

Technical Guideline for Tuberculosis (TB) and TB-HIV Program Implementation

WORLD VISION
2017



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Mehda was treated successfully for MDR-TB in World Vision-supported TB clinic in Hargeisa, Somaliland. Photography: Stefanie Glinski

Cover photo: Abdi, 2, and his mother came to the TB clinic in Hargeisa, from Ethiopia, and were both treated for TB. Photography: Stefanie Glinski

CONTENTS

INTRODUCTION: ABOUT TUBERCULOSIS	3
a. TB drug resistance	4
EPIDEMIOLOGY OF TB	5
GLOBAL STRATEGIES AND APPROACHES	6
a. Stop TB Strategy	6
b. Engage TB	7
c. End TB Strategy	8
WHY WORLD VISION SHOULD SUPPORT THE END TB STRATEGY	10
a. World Vision Response - Current TB programmes	11
HOW WORLD VISION PROGRAMMES CONTRIBUTE TO ENDING TB	12
a. Community Mobilisation and Action	12
b. Collaboration with NTP and local health facilities	14
c. Complementary services	14
d. Strengthen Community systems and structures	15
MONITORING AND EVALUATING TB PROGRAMMES	16
TECHNICAL ANNEXES: CRITICAL STEPS FROM TB PREVENTION TO TREATMENT TO CURE	18
Annex 1: Continuum of Care: TB prevention, treatment and cure	18
1. Prevention	18
2. Case Finding - systematic screening for active TB	21
3. Referral for testing and treatment	22
4. Follow up: treatment compliance/adherence	23
Annex 2: Potential grant sources for TB and TB/HIV	25
Annex 3. High TB burden countries	26

INTRODUCTION: ABOUT TUBERCULOSIS

TB is an airborne disease caused by *Mycobacterium tuberculosis*. When TB-infected individuals cough, sneeze, shout, etc., tiny particles containing *M. tuberculosis* suspended in air can enter the respiratory system of a nearby healthy person. Pulmonary tuberculosis occurs when *M. tuberculosis* primarily attacks the lungs. However, it can spread to other organs causing extrapulmonary TB. Miliary TB, also known as generalised homogeneous TB, occurs when a tuberculous lesion erodes a blood vessel, disseminating millions of tubercle bacilli into the bloodstream and throughout the body. The lungs and bone marrow are most often infected, but any body part, such as kidneys, nervous system (causing meningitis), peritoneal cavity seeding from the abdominal lymph nodes, cardiac wall (pericardial infection), bones (such as Pott disease), etc., can be affected.

Most people infected with *M. tuberculosis* don't have signs and symptoms of the disease because their immune system prevents the mycobacterium from causing any damage. Those with latent TB infection are not infectious and cannot spread TB infection to others. When a person's immune system is weak, for instance in young children, the elderly or due to nutritional deficiencies or illnesses (especially people with HIV/AIDS), the risk of developing active TB disease is considerably higher than for people with normal immunity. Overall, about 5 to 10 per cent of infected persons, who do not receive treatment for latent TB infection, will develop TB disease at some time in their lives. Nearly one-third of the world's population has latent tuberculosis infection. The greatest risk for progression to active disease occurs within the first two years of infection, when about 5 per cent of individuals progress to tuberculosis disease. Following the first two years of infection, the risk of developing active disease over an individual's lifetime is 5-10 per cent.

(For pathogenesis of TB, refer to: <http://www.merckmanuals.com/professional/infectious-diseases/mycobacteria/extrapulmonary-tuberculosis>).

According to the World Health Organization (WHO), TB places its heaviest burden on the world's poorest and most vulnerable, further aggravating inequalities. People affected by TB face costs and suffer income loss equivalent on average of more than 50 per cent of their income.

Drug-resistant TB is caused by *M. tuberculosis* organisms resistant to drugs typically used to treat the disease. Drug-resistant TB is transmitted in the same way as drug-susceptible TB, and is no more infectious than drug-susceptible TB. However, delay in the recognition of drug resistance or prolonged periods of infectiousness may facilitate increased transmission and further development of drug resistance.

Multidrug-resistant TB (MDR-TB) is caused by organisms resistant to the most effective anti-TB drugs: isoniazid and rifampin. These drugs are considered first-line drugs and are used to treat most people with TB disease.

Extensively drug-resistant TB (XDR-TB) is a relatively rare type of drug-resistant TB. XDR-TB is resistant to isoniazid and rifampin, plus any fluoroquinolone and at least one of three injectable second-line drugs (i.e., amikacin, kanamycin, or capreomycin). Because XDR-TB is resistant to first-line and second-line drugs, patients must rely on treatment options that are more toxic, more expensive and much less effective.

TB DRUG-RESISTANCE TYPES

- Mono-resistance: resistance to one first-line anti-TB drug only
- Poly-resistance: resistance to more than one first-line anti-TB drug, other than both isoniazid and rifampicin
- Multidrug resistance (MDR): resistance to at least both isoniazid and rifampicin
- Extensive drug resistance (XDR): resistance to any fluoroquinolone, and at least one of three second-line injectable drugs (capreomycin, kanamycin and amikacin), in addition to multidrug resistance
- Rifampicin resistance (RR): resistance to rifampicin detected using phenotypic or genotypic methods, with or without resistance to other anti-TB drugs. It includes any resistance to rifampicin, in the form of mono-resistance, poly-resistance, MDR or XDR.

Reference: WHO:TB

THE EPIDEMIOLOGY OF TB

TB remains a major public health problem in many developing countries with an estimated 10.4 million new TB cases worldwide, of which 56 per cent are among men, 34 per cent among women and 10 per cent among children. People living with HIV (PLHIV) comprise 1.2 million (11 per cent) of all new TB cases. TB is the cause of death for 1.4 million people globally including 140,000 children (2015). It is also the leading cause of death (0.4 million) among PLHIV. India, Indonesia, China, Nigeria, Pakistan and South Africa account for 60 per cent of new TB cases.

Factors determining probability of transmission of *M. Tuberculosis*

THE FOLLOWING FACTORS DETERMINE THE PROBABILITY OF TRANSMISSION OF *M. TUBERCULOSIS*:

- 1. Susceptibility of the exposed individual:** People with weak immunity such as PLHIV, young children, people receiving immunosuppressive therapy, people with silicosis, diabetes mellitus, chronic renal failure, cancer, etc., are more susceptible to developing TB disease if exposed to *M. tuberculosis*.
- 2. Infectiousness of the person with TB disease:** People with TB disease expel a large number of tubercle bacilli into the environment, which can infect others. The more droplet nuclei in the air, the more probable that *M. tuberculosis* will be transmitted.
- 3. Environmental factors that affect the concentration of *M. tuberculosis* organisms:** Crowded and enclosed spaces such as prisons, migrant worker dormitories and factories, where there is inadequate local or general ventilation resulting in insufficient dilution or removal of infectious droplet nuclei.
- 4. Exposure:** The proximity, frequency and duration of exposure by the healthy individual to a person with TB disease increases the risk of transmission.

Any child living in close contact with a person who has infectious TB can become ill with TB, even if they are vaccinated.

TB in pregnancy is common during the perinatal period, especially in HIV-infected women. It is associated with increased maternal mortality, low birth weight (LBW) babies, increased risk of TB transmission to the infant, increased transmission of HIV to the infant and increased infant mortality.

GLOBAL STRATEGIES AND APPROACHES TO TB

I. Stop TB Strategy: The Stop TB Partnership (established in 2001) and WHO developed the Stop TB Strategy to reduce the global burden of TB by 2015 in line with the Millennium Development Goals. The strategy incorporated the DOTS (Directly Observed Treatment, Short Course) programmatic approach into a framework that also includes other elements necessary for TB prevention, diagnosis and treatment. The strategy aims to:

- Pursue high-quality DOTS expansion and enhancement
- Address TB/HIV, drug-resistant TB and other challenges
- Contribute to health systems strengthening
- Engage all care providers
- Empower people with TB and communities
- Enable and promote research

THE FIVE COMPONENTS OF DOTS (DIRECTLY OBSERVED TREATMENT, SHORT COURSE) INCLUDE:

- Sustained political and financial commitment. TB can be cured and the epidemic reversed if adequate resources and administrative support for TB control are provided.
- Diagnosis by quality ensured sputum-smear microscopy. Case detection through passive case finding using sputum-smear microscopy in patients with respiratory symptoms.
- Treatment using standard short-course (SCC) chemotherapy regimens containing rifampicin, administered under direct observation (for at least the first two months of treatment).
- Securing a regular uninterrupted supply of essential anti-TB drugs.
- Standardized recording and reporting: Establishing a reliable monitoring, recording and reporting system for program supervision and evaluation.

Five components of DOTS

Following the STOP TB Strategy and the Millennium Development Goal 6, (to have halted and begun to reverse the incidence of tuberculosis by 2015), TB prevention, diagnosis and treatment interventions, and the mortality rate for TB decreased by 47 per cent between 1990 and 2015¹.

Potential for integrating community- based TB activities

2. **Engage TB** approach is an operational guideline for integrating community-based TB activities into the work of NGOs and other civil society organisations (CSOs), such as integrated TB services in maternal, newborn and child health (MNCH), HIV and AIDS care and support programs, education, agriculture and livelihoods development programs. The main areas of intervention include: Early TB case-finding, TB treatment support, TB prevention and addressing social determinants that contribute to TB such as poverty, poor living conditions, poor nutrition, hygiene and sanitation.

The following table from the WHO Engage TB manual summarises the potential for integrating community-based TB activities into the work of NGO/CSO health and other programmes:

THEME	POSSIBLE ACTIVITIES
Prevention	Awareness raising, information, education, communication (IEC) , behavior change communication (BCC), infection control, training providers
Detection	Screening, contact tracing, sputum collection, sputum transport, training providers
Referral	Linking with clinics, transport support and facilitation, accompaniment, referral forms, training providers
Treatment adherence support	Home-based DOT support, adherence counseling, stigma reduction, pill counting, training providers, home-based care and support
Social and livelihood support	Cash transfers, insurance schemes, nutrition support and supplementation, voluntary savings and loans, inclusive markets, training providers, income generation
Advocacy	Ensure availability of supplies, equipment and services, training providers, governance and policy issues, working with community leaders
Stigma reduction	Community theater/drama groups, testimonials, patient/peer support groups, community champions, sensitizing and training facility, and CHWs and leaders

3. **The End TB Strategy** is a post-2015 global strategy aiming to end the global TB epidemic, with targets to reduce TB deaths by 95 per cent and cut new cases by 90 per cent between 2015 and 2035, and ensure that no family is burdened with catastrophic expenses due to TB. It sets interim milestones for 2020, 2025 and 2030.

STRATEGY: A WORLD FREE OF TB. END THE GLOBAL TB EPIDEMIC ZERO DEATHS, DISEASE, AND SUFFERING DUE TO TB				
	2020	2025	SDG: 2030	END TB: 2035
Reduction in number of TB deaths	35%	75%	90%	95%
Reduction in TB-incidence rate	20%	50%	80%	90%
TB-affected families facing catastrophic costs due to TB (%)	0%	0%	0%	0%



The strategy builds on three pillars underpinned by four key principles:

Pillar 1: Integrated patient-centered TB care and prevention

- Early diagnosis of TB including universal drug susceptibility testing, and systematic screening of contacts and high-risk groups
- Treatment of all people with TB including drug-resistant TB, and patient support
- Collaborative TB/HIV activities; and management of comorbidities
- Preventive treatment of persons at high risk, and vaccination against TB

Pillar 2: Bold policies and supportive systems

- Political commitment with adequate resources for TB care and prevention
- Engagement of communities, civil society organizations, and all public- and private-care providers
- Universal health coverage policy, and regulatory frameworks for case notification, vital registration, quality and rational use of medicines, and infection control
- Social protection, poverty alleviation and actions on other determinants of TB

Pillar 3: Intensified research and innovation

- Discovery, development and rapid uptake of new tools, interventions and strategies
- Research to optimize implementation and impact and promote innovations

To implement this strategy, advocacy for high-level political commitment and multisectoral collaboration is important. Assessing the TB situation, “knowing your epidemic,” including the status of health system capacity and their policy and regulatory environment, is essential. Collaboration with relevant ministries and departments, patients and affected communities, civil society, the private sector and national and international partners is recommended.

- 4. Recent advances:** Until late 2016, children treated for TB were given medicines made for adults. The pills are large and taste bitter. Caregivers had to crush the adult tablets to adjust the dose for the child and mix it with food to mask the taste. As a result, children did not get accurate doses, which can lead to drug-resistant TB. The TB Alliance and its partner recently developed a new pediatric formula tablet that dissolves easily and tastes good.

WHY WORLD VISION SHOULD SUPPORT the THE END TB STRATEGY

As a child-focused organisation, World Vision recognises the threat of TB to the well-being of children and their families and its negative impact in reversing successes gained through development programmes. World Vision's Child Well-being targets emphasise an increase in children protected from infection and diseases.

- World Vision operates in countries and communities worldwide, where there are huge needs for health services. Most locales have high rates of HIV, TB, malaria and other infectious diseases affecting the well-being of families, particularly children and mothers.
- It is estimated that TB patients in low- and middle-income countries lose more than 50 per cent of their annual income for medical expenses and care. Studies in Sudan, Ghana, Vietnam and Dominican Republic show the impact of TB on the household economy as high as an individual's yearly income, even in countries where TB diagnosis and treatment is free. The task of caring for sick individuals by family members places them at greater risk of infection, lowering their productivity and perpetuating the cycle of poverty. The cost of treating MDR-TB and XDR-TB imposes huge economic burdens on health systems.
- TB is not only preventable, but treatable. By raising public awareness of TB prevention and through active case-finding (ACF) and proper management of cases in partnership with health systems, it is possible to break the transmission cycle of TB and save millions of children from the scourge of TB. World Vision's development and emergency relief programmes and networks can serve as a platform to reach out to communities and families with lifesaving messages, case-finding and treatment interventions against TB.
- Through the years, World Vision has developed knowledge and competencies in facilitating community health interventions including programmes related to TB, HIV and AIDS. With funding from USAID, Global Affairs Canada, TB Reach and the Global Fund, World Vision has implemented world-class TB programmes in Somalia, Senegal, South Africa, India, Indonesia, Papua New Guinea, Philippines, Mongolia, Myanmar, Thailand, and elsewhere, contributing to the global effort to end TB.

WORLD VISION'S RESPONSE: CURRENT TB PROGRAMMES

Considering the high prevalence of TB and its dire consequences in the lives of children and families, World Vision has engaged in TB prevention, care and treatment programmes for the last 20 years. As of the end of 2016, World Vision is implementing TB programmes in nine countries: Kenya, Swaziland, Senegal, Bosnia–Herzegovina, Somalia, Thailand, Papua New Guinea, Myanmar and India. (See WHO list of 30 high TB burden countries in the annex.) With funding mainly from the Global Fund and USAID, World Vision national offices (NOs) in collaboration with National TB Programmes' work in community mobilisation, health education and behavioural interventions, implement active TB case-finding interventions, facilitate testing and referrals for treatment, strengthen community and health systems, conduct DOTS and treatment adherence follow-up, and strengthen local- and national-level advocacy efforts.

Since 2016, World Vision joined the global campaign Louder than Childhood TB, advocating and promoting improved diagnosis and treatment for pediatric cases including scale-up of fixed-dose pediatric formulations for the treatment of TB in children.



HOW CAN WORLD VISION PROGRAMMES CONTRIBUTE TO ENDING TB?

THE FOLLOWING ARE COMMON BARRIERS TO SUCCESSFUL TB CASE DETECTION AND TREATMENT:

- Poor knowledge about TB (symptoms, care and treatment, misperception, etc.)
- Stigma related to TB
- Weak health systems: poor access to health facilities (cost, distance, etc.), lack of services and supplies, poor quality services, lack of adequate diagnostic tools and child-friendly adequately dosed Fixed Dose combination (FDC) drugs for children, etc.
- Weak policies, community systems and structures for community-based TB programming

Common barriers to successful TB case detection & treatment

WORLD VISION PROGRAMMES CAN CONTRIBUTE TO END TB STRATEGY:

I. Through community mobilisation

- **Engage community-based organizations (CBOs):** Existing CBOs such as village health committees, women's and youth groups, PLHIV networks, worker/labor associations and faith groups can be mobilised to provide ongoing community education, DOTS volunteers and local advocacy for integrated TB services at the local level. The World Vision COMM project model for village health committees can be adapted for this purpose. It is equally important to engage the private-sector health-care providers, as well as HIV-prevention and care providers.
- **Advocacy:** Local-level advocacy increases demand for quality services including laboratory services, availability of integrated TB diagnosis and care, attention to stock-outs and depletion of quality diagnostics and drug supplies. Local-level advocacy models, such as Community Voice and Action (CVA), can mobilise communities and empower them to monitor the community health system and demand quality services. Issues and concerns discussed at the local level can be utilised for national-level advocacy. This calls for World Vision's active participation in National TB Technical Working Groups and networks and support to the National TB Programme (NTP).

HOW DO NGOs AND OTHER CSOs WORK ON HEALTH IN COMMUNITIES, INCLUDING TB?

- Providing health services in the community, including awareness and prevention, home-based care, TB screening, sputum collection and transport, treatment support including DOT and health education. They can also monitor and document the way in which communities are able to use the health system.
- Providing support for people needing or using health services, including reducing TB stigmatization in families and health facilities, helping people to access services, providing transport and psychological, economic and legal support; and
- Acting to create and improve the enabling environment to TB activities by:
 - mobilizing communities to act on stigma, basic rights and access to health services and basic standards of housing, nutrition, water, sanitation and hygiene;
 - linking community services with the formal health system and its personnel and institutions; and
 - engaging in local level advocacy to ensure responsiveness to needs such as for laboratory equipment or drugs and medicines at health facilities.

*WHO Engage TB
Implementation Manual*

- **Raise public awareness about TB prevention and treatment:** Community-wide information, education and communication programmes serve to educate people about TB symptoms and reduce stigma associated with the disease, encouraging people with symptoms to seek testing and treatment, as well as emphasise the importance of using quality drugs approved by NTP. The various platforms that World Vision utilises to reach out to individuals, families and communities for health and development programmes such as MNCH programmes using CHWs and COMM, nutrition programmes such as Positive Deviance (PD)/Hearth, Community-based Management of Acute Malnutrition (CMAM) and water, sanitation and hygiene (WASH) platforms can serve to raise public awareness about TB prevention and treatment. It is advisable for World Vision NOs in high TB burden countries to integrate public awareness for TB prevention, community mobilisation for active case finding and referral during the design of health and other sector programmes.
- **Facilitate community-based action to address the following:**
 - a) **Increase case detection and access to diagnosis:** WHO noted that passive case-finding, previously implemented, was insufficient to achieve End TB goals and recommends ACF of people who may have TB and providing access to diagnosis. This can be achieved by CHWs and CBO volunteers screening community persons with presumptive TB based on symptoms (symptom screening), or in high transmission zones, or by following-up with people exposed to someone with TB (contact tracing), such as family members. Further, people with presumptive TB are referred for establishing diagnosis, which is made after laboratory tests are completed on the sputum and/or following a chest x-ray.
 - b) **Treatment and cure:** DOT supporters recruited from community volunteers and family should be engaged to ensure that those who have TB receive a supply of quality-assured medicine, begin treatment promptly and are able to take the entire course of medicine consistently and completely. In a 2006 report, WHO showed that more than 30 million patients with TB were treated with its five-element DOTS strategy, resulting in cure rates of > 80 per cent and default rates of < 10 per cent. It is recommended that treatment observation be performed by a person who is accessible and acceptable to the patient, yet also accountable to the health system.
 - c) **Work towards stigma reduction:** In areas of high HIV prevalence, where HIV and TB co-infection is common, the link between the diseases has contributed to the stigmatisation of TB. TB is perceived as a marker for HIV positivity, therefore HIV-associated stigma is transferred to TB-infected individuals. In some cultures, TB is associated with witchcraft or considered a family curse, as the illness often affects multiple generations as it spreads among people living in close proximity. The association of TB with extreme poverty and communal living also adds to the stigma. TB stigma is perceived to increase TB diagnostic delay and treatment noncompliance in many countries. Stigma can be overcome by bringing discussion about the disease

into the open in community forums, increasing information and understanding about actual causes, transmission and treatment of the disease, and eliminating myths and rumors. Often, cured TB patients act as community educators and TB DOT supporters, further demonstrating the full recovery to health that is possible with appropriate diagnosis and treatment.

2. Work in collaboration with NTP and local health facilities in strengthening health system capacity to deliver quality service including:

- Facilitate training on TB prevention and management for CHWs, community volunteers, health system staff, CBOs and project supervisors, as needed. Training covers signs and symptoms, causes and modes of transmission of TB, methods to systematically identify people with suspected TB in health facilities and the community (and referring them for diagnosis), DOT and record keeping, and reporting to the NTP
- Mobilise community volunteers and CHWs to provide direct observation and treatment adherence support to patients
- Assist the health facility with contact tracing and defaulter tracing in the community
- Facilitate support to TB patients who seek help for side effects and provide answers to their questions
- Ensure community-level records are properly kept and data provided to the NTP
- Ensure that community providers administer correct and high-quality drugs approved or sourced by the NTP or in compliance with internationally recognised protocols

3. Other complementary services as applicable:

- Food and nutrition support, which can improve a patient's health and may decrease side effects
- Economic strengthening and practical support including cash transfers for transportation and other health-related costs and involvement of TB patients in income-generating activities
- Facilitating the integration of TB services into other community-based activities
- Public-private mix: Work to ensure private-sector health providers (including private clinics, herbalists, traditional healers, etc.) follow NTP guidelines for diagnosis, treatment and reporting of TB
- Psychological and legal support to address stigma and discrimination

4. **Strengthen community systems and structures:** Building the capacity of CBOs, faith leaders and volunteers in TB prevention and treatment, so they participate in community-level efforts toward the goal of ending TB by 2035. Barriers to accessing diagnostic services can be reduced by the creation of a specimen transport system and the movement of anti-TB treatment initiation and follow-up in the community.
5. **Participate in local, regional and national TB prevention and treatment discussion forums** and serve as a voice to community-based service providers and communities, who often don't have a platform to share their views and concerns.

For more information on how INGOs, NGOs, and CBOs contribute to TB strategy, please refer to WHO Engage TB manual, Engage TB Operational Guidance, Engage TB Training of CHWs and community volunteers' documents:

<http://www.who.int/tb/en/>

For additional references from CORE Group on a framework for integrating childhood TB into community-based child health care, refer to:

<http://www.coregroup.org/resources?start=10>

Best practices from TB REACH programme in Ethiopia

BEST PRACTICES FROM TB REACH PROGRAMME IN ETHIOPIA (2010)

In the Sidama Zone of Ethiopia, health extension workers (HEW), employed by MoH, carried out systematic verbal screening activities during their routine house-to-house visits. Individuals with a cough lasting two or more weeks were asked to provide sputum specimens, which HEW fixed onto slides. HEW, with support from the project supervisor, coordinated the collection and transportation of the fixed slides to the nearest laboratory, which were stained and examined using conventional smear microscopy or light emitting diode-fluorescence microscopy (LED FM), depending on the laboratory. Supervisors collected laboratory results and returned them to patients. Smear-positive patients were initiated on treatment by supervisors in the same community, without the oversight of a presiding clinician. Supervisors also examined household contacts of diagnosed patients and initiated isoniazid preventive therapy for asymptomatic children. HEWs also provided treatment support; conducting follow-up visits, collecting sputum specimens to monitor treatment and reporting drug side effects and treatment outcomes. Results showed the initiative to be a source of pride and motivation for HEWs, who were seen in their communities as providers of quality services. To date, HEWs have collected sputum specimens from 196,735 people with suspected TB and have detected over 17,200 smear-positive patients in three years.

MONITORING AND EVALUATION FOR TB PROGRAMMES

The following are global priority indicators and targets for monitoring implementation of End TB Strategy aiming to reduce TB deaths by 95 per cent, cut new cases by 90 per cent and ensure no family is burdened with catastrophic expenses due to TB by 2035.

GLOBAL PRIORITY INDICATORS AND TARGETS FOR MONITORING THE IMPLEMENTATION OF THE END TB STRATEGY

Treatment coverage	Number of people that developed TB and were notified and treated, out of the total estimated number of incident cases in the same year (%)	≥90%
TB treatment success rate	Number of TB patients successfully treated out of all notified TB cases (%)	≥90%
Preventive treatment coverage	Number of people living with HIV and children, who are contacts of cases and started on preventive treatment for latent TB infection, out of all those eligible (%)	≥90%
TB-affected households facing catastrophic costs	Number of TB patients and their households that experienced catastrophic costs due to TB, out of all TB patients (%)	0%
Uptake of new diagnostics and new drugs	<ul style="list-style-type: none"> • Number of TB patients diagnosed using WHO-recommended rapid tests, out of all TB patients (%) • Number of TB patients tested with regimens including new TB drugs, out of those eligible for treatment with such drugs (%) 	≥90%

Two key indicators for monitoring and evaluating DOTS programmes are:

1. The number of cases (people with TB) diagnosed and notified to the National TB Programme
2. The percentage of patients successfully treated, that are cured or completed treatment

A Monitoring and Evaluation Framework for Active Case-Finding Interventions

ACF initiatives that include TB contact investigations, screening of prisoners, PLHIV and other easily identified risk groups, are well suited for measuring direct yield. Interventions should attempt to collect a basic set of core data including the number of people approached, screened, screened positive, tested, diagnosed, initiated on treatment and successfully treated. Reviewing the numbers of people passing through each step of the screening and testing process is essential to evaluate dropout and inefficiencies, and to identify strategies that minimise loss to follow-up.

MONITORING THE PATHWAY TO TB CARE

	Number of people eligible for screening	A
Proportion of people screened among those eligible (B/A)	Number of people screened	B
Proportion of people with suspected TB identified among those screened (C/B)	Number of suspected TB patients identified	C
Proportion of people tested/evaluated for TB among suspected TB patients (D/C)	Number of people tested / evaluated for TB disease	D
Proportion of people diagnosed among those screened (E/B) and tested (E/D)	Number of people diagnosed with TB	E
Proportion of people initiated on treatment among those diagnosed (F/E)	Number of patients initiated on treatment	F
Proportion of people successfully completing treatment among those initiated (G/F)	Number of patients successfully completing treatment	G

TECHNICAL ANNEXES: CRITICAL STEPS FROM TB PREVENTION TO TREATMENT AND CURE

ANNEX I: CONTINUUM OF CARE: TB PREVENTION, TREATMENT AND CURE



1. Prevention: Prevention of TB infection and its transmission is an essential element in the strategy to end TB among the general public. For optimal effectiveness, emphasis is given to the most at-risk groups including PLHIV, children, pregnant women, people who have a chronic disease such as diabetes mellitus, malnutrition, cancer, chronic lung diseases and those who smoke.

1.1 Public awareness. Despite knowledge about TB, many people view TB as resulting from HIV and/or malnutrition. For some traditionalists, it is also seen as a family curse. Because symptoms are similar to those in many other conditions, TB is often misdiagnosed, delaying treatment and increasing risk of transmission. TB mainly affects the poor in marginalised communities such as migrants, prisoners, people who misuse alcohol and drugs, and PLHIV, who are generally underserved by the health system. Therefore, it is important for the general public and especially the most at-risk groups to have accurate information about TB and its prevention and treatment approaches, while empowering those affected to participate in the effort to end TB.



To reduce exposure in households where someone has infectious TB, the following actions should be taken, when possible:

- Houses should be adequately ventilated
- Anyone who coughs should be educated on cough etiquette and respiratory hygiene, and should follow such practice at all times

While smear positive, TB patients should:

- Spend as much time as possible outdoors
- If possible, sleep alone in a separate, adequately ventilated room
- Spend as little time as possible on public transport
- Spend as little time as possible in places where large numbers of people gather together.

<http://www.tbfacts.org/tb-prevention/>

1.2 Preventive measures from personal protection to environmental action.

The following recommendations are obtained from various sources including CDC:

- a) Bacillus Calmette-Guerin (BCG) vaccine: Excellent in protecting children against disseminated forms of TB, however protection against pulmonary TB in adults is variable.
- b) Addressing environmental risk factors. Environmental factors related to housing that may enhance the likelihood of TB transmission include:
 - exposure of susceptible individuals to an infectious person in a relatively small, enclosed and crowded space
 - inadequate ventilation resulting in either insufficient dilution or removal of infectious droplet nuclei
 - recirculation of air containing infectious droplet nuclei
 - duration of exposure
 - susceptibility of the exposed person
- c) Stop transmission from infected person to a healthy individual: Treat and cure individuals with active TB to stop its spread to healthy individuals.

1.3 To prevent people with latent TB from developing active, and infectious TB disease.

Groups who should receive high priority for latent TB infection treatment are those with a positive Interferon-Gamma Release Assays (IGRA) result or a Tuberculin Skin Test (TST) reaction of 5 or more millimeters who are HIV-infected persons, recent contacts of a TB case, or immunosuppressed. People with a positive IGRA result or a TST reaction of 10 or more millimeters who are recent immigrants (< five years) from high-prevalence countries, injection drug users, residents and employees of high-risk congregate settings (e.g., correctional facilities, nursing homes, homeless shelters, hospitals, and other health-care facilities), mycobacteriology laboratory personnel, children under four years old, and children and adolescents exposed to adults in high-risk categories.

1.4 Scaling-up the three I's for TB/HIV

- **Intensified case finding:** WHO recommends that all PLHIV be screened with a clinical algorithm at each clinical encounter. Those who do not report anyone with current cough, fever, weight loss or night sweats are unlikely to have active TB and should be offered Isoniazid Preventive Therapy (IPT). The diagnosis of TB is difficult in PLHIV, as they are more likely to have smear-negative pulmonary TB. Therefore, WHO recommends, where available, Xpert MTB/RIF be used as a primary diagnostic test for TB in PLHIV.

- **Isoniazid Preventive Therapy (IPT):** It has been known for many years that IPT for PLHIV prevents TB. WHO recommends that PLHIV, who are unlikely to have active TB, should receive at least six months of IPT as part of a comprehensive package of HIV care.
- **Infection control for TB:** WHO recommends that TB infection-control practices should be in place in all congregate settings and health facilities providing HIV care. TB infection-control practices include personal, administrative, and environmental controls, as well as health-worker surveillance. Informing communities and the general public about these practices also helps reduce the spread of TB and MDR-TB to PLHIV.

For more information, refer to: WHO three I's meeting report:

http://www.who.int/hiv/pub/meetingreports/WHO_3Is_meeting_report.pdf

1.5 Prevention of drug-resistant TB (MDR, XDR)

Prevention of drug-resistant TB is achieved through the expansion and proper implementation of DOTS strategy, infection control and enhancement of basic health-care infrastructure, which are the cornerstones of a sound TB-control programme. Multidrug-resistant TB (MDR-TB) is fueled by improper treatment of patients, poor management of supply, poor quality of drugs and airborne transmission of bacteria in public places. Timely diagnosis and initiation of treatment for MDR/XDR patients, with appropriate patient-centered care and support to avoid disease transmission, which also requires strengthening the capacity of laboratories with newer diagnostic tools, is important. Ensuring availability of quality-assured anti-TB drugs including second-line drugs and establishing and/or strengthening continuous surveillance systems for drug-resistant TB is key to prevent further spread of MDR/XDR TB.



2. Case finding

2.1 Screening

Experience from TB REACH programmes during active case finding intervention, shows it is always necessary to identify key populations with high numbers of undiagnosed TB, to understand the health-seeking behaviours of those populations and explore barriers they might face in TB diagnosis. It is also recommended to identify gaps in case detection strategies in the existing TB care system rather than creating a parallel and often competing TB care system.

By definition, active case-finding interventions attempt to find people with TB earlier than they would have been detected (if at all) without intervention, through resources and efforts that surpass the passive case-finding model.

A. Screening for latent tuberculosis infection

Until the early 2000s, the TST was the standard screening for latent tuberculosis infection. The tuberculin skin test measures an individual's response to a solution of *M. tuberculosis* - complex antigens, known as purified protein derivative. However, the test has limitations, including precise intradermal administration, the need for a follow-up visit to interpret results, specific criteria for interpretation of results, and the possibility of false-positive results with BCG vaccination or other environmental mycobacteria. Therefore, IGRA are gaining acceptance as an alternative screening test. Since IGRA are performed in the laboratory, requiring one blood draw and only one patient visit to obtain results, they are significantly distinct from the traditional tuberculin skin test.

The two main categories of people who should be screened for latent tuberculosis infection are: 1) individuals at risk for exposure to persons with active tuberculosis disease, and 2) individuals with conditions or other factors associated with progression from latent tuberculosis infection to tuberculosis disease such as HIV infection, etc.

B. Systematic screening for active TB

Systematic screening for active TB is defined by WHO as the systematic identification of people with suspected active TB, in a predetermined target group, using tests, examinations or other procedures that can be applied rapidly.

The primary objective of screening for active TB is to ensure that active TB is detected early and treatment is initiated promptly, with the ultimate aim of reducing risk of poor treatment outcomes, health sequelae and the adverse social and economic consequences of TB, as well as helping to reduce TB transmission.

Systematic TB screening is recommended for (a) household contacts and other contacts of a TB-infected person (b) PLHIV (c) current or former workers in workplaces with silica (d) people in prisons and other penitentiary institutions (e) people with an untreated fibrotic chest X-ray lesion (f) people in settings where

TB prevalence in the general population is 100/100 000 population or higher (g) geographically-defined subpopulations with extremely high levels of undetected TB (1 per cent prevalence or higher) and other subpopulations with very poor access to health care, such as people living in urban slums, homeless people, people living in remote areas with poor access to health care, and other vulnerable or marginalised groups including some indigenous populations, migrants and refugees.

KEY PRINCIPLES FOR SYSTEMIC SCREENING FOR ACTIVE TB

1. Before screening is initiated, high-quality TB diagnosis, treatment, care, management and support for patients should be in place, to match the anticipated rise in case detection.
2. Indiscriminate mass screening should be avoided. The prioritization of risk groups for screening should be based on assessments made for each risk group.
3. The choice of algorithm for screening and diagnosis should be based on an assessment of the accuracy of the algorithm for each risk group considered.
4. TB screening should follow established ethical principles for screening for infectious diseases.
5. The TB screening approach should be developed and implemented in a way that optimizes synergies with the delivery of other health services.
6. A screening strategy should be monitored and reassessed continually to inform re-prioritization of risk groups, re-adaptation of screening approaches when necessary.

Reference: *Systemic screening for active tuberculosis, principles and recommendations*, WHO <http://apps.who.int/iris/bitstre>

Key principles for systemic screening for Active TB

3. Referral for testing and treatment

Strengthening TB referral systems increases opportunities for early diagnosis and treatment of TB cases. Programmes collecting sputum from symptomatic individuals need a system to transport the collected sputum to the nearby laboratory for diagnosis. If such services are unavailable, TB-suspected individuals should be referred to a health facility for diagnosis and treatment. The CHW is expected to further follow-up to ensure that the person had required tests and services. Establishing a formal referral and feedback system between the CHW and the health facility would minimise challenges to follow-up and facilitate treatment support, if and when the person starts treatment.

4. Follow-up: Treatment compliance/adherence

The literature identifies specific groups as likely treatment defaulters. A study in Ethiopia concluded that males have twice the risk of treatment non-adherence compared to females. Also, the most excluded sectors of society such as migrants, undocumented workers, the unemployed, the homeless, the mentally ill, and drug addicts are more likely to interrupt treatment. In developing countries, rural, older and less educated people are also more likely to default.

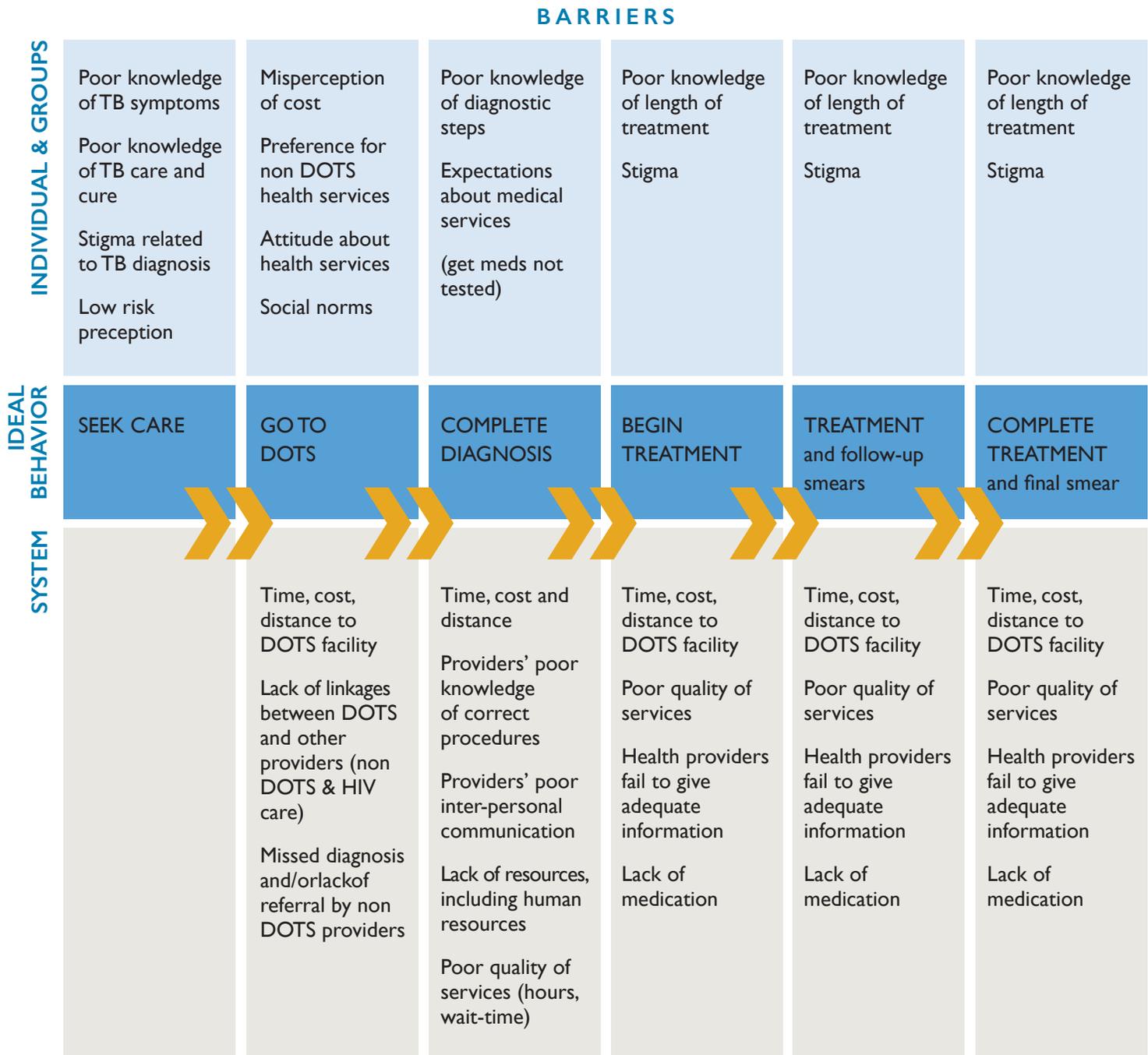
One main reason for treatment non-adherence is lack of knowledge. Studies in India, Swaziland, Thailand and Zambia indicate that poor knowledge about length of treatment predicts default behavior. Most defaulting patients interrupt treatment soon after they feel better and/or around two months after initiating chemotherapy. For example, findings from India suggest that patients' misconception of well-being as cure leads to default. Also, patients who experience unexpected side effects of medicines were more likely to default.

A study in India shows key differences among compliers and non-compliers including motivation, perceived severity of disease, and self-efficacy. That is, those who are more motivated have a higher perception of risk and feel more confident about their ability to complete treatment are less likely to default. Similar findings in a study in Thailand showed that compliance was more likely among well-informed patients, who perceived their illness to be more serious, and believed that treatment would alleviate their condition. Another important finding is that the quality of health-care provider-patient interaction accounts for variations in treatment adherence. One study in South Africa shows that the quality of the health practitioner-patient interaction coupled with correct causative belief were more strongly associated with compliance behavior, whereas knowledge, onset of TB, sociodemographic variables, health-care seeking, and health beliefs were not associated.

One key lesson learned is that behavioural assessments of factors that cause diagnosis delay and poor treatment adherence are needed to plan behaviour change and communication (BCC) programs. The literature also suggests BCC programs must prioritize gender, stigma and other socio-cultural issues (e.g. care-seeking practices and medical beliefs).

Reference: Behavioral barriers in tuberculosis control: A literature review <http://www.stoptb.org/assets/documents/countries/acsm/Behavioral%20Barriers%20in%20TB%20Control.pdf>

FROM COUGH TO CURE: A PATH OF IDEAL BEHAVIORS IN TB CONTROL



ANNEX 2: POTENTIAL GRANT SOURCES FOR TB AND TB-HIV

SOURCE OF GRANT	ACTION POINTS FOR WV NATIONAL OFFICES
The Global Fund	<p>For information, refer to World Vision Business Process for the Global Fund grants at wvcentral: https://www.wvcentral.org/community/health/Pages/Global-Fund-IG2.aspx</p>  <p style="text-align: right;">BP for GF_FINAL.pdf</p>
TB REACH	<p>TB REACH provides grants to partners for testing innovative approaches and technologies aimed at increasing the number of people diagnosed and treated for TB, decreasing the time to appropriate treatment and improving treatment success rates. It combines fast-track, results-based financing and rigorous, external monitoring and evaluation (M&E) to produce results, so other donor agencies and/or national governments can scale-up successful approaches and maximise their own investments.</p> <p>For information on TB REACH, refer to: http://www.stoptb.org/global/awards/tbreach/</p> <p>The following are lessons learned from World Vision TB REACH programmes</p> <div style="display: flex; justify-content: flex-end; gap: 20px;">   </div> <p style="text-align: right; font-size: small;"> TB REACH WVC LL June 15 2016.docx TB-REACH Wave 3 Lessons Learned Call I </p>
UNITAID	<p>Through Calls for Proposals, Unitaid seeks smart, new ideas to help alleviate the burden of diseases, such as HIV/AIDS, TB and malaria, which often affect the poorest people in society.</p> <p>Proposals are eligible for consideration if they compile:</p> <ul style="list-style-type: none"> • Within the specific scope of the announced open call for proposals; address areas of interventions addressed in the text • Have a global impact: projects that have a global market and public health impact • Represent an innovative approach • Are sustainable • Are scalable • Target low-income and middle-income countries • Are submitted by an organisation or group of partners with proven capability and capacity to implement the project • Includes “lean” budget <p>In TB, major areas of investment are related to TB diagnosis, treatment and pediatric TB treatment</p>
Others	<p>CDC / USAID</p> <p>Bill and Melinda Gates foundation</p>

ANNEX 3: HIGH TB BURDEN COUNTRIES

THE THREE TB HIGH-BURDEN COUNTRY LISTS THAT WILL BE USED BY WHO DURING THE PERIOD 2016–2020

LIST	THE 30 HIGH TB BURDEN COUNTRIES		THE 30 HIGH TB/HIV BURDEN COUNTRIES		THE 30 HIGH MDR-TB BURDEN COUNTRIES	
Purpose and target audience	To provide a focus for global action on TB in the countries where progress is most needed to achieve End TB Strategy and SDG targets and milestones, to help build and sustain national political commitment and funding in the countries with the highest burden in terms of absolute numbers or severity, and to promote global monitoring of progress in a well-defined set of countries.		To provide a focus for global action on HIV-associated TB in the countries where progress is most needed to achieve End TB Strategy, UNAIDS and SDG targets and milestones, to help build and sustain national political commitment and funding in the countries with the highest burden in terms of absolute numbers or severity, and to promote global monitoring of progress in a well-defined set of countries.		To provide a focus for global action on the MDR-TB crisis in the countries where progress is most needed to achieve End TB Strategy targets and milestones, to help build and sustain national political commitment and funding in the countries with the highest burden in terms of absolute numbers or severity, and to promote global monitoring of progress in a well-defined set of countries.	
Definition	The 20 countries with the highest estimated numbers of incident TB cases, plus the top 10 countries with the highest estimated TB incidence rate that are not in the top 20 by absolute number (threshold, >10 000 estimated incident TB cases per year).		The 20 countries with the highest estimated numbers of incident TB cases among people living with HIV, plus the top 10 countries with the highest estimated TB/HIV incidence rate that are not in the top 20 by absolute number (threshold, >1000 estimated incident TB/HIV cases per year).		The 20 countries with the highest estimated numbers of incident MDR-TB cases, plus the top 10 countries with the highest estimated MDR-TB incidence rate that are not in the top 20 by absolute number (threshold, >1000 estimated incident MDR-TB cases per year).	
Countries in the list	<i>The top 20 by estimated absolute number (in alphabetical order):</i> Angola Bangladesh Brazil China DPR Korea DR Congo Ethiopia India Indonesia Kenya Mozambique Myanmar Nigeria Pakistan Philippines Russian Federation South Africa Thailand UR Tanzania Viet Nam	<i>The additional 10 by estimated incidence rate per 100 000 population and with a minimum number of 10 000 cases per year (in alphabetical order):</i> Cambodia Central African Republic Congo Lesotho Liberia Namibia Papua New Guinea Sierra Leone Zambia Zimbabwe	<i>The top 20 by estimated absolute number (in alphabetical order):</i> Angola Brazil Cameroon China DR Congo Ethiopia India Indonesia Kenya Lesotho Malawi Mozambique Myanmar Nigeria South Africa Thailand Uganda UR Tanzania Zambia Zimbabwe	<i>The additional 10 by estimated incidence rate per 100 000 population and with a minimum number of 1000 cases per year (in alphabetical order):</i> Botswana Central African Republic Chad Congo Ghana Guinea-Bissau Liberia Namibia Papua New Guinea Swaziland	<i>The top 20 by estimated absolute number (in alphabetical order):</i> Bangladesh China DPR Korea DR Congo Ethiopia India Kazakhstan Kenya Indonesia Mozambique Myanmar Nigeria Pakistan Philippines Russian Federation South Africa Thailand Ukraine Uzbekistan Viet Nam	<i>The additional 10 by estimated rate per 100 000 population and with a minimum number of 1000 cases per year (in alphabetical order):</i> Angola Azerbaijan Belarus Kyrgyzstan Papua New Guinea Peru Republic of Moldova Somalia Tajikistan Zimbabwe
% global total	84%	3.1%	87%	4.8%	84%	5.4%
Lifetime of list	5 years (review criteria and included countries in June 2020).		5 years (review criteria and included countries in June 2020).		5 years (review criteria and included countries in June 2020).	

DPR Korea, Democratic People's Republic of Korea; DR Congo, Democratic Republic of the Congo; HIV, human immunodeficiency virus; MDR, multidrug resistant; SDG, Sustainable Development Goal; TB, tuberculosis; UNAIDS, Joint United Nations Programme on HIV/AIDS; UR Tanzania, United Republic of Tanzania; WHO, World Health Organization

ENDNOTES

¹ Global Fund

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9. Page 24: AED Pathway from cough to cure: Applying a Pathway of Ideal Behaviors in TB Control. Presentation by Dr. Silvio Waisbord, Dr. Susan Zimicki; Stop TB Partnership: Thaddeus Pennas
10. Page 26: Annex 3: High TB Burden Countries: Global Tuberculosis Report, WHO 2016. http://www.who.int/tb/publications/global_report/en/

Photo credits:

P. 8 Myanmar child receives her TB medication from a DOTS volunteer.

Photography: Khaing Min Htoo

P. 11 Sujatha, DOTS volunteer, with TB patients in World Vision India.

Photography: Alfred Ling

P. 20 Ma Sein, TB volunteer for World Vision Myanmar educates a family.

Photography: Khaing Min Htoo

This page: Molit, 8, Saïid, 3, and their parents wait to receive their TB medication in Hargeisa.

Photography: Stefanie Glinski

Next page: 50-year-old Porviso Aparante receives his TB medicine from a World Vision DOTS volunteer in Philippines.

Photography: Mary Grace T. Gayoso





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