

A FRAMEWORK FOR THE HARMONIZED MANAGEMENT OF TUBERCULOSIS IN THE MINING SECTOR

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TABLE OF CONTENTS

TABLE OF CONTENTS.....	2
LIST OF ABBREVIATIONS	5
ACKNOWLEDGEMENTS	6
FOREWORD	7
PART 1: BACKGROUND.....	10
1.1 Overview of the global and regional TB situation.....	10
1.2 TB and the mining sector in southern Africa	10
1.3 Current approaches to managing TB in the mines	11
1.4 Specific challenges of TB prevention, treatment and care in the mining sector.....	11
1.4.1 Access to health services	11
1.4.2 Labour issues	11
1.4.3 Cross-border migration and poor referral system.....	11
1.4.3 Ex-mineworkers and family contacts.....	12
1.5 Justification for and purpose of this regional framework for the harmonized management of TB in the mining sector	12
1.6 Target audience for the Framework.....	12
1.7 Rationale for engaging mining sector in TB care activities	12
PART 2: APPROACH TO REVIEW AND SUPPLEMENT NATIONAL GUIDANCE FOR USE IN CARE OF MINeworkERS AND IN MINING COMMUNITIES	14
2.1 Situational analysis of the scope and nature of the mining community in each country ...	14
2.2 Enlist mining companies' management commitment.....	14
2.3 Enlist employees commitment and participation.....	14
2.4 Design of overall service delivery approaches.....	15
2.5 Development of TB/HIV workplace plan	15
2.6 Workplace policy.....	15
2.7 Return-to-work-policy	16
2.8 Advocacy and education	16
2.9 Service provision and support	16
2.9.1 Continuity of treatment	17
2.9.2 Referral and treatment support.....	17
2.9.3 Outreach to employees' families, communities and beyond	17
2.9.4 Privacy and confidentiality.....	18

PART 3: HARMONIZED PROTOCOLS FOR TB DIAGNOSIS, TREATMENT AND CARE AMONG MINING POPULATIONS	19
3.1 Protocol for systematic TB screening.....	19
3.2 Protocol for TB diagnosis	19
3.2.1 <i>Role of other investigations in TB diagnosis</i>	20
3.2.2 <i>Silicosis diagnosis</i>	20
3.3 Protocols for TB treatment	20
3.3.1 <i>Treatment of drug susceptible TB in adults and adolescents</i>	20
3.3.2 <i>Treatment regimens of drug sensitive childhood TB</i>	21
3.4 Protocol for management of drug-resistant TB (DR-TB).....	21
3.4.1 <i>DR-TB case finding</i>	21
3.4.2 <i>DR-TB diagnosis</i>	21
3.4.3 <i>Treatment regimens for MDR-TB in adults</i>	22
3.4.4 <i>Treatment regimen for XDR-TB in adults and adolescents</i>	23
3.4.5 <i>Treatment regimens for MDR-TB in children</i>	23
3.5 Treatment of TB/HIV co-infection.....	24
3.5.1 <i>Provision of anti-retroviral therapy (ART) in adults and adolescents</i>	24
3.5.2 <i>Concomitant treatment of DR-TB and HIV</i>	25
3.5.2 <i>Provision of ART in children with DR-TB</i>	25
3.5.3 <i>Monitoring of DR-TB and HIV therapy in co-infected patients</i>	26
3.6 Cotrimoxazole preventative therapy (CPT).....	28
3.7 TB infection control.....	28
3.7.1. <i>Administrative control measures</i>	28
3.7.2 <i>Environmental control measures</i>	29
3.7.3 <i>Personal respiratory protection (respirator masks)</i>	29
3.7.4 <i>Infection control in the community</i>	29
3.8 INH prophylaxis.....	30
PART 4: FRAMEWORK FOR IMPLEMENTATION AND COORDINATION OF TB CARE IN THE MINING SECTOR.....	31
4.1 Stakeholder analysis	31
4.2 Roles and responsibilities.....	31
4.2.1 <i>National TB Programs and national HIV/AIDS Programs</i>	31
4.2.2 <i>Businesses/company management</i>	32
4.2.3 <i>Trade unions</i>	32
4.2.4 <i>Labor inspectorate/Ministry of Labor</i>	32

4.2.5	<i>Employers' organizations/Chambers of commerce</i>	32
4.2.6	<i>Business coalitions and associations</i>	33
4.2.7	<i>ILO, WHO, World Bank, and UNAIDS country staff</i>	33
4.2.8	<i>NGOs involved in TB and HIV (international and local)</i>	33
4.3	Monitoring and evaluation	34
PART 5: INSTITUTIONAL LINKAGES FOR REGIONAL COORDINATION OF TB CONTROL IN THE MINING SECTOR.....		35
5.1	Cross-border linkages.....	35
5.2	Technical collaboration	35
5.3	Referral and feedback mechanisms.....	36
5.4	Mapping of current mineworkers and ex-mineworkers.....	36
5.5	Database of mineworkers.....	36
5.6	Cross-border tracking and contact tracing	36
REFERENCES.....		37

LIST OF ABBREVIATIONS

AFB	Acid fast bacilli
ART	Antiretroviral therapy
CPT	Cotrimoxazole preventive treatment
CSF	Cerebral spinal fluid
CXR	Chest X-ray
DOT	Directly observed therapy
DST	Drug susceptibility testing
EPTB	Extra-pulmonary tuberculosis
FDC	Fixed dose combination
FLD	First line drug
ICF	Intensive case finding
IPT	Isoniazid preventive treatment
LPA	Line probe assay
MDR-TB	Multidrug-resistant tuberculosis
MTB	Mycobacterium tuberculosis
NNRTI	Non nucleoside reverse transcriptase inhibitor
NRTI	Nucleoside / Nucleotide reverse transcriptase inhibitor
OSH	Occupational Safety and Health
PI	Protease inhibitor
PLHIV	People living with HIV
PTB	Pulmonary tuberculosis
RR-TB	Rifampicin-resistant tuberculosis
SADC	Southern African Development Community
SCC	Short course chemotherapy
SLD	Second line drug
TB	Tuberculosis
TBM	Tuberculosis meningitis
WB	World Bank
WHO	World Health Organization
WRD	WHO-recommended rapid diagnostic test
XDR-TB	Extensively drug-resistant TB
ZN	Ziehl Nielsen

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This framework for the harmonized management of tuberculosis in the mining sector was developed by a core team comprising National Tuberculosis Program Managers of Lesotho, Mozambique, South Africa and Swaziland, the World Bank, and the World Health Organization. The World Bank convened the process for development of this framework.

The team would like to express its gratitude to the Ministers of Health of Lesotho, Mozambique, South Africa, and Swaziland for their guidance and leadership throughout this process. In the course of developing this framework document, several country consultation workshops and a regional workshop were held to elicit the inputs of key stakeholders. The team would like to thank the following institutions for their contributions:

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- International Organization for Migration
- Médecins Sans Frontières
- Medical Research Council, South Africa
- Ministry of Labour, Swaziland
- Ministry of Mining, Lesotho
- National Health Laboratory Services, South Africa
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- Private Practitioners Association, Lesotho
- Swaziland Migrant and Mineworkers Association
- TB Care – Management Sciences for Health
- The Employment Bureau of Africa
- United States Agency for International Development
- University Research Council, South Africa
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FOREWORD

The completion of this document is the culmination of a remarkable process of cooperation between national TB control programs, partners and stakeholders – national, regional and international. However, it only represents one step in a much larger process to put an end to the shameful 100-year legacy of tuberculosis in the mining industry that has helped make TB the most common cause of death for the Southern African sub-region.

Mineworkers have a risk of contracting TB that is almost three times greater than that of the general population, and an incidence rate that is ten times higher than the level of a TB health emergency, as designated by the World Health Organization (WHO). In addition to their high risk of infection, many mineworkers in Southern Africa are made more vulnerable by difficulties they face in accessing health and social services, largely as a result of frequent migratory movements across provincial and national borders, and informal employment arrangements that may not cover health care.

The pathway to change

Formal recognition of mineworkers in Southern Africa as a group of particular vulnerability and disease risk came a little over three years ago when the Ministers of Health of Lesotho, South Africa and Swaziland issued a joint call for action on TB in the mines. This announcement followed on from an expert consensus meeting held in Johannesburg by the South African Department of Mineral Resources, the National Institute of Occupational Health, and with support from the World Bank, which sensitized the countries on the high burden of TB and TB/HIV among mineworkers and the paucity of services available.

In follow-up to this meeting, the World Bank initiated a work program to address knowledge gaps about the exact numbers of migratory mineworkers at risk of TB and the extent of post-employment infections among ex-mineworkers. Starting with a rapid data analysis of available information in May 2011, this ongoing work has stimulated larger economic studies to define the costs of intervention versus inaction and provided the financial rationale necessary to obtain Southern African Development Community approval for regional intervention.

Concurrently, the Department of Health of South Africa led an effort to establish a national multi-stakeholder committee on TB in the mining sector, involving representatives of the National Institute of Occupational Health, the Department of Mineral Resources, Chamber of Mines, development partners (World Bank, Stop TB Partnership, International Organization for Migration, UK Department for International Development), The Employment Bureau of Africa (TEBA, the regional recruitment agency for the industry) labor representatives, and academics. The aim of this group was to bridge gaps between opposing interest groups and tackle the fragmentation that had prevented an effective response to TB in the mining sector since its recognition as an issue of public health concern in 1914.

Regional leadership

Regional concerns about the potential for cross-border disease transmission led the Southern African Development Community (SADC) to add its weight to efforts to establish a coordinated regional solution to TB in the mining sector. This builds on existing SADC initiatives to support service provision improvements for mobile populations through regional cooperation, and its regional project to develop minimum standards for management of HIV, TB and malaria in the sub-region as the first step towards harmonized disease management.

SADC Health Ministers highlighted the issue of TB in the mines at their annual meeting in November 2012 and mandated the establishment of a Technical Working Group involving the World Bank, Stop TB Partnership, International Organization for Migration and representatives of the three most highly affected countries (Lesotho, South Africa, and Swaziland) to draft a Declaration on TB in the Mining Sector and undertake stakeholder consultation. This Declaration, which was signed by SADC Heads of State in August 2012, recognized the special vulnerability of mineworkers and their communities to TB, and identified some key steps needed to reduce risks and improve services. Harmonization of the management of TB for countries between which mineworkers regularly migrate to and from mine sites was one of the key recommendations of the Declaration, building on SADC's previous work to improve health service access for mobile populations and expert consensus on necessary steps to reduce mineworkers' vulnerability.

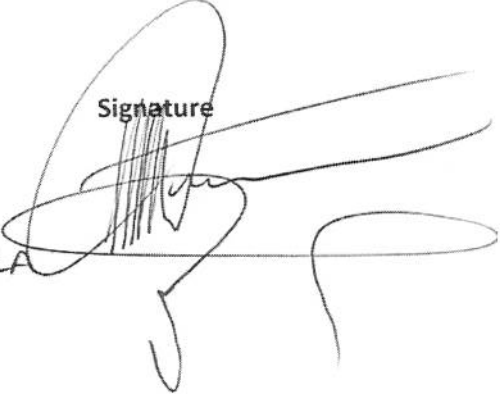


From commitments to action

As the most highly affected labor-sending and receiving countries, Lesotho, Mozambique, South Africa, and Swaziland requested support from the World Bank to begin implementation of the Declaration's provisions, starting with the harmonization of management of TB in mineworkers. An intensive process of country-level engagement, national consultations and expert technical meetings supported by the WHO and World Bank, led to the development of a document that aims to give mineworkers and their communities the confidence that wherever they seek treatment in the sub-region, their physicians will prescribe the same interventions and will follow the same set of guidelines for disease management.

The completion of this document is a triumph for the national TB control programs of Lesotho, Mozambique, South Africa, and Swaziland who have overcome social, cultural, economic, and language barriers to work together with partners to achieve a common goal. But perhaps an even bigger achievement is the demonstration that such cooperation on technical and political levels is feasible and can achieve results within the relatively short timeframe of one year.

We, the undersigned Ministers of Health, recognize this document as an important achievement in redressing some of the concerns raised by mineworkers and their communities over the past century and more. It is our collective hope that the cross-border, multi-stakeholder cooperation it represents will move the Southern Africa sub-region forward in the long fight against TB.

**SIGNATORIES TO THE FRAMEWORK FOR THE HARMONIZED MANAGEMENT OF
TUBERCULOSIS IN THE MINING SECTOR**

Country	Name and Designation	Signature
South Africa LESOTHO	Dr P.A. Maphahle Minister of Health P.A. MANAMOLELA MIN. HEALTH	
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Zimbabwe	Marcelino E.S. hwas PS of MoH on behalf the minister Do. Alexandre Mangwede	

Signed on this day the 25th of March 2014, in Johannesburg, South Africa

PART 1: BACKGROUND

1.1 Overview of the global and regional TB situation

The World Health Organization (WHO) in 2013 estimated that globally 8.6 million incident cases of tuberculosis (TB) occurred in 2012 (13 percent co-infected with HIV). There were also 1.3 million deaths from TB (980,000 deaths among HIV-negative individuals and 320,000 among people who were HIV-positive). These deaths included 410,000 women, making TB one of the top three killers of women worldwide¹.

TB has risen markedly in sub-Saharan African nations over the past two decades, with reported annual incidence doubling between 1990 and 2007. The most recent estimates of TB data from the WHO indicate that TB incidence declined in only 10 of 46 African countries between 2000 and 2007. The African Region has 24 percent of the world's cases and the highest rates of cases and deaths per capita.

The 15 countries of the Southern African Development Community (SADC) region include five of the 22 global TB high-burden countries identified by the WHO. The SADC region has some of the highest national adult HIV prevalence rates in the world, and accounts for more than 37 percent of all people living with HIV. The SADC region has some of the highest TB/HIV co-infection rates in the world, ranging from 50 percent to 77 percent². This situation is further complicated by the emergence of drug-resistant strains including multi-drug resistant (MDR) and extensively drug-resistant (XDR) TB in the sub-region.

1.2 TB and the mining sector in southern Africa

Mining is an important industry in Africa, as 52 out of the 54 countries in Africa have discovered minerals. However, in southern Africa the bulk of mining activity is in South Africa with over 2,000 mines and approximately 500,000 mineworkers. These mines also draw employees from the neighbouring countries. Approximately 40% of mineworkers in South Africa are from Lesotho, Swaziland and Mozambique³. Many mineworkers are exposed to multiple TB risk factors, including HIV, health care disruptions, congregate living and challenging working environment. Their migration may also facilitate the transmission of TB to the general community. Sex work remains common around all-male hostels at the mines, increasing the risk of HIV transmission, which in turn increases the risk of active TB.

TB incidence among mineworkers is estimated to be as much as three to eight times higher than in the populations from which they originate. A recent World Bank study established an extremely high incidence of 2,500-3,000 TB cases per 100,000 people among mineworkers in South Africa⁴. The TB incidence rate in the general population of South Africa is 950 TB cases per 100,000.

The issue of TB in the mining sector is complex due to the fact that: i) TB is a health issue ii) mining is regulated by the Department of Minerals, iii) mining is private sector led; and iv) mineworkers come from different countries with varying health systems. Therefore addressing TB in the mining sector requires innovative, collaborative approaches among public and private sectors as well as civil society.

Recognizing the economic importance of the mining industry and the associated negative impact of TB on the health of mineworkers and their communities, the SADC Heads of State made a Declaration on addressing TB in the mining sector in August 2012 in Maputo, Mozambique.

This has prompted the SADC member states to take the initiative to develop a framework for harmonized management of TB in the mining sector, with the support of the World Bank and WHO.

1.3 Current approaches to managing TB in the mines

A wide variation currently exists in the package of health care services provided to employees in the mining sector in southern Africa. This is related to the size of the mines (large, medium and small scale), the location, and employment policies. While some mines provide health care services for both permanent and contract employees, others provide services to permanent employees only. Furthermore, some small-scale mines do not provide health services at all, leaving their employees to rely on public health services.

A survey of TB and HIV health services conducted by the South African National Institute for Occupational Health in 2010 identified inadequate TB care services in the mines. Of the 63 mines visited, only 40 percent provided TB services on site. Of the 60 percent with no services on site, 16 percent outsourced services to private health care companies. Overall, 51 percent indicated 'no service', implying total reliance on government health care facilities for TB services.⁴

1.4 Specific challenges of TB prevention, treatment and care in the mining sector

1.4.1 Access to health services

Absence of basic health care facilities as well as TB-specific care services in some mines, as described above, is a major barrier to accessing health care for some mineworkers. There is also a growing pool of undocumented migrant mineworkers who are susceptible to exploitation and who, due to their undocumented status, may struggle to access public health care services.

The vast majority of mineworkers in southern Africa are migrants and this could lead to TB treatment disruption, multiple treatment episodes, and loss to follow-up care. Access to TB services in communities around mines has generally been limited, with few mobile healthcare services provided either by mining companies or the public sector.

1.4.2 Labour issues

Employee conditions in the mining industry are often characterized by occupational exposure to silica dust and silicosis; a confined, poorly ventilated working environment; cramped living quarters; and high HIV prevalence. This substantially increases the risk of TB in the population of the mining workforce and their families.

Contract employees (unlike permanent employees), who are often migrants, are generally not entitled to health benefits. This compromises their access to health services and may also make them less likely to seek care and treatment for active TB, for fear of losing wages or losing their jobs.

The slow process of compensation around occupationally acquired TB poses a challenge for ex-mineworkers within South Africa and in the labor-sending countries. It is not uncommon for some ex-mineworkers to die several years after applying for compensation, while still waiting for the finalization of the process. This situation creates disincentives for ex-mineworkers to make the appropriate effort and investment to file compensation claims.

1.4.3 Cross-border migration and poor referral system

Migrant mineworkers can be highly mobile while undergoing care and treatment. Some may start treatment on the mines or in the public sector, return home to receive care, and then return to work on the mines when they feel strong enough to do so. Absence of efficient referrals and monitoring systems between countries and within countries seriously compromises the management of TB and TB/HIV among migrant mineworkers. This results in the growing risk of drug resistance and continuous transmission of TB among mineworkers, their families, communities around the mines, and labor-sending communities.

1.4.3 Ex-mineworkers and family contacts

Some ex-mineworkers return to their home countries after a period of service in the mines. For these groups the latest medical examination results should be made available for future reference in their home countries. Furthermore, it is desirable for the ex-mineworkers to maintain regular check-ups with the health system to ensure early detection of any emerging health issue, including TB. However, the home health systems usually lack health records of returning ex-mineworkers, which affects proper assessment and management of TB and related risk factors, especially silicosis and HIV. This situation increases the risk of family members and close contacts contracting TB from returning ex-mineworkers.

1.5 Justification for and purpose of this regional framework for the harmonized management of TB in the mining sector

The frequent movement of mineworkers, across both provincial and national borders, extends the high TB disease risk to the communities surrounding mines and the communities from which the workers originate and return to between contracts. This pattern of movement constitutes the most significant challenge in planning effective health service provision and ensuring adherence to treatment.

Harmonized framework for prevention, diagnosis, treatment and care of TB and related conditions will enhance access to and improve delivery of essential services in mines within countries and across borders.

This Framework serves as a resource for countries in southern Africa, notably Lesotho, Mozambique, South Africa and Swaziland, and the entire SADC sub-region, to facilitate increased collaboration that complies with WHO-recommended minimum standards for TB care.

The Framework is complementary to the various national TB management guidelines and tools. It focuses on policy areas and options that require further harmonization and collaboration across and within national borders

The clinical treatment of TB among mineworkers is similar to the treatment of TB in the general population. While the TB treatment guidelines of the countries are in compliance with WHO recommendations, there is no mechanism for cross-border management and referral.

1.6 Target audience for the Framework

The framework is aimed primarily at the national TB programmes in southern Africa and for institutions and authorities involved in planning and delivering mineworkers' health care services for TB, TB/HIV, silicosis and other occupational respiratory diseases.

1.7 Rationale for engaging mining sector in TB care activities

Businesses rely on a healthy and productive workforce. TB and HIV can undermine this. Workers in certain sectors are particularly vulnerable to TB and HIV. A sick worker could mean disrupted workflow, reduced productivity, absenteeism, direct and indirect costs for the employer, increased medical and health care costs, recruitment and training costs, and increased accident rates.

- A workplace programme that comprehensively addresses TB and HIV prevention, diagnosis, treatment and care in high burden settings can effectively mitigate the impact of these diseases on the workforce and thus on productivity. The workplace is a win-win setting for TB management and TB/HIV co-management strategies. Businesses that are already addressing HIV should consider implementing additional TB policies and treatment activities, and vice versa.

- National TB Programs (NTPs) are recognizing the importance of workplaces in expanding access to TB prevention, treatment and care. NTPs and NAPs can provide businesses with strong management and technical skills, and access to TB drugs and diagnostics, and broader health infrastructure.
- Efforts will have to be made by the NTP through partners to convince companies of the profitability of engaging in TB and HIV care, and gain commitment from company management. CEO's from major companies as well as inspiring leaders or role models may help in getting this accomplished.
- Well-functioning TB and TB/HIV workplace programmes can be expanded to increase access to SMEs, the informal sector and to the community. NTPs should coordinate these efforts in collaboration with civil society and relevant partners.

Managing TB at the workplace in conjunction with HIV or other occupational health programmes makes good business sense. TB workplace programmes may contribute to:

- Improving the health and increasing productivity of the workforce, or even preventing supply chain disruptions.
- Saving costs by reducing absenteeism, staff turnover and health care costs (through early and prompt diagnosis, and effective treatment).
- Reducing associated costs for insurance or sick leave through offering services on premises;
- Limiting loss of staff or their turnover through prompt diagnosis and effective treatment on premises or through referral, thus also saving costs for recruitment and training of new staff.
- Reducing risk of TB transmission to other workers by active case finding and screening on premises.
- Retaining knowledge and expertise otherwise lost when sick workers drop out or die.
- Maintaining workforce morale by providing them the convenience of increased access to TB and HIV prevention, treatment and care services and saving related costs.
- Demonstrating social commitment and respect towards businesses' human capital as part of their corporate social responsibility, thus also strengthening corporate image and reputation.
- Fulfilling a legal and moral obligation/responsibility to contribute to TB prevention, treatment and care efforts in those industries where workers are at increased risk of contracting the disease due to the nature of work.
- Increasing efficiency and results of public health programs by harmonizing treatment and referral of patients between private and public sector, which in turn benefits companies in the long run.

PART 2: APPROACH TO REVIEW AND SUPPLEMENT NATIONAL GUIDANCE FOR USE IN CARE OF MINeworkERS AND IN MINING COMMUNITIES

2.1 *Situational analysis of the scope and nature of the mining community in each country*

An initial and follow-up assessment of the nature and characteristics of the mining companies and communities needs to be carried out to inform the design and implementation of relevant interventions. Critical areas to consider include:

- Population of the community.
- Number of mineworkers and ex-mineworkers in the community.
- TB/HIV burden.
- Availability of general health and TB services.
- Availability of community-based structures (community health worker, community committees, etc.).
- Civil societies and NGOs active in the community.

Based on the results of the situation assessment, the mining companies could be categorized based on size and capacity to provide TB and HIV care and support.

A baseline survey may be undertaken to establish the benchmark for future comparison after implementation.

2.2 *Enlist mining companies' management commitment*

The management of the mining companies should be engaged from the start as part of the situational analysis exercise to enlist their support for functional collaboration in establishing a sound programme to address TB in the mines. This advocacy should aim to:

- Obtain commitment by the management to provide sustainable resources for TB (and HIV) prevention, treatment and care in the workplace.
- Encourage development and implementation of clear management policies (by management and employees) on confidentiality, discrimination, and time allowed for medical treatment; as well as job modification when necessary.
- Ensure education of employees on these policies.
- Encourage implementation of infection control measures to minimize the risk of transmission of infection in the workplace.

2.3 *Enlist employees commitment and participation*

Employee representatives and other key stakeholders should be engaged from the planning stages and throughout the process of developing and implementing the program for addressing TB in the mines, to ensure their full support and participation. The workers union and ex-mineworkers associations, and recruitment agencies are crucial stakeholders in this process.

To enable effective participation of mineworkers, ex-mineworkers, and other relevant stakeholders it is essential to:

- Increase their awareness about TB prevention, diagnosis and management, and its related risk factors such as HIV and silicosis.
- Inform prospective, current and ex-mineworkers about their rights and responsibilities such as TB screening, compensation policies, and treatment adherence.

2.4 Design of overall service delivery approaches

Based on the information generated from the mining community assessments, the design, service package, and implementation strategy should be appropriately developed. This service delivery strategy should be assessed regularly and, based on findings; the strategy should be updated accordingly. The package of intervention designed should be implemented in line with national guidelines of respective countries, which should be consistent with WHO recommendations. Key intervention packages include prevention, diagnosis, treatment and care for TB, TB/HIV, and MDR-TB within mining communities.

2.5 Development of TB/HIV workplace plan

A plan of action with clear objectives, strategy, methods of delivery and monitoring, identified partners, specified roles and responsibilities, and potential budgeting will ensure effective implementation of TB and TB/HIV programs in the mining workplace activities.

Mining companies should also be provided with technical support in developing the plan in consultation: 1) internally with both senior management and workers' representatives, and 2) externally with the NTPs and partners. They may identify a focal person to coordinate all relevant activities.

Mining companies which have the capacity or have their own dedicated health services should set up their own workplace TB and TB/HIV programs or integrate these activities into existing Occupational Safety and Health (OSH) or 'wellness' programs.

The existing health benefits and schemes for employees and existing schemes for TB and HIV prevention, treatment and care, and antidiscrimination rules and policies should be assessed for mainstreaming of any planned interventions.

To facilitate the latter it is essential to:

- Identify all possible entry points in the HIV/OSH/wellness workplace program where TB can be integrated.
- Ensure that integration is built upon what exists and not through the creation of vertical or duplicate structures which may not be sustainable in the long term.
- Based on their capacity, and in collaboration with the NTP and other partners, the businesses should identify which tasks they can undertake in the workplace or beyond. This should be clearly outlined in the plan with assigned responsibilities.

2.6 Workplace policy

Formulation of a workplace policy on TB (and HIV) or integrating them into existing occupational health and safety policies is vital in increasing awareness among workers and enhancing trust, accountability, ownership, commitment, and sustainability.

TB and HIV workplace policies provide a framework for direct action in the workplace and demonstrate the commitment of management and workers. Workplace policies should be based on the principles of the International Labour Organization (ILO) Code of Practice and ILO recommendations on HIV/AIDS and the World of Work, 2010, and be developed with the active involvement of senior management and representatives of workers.

A TB/HIV workplace policy is necessary as it provides the framework for direct action in the workplace and demonstrates the support and commitment of management. It should be developed in a participatory manner with the active involvement of senior management and representatives of workers. This process will ensure trust, transparency, accountability, ownership, commitment, as well as sustainability of the workplace programme.

The workplace TB policy, if one exists, should be integrated in a broader policy (e.g. health, wellness or HIV workplace policy) or agreement, or an exclusive statement of commitment.

The workplace policy, agreement or exclusive statement of commitment should address the following principles of the ILO Code of Practice & the Occupational Diseases List (2010):

- Recognition of TB and HIV as workplace issues.
- Bipartite approach (working with management and workers representatives).
- Gender equality.
- Protection of the rights of workers.
- Non-discrimination.
- Confidentiality.
- Continuation of employment.
- Prevention.
- Treatment, care and support.

Socioeconomic issues that contribute to cross-border spread of this epidemic, such as living conditions and gender dynamics, need to be tackled by sectors beyond health.

2.7 Return-to work-policy

A clear return-to-work policy is needed for the employee with TB because of possible anxieties among other employees.

Constantly reminding all staff that TB is a curable disease is necessary to dispel stigma and misconceptions. Returning to work should be linked to medical certification that the employee is no longer infectious and is not otherwise ill or incapacitated for his or her usual work.

If permanent incapacitation results, the company's normal permanent incapacity procedures should be applied.

2.8 Advocacy and education

Enhanced awareness and knowledge have a significant role towards TB prevention, early diagnosis, better treatment adherence, and stigma and discrimination reduction.

Awareness and educational campaigns targeting employees and their families can address negative attitudes towards people with TB and HIV and increase awareness among employees about TB and TB/ HIV co-infections. A focus on prevention and strengthening of advocacy efforts is necessary.

Development of a sound advocacy and education package that will address the information needs of employees and their families requires the collaborative efforts of the national HIV and TB program. As a minimum, all workers should at least be aware of the symptoms of TB and when, where, and how to seek TB testing.

2.9 Service provision and support

The plan for TB, HIV and MDR-TB services should include the following:

- Active case finding (systematic active TB screening) system should be implemented in all mines.
- Ensuring access to good quality diagnostic services, particularly rapid molecular diagnostic tests, sputum smear microscopy, culture and DST to ensure early detection of infectious and drug-resistant cases, thereby preventing the further spread of TB.
- Provision of an uninterrupted supply of good quality, free drugs accessed through the national TB Programme and the state health system.

- Direct observation of standardized short course chemotherapy by a health care worker or treatment supporter to ensure a cure and prevent the emergence of drug resistance.
- Psychosocial support for employees who have TB, such as ensuring free treatment and services, identical salary during treatment or compensation for loss of income, free transport to health facilities, food support or other motivations to continue treatment.

2.9.1 Continuity of treatment

Ensuring continuity of TB treatment is an essential part of case management. This is of extremely high importance considering the migratory nature of the mineworkers. Appropriate measures to ensure continuity of treatment should be put in place for employees who are being treated for TB. In the case of mineworkers leaving employment, or disengaging from the company on a temporary leave or permanent basis while on treatment, should be linked to appropriate health services in their area of residence, if they are not in a position to avail of workplace treatment services.

Innovative collaborative mechanisms, including electronic registers for information exchange, should be established within and across countries to ensure treatment adherence.

2.9.2 Referral and treatment support

Intensified TB case-finding (TB screening), referral of people with TB symptoms, and treatment adherence support are activities that workplaces could contribute to, with marginal investment or effort. Medical and paramedical staff, human resource personnel and workers (peer educators/counselors) with appropriate training, can easily identify TB symptoms, refer people with symptoms for diagnosis, or provide treatment support and counseling.

These activities include:

- In the case of smaller companies that do not have on-site health facilities, establishing referral mechanisms to TB and HIV service providers within the public or private sector. This should be developed in a manner which enables the tracking of all referrals from the company; this will not only improve company planning of its workplace program, but also demonstrate the contribution of the workplace program to TB case finding and treatment within the community.
- Training of medical/paramedical staff and workers (peer educators/counselors) to identify and refer people with symptoms to the service points, and also to act as treatment adherence supporters contracted by medical institutions or by the public sector for sputum examination and other investigations.
- Training of medical/paramedical staff and workers to act as treatment adherence supporters.

2.9.3 Outreach to employees' families, communities and beyond

Reaching out beyond the workplace to the families, dependents, contracted companies and surrounding communities that 'supply' the workers is a key component of TB and TB/HIV workplace programs, and in some areas it complements the otherwise inadequate public health service infrastructure.

- Companies should extend provision of a comprehensive package of TB services not only to the workers' families, but also to the communities in which workers live.
- Alternatively, companies may adopt underserved communities or villages in close consultation with national TB and HIV programs; this may be especially beneficial in remote areas with poor access to public health services.
- Larger businesses can support smaller businesses in their supply chain to initiate and implement workplace programs.
- Larger businesses with support from trade unions, local partners and community representatives can help organize services for informal suppliers and workers in the informal,

unorganized sector. While some informal groups have strong associations, others exist only as disjointed, fragmented groups without the capacity to respond adequately to any emerging public health problem.

2.9.4 Privacy and confidentiality

- For all employees, when medical records are kept in the company, provision needs to be made for adequate data-processing measures.
- These measures should be governed by rules of confidentiality consistent with the ILO Code of Practice on the Protection of Workers' Personal Data, 1997, and other relevant international data protection standards.
- The transfer of important medical information with the employee at exit (e.g. past TB/HIV treatment experience) should be consistent with these rules and national policies and should be done in a fully confidential manner.

Awareness activities should be carried out at two levels within the workplace.

- Sensitization of senior management and labor unions to commit themselves to help undertake and sustain activities related to TB and HIV care.
- Sensitization of employees within the workplace to support and participate willingly in the TB and HIV control program.

Health education can take the form of peer education, special meetings and internal awareness seminars for all levels of staff, mailings, notice board posters, stickers, pay-slip inserts, and other promotional materials on workplace premises.

PART 3: HARMONIZED PROTOCOLS FOR TB DIAGNOSIS, TREATMENT AND CARE AMONG MINING POPULATIONS

3.1 Protocol for systematic TB screening

Systematic TB screening refers to a process that is usually provider-initiated, for the systematic identification of people with suspected active TB among at-risk individuals or communities through rapid symptomatic assessments, laboratory and other tests.

The most recent WHO global guidance on systematic TB screening classifies mineworkers and others who are exposed to silica as a TB high-risk group. The guidance recommends systematic screening of these groups to ensure that active TB is detected early and appropriate treatment is initiated promptly. This is also essential to achieve the ultimate aim of reducing the risk of poor treatment outcomes, health sequelae and the adverse social and economic consequences of TB, as well as helping to reduce TB transmission.

Rapid access to TB/HIV screening, HIV testing and counseling services for mineworkers and/or their dependents – on site or in collaboration with public and private institutions, and other community structures can greatly facilitate the identification of TB and HIV cases in mining workplaces. This will significantly reduce diagnostic delays and improve outcomes of treatment. This framework promotes an integrated approach to delivery of care for TB and HIV.

Periodic TB screening should be conducted, not only at the beginning and end of employment but regularly throughout the course of mineworkers' employment as part of occupational health activities, and should continue post-retirement.

The screening should be conducted using the nationally adopted algorithms that combine clinical, radiological and bacteriological methods. A six-monthly radiological screening detects more patients with presumptive TB than 12-monthly screening; and when confirmed, they have less extensive disease and lower mortality⁵.

Household and other close contacts of index TB cases (persons detected with active TB disease) should also be systematically screened for active TB upon detection of the index case and during each visit to a health facility.

To the greatest extent possible, TB screening should be combined with screening for other diseases and health-promotion activities, and with efforts to improve working conditions (especially by reducing exposure to silica) and living conditions.

Systems should be put in place to ensure complete documentation and availability of mineworkers' medical history, including screening results. Continuity of care after screening should also be ensured through referral of patients and transmission of their records to facilities providing either treatment or isoniazid preventive therapy (IPT) if this is not available within the screening structures.

3.2 Protocol for TB diagnosis

TB screening should be followed by a rapid establishment of tentative TB diagnosis using reliable laboratory diagnostic tests.

The diagnostic approach should be based on a good medical history and laboratory investigation. This should include consideration of the following:

- Ensure assessment of the past medical records of the mineworker, ex-mineworker and/or family members and close contacts.
- If the mineworker undergoes a Medical Benefits Examination (MBE) programme, the records of such periodic medical exams should be examined and taken into account.

- The presence of any exposure to or emergence of any occupational lung disease should be properly documented.

Given the high HIV prevalence among incident TB cases in the SADC region, the WHO-recommended Rapid Diagnostic Test, e.g. Gene Xpert should be performed as an **initial diagnostic test** for all mineworkers, ex-mineworkers and their close contacts with presumptive TB or drug-resistant TB⁶.

A positive Gene Xpert result without Rifampicin resistance should be registered as a 'bacteriologically confirmed TB case' and the patient started on anti-TB treatment immediately. On the other hand, a positive Gene Xpert result with positive Rifampicin resistance should be registered as an MDR-TB case and the patient started immediately on the standardized MDR-TB regimen according to national guidelines.

Where Rapid Diagnostic Test is not available, smear examination should be performed according to national guidelines.

The WHO recommends non-automated nucleic acid amplification tests, referred to as Line Probe Assay (LPA), which simultaneously detects Rifampicin and isoniazid resistance in individuals with sputum smear positive TB⁷.

Positive cultures should be speciated to differentiate *M. tuberculosis* from non-tuberculous mycobacteria (MOTT), which are more common in HIV-infected patients.

HIV testing should be offered at every opportunity in the TB diagnostic process.

3.2.1 Role of other investigations in TB diagnosis

Other methods of diagnosis, e.g. chest X-ray, LPAs, biopsies etc. have a role to play in the diagnosis of TB and should be used according to national guidelines. Sero-diagnostic TB tests should not be used for TB diagnosis until endorsed by WHO.

3.2.2 Silicosis diagnosis

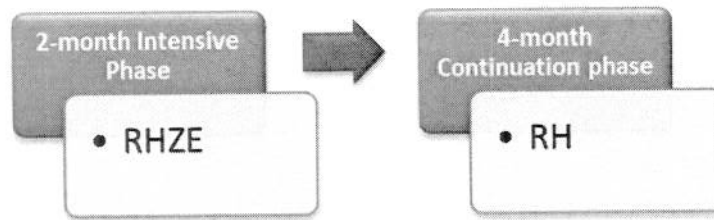
Silicosis is an incurable lung disease caused by inhalation of dust that contains free crystalline silica, especially due to excavation activities. Silicosis is not only one of the major risk factors for the development of TB in mineworkers, but the signs and symptoms can also be confused with TB. A complete work history, CXR +/- lung function tests will help in the diagnosis of silicosis. Countries should have appropriate policies, guidelines and tools for effective management of silicosis. Health workers dealing with mineworkers or ex-mineworkers with respiratory symptoms or confirmed TB should endeavour to rule out or confirm the diagnosis of silicosis.

3.3 Protocols for TB treatment

3.3.1 Treatment of drug susceptible TB in adults and adolescents

Treatment of drug sensitive TB in mineworkers and their families should be based on nationally agreed treatment regimens developed in line with WHO recommendations⁸. The recommended anti-TB drugs to be used in the treatment regimens should include Rifampicin (R); Isoniazid (H), Pyrazinamide (Z), Ethambutol (E), and Streptomycin (S). **The recommended regimen for the treatment of drug-susceptible types of TB is typically as follows:**

- New patient regimen: the regimen containing six months of Rifampicin: 2HRZE/4HR
- Regimen for previously treated cases: with first line drugs: 2HRZES/1HRZE/5HRE



3.3.2 Treatment regimens of drug sensitive childhood TB

Treatment of drug sensitive TB in children of mineworkers should be based on nationally agreed treatment regimens developed in line with WHO recommendations⁸. **This regimen should include the dosage formulation and fixed combinations appropriate for children. This regimen is typically represented as follows:**

- New patient regimen: the regimen containing six months of Rifampicin: 2HRZE/4HR
- Regimen for previously treated cases: with first line drugs: 2HRZES/1HRZE/5HRE

3.4 Protocol for management of drug-resistant TB (DR-TB)

3.4.1 DR-TB case finding

Intensive MDR-TB case finding should be implemented in patients, such as mineworkers, who are at high risk of harbouring drug-resistant strains.

All children who are close contacts of mineworkers or ex-mineworkers who are known MDR-TB patients should be evaluated for MDR-TB.

Relevant samples should be collected for rapid TB diagnosis using available methods (GeneXpert, LPA) and culture/DST. Where feasible, induced sputum and gastric aspiration samples should be collected if the child cannot expectorate.

3.4.2 DR-TB diagnosis

As described in section 3.2 above, all mineworkers with a presumptive diagnosis of TB should have their sputum examined with a WHO-recommended rapid molecular diagnostic (WRD) test capable of identifying at least Rifampicin resistance (GeneXpert or LPA).

A high index of suspicion is essential to rapidly identify child cases with presumptive DR-TB, especially where the child is a close contact of mineworkers or ex-mineworkers.

If the child is already diagnosed and receiving TB treatment, DR-TB should be suspected if there is:

- Poor clinical response.
- Persistent TB symptoms: cough, fever, night sweats, reduced playfulness, poor appetite.
- Poor weight gain or failure to thrive after two or three months of treatment.
- Worsening of the chest X-ray.

When a child is a contact of confirmed MDR-TB patient and is diagnosed with TB, She/he should be treated as drug resistant TB patient

All respiratory specimens should be sent for smear, Gene Xpert and culture/DST.

Rapid HIV testing should be performed according to national protocols if there is any doubt about the patient's HIV status, or if the patient has not been tested recently.

3.4.3 Treatment regimens for MDR-TB in adults

DR-TB in mineworkers, ex-mineworkers and their family members should be treated in the context of programmatic management of drug-resistant TB as recommended by WHO. Mineworkers and ex-mineworkers and their family members diagnosed with MDR-TB should be treated mainly on an ambulatory basis rather than a reliance principally on hospitalization.

A decision to initiate a patient on MDR-TB treatment must be informed by the patient's DST results; at a minimum, results of resistance to Rifampicin should be available with exceptions only considered in children. The recommended second line anti-TB drugs and their standard codes to be used in MDR-TB treatment regimens are shown in the table below:

Table 2

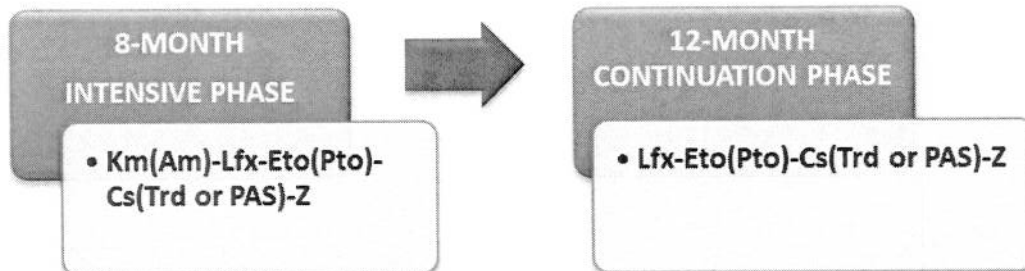
Group	Drugs	Standard code
Group 1: First line oral anti-TB drugs	Isoniazid	I
	Pyrazinamide	Z
	Ethambutol	E
Group 2: Second line injectable anti-TB drugs	Amikacin	Amk
	Kanamycin	Km
	Capreomycin	Cm
Group 3: Fluoroquinolones	Levofloxacin	Lfx
	Moxifloxacin	Mfx
	Ofloxacin	Ofx
Group 4: Oral bacteriostatic second line anti-TB drugs	Ethionamide	Eto
	Protionamide	Pto
	Cycloserine	Cs
	Terizidone	Trd
	Para-amino salicylic acid	PAS
Group 5: Agents with unclear role (not recommended by WHO for routine use in DR-TB patients)	Clofazimine	Cfz
	Liozelid	Lzd
	Amoxicillin/Clavulante	Amx/Clv
	Clarithromycin	Clr
	High-dose Isoniazid	HDH

An MDR-TB regimen consists of two phases:

- The first is known as the intensive phase, during which a combination of injectable and oral drugs is used (at least five drugs). The injectable agent should be continued at least four (4) months after the patient first becomes and remains culture-negative.
- The second is known as the continuation phase, during which only oral drugs are used.

Patients should continue treatment for at least 18 months after culture conversion to result in at least 20 months of total treatment duration.

An example of a standardized regimen for MDR-TB isⁱ:



The number shown at the beginning stands for the phase duration in months, and is the minimum amount of time that phase should last. Treatment is daily (a minimum of six times a week). An alternative drug(s) is indicated in brackets. The drugs in the higher groups are written first, followed by others in descending order. In the selection of fluoroquinolones to be used in the DR-TB regimen, a later-generation rather than an earlier-generation of the drug should be used.

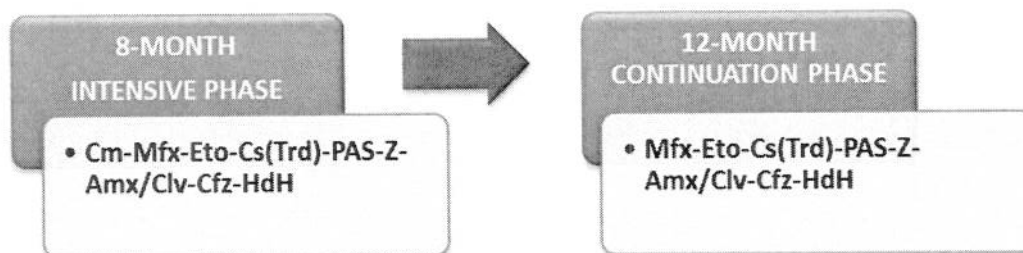
Patients who require second line treatment, but do not have DST results or where this is a significant delay in obtaining the DST results, should be started on the standardized regimen above until the results are available, after which treatment may be modified depending on the DST pattern.

Introduction of new drugs into the MDR-TB treatment regimen should be guided by the most recent WHO recommendations and adapted in countries based on local context and resources.

3.4.4 Treatment regimen for XDR-TB in adults and adolescents

Patients whose second line DST results show resistance to both a fluoroquinolone (e.g. levofloxacin, moxifloxacin); and second line injectable agent (e.g. kanamycin, amikacin or capreomycin) are defined as having XDR-TB. XDR-TB is much more difficult to treat than MDR-TB and is extremely difficult to treat in HIV-positive patients.

An example of a standardized XDR-TB regimen is as follows:



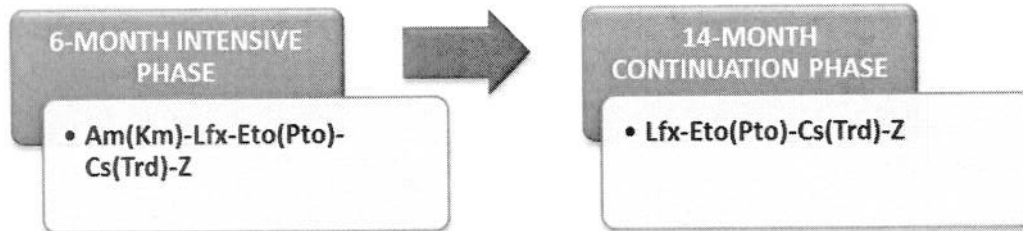
3.4.5 Treatment regimens for MDR-TB in children

Generally, children with MDR-TB should be treated with the first line drugs to which their M. tuberculosis strain (or that of their source case) is susceptible, including pyrazinamide.

ⁱ Kanamycin can be substituted with amikacin, terizidone can be substituted with cycloserine, ethionamide can be substituted with protionamide and PAS can be added to the regimen

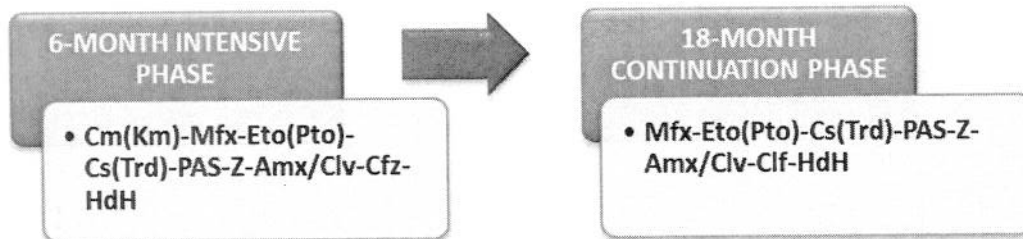
Specialist advice or referral to a specialist centre should be considered in the event of any difficulty with initiating DR-TB treatment in children.

The following standard treatment regimen should be used for the treatment of children with DR-TB in the absence of an individual DST result:



Amikacin can be substituted with kanamycin, while terizidone can be used when cycloserine is not available.

Children diagnosed with XDR-TB should receive the following regimen in the absence of guiding culture results:



Where monthly cultures are available, children with confirmed XDR-TB should continue treatment for 24 months⁹.

3.5 Treatment of TB/HIV co-infection

HIV testing and counseling should be offered to all patients of all ages who present with signs or symptoms suggestive of TB or have confirmed TB (Standard 14 of the ISTC). The family-centred approach to HIV testing should be employed such that once a family member is identified as having HIV, health workers should encourage and actively facilitate HIV testing for other family members.

Appropriate post-test counseling should be ensured, with a strong focus on HIV prevention, as this will also help prevent the spread of TB. Results of HIV testing should be properly documented in the appropriate columns of the TB register.

HIV care settings should implement the WHO's 'Three I's' strategy, which includes intensified TB case finding, isoniazid preventive therapy (IPT) and infection control at all encounters with TB and HIV patients.

3.5.1 Provision of anti-retroviral therapy (ART) in adults and adolescents

The existence of TB/HIV co-infection in mineworkers, ex-mineworkers or their family members have implications for the treatment, care and support for both conditions, including the timing and choice of ARV drugs. The recommended first line ART regimen in adults is TDF + 3TC (or FTC) + EFV as a fixed-dose combination¹⁰. However, if TDF + 3TC (or FTC) + EFV is contraindicated or not available, one of the following options should be considered:

- AZT + 3TC + EFV
- AZT + 3TC + NVP

- TDF + 3TC (or FTC) + NVP

The following should be observed in the treatment of HIV/TB co-infection in mineworkers, ex-mineworkers or their family members:

- ART should be started in all TB patients, including those with DR-TB, irrespective of the CD4 count;
- Anti-TB treatment should be initiated first, followed by ART as soon as possible within the first eight weeks of treatment.
- HIV-positive TB patients with profound immunosuppression (such as CD4 counts less than 50 cells/mm³) should receive ART immediately within the first two weeks of initiating TB treatment.
- ART should be started in any child with active TB as soon as possible and within eight weeks following the initiation of anti-TB treatment, irrespective of the CD4 count and clinical stage.
- Efavirenz should be used in patients starting ART while on anti-TB treatment.

3.5.2 Concomitant treatment of DR-TB and HIV

HIV co-infection is a significant challenge for the prevention, diagnosis and treatment of DR-TB, especially in the case of MDR-TB and XDR-TB. This is especially in view of the reported high mortality rates associated with DR-TB with HIV co-infection, and alarming mortality rates in patients co-infected with XDR-TB and HIV.

ART plays a crucial role, as mortality in MDR-TB/HIV patients without the use of ART is extremely high. The concurrent use of ART and DR-TB treatment has been reported to improve outcomes of DR-TB in the HIV-infected.

The treatment of DR-TB in HIV positive patients is essentially the same as for patients without HIV co-infection. Therefore, HIV testing and counseling should be offered to all patients of all ages who present with signs or symptoms suggestive of TB or have confirmed TB. Appropriate post-test counseling should be ensured, with a strong focus on HIV prevention, as this will also help prevent the spread of MDR-TB. Results of HIV testing should be properly documented in the appropriate columns of the TB register.

All mineworkers or ex-mineworkers diagnosed with HIV and DR-TB requiring second line anti-TB drugs should be started on ART irrespective of CD4 cell-count as early as possible (within the first eight weeks) following initiation of anti-TB treatment (Reference: Guidelines on Programmatic Management of DR-TB, 2011 emergency update).

The following should be considered in the management of HIV/DR-TB cases:

- The multiple medicines involved in DR-TB with recognized high toxicity risks, often combined with ART, results in a high incidence of adverse effects.
- Some toxic effects are common to both anti-TB treatment and ART and therefore tend to overlap, which may result in added rates of adverse events.
- Monitoring needs to be more intense for both response to therapy and adverse effects.
- Immune Reconstitution Syndrome (IRIS) may complicate therapy.

3.5.2 Provision of ART in children with DR-TB

All child TB suspects should be screened for HIV infection at the beginning of the evaluation and repeatedly if they are considered to be at risk for HIV infection. HIV co-infected children with MDR-TB should be rapidly initiated on ART, as concomitant ART markedly improves TB outcomes in children.

ART should be started within two to eight weeks after starting anti-TB treatment in HIV-infected children with MDR-TB in line with WHO recommendations. In addition to early ART initiation, all co-infected child TB cases should receive cotrimoxazole prophylaxis and pyridoxine supplementation.

Children who are antiretroviral treatment naïve or on any first line ART regimen should be started on a triple combination with an AZT + 3TC back bone:

Key issues relevant for employed mineworkers, ex-mineworkers and in mining communities:

- TB treatment should be provided at the nearest and most convenient point, including workplace, public and private facilities.
- Time off for treatment should be provided to employees, as recommended by the treating clinician, without negative consequences to their employment.
- Provision of ongoing counseling and psychosocial support as part of patient management to ensure good treatment outcomes.
- Provision of appropriate information on TB, TB/HIV and the need for screening family contacts.
- Adequate health records should be maintained.

Table 3: Recommended ART regimens for treatment of naïve children

UNDER 3 MONTHS OF AGE	AGE 3 MONTHS AND OVER
AZT–3TC–NVP	AZT–3TC–EFV

Table 4: Alternative TB/HIV co-treatment child regimen options in special situations

SPECIAL SITUATION	ALTERNATIVE REGIMEN	COMMENTS
NVP or EFV toxicity	AZT–3TC–ABC	Immediately switch to an LPV/r-based regimen when TB therapy is completed
Severe anemia (<i>Hb</i><8 g/dl)	Use d4T instead of AZT	Switch to AZT when stable

Source: WHO guidelines for antiretroviral therapy for the treatment of HIV infection in infants and children. 2010 revision.

3.5.3 Monitoring of DR-TB and HIV therapy in co-infected patients

HIV treatment must be taken daily without exception to prevent the development of drug resistance. Since DOT is an important component of DR-TB therapy, programmes would be advised to explore the provision of TB medications and ARVs through concomitant DOT or other methods of adherence support.

This is particularly important in the setting of second line anti-TB therapy, since it can result in a large pill burden and numerous adverse effects that make taking ARVs more difficult. The table below describes the monitoring requirements while on DR-TB therapy and indicates where any extra monitoring is required for patients co-infected with HIV and/or on ART. In addition, the ART regimen should be evaluated for possible treatment failure, as described in national ART guidelines.

Table 5: Monitoring and evaluation of patients during hospitalization and during ambulatory care

Monitoring and Evaluation	Recommended frequency
Evaluation by a clinician	At baseline Two to three times per week for stable patients and daily for very sick patients until conversion Every month or bi-monthly for outpatients on continuation phase
Evaluation by nurse	Daily
Sputum smear and cultures	At baseline Monthly
Weight	At baseline and weekly during intensive phase Monthly during continuation phase
Height	At baseline in adults and children
Body mass index	At baseline and then monthly
Drug Susceptibility Testing (DST)	At baseline For patients who remain culture-positive at six months
Chest radiograph	At baseline Every six months (For children every two to three months in intensive phase) At treatment completion When requested by clinician
Serum creatinine	At baseline, then monthly during injectable phase Weekly if TDF in ART regimen (or other risk factor for increased renal toxicity)
Serum potassium	Monthly during injectable phase
Thyroid stimulating hormone	Every six months if receiving ethionamide and/or PAS Monitor monthly for signs of hypothyroidism In children every two months
Liver serum enzymes	Periodic monitoring (every one to three months) in patients receiving pyrazinamide for extended periods or for patients at risk of or with symptoms of hepatitis In children: if symptomatic or every six months if on ART
HIV screening	At baseline, and repeat if clinically indicated
Pregnancy tests	At baseline for women of childbearing age, and repeat if indicated
Audiometry	At baseline, monthly during injectable phase and for three months after the interruption of the injectable agent
Eye test	At baseline and when indicated

(Adapted from: World Health Organization. *Guidelines for the Programmatic Management of Drug-resistant Tuberculosis (WHO/HTM/TB/2005.361)*, World Health Organization: Geneva, Switzerland, 2008).

Patients with HIV-associated DR-TB may require special socioeconomic, nutritional and psychosocial support in order to successfully complete treatment.

3.6 *Cotrimoxazole preventative therapy (CPT)*

Co-trimoxazole preventive therapy substantially reduces morbidity in HIV-positive MDR-TB patients by reducing the risk for recurrent bacterial infections, malaria and pneumocystis jirovecii. All TB/HIV co-infected patients should receive co-trimoxazole preventive therapy throughout the duration of the anti-TB therapy.

Ideally, cotrimoxazole should be initiated prior to ART on the first adherence visit. This will allow differentiation between side effects from the anti-TB medicines and cotrimoxazole. Patients with known hypersensitivity to cotrimoxazole could be given dapsone instead²¹.

Given the higher likelihood of sulfa-related adverse reactions in HIV-positive patients (six to eight times greater than in the general population), sulfa-based prophylaxis should be started at least two weeks apart from MDR or XDR-TB treatment and/or ART. This might help differentiation between side effects from second line drugs and cotrimoxazole.

3.7 *TB infection control*

The working and living environments for mineworkers are usually characterized by conditions such as poor ventilation and over-crowding, which elevates the risk of transmission of TB among mineworkers, family members and close contacts. This underscores the importance of establishing effective infection control measures to prevent TB transmission at the workplace, within the household, and in the communities.

The three main WHO-recommended approaches for effective TB infection control in health care facilities, congregate settings, and households include the following:

- Administrative control measures.
- Environmental control measures.
- Personal protection measures.

3.7.1. *Administrative control measures*

In general, administrative control measures are aimed at preventing the generation of infectious aerosols or droplet nuclei containing *M. tuberculosis*, and thus reduce exposure of individuals to TB infection.

In the context of the mines, elements of an infection control programme to be instituted should include:

- Development of an infection control plan and coordination for the mining workplace, hostels and health facilities (where available), based on a risk assessment and in accordance with national and international guidelines.
- HIV testing for those working in high-risk situations should be offered and alternative jobs and ART for HIV-infected workers should be offered.
- Early identification of workers with symptoms suggestive of TB should be facilitated to ensure rapid diagnosis and treatment.
- Prompt identification of potentially infectious cases and separating them (triage) from other mineworkers until considered non-infectious by the health worker.
- Establishment of an effective system for maintaining cough hygiene among workers.
- Institution of a system of safe sputum-sample collection, storage and transportation to laboratories, according to national guidelines.
- Provision of regular training on infection control for administrators and health care workers.

Administrative control measures should also include keeping away infectious workers from other colleagues until two to four weeks after starting treatment.

3.7.2 Environmental control measures

These measures reduce the concentration of airborne infective droplet nuclei. Environmental control of TB refers to implementing environment-associated interventions to prevent or reduce airborne transmission from unsuspected cases or from diagnosed cases of TB to non-infected employees.

Environmental factors that enhance TB transmission are:

- Small, enclosed spaces.
- Areas that lack sufficient ventilation to clean the air through dilution or removal of infectious droplet nuclei.
- Ventilation systems recirculating air.

Reducing the concentration of airborne infective droplet nuclei requires systems that ensure a high flow of fresh air into the workplace environment:

- ✓ Ensuring free air circulation in workplace, hostels and homes.
- ✓ Installing directional air flow ventilation, air conditioning or heating system.
- ✓ Installing air disinfection devices.
- ✓ Installing air filtration systems within the existing heating and/or air conditioning systems.

3.7.3 Personal respiratory protection (respirator masks)

These measures aim to prevent personnel from inhaling both airborne infective droplet nuclei and crystalline silica particles¹². This can be achieved with the proper use of appropriate particulate respiratory masks.

3.7.4 Infection control in the community

At community level, infection control measures follow the same pattern as discussed for the mines but the specific activities may differ. For example, in a household or hostel with a patient with TB, the following may apply:

- ✓ Screen hostel and household contacts for TB.
- ✓ Offer education on TB transmission, airborne precautions to the patient and household/hostel members e.g. cough etiquette.
- ✓ Offer HIV testing and counseling to hostel and household members of TB patient.
- ✓ Where feasible, the patient should sleep in a separate room until considered non-infectious.
- ✓ Shared spaces should be well ventilated (keep windows open at all times).
- ✓ The patient should be encouraged to spend time outside in a shaded area if weather permits.
- ✓ When patients are confirmed or suspected to have DR-TB, caregivers should ensure self-protection with appropriate respirator masks.
- ✓ Smear-positive patients who are coughing should use surgical masks to minimize the release of infectious aerosols.

3.8 *INH prophylaxis*

Isoniazid preventive therapy (IPT) is aimed at treating latent TB infection in individuals at a high risk of developing active TB disease. The two main recognized high risk groups that should benefit from IPT are **HIV-infected individuals** and **child contacts** of infectious TB patients. Recognizing that mineworkers have a high prevalence of latent TB infection (up to 89 percent)¹³, high prevalence of HIV infection¹⁴ and a consequently estimated TB incidence of more than 10 times higher than the population in which they originate¹⁵, **mineworkers** should be recognized as a high-risk group and should routinely benefit from IPT.

Interventions in the mining community such as the Thibela study have shown limited population-level impact of IPT beyond the on-treatment period owing to high levels of TB incidence, low uptake and adherence challenges¹⁶. Individual-level effect of IPT on TB risk was, however, clearly demonstrated in the same study¹⁷. Therefore, mineworkers should be encouraged to access IPT as part of a holistic approach including intensified TB screening and HIV counseling and testing.

Exclusion of active TB is critically important before IPT is started. The absence of those without current cough, night sweats, fever, or weight loss can identify a subset of adolescents and adults who have a very low probability of having TB disease and can reliably be initiated on IPT.

Adults and adolescent patients who are living with HIV, with unknown or positive tuberculin skin test (TST) status, and who are unlikely to have active TB should receive at least six (6) months of IPT as part of a comprehensive package of HIV care¹⁸. IPT should be given to such individuals irrespective of the degree of immunosuppression and also to those on ART, those who have previously been treated for TB, and pregnant women.

PART 4: FRAMEWORK FOR IMPLEMENTATION AND COORDINATION OF TB CARE IN THE MINING SECTOR

Establishment of a comprehensive and sustainable programme to address TB, MDR-TB and TB/HIV in the mining workplace requires collaborative efforts of the government, companies, development partners, civil society, and the workers unions. Most countries in the region do not yet have a framework in place. This framework recommends key steps to be taken by countries to address the issue of TB in the mining sector, as elaborated below.

4.1 Stakeholder analysis

In addition to the assessment of the scope and nature of mining communities as outlined in section 2.1, a stakeholder analysis of all key state and non-state actors in the mining sector should be conducted. This will enable the determination of the various roles, capacities and resources of the stakeholders. This analysis should identify current gaps, inform definition of roles and responsibilities, mechanisms for collaboration, as well as informing future planning.

4.2 Roles and responsibilities

The NTP has the primary function of enlisting partnerships among both private and public sectors to support establishment and implementation of a workplace program in the mines. The responsibilities of the various potential partners should include the following:

4.2.1 National TB Programs and national HIV/AIDS Programs

NTPs should take on a stewardship role in creating a conducive and supportive environment for the setting up of workplace programs or partnering with existing workplace programs. It includes the following:

- Strategically facilitate partnerships and coordinate activities in collaboration with partners already involved in engaging workplaces, such as HIV programs, public and private sector employers, business coalitions, employer federations, chambers of commerce, workers' organizations (e.g. trade unions) UN agencies, non-governmental organizations (NGOs), and private health practitioners.
- Identify and link with relevant partners.
- Engaging relevant partners early in the planning process will make implementation of workplace programs easier and more efficient, and will ensure a better chance of sustainability.
- Identifying and listing all organizations in addition to the public sector involved in TB and/or TB/HIV activities within the region/district/province/community of the workplace. A list and description of key partners to assist implementation of workplace programs is highlighted in the next chapter.
- Identifying the core competencies of potential partners and charting out clear roles and responsibilities in consultation with partners.;
- Setting TB control policy.
- Monitoring and evaluating TB program activities (case finding and treatment outcomes).
- Reporting program results to the Ministry of Health and to the WHO.
- Training and supervising staff involved in TB control activities.
- Quality control of diagnostic laboratory activities.
- Procurement of drugs, diagnostic agents, and other supplies.
- Information, education, and communication activities.
- Advocacy.

4.2.2 Businesses/company management

Businesses across the board, irrespective of size or capacity, can contribute in diverse ways to TB prevention, treatment and care, via:

- Provision of TB and HIV services to their workers.
- Development of an appropriate workplace policy.
- Ensuring that no employee experiences discrimination on the basis of their TB or HIV status, whether in terms of continuing employment relationships or access to health insurance, occupational safety, and health care schemes.

4.2.3 Trade unions

Their roles could include:

- Mobilizing broad membership to address TB and HIV.
- Creating awareness amongst employers and workers.
- Negotiating and shaping the right workplace policies and plans.
- Building support among workers for implementation of workplace TB and HIV programme activities.
- Protecting the rights of workers.
- Advocating in the political arena.
- Helping build informal workers' organizations through education, training, and collaboration.
- Working with NGOs and other unions to spread awareness messages to the surrounding community; add resources; share ideas, experiences and knowledge; and coordinate strategies.

4.2.4 Labor inspectorate/Ministry of Labor

Labor inspectors have the role of ensuring that labor laws are given practical effect and become actual standards for workers. Inspectors can also help employers to monitor work practices and ensure that action is taken to change them when necessary.

Their roles could include:

- Advising on legal and policy reform.
- Integrating TB and HIV in existing occupational safety and health structures, including labor inspection.
- Providing policy guidance and practical measures to extend social protection, and advising specifically on the development of innovative health and life insurance schemes.
- Advocating for the workplace to be the key delivery point for prevention, treatment and care to workers.

4.2.5 Employers' organizations/Chambers of commerce

Employers' organizations are national umbrella bodies which can play a key role in assisting companies within and outside their networks to formulate, implement and monitor HIV/AIDS and TB workplace policies and programs; disseminate information to their employees, families and dependents; and access technical and financial support in order to scale up interventions. At the national level, NTPs could contact and link with the HIV/AIDS and TB focal persons in the employers' organizations.

Their roles could include:

- Initiating and fostering NTP-NAP business sector collaboration.
- Facilitating communication with and support to NTP and NAP staff to work effectively with the business sector.
- Providing awareness to all levels of management and company employees.

- Assisting companies to formulate, implement and monitor TB and HIV workplace policies and programmes.
- Facilitating training by NTP and NAP.
- Organizing SMEs and the informal sector to build their capacity to participate in TB and HIV prevention, treatment and care activities for workers, and motivate and support those with existing HIV interventions to integrate TB care and control.

4.2.6 Business coalitions and associations

NTPs can work together with existing coalitions to help them integrate TB in their mandate and into workplace programs of their member companies. Their roles could include:

- Advocating for business action through the fostering of NTP-NAP business sector collaboration and public-private partnerships.
- Raising awareness among all levels of management and company employees.
- Supporting the design, development, and implementation of workplace programmes by sharing best practices, and providing necessary tools and training material.
- Facilitating training by NTP and NAP.
- Enabling company peer-to-peer knowledge sharing and learning.
- Organizing SMEs and the informal sector to participate in TB and HIV prevention, treatment and care activities for the workers.
- Motivating and supporting those with existing HIV interventions to integrate TB prevention, treatment and care.
- Accrediting companies with effective workplace programs.

4.2.7 ILO, WHO, World Bank, and UNAIDS country staff

ILO National Focal Persons and National Project Coordinators, WHO national TB and HIV Programme Officers, and UNAIDS Partnership Advisors can provide technical support to companies to initiate and implement TB and/or integrated TB/HIV workplace programs and policies at the national level.

Their roles could include:

- Providing technical support for the development of TB and HIV workplace policies and programs, including training assistance to all companies and partners identified.
- Brokering partnerships (in what can become a tense collaboration) between workers demanding better working conditions and health services, and employers trying to keep costs to a minimum.

4.2.8 NGOs involved in TB and HIV (international and local)

NGOs have potential roles in providing TB and HIV care, and serving as intermediaries between the public and private sectors.

These may be local or international NGOs/not-for-profit organizations. In many instances, local NGOs are enabling companies to reach out to the communities beyond the workplace that 'supply' the workforce.

These NGOs may also be vital in linking the NTP with other intermediary organizations such as trade unions, recruitment agencies and labor inspectorates.

Their roles could include:

- Advocating and fostering NTP-NAP business sector collaboration.
- Facilitating communication with and supporting NTP and NAP staff to work effectively with the business sector.
- Raising awareness among all levels of management and workers.
- Assisting NTPs and NAPs to train company employees, especially health care professionals and members of trade unions.

- Organizing SMEs and the informal sector to participate in TB and HIV prevention, treatment and care activities for workers: assisting those with existing HIV interventions to integrate TB prevention, treatment and care.
- Providing logistical support.
- Supporting monitoring and evaluation of activities.
- Facilitating community outreach.
- Supporting monitoring and evaluation of activities.
- Facilitating community outreach.

4.3 *Monitoring and evaluation*

Countries should develop appropriate monitoring and evaluation indicators and tools to assess progress in the implementation of this Framework. These indicators should include, among others, case notifications of treatment outcomes and referral rates for TB in the mining and labor-sending communities.

The workplace programs should be consistently and rigorously monitored in line with national standards.

The effectiveness of TB prevention, diagnosis, treatment and care activities should be measured against clear goals in terms of uptake and coverage indicators, successful treatment outcomes, and reduction in TB and HIV incidence, prevalence and mortality, in line with national standards.

Where successful, results and the methods used to achieve them should be disseminated internally as well as to other businesses, public sector and non-governmental agencies working in TB control. The standardized monitoring and evaluation tools in line with the national TB program-reporting system should be adapted and used by mine health services in TB notification, and assessment of treatment outcomes.

PART 5: INSTITUTIONAL LINKAGES FOR REGIONAL COORDINATION OF TB CONTROL IN THE MINING SECTOR

5.1 *Cross-border linkages*

A major shortcoming of TB management in the mining sector stems from lack of coordination among the various countries where these mineworkers originate and work, and insufficient health systems to deal with cross-border TB management. Therefore, the increased mobility of the mineworkers requires an effective and sustainable approach to coordinate interventions that would ensure quality TB prevention, care, and uninterrupted treatment activities together with patient support across the borders of Lesotho, Mozambique, South Africa, and Swaziland. Some of the specific challenges encountered across the mining sector in TB management include:

- Limited access to early TB diagnosis for mineworkers in medium and small mines and for those living in mining communities.
- Lack of continuity of care when mineworkers migrate back to their original homes.
- Little or no information regarding availability and quality of care where mineworkers come from.
- Lack of information for mineworkers regarding the risk of acquiring TB and how to prevent TB transmission.

These result in high treatment default rates, low cure rates and development of resistant TB.

Formal agreements need to be established among the governments of Lesotho, Mozambique, South Africa, and Swaziland. They should not only be restricted to the Ministries of Health but should be shared with other relevant government ministries and departments responsible for labor, immigration, and home affairs. These agreements should take the SADC Declaration on TB in the Mining Sector as a starting point, and the main areas should include:

- Harmonized framework for treatment referral and transfer of patients.
- Establishment of legal frameworks to protect the rights of mineworkers and ex-mineworkers.
- Adequate recording, monitoring and evaluation of the initiative.

These formal policy agreements will then provide space for technical collaborations across the region.

5.2 *Technical collaboration*

In order to ensure effective implementation and monitoring of this Framework, regional and country-level technical working groups (TWGs) should be established. The composition, secretariat and reporting responsibilities of the country TWGs should be determined based on local context. The WHO and the World Bank will remain principal partners to support both the regional- and country-level TWGs. The functions of the TWGs shall focus mainly on promoting the adoption and implementation of the Framework; and facilitation and resolution of intra- and inter-country technical issues related to TB management.

If providing services within the workplace is not feasible, the NTP should liaise with the nearest clinic to find alternative solutions to improve access to workers, e.g. early morning, lunchtime or evening clinics, outreach visits to workplaces by clinic staff, priority access at certain times, etc.

5.3 Referral and feedback mechanisms

A robust tracking and referral mechanism within and between countries should be established. An electronic, interlinked online referral system would be ideal in achieving the objectives of this Framework. This would allow direct monitoring of referral processes and ensure the trigger of tracking mechanisms in case of potential loss to follow-up. It would be appropriate for this electronic referral module to be able to have modules for other diseases in order to facilitate the delivery of a patient-centred 'total package' of service. In the absence of an electronic system, a paper-based referral system should be used. This paper-based system should be complemented by the use of telecommunication systems (e.g. cell phone technology) to optimize its efficiency.

5.4 Mapping of current mineworkers and ex-mineworkers

Countries should initiate the mapping of current mineworkers and ex-mineworkers in order to understand the number and location of current mineworkers and ex-mineworkers; and the location and quality of health services available to them. This will facilitate active case finding, contact tracing and referral. Ex-mineworkers' associations can play a critical role in the mapping of ex-mineworkers, as this may reduce stigma associated with TB/HIV amongst the communities in which ex-mineworkers live.

5.5 Database of mineworkers

It is recommended that the countries work together with mining companies and other stakeholders to generate a database of mineworkers with a history of TB infection. This database should contain unique information on each mineworker, including basic demographics, relevant medical history, contact details, and addresses. It should be accessible to the health systems of each of the countries to facilitate referral processes between and within the countries, and case finding.

5.6 Cross-border tracking and contact tracing

Patient tracking and contact tracing across borders often pose significant challenges related to immigration status which may compromise identification of patients and patient tracking.

There is a need for a coordinated stakeholders' engagement in establishing an effective cross-border patient tracking and loss to follow-up. The technical coordinating body should identify various stakeholders (e.g. multinational NGOs) and harmonize the referral, patient-tracking and contact-tracing mechanism. Since almost half of the mines rely on the government in the 'mineworker receiving country' (South Africa) and a vast majority of the mineworkers will be accessing the public facilities in the 'mineworker-sending countries', effective collaboration with government facilities will also be vital.



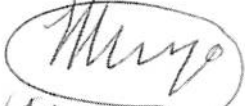
An efficient cross-border communication mechanism involving the national TB programs for cross-referencing of patients and validation of referrals, tracking and contact-tracing information is crucial. This should be coordinated by the technical coordinating body and should involve all stakeholders.

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**SIGNATORIES OF MINISTERS/DELEGATES EXPRESSING INTENTIONS TO SIGN
THE FRAMEWORK FOR HARMONIZED MANAGEMENT OF TUBERCULOSIS IN
THE MINING SECTOR**

The following Ministers/Heads of Delegations have expressed an intent to adopt the Framework for
Harmonized Management of Tuberculosis in the Mining Sector after in-country consultations.

COUNTRY	NAME AND DESIGNATION	SIGNATURE
MALAWI	C. HARA MINISTER OF HEALTH	
ZAMBIA	RAYFORD MBULLU (HON) DEP. MIN. LABOUR & SOCIAL SECURITY	
ZIMBABWE	FRED MOYO DEP. MIN. MINES	
NAMIBIA	A.V. MUHEHA DEP. MIN. LABOUR	