularly important in prison-civilian integrated programmes to ensure equivalence and continuity of care on transfer between sectors.

Uniform definitions and procedures are an integral part of TB control programmes. Dividing patients into broad groups with similar clinical presentations and needs makes programme planning and management easier in terms of:

- being able to compare the treatment outcomes between each group and the trends in outcomes over time
- having an improved knowledge of what drugs and laboratory materials are required
- making the best use of the resources available.

If each TB programme were to make its own patient classification, treatment protocols and outcome definitions, programmes would be impossible to compare within or between



countries. Collecting meaningful data on the progress of the epidemic or the effectiveness of treatment strategies would be difficult. Therefore, it is extremely important that definitions and treatment protocols are standardized, i.e. that all programmes use the same definitions and protocols.

13.3 CASE CLASSIFICATION

The WHO system of case classification is designed to prioritize resource allocation to the individuals most likely to be transmitting the disease and to prevent death.

The established system of case classification is based on the:

- site of TB
- severity of TB
- bacteriology results
- history of previous treatment for TB.

See tables 12.2 (Chapter 12) and 13.1.

TABLE 13.1 STANDARDIZED DOTS TUBERCULOSIS CASE CLASSIFICATION

New:

- A patient who has never had treatment for TB or took anti-TB drugs for less than one month.

Relapse:

- A patient previously treated for TB who has been declared cured or treatment completed, and is diagnosed with bacteriologically positive (smear or culture) TB.

Transfer in:

- A patient who has been transferred from another tuberculosis register to continue anti-TB treatment.

Return after default:

- A patient who returns to treatment with positive bacteriology, following interruption of treatment for 2 months or more.

Failure:

- A patient who, while on treatment, is sputum smear-positive 5 months or later after the start of anti-TB chemotherapy.

Other:

- Patients who do not fit into the above named categories. This group includes **Chronic cases:** A patient who is sputum smear-positive at the end of a re-treatment regimen.

NB: Although, smear-negative pulmonary and extra-pulmonary cases may also be failures, relapses or chronic cases, this should be a rare event, supported by pathological or bacteriological evidence.



13.4 TREATMENT CATEGORIES AND REGIMENS

Case classification by site and severity of disease, infectious status and previous treatment is also designed to place patients into different treatment protocols depending on their risk of transmitting TB and their risk of resistant disease (tables 13.2 and 13.3).

TABLE 13.2 STANDARDIZED DOTS TUBERCULOSIS TREATMENT CATEGORIES [1]:

Patient case classification	TB treatment category
Smear-positive New case Or: severely ill New smear-negative or extrapulmonary case ⁷	Category I
Smear-positive Retreatment case: Relapse Failure Return after default Or: severely ill smear-negative or extrapulmonary retreatment case	Category II
Smear-negative pulmonary TB Extrapulmonary TB	Category III
Chronic cases	Category IV

Each TB treatment category has associated standardized treatment regimens, given in table 13.3. Treatment is based on 5 essential first-line drugs – isoniazid (H), rifampicin (R), pyrazinamide (Z), streptomycin (S), ethambutol (E). Information about these drugs and their recommended doses is provided in Annex 7.

Treatment is divided into two phases: the initial, intensive phase (to kill TB bacilli rapidly) and the second, continuation phase (to destroy any persisting bacteria thus reducing the risk of relapse).

DOTS programmes use codes to identify different treatment protocols. Each drug is coded by a letter, as indicated above. The number of **months** of a protocol is shown by the number directly **before** the letter indicating the drug to be taken. The number of **times in a week** that the drug is taken is indicated by a number as a subscript **after** the letter; the absence of such a number indicates daily therapy is given.

⁷ Includes TB meningitis, miliary (disseminated) TB, Pott's disease (spinal TB), pericardial TB



Thus, 2 SHRZE / 1 HRZE / 5 H₃R₃E₃ indicates that:

For **TWO** months the patient is prescribed daily streptomycin, isoniazid, rifampicin, pyrazinamide and ethambutol, followed by **ONE** month of daily isoniazid, rifampicin, pyrazinamide and ethambutol. For the next **FIVE** months he/she is prescribed isoniazid, rifampicin and ethambutol, **THREE** times a week.

TABLE 133 STANDARDIZED DOTS TUBERCULOSIS TREATMENT [1]

TB treatment category (see table 13.2)	Alternative TB treatment regimes	
	Initial phase (daily or 3 times per week)	Continuation phase
I	2 EHRZ (SHRZ) ⁸	6 HE or 4 HR or 4 H ₃ R ₃
II	2 SHRZE / 1 HRZE	5 H ₃ R ₃ E ₃ or 5 HRE
III	2 HRZ	6 HE or 4 HR or 4 H ₃ R ₃
IV	Refer to specialist treatment centre (or DOTS-Plus project) if available. If not, provide counselling, palliative treatment and place in respiratory isolation ⁹ .	

Thus, new smear-positive cases and severely ill smear-negative and extrapulmonary cases are prioritized. Smear-positive relapses, failures and returns after default (who are at greater risk of drug-resistant disease) receive a strengthened regimen.

Health personnel managing admission to a treatment programme use a method of triage, i.e. diagnosing and treating TB cases in order of priority. Selection criteria must first focus on infectiousness i.e. the treatment of smear-positive cases as these account for disease transmission. Criteria must also consider the severity of the patients' conditions, so that the most severely ill receive treatment in advance of those less ill.

A limit should be placed on the number of smear-negative and extrapulmonary patients treated (e.g. no more than 20% of the total number of cases treated) until the epidemic is under control. Severely ill cases should be the priority. A limit is particularly important where there are restrictions in the number of patients that can be correctly treated because of shortages in treatment places or drugs.

⁸Ethambutol is preferred to streptomycin, as injectable drugs should be avoided where possible because of the risks of HIV transmission if equipment is not fully sterilized (see section 13.13). Ethambutol is also less costly than streptomycin.

⁹Must not be synonymous with punishment.



13.5 ADHERENCE TO TREATMENT

Partial and erratic treatment for TB reduces the chance of cure and promotes the development of drug-resistant TB. Incomplete treatment also increases the risk of relapse. Therefore ensuring adherence to complete treatment is extremely important.

Adherence to treatment depends on many factors. These include:

- the support and encouragement the patient receives to continue treatment
- the pressures on patients that may cause them to default from treatment
- the awareness level of staff and patients of the importance of complete treatment
- whether the patient is in a position to receive complete treatment
- whether staff follow the established guidelines of the programme.

Many patients in the community find TB treatment difficult. This is even more the case in prisons, which are generally not supportive societies. If health personnel also fulfil a custodial role this may aggravate the situation, straining the relationship of trust needed between carer and patient.

Pressures on patients to default from treatment include coercion by other prisoners, the use of medication as an alternative currency, more immediate concerns than TB treatment or feelings of anxiety or hopelessness, etc. As a result, such evasion is often concealed or denied [2]. In some situations mass treatment default has occurred in the form of a 'tablet strike' as a means of protest, much in the way that the better known hunger strikes are used.

However, the commonest reason for default from TB treatment is for judicial reasons, such as transfer between prisons or release into sectors where TB treatment is unavailable [3, 4]. Availability and integration of services must therefore be coupled with a rigorous system for notifying and following up transfers between and in or out of prison (see below).

Acknowledging the potential for treatment default and addressing, where possible, the underlying causes is essential. Adherence to treatment can be enhanced by a variety of measures.

13.5.1 *Direct observation of treatment*

DOT should be considered the norm throughout prison TB programmes both in intensive and continuation treatment phases. This reduces the chance of concealed defaulting and the diversion of drugs. It can also help to protect a patient who may otherwise be coerced to surrender his drugs. Fixed-dose combination (FDC) tablets should be considered as they may help patients to take their anti-TB drugs and make DOT easier. The DOT protocol in Annex 6 is suggested.



13.5.2 Education, counselling and support (see also Chapter 14)

Patients are more likely to comply with treatment if they understand the principles behind it, the risks of erratic treatment and are supported by friendly health personnel willing to discuss issues related to their disease and treatment. A relationship of trust between patients and staff is extremely important and for this to develop health personnel should be completely independent of any security or punishment role.

Obtaining the co-operation and endorsement through education and advocacy of both the official and unofficial prison administrations can also greatly improve adherence.

Auxiliary treatment to alleviate the symptoms of side-effects and disease complications should be readily available. If at all possible, narcotic and alcohol detoxification regimes should be considered for addicts as well as psychiatric support and treatment for mentally ill patients.

13.5.3 Incentives and enablers for patients

Some form of incentive or enabler is often provided in TB control programmes to enhance adherence [5].

However, well-intentioned incentives may have detrimental effects in terms of TB control. For example, the benefits associated with being in the TB programme may promote hidden defaulting in order to stay smear-positive or initially in the provision of false sputum to enter the programme. Therefore the possible negative consequences of incentives should always be considered.

Written contracts between patients and health personnel are sometimes used as enablers and to encourage patients to view their treatment seriously. However, it must be remembered that patients have a right to refuse treatment regardless of a written contract and that treatment should never be coerced.

13.5.4 Improving adherence to treatment post-release

Integrated civilian-prison TB services are fundamental to enabling prisoners released on treatment to complete it (Chapter 6). However, the mere presence of civilian services does not guarantee treatment completion and there are numerous reports of difficulties following up released prisoners with TB [6, 7, 8, 10]. Proposed solutions include patient education, financial and material incentives.

Adherence can be improved by establishing a rigorous notification system for transfers in and out of prison, which should also be used for transfers between prisons (see section 13.7). Notification between prison and civilian services will be facilitated if the prisoner is held in a prison close to his area of residence. It is also extremely important that patients and their families are fully informed of the importance of complete treatment and the means of obtaining it before release or transfer.



In addition, social support for prisoners at release can be invaluable in helping them re-establish themselves in society and in encouraging them to attend for treatment. This may include help with accommodation, legal assistance, transport, nutritional or other support. The involvement of social welfare services or non-governmental organizations such as the local Red Cross or Red Crescent Society before and after release should be encouraged. However, such incentives, if restricted only to former inmates with TB, may inadvertently promote hidden treatment defaulting. Therefore social support should be made available to all prisoners at release.

Medical staff may also consider providing prisoners with a limited amount of treatment (e.g. 10 doses) for self-administration whilst they are getting themselves established, or accept a maximum 2 week interruption with the missed doses made up later by extending the duration of therapy.

13.6 MANAGEMENT OF DEFAULTERS FOR NON-JUDICIAL REASONS AND REFUSERS

Defaulters for non-judicial reasons are usually 'medical defaulters' because patients are unable to take medication due to side-effects or 'voluntary defaulters' because patients no longer wish to take treatment. 'Refusers' are patients who do not agree to take treatment from the outset. Although these patients usually number only a few, the programme needs to be prepared for this eventuality.

Medical defaulters will usually require palliative, symptomatic care. When they recover from their side-effects they should be re-treated (see Annex 7). If treatment cannot be restarted, they should be held separately from the main body of prisoners to reduce the spread of infection. Ideally, they should not block a treatment place for a patient who can be treated.

For voluntary defaulters and refusers, attempts must be made to try to find the motive behind their decision. Whilst their right to refuse treatment must be respected, time should be spent elucidating, and if possible, addressing the problem. Often, all that is required is counselling, information and reassurance, and repeated offers of treatment. However, it is imperative that all staff and prisoners understand that coercion is not acceptable or likely to have a positive outcome.

Housing for refusers and voluntary defaulters also needs to be considered. Again it is better that they do not block a treatment place and, if they are disruptive, the effect on other prisoners on treatment must be taken into account. However, prisoners who choose not to take treatment should not be punished for their decision or placed in a department with chronic cases. Nevertheless separation from the main body of prisoners should be maintained. Care should be taken that their subsequent housing does not act as an incentive to default from treatment. Refusing or defaulting from treatment should not be a reason to withhold symptomatic or palliative treatments. Patients should be monitored as for chronic cases (section 13.12.1) to detect spontaneous cure.



13.7 MANAGEMENT OF RELEASES AND PRISON TRANSFERS

Movements of prisoner-patients on treatment are inevitable and their management must be planned. Release, parole, trial or appeal should not be delayed because of a diagnosis of, or treatment for, TB. However, transfers to a facility where treatment continuation and completion cannot be assured must be avoided.

The management of transfers between prisons or between the prison and civilian sector includes the following measures:

- A standardized transfer form should be used (TB09 - see Annex 4). This should be completed in triplicate with one form kept by the referring unit, one provided to the patient and one forwarded to the next service responsible for his treatment. Once the patient has reported for treatment the bottom half of one copy of the form should be returned to the referring unit.
- The responsibility for managing transfers between health services should be clearly designated to the staff member responsible for the patient's care at transfer. This should include collecting returned transfer forms and determining the outcomes of treatment wherever possible. Otherwise the patients' treatment outcomes should be registered as 'transfer out' (see Table 13.6).
- Patients, families and staff must be informed of the need to continue treatment, the dangers of erratic treatment and patients must be given advice on where they should report for treatment in advance of release or transfer. A TB patient identity card (TB02 – see Annex 4) should be completed and given to the patient at the start of treatment. Treatment should continue to be directly observed.
- A sputum sample should be collected if time permits to assess infectiousness, particularly if the last sputum test was positive. Otherwise infectious status should be recorded as at the last sputum analysis and the next unit informed.

In addition for prison transfers:

- Transfer should be avoided if the patient is still infectious. However, if there is no alternative the patient should be held in an area dedicated for infectious TB cases. All centres of detention should have an area reserved for infectious TB cases.
- Transfers should only be to prisons where health services are available for the continuation of treatment and patient monitoring.

In addition for releases back to the community:

- The patient should be given up to 10 doses of oral anti-TB treatment and advised on how to take it, to allow time for the patient to locate the treatment centre recommended.
- The patient should be registered as a 'transfer out' in the prison register (see table 13.6) if the patient reports for treatment at the civilian centre and the outcome of treatment cannot be determined. If the patient does not report to the civilian centre, treatment outcome should be recorded as 'defaulter'. The patient should be recorded as a 'transfer in' in the civilian register.



13.8 MANAGEMENT OF INDIVIDUALS WHO RETURN TO TREATMENT AFTER INTERRUPTING DOTs

TABLE 13.4

Length of interruption	Smear examination on return?	New Registration?	Action
< 2 weeks	No	No	Continue treatment phase from the point interrupted, making up for missed doses.
2-8 weeks	Yes	No	Smear-negative – Continue phase from the point interrupted, making up for missed doses. Smear-positive – Start or restart category II treatment.
> 8 weeks	Yes	Yes – ‘Return after default’ if smear-positive	Record outcome of prior registration as ‘defaulter’ and give reason for default. Send sputum for culture and DST if significant drug resistance suspected. Start or re-start category II treatment.
		Yes – ‘Other’ if smear-negative or extrapulmonary and determined to still have active TB	Record outcome of prior registration as ‘defaulter’ and give reason for default. Clinical decision on individual basis whether to continue or re-start original treatment.

13.9 MONITORING THE EFFECT OF TUBERCULOSIS TREATMENT

Regular sputum checks are performed to assess treatment response. The result of the smear examination is important as it may change the management of the patient.



For patients *who commence treatment smear-positive*, sputum smears are examined during and at the end of treatment to assess a patient's response to treatment and to determine infectious status. Patients who *commence treatment smear-negative* and are clinically improving, need only have one follow-up sputum examination at the end of the first phase of treatment.

Whether one or two specimens are collected at each monitoring stage depends on country policy. In those who are clinically improving only one sputum smear is necessary. In addition, one positive smear is enough to suggest failure of a treatment stage.

Sputum smear-positive patients on Category I treatment should have sputum smears examined at the end of the 2nd, 4th and 6th months of treatment. If sputum remains positive at the end of the 2nd month, the first phase of treatment should be prolonged by one month and sputum examination repeated at the end of this month. Patients should then enter the continuation phase regardless of the smear result. If smears are still positive, sputum should be sent for culture and drug susceptibility testing if available. If sputum examination remains, or becomes again, positive at the end of the 4th/5th month¹⁰ of treatment, category I treatment has failed. Treatment outcome should be recorded as 'Treatment failure' and patients should be treated with the Category II 'retreatment' regimen. Otherwise sputum should be again examined at the end of the course of treatment (end of month 7).

Sputum smear-positive patients on Category II treatment should have sputum smears examined at the end of the 3rd, 5th and 8th months of treatment. If sputum remains positive at the end of the 3rd month of treatment, the first phase should be prolonged by one month. If sputum remains or becomes again smear-positive at the 4th/5th month, a sputum specimen should be sent for culture and drug susceptibility testing if possible. Treatment outcome should be recorded as 'Treatment failure'. If specialized treatment for drug-resistant TB is available, these patients should be referred for assessment. If specialized treatment is unavailable, the Category II continuation phase of treatment should be completed.

TABLE 13.5 MONITORING OF SMEAR-POSITIVE PATIENTS

	Sputum smear examination required at end of month:			
Category I	0	2 (3)	4 (5)	6 (7) ¹¹
Category II	0	3 (4)	5	8 (9)

Initially, sputum smear-negative patients who have a positive sputum examination at the end of the first phase should have this phase of treatment prolonged by one month. If smear examination remains positive after this extra month, sputum should be sent for culture and drug susceptibility testing if possible. If smear examination still remains positive at end of the 4th/5th month of treatment, treatment outcome should be recorded as 'Treatment failure'. Patients initially on Category III treatment should follow the procedure for failure of Category I. Patients on category I and II regimens should be managed as above.

¹⁰ For practical reasons, cases that are found to be sputum smear positive at the end of the 4th month of treatment may be defined as treatment failures, although this is not strictly in keeping with the definition.

¹¹ If 6HE is used for the continuation phase, sputum should be checked at month 8(9) rather than at month 6(7).



Managing sputum collection for a variety of patients on different categories of treatment and with some receiving prolongation months of the first phase can be difficult unless properly organized. Outcomes of sputum tests should be recorded on patient treatment cards and the date for the next planned sputum test highlighted to draw attention for the need for an examination on the proper date. Additionally, an agenda can be kept for all patients in the laboratory or with the patient register. The patient's unique identifying information can be recorded under the date for the next planned test, thus producing a list under each working day of patients from whom a sputum specimen should be collected (see section 10.5 and Annex 5 for collection procedures).

13.10 TREATMENT OUTCOMES

Recording and reporting the outcomes of treatment is extremely important. For individuals and health professionals later responsible, it is important that patients know whether they were cured or not. For programme managers, it is essential to know what proportion of patients are cured or successfully treated to properly monitor and evaluate the programme and to identify problems that are compromising its overall success, such as a high death or default rate. Treatment outcomes should be reported to the civilian TB services for reporting with national statistics. The evaluation and reporting of treatment outcomes is discussed in greater depth in Chapter 16.

TABLE 13.6 DOTS STANDARDIZED TREATMENT OUTCOMES:

Cure:

- A patient who was smear-positive at the start of treatment and is smear-negative in the last month of complete treatment and on at least one previous occasion.

Treatment completed:

- A patient who has completed treatment but who does not meet the criteria to be classified as cured or failed.

Failure:

- A patient who is smear-positive at 5 months or later, during treatment.

Died:¹²

- A patient who dies for any reason during the course of treatment.

Defaulter:¹³

- A patient whose treatment was interrupted for 2 consecutive months or more.

Transfer out:¹⁴

- A patient who is transferred to another reporting unit and for whom the treatment outcome is not known.

Note: In countries where culture is current practice, patients can be classified as cure or failure on the basis of culture results.

¹² This should include patients who die but have defaulted from treatment because they are too ill to take treatment or have fatal side-effects.

¹³ Sub-groups of patients who default should be recorded within this outcome category so that the cause of default can be assessed – voluntary default, medical default, prison transfer and release (i.e. where there is no possibility for treatment to be completed in a regulated manner).

¹⁴ Transfer out should only be used if the patient is transferred to a centre where treatment will be continued, but the outcome of treatment is unknown.



13.11 DOCUMENTATION

Case management documentation also uses WHO standardized forms. These include:

- *TB treatment cards* (TB01) for each patient that are kept at the TB treatment centre, but should follow the patients that are moved after the appropriate information has been recorded in the register. The card records patient identifying information, smear results, case definition, prescription and the doses taken. As this form will pass through many hands and is completed on an often, daily basis, using card instead of paper, may help these forms last longer.
- *TB patient identity cards* (TB02) that are completed and given to each prisoner when treatment starts. This records basic patient identifying information and facts about his treatment and monitoring. Using such cards is particularly advantageous in a prison context since if the patient is suddenly transferred or released before medical staff are aware, the patient will possess information that will be useful for subsequent health service contact.
- A *TB register* (TB03) that should be kept in each prison TB treatment centre (or district in a fully decentralized model of care where a prison treating TB cases is considered as a 'health post'). This summarizes all the information about each patient treated, including case definition, smear results and outcome. This is the most valuable tool for assessing the overall impact of case management on the patients entering the programme and is necessary for cohort analysis every 3 months (see Chapter 16).
- *TB transfer forms* (TB09) that are completed if a patient is transferred or released whilst on treatment. This is used to inform the next unit responsible of the patient details and treatment.

These WHO standardized forms are given in Annex 4. Small adaptations can be made to fit the needs of the prison environment or where high levels of MDR-TB exist, whilst remaining compatible with the originals. An additional example form for notifying TB treatment outcome of patients transferred to another unit is provided.

The importance of good documentation and reporting cannot be underestimated. It is often put at a lower priority than other programme activities such as treating patients, dealing with side-effects, arranging sputum collection, liaising with custodial staff, counting drugs and tracing defaulters. However, documentation is as important as any other aspect. Missing results, outcomes of treatment, case classifications or incorrectly completed 'treatment taken charts' means that assessing whether the programme is working or not, as well as defining and addressing problems, becomes impossible and improvements are difficult to make. Analysing the data collected and evaluating the programme is discussed in Chapter 16.



13.12 CASE MANAGEMENT IN SETTINGS OF MULTIDRUG-RESISTANT TUBERCULOSIS

Unfortunately, once polydrug and multidrug-resistant TB is established TB control becomes increasingly difficult to manage. There are a number of issues:

- Standard first-line treatment protocols are often inadequate for individuals who have multidrug-resistant forms of the disease [3, 4] and their application may amplify resistance in a minority of highly resistant cases. [MSF-Belgium, submitted for publication].
- Treatment strategies for MDR-TB using second-line drugs have been recommended [11], but applying these strategies at a programme level is extremely complex. There is only a small amount of data currently available to assess the efficacy, feasibility and cost-effectiveness of various treatment strategies that could be considered.
- The second-line treatment protocols that have been proposed are currently very expensive, of long duration and have side-effects that can be difficult to manage.
- Treatment history is less reliable for the identification of cases likely to be suffering from highly resistant disease where transmission is occurring. Confirmation requires drug susceptibility testing by a qualified laboratory and the associated increased resources and expertise.
- Negative sputum culture may be necessary to confirm cure.

Given the difficulties of treating patients with polydrug- and multidrug-resistant TB, preventing further development of the problem must be the highest priority. Programmes must examine in each context why high levels of resistance are present and address the causal factors urgently. Action must be taken to:

- implement all five components of the DOTS strategy
- ensure that the programme is accessible to all prisoners through active case-finding and partially decentralized diagnosis and treatment
- reduce delays to diagnosis and treatment
- eliminate all erratic or anarchic treatment
- control all TB drugs inside (and outside) prisons.

The start of programmes in these contexts can be initially disheartening as many patients referred may have had previous erratic treatment. New cases are likely to be in the minority. As a result, extremely high rates of drug resistance may be detected with consequently poor outcomes for first-line drug regimens. However, prison programmes operating in these contexts for several years are now demonstrating that with the application of the above strategy, the proportion of cases that are previously treated and the level of drug-resistant strains are becoming lower and thus cure rates with standard short course chemotherapy are consequently higher [MSF Belgium, submitted for publication].

However, DOTS alone is unlikely to be the complete solution to these problems as a significant minority of patients will remain ineffectively treated and continue to transmit drug-resistant strains. Pilot projects using second-line drugs will be established in the near future to test the effectiveness and feasibility of various treatment protocols and strategies.



These strategies are referred to as DOTS-Plus strategies and reference to the WHO publication '*Guidelines for Establishing DOTS-Plus Pilot Programmes*' [12] is essential for those considering specific treatment for MDR-TB.

The prerequisites for establishing DOTS-Plus pilot programmes are that:

- a functioning DOTS programme is in place and that the five components of the DOTS strategy are fulfilled
- there is a high level of commitment and co-ordination of the community, government and international agencies involved in the programme
- access to the laboratory services necessary for MDR-TB control (first- and second- line drug susceptibility testing) is available
- a locally appropriate treatment strategy is implemented to address the resistance profile of the strains present
- DOTS-Plus programmes should be considered pilot or operational research projects and, as such, should be subject to rigorous quality assurance, monitoring and evaluation through the implementation of strong data management systems
- projects should be reviewed and approved by the 'Green Light Committee' (selected members of the WHO Working Group on DOTS-Plus for MDR-TB).

Evaluation of these pilot projects will allow appropriate programme policies to be eventually drawn up.

Where high levels of resistant TB are present and a DOTS-Plus pilot programme unavailable, it is recommended to:

- Use the Category II re-treatment protocol for all smear-positive prison TB cases.
- Classify patients who have received more than one month of previous non-DOTS treatment as a subcategory within 'Other' so that the monitoring of these cases is facilitated.
- Consider culture and drug susceptibility testing at diagnosis and during treatment for surveillance purposes if possible.
- Confirm cure with culture at the end of treatment, but if this is not available repeat smears monthly after treatment completion for 3 – 6 months. Treatment outcome should be recorded as 'Treatment failure' if culture or repeat smears are positive.

13.12.1 Management of chronic cases

A number of issues arise in the care of chronic patients (see table 13.1 for definition). Firstly there is a risk that these patients may be neglected by staff because of a fear of MDR-TB, a feeling of impotence, or a wish to avoid difficult discussions. Secondly, health personnel may be put under enormous pressure by patients to provide alternative treatment where DOTS has failed. Thirdly, some patients may recover spontaneously, but determining when they are no longer infectious and a potential risk to others can be difficult.



Chronic cases should have staff dedicated to their care who are specifically trained in counselling and palliative treatment. These staff require particular support both for the emotional difficulties of the work and the risks of exposure to highly resistant TB. Personal and environmental controls should be prioritized to areas where these cases are held (see Chapter 15).

Necessary palliative treatment should be available. However the uncontrolled use of second-line drugs must be resisted. Patients should be formally reviewed at least once a month and undergo a sputum smear, if possible, every 3 - 6 months to assess clinical progress. Those with negative smears and demonstrating improvement should have sputum specimens cultured and be discharged if culture-negative on 3 separate, consecutive occasions, at least one month apart. They will require close follow-up in case of relapse.

13.13 CASE MANAGEMENT OF INDIVIDUALS WITH HIV INFECTION

Prisons typically have an increased prevalence of HIV infection compared to corresponding civilian communities. Therefore the management of patients with co-existing HIV and TB must be considered. The treatment of TB in cases with confirmed HIV infection prolongs life and reduces TB transmission. It makes no sense for individual patient care or population TB control to implement a programme that excludes TB cases with HIV infection. Anti-TB treatment for individuals infected with HIV is the same as for those not infected with the virus. Short-course chemotherapy has been shown to be as effective in HIV-positive as in HIV-negative individuals, although case fatality is higher due to TB itself and other complications of HIV disease.

The anti-TB drug, thioacetazone, should be avoided whenever possible in cases with confirmed or suspected HIV as it has been associated with serious sometimes, fatal skin reactions in HIV-positive individuals. As prisons may have high levels of unknown or unsuspected HIV infection, thioacetazone should be avoided generally in these settings. If there is no alternative, patients should be warned to report any itching or rashes and the drug withdrawn immediately. Injections should be avoided if at all possible, because of the potential risks of needle stick injuries and because adequate sterilization of needles and syringes is not always assured.

TB is often the first disease presentation in HIV-positive individuals. HIV testing should be considered for those whose HIV status is unknown. However, this must follow UNAIDS guidelines for testing [13] which include voluntary testing, pre and post test counselling and an assurance of confidentiality (see also section 12.4).



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14.1. KEY MESSAGES

- Education and training are integral parts of TB control programmes and educational and training needs for all aspects of the programme should be identified and addressed.
- The aim of education is to raise levels of knowledge and have a positive impact on attitudes and behaviour of individuals likely to be affected by TB, which in prisons will include prisoners, family, prison personnel and visitors.
- Training is specifically task-related to enable individuals to perform particular roles necessary for tuberculosis control and is primarily directed towards medical and custodial prison staff and key prisoners who may want to actively participate.

14.2. EDUCATION

14.2.1 *The importance of education*

Education improves TB control by:

- advising prisoners and personnel of the symptoms of TB and the benefits of seeking and obtaining early diagnosis and complete treatment so enhancing co-operation with case-finding and correct treatment
- informing healthy prisoners and personnel that the best protection from TB infection for themselves is to assist individuals with symptoms suggestive of TB in obtaining early diagnosis and treatment if necessary
- providing accurate information to inmates and personnel about the nature of TB and the means of controlling it, so reducing the negative impact of fear and misinformation often present in prisons
- encouraging inmates and personnel to adopt behaviours likely to reduce the risk of transmission of infection (cough etiquette), the development of disease and the development of drug-resistant strains (unsupervised, erratic, partial treatment)
- promoting more open discussion of TB and the associated health threats that aggravate its spread e.g. HIV, alcoholism, drug use, poor nutrition
- providing a forum for questions and the raising of issues for both prisoners, personnel and visitors
- ensuring personnel are fully aware of the methods and management procedures of the programme and the reasons behind their establishment
- advising patients confirmed to have TB of the procedures associated with their care (e.g. respiratory isolation, sputum collection, DOT, post-treatment management) so that the reasons for certain procedures are understood and co-operation is enhanced.



14.2.2 Who needs education?

Health education should be considered important for all groups who come into contact with prisons. These groups include:

- all prisoners from the lowest level inmate in the unofficial hierarchy to the highest prisoner boss, those with and without TB
- all the different personnel working in prisons (e.g. maintenance and housekeeping staff, administrators and custodial staff, health professionals)
- all those who visit prisons (e.g. family and friends of prisoners, human rights groups, legal personnel, religious personnel)
- policy makers (e.g. ministers responsible for prisoners, health and finance).

Where possible, civilian health education activities should include basic information relating to the prison context, aiming to raise awareness and to reduce the stigmatization of released prisoners.

Education campaigns need to be targeted to the audience so any campaign needs to be preceded by a 'needs assessment' to establish the predominant existing knowledge, attitudes, practices and behaviours and of each group.

14.2.3 Who should be the educators?

Anyone can be an educator, as long as they possess the correct information and are given training on the most effective ways to impart information, promote discussion and to listen.

Evidently, those in the best position to be effective educators are they the audience respects, trusts and relates to, and those who have the best understanding of the concerns of their audience. Often these are individuals who have been successfully treated for TB themselves.

Although health educators may often be health personnel, particularly when educating other staff, this is not always the case. Given the particular characteristics of prison life and the often, powerful nature of the unofficial hierarchy, peer educators, e.g. prisoners who have recovered from TB or those who have gained the respect of other prisoners may be the most effective educators [1].

Thus, particular educators should be selected according to how appropriate they are for each target group and for the information that needs to be imparted.

14.2.4 When should education be implemented?

Education should be considered a continuous and evolving issue. Every opportunity should be taken to promote healthy behaviour and risk reduction for communicable diseases generally, as well as early case detection and the dangers of erratic, partial



treatment for TB. Combining formal and informal education sessions is recommended and there are a variety of tools (such as meetings, posters, question and answer sessions, and videos) that could be used.

However, to be effective, educators need to determine the prevailing knowledge, attitudes and behaviour of the target group concerned. Quantitative and qualitative information can be obtained with representative groups of each target population by:

- questionnaires and interviews
- formal focus groups
- informal gatherings.

Although health education should be constant, there are key moments when efforts should be intensified by formal meetings, for example, to present a new intervention (such as active case-finding) or through individual or small group briefings at various stages of diagnosis and treatment.

In particular, attention must be paid to relevant and appropriate education, discussion and counselling of prisoners confirmed to have TB:

- At the time of diagnosis – the implications to the prisoner and those he/she comes into contact with.
- At the start of treatment – treatment procedures, the length of treatment and the need for complete treatment, the possibility of side-effects and their management, the risks of non-adherence.
- At the start of the continuation phase – outcome of sputum results, likely treatment outcome, the need to continue treatment even if feeling better.
- At treatment completion – outcome of sputum tests and subsequent management if successful or failed.
- If treatment is interrupted – tailored education to the reason for interruption – medical, voluntary or judicial default.
- If the patient is released or transferred while on treatment – means and importance of continuing treatment for successful outcome and for protecting family and community.

Standardized briefings, indicating the issues that need to be covered, are very helpful at these key moments, ensuring that important issues are not forgotten.

14.2.5 Educational tools

Effective education should attract attention and be informative, precise and accurate. Messages should be repeated and reinforced in a variety of ways to maintain their impact. Educational tools can be rotated, so that as the population changes, individuals come into contact with messages that are presented in a way that is fresh to them.

Some of the tools available are:

- presentations, discussion groups, individual briefings
- posters, newsletters



- notices, pamphlets, fact sheets
- stories, plays, case studies
- video, radio, television.

The tools chosen will depend on the acceptability and cultural appropriateness to the intended audiences, the resources available and the prison administration who may need some encouragement in accepting certain tools which may initially be seen as a security risk. Wherever possible, members of the target audience should participate in the design and production of materials. Written material should be provided in all the languages of the audience or alternatively illustrations and diagrams can be used if literacy of the audience is not certain.

14.3 PERSONNEL TRAINING AND SUPPORT

14.3.1 The need for training

Providing good, multidisciplinary training and support for personnel brings with it a number of benefits. These include:

- ensuring programme procedures are followed correctly and that staff are aware of why procedures are in place
- ensuring that staff are aware of other roles being performed by other members of staff and the particular difficulties and limitations of different roles, to foster understanding and good relations between different sectors
- raising morale and motivation by bringing staff together to discuss the control of TB and the sharing of problems and solutions
- ensuring that staff are aware of ways to reduce personal risk in work and are aware of security requirements and regulations.

14.3.2 Who should be trained in which tasks?

Training needs can be divided into two broad categories: training in programme management and support, and training for specific technical tasks such as case identification and treatment.

Tables 14.1 and 14.2 provide training needs for broad categories of staff in programme management (14.1) and programme implementation (14.2). Some staff will fall into both categories and both groups should be aware of the basic tasks expected and performed by the other. Training must be orientated towards the tasks the individual is expected to perform and therefore specific needs for specific individuals must be decided at programme level taking into account the overall programme plan and staff job descriptions.


TABLE 14.1 MANAGEMENT TRAINING NEEDS (adapted from TB *Handbook* [2])

Staff	Should have knowledge and skills on how to:
NTP and central prison medical service	<ul style="list-style-type: none"> ● Be an effective advocate for TB in prisons, gain and maintain political commitment. ● Plan, provide and support a prison TB control programme integrated in the national TB control programme (including standardized and equivalent technical policy, supplies, training, treatment and laboratory network, supervision, occupational health policy, reporting of cases with national TB statistics). ● Co-ordinate with all authorities with a responsibility for prisoners. ● Write and formalize management structure and technical policy and initiate review of legislation if necessary. ● Establish links with health programmes pertaining to prisoners (e.g. AIDS, harm reduction programmes), NGO's and other international institutions. ● Co-ordinate with specialists in penal reform.
Regional TB co-ordinator and TB co-ordinator for prisons	<ul style="list-style-type: none"> ● Be an effective advocate for TB in prisons, gain and maintain political commitment at regional level. ● Establish regional links between prisons and civilian TB laboratory and treatment services. ● Establish notification and follow-up policy for regional transfers of TB cases in and out of prison. ● Manage staff, prepare job descriptions and perform staff evaluations, ensure access to the prison for appropriate civilian health staff. ● Integrate technical training of prison personnel with civilian counterparts. ● Supervise and evaluate prison programmes. ● Use the reporting system and to report prison data to NTP.
Prison administrations	<ul style="list-style-type: none"> ● Share responsibility for and support prison TB control programmes. ● Provide access to the prison for appropriate civilian health staff. ● Examine current procedures and regulations to determine the impact they have on TB control and if they can be modified.



TABLE 14.2 STAFF TECHNICAL NEEDS (adapted from Tuberculosis Handbook [2])

Staff	Should have knowledge and skills on how to:
Health personnel in all prisons	<ul style="list-style-type: none">● Identify TB suspects at screening on entry and through case detection among symptomatics. Manage necessary documentation.● Collect sputum, handle and transport specimens or prepare slides for transport.● Refer and arrange transport of confirmed cases to a prison designated for TB treatment, if not available on site.● Prepare necessary documentation for transport of specimens and cases.● Provide health education to prisoners, staff and visitors.● Protect themselves from occupational hazards.● Dispose of medical waste safely.● Follow prison security regulations and codes of conduct.
Health personnel in prisons designated for TB treatment	<ul style="list-style-type: none">● Identify TB suspects at screening at entry and through case detection among symptomatics. Manage necessary documentation.● Collect sputum, handle and transport specimens or prepare slides for transport.● Accept cases referred from other prisons.● Correctly classify cases.● Prescribe treatment according to standardized protocols.● Provide directly observed treatment (DOT).● Manage side-effects● Manage defaulters and transfers in and out of prison (including releases).● How to complete all documentation (registers, treatment cards, laboratory requests, transfer forms).● Report data (quarterly reports on case-finding and treatment outcomes).● Provide health education to prisoners, staff and visitors.● Provide rudimentary training in case-finding and treatment for laboratory staff.● Protect themselves from occupational hazards.● Dispose of medical waste safely.● Follow prison security regulations and codes of conduct.
Health personnel in prison laboratories	<ul style="list-style-type: none">● Collect, store and transport sputum specimens.● Prepare and examine specimens according to request and level of laboratory.● Refer and transport specimens to other network laboratories.● Register and report results to health personnel and provide quarterly reports of activities.● Perform quality control procedures.● Maintain and repair equipment.● Disinfection and sterilization of contaminated material.● Follow laboratory safety policy and protect themselves from occupational hazards.● Provide rudimentary laboratory training for health personnel.● Follow prison security regulations and codes of conduct.



Staff	Should have knowledge and skills on how to:
Medical stock managers (drug, laboratory material and stationery)	<ul style="list-style-type: none"> ● Order drugs and supplies; arrange delivery. ● Correctly store and distribute drugs and supplies. ● Apply the first-in, first-out principle to avoid expiry of supplies. ● Maintain a 3-month buffer stock of drugs and supplies to avoid stock ruptures. ● Record each stock deposit and withdrawal and maintain inventory. ● Manage expired materials. ● Follow prison security regulations and protect supplies from theft.
Custodial staff	<ul style="list-style-type: none"> ● Identify symptoms suggestive of TB in prisoners, staff or visitors. ● Keep a cough register (if appropriate) – see Chapter 12. ● Obtain and enable access to medical services for sick individuals. ● Follow and promote international human rights law and codes of conduct. ● Protect themselves from occupational hazards. ● Provide health education for other custodial staff.
Key prisoners	<ul style="list-style-type: none"> ● Identify symptoms suggestive of TB in fellow prisoners or visitors. ● Keep a cough register (if appropriate). ● Obtain and enable access to medical services for sick individuals. ● Provide health education for fellow prisoners and their visitors.
Housekeeping, maintenance and waste disposal staff	<ul style="list-style-type: none"> ● Identify symptoms suggestive of TB themselves and know how to obtain medical attention. ● Protect themselves from occupational hazards. ● Follow prison security regulations and codes of conduct.

14.3.3 **How should training be performed?**

Training must be implemented before a new programme starts and is crucial to its success. A training programme must be carefully planned taking into account the programme priorities, the number of staff to be trained, the most appropriate way to organize training and the time available. Training, however, should be considered a continuous process and not just one event before the implementation of a programme.

By far the most useful way to implement training for prison health personnel is to integrate with the training programme for civilian personnel. This not only allows a two-way information flow between sectors but will also allow strengthening of ties between the two professional groups. A designated member of the prison health service should perform training of non-medical staff and prisoners.

To enhance learning, training should be carried out in a way that encourages participation and uses real examples. Regular problem-solving orientated sessions are particularly



useful. Effective training is a skill in itself for which training is required and should be arranged for those identified as trainers.

Training materials available include:

- WHO Course on Managing TB at National level [3]
- WHO Course on Managing TB at District level [4]
- WHO TB guides and manuals [2, 5-11]
- Materials used in IUATLD international courses, guides and manuals [12-15].

Staff training and support can use a variety of methods. These might include:

- Initiation and refresher courses
- Seminars and workshops on particular topics
- Participation in national and international TB conferences
- Exchange visits between different treatment centres or between the treatment areas and the periphery
- Visits to national or international centres of excellence in TB control
- Access to recent medical literature – for example libraries or subscriptions to appropriate journals.



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**15.1. KEY MESSAGES**

- Prisons are associated with high levels of transmission of TB and prisoners, staff and visitors are at increased risk of the disease.
- Prison staff should be protected by effective TB control among prisoners.
- Early diagnosis of infectious tuberculosis cases and the prompt initiation of effective treatment are the most important infection control measures for prisoners, staff and visitors.
- Administrative measures are the highest priority followed by environmental and personal respiratory measures.
- Other hazards associated with prison include other communicable diseases (particularly HIV disease), substance abuse, violence and mental illness and should be addressed wherever possible to complement TB control efforts.

Prisons and health care facilities carry an increased risk of TB transmission and exposure to inmates, staff and visitors [1-5]. However, the precise risk to staff working in health care facilities has been difficult to measure because of difficulties with surveillance. Cases of TB infection and active disease have been reported in prison staff, but the risk has rarely been quantified [6, 7].

Protection of all staff is important. Health care staff are vital to the control of TB and are an extremely valuable resource. Their expertise cannot be easily replaced if they become sick or die. Shortages of health care staff already cause marked problems in implementing TB control in some parts of the world [5]. Prison staff are vital to the management of prisons. Staff protection from occupational hazards is a basic obligation of all employers.

Various recommendations for preventing the transmission of TB in health care facilities and prisons have been produced from industrialized countries [8, 9], although the efficacy and cost effectiveness of some interventions remain controversial [10, 11, 12]. WHO has also published guidelines for the prevention of TB in health care facilities in resource limited settings [13] which are designed to reduce patient-health care worker and patient-patient transmission of TB.

Common to all recommendations for the prevention of TB in institutions are three levels of infection control: administrative, environmental and personal respiratory protection. These recommendations can equally apply to prison settings and are summarized and adapted for prisons below.



15.2 BASIC PRINCIPLES

- The risk of transmission of infection depends on the concentration of infectious droplets in the air and the duration of exposure. The greatest risk is therefore when a case remains undiagnosed or ineffectively treated.
- The most effective way to reduce transmission of TB is the early diagnosis and effective treatment of infectious TB cases.
- Many of the factors which promote TB transmission can be remedied by simple and inexpensive administrative measures to obtain early identification of cases and prompt initiation of effective treatment of infectious cases.
- Poorly applied infection control measures or badly functioning equipment (particularly environmental and respiratory protection measures) can do more harm than good because of the false sense of security they encourage.
- Infection control measures should be adapted to the local setting, the level of risk of TB transmission and the resources available.

15.3 ADMINISTRATIVE MEASURES

- Assessment of risk in different prisons and prison TB treatment centres based on the number of infectious TB cases in a year and staff cases per 100 person-years. Assessment of risk in specific high-risk areas such as laboratories, sputum collection sites, radiography and autopsy rooms or areas where prisoners with MDR-TB are held.
- Development of an infection control plan prioritising the highest risk areas. Organization of a separate area in each prison for infectious TB cases.
- Early diagnosis of potentially infectious TB patients – screening at entry, effective case-finding through self-referral, use of cough registers, training and education programme for staff and visitors, effective procedures and timely communication between laboratory and health personnel.
- Collection of sputum outdoors and away from other people. If climate makes this impossible, sputum collection should only be collected in well-ventilated areas where the risk of infecting others is low.
- Prompt initiation of effective and directly observed treatment, systems to ensure completion of treatment if transferred during treatment, and an effective education programme.
- The separation of infectious cases from other patients and prisoners until they are considered non-infectious. Where MDR-TB is not common, this should be after a minimum of two weeks directly observed treatment and clinical improvement. Where MDR-TB is common, at least one negative smear is also required.
- Evaluation of implementation of infection control measures (e.g. proportion of new entrants screened for TB, time between suspicion of TB and request for sputum analysis, time from collection of sputum to receipt of results, time from receipt of positive result to initiation of treatment).
- Training of staff to implement the infection control plan, reduce personal risk, identify symptoms of TB and where to report for investigations of TB. Assurances of confidentiality and fair employment conditions if diagnosed with TB. Leave from work with full pay whilst infectious. Counselling regarding the risk of TB to personnel infected with HIV and opportunities to work in low risk areas.



15.4 ENVIRONMENTAL MEASURES

- Must be coupled with administrative measures above to be effective.
- Most simply, involves maximising natural ventilation and controlling the direction of airflow by opening windows or external doors at opposite ends of a room and using fans.
- Other more complex and costly methods include:
 - Mechanical ventilation (air extraction fans, exhaust ventilation systems)
 - Air filtration or ultraviolet germicidal radiation.
- Other methods must be maintained in a good state of repair and installed with expert guidance and if used, should be prioritized to the highest risk areas (e.g. sputum collection rooms, laboratories, autopsy suites).

15.5 PERSONAL RESPIRATORY PROTECTION

- Respiratory protection should only be seen as a **complement** to administrative and environmental measures and **is not adequate when used alone**.
- Surgical masks are not designed to protect the wearer. However, infectious TB patients may wear surgical masks to protect others during transport or meeting visitors for example. However, care should be taken not to stigmatize TB patients, and health education and information should accompany the distribution of masks.
- Respirators are a special type of mask that filter air inhaled and fit closely to the face to prevent leakage. The specifications for protection against TB are that they must have a 95% filter efficiency for particles of 0.3 micron in diameter. They should be fitted correctly.
- As the widespread use of respirators is impractical and costly, their use should be limited to high risk areas (MDR-TB areas, sputum collection, autopsy suites).
- Some respirators can be re-used if handled, cleaned and stored correctly (away from humidity, dirt and not crushed).

15.6 OTHER MEASURES

15.6.1 Tuberculin skin test (TST) and preventive treatment

In guidelines from low TB prevalence settings the use of tuberculin skin testing and preventive treatment is recommended for certain groups, including staff and prisoners [8, 9, 33]. However, in high prevalence settings **TST screening and preventive therapy are categorically not recommended where the effective control of active TB is not in place** because:

- the most cost-effective way of controlling the epidemic is to detect and correctly treat infectious cases that are transmitting the disease to others
- a TST and preventive treatment programme will divert resources and attention from this priority



- detecting and treating cases with latent infection will not control the epidemic as these are not the individuals transmitting the infection and the great majority will not develop active disease
- it is not feasible to try to detect, give and monitor preventive treatment to the prisoners with a positive skin test which may make up a significant proportion of the population (over 50% of new admissions to prison in one study [14])
- using preventive treatment in cases where active disease cannot be reliably excluded may promote the development of drug resistance
- unsupervised preventive therapy may be diverted from its original purpose and so contribute to the development of drug resistance.

WHO guidelines state that in high TB prevalence settings, preventive therapy may be used in skin-test positive/HIV-positive individuals to reduce the risk of their developing active disease. If TST testing is not feasible, individuals from certain groups, including health care workers and prisoners, may be considered for preventive therapy if they are HIV-positive [15].

However, questions remain over the feasibility of such a strategy in low-resource settings. These include problems identifying HIV-positive individuals, excluding active disease (particularly in a context where the high rate of smear negativity means radiography is also required), following up TST tests, ensuring adherence to treatment and monitoring side-effects [16]. These problems are likely to be magnified in a prison context where individuals with HIV infection may well be stigmatized. In addition, the high mobility of the population will make follow-up difficult and preventive therapy may be diverted from its intended use and must therefore be directly observed. Therefore, a preventive therapy programme for skin test positive/HIV-positive prisoners should only be started after due assessment of the possible risks and benefits, including assessment of programme capacity to administer and monitor such a programme.

Preventive treatment must be considered for infants born to mothers with active TB (isoniazid 5-10mg/kg per day for 6 months). These infants should subsequently be vaccinated with BCG. TB treatment of the mother does not preclude breast-feeding and where possible breast-feeding should continue. Where mothers are HIV-positive internationally recommended guidelines on infant feeding should be followed [17-19] Children in prison should be given preventive treatment if skin test positive and never previously vaccinated. Children should not be separated from their mothers solely because of a diagnosis of TB in the mother or the child.

15.6.2 Bacille Calmette-Guerin (BCG) vaccination

BCG vaccination acts by preventing the spread of TB bacilli in the body after initial infection rather than reducing the risk of infection. It has only been consistently demonstrated to reduce the risk of progression from infection to disseminated disease in children, while its protective role in adults is unclear.

Some studies have shown that BCG may reduce the risk of TB among health care personnel and close household contacts [20, 21]. However, BCG vaccination has not been



shown consistently to provide protection in different settings. The Centers for Disease Control and Prevention (CDC) in the United States only recommends its use in settings where there is a high risk of exposure to MDR-TB after full counselling of the staff member on the possible advantages and disadvantages [22].

BCG should, however, be given to all children born in prison, as soon as possible, according to the Expanded Programme of Immunization (EPI) schedule. Children under 5 who enter prison to live with their parents should be vaccinated with BCG, if there are no contraindications and they did not receive the vaccination as an infant.

15.7 OTHER HAZARDS

15.7.1 Other communicable diseases

Health care and correctional facilities also present other communicable disease risks to staff and inmates. These include transmission of blood-borne or sexually transmitted infection (e.g. HIV, hepatitis, syphilis, gonorrhoea), food or water borne diseases and vector borne diseases such as epidemic typhus. Many can be avoided by scrupulous attention to hygiene and safe working practice. This includes frequent hand washing, a safe water supply and sewage disposal, kitchen hygiene and control of infestations.

As HIV infection fuels TB epidemics and is of increased prevalence in prison societies, strategies to control the spread of HIV recommended by UNAIDS [23] are extremely important. Such strategies include:

- Education programmes for all staff and inmates on HIV and other blood borne disease – routes of transmission, risk behaviours, risk reduction.
- The use of universal precautions (treating blood or bodily fluids from all individuals as if they contain infectious pathogens)
 - the use of gloves for injections
 - the use of sterile disposable needles for injections (or if needles must be re-used ensuring that they are designed to be re-used and are completely sterilized through autoclaving before each use)
 - care in the use of needles and sharp equipment to avoid injury
 - the use of special puncture proof containers for the safe disposal of used needles and incineration so that they are not diverted for illicit drug use.
- Providing medically supervised narcotic detoxification programmes (e.g. narcotic substitution) for addicts [24].
- Harm reduction programmes enabling prisoners to obtain clean injecting equipment through exchange programmes or by providing materials and training on how to sterilize equipment [25].
- Making condoms freely and confidentially available [26, 27].

For guidelines regarding screening and testing for HIV see section 12.4.



15.7.2 Substance abuse

A disproportionate number of prisoners are substance abusers (alcohol or illicit drugs) because it is an offence in itself or because they have committed an offence under the influence or in order to buy more to serve their addiction. However, many use narcotics, for example, for the first time in prison [28] and turn to substance abuse inside prison because of anger, frustration and boredom [29]. Prison staff are also at risk of abusing alcohol or illicit drugs.

Substance abuse in prisons should be acknowledged. Harm reduction programmes through the provision of clean injecting equipment as above acknowledge the presence of illicit drug use in prison. Addiction should be treated if possible. The response to substance addiction should be based on the voluntary participation of the prisoner concerned, adapted to his needs and continued on release. Drug-free units, detoxification programmes and narcotic substitution programmes should be considered. The anti-TB drug rifampicin induces liver enzymes so methadone doses may need to be adjusted accordingly to avoid symptoms of opiate withdrawal [30].

15.7.3 Violence

Prison society is often a very violent community – a factor that is aggravated by overcrowding, a lack of basic needs and respect for prisoners' rights, isolation from family and friends. Violence may express itself in many forms such as sudden outbursts, persistent bullying and sexual assault of weaker individuals, mass protests or riots or hostage taking. Similarly staff can be pushed to violence by feelings of frustration, fear or hopelessness. Clearly this atmosphere can put all who enter prison at risk.

The risk of violence presents yet another reason for improving living and working conditions inside prisons. In recruiting prison staff, attention should be paid to an individual's ability to cope with the likely difficulties of the job and their response to stress. All levels of prison staff need specific training on how to respect prisoners' rights in various situations that they will encounter and on non-violent measures of defusing a problem. The development of a professional rapport between staff and prisoners may also help to ease the tendency to violence. All staff should be aware of security procedures and how to obtain help if necessary.

15.7.4 Psychological and psychiatric illness

Psychological and psychiatric problems are extremely common in prisoners because the mentally ill are more likely to be arrested, because of the nature of detention itself and the conditions in which prisoners find themselves held. Depression, anxiety and psychoses are all much more common in prison populations than in the general society. This can manifest itself in many ways from lack of co-operation or delusions to violence and suicide.

Prison staff may also suffer from stress-related illness. The stress of day to day exposure to a resentful and manipulative population incarcerated in often appalling conditions is



often not considered. These problems are aggravated by poor pay, the stigma that can attach to prison workers and the professional isolation from their peers.

These issues can be alleviated by providing psychological support and psychiatric services to inmates and staff. Raising awareness of the service prison workers provide to society can help, as well as adequate recompense, the provision of training and strengthening communication with their peers. Mental health issues are examined in greater detail in the Mental Health Consensus Statement of the Health in Prisons Project [31]. A booklet for prison officers on preventing suicide is available from the WHO [32].

Note that concurrent treatment for TB and mental illness may require dose adjustments to counter drug interactions.

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16.1. KEY MESSAGES

- Programme evaluation through data analysis is an integral component of tuberculosis control. It enables the success of the programme to be monitored and draws attention to problems that must be addressed.
- Evaluation will only serve this purpose if it is done appropriately, regularly and objectively and if the results of the evaluation are acted upon.
- Tools and methods for data analysis and programme evaluation should be planned before the programme is implemented. Tools include standardized quarterly reports on case-finding and treatment outcomes (cohort analysis), using programme documentation such as laboratory, screening and treatment registers.
- Responsibility for data analysis and programme evaluation should be clearly assigned, e.g. to the regional prison tuberculosis co-ordinator, who should receive the necessary training and support.
- Results of evaluations should be reported to central prison medical authorities and the civilian tuberculosis services and data collected from prisons should be reported with national tuberculosis statistics. Results should also be available to implementing staff and appropriate officials for proper feedback.
- Detailed evaluation of all programme activities should be performed on a yearly basis, compared with previous findings and used as a framework for discussions among authorities for measuring success and addressing problems.

16.2 THE IMPORTANCE OF COLLECTING, ANALYSING AND REPORTING DATA

Collecting, analysing and reporting programme data is essential to:

- obtain basic information about the population of TB patients being served by the programme and the epidemiology of their disease
- determine if programme targets are being met and are appropriate
- establish what factors hinder the realization of programme targets and to use this information to decide on potential solutions
- quantify the impact of programme policies and implementation strategies and to strengthen political commitment to address problems that cannot be solved by the programme alone
- establish and maintain programme accountability.



16.3 EVALUATION OF CASE-FINDING

16.3.1 Recording - Screening and laboratory registers

For case-finding to be evaluated, activities must be documented. The use of screening and laboratory registers (see Annex 3 and 4) is essential. Registers should be correctly and completely filled out for every patient screened and every patient who submits sputum specimens for smear examination. The data collected in these registers is later analysed as detailed below on a quarterly¹⁵ basis.

16.3.2 Reporting - form TB07

Case-finding reports should be provided at the end of every quarter to the regional prison TB co-ordinator from every prison in the region, using the screening register and form TB07 (adapted for prison - see Annex 4). This adapted form indicates the total numbers of smear-positive cases either commenced on or transferred for treatment during the quarter, as well as the numbers detected. Discrepancies between the number of smear-positive cases detected and the number commenced on or transferred for treatment must be accounted for.

The regional prison TB co-ordinator should verify the reports by consulting the screening register in each prison and the register of the laboratory serving the prison. Smear-positive cases detected but not treated should be traced and treated if possible. If they have been transferred or released, the receiving unit should be notified of the case.

The regional prison TB co-ordinator should compile a summary TB07 form for prisons from his region and send a copy to the central prison medical services and the civilian TB services for incorporation in national statistics. For cases of arrest, transfer or release to the community, only the unit that initially made the diagnosis of the case should report it to avoid double notification.

16.3.3 Analysis

Case-finding activities in each prison and for the region per quarter should be analysed as in table 16.1

¹⁵ Usually the annual TB cases are divided into 4 standardized cohorts: Quarter 1 - January 1st - 31st March; Quarter 2 - 1st April - 30th June; Quarter 3 - 1st July - 30th Sept; Quarter 4 - 1st October - 31st December

**TABLE 16.1 CASE-FINDING ANALYSIS**

Activity	Calculation	Target
Estimated case detection %	Number of smear-positive cases detected among estimated total number of smear-positive cases.	>70%
Smear-positive case detection %	Number of smear-positive cases detected among total number of TB cases detected.	> 80 ¹⁶ %
Smear-positive treatment %	Number of smear-positive cases commenced on (or transferred for) treatment among the total number of smear-positive cases detected.	100%

16.4 EVALUATION OF CASE MANAGEMENT – COHORT ANALYSIS

16.4.1 Recording - The TB register

Every patient confirmed to have TB should be registered in the TB register (TB03, see Annex 4). A TB register should be present in every prison where TB treatment is carried out in a centralized or partially decentralized system. Alternatively in a fully integrated, decentralized system a TB register can be maintained at district level and the district prison managed as a 'health post'.

The TB register summarizes the progress of each patient and the eventual outcome of his treatment. The register is used to analyse treatment outcomes for groups of patients divided into cohorts. A cohort is the total number of patients registered in a given period of time, usually a quarter of the year (using the same system of dividing the year as for case-finding).

16.4.2 Reporting - form TB08

Treatment outcomes are reported on form TB08 (Annex 4) once this information is available on every patient in the cohort. As a cohort is registered during three months and treatment lasts up to nine months, the reporting is performed at least 12 months after the first patient of the cohort was registered.

¹⁶Target may be adjusted in different settings depending on the local epidemiology and the progress of the programme (see Chapter 13)



Each prison with TB treatment facilities should complete the form and send it to the regional prison TB co-ordinator who should verify the information by reviewing the TB register. The reports should be forwarded to the civilian TB services and the central prison medical services.

16.4.3 Analysis

Data from each prison should be collected as shown in table 16.2. Analysis should focus on smear-positive cases and be separated by case classification – at least into new cases and retreatment cases, but retreatment cases can be further subdivided by the programme if feasible. In settings with high levels of drug resistance, treatment outcomes can also be analysed by resistance profile at the start of treatment if this type of information is available.

TABLE 16.2 TREATMENT OUTCOME ANALYSIS

Activity	Calculation	Target
Smear-positive treatment success rate	Total number of cases who started treatment smear-positive and were either cured or completed treatment among the total number of cases who started treatment smear-positive.	>85%

A successful treatment rate of over 85% implies that the combined number of deaths, treatment failures, defaulters and transfer outs among the total number of smear-positive cases starting treatment should be less than 15%. If the successful treatment target has not been reached, the reasons for deaths, failures, defaulters and transfers out should be investigated further so that an explanation can be found and the problem addressed if possible (see table 16.3).


TABLE 16.3 INVESTIGATING LOW TREATMENT SUCCESS RATES

If there is a large proportion of:	Consider:
Treatment Failures	<ul style="list-style-type: none"> ● Poor adherence to treatment – assess quality of direct observation, patient education, hidden factors leading patients not to be adherent to treatment. ● Poor quality anti-TB medication – assess procurement, quality assurance certificates, storage, expiry dates, presence of stock ruptures during treatment. If possible send samples for chemical testing. ● Laboratory error – check quality control procedures for preparing and reading slides, recording results. ● Falsification of sputum specimens – check direct observation of sputum collection, that specimens are always kept secure before, during and after transit. ● Errors in registration – verify TB register records with treatment cards and laboratory register. ● Drug resistance – examine DST profiles from the start of treatment if available or send specimens from these individuals for culture and DST now if possible. Examine how many patients failing the intensive phase have drug resistance.
Deaths	<ul style="list-style-type: none"> ● Late case detection or delays in commencing treatment – check date of diagnosis and date of start of treatment. Check duration of symptoms before diagnosis. ● Co-existent HIV disease – determine or estimate HIV rate in TB patients or population, look for clinical signs of HIV disease. ● Hidden or overt unrelated pathology – epidemic typhus, hepatitis, malnutrition, violence.
Defaulters	<ul style="list-style-type: none"> ● Medical default <ul style="list-style-type: none"> - Verify whether 'side-effects' are drug related and that symptoms and side-effects are managed correctly, assess patient and staff understanding of TB and its management. - Consider rates of malnutrition and alcoholism that may contribute to hepatitis, peripheral neuropathy or skin rash. ● Voluntary default <ul style="list-style-type: none"> - Assess patient education and determine disincentives for treatment. ● Judicial default¹⁷ <ul style="list-style-type: none"> - Assess reasons and determine if there are feasible alternatives. Verify that procedures were correctly followed and, if not, why not. - Verify that the patient has been accurately registered and that no follow-up was arranged.
Transfers out	<ul style="list-style-type: none"> ● Trace patients and contact staff now responsible for the patients' care to obtain outcome data. Verify that the patient remains under treatment if possible. If it is confirmed that the patient is no longer under treatment the patient's outcome should be changed to treatment interrupted in the register. Determine, if possible, why treatment was not continued.

¹⁷ No planned follow-up after prison transfer or release



16.5 INTERIM COHORT ANALYSIS

As it takes over one year to obtain all the treatment outcomes, interim analyses can be performed using the same method. Interim analyses can be performed at any stage of treatment but should indicate the stage they refer to. They can be an early indicator of treatment success or programme problems such as high death or default rates.

These analyses are most often performed after completion of the intensive phase, where the outcome 'cure' is replaced by 'smear conversion'. New cases and re-treatment cases are again analysed separately. The method for calculating these rates is given in table 16.4. Further analyses can be done after an intensive phase prolongation month for each category if so wished, combining the numbers converting after the intensive phase and the prolongation month for the numerator (smear conversion after prolongation (m3/4)).

TABLE 16.4 INTERIM COHORT ANALYSIS

Activity	Calculation	Target
Category I smear conversion rate (m2)	Total number of cases who started Category I treatment smear-positive and are smear-negative at the end of two months of treatment among the total number of smear-positive cases starting Category I treatment.	80-85%
Category II smear conversion rate (m3)	Total number of cases who started Category II treatment smear-positive and are smear-negative at the end of three months of treatment among the total number of smear-positive cases starting Category II treatment.	

16.6 OTHER INDICATORS

There are many operational indicators to measure how well or poorly other TB control activities are managed. Several types of indicators are detailed in the 'Tuberculosis Handbook' [1] with examples and data sources. These include indicators on:

- Training coverage rates
- Availability of drugs and other materials
- Drug utilization
- Supervision
- Patient's knowledge of TB
- Access to DOTS



Other indicators can be created to measure specific aspects of TB programmes in prisons, for example:

- screening rates (number of prisoners screened among the number eligible for screening) over a specified time period
- malnutrition or other co-existing disease
- staff coverage rates
- prison living conditions that impact negatively on TB control
- occupational health procedures
- appropriate dosing of TB drugs based on weight (kg).

If additional indicators are to be created, it is important that both numerator and denominator are defined for each, so that it is clear to all what is being measured. However, as data collection, analysis and reporting is time-consuming and the priority must be on treatment outcome and case detection indicators, additional measures should only be used if a particular problem has a significant impact on the programme.

16.7 DETAILED PROGRAMME EVALUATIONS

In addition to quarterly analyses and reports on case-finding and treatment outcomes, a full evaluation performed by national managers should be performed on a yearly basis. This should include assessment of activities as above, as well as standard case-finding and treatment outcomes. The assessment should examine the progress in TB control since the situation analysis (Chapter 8) or last evaluation. An example checklist for this purpose (not exhaustive and should be adapted to each setting) is given in Annex 8.

An activity report should be distributed to the prison administrations, the civilian TB services, the ministries responsible for health and prisoners and any other appropriate authorities or agencies. It should highlight improvements made over the last year, identify significant problems and make recommendations. It should be written in a way that is understandable to both medical and non-medical readers and be as concise as possible, focusing on a few important issues, rather than many and less significant aspects.

The report can be used as a framework for discussion at programme evaluation meetings of all the parties involved in the programme. Regular meetings can facilitate more open communication enabling one group to understand the limitations faced by another and to find ways of working together to reach the same goal, which is control of TB.

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Instruments of International Law

(for full texts see United Nations High Commissioner for Human Rights website: <http://www.unhchr.ch/html/intlinst.htm>)

- **Universal Declaration of Human Rights**
(adopted by UN General Assembly 1948)
- **Standard Minimum Rules for the Treatment of Prisoners**
(adopted by the First United Nations Congress on the Prevention of Crime and the Treatment of Offenders, 1955)
- **Declaration on the Protection of All Persons from being subjected to Torture and Other Cruel, Inhuman or degrading Treatment or Punishment**
(adopted by the UN General Assembly 1975)
- **International Covenant on Civil and Political Rights**
(entered into force 1976)
- **International Covenant on Economic, Social and Cultural Rights**
(entered into force 1976)
- **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**
(adopted by the UN General Assembly 1982)
- **United Nations Standard Minimum Rules for the Administration of Juvenile Justice “The Beijing Rules”**
(adopted by the UN general assembly 1985)
- **The Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment**
(entered into force 1987)
- **The Body of Principles for the Protection of All Persons under Any Form of Detention or Imprisonment**
(adopted by the UN general assembly 1988)
- **The Basic Principles for the Treatment of Prisoners**
(adopted by the UN general assembly 1990)
- **United Nations Rules for the Protection of Juveniles Deprived of their Liberty**
(adopted by the UN general assembly 1990)



a) Population proportionate two-stage cluster sampling

The population size of each prison is added consecutively and presented in a list in any order, e.g.

	Population	Cumulated population
Centre A	1295	1295
Centre B	456	1751
Centre C	792	2543
etc.	etc.	etc.
Total incarcerated population		10,000

30 clusters are the minimum recommended. Thus, when sampling a hypothetical population of 10 000, a cluster should be created every $10,000/30 = 333$ prisoners (the sampling interval).

A random number is selected between 0 and 333, e.g. 288 = start-point.

The first cluster is created in the centre that holds the 288th prisoner, i.e. centre A.

The next cluster is created by adding 333 to 288 = 621st prisoner, i.e. also centre A.

The next clusters are created by successively adding the sampling interval to the previous cluster (621 + 333 = 954 [A]; 954 + 333 = 1287[A]; 1287 + 333 = 1620[B]); thus clusters are created in this example as follows:

	Population	Cumulated population	Cluster number
Centre A	1295	1295	1, 2, 3, 4,
Centre B	456	1751	5
Centre C	792	2543	6, 7
etc.	etc.	etc.	etc.
Total		10 000	30

If a sample size of 500 (see below) is selected with 30 clusters (the minimum number recommended), the number of patients in each cluster is calculated as $500/30 = 17$. Thus 4 clusters of 17 prisoners should be surveyed in centre A for example. The 17 prisoners of each cluster should be randomly selected.

For a given sample size, increasing the number of clusters will improve the representativeness whilst increasing each cluster size will increase the precision.

b) - Sample sizes for estimating a population proportion (or prevalence) with relative precision

Anticipated population proportion

Relative precision	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
0.05	152127	75295	49685	36879	29196	24074	204157	671	15537	13830
0.10	38032	18824	12421	9220	7299	6019	5104	4418	3884	3457
0.15	16903	8366	5521	4098	3244	2675	2268	1963	1726	1537
0.20	9508	4706	3105	2305	1825	1505	1276	1104	971	864
0.25	6085	3012	1987	1475	1168	963	817	707	621	553
0.30	4226	2092	1380	1024	811	669	567	491	432	384
0.35	3105	1537	1014	753	596	491	417	361	317	282
0.40	2377	1176	776	576	456	376	319	276	243	216
0.45	1878	930	613	455	360	297	252	218	192	171
0.50	1521	753	497	369	292	241	204	177	155	138



a) Questionnaire example

DATE: .../.../...	PLACE: _____	IDENTIFICATION No:
DATE OF BIRTH: .../.../...		
DATE OF ARRIVAL IN THIS PRISON: .../.../...		DATE OF IMPRISONMENT: .../.../...
	No	Yes
Cough > 2 weeks	0	2
Sputum production	0	2
Loss of weight (in last 3 months)	0	1
Loss of appetite (recently)	0	1
Chest pain	0	1
Total score: (max. 7)		
Previous anti-tuberculosis treatment: (in the previous 5 years)	YES	NO
	When: (year)
	Length: (months)
	Which drug(s)?	H R E S Z other
Weight: kg	Height: ...m	BMI: ... kg/m ²
Fluorography : Pos	Neg	When:
SUSPECT		
NON SUSPECT		
DATE sputum 1: .../.../...	POS	NEG
DATE sputum 2: .../.../...	REF	TRF
DATE sputum 3: .../.../...	NPC	REL
DATE sputum 4: .../.../...	DEA	ILL*

* POS: positive smear result / NEG: negative smear result / REF: refused to provide a sputum specimen / TRF: transferred to another facility in the period between interview and sputum collection / NPC: non productive cough / REL: released in the period between interview and sputum collection / DEA: death between interview and sputum collection / ILL: too ill to provide a sputum specimen

Identification of prisoners for sputum collection (TB suspects):

Variable	Sputum collection
Score 5 or more on symptom screen	√
Previous TB treatment in last 5 years	√
BMI < 20	√
Positive fluorography	√



b) Screening register example

Screening register

Name	Home address	Date of incarceration (this episode)	Sex	Screening strategy* (ESRA)	TB suspect? (Y/N)	Sputum 1 result Date sample taken	Sputum 2 result Date sample taken	Sputum 3 result Date sample taken	Additional sputum result Date sample taken
			Age	Screening date					

* Screening at entry (E), Case-finding through self referral (SR), Active case finding (A)

** TB in a patient with TWO or more initial sputum smear examinations positive for AFB; OR ONE sputum smear examination positive for AFB plus radiographic abnormalities consistent with active pulmonary TB as determined by a clinician; OR one sputum specimen positive for AFB and culture positive for *M.tuberculosis*

*** Case of tuberculosis which does not meet the definition for smear positive TB. Diagnostic criteria should include: at least 3 sputum smear examinations negative for AFB; radiographic abnormalities consistent with active pulmonary TB; no response to a course of broad spectrum antibiotics, a decision by a clinician to treat the patient with a full course of curative anti-TB chemotherapy



TUBERCULOSIS TREATMENT CARD

TB01 (front)

Name: _____

Patient TB no: _____

Treatment facility: _____

Home address: _____

Prison of origin: _____

Sex: M F Age

Disease classification

Pulmonary Extrapulmonary

Site: _____

Type of patient

New Relapse

Transfer In Failure

Return after default Other

1. INITIAL INTENSIVE PHASE - Prescribed regimens, numbers of tablets and does S (grams)

Category I	Category II	Category III	Result of sputum examination				Weight kg
			Local lab	Reference lab	Reference lab	Resist	
Date	Smear	Lab No	Smear	Culture	Sensit	Resist	
Month							
0							
2							
3							
4							
5							
6(7)							
8(9)							

Tick appropriate box after drugs have been administered

Month	Day	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



TUBERCULOSIS IDENTITY CARD TB02

Name: _____
 Patient TB no: _____
 Treatment facility: _____
 Home address: _____

Disease classification:

Pulmonary: Extrapulmonary
 Site: _____

Type of patient

New Relapse
 Transfer In Failure
 Return after default Other

Date treatment started: .../.../.....
 Drugs patient receiving: Initial Continuation

(front)

Month	sputum examination	
	Date	Smear
0		
2		
3		
4		
5		
6		

Name and address of nearest health facility in the event of release/transfer:

REMEMBER:

1. Take care of your card.
2. Interrupting treatment is dangerous - Interrupting treatment reduces your chances of cure and increases the chance of spreading TB to others.
3. Irregular treatment increases the risk of developing drug resistant disease.

(back)



TB LABORATORY FORM
REQUEST FOR SPUTUM EXAMINATION

TB05

Name of Treatment Unit or Prison: _____ Date: _____

Name of patient: _____ Age: _____ Sex: M F

Home address: _____ District: _____

Disease classification: Pulmonary Extrapulmonary Site: _____

Reason for examination: Diagnosis Follow-up of chemotherapy:

Specimen Identification No: _____ Patients TB No*: _____

Date of Sputum collection: _____ Signature specimen collector: _____

* Be sure to enter the patients TB No. for follow-up of patients on chemotherapy
Enter the patients screening number for mass active case finding in prisons

RESULTS (to be completed in Laboratory)

Lab Serial No: _____

Date	Specimen	Visual appearance*	Results**	Positive (grading)			
				3+	2+	1+	<3
	1			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* MP- muco purulent
B- blood stained
S - saliva

**Write neg or pos

Date: _____ Examined by (signature): _____

The completed form should be sent to the treatment unit or prison and the District tuberculosis co-ordinator



TB07

Quarterly report on new cases and relapses of tuberculosis

Name of prison/region: _____

Average daily population: _____

No. of new prisoners in quarter: _____

Patients detected during _____ quarter of 20____

Name of staff member responsible for form completion: _____

Date of completion of this form: _____

Signature: _____

Block 1 (a):
Cases
detected

Pulmonary Tuberculosis									New extra - pulmonary		Total		
Smear positive (*)						New smear negative							
New (1)			Relapses		Others			M	F	M	F	Total	
M	F	Total	M	F	M	F	M						F

Block 1 (b)
Cases
detected
commenced
on or
transferred for
treatment.

Pulmonary Tuberculosis									New extra - pulmonary		Total		
Smear positive						New smear negative							
New (1)			Relapses		Others			M	F	M	F	Total	
M	F	Total	M	F	M	F	M						F

_____ (No.) detected smear positive cases (*) were not commenced on or transferred for treatment because

Block 2:
Smear
positive
new cases
detected
(from block 1
(a), column 1)

Age group (years)												Total		
0-14		15-24		25-34		35-44		45-54		55-64				
M	F	M	F	M	F	M	F	M	F	M	F	M	F	Total

Explanations on how to fill in the form:

- Quarters: 1st Jan, Feb, Mar Block 1 (a) Cases detected during the quarter
- 2nd Apr, May, Jun Block 1 (b) Cases detected and commenced on treatment during the quarter
- 3rd Jul, Aug, Sep
- 4th Oct, Nov, Dec Block 2 New smear positive cases detected during the quarter (from block 1 (a), column 1) If the exact age is unknown it should be estimated to the nearest 5 years

**QUARTERLY REPORT ON THE RESULTS OF TREATMENT OF SMEAR POSITIVE
CASES REGISTERED 12-15 MONTHS EARLIER**

TB08

Name of prison/region _____ Prison/region No. _____	Patients registered during _____ quarter of 20 _____	Date: _____
Name of staff member responsible for form completion _____		Signature: _____

Total No of smear-positive patients reported during the quarter*	Regimen	Treatment Outcomes						Total number evaluated
		Cured	Treatment completed	Died	Treatment Failure	Defaulter	Transfer out	
	Smear-positive new cases (1)							
	Smear-positive relapses (2.1)							
	Other smear-positive cases (2.2)							
	Total smear-positive retreatment cases (2.1+2.2)							

Of those* _____ (No.) were excluded from the evaluation of chemotherapy for the following reasons: _____





TUBERCULOSIS TRANSFER FORM

TB09

Name of Transferring Unit: _____

Name of Unit to which patient was transferred: _____

Name of patient: _____

Address of patient: _____

Patient's TB No: _____ Date treatment started: _____

Disease classification:	
Pulmonary: <input type="checkbox"/>	Extrapulmonary <input type="checkbox"/>
Site: _____	

Type of treatment	
Cat I <input type="checkbox"/>	
Cat II <input type="checkbox"/>	
Cat III <input type="checkbox"/>	

Type of patient	
New <input type="checkbox"/>	Relapse <input type="checkbox"/>
Transfer In <input type="checkbox"/>	Failure <input type="checkbox"/>
Return after default <input type="checkbox"/>	Other <input type="checkbox"/>

Drugs patient received:

Remarks: _____ Signature: _____

_____ Designation: _____

_____ Date referred/transferred _____

For use by Treatment Unit where patient has been referred.

Name of patient: _____ Patient's TB No: _____

Age: _____ Sex: M F

Date referred/transferred: _____

The above named reported at this Treatment Unit on: _____

Signature: _____ Date: _____

Designation: _____

Name of Treatment _____

Unit: _____ District: _____

Send this part back to the referring unit as soon as the patient has reported and been registered.



**TREATMENT OUTCOME NOTIFICATION FORM
FOR PATIENT TRANSFERS**

Name of Unit at which patient originally registered: _____

Name of Unit to which patient was transferred: _____

District: _____

Name of patient: _____

Address of patient: _____

Age: _____ Sex: M F

Patient's TB No: _____ Date treatment started: _____

Disease classification:	
Pulmonary: <input type="checkbox"/>	Extrapulmonary <input type="checkbox"/>
Site: _____	

Type of treatment	
Cat I <input type="checkbox"/>	
Cat II <input type="checkbox"/>	
Cat III <input type="checkbox"/>	

Type of patient	
New <input type="checkbox"/>	Relapse <input type="checkbox"/>
Transfer In <input type="checkbox"/>	Failure <input type="checkbox"/>
Return after default <input type="checkbox"/>	Other <input type="checkbox"/>

Drugs patient received:

Date referred/transferred: _____

Remarks: _____

Date patient reported for treatment after transfer: _____

Date treatment ended: _____

Treatment outcome	
Cured <input type="checkbox"/>	Failure <input type="checkbox"/>
Treatment completed <input type="checkbox"/>	Defaulter <input type="checkbox"/>
Died <input type="checkbox"/>	Transfer out <input type="checkbox"/>

Signature: _____

Designation: _____

Date: _____

Suggested Protocol for Sputum Collection

Staff

1. Only appropriately trained staff should collect sputum.
2. Staff sputum collection duties should be rotated among the staff on a daily or weekly basis.
3. Staff should be provided with and wear appropriate respiratory protection.
4. Each member of staff should supervise no more than one prisoner at a time.
5. A member of staff or an assistant prisoner should be responsible for locating and requesting prisoners to attend for sputum collection.

Site

6. Sputum should only be collected in designated areas outside or in rooms that are well-ventilated or have other environmental protection. Queuing to provide sputum should also be in well-ventilated areas. Health education materials should be available.
7. If patients are too sick to move to the designated area, sputum should be collected by the side of the bed. All attempts should be made to ventilate the room.
Punishment is not a reason to not collect sputum. Sputum should be collected in the yard of the punishment cells.

Preparation

8. Before commencing sputum collection, adequate preparations must be made. Sputum collection should not be interrupted because of inadequate preparation
9. Adequate preparation includes: information to prisoners about the procedure; a list of all prisoners required to provide sputum at that collection point and time; appropriately completed sputum request forms per prisoner; one clean, officially designated container per prisoner pre-labelled with identification details; a water supply for hand and mouth washing; packing materials; and arrangements for transport and storage of specimens.

Procedure

10. Sputum should be collected in the early morning before prisoners have eaten or taken any medication.
11. Smoking is forbidden once sputum collection has started, as false specimens may be hidden in cigarette ends.
12. Prisoners wash their hands and mouths under supervision before giving sputum.
13. The responsible staff member should ensure that the prisoner is observed continuously (Directly Observed Sputum collection) and advise the prisoner that these are his or her instructions. The staff member should ensure that the correct individual is giving sputum and that no substitution has occurred between prisoners.
14. Prisoners should be given clear guidance on how to provide a good sputum sample, expectorating from deep within their lungs by deep breathing or exercise. Guidance should be constructive and supportive, not coercive.
15. Staff should stand away from the prisoner during coughing, but must continue to observe him/her.
16. Prisoners should be given a ready prepared sputum collection container on which are written their identification details.



17. A member of staff should check the sample to ensure that it contains sputum, as opposed to saliva or nasal discharge. If the sample is insufficient the prisoner should be encouraged to cough again until the sample is satisfactory.
18. Once the prisoner has produced a sample of adequate volume and quality, the responsible member of staff should give the prisoner the lid of the container so that the prisoner may seal it correctly.
19. If after several minutes, there is inadequate expectoration, the container should be appropriately disposed of (incinerated or boiled/autoclaved). The laboratory should be informed that no specimen was produced.
20. Once all the samples have been collected, a member of staff should take the samples to the laboratory or to the designated storage area. Care must be taken to ensure that the specimens are not tampered with before or after collection. An appropriately completed request form for each sample must accompany, but be kept separately from, the specimens.



Suggested Protocol for Direct Observation of Treatment

DOT is non-negotiable in the prison environment and should be performed each and every time TB treatment is administered.

Staff

1. Only appropriately trained staff should distribute tablets and administer injections.
2. Treatment duties should be rotated among the staff on a daily or weekly basis.
3. Staff should be provided with, and wear, appropriate respiratory protection in smear-positive and drug-resistant areas.
4. There should be a minimum of one member of staff to supervise tablet swallowing and document doses taken, one member of staff to administer injections and to supervise nutritional supplement allocation at each distribution point.
5. A member of staff or an assistant prisoner should be responsible for locating prisoners who do not attend for treatment. The reason for non-attendance should be established and addressed.

Site

6. Tablet distribution and injection administration should only be carried out in designated sites with adequate space, furniture and utilities (light, water for hand washing).
7. The only exceptions to this should be if prisoners cannot physically get to the treatment site because, for example, they are held in punishment cells, are too sick to walk, etc. in which case treatment should be brought to them after the main tablet distribution.

Preparation

8. Treatment distribution should be adequately prepared in advance and should not be interrupted because of poor preparation. In particular, medicines or nutritional supplements should not be left unsupervised.
9. Preparation includes the presence of all necessary (patient treatment cards); the required amount of medication (anti-TB tablets and injections) as well as the necessary materials for injections (gloves, needles, syringes, skin cleaning); containers for medical waste (particularly for the safe disposal of needles); health education materials.
10. Treatment distribution time will be saved if all injections necessary are made up immediately in advance of treatment distribution. Consideration should be given to the benefits of pre-preparing labelled packages of individual patient's tablets.
11. If nutritional supplementation is to be distributed (e.g. high-energy milk) the required amount should also be prepared in advance, along with the means of distribution (e.g. ladle, patients bring own cups).

Procedure

12. Times of medicine administration should be advertised and patients made aware of when and where they should attend for treatment.
13. Patients should form an orderly queue in a well-ventilated area at the allocated distribution point and enter the treatment room one at a time. This allows control of treatment and gives the patient an opportunity to raise any concerns with medical personnel.



14. Patients should first receive the tablets prescribed for them. The member of staff should check the patient's treatment card and give the appropriate prescription with clean hands. The staff member should check that the individual is the genuine patient and that no substitution has occurred. If individual medication packages have been pre-prepared the member of staff should verify that the label matches the patient and the dose and combination of tablets is correct.
15. The member of staff responsible should constantly observe the patient from the moment tablets are given to the patient until they are certain all have been swallowed. After swallowing the tablets, the patient should show his/her open mouth and hands and empty cup (if used) to the member of staff to reduce the risk of concealed tablet defaulting. Prompting the patient to speak may reveal tablets hidden under gums or the tongue. On no account can tablets be saved for taking later.
16. After tablet swallowing, injections are given (if prescribed). Injections must be performed aseptically and in a manner that respects the patient's privacy, if culturally appropriate. Needles must be disposed of immediately in an appropriately designated container, for later incineration.
17. Once the treatment dose (both tablets and injections) is complete, the patient treatment card is marked with an 'X' in the appropriate box. If treatment is incomplete in anyway, the box should be marked with '0'.
18. If treatment is partially or fully refused, the reason should be elucidated and addressed if possible (misunderstanding, side-effects, need to reinforce health education messages etc). However, treatment must not be coerced. If the problem cannot be resolved, the patient should be referred to the responsible doctor who must try to find a solution.
19. If nutritional supplementation is given, this should also be directly observed and completed in the treatment room to ensure patients who need it are actually able to receive it (risk of coercion, sale). Patient weight (and Body Mass Index (BMI) should be monitored and recorded on a monthly basis during distribution. This is important for all patients as changes in weight may require alteration of treatment doses.
20. After treatment distribution is complete, any unused medicines, needles or syringes must be returned to the pharmacy in a secure manner and clinical waste incinerated immediately.



TABLE 7a

Drug (abbreviation)	Recommended dose (mg/kg) Adults and children Daily 3 doses/ week	Contraindications	Precautions –laboratory investigations recommended only if possible	Major side-effects	Minor side-effects
Isoniazid (H)	5 (4-6) 0 (8-12)	Known hypersensitivity. Active hepatic disease.	Monitor serum hepatic transaminases where alcohol abuse/ liver disease exists. Give 10mg of pyridoxine per dose routinely for prisoners to prevent neuropathy.	Hepatitis, acute liver failure. Confusion, peripheral neuropathy.	Cutaneous hypersensitivity. Arthralgia, acne.
Rifampicin (R)	10 (8-12) 10 (8-12)	Known hypersensitivity. Active hepatic disease.	Monitor serum hepatic transaminases where alcohol abuse/liver disease exists.	Hepatitis, acute liver failure. Immunological reaction - shock, purpura, low platelets, renal failure.	Anorexia, nausea, abdominal pain. Orange secretions (e.g. urine, tears).
Pyrazinamide (Z)	25 (20-30) 35 (30-40)	Known hypersensitivity. Active hepatic disease.	May exacerbate gout and diabetes. Monitor blood glucose and uric acid in patients with diabetes or gout.	Hepatitis, acute liver failure. Cutaneous hypersensitivity.	Arthralgia. Flushing of skin.
Streptomycin (S)	15 (12-18) 15 (12-18)	Known hypersensitivity.	Auditory nerve impairment. Myasthenia gravis. Pregnancy.	Monitor renal function, balance and hearing in renally impaired. Wear gloves in preparation to avoid sensitization dermatitis.	Skin rash and fever, deafness. Ataxia and nystagmus. Renal failure. Itching.
Ethambutol (E)	15 (15-20) 30 (25-35) *Children max. dose 15mg/kg/d	Known hypersensitivity. Optic neuritis. Creatinine clearance < 50ml/min Children < 6 yrs.	Advise patients to report any visual disturbance. First symptom is often red-green colour blindness.	Optic neuritis which may lead to blindness if treatment not discontinued.	Occasional peripheral neuritis.

**TABLE 7b**
A SYMPTOM BASED APPROACH TO ADVERSE EFFECTS
(from "Guidelines for National Programmes"[1])

Side-effects	Drug (s) probably responsible	Management
Minor		
Anorexia, nausea, abdominal pain	Rifampicin	Give drugs last thing at night
Joint pains	Pyrazinamide	Aspirin
Burning sensation in feet	Isoniazid	Pyridoxine 100 mg daily
Orange urine	Rifampicin	Reassurance
Major		
Itching	Thioacetazone / Streptomycin	Stop thioacetazone if on a regime containing the drug. Otherwise exclude and address infestations, antihistamines.
Skin rash (+/- fever, oedema, mucous membrane ulceration and shock).	Thiacetazone (streptomycin). H, R and Z rarely responsible.	Stop anti-TB drugs. Prescribe anti-histamine (plus corticosteroids and intravenous fluids if severe reaction). Do not use thioacetazone again. If other drugs thought responsible use challenge doses when the patient has recovered to determine which drug (table 7c). For more information see ' <i>Clinical tuberculosis</i> '[2].
Jaundice (other causes excluded)	Most anti-TB drugs especially H,R and Z.	Stop anti-TB drugs. Perform liver function tests if possible. After the hepatitis has resolved re-introduce the same regimen (it rarely has the same result when reintroduced). If the reaction has been severe avoid pyrazinamide and rifampicin and use 2 SHE/10HE or where H resistance is known: 9RE.
Vomiting and confusion (suspect acute liver failure)	Most anti-TB drugs especially H,R and Z.	Stop anti-TB drugs. Urgent liver function tests and prothrombin time.
Shock, purpura, thrombocytopenia, acute renal failure.	Stop rifampicin	Stop rifampicin.
Deafness	Streptomycin	Stop streptomycin. Use ethambutol instead.
Dizziness (vertigo and nystagmus)	Streptomycin	Stop streptomycin. Use ethambutol instead.
Visual impairment (other causes excluded)	Ethambutol.	Stop ethambutol.



TABLE 7c REINTRODUCTION OF ANTI-TUBERCULOSIS DRUGS AFTER A CUTANEOUS HYPERSENSITIVITY REACTION

(from "Guidelines for National Programmes"[1])

Drugs (in sequence)	Likelihood of causing a reaction	Day 1	Day 2	Day 3
Isoniazid	Least likely ↓ Most likely	50-100 mg	300mg	300mg
Rifampicin		75mg	300mg	Full dose
Pyrazinamide		250mg	1g	Full dose
Ethambutol		100mg	500mg	Full dose
Streptomycin		125mg	500mg	Full dose

ROLE OF AUXILIARY TREATMENTS

Nutrition

Prisoners are often malnourished. TB disease worsens an often already precarious nutritional status. Whilst deficiencies of protein and other nutrients such as Vitamins A, C and D, cobalamin, zinc and selenium have all been implicated in increasing susceptibility to TB, the role of poor nutritional status in influencing TB treatment outcome is not established. However, a body mass index of less than 16 (normal 20-24) was independently associated with treatment failure in the Azeri prison TB programme [3]. Despite the lack of data, common sense would suggest that increasing energy and protein intake as well as essential nutrients may well play a positive role in influencing response to treatment.

If possible nutritional supplementation should be provided in the form of high-energy milk, high-energy biscuits or supplementing the prison diet with locally available high protein foodstuffs, fruit and vegetables wherever possible.

Palliative treatment

Other treatments should be available for conditions that may inhibit the taking of food or TB treatment. Such treatments include analgesics, antacids, anti-emetics, anti-pyretics, simple antibiotics, antipsychotics, treatment for infestations, etc. Various palliative treatments should be available for patients who are dying. These may include strong analgesics, antidepressants and anxiolytics, although these may be restricted by prison regulations.

Corticosteroids

Treatment with corticosteroids for a limited period of time is useful for reducing the sequelae of TB meningitis and TB pericarditis. The dose should be gradually reduced over a number of weeks. Replacement steroids may also be required with TB of the adrenal glands.



However, as steroids also suppress the immune response, they should ***only be used for patients on effective TB therapy***, otherwise the end result may be a worsening of their condition. Because of these risks they should not be used in suspected or confirmed cases of MDR or polydrug-resistant TB, unless these patients are on an adequate second-line drug protocol.

Corticosteroids are also of value as an emergency measure in managing severe cutaneous hypersensitivity reactions as above.

REFERENCES

1. Maher D, Chaulet P, Spinaci S, et al: Treatment of tuberculosis: Guidelines for National Programmes. WHO/TB/97.220. Geneva, World Health Organization, 1997.
2. Crofton J, Horne N, Miller F: Clinical tuberculosis, 2 ed. London and Oxford, Macmillan Education Ltd, 1999.
3. Coninx R, Mathieu C, Debacker M, et al: First-line tuberculosis therapy and drug-resistant *Mycobacterium tuberculosis* in prisons. *Lancet* 1999; 353(9157): 969-73.



(adapted from MSF Evaluation paper: “Quality Criteria for Tuberculosis Control Programmes”)

a) Case-finding evaluation for each prison/region per year

Activity	Indicator/tool	Target
Screening at entry to prison	Number of prisoners screened for TB within 24 hours of arrival in prison among total number of prisoners entering prison.	100%
Mass active case-finding (if performed during the year). Specify method (s).	Number of prisoners screened for TB among total number eligible for screening.	100%
Smear-positive case detection	Number of smear-positive cases detected among total number of TB cases (all forms) detected.	> 80 ¹⁸ %
Case detection registration	Number of smear-positive cases registered in screening register as compared to laboratory register.	100%

b) Treatment process evaluation

Activity	Indicator/tool	Target
Treatment of smear-positive cases	Number of smear-positive cases commenced on (or transferred for) treatment among the total number of smear-positive cases detected.	100%
Smear-positive transfer/release notification	Number of smear-positive cases released or transferred before treatment that are notified to the receiving service among the total number of smear-positive cases released or transferred before treatment.	100%
Timely treatment or treatment delay	Number of smear-positive cases commenced on treatment within 24 hours of diagnosis among total number of smear-positive cases commenced on treatment.	>90%
Direct observation of treatment	Number of cases receiving directly observed treatment among those receiving anti-TB treatment.	100%
Registration and documentation of treatment	Number of treatment charts correctly registered as compared to TB register.	100%

¹⁸ Target may be adjusted in different settings depending on the local epidemiology and the progress of the programme.



c) Treatment outcomes evaluation

Activity	Indicator/tool	Target
Sputum monitoring	Number of patients starting treatment smear-positive who submit sputum for examination at or one month prior to treatment completion and on at least one previous occasion among those who completed treatment.	100%
Smear-positive treatment success rate	Number of cases who started treatment smear-positive and were cured or completed treatment among the total number of cases who started treatment smear-positive.	>85%
Combined death, failure, default and transfer out rate	Number of cases who started treatment smear-positive and, failed, defaulted or were transferred out among the total number of cases that started treatment smear-positive.	<15%
Notification of transfer/release treatment outcomes	Number of cases who started treatment smear-positive and were transferred or released, whose treatment outcome is known among total number of cases who started treatment smear-positive and were released or transferred.	100%

d) Supplies for each laboratory and tuberculosis treatment facility

Activity	Indicator/tool	Target
Stock management (drugs, laboratory materials, stationery)	Number of stock ruptures per year.	None
	Quantity of each stock article expected to be consumed (in relation to number of cases) compared with actual yearly consumption.	>90%
	Quantity of drugs or laboratory material that expired during the year.	None



e) Health education and training

Activity	Indicator/tool	Target
TB education (inmates, patients, staff, families)	Knowledge, attitudes, behaviours and practices (KABP) studies for each group.	
	Proportion of each group with specified minimum knowledge regarding TB.	100%
Health personnel	Proportion of prison health personnel with specific training for TB related roles.	100%

f) Data collection and analysis for each region per year

Activity	Indicator/tool	Target
Quarterly report on case-finding (TB07)	Number of complete, correct reports submitted on time among number of reports required.	100%
Cohort analysis of treatment outcomes (TB08)	Number of complete, correct reports submitted on time among number of reports required.	100%

g) Access to tuberculosis control per region per year

Activity	Indicator/tool	Target
Laboratory access	Number of prisons with access to a level 1 laboratory among total number of prisons.	100%
Case-finding personnel	Number of prisons with staff trained in TB case-finding among total number of prisons.	100%
Access to treatment	Number of prisons able to provide or refer patients for TB treatment among total number of prisons.	100%



The definitions in this glossary are not necessarily official WHO definitions but related rather to general usage and this manual specifically.

active TB: TB infection that has progressed to disease and causes illness, associated with symptoms and/or physical findings.

civilian: of the general, non-incarcerated, population.

cohort: group of individuals with specified characteristics (e.g. smear positive tuberculosis) identified during a defined period of time.

95% confidence interval: a range of values which we are 95% sure contain the true value of the measure of interest in the overall population.

cough etiquette: turning head and covering mouth when coughing and using cloths or spittoons to spit into.

directly observed treatment (DOT): a trained and supervised person observes the patient swallowing the tablets.

DOTS: the WHO-recommended basic TB control package (see section 2.3).

drug-resistant TB: TB that is resistant to one or more anti-TB drugs.

health education: information that seeks to raise awareness and knowledge and to change attitudes, behaviours and practices towards health.

extrapulmonary TB: TB affecting organs other than the lungs, most commonly pleura, lymph nodes, spine/bone, genitourinary tract, nervous system, abdomen and major joints.

fixed dose combinations: anti-TB drugs combined in a single tablet in specific dosages to facilitate correct drug intake.

incidence: the number of new cases of a disease or infection occurring in a defined population in a fixed period of time, usually one year.

indicator: a means of measuring and monitoring an activity or situation.

integrated TB services: TB services that are fully linked and co-ordinated between civilian and penitentiary systems at all levels (managerial, operational and technical).

latent infection: infection with TB that is currently dormant, but may be reactivated. Individuals with latent TB have no symptoms and are well.

multidrug-resistant TB: TB that is resistant to at least rifampicin and isoniazid, the most important anti-TB drugs.

Mycobacterium tuberculosis: the bacteria that cause TB.

new case: patient with TB who has either never received, or received less than one month of, anti-TB treatment.



peer educator: a person who provides health education to individuals from a similar background or social group.

penal reform: advocates changes to the way prisons are used by society (e.g. alternative sentencing policies) to reduce rates of incarceration, improve prison living conditions and increase opportunities for prisoners (education, training, rehabilitation).

polydrug-resistant TB: TB that is resistant to two or more anti-TB drugs, but not the combination of rifampicin and isoniazid.

pre-trial detention: any incarceration of an individual before trial and sentencing.

prevalence (infection or disease): the total number of cases of an infection or disease in a population at a particular time.

preventive therapy: drug treatment to prevent the development of active TB in those with latent TB infection.

previously treated TB case: patient with TB who has previously received at least one month or more of anti-TB treatment

prison: used generically to mean any place of detention.

pulmonary TB: TB that affects the lung parenchyma. The commonest disease site for TB.

recidivist: a prisoner who has been imprisoned on more than one occasion.

smear-negative pulmonary case: see Table 12.2.

smear-positive pulmonary case: see Table 12.2.

substance abuse: the abuse of drugs or chemicals, most commonly used in referring to alcohol and opiates (e.g. heroin).

thiacetazone: an anti-TB drug taken orally; can cause serious side-effects in those who are HIV-positive and should be used with hesitation in environments such as prisons.

training: information and practice directed to individuals to enable them to perform specific tasks.

tuberculin skin test (TST): skin test to detect latent TB infection, normally using a purified protein derivative (PPD).

tuberculosis case: a patient in whom tuberculosis has been bacteriologically confirmed, or has been diagnosed by a clinician.

tuberculosis suspect: person with symptoms or signs suggestive of TB.

universal precautions: treating all bodily fluids from all individuals as if they contain infectious agents such as HIV.



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