



AN INTERAGENCY FIELD GUIDE

Tuberculosis Prevention and Care Among Refugees and Other Populations in Humanitarian Settings





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Foreword

The 2030 Agenda for Sustainable Development envisions sustainable development grounded in international human rights standards, placing equality and non-discrimination at the centre. Consistently, “Leave no one behind” is one of its three guiding principles, voicing the commitment of all United Nations (UN) Member States to reduce inequalities and vulnerabilities that undermine individual potential and humanity as a whole.

Tragically, as the world combats the COVID-19 pandemic, the global displacement crisis due to conflict, poverty, and changing climate continues a decade long upward trajectory. Among the most vulnerable are millions of refugees, internally displaced persons and all other people experiencing humanitarian emergencies.

Tuberculosis (TB) remains one of the leading infectious diseases causing millions to fall ill and lose their lives annually. Refugees and other populations in humanitarian settings face substantial threats to health and survival, such as poverty, crowded living conditions, undernutrition and poor access to health services – all conditions in which TB transmission thrives.

This guide is a joint effort of the Centers for Disease Control and Prevention (CDC), the UN High Commissioner for Refugees (UNHCR) and the World Health Organization (WHO). It includes new strategic approaches, guidance and innovations for TB prevention and care interventions in humanitarian settings. Further, international research and global digitalization have accelerated the way in which scientific evidence informs practice, making it impossible to develop a single, easy-to-consult field publication that would not become quickly obsolete. For this reason, the guide focuses primarily on managerial/organizational aspects of TB interventions, and provides links to the most updated references for the clinical aspects. We hope this guide can serve as a useful tool in humanitarian settings to alleviate the suffering and deaths caused by this preventable and curable disease, especially for refugees and displaced populations in humanitarian settings.



Dr Ren Minghui

Assistant Director-General
Universal Health Coverage/
Communicable and Noncommunicable Diseases
World Health Organization

AND



Dr Ibrahima Socé Fall

Assistant Director-General, Emergency Response,
WHO Health Emergencies Programme,
World Health Organization



Raouf Mazou

Assistant High Commissioner for Operations,
Office of the United Nations High
Commissioner for Refugees



Nathaniel H. Smith, MD, MPH

Deputy Director for Public Health Service
and Implementation Science (DDPHSIS)
Director (Acting), Center for Global Health
Centers for Disease Control
and Prevention (CDC)

Acknowledgements

This document was prepared by an interagency writing group:

Pierpaolo de Colombani	Senior WHO Consultant
Ann Burton	Chief, Public Health Section, UN High Commissioner for Refugees (UNHCR), Geneva, Switzerland
Kevin R. Clarke	Medical Officer, Division of Global Health Protection, Center for Global Health, Centers for Disease Control and Prevention (CDC), Atlanta, USA
Rudi Coninx	Senior Policy Advisor, Interagency Policy for Emergencies, WHO Health Emergencies Programme, World Health Organization (WHO), Geneva, Switzerland
Hannah Monica Dias	Crosscutting Specialist, Global TB Programme, WHO, Geneva, Switzerland
Allison Hoskins	ORISE Fellow, Health Communications, Global TB Branch, Division of Global HIV & TB, CDC, Atlanta, USA
Allen Gidraf Kahindo Maina	Senior Public Health Officer, UNHCR, Cox's Bazar, Bangladesh
Susan Maloney	Senior Technical Advisor, Tuberculosis, Division of Global HIV and TB, Center for Global Health, CDC, Atlanta, USA
Susan Cookson	retired from US CDC, US Public Health Service
Diana Weil	Senior Adviser, Strategic Action for Small Island Developing States (SIDS), Environment, Climate Change and Health Department (ECH), UHC/Healthier Populations Division (HEP), WHO, Geneva, Switzerland

Other agency staff who contributed to the content in specific sections include:

WHO	Tereza Kasaeva, Matteo Zignol, Muhammad Akhtar, Rafael Lopez Olarte, Annabel Baddeley, Oscar Bernal, Linda Doull, Christian Gunneberg, Qudsia Huda, Tauhid Islam, Ernesto Jaramillo, Partha Pratim Mandal, Farai Mavhunga, Askar Yedilbayev, Martin van den Boom, Zita Weise Prinzo, Sabine Verkuijl, Annemieke Brands, Wang Yi
CDC	Mark Anderson, Christina Phares, Mija Tesse Ververs
UNHCR	Hasan Abdi, Terry Njeri Theuri
WFP	Sara Bernardini, Michael Smith

The work was initially informed and then reviewed by a number of independent experts:

Mohamed Abdel Aziz	Former TB Regional Adviser, WHO Eastern Mediterranean Region Office (EMRO), Cairo
---------------------------	---

Louisa Baxter	Humanitarian Health Advisor, Save the Children, London
Máire Connolly	Professor of Global Health and Development, School of Medicine, National University of Ireland Galway (NUIG), Galway, Ireland
Antonio Flores	Special COVID-19 Medical Advisor, Médecins Sans Frontières (MSF), Rio de Janeiro, Brazil
Michelle Gayer	Director, Emergency Health, International Rescue Committee, Geneva, Switzerland
Christopher Gilpin	Global Laboratory Coordinator, Migration Health Division, International Organization for Migration (IOM), Geneva, Switzerland
Cathy Hewison	TB Advisor and TB Working Group Leader, MSF, Paris, France
Laura Sannino	Physician, MSF, Paris, France
Jacqueline Weekers	Director, Migration Health Division, IOM, Geneva, Switzerland

Abbreviations and acronyms

aDSM	active TB drug safety monitoring and management
AIDS	acquired immunodeficiency syndrome
ART	antiretroviral therapy
BCG	bacille Calmette-Guerin
BMI	body mass index
CDC	Centers for Disease Control and Prevention (USA)
DOT	directly observed treatment
DST	drug susceptibility testing
FBF	fortified blended food
FDC	fixed dose combination
HeRAMS	Health Resources and Services Availability Monitoring System
IFRC	International Federation of Red Cross and Red Crescent Societies
IOM	International Organization for Migration
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GUV	germicidal ultraviolet
HEPA	high-efficiency particulate air (filters)
HIV	human immunodeficiency virus
IASC	Inter-Agency Standing Committee
IDP	internally displaced person
IGRA	interferon-gamma release assay
IRIS	immune reconstitution inflammatory syndrome
LF-LAM	lateral flow lipoarabinomannan assay
LTBI	latent tuberculosis infection
MDR-TB	multidrug resistant tuberculosis
MTB/RIF	<i>Mycobacterium tuberculosis</i> /rifampicin
MUAC	mid-upper arm circumference
mWRD	molecular WHO-approved rapid diagnostic test
NGO	nongovernmental organization
NSP	national TB strategic plan
NTP	national tuberculosis programme
OCHA	Office for the Coordination of Humanitarian Affairs
PPM	public-public and public-private mix for TB prevention and care

RR-TB	rifampicin-resistant tuberculosis
RUTF	ready to use therapeutic food
SDGs	Sustainable Development Goals
TB	tuberculosis
TB/HIV	HIV-related TB
TIBU	Treatment Information from Basic Unit
TPT	tuberculosis preventive treatment
TST	tuberculin skin test
UN	United Nations
UN DHA	United Nations Department of Humanitarian Affairs
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UNHLM	United Nations General Assembly High-level Meeting
UNICEF	United Nations International Children's Emergency Fund
VOT	video-observed treatment
WHO	World Health Organization
XDR-TB	extensively drug-resistant tuberculosis

TB drugs

First-line:

H	Isoniazid
R	Rifampicin
E	Ethambutol
Z	Pyrazinamide
Rfb	Rifabutin
Rpt	Rifapentine

Second-line:

Group A:

Lfx	Levofloxacin
Mfx	Moxifloxacin
Bdq	Bedaquiline
Lzd	Linezolid

Group B:

Cfz	Clofazimine
Cs	Cycloserine
Trd	Terizidone

Group C:

E	Ethambutol
Dlm	Delamanid
Z	Pyrazinamide
Ipm/Cln	Imipenem/Cilastatin
Mpm	Meropenem
Am	Amikacin
S	Streptomycin
Eto	Ethionamide
Pto	Prothionamide
PAS	<i>p</i> -aminosalicylic acid

Other medicines:

Gfx	Gatifloxacin
Hh	high-dose isoniazid
Km	Kanamycin
Cm	Capreomycin

Glossary (1–3)

Asylum seeker is an individual who is seeking international protection. In countries with individualized procedures, an asylum seeker is someone whose claim has not yet been finally decided on by the country where the claim is submitted. Not every asylum seeker will ultimately be recognized as a refugee, but every refugee is initially an asylum seeker. (UNHCR)

Camp is a newly erected site (regardless of how recent) with non-permanent shelters (such as tents) used for the collective and communal accommodation of evacuated/displaced persons in the event of a humanitarian emergency. A camp can be planned (i.e. purposely-built sites, completed before or during the influx) or self-settled (i.e. set up spontaneously without the support of the government or the humanitarian community). (UNHCR)

Cluster approach aims to strengthen humanitarian response capacity and effectiveness in five key ways: (i) ensuring that sufficient global capacity is built up and maintained in key gap sectors/areas of response; (ii) identifying predictable leadership in the gap sectors/areas of response; (iii) facilitating partnerships and improved interagency complementarity by maximizing resources; (iv) strengthening accountability; and (v) improving strategic field-level coordination and prioritization in specific sectors/areas of response by placing responsibility for leadership and coordination of these issues with the competent operational agency. (IASC)

Complex emergency is a multifaceted humanitarian crisis in a country, region or society where there is a total or considerable breakdown of authority resulting from internal or external conflict and which requires a multisectoral, international response that goes beyond the mandate or capacity of any single agency and/or the ongoing United Nations (UN) country programme. Such emergencies have a devastating effect on children and women (in particular), which call for a complex range of responses. (OCHA)

Congregate settings are a mix of institutional settings where people live in close proximity to each other, for long time (such as correctional facilities) and short time (such as homeless shelters, jails). Health care facilities are also congregate settings likely to have high risk for tuberculosis (TB) transmission. (WHO)

Contingency planning is a management tool used to ensure that adequate arrangements are made in anticipation of a crisis. This is achieved primarily through engagement in a planning process leading to a plan of action, together with follow-up actions. (OCHA)

Durable solutions¹ are means by which the situation of [persons of concern](#) to the UN High Commissioner for Refugees can be satisfactorily and permanently resolved through ensuring national [protection](#) for their civil, cultural, economic, political and social rights. (UNHCR)

¹ In the [refugee](#) context, a durable solution generally involves [voluntary repatriation](#), [local integration](#) or [resettlement](#). For [internally displaced persons](#), this is achieved when individuals no longer have specific [assistance](#) or protection needs linked to their [displacement](#). For [stateless persons](#), durable solutions are linked to the provision or recognition of [nationality](#).

Equity principle states that all persons should have equal protections of their rights, interests and welfare. Ensuring equity requires, for example, that the resources necessary to tackle TB should be distributed on the basis of need with the goal of addressing the disease and also attempting to address all possible underlying social and economic factors that cause TB.

Host community hosts refugees or internally displaced persons, whether in camps, integrated into households, or independently. (UNHCR)

Human rights are agreed international standards that recognize and protect the dignity and integrity of every individual, without any distinction. Human rights form part of customary international law and are stipulated in a variety of national, regional and international legal documents generally referred to as human rights instruments. The most prominent of these are the UN Charter, and the UN Bill of Rights, made up of the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights, and the International Covenant on Economic and Social Rights. (UNHCR)

Humanitarian emergency is an event or series of events that represents a critical threat to the health, safety, security or well-being of a community or other large groups of people and requires substantial assistance exceeding the available capacities. Humanitarian emergencies may be generated by natural disasters (such as earthquakes, epidemics) or man-made circumstances (such as armed conflicts); complex humanitarian emergencies are those requiring an international response which goes beyond the mandate or capacity of any single agency or the whole community or society. (WHO)

Humanitarian setting is the place and time of a humanitarian emergency.

Integration (local) is a durable solution to the plight of refugees that involves their permanent settlement in the country in which they sought asylum. (UNHCR)

Internally displaced person is an individual who has been forced or obliged to flee from the individual's home or place of habitual residence, "...in particular as a result of or in order to avoid the effects of armed conflicts, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border" (according to the Guiding Principles on Internal Displacement). (UNHCR)

Mitigation are measures taken in advance of a disaster to decrease or eliminate its impact on the society and environment. (UN DHA)

National TB Strategic Plan defines the priorities and strategic directions for TB prevention and care over a period of time (e.g. five years) to be aligned with the national health plan. A sound plan should be composed by a core plan (with TB analysis, goals and objectives, strategic interventions and their related activities and sub-activities); operational plan (detailed description of implementation of each activity and sub-activity); monitoring and evaluation plan; technical assistance plan; budget plan; emergency preparedness plan (subpart consistent with the other parts and required in countries with fragile security situation or prone to natural disasters). (WHO)

Operational research deals with investigations that provide decision-makers with information that enables them to improve programme performance. Operational research helps to identify solutions to problems that limit programme quality, efficiency and effectiveness, or to determine which alternative service delivery strategy would yield the best outcomes. (WHO)

Preparedness includes capacities and knowledge developed by governments, professional response organizations, communities and individuals to anticipate and respond effectively to the impact of likely, imminent or current hazard events or conditions. (ReliefWeb)

Protection² encompasses all activities aimed at obtaining full respect for the rights of the individual in accordance with the letter and spirit of human rights, refugee and international humanitarian law. Protection involves creating an environment that is respectful to human beings, prevents and/or alleviates the immediate effects of a specific pattern of abuse, and restores dignified conditions of life through reparation, restitution and rehabilitation. (UNHCR)

Refugee is a person who meets the eligibility criteria under the applicable refugee definition, as provided for international or regional instruments, under UNHCR's mandate and/or in national legislation. (UNHCR)

Refugee-like-situation is when a category of people including groups of people who are outside their country of origin face protection risks similar to those of refugees, but for whom refugee status has, for practical or other reasons, not been ascertained. (UNHCR)

Reintegration is a process which enables returnees to regain physical, social, legal and material security needed to maintain life, livelihood and dignity and which eventually leads to the disappearance of any observable distinctions vis-à-vis their compatriots.

Relocation can be (i) temporary: the act of moving evacuated people to a place where they stay until return or settlement elsewhere in the country becomes possible; or (ii) permanent: the act of moving people to another location in the country and settling them there when they can no longer return to their homes or place of habitual residence. (UNHCR)

Repatriation (voluntary) is the return to the country of origin based on a refugee's free and informed decision. Voluntary repatriation is one of the three durable solutions and may be organized (when it takes place under the auspices of the concerned governments and/or UNHCR) or spontaneous (the refugees return by their own means with no involvement of UNHCR and governments). (UNHCR)

Resettlement is the transfer of refugees from the country in which they have sought asylum to another country that has agreed to admit them. Refugees will usually be granted asylum or some other form of long-term resident rights and in many cases have the opportunity to become naturalized citizens. For this reason, resettlement is a durable solution as well as a tool for the protection of refugees. It is also a practical example of international burden and responsibility sharing. (UNHCR)

Respiratory hygiene is the practice of covering the mouth and nose during breathing, coughing or sneezing (such as wearing a surgical mask or cloth mask, or covering the mouth with tissues, a sleeve, or a flexed elbow or hand, followed by hand hygiene) to reduce the dispersal of droplets and airborne respiratory secretions. It is also called "cough etiquette". (WHO)

Returnee is a person who was of concern to the UNHCR when outside his/her country of origin and who remains so, for a limited period (usually two years), after returning to the country of origin. The term also applies to internally displaced persons who return to their previous place of residence. (UNHCR)

2 This concept of protection, which applies to all humanitarian action including outside refugee contexts, is related but distinct from the concept of international protection.

Risk is a combination of likelihood (estimated probability that a scenario will occur) and impact (perceived negative consequences of the scenario on the current capacity to respond). (WHO)

Vulnerability indicates physical, mental or socially disadvantaged conditions that do not allow people to meet their basic needs making them require specific assistance or support. (WHO)



CHAPTER 1

INTRODUCTION

The world has been facing more concurrent humanitarian emergencies in the past few years than at any time in the past 60 years. The social and economic impacts of these emergencies are profound. The individuals, communities and populations hardest hit are often those already deeply affected by poverty, marginalization and ill-health. In addition, tuberculosis (TB) – one of the leading infectious killers globally – often poses a substantial threat during humanitarian emergencies.

Since the adoption of the 2030 Agenda for Sustainable Development (4), there have been important commitments to comprehensively address the plight of refugees and other displaced persons. Global preparedness and response efforts during humanitarian emergencies have increasingly emphasized strengthening of the nexus between humanitarian response and long-term development. The United Nations (UN) has committed to end the TB epidemic by 2030, with new technologies that can enable earlier diagnosis and improved treatment and care. TB is the second leading infectious disease killer after COVID-19. Progress in the fight against TB has been severely impacted due to the COVID-19 crisis. There is urgent need to accelerate universal access to care, and leave no one behind, including those in humanitarian settings.

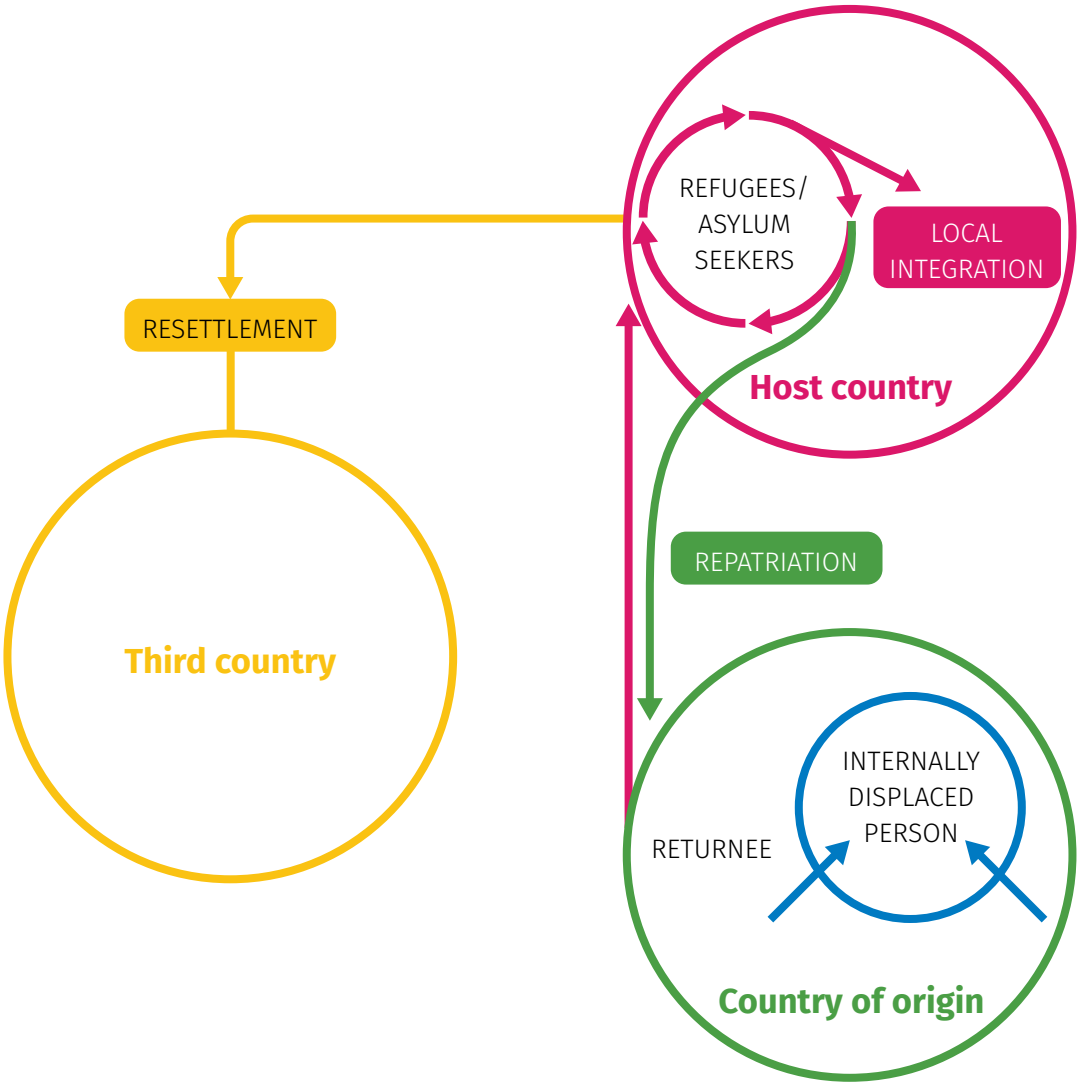
Purpose

This operational guide provides an overview of key actions in preparing for, and delivering, effective TB prevention and care (diagnosis, treatment and prevention) services for refugees and other populations during humanitarian emergencies. The actions are designed to be integrated fully within coherent emergency preparedness planning and response.

Humanitarian emergencies are generated by events that threaten the health, safety, security or well-being of large groups of people and require substantial multisectoral assistance. While this guide focuses on complex humanitarian emergencies and affected populations (such as those resulting from conflict or social disruption), it may also be relevant for populations affected by natural disasters. Figure 1 provides an overview of the main groups of people affected by humanitarian emergencies, their displacement movements and durable solutions.

TB detection, diagnosis, treatment, prevention, and related standards outlined in this guide are those recommended by the World Health Organization (WHO). Users of this guide are strongly encouraged to refer to current WHO and national guidelines in case finding and management decision-making. This guide is intended to assist strategic prioritization and use of these standards and guidelines, depending on the stage and context of the humanitarian emergency. All recommended approaches and interventions should contribute to effective emergency preparedness and response that advances the well-being of those affected and strengthens basic health services and systems, including national TB programmes (NTPs).

Figure 1: People affected by humanitarian emergencies, displacement and durable solutions



Source: Adapted from Strategies to support the HIV-related needs of refugees and host populations. A joint publication of the Joint United Nations Programme on HIV/AIDS (UNAIDS) and the United Nations High Commissioner for Refugees (UNHCR). Best Practice Collection. Geneva: UNAIDS; 2005 (https://data.unaids.org/publications/irc-pub06/jc1157-refugees_en.pdf).

Target audience

There are three main and complementary audiences for this guide:

- Persons leading, managing and technically supporting overall **emergency preparedness and response** in any given country or setting, including those overseeing and delivering health-related services.
- Persons leading, managing and technically supporting the implementation of **NTPs** aimed at ending the TB epidemic in any given country or setting.
- Persons engaging in the design, delivery and/or monitoring of **services provided to displaced populations and surrounding communities** that are affected by complex humanitarian emergencies.

Development process

This guide replaces the 2007 interagency field manual *Tuberculosis care and control in refugee and displaced populations* (5). The guide has been re-conceived in this era of Sustainable Development Goals (SDGs) and outlines greatly updated approaches to emergency response and TB prevention and care. It was developed by a core writing group of experts from the UN High Commissioner for Refugees (UNHCR), WHO and US Centers for Disease Control and Prevention (CDC) working with an external senior consultant. The guide builds upon the New York Declaration for Refugees and Migrants, the Global Compact on Refugees, other World Health Assembly resolutions, the WHO End TB Strategy and associated targets, WHO TB guidelines and related documents, and experiences and lessons learned in health care and prevention for refugees and other populations in humanitarian emergencies. Key informants from partner agencies and humanitarian nongovernmental organizations (NGOs) informed the early development process. The draft guide was reviewed by experts at different levels within the UNHCR, WHO and CDC as well as from partner agencies including the International Organization for Migration (IOM), the International Rescue Committee, Médecins Sans Frontières, the National University of Ireland Galway, and Save the Children (see the Acknowledgements section for the names of those who contributed).

Using the guide

Chapter 2 provides the **Background** on the status of people living in humanitarian emergencies and the overall strategy and principles for preparedness and structures for response to humanitarian emergencies. It also outlines the status of the TB epidemic and the overarching goals and strategies to end the TB epidemic by 2030. These strategies are aligned with the UN 2030 Agenda for Sustainable Development.

Chapter 3 addresses **TB within emergency preparedness**. The chapter presents actions and interventions within a coherent “preparedness action framework”.

Chapter 4 addresses **TB within the emergency response**. It outlines TB management, prevention and care during the response to a humanitarian emergency following a “response action framework”. Interventions are prioritized for an initial **minimum response** during an emergency and then for a **comprehensive response** as soon as feasible.

Each chapter includes detailed references to support further workforce development and programme design.

Annexes are provided at the end of the manual, including a list of **additional resources**.

Action framework for TB in emergency preparedness

Area of intervention	Action
3.1 National emergency planning	3.1.1 Liaise with the coordination mechanism for national emergency planning
	3.1.2 Contribute to a National Emergency Preparedness Plan
	3.1.3 Assess TB risk factors, disease and response
3.2 Address emergencies within a National TB Strategic Plan	3.2.1 Elaborate a TB preparedness plan
	3.2.2 Mobilize financing for contingency or ongoing emergency
3.3 Specific guidance and tools for TB emergency preparedness	3.3.1 Assert ethical responsibility to detect, treat and prevent TB
	3.3.2 Ensure up-to-date mapping of TB diagnostic and treatment services
	3.3.3 Prepare human resources
	3.3.4 Develop a contingency plan for TB procurement and supply management
	3.3.5.A. Offer standardized TB recording and reporting tools
	3.3.5.B. Use data locally for improved care and emergency response
	3.3.5.C. Develop a mechanism for safely sharing TB patient data between countries
	3.3.5.D. Use a common checklist for supervision
	3.3.6.A. Adapt national approaches for engagement of communities, civil society organizations and community health providers
	3.3.6.B. Involve private and unengaged public health care providers if public-private mix engagement models for TB are established and functioning
	3.3.7 Develop a TB component in the emergency communication plan
3.3.8 Collaborate to prepare for infection control	
3.3.9 Apply innovations and enable operational research	

Action framework for TB in emergency response

A. Management of TB services

Area of TB intervention	Action	
	Minimum response	Comprehensive response
4.1 Coordination	4.1.1 Ensure TB competency in the work of the central coordination mechanism for emergencies	Same
4.2 Analysis of the TB risk	4.2.1 Assess the TB burden and needs as part of the rapid health risk assessment	4.2.2 Monitor the TB risk overtime
4.3 Planning for TB interventions	4.3.1 Ensure that all TB services are supported to take on initial and additional case loads	Same
	4.3.2 Participate in humanitarian response monitoring and resource mobilization	Same
		4.3.3 Ensure that additional TB services are engaged if necessary
4.4 Human resources	4.4.1 Ensure highly skilled and experienced health workers	Same
4.5 TB infection control	4.5.1 Ensure adequate natural ventilation	Same
	4.5.2 Separate people with TB and implement respiratory hygiene measures	Same
	4.5.3 Ensure the use of particulate respirators by all health workers at risk of TB	Same
		4.5.4 Enhance ventilation
		4.5.5 Install germicidal ultraviolet systems
4.6 Supplies and logistics	4.6.1 Ensure emergency supply of TB drugs, other main commodities and equipment	4.6.2 Streamline the procurement supply management with the NTP

Area of TB intervention	Action	
	Minimum response	Comprehensive response
4.7 Monitoring and evaluation	4.7.1 Ensure monitoring of people with TB and service performance	Same
	4.7.2 Pursue mechanisms for internal review and action among all partners	Same
	4.7.3 Conduct supervisory visits	Same
		4.7.4 Include TB within the essential services reviewed during humanitarian setting evaluations
		4.7.5 Conduct periodic external TB reviews
4.8 Engagement of communities, civil society organizations, and other health providers	4.8.1 Engage communities, civil society organizations, and community health providers	Same
		4.8.2 Engage private and unengaged public health providers (non-NTP)
4.9 Communication	4.9.1 Ensure effective TB risk communication	4.9.2 Ensure that TB risk communication is tailored to the updated needs
4.10 Research	4.10.1 Conduct documentation research	4.10.2 Conduct research in humanitarian settings
4.11 Durable solutions and other specific situations		4.11.1 Implement voluntary repatriation, local integration, resettlement and relocation
		4.11.2 Conduct phasing out/handover
		4.11.3 Consider various approaches necessary for patient data sharing
		4.11.4 Ensure safe transport of people with TB who are infectious

B. TB care and prevention services

Area of TB intervention	Action	
	Minimum response	Comprehensive response
4.12 Case finding	4.12.1 Detect people with TB among people accessing health services	Same
	4.12.2 Identify people who are currently on treatment for TB among new arrivals	Same
	4.12.3 Screen all close contacts of people with TB and people living with HIV	Same
		4.12.4 Systematically screen all people at risk of TB
4.13 Diagnosis of TB disease	4.13.1 Use diagnostic algorithms translated into appropriate languages	Same
	4.13.2 Arrange early access to laboratory diagnostic testing	Same
	4.13.3 Arrange access to existing radiological services for additional investigations	Same
		4.13.4 Assess the initial capacity of TB diagnostic services
4.14 Treatment of drug-susceptible TB and patient support	4.14.1 Provide treatment to newly diagnosed people with TB, prioritizing those who are severely ill	4.14.2 Provide treatment and support to all people with TB
4.15 Treatment of drug-resistant TB	4.15.1 Provide treatment to newly diagnosed people with TB, prioritizing those who are severely ill	4.15.2 Provide treatment and support to all people with TB
		4.15.3 Provide TB palliative care
4.16 TB preventive treatment		4.16.1 Provide TB preventive treatment to people living with HIV, contacts and other people at risk

Area of TB intervention	Action	
	Minimum response	Comprehensive response
4.17 TB among individuals below 15 years of age	4.17.1 Ensure TB treatment for all individuals below 15 years of age with known TB and those at risk	Same
	4.17.2 Ensure BCG vaccination of all infants as soon as possible after birth	Same
		4.17.3 Provide TB preventive treatment to at risk individuals below 15 years of age
4.18 TB among pregnant women	4.18.1 Ensure TB diagnosis and treatment of all pregnant women	Same
4.19 TB and HIV	4.19.1 Screen all people living with HIV for active TB disease and place them on TB treatment	Same
	4.19.2 Screen all people with presumptive or diagnosed TB for HIV and place them on ART	Same
	4.19.3 Provide co-trimoxazole preventive therapy to all people with TB/HIV	Same
	4.19.4 Provide minimum HIV preventive measures	4.19.5 Provide TB preventive treatment to all people living with HIV 4.19.6 Provide comprehensive HIV preventive measures
4.20 TB and nutrition	4.20.1 Assess nutrition and provide counselling and support to all people with TB	Same
4.21 TB and other comorbidities	4.21.1 Screen and treat all people with TB for known comorbidities	4.21.2 Screen and treat all people with TB for comorbidities 4.21.3 Provide smoking cessation measures
4.22 TB and emerging diseases with potential for pandemic spread	4.22.1 Ensure continuity of TB services	Same
	4.22.2 Protect people seeking TB care and the health workers	Same
		4.22.3 Screen patients for the pandemic illness

ART = antiretroviral treatment; BCG = bacille Calmette-Guerin; HIV = human immunodeficiency virus; TB = tuberculosis



World Health
Organization

CHAPTER 2

BACKGROUND

This chapter provides an overview of the people affected by humanitarian emergencies and their increased vulnerability to infectious diseases like TB. TB particularly affects poor and vulnerable populations such as refugees and internally displaced persons (IDPs) who are at increased risk of developing TB and often have poor access to TB prevention and care services. An outline of the key principles for preparedness and global structures for responding to humanitarian emergencies, and the integration of TB prevention and care into these responses are highlighted.

Global situation on humanitarian emergencies and displacement

Nearly 235 million people are estimated to be in need of humanitarian assistance and protection in 2021; this represents a population larger than Pakistan, Nigeria or Brazil (6). Of these, 82.4 million were forcibly displaced people worldwide at the end of 2020 of which 48 million were IDPs, 26.4 million were refugees, 4.1 million were asylum seekers and 3.9 million were Venezuelans displaced abroad³ (see Figure 2) (7).

3 This number excludes Venezuelan asylum seekers and refugees.

Figure 2: Forcibly displaced people worldwide, 2020



86%
HOSTED IN
DEVELOPING
COUNTRIES

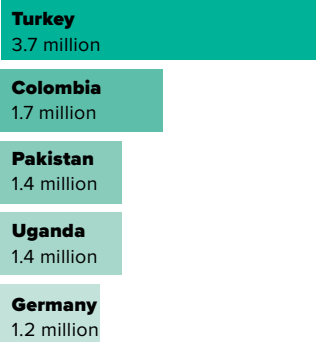
Developing countries hosted 86 per cent of the world's refugees and Venezuelans displaced abroad. The Least Developed Countries provided asylum to 27 per cent of the total.

73%
HOSTED IN
NEIGHBOURING
COUNTRIES

73 per cent of refugees and Venezuelans displaced abroad lived in countries neighbouring their countries of origin.

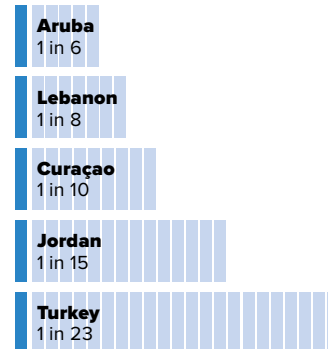
3.7 MILLION
REFUGEES HOSTED
IN TURKEY

Turkey hosted nearly 3.7 million refugees, the largest population worldwide. Colombia was second with more than 1.7 million, including Venezuelans displaced abroad.



1 IN 6
ARE DISPLACED

Relative to their national populations, the island of Aruba hosted the largest number of Venezuelans displaced abroad (1 in 6) while Lebanon hosted the largest number of refugees (1 in 8)³, followed by Curaçao (1 in 10), Jordan (1 in 15) and Turkey (1 in 23).⁴



¹ Source: Internal Displacement Monitoring Centre

² This number excludes Venezuelan asylum-seekers and refugees.

³ When the 480,000 Palestinian refugees registered with UNRWA living in Lebanon are included, this proportion increases to one in five.

⁴ In addition, Lebanon hosted 480,000 and Jordan 2.3 million Palestine refugees under UNRWA's mandate.

Source: Global Trends: Forced Displacement in 2020. Geneva: UN High Commissioner for Refugees; 18 June 2021 (<https://www.unhcr.org/flagship-reports/globaltrends/>).

Global TB situation

According to the latest Global TB Report of WHO (8), TB remains one of the world's top infectious disease killers claiming over 4000 lives a day, and 1.5 million lives annually. It is the leading killer of people with HIV and a major contributor of antimicrobial resistance related deaths. Over 9.9 million people fell ill with TB worldwide in 2020, including 5.5 million men, 3.3 million women and 1.1 million children. COVID-19 disruptions have severely impacted access to essential TB services, with far fewer people being diagnosed and treated or provided with TB preventive treatment in 2020 compared with 2019.

The number of people newly diagnosed with TB and those reported to national governments dropped from 7.1 million in 2019 to 5.8 million in 2020. WHO estimates that some 4.1 million people with TB missed out on access to care or have not officially reported to national authorities. This figure is up from 2.9 million in 2019 (Figure 3). This remains a major challenge with vulnerable populations (such as refugees) who then miss out on access to TB prevention and care. Thirty countries bear a high burden of TB in the world, and many of them also face humanitarian emergencies.

Figure 3: Global TB burden, 2020



Impact of TB on refugees and internally displaced persons

TB particularly affects poor and vulnerable populations; refugees, IDPs and other populations in humanitarian settings are at increased risk of developing TB and of having poor access to TB prevention and care services. Comorbidities (such as HIV, diabetes mellitus), poor health and poor nutrition weaken the immune system and make people more vulnerable to developing active TB. Furthermore, health and TB services may be interrupted by crisis, or access to available services compromised due to socio-cultural barriers (such as language, stigma) and costs.

Several factors put refugees and IDPs at risk of TB:

- **Crowded and poor living conditions:** Crowding and poor living conditions, combined with poor health and nutritional status during the acute phase of refugee displacement may facilitate TB transmission as well as increase the susceptibility to infection and progression to disease.

- **Lost to follow-up:** This may include difficult-to-track existing people with TB among the newly-arrived refugee population and in continuing their treatment, which may result in spread of TB and the development and spread of drug resistant TB.
- **Poor access to medicines:** The distribution system of TB drugs and supplies implemented by the NTP may be interrupted in refugee hosting areas, especially during the acute phase of an emergency where the existing health infrastructure may be overwhelmed by the additional and urgent workload.

Figure 4: 30 high TB burden countries (9)

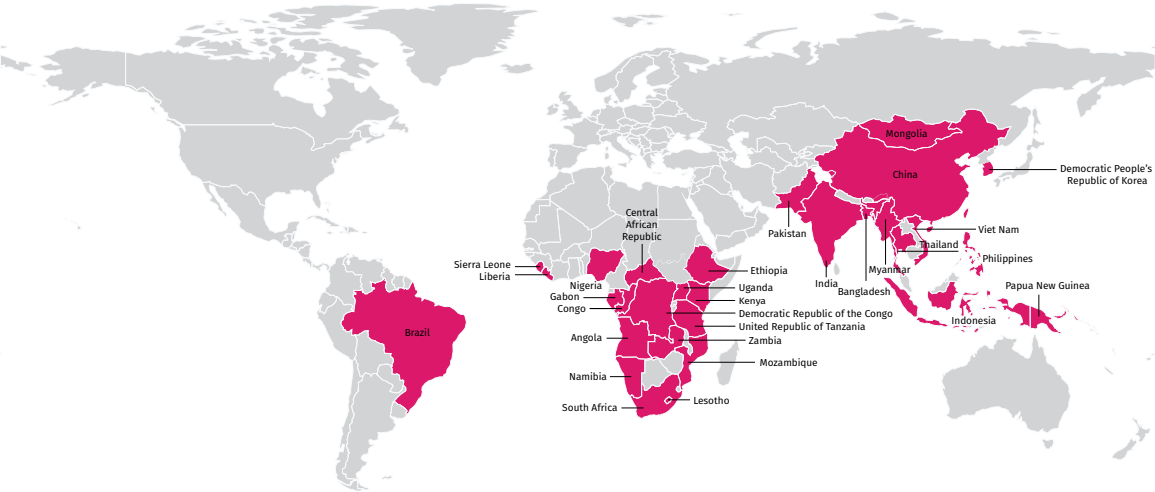


Figure 5: Top countries in the world hosting refugees and asylum seekers (>200 000) in 2020 (10)

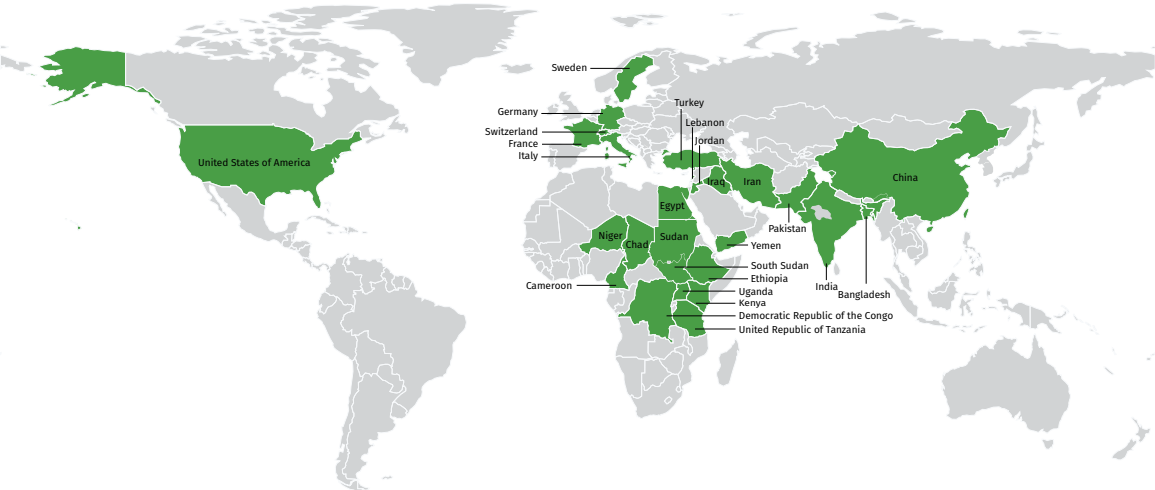
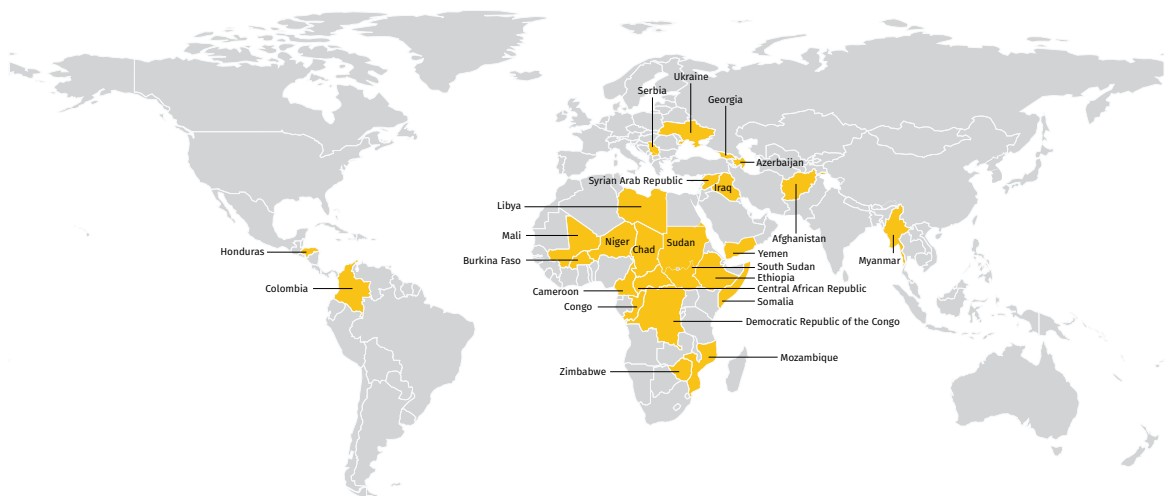


Figure 6: Top countries in the world hosting IDPs (>200 000) in 2020 (10)



Global commitments

As for all people, refugees, IDPs and other populations affected by humanitarian emergencies have the fundamental right to achieve the highest attainable standard of health, including for infectious diseases like TB. Ratified international human rights standards and conventions exist to protect the rights of refugees and other displaced populations, including their right to health.

The *New York Declaration for Refugees and Migrants* (11), the *Global Compact on Refugees* (12) and *World Health Assembly resolution* (13) put a spotlight on promoting the health of refugees and migrants. A *Draft Global Action Plan ‘Promoting the health of refugees and migrants’* (2019–2023) (14) includes highlights on addressing TB. UNHCR’s *Global Public Health Strategy 2021–2025*⁴ aims to ensure that all refugees are able to exercise their right in accessing life-saving and essential health care, mental health, TB and HIV prevention and care, sexual and reproductive health and nutrition services, by supporting and strengthening national services. The WHO Regional Office for the Eastern Mediterranean, WHO Regional Office for Europe and WHO Regional Office for the Western Pacific have developed policy documents outlining strategic areas and priority actions to address prevention and care of TB among refugees and other populations in humanitarian settings (15–17). These commitments will be vital to ensuring the health of refugees and IDPs, including addressing TB prevention and care.

Humanitarian principles (Table 1) provide the fundamentals for humanitarian action and are central to establishing and maintaining access to affected populations whether in the context of a natural disaster, an armed conflict or a complex humanitarian emergency. This includes provision of access to health services, such as to combat TB. Promoting compliance with humanitarian principles in a humanitarian response is an essential element of effective humanitarian coordination.

4 <https://www.unhcr.org/612643544>.

Table 1: Humanitarian principles in response to humanitarian emergencies

Humanity: human suffering must be addressed wherever it is found; the purpose of humanitarian action is to protect life and health and ensure respect for human beings.

Neutrality: humanitarian actors must not take sides in hostilities or engage in controversies of a political, racial, religious or ideological nature.

Impartiality: humanitarian action must be carried out on the basis of need alone, giving priority to the most urgent cases of distress and making no distinctions on the basis of nationality, race, gender, religious belief, class or political opinions.

Operational independence: humanitarian action must be independent of any political, economic, military or other objectives that any actor may hold with regard to areas where humanitarian action is being implemented.

Source: UN Office for the Coordination of Human Affairs. What are the humanitarian principles? New York: OCHA, 2012 (https://www.unocha.org/sites/dms/Documents/OOM-humanitarianprinciples_eng_June12.pdf)

The UN 2030 Agenda for Sustainable Development with its SDGs (4) and WHO's End TB Strategy (18,19) have both set ambitious targets for ending the TB epidemic by 2030 (Figure 7).

Figure 7: WHO End TB Strategy at a glance

THE END TB STRATEGY: **AT A GLANCE**

VISION: A WORLD FREE OF TB

Zero deaths, disease and suffering due to tuberculosis

GOAL: END THE GLOBAL TB EPIDEMIC

INDICATORS	MILESTONE		TARGETS	
	2020	2025	2030*	2035
Reduction in number of TB deaths compared with 2015	35%	75%	90%	95%
Reduction in TB incidence rate compared with 2015	20% (<85/100 000)	50% (<55/100 000)	80% (<20/100 000)	90% (<10/100 000)
TB-affected families facing catastrophic costs due to TB (%)	0	0	0	0

PRINCIPLES

1. Government stewardship and accountability, with monitoring and evaluation
2. Strong coalition with civil society organizations and communities
3. Protection and promotion of human rights, ethics and equity
4. Adaptation of the strategy and targets at country level, with global collaboration

PILLARS AND COMPONENTS

1. INTEGRATED, PATIENT-CENTRED CARE AND PREVENTION

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

2. BOLD POLICIES AND SUPPORTIVE SYSTEMS

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

3. INTENSIFIED RESEARCH AND INNOVATION

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

The WHO End TB Strategy builds on a “know-your epidemic” approach and focuses particularly on serving those not reached – the most vulnerable and marginalized populations. Inclusion of refugees and other displaced populations in national TB policies, strategies and equitable access to services upholds basic human rights principles and is sound public health practice in line with the Strategy (20). High-level commitments were bolstered through the political declaration of the first WHO global ministerial conference on TB (21) and the political declaration by heads of state and government in 2018 at the United Nations General Assembly High-level meeting on the fight against TB (UNHLM) (22) (see [Annex 1](#)). Additional interim targets were defined in the UN political declaration. In late 2020, a new report released by the UN Secretary-General and developed with WHO support, outlined ten priority recommendations to put the world on track to reach agreed targets by 2022 and beyond, and to reduce the enormous human and societal toll caused by TB, especially in the context of COVID-19 (23). [Annex 1](#) provides a full summary of TB targets from the UN 2030 Agenda for Sustainable Development, End TB Strategy, the UNHLM and the 2020 Progress Report of the UN Secretary General on TB. WHO’s Multisectoral Accountability Framework emphasizes the need to work across sectors to foster action and accountability to address TB among vulnerable populations including refugees. All these strategies and commitments place the spotlight on leaving no one behind, with refugees and the internally displaced among the key populations at risk. Achievement of these ambitious global targets requires adequate access to TB prevention and care services for populations in humanitarian settings.

Impact of the COVID-19 pandemic

Since the end of 2019, the COVID-19 pandemic has caused enormous health, social and economic impacts on people around the world. For vulnerable populations, such as refugees and other displaced populations, the impact is even greater. In the context of the global TB epidemic, the COVID-19 pandemic has reversed years of progress. For the first time in over a decade, WHO reported an increase in TB deaths.

COVID-19 disruptions have severely impacted access to essential TB services, with far fewer people being diagnosed and treated or provided with TB preventive treatment in 2020 compared with 2019. More than 85% of refugees are hosted in low- and middle-income countries which often have weak health systems, high burden of infectious diseases like TB and limited capacity to manage persons with severe disease related to COVID-19 (24-25). It is vital to ensure access to essential TB services for refugees, for IDPs and others affected by humanitarian emergencies. WHO, UNHCR and CDC have been responding to the COVID-19 pandemic across operations worldwide in a coordinated manner, to address the needs of the most vulnerable in close collaboration with governments, partners and civil society. In tandem, WHO is working with countries, partners and civil society to ensure continuity of essential TB services and to learn lessons from the COVID-19 pandemic to strengthen preparedness and build back stronger.

Box 1: Negative impact of COVID-19 on TB services for refugees and the hosting population in Cox's Bazar, Bangladesh

In 2017, more than 860 000 people of Rohingya ethnic origin fled from Myanmar to settle in refugee camps around the town of Cox's Bazar, Bangladesh; currently, the largest refugee camp population in the world. The NTP was strengthened to cover the refugee camps and their host communities, in partnership with the NGO named Bangladesh Rural Advancement Committee and WHO; other partners in the health cluster are the UNHCR, IOM, Médecins Sans Frontières and Save the Children. TB diagnosis and treatment were organized in the camps and through the health centres of the surrounding sub-districts (*upazila*); at the community level, field staff were identifying and referring presumptive TB case, supporting people during treatment, providing health education and community engagement.

The COVID-19 epidemic spread among the refugee and hosting population starting in early 2020. Until that time, every four months, 130 000 Rohingya refugees and 12 000–15 000 people of the hosting communities were screened for TB and respectively, almost 8000 and 900–1100 were confirmed with TB. Treatment success rates exceeded 95%.

With the advent of COVID-19, restrictions in movement limited most of the TB services, such as TB diagnosis, treatment follow up and patient support, health education and community engagement. The stigma associated with both conditions and the fear of being forced into quarantine discouraged and delayed people's seeking of health care. During April-June 2020, only 5454 Rohingya refugees and 2087 people from the hosting communities were screened and, respectively, 395 and 273 were confirmed with TB. Staff continued to work under these constraints, however with concerns about final treatment outcomes of those diagnosed. The staff working in the laboratories and in the field were additionally trained on COVID-19 infection control measures.

Source: Rohingya Crisis. Situation report N.20, week 34. Cox' Bazar, Bangladesh: World Health Organization, 26 August 2020. (<https://reliefweb.int/sites/reliefweb.int/files/resources/who-cxb-situation-report-20.pdf>).

Main stakeholders in health among refugees and internally displaced persons

Government

The affected state, i.e. the government and national actors (such as ministries of health, interior, and other relevant ministries), retains the primary role in the initiation, organization, coordination and implementation of emergency preparedness and response, including humanitarian assistance and health care within its territory (26). Moreover, the major challenges in TB prevention and care among refugees and other affected populations can be effectively addressed only through sustainable and system-supporting interventions led by the health ministry working with all sectors within the hosting country. As per the SDGs and WHO's End TB Strategy, the government must be the duty-bearer and steward but needs to engage a wide array of stakeholders in the response to emergencies and to epidemics. Engagement of civil society, affected communities, NGOs and private health providers is especially critical. Coordination across national ministries, regional and local authorities in and of

itself can be challenging, so understanding local coordination models and past precedents in specific countries and settings is of paramount importance.

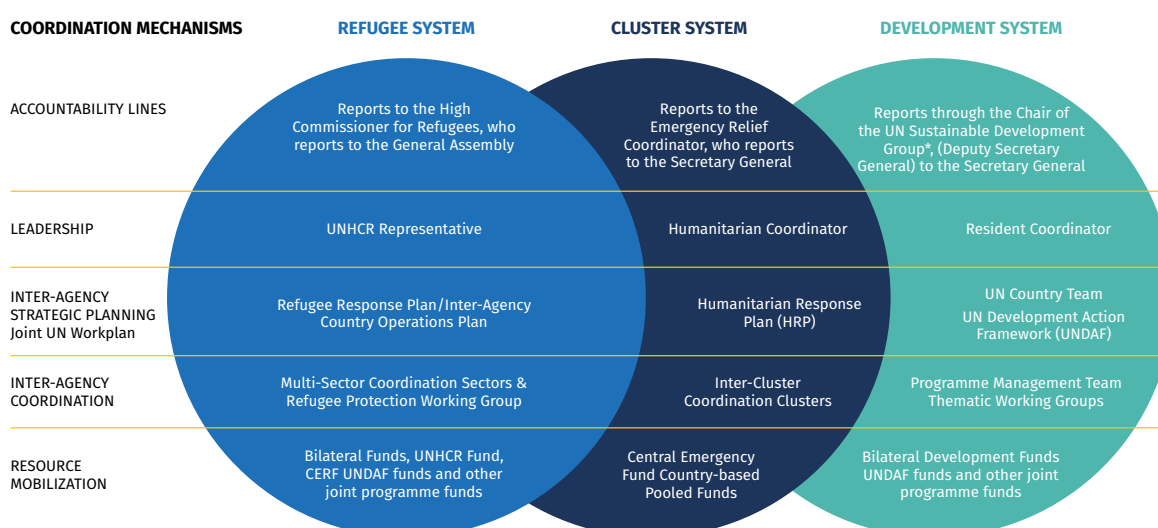
Nearly every country has a NTP, at least with a central unit and focal points at regional and district levels, but staffing and structure vary greatly, depending on the overall health system. In most countries, TB care and prevention is largely integrated into primary care, community-based care and other levels of the system, and quality and coverage of services depends heavily on human and financial resources for health care overall.

UNHCR and the Refugee Coordination Model

UNHCR’s work with refugees is an integral yet distinct element in the overall humanitarian coordination architecture and is applicable in all refugee situations. It functions throughout a refugee response, whether in a new or protracted emergency, and whether refugees are living in camps, rural areas, urban settings or in mixed situations (27).

Apart from governments leading refugee responses where possible, the way UNHCR exercises its coordination responsibilities is context specific (Figure 8). UNHCR leads the development, implementation and resource mobilization for interagency refugee response plans (country specific) and/or regional refugee response plans (to respond to a significant refugee influx into several countries). These response plans are a coordination tool that establish a common strategy and provide the host government and donors with an overview of the interagency response, including resource requirements. Similarly, as requested by the host country, UNHCR assists governments to establish and support national, regional and international arrangements for the application of the Global Compact on Refugees. The Global Compact on Refugees engages a broad range of stakeholders and is a framework for more predictable and equitable responsibility-sharing, recognizing that a sustainable solution to refugee situations cannot be achieved without international cooperation.

Figure 8: Coordination mechanisms in UN humanitarian operations at country level



* The UN Development System is under reform

Source: Refugee Coordination Model (RCM). Geneva: UN High Commissioner for Refugees; 15 May 2021 (<https://emergency.unhcr.org/entry/38270/refugee-coordination-model-rcm>).

Cluster response to humanitarian emergencies

Within the cluster response, **the overall responsibility of coordinating the health sector response is with the health ministry of a country** (in non-refugee situations), **with support of WHO as the leading agency of the health cluster**. In-country, the Humanitarian Coordinator leads the Humanitarian Country Team composed by the Cluster Lead Agency(s) that works closely with government bodies and NGOs. Each Cluster Lead Agency has a Head and Cluster Coordinators. The Health Cluster Members are all those contributing to the delivery of health services. Areas and leading agencies are shown in Figure 9 (28).

Figure 9: Cluster response to humanitarian emergencies by area and leading agency(s)



FAO = Food and Agriculture Organization; IFRC = International Federation of Red Cross and Red Crescent Societies; IOM = International Organization for Migration; UNDP = UN Development Programme; UNICEF = UN International Children's Emergency Fund; WFP = World Food Programme; WHO = World Health Organization.

Source: Health cluster guide: a practical handbook. Geneva: World Health Organization; 2020.

Other key partners

Civil society organizations play a vital role under humanitarian emergencies by promoting rights-based approaches, contributing to policies and partnerships and overseeing implementation. Many of the international and national NGOs working in humanitarian emergencies are also active in health, including TB prevention and care.

The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) encourages countries to include refugees and other displaced populations into their application for funding, to promote sustainability and equity. Countries experiencing humanitarian emergencies may benefit from the Challenging Operating Environments Policy (29) which offers the flexibility to use funds for affected populations and their host communities either through reprogramming an existing grant or, when reprogramming is not possible, making a separate application for the Emergency Fund.

Since 2016, the Engagement in Situations of Fragility, Conflict, and Violence is part of the World Bank strategy to achieve its goals of ending poverty and promoting shared prosperity (30). The World Bank's approach is to tackle long-term developmental challenges through early engagement and sustained presence in conflict-affected areas, and continuous dialogue, where possible, with the parties causing violent conflicts.

Multisectoral action and accountability

Addressing the impact of TB on refugees and other displaced populations requires the engagement of a range of non-state and government actors, such as home and foreign affairs, justice, labour, social affairs, education and health, whose policies and interventions have implications across sectors. Multisectoral, multilevel and transnational approaches are the way forward to enable coordinated, structural and sustainable change, to ensure the health of refugees. To reduce health inequalities and achieve health for all, the joint policies and interventions mentioned in this manual must be performed with full respect for the principle of non-discrimination and, overall, following a human rights approach ensuring accountability.

Box 2: Global Fund support for multicountry TB interventions among Afghan returnees, refugees and migrants in Afghanistan, Islamic Republic of Iran and Pakistan

Afghanistan has one of the highest numbers of refugees, returnees and IDPs in Asia. In 2019, Pakistan and the Islamic Republic of Iran were home to, respectively 2.4 million and 951 000 documented Afghan refugees; with many more unregistered Afghan refugees in both countries. Furthermore, Afghanistan has more than 500 000 refugee returnees from these countries along with more than 4.2 million IDPs. These populations are at higher risk for TB due to their poor living conditions and lower access to health care services. A 3-year multicountry TB grant of the Global Fund was launched in January 2019 to create an enabling environment and assure to all Afghan refugees and migrants access to quality TB care.

Accordingly, the grant support has been covering around 1 000 000 refugees, returnees and IDPs in the three countries. TB active case finding strategies were introduced to respond to access barriers and to screen the target populations. Diagnostic pathways with new diagnostic tools (Gene Xpert in Afghanistan) were introduced after a comprehensive health facility assessment. Active case finding during 2020 resulted in the screening of 983 193 people and detection of 945 people with TB, equal to 145% of the target for 2020.

One of the main successes achieved under the multicountry grant was at the policy level: a sub-regional strategic plan for cross-border TB care and prevention was developed and adopted, as well as consistent subregional guidelines and harmonized and updated national guidelines for TB active case finding. All these documents were translated into national strategic plans to ensure consistency and sustainability of TB care and prevention among the Afghan migrants of concern.

Furthermore, a cross-border digital platform is being developed to allow sharing of TB data among the three countries; it is expected to be rolled out by 2022 to facilitate TB screening, registration, testing, tracking, treatment enrollment and follow up. This platform is expected to improve the communication within and between the countries, leading to reduced “lost to follow up” and increased treatment success.

Source: Yousofzai Abdul Wali and Nasrat Akmal, UNDP, Kabul, Afghanistan, 2021.



CHAPTER 3

TB PREVENTION AND CARE IN EMERGENCY PREPAREDNESS

Preparedness for humanitarian emergency response can save precious time and lives. Preparedness efforts are generally led by an emergency management authority, with the involvement of many ministries, institutions and partners. The health ministry of a country is usually the main actor in addressing health risks. Given the breadth of issues to be addressed across sectors, preparedness tends to not consider details on individual disease response. Yet given the risks to public health posed by TB and its drug-resistant forms, several issues must be addressed. Therefore, as a critical complement to preparedness plans, national TB strategies should include a planning component to address emergencies, as should overall health plans.

This chapter addresses the nature of national emergency planning and how TB concerns can be addressed. It introduces how national TB strategic plans (NSPs) can be strengthened to enable better in-depth planning for the TB response in humanitarian emergencies. Most importantly, this chapter offers some guidance and tools for specific elements of planning that can be useful for both overall national planning and TB strategic and operational planning.

The **Action framework for TB in emergency preparedness** in Chapter 1 presents in summary the priority actions addressed in this chapter.

Box 3: TB prevention and care in humanitarian emergencies: lessons from the Syrian displacement crisis

In 2017, over 13 million Syrians were in need of humanitarian assistance, with 5.4 million refugees in the neighbouring countries of Iraq, Jordan, Lebanon and Turkey. In this setting, the IOM provided support to the NTPs of Iraq, Jordan and Lebanon through early funding from the UNHCR and then through a Global Fund Emergency Grant in 2015. Policies that were successful in TB prevention and care in the countries affected by the Syrian crisis could be considered and adapted in other humanitarian emergencies.

TB care and prevention in humanitarian emergencies requires increased awareness of TB symptoms and services among health care workers and affected populations. It also requires performing standardized symptom screening at the borders or registration points, while leveraging more widely available diagnostic tools to find people with TB in high-burden settings that may be missed using symptom screening alone. Additionally, treatment completion rates can be maintained and improved through sufficient dedicated resources and innovative strategies to keep mobile populations on treatment. Doing so requires capacitating local health workers, adapting control strategies based on unique epidemiologic profiles and mobility of the displaced population, use of radiographic and laboratory diagnostic tools, sufficient resources to ensure treatment completion, and more standardized NTP coordination. Most importantly, sustained commitment from the international humanitarian community, including funding, is necessary to reach, provide treatment, and cure TB among these very vulnerable populations. To end TB worldwide, TB prevention and care can no longer be neglected among the populations affected by humanitarian emergencies.

Source: Boyd AT, Cookson ST. TB control in humanitarian emergencies: lessons from the Syria displacement crisis. *J Clin Tuberc Other Mycobact Dis.* 2019;14:31–35.

3.1 National emergency planning

3.1.1 Liaise with the coordination mechanism for national emergency planning

For humanitarian emergency preparedness, a core leadership and coordination mechanism is needed to plan and serve in guiding any response. This mechanism should drive strategic directions, define key risks within and across sectors, as well as elaborate and prioritize required actions. It can provide rules for the engagement of stakeholders, and drive resource mobilization for preparedness and response. In the absence of planning and coordination, emergency response can be chaotic and may even exacerbate risks to affected communities, rather than mitigate them. Coordination is also essential given the dynamic nature of emergencies.

A national emergency preparedness committee generally includes a limited number of leaders and stakeholders from different sectors. It is unlikely that NTP leaders can be represented directly on the cross-sectoral committee but they can contribute to efforts in planning by providing

key documentation, guidance and tools, and being available as needed by the committee. This documentation can be drawn from NSPs and operational plans.

Civil society organizations and NGOs active in ending TB can be powerful voices to ensure that TB is included in the emergency response, and that lessons learned from previous local emergencies are taken into account. Furthermore, up-to-date preparatory measures are necessary to include important recent improvements in tools for TB diagnosis and treatment, and to aid integrated community-based treatment.

3.1.2 Contribute to a national emergency preparedness plan

National emergency preparedness plans vary in their depth and composition. The health component of an emergency preparedness plan can be based on some core elements (31):

- **Assessment** of: (i) the health situation, including communities with the poorest health profiles; (ii) the health system, including capacities of the health workforce, clinical, laboratory and public health networks; (iii) major health risk factors; (iv) communities at high risk for environmental disasters and conflicts; and (v) health profile and risks; all with a focus on addressing critical gaps.
- **Country emergency risk profile** with prioritized health risks posed to populations across national borders that need to be addressed during humanitarian emergencies, and lessons learned in addressing risks during previous emergencies.
- **Stakeholders and partnerships** with existing health stakeholders and partners having experience in emergency response and/or likely be called on in an emergency; proposed rules of engagement of partners; and perspectives on factors needed to achieve a whole-of-society response to an emergency.
- **Detailed planning and resource mobilization** during the first few months of operations (contingency plan).

A number of elements could help in ensuring that TB is properly addressed in national emergency preparedness planning:

- Presence of a TB-knowledgeable person to serve as an expert for the NTP in the national emergency preparedness committee.
- Availability of updated TB documentation.
- Incorporation of each of the areas listed in section 3.3.

Recent guidance in planning responses to the COVID-19 pandemic in humanitarian emergency settings provides recommendations relevant to emergency response in general, as well as response to infectious disease epidemics, including TB (32–35).

3.1.3 Assess TB risk factors, disease and response

In a national emergency preparedness plan, basic information on TB epidemiology, alongside other diseases and health conditions should be available. This includes TB as a risk for the general population and any populations likely to be at high risk of being affected by emergencies including disasters as well as subgroups with higher risk of TB (such as children, People Living with HIV (PLHIV), people in correctional facilities) (36).

Key risk factors for TB include:

- Prevalence of poverty
- Prevalence of overcrowding
- Prevalence of major biological/behavioural risk factors (such as malnutrition, HIV, diabetes mellitus, smoking, poor mental health, injecting drugs or alcohol use) that weaken the immune system or create other biological risk factors for TB.

TB disease data include:

- Incidence and prevalence of TB disease
- Incidence and prevalence of drug-resistant TB
- TB mortality and/or case fatality rates in the general population, and any population likely to be at high risk of being affected by emergencies including disasters as well as subgroups with higher risk of TB (such as children, people living with HIV, people in correctional facilities).

The NTP should have this information readily available from their own routine reports, programme reviews and/or related epidemiological reviews, updated national TB strategic plans as well as from the WHO TB database that provides data and/or estimates on nearly all points above for all countries. Subnational data should also be provided to the WHO TB data dashboards. Additional local information may be available in published and unpublished research and reports.⁵ Risk matrixes recommended by the Inter-Agency Standing Committee (IASC) (37) and UNHCR may also be helpful tools that the NTP and partners can become acquainted with (38).

Assessments and monitoring of selected TB indicators (Table 2) available from national surveillance systems of the affected country or the country(ies) of origin of refugees who may enter a country during an emergency, should be periodically updated. Country and regional institutions, including WHO country and regional offices may facilitate such data retrieval.

Table 2: Several top TB epidemiological indicators

Indicator (estimated and/or reported)	Main sources
TB incidence rate	National reports WHO's global tuberculosis database ^a
TB mortality rate	National estimates WHO's global tuberculosis database
MDR/RR-TB rate	National and subnational reports WHO's global tuberculosis database
TB/HIV coinfection in adults	National and subnational estimates WHO's global tuberculosis database
Five essential risk factors for TB ^b	Population prevalence of excessive alcohol use, diabetes, HIV, smoking and undernourishment

MDR/RR-TB = multidrug resistant or rifampicin-resistant tuberculosis; TB/HIV = HIV-related TB

^aWHO's global tuberculosis database. World Health Organization [website]. (<https://www.who.int/tb/country/data/download/en/>).

^bWHO provides measures of each indicator for each country, as used by the UN/WHO. For latest information by country, see national profiles available at: <https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2020>.

5 Special mention should be made to the epidemiological reviews periodically conducted under WHO coordination.

3.2 Addressing emergencies within a national TB strategic plan

National TB programmes, especially in countries with a fragile security situation, or those prone to natural disasters are recommended to develop a TB emergency preparedness plan, or update it, as part of their NSP (39). This is an opportunity to envision and prioritize key needs, reflect on the state of overall support to populations highly vulnerable to TB, and budget funding for key interventions that may need to be financed from TB programme resources, at least in the initial phases of the response.

3.2.1 Elaborate a TB preparedness plan

NSPs have progressed with the evolution of the global TB strategy. Most NSPs now aim to address more ambitious people-centred TB care and prevention, working with communities and a range of providers; forming linkages with national efforts to expand access to universal health coverage, poverty alleviation and social protection floors, and innovation and research components. As NSPs now are often the basis for international financing support and domestic budgetary submissions, these plans are more detailed than in the past. Therefore, a planning component for emergency preparedness should be elaborated in these NSPs, though it is often overlooked, or mentioned among actions for a wide range of vulnerable groups. [Annex 2](#) provides an overview of the main content of such planning.

Box 4: Addressing refugees and internally displaced persons in Iraq's NSP

Iraq has faced a highly challenging environment during the past decade that negatively impacted the whole country. In 2016, over 50% of the population were deemed “vulnerable” after several years of extensive instability. In 2019, more than 2 million Iraqis were estimated to be internally displaced, and the country hosted approximately 250 000 refugees from Syria and Yemen. Overall 8 million people were estimated to be in need of humanitarian assistance. In September 2019, the Ministry of Health and Environment of the Republic of Iraq completed a new NSP for TB prevention, care and control for the period 2020 to 2024 entitled: Towards TB-Free Iraq: No deaths, no disease and no suffering associated with TB. The new NSP focuses on these refugee populations and aims to overcome the major reductions in support of national and international partners since 2018.

The new NSP focuses on enhancing TB prevention and care in the areas with major concentration of refugees, IDPs and other vulnerable populations. This is done by increasing rapid diagnostic TB testing capacity, engaging primary care facilities, preserving capacities challenged by the high turnover of health workers, re-establishing community health workers, and implementing an electronic case-based recording and reporting system.

The NSP also seeks to bolster an emergency response should another flow of refugees begin given the ongoing instability in the neighbouring countries. This is through the Crisis Response Committee established under the NTP in 2014 and the WHO Health Cluster Coordination Unit for Complex Emergency in Iraq. Intentions are to ensure surveillance of “hot spots”, build capacities with established standard operating procedures, standardize TB drug procurement and supply management, formalize partnerships with memoranda of understanding, and establish and implement cross-border policies.

Source: Towards TB-free Iraq. National strategic plan for tuberculosis prevention, care and control in Iraq. January 2020–December 2024. Bagdad: Ministry of Health and Environment; 2019 (available upon request).

3.2.2 Mobilize financing for contingency or ongoing emergency

Where there are ongoing humanitarian emergencies at the time of revision and updating of NSPs, the affected populations must be recognized among the key vulnerable populations for special attention in the plan. Under the current policy, the Global Fund finances NSP-based funding applications, and advocates for financing requests to reach vulnerable and at-risk groups. Through its Challenging Operating Environments Policy, a country experiencing a humanitarian emergency may be able to re-programme its current grant. It may also be possible to access the Emergency Fund established to support interventions for affected populations and their hosting populations. This is the case for countries facing an IASC classified Level 2 or 3 emergency or a WHO classified Grade 2 or 3 emergency, even if they are not eligible for funding from the Global Fund. The Emergency Fund has a separate application process (40,41).

3.3 Specific guidance and tools for TB emergency preparedness

The following 10 subsections describe specific guidance and tools that are useful to inform national humanitarian emergency planning and national TB strategic plans to help support TB programme resiliency during an emergency. Even in low-resource settings, these issues can be addressed.

3.3.1 Assert ethical responsibility to detect, treat and prevent TB

In preparing for humanitarian emergencies, consideration must be given to safeguard ethical and human rights principles as noted in Chapter 2. As for many areas in the emergency response, overall individual rights, and cultural and other differences, need to be respected and addressed in TB prevention and care communications. Also the engagement and respect of civil society organizations, as well as NGOs often with specific capacities to best serve specific vulnerable groups, is essential to enable people-centred, quality TB prevention and care (20,42,43).

A prominent concern to be addressed in humanitarian settings is the ethical duty to detect, treat and prevent TB. According to the WHO guidance on ethics in pursuing the End TB Strategy, it is not acceptable to forego diagnosis of TB or multidrug resistant or rifampicin-resistant (MDR/RR) TB if treatment is not available immediately. Individuals have the right and need to know their status, including help in reducing the risk of transmission of infection. Therefore, diagnostic capacity for TB as well as treatment and preventive treatment for those most at risk should be planned for. With new rapid TB diagnostics, sample transport models, and artificial-intelligence aided radiography, diagnosis of persons with TB symptoms should be enabled early in the emergency response. Assurance of continuation of treatment also remains a priority. Tools are provided below to help forecast the need and plan for the supply. Other ethical principles, including informed consent, are also addressed in the WHO ethics guidance. The basic principles should be part of training for those working in health in emergency settings.

3.3.2 Ensure up-to-date mapping of TB diagnostic and treatment services

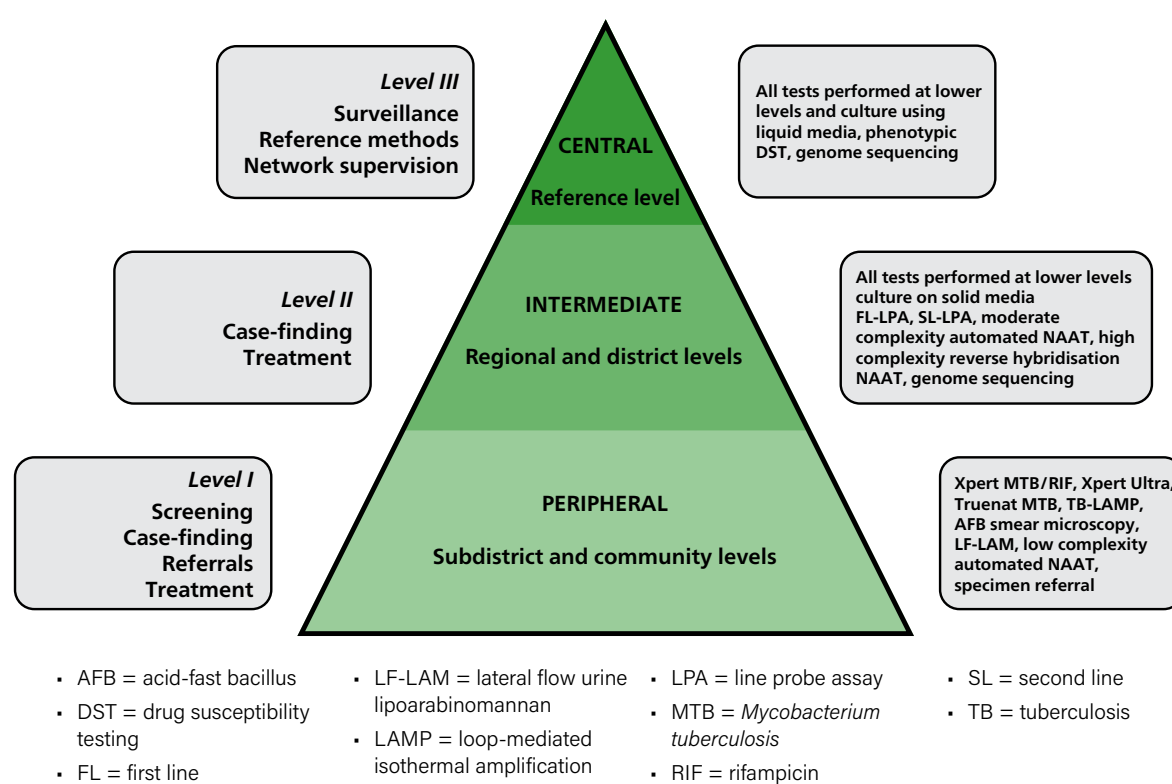
Planning for an emergency should consider optimal use of existing health structures or services in the country, before seeking to establish new temporary or permanent ones. The mapping should consider all available and potential resources, including from national and international organizations and entities working on TB and other communicable diseases, private laboratories, private practices, pharmacies, informal and traditional care providers, and community-based/organized care in regions/areas likely to be affected by a humanitarian emergency, with information on their number, location and accessibility. The mapping should also address capacities/functionality (such as the availability of

WHO recommended rapid diagnostic tests, capacity of investigating paediatric and extra-pulmonary TB), staffing and contact details. The Health Resources and Services Availability Monitoring System (HeRAMS) in countries adopting this approach could be instrumental for updating TB service mapping (44).

Diagnostic/laboratory services

Laboratory services play a critical part in TB prevention and care by providing the basis for diagnosis and guiding the course of treatment. Because of technical requirements, quality assurance and to optimize coverage, laboratory services are organized in a network at different levels of care, with complementary tools and an accompanying supply system (Figure 10).

Figure 10: Organization of a TB diagnostic network



In many moderate and high TB burden countries, there is still a significant gap in access to WHO-recommended rapid molecular diagnostic testing for MDR/RR-TB (such as the Xpert *Mycobacterium tuberculosis*/rifampicin (MTB/RIF)); and smear microscopy is still recommended for use in treatment monitoring. Novel specimen transport approaches are helping but insufficient. A major focus of domestic and international financing for TB in recent years has been on expanding testing resources. As shown in the COVID-19 response, expanding access to diagnostic platforms that can enable multiple disease testing is feasible and very important in serving vulnerable populations (45).

The mapping of TB diagnostic services should include those providing chest radiography investigation, availability of mobile units, and additional tools for diagnosis of TB. Where relevant, assessment of available capacity across borders should also be undertaken, as during an emergency; cross-government collaboration may enable access to the nearest facilities, tools and commodities.

Box 5: The importance of having Xpert MTB/RIF services in detecting TB among Tibetan refugees in India

Limited studies that have documented the incidence of TB among Tibetan refugees in India indicate it as one of the highest in the world (estimated 835–1700 incident TB cases per 100 000 population in mid-1990s). In 2010, the reported incidence rate of TB among Tibetans living in India was 431 cases per 100 000 population, with more than half of them in students, monks, and nuns living in congregate settings and at higher risk of TB and MDR/RR-TB. With the support of TB REACH, an initiative of the Stop TB Partnership, and the Canadian International Development Agency, active TB case finding and rapid molecular diagnostics were introduced under an operational study conducted between September 2011 and March 2013. 27 714 persons were screened for symptoms of TB from 21 Tibetan schools, 36 monasteries and nunneries, and the Tibetan Reception Centre in Dharamsala (dormitory-style facility for newly arrived refugees from Tibet) located in the Indian states of Himachal Pradesh, Karnataka and Uttarakhand. 3830 persons with TB symptoms were tested by using an algorithm incorporating chest radiography, sputum smear microscopy, bacteriological culture, and Xpert MTB/RIF test. TB was diagnosed in 96 (2.5%) of the 3830 persons tested, including five (5.2%) persons with multidrug MDR-TB. The use of the rapid diagnostic test and active case finding enabled the detection of many more cases than what could have been expected.

Source: Dierberg KL, Dorjee K, Salvo F, Cronin WA, Boddy J, Cirillo D, et al. improved detection of tuberculosis and multidrug-resistant tuberculosis among Tibetan refugees, India. *Emerg Infect Dis.* 2016;22:463–468.

Treatment services

The mapping of TB treatment services similarly needs to describe treatment initiation capacity at each level of the health system. There are typically three levels of TB treatment services.

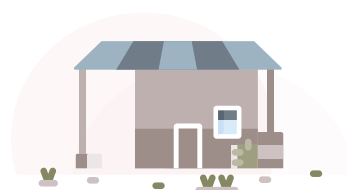
Figure 11: Three levels of TB treatment services



Hospital-based: people stay in hospital only to initiate treatment if severely ill or to address adverse side-effects, etc.



Clinic-based: people receive the full course of treatment on an ambulatory basis at an accessible outpatient clinic, health centre, or health post



Community-based: people receive full course of treatment on an ambulatory basis, at a venue in the community, such as the people' or relatives' household, workplace, or even a nearby park or through mobile health delivery services; there should be a treatment supporter or community health worker from the same neighbourhood where the patient lives

The people-centred care principle promotes the use of ambulatory care (clinic-based or community-based whichever is more convenient for the patient) over hospital-based care. Hospital care may still be necessary for severely ill people with TB, including some people with drug-resistant TB. Service mapping should also consider location and accessibility, capacities, staffing and contact details. At the time of an emergency response, this information will be critical for initiating the response, and informing the revisited HeRAMS.

Box 6: Enabling continuity of care after a typhoon in The Philippines

In November 2013, Typhoon Haiyan killed thousands of people and destroyed homes, hospitals and schools across vast areas of the Philippines. To ensure continuity of care as the first priority, the Department of Health (DoH) with WHO and other health partners established a system to trace people with TB and send them to the nearest treatment centre. As many medical records were washed away, local health staff had to compile a list of their people with TB from memory. TB treatment centres, including those for MDR-TB were mapped and assessed for functionality so that appropriate referral of people with TB could occur to reinstitute their therapy as soon as possible. Facility maps were distributed to NGOs and foreign medical teams that arrived days to weeks after the typhoon, to ensure they identified and referred existing people with TB quickly to appropriate facilities. The DoH also rapidly developed and distributed a simple field manual to help NGOs, foreign medical teams and national health staff in identifying and managing people with TB. The result was that within a month after the typhoon, almost every person with TB who was still present in typhoon-affected areas was receiving their treatment again. A small minority who had not yet been traced after six months were in fact those who had migrated to other areas in the country.

After the initial priority to identify and reinstitute treatment of existing people with TB, the programme was later expanded to re-start diagnosis of new TB suspects, including the use of GeneXpert®. The TB culture laboratory in Tacloban, which was completely destroyed, was repaired. Given the large geographical scale of damage, assessment and rehabilitation of treatment centres and laboratories continued for at least six months after the typhoon hit, along with provision of further equipment and training for health care professionals.

Sources:

Guidelines for managing tuberculosis control program during emergencies and disasters. Administrative Order 39/2015. Manila: DOH, 2015).

Adapted from Gayer M and Cookson ST. Chapter 32. Tuberculosis in humanitarian emergencies. In: Health In humanitarian emergencies – principles and practice for public health and healthcare practitioners, Cambridge University Press: UK; 2018.

3.3.3 Prepare human resources

Under the acute phase of an emergency and its harsh conditions, experienced professionals are needed to confirm a TB diagnosis and support or reinstate treatment. NTP emergency focal point(s) or other qualified persons from technical partners should be identified ahead of time for their prompt deployment to support the launch of TB diagnosis and care in an emergency. The needs will be different if health services are already operating in the affected area or if new services need to be set-up or re-established. Expertise should include: diagnostics and laboratory assessment, clinical management and infection control, procurement and supply management, recording/reporting, community care and education/counselling. These experts may be requested to cover non-TB areas

within their own expertise. This team can help devise appropriate training on TB preparedness and promote appropriate scenarios for training emergency teams in thinking “TB” during operations. In budgeting under the NSP, emergency contingency planning should include dedicated support teams or enhanced district team(s).

3.3.4 Develop a contingency plan for TB procurement and supply management

TB service delivery during an emergency, including possible losses of stock, requires additional planning for procurement, distribution (storage, transport), and use of TB commodities. There are significant differences in the supply approach for multimonth care of people with TB (and persons requiring chronic care) compared with supplies for acute illnesses. NTPs typically utilize centralized mechanisms for TB drug procurement and use distribution systems integrated into the general health system. Such a systematized approach can be leveraged for humanitarian emergencies, provided that it is properly planned in advance and considers:⁶

- Forecasted incoming population (number, age distribution);
- Available stock of each item in quantity, shelf life and storage location (central and peripheral);
- Available means of transport;
- Additional needs in procurement and related budget (amount, potential sources and mechanisms, negotiation with external donors);
- Regulations for the registration and importation of TB drugs, laboratory and other equipment and commodities;
- System of monitoring storage and utilization.

In addition to its standard support, the Stop TB Partnership Global Drug Facility (GDF) also offers emergency grants of one year to prevent stockouts due to natural disasters and humanitarian crises (46).

Forecasting TB drug requirements for adults and children depends on the drug formulation and the type and duration of the treatment regimen. The calculated need for one person with TB should be multiplied by the total number of people with TB following that regimen, increased by 20% to ensure a reserve stock and then reduced by the quantity available in the store. The same approach should be followed for the quantification of other TB commodities. Such quantification should be done every quarter. [Annex 2](#) provides examples and tools for such quantification.

Pre-determined quantities of TB drugs, core commodities and equipment could greatly simplify the logistics (transport and storage) and thus ensure their uninterrupted supply to the final point of care. Furthermore, a well-designed system should be established for the transport of biological samples to laboratories for diagnosis. Pre-determined health kits are designed for health emergency programmes but none of them include TB items (47,48). [Annex 2](#) proposes a pre-determined quantity of TB drugs, other main commodities and equipment for an ideal population of 10 000 persons with estimated incidence of 10 new people with TB per year (i.e. 100 new people with TB per 100 000 population).⁷ This could be easily adjusted by the actual population and expected TB incidence.⁸

6 It is critical to avoid the importation and use of TB drugs by nongovernmental entities or other elements of the government that are not consistent with or not vetted by the National TB Programme/Ministry of Health and pharmaceutical authority, for given quality and specific national recommendations for drug regimens.

7 The diagnostic and treatment requirements for drug-resistant TB cannot be included in a standard kit as it is often designed for each individual patient.

8 For example, the quantities for 20 000 people with 150/100 000 TB incidence will be multiplied by 2 and then increased by 50%.

Planning needs to consider that TB drugs should be stored at 15–25°C and protected from sunlight and moisture.

The response to the COVID-19 pandemic showed that innovative approaches can be put in place to enable continuity of TB treatment during an emergency if service access is impossible. Among the key innovations was modified supply systems that enabled supply for several weeks/month to patient treatment supporters, and differentiated service delivery models that include use of digital technologies (49). Preparedness should include scenarios for modifying supply channels.

3.3.5 Adapt and strengthen TB monitoring

All NTPs have a monitoring system with forms and registers where TB service delivery components are recorded and eventually analysed. Such systems are designed to support the analysis of each person with TB and the whole programme. The programme can be evaluated using its current outputs (such as the number of investigations conducted or people with TB detected last month) or treatment outcomes (such as the percentage of people with TB cured out of the quarterly cohort of people with TB who started treatment one year ago). Monitoring both types of performance measures has to continue without interruption even during humanitarian operations. Programme monitoring relies on quality and complete data, which is ensured through standardized TB recording and reporting tools (see section 3.3.5.A). The inclusion of all TB service delivery points dealing with refugees, IDPs and affected populations is needed to ensure comprehensive TB monitoring.

3.3.5.A. Offer standardized TB recording and reporting tools

In an emergency, all stakeholders need to be pursuing common standards for essential monitoring and evaluation of operations and interventions, including health interventions. UN agencies and NGOs may use their own health data collection systems (50) which need to be adapted in advance to incorporate core national indicators and standards including for TB, and to enable national reporting. Monitoring of TB prevention and care needs to contribute to immediate humanitarian needs and to national TB surveillance and monitoring. Any early warning system should include essential TB indicators, as feasible (see section 4.2.2).

Where populations are affected by humanitarian emergencies, the Global Compact on Refugees calls for national data that are disaggregated by nationality or refugee status (51). In some countries, adapting paper-based systems to digital format could be challenging, but as countries shift to case-based electronic reporting systems for TB, this will be feasible (52).

The most important standard TB forms, registers and reports that are used by NTPs in most moderate and high burden settings, including by primary health care staff, are shown in Table 3. In some settings, there has been substantial progress in moving to electronic case-based reporting, but many countries have yet to transition to electronic case-based systems.

Table 3: List of main TB forms, registers and reports

Forms

TB identity card
TB laboratory request form
TB referral/transfer form
TB treatment card

Registers

Register of persons with presumptive TB
Register of TB contacts
TB laboratory register for smear microscopy and Xpert® MTB/RIF assay
Health facility register of people with drug-susceptible TB
Health facility register of people with drug-resistant TB
Health facility register of people on TB preventive treatment

Reports

Quarterly report on TB case registration
Quarterly report on TB treatment outcome

Box 7: How TB data from refugees contributes to the NTP in Kenya

In 1994, people fled from the civil war in Somalia to Kenya, establishing one of the largest refugee camp complexes in the world at that time in Dadaab in the eastern part of the country, 90 km from the border with Somalia. In February 2019, more than 202 000 registered refugees were distributed across three camps. The NTP is supported by UNHCR in conjunction with the International Rescue Committee (IRC), the Kenya Red Cross (KRC) and Médecins Sans Frontières (MSF-Switzerland). Furthermore, IOM runs one TB clinic and provides pre-immigration medical examinations for the resettlement of refugees to other countries. TB services comply with the national policies and guidelines and case-based TB data are submitted via the web to the NTP electronic database through the TIBU (Treatment Information from Basic Unit or “*treat*” in Kiswahili) application software downloaded into the personal tablet of the health workers. TIBU is an android-based platform that was launched in 2012, updated during the years to include additional relevant TB data (such as data on laboratory, drug resistance, tracing those lost to follow-up, TB contacts and preventive treatment); it is currently used in the entire country, including in remote programme areas such as refugee camps. Importantly, TIBU also interfaces with the District Health Information System.

Source: de Colombani P. UNHCR-supported field visit with inputs for the review of the interagency manual on tuberculosis in refugee and displaced populations. Dadaab Refugee Complex, Kenya, 10–14 June 2019.

3.3.5.B. Use data locally for improved care and emergency response

As noted above, several core TB monitoring tools can be used within national health data systems as well as included within emergency operations data platforms. Monitoring of information can help inform real-time improvements in TB care and prevention, as noted in [Annex 3](#). Similarly, data collected on population characteristics and conditions in emergency settings can also be applied to better adapt TB services. Review mechanisms that are planned to assess performance quality of the emergency response can benefit from TB data, as seen in emergency reporting during the COVID-19 pandemic in refugee communities in Bangladesh, and during the humanitarian crisis in Libya (53,54).

3.3.5.C. Develop a mechanism for safely sharing TB patient data between countries

TB, MDR/RR-TB, and latent TB infection (LTBI) treatments all require months of uninterrupted treatment. During a humanitarian emergency, refugees may travel across borders making treatment continuity essential. Patient TB cards should always be provided to people with TB such that if they have to move, they can present the card at health facilities within or beyond their country. When feasible in such emergencies it is critical that responsible services and/or district authorities transmit referral information on people being moved to national authorities. This information can be forwarded to health authorities where the patient is being relocated or resettled. Transmitting personal patient information across national borders, and/or transfer of people with drug-resistant TB who may still be infectious, may pose particular challenges. Early international planning using the experience of UN agencies including UNHCR, IOM and WHO is critical.

3.3.5.D. Use a common checklist for supervision

Given the lengthy nature of TB care and many innovations recently launched in TB diagnosis, treatment and prevention, as well as supervision of services is critical to ensure quality TB care. Supervision of health services for TB are generally conducted jointly during humanitarian emergency operations. It is important that supervisors are trained in the key elements for monitoring if a TB-specialized district or other staff cannot participate. To help enable standardized, manageable quality supervision, a TB checklist could be provided to the supervision team(s). A sample checklist is provided in [Annex 4](#).

3.3.6 Engage communities, civil society organizations, and health providers

3.3.6.A. Adapt national approaches for engagement of communities, civil society organizations and community health providers

In emergency settings, affected populations most often seek to maintain social and cultural ties to create a sense of community to address difficulties and face uncertainty. Community leaders and community organizations even if informal, can provide key opportunities for enabling people-centred care and prevention. Some activities that can be pursued through them are:

- Identifying persons with symptoms, or known people with TB and linking them to TB services
- Supporting people to start, continue and complete TB treatment
- Raising community awareness on prevention and increasing demand for TB testing, treatment and support
- Advocating for better access to TB diagnostics, treatment and care.

Community health workers who receive some formal training, and/or may be from the affected populations, can also pursue these critical activities and link health services and communities.

WHO has developed operational guidance, case studies, training and monitoring tools for community-based TB care by civil society organizations, NGOs, and community health workers, under Engage TB (55).

Box 8: The value of engaging community health workers in Burkina Faso

In Burkina Faso, the efforts of the NTP are undermined by the disruption of health services consequent to the escalation of armed conflict in Sahel that has caused the internal displacement of over 480 000 civilians since 2016. Through ENGAGE-TB and the New Global Fund Grants to Accelerate Progress against HIV, TB and Malaria with specific approach in humanitarian setting launched in 2018, the Ministry of Health of Burkina Faso and The Global Fund, supported the training and use of community health workers for the early detection, contact tracing and treatment follow-up (peer education and treatment support) of people with TB in camps and communities hosting IDPs, especially where health facilities are closed. As of 2019, the engagement of community health workers significantly decreased the number of people with TB lost to treatment follow-up and increased the treatment success rate, while promoting the full integration of standalone TB and HIV services into the general health services. The success of the new grants has convinced Burkina Faso and The Global Fund to renew them for 2021–2023 in supporting the implementation of the National TB Strategic Plan 2021–2025.

Source: Ministry of Health of Burkina Faso. National TB Strategic Plan 2021–2025.

3.3.6.B. Involve private and unengaged public health care providers if public-private mix engagement models for TB are established and functioning

In some communities affected by emergencies, private and unengaged (non-NTP) public health providers may already be providing TB care and prevention through networks supported by the NTP. Examples of non-NTP public providers include public hospitals, public medical colleges, correctional facilities and detention centres, military facilities and public health insurance organizations. Examples of private health care providers include private individual and institutional providers, the corporate or business sector, mission hospitals, NGOs, faith-based organizations and informal/traditional care providers. A coordination entity may be in place to support these “public-private mix” (PPM) (56) models/approaches. If such networks already exist, these networks can be deployed to serve populations affected by emergencies. The engagement of private providers in TB prevention and care in emergency settings, given its complexities, may be difficult to undertake in the absence of a well-functioning PPM framework and network. The network needs to be well-functioning and with a supervisory/coordination structure, and should not financially impact people with TB, given their underlying vulnerabilities.

3.3.7 Develop a TB component in the emergency communication plan

The NTP with its partners can help include a TB component as part of an effective national emergency communication plan, and provide a core communications toolkit as well as expertise. Effective collaboration between the emergency communication team and the NTP will lay the groundwork for good communication in the event of an emergency. The NTP with health communication team partners can also train its own network of staff to be aware of risk communication approaches during emergencies that are very different from general health communications (57).

To avoid confusing messages during an emergency, a concise TB messaging toolkit can be prepared in advance for use by the emergency communications team with: (i) media; (ii) affected populations; and (iii) host communities, as relevant. [Annex 5](#) lists some tools for developing messaging and communication plans. The toolkit can include basic TB fact sheets, infographics and flash cards, available education and communications tools (58), as well as key messages for specific audiences. The possible challenges when communicating about TB in an emergency and measures to help overcome these are:

- Having communication materials prepared in the language of specific refugees and displaced populations to ensure they are well understood.
- Addressing the risks of TB or drug-resistant TB in affected populations and host populations.
- Dispelling TB stigma in different cultures.
- Addressing the issue of TB/HIV coinfection.
- Communicating the importance of diagnosis, treatment and adherence in the midst of an emergency.
- Building trust to seek and accept care for an often stigmatized infectious disease.

3.3.8 Collaborate to prepare for infection control

TB is mainly transmitted by air and effective airborne infection control measures are crucial to prevent new infections in people. National infection prevention and control policy and guidelines are ideally developed by the health ministry for all infectious diseases, with the NTP contributing specifically in the area of TB infection control. Its effective implementation relies on managerial conditions at national and subnational levels that need to be verified in preparation of a humanitarian emergency.

The possibility to implement effective TB infection control measures immediately in humanitarian emergency settings relies on the presence of the following conditions: (i) a clear plan that includes human resource requirements and budget; (ii) specific coordination bodies at national and subnational levels; (iii) adequate health facilities (existing or new construction), which may need to be renovated; (iv) surveillance of TB disease among health workers; and (v) communication strategy and means for communication with health providers and users.

3.3.9 Apply innovations and enable operational research

As noted in section 3.2, NSPs in line with the End TB Strategy should include research plans developed with academic and civil society partners. Among the priorities of the research pillar of the End TB Strategy are rapid implementation of proven effective new technologies and approaches. The approach should leave no one behind, and prioritize vulnerable populations for the roll-out of innovations. As noted above, populations affected by emergencies can benefit tremendously from rapid diagnostics, new artificial intelligence-assisted radiography, and other digital technologies that enable care and needed follow-up from specialists located at a distance.

The strategy calls for robust operational research. In emergency settings this can involve core operations partners and communities, to help problem-solve, address cultural, gender and other barriers to care, arrive at strong adapted models of care, and respond to the expressed needs of affected populations. There are documents to aid general research and innovative thinking in emergency settings (59).

Emergency preparedness planning can help arrive at some research questions that could be addressed during innovative emergency field operations and involve basic documentation. Academic partners could be engaged to assist as feasible during emergency operations. Results can help iterate preparedness and implementation efforts.



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CHAPTER 4

TB PREVENTION AND CARE IN EMERGENCY RESPONSE

This chapter outlines the interventions in TB management, care and prevention during a humanitarian emergency (60).

The level of response to a humanitarian emergency depends on the needs of the affected populations and the capacities at the national and local levels, which is contingent on the features of the population, the host environment and the timing. For example, people's needs can be very different when fleeing from a natural disaster or an armed conflict or social unrest and arriving after a few days or many months of journey. While health services may be well-established in an urban area, it may be poor or even absent in a spontaneous camp in a remote rural area. The NTP's capacity to support local health services or new humanitarian providers may be limited at the onset of the emergency but can improve with time.

The initial phase of a humanitarian emergency is often characterized by extreme hardships and deprivation, which later stabilizes when basic needs are met and mortality and morbidity rates decrease. Therefore, TB emergency interventions can be categorized by “minimum priority actions” for **immediate response** and additional actions to those already initiated and to be continued for a more **comprehensive response** as soon as there is adequate capacity.

The **Action framework for TB in emergency response** described in Chapter 1 presents in summary the priority actions addressed in this chapter.

A) Emergency response in the management of TB services

4.1 Coordination

Whatever overall coordination is established in a humanitarian emergency response setting (see Figure 5), there should be a TB emergency focal point coordinating the TB programme for the central coordination mechanism. This person could be chosen from the NTP or from one of its technical partners.

Minimum response

4.1.1 Ensure TB competency in the work of the central coordination mechanism for emergencies

The responsibilities of the TB emergency focal point are the following:

- Direct liaison with the central coordination mechanism
- Direct liaison with focal points from TB-relevant clusters/sectors (food security, nutrition, shelter, education, logistics) and HIV as a cross-cutting approach
- Direct liaison with the NTP manager
- Oversight of all interventions relevant to TB prevention and care
- Coordination with representatives from technical partners and civil society organizations
- Coordination and supervision of staff working in TB technical areas
- Regular discussion of data and supporting supervision visits.

4.2 Analysis of the TB risk

The analysis of TB risk after the onset of a humanitarian emergency is important to guide the response with the most updated primary data.

Minimum response

4.2.1 Assess the TB burden and needs as part of the rapid health risk assessment

At the site of the emergency and as part of a general rapid risk assessment, the specific assessment of the TB burden and needs should be done through the investigation of the following aspects:

TB hazard

- Presence of people with TB: number of people with TB-related deaths, age, sex, country of origin, social/cultural vulnerability.
- Clinical features: clinical presentation, previous diagnosis and investigations (including drug susceptibility profile), treatment prescription and availability.

Exposure of the affected and hosting population

- Presence of TB contacts: size of households, number of contacts, age, sex, country of origin, social/cultural vulnerability.
- Level of integration of people with TB with the host population.⁹
- Presence of behavioural and medical conditions that weaken the immune system.
- Presence of physical conditions favouring TB exposure (such as overcrowding).
- Presence of airborne infection control measures in health facilities.
- Status of bacille Calmette-Guerin (BCG) vaccination.

Context

- Local capacities for TB prevention and care (through HeRAMS).
- Mobility of the population.

The above information was retrieved from the review of recent reports, consultation of registers and interviews conducted at the emergency response site.

Comprehensive response

4.2.2 Monitor the TB risk over time

TB risk among the affected and hosting population changes over time and has to be monitored. Table 4 shows a selection of TB indicators of national and global priority (19) for essential TB monitoring and evaluation during humanitarian emergencies (calculation is described in [Annex 6](#)).

Table 4: Main indicators for monitoring TB risk

Indicator	Assessment	Remarks
TB notification rate ^a	Monthly, quarterly, annually	Calculated per 100 000 people instead of 1000 people Disaggregated by sex, age group (0–4, 5–14, 15–24, 25–34, 35–44, 45–54, 55–64, 65+) and HIV status ^b
TB mortality rate ^c	Monthly, quarterly, annually	Calculated per 100 000 people instead of 1000 people Disaggregated by sex, age group (0–4, 5–14, 15–24, 25–34, 35–44, 45–54, 55–64, 65+) and HIV status
TB treatment success rate	Quarterly, annually	Disaggregated by sex, age group (0–4, 5–14, 15+), HIV status and anti-TB drug resistance
TB case fatality rate ^d	Quarterly, annually	Disaggregated by sex, age group (0–4, 5–14, 15+), HIV status and anti-TB drug resistance

9 There are different dimensions of integration: legal (such as holding of valid travel and identity documents, access to education and labour market, access to public services, property ownership); socio-cultural (such as differences, discrimination, residential segregation); and economic (such as employment, income, occupation).

Indicator	Assessment	Remarks
Coverage of HIV testing	Monthly, quarterly, annually	
Coverage of latent TB infection (LTBI) treatment	Monthly, quarterly, annually	Expressed as a percentage separately for people living with HIV and individuals aged <5 years who are household TB contacts

^a Proxy of TB incidence; the TB notification rate could be compared with the national TB programme country figures or recalculated for 1000 population and compared with other disease rates under the SPHERE system.

^b TB among children is an indirect indicator of TB transmission in the community.

^c Death from any reason that occurred after diagnosis of TB.

^d Death from any reason that occurred during TB treatment.

4.3 Planning for TB interventions

Minimum response

4.3.1 Ensure that all TB services are supported to manage initial and additional case loads

Facilities with TB diagnostic and treatment services mapped at the different levels of care during preparedness should be chosen based on the actual needs and their functionality validated. Effective transport of biological specimens and communication between facilities should be ensured. Priority under the minimum response is the access to quality diagnosis and treatment for people with known TB disease (to retrieve/continue their treatment and prevent drug resistance), those severely sick and those at high TB risk (contacts, people living with HIV and children). Some basic conditions should be ensured, especially for people with drug-resistant TB:

- All infrastructures are fully compliant with the TB infection control standards.
- TB services are accessible at least six days a week.
- Standard operating procedures are in place for all main practices with effective communication/coordination among different services.
- Health workers are present in adequate numbers, trained on TB and motivated.
- Cultural mediators and interpreters are available.
- Administrative procedures and sensitized staff are there to prevent discrimination and stigma.
- Direct costs (out-of-pocket) and indirect costs for TB prevention and care are minimized.

Various digital technologies may be considered in planning for TB prevention and care (see [Annex 7](#)). The decision to apply digital technology is linked to service availability of telecommunications.

Box 9: Re-establishing TB services in North-western Syria

Several years of interruption of health services in North-western Syria, severely hindered the diagnosis and treatment of TB among four million IDPs and their host populations. In most cases, TB diagnosis was only clinical and its treatment with medications not verified for quality and provenance; frequent stockouts resulted in use of expired medicines. In 2019, the WHO in coordination with the partners of the Health Cluster reactivated TB services by re-establishing three TB clinics serving the cities and large informal IDPs camps in Afrin, Azaz and Idlib areas, near the north Syrian border. Diagnostic capacity was enhanced through laboratories and radiology units. Specifically, laboratory capacity was enhanced by increasing direct microscopy of sputum samples inside Syria and establishing GeneXpert investigations and drug susceptibility testing in Turkey with a transport system for sputum samples from Syria (due to the existing international embargo to establishing such technology in the country); two machines for Truenat MTB-RIF are expected to become available in Syria through IOM support.

First- and second-line TB medicines were secured through the Global Drug Facility. Training was given to 17 doctors and 7 laboratory technicians at Gaziantep University; around 50 doctors working in primary health care centres were also trained on early detection and referral of suspected cases. In 2021, WHO with the health partners operating the three TB clinics started implementing the programmatic management of MDR cases with the last WHO-recommended all oral shorter treatment regimen with bedaquiline. The immediate achievements of such an intervention were the increasing number of people visiting the clinics and receiving free-of-charge TB care.

Source: Personal communication. WHO Global Health Cluster, June 2021.

4.3.2 Participate in humanitarian response monitoring and resource mobilization

Many humanitarian responses undertake a monitoring process to verify progress towards the objectives, guide future directions of response, and support resource mobilization. Such a process should include a TB component with routine data analysis (see section 4.6.1) also in relation to the overall response, that is discussed with technical partners and presented to the central coordination mechanism. Incorporating TB into the overall response, and monitoring from the beginning will promote active participation in decisions of overarching resource mobilization strategies and actions aimed at ensuring medium-term sustainability and strengthening capacity.

Comprehensive response

4.3.3 Ensure that additional TB services are engaged if necessary

A comprehensive response to TB includes full coverage of preventive, diagnostic and treatment services for everybody in need. Such universal coverage should be achieved as soon as possible by increasing the number of services used and their coordination. When the required additional services are not available among the existing public or private agencies to meet population needs, building new ones may be considered if cost-effective.

4.4 Human resources

Humanitarian aid/relief workers often experience the same harsh environment and security as the affected populations they assist. Their work is additionally stressful and exposed to communicable diseases. For these reasons, many relief organizations adopt special programmes for selection and training of staff employed in emergency operations.

An historical disease such as TB has profound interlinks with any culture and society which should be known by those providing health services. Stigma and cultural beliefs linked to TB, as well as its requirements in long-term treatment adherence and social support require specific cultural competence, i.e. the capacity of health care providers to overcome cultural and linguistic differences and establish good communication and trust.

Minimum response

4.4.1 Ensure highly skilled and experienced health workers

During the acute phase of an emergency and its harsh conditions, only well-experienced professionals can provide quality TB services and, even more importantly, assess, plan and adapt means and tools for an effective emergency response. NTP staff or other qualified persons from technical partners should be identified ahead of time for their prompt deployment to an emergency/humanitarian setting. The areas to ensure specific expertise are in TB laboratory diagnosis, clinical management (with knowledge of infection control), procurement supply management, recording/reporting, and education and counselling. Their contribution is expected under the supervision of the TB focal point and may also be requested to cover non-TB areas within their own expertise.

The staff deployed in emergency settings should be highly motivated and protected from negative physical and psychological consequences. This could be planned by agreeing in advance on all necessary administrative rules and arrangements: such as payment of per diems, payment for overtime and compensatory leave; occupational health services (including regular screening and insurance), sharing resources among different administrations, co-option of health workers from refugees and other emergency-affected populations (61),¹⁰ administrative briefings and debriefings; mandatory rest and recuperation; psychological counselling.

10 As part of the Comprehensive Refugee Response Framework (CRRF) annexed to the New York Declaration for Refugees and Migrants, adopted at the UN General Assembly in 2016, host States have agreed to “take measures to enable refugees to make the best use of their skills and capacities, recognizing that empowered refugees are better able to contribute to their own and their communities’ well-being and to invest in building human capital, self-reliance and transferable skills as an essential step towards enabling long-term solutions” (§ 13 c & d).

Box 10: Quality of health care for refugees and asylum-seekers in South Africa

At the end of 2018, South Africa had over 89 000 registered refugees and 184 000 asylum-seekers, most of whom were living in urban areas. The Government of South Africa has been commendably providing comprehensive primary care, including for HIV and TB, to all. The UNHCR and the CDC used a jointly developed tool to assess a sample of clinics and community centres in the metropolitan areas of Cape Town, Johannesburg and Pretoria to better understand access to these services by refugees and asylum-seekers. The findings revealed that refugees and asylum-seekers preferentially used the public health care system, where valid refugee or asylum certificates currently entitled them to free primary health care access. 87% of the interviewed refugees and asylum-seekers believed their most frequently used clinic would be available to any refugee or asylum-seeker. In terms of barriers to access, health care workers, refugees and asylum-seekers reported a lack of translation services, with over 40% of the health care workers recognizing this as the main challenge, in addition to not having the correct documents (expiration or loss) and loss to follow-up due to frequent relocation. Almost 80% of the refugees and asylum-seekers reported at least one barrier in accessing health services, with the most common, in addition to the language barrier, being the perceived poor treatment in clinics (50%). Issues such as denial of services (25%); as well as excessive waiting time and cost of services (20%) though reported less frequently were still hindering access for some. Such findings highlight the importance of working with the government, health care workers, UNHCR, their partners and refugee or asylum-seekers in understanding local situations and dynamics; capitalizing on good practices; providing effective translation services; and promoting client-centred care among health care workers.

Source: Melgar M, Moturi E, Ncube N, Kayembe B, Fajans M, Cookson ST et al. Evaluating access to tuberculosis and HIV services among urban refugees: developing standardized tools. Oral presentation at: 51st Union World Conference on Lung Health; 2020 October 20-24; Seville, Spain [virtual] (<https://worldlunghealth2020.theunion.org/events/calendar?etype=290&day=24-Oct-2020&page=1>).

4.5 TB infection control

TB is an infectious disease and all staff and patients exposed directly or indirectly to people with presumptive or confirmed TB disease should be protected with effective infection control measures, including airborne infection control measures. Airborne infection control focuses on reducing the concentration of infectious particles in the air and exposure by decreasing the sources of transmission (rapidly identifying and separating people with TB and treating them). These principles are the basis for a number of measures adopted in different settings (health care facilities and other settings at high risk of transmission, community, home) (62,63).¹¹ There are also additional specific TB infection control measures to be undertaken in a laboratory (laboratory safety) (64).

11 Other settings with a high risk of TB transmission are “congregate settings”, a mix of institutional settings where people live in close proximity to each other, for a long time (such as correctional facilities) or short time (such as homeless shelters, detention centres); health care facilities are also congregate settings but considered separately as there is higher potential likelihood of TB transmission.

Minimum response

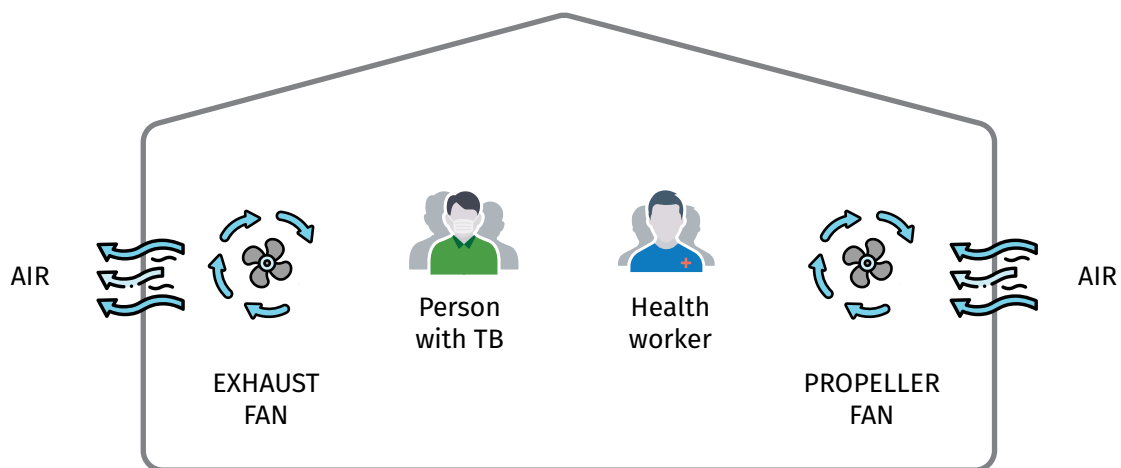
4.5.1 Ensure adequate natural ventilation

Natural ventilation refers to fresh dilution of air that enters and leaves a room or other areas through openings such as windows or doors. Once out, the contaminated air is diluted in the environment and is sterilized by sunlight. Natural ventilation should be maximized whenever possible in health care facilities, including waiting areas, and other high risk settings, such as reception centres.

If placed properly, propeller/exhaust fans, which are inexpensive, can also be used to enhance air movement into and out of a room to increase the effectiveness of natural ventilation, by mixing the air and pushing/pulling it in one direction. Over time, fans, motors, blades and ducts become dirty and less air is exhausted; therefore, they should be cleaned periodically, usually once a month.

Waiting areas have the potential to expose others to people with TB, even before their TB is diagnosed. Therefore, these areas should be well ventilated, which in warmer climates can be accomplished by creating cross-ventilation between one open side of the structure and its roof raised above the walls while protecting people from rain and sun. In examination rooms, health care staff should be mindful of the direction of airflow by ensuring that windows and if possible, doors, are kept open and the staff are closest to the clean air source. If fans are used, ensure that people with TB are closest to the exhaust fans, or farthest from the propeller fans, with again the staff being closest to the clean air source (see Figure 12).

Figure 12: Correct positioning of exhaust and propeller fans



4.5.2 Separate people with TB and implement respiratory hygiene measures

Respiratory hygiene measures are applied differently according to the different settings.

In health care facilities and other high risk settings:

- Among all people seeking care, promptly identify (triage) and separate those with cough and other signs and symptoms of TB.¹² This needs to begin with the waiting areas.
- For people who present with obvious signs and symptoms of TB, promptly refer them to staff and facilities that can start effective TB treatment.
- Encourage and implement respiratory hygiene measures (cough etiquette): i.e. covering the mouth and nose with a surgical mask (if available) or cloth mask; covering the mouth and nose with tissues, a sleeve, or a flexed elbow during breathing, coughing or sneezing. If the hand is used to cover, follow immediately with hand hygiene measures.¹³

In the home and community of people with TB:

- Ensure continuation of treatment and support.
- Encourage people with TB to avoid enclosed areas until they are no longer infectious; this may include sleeping in a separate room or location from the rest of the family and remaining outside as much as possible.
- Provide health education, including practices of respiratory hygiene (cough etiquette).

The transport of people with infectious TB is described in section 4.11.4.

4.5.3 Ensure the use of particulate respirators by all health workers at risk of TB

All personnel at risk of exposure to people with TB who are infectious such as health workers, staff in reception centres should wear particulate respirators.¹⁴ These are a special type of closely fitted face mask with the capacity to filter infectious TB droplet nuclei before they are inhaled. The correct positioning and fit of the mask on the face is essential for effective protection, and specific training and fit testing are recommended.

During the initial response to a humanitarian emergency it may be difficult to provide particulate respirators to the staff. Therefore, ensuring natural ventilation and triage of persons with presumptive TB, as well as other administrative and environmental interventions, are of paramount importance.

Comprehensive response

4.5.4 Enhance ventilation

In the comprehensive response to an emergency, more resources must be invested to increase environmental infection control through ventilation in health care facilities, including their waiting areas, and other high risk settings, such as reception centres. The effectiveness of ventilation should be measured regularly in its proper in/out direction¹⁵ and air mixing¹⁶.

12 These people present the highest risk for TB transmission to health workers (including community health workers) and visitors in health care facilities and congregate settings.

13 Respiratory hygiene measures are designed to reduce the dispersal of airborne respiratory secretions that may carry *M. tuberculosis*.

14 There are two main types of particulate respirators: the “N95” respirator (US certified) that stops 95% or more 0.3 µm particles in aerosol free of oil (“N” is for no resistance to oil); the “FFP2” respirator (EU certified) stops 94% or more 0.4 µm particles either in oil or non-oil aerosol. *M. tuberculosis* is carried in airborne particles of 1–5 µm diameter.

15 Observe the direction of the smoke of two incense sticks.

16 Check the air velocity with an anemometer and then calculate the air exchange per hour = [area of window (m²) x average air velocity (m/second) x 3600 (seconds/hour)] / room volume (m³).

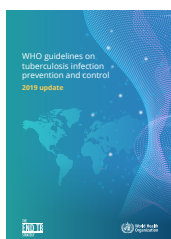
The use of poorly designed or poorly maintained ventilations systems lead to inadequate airflow that can result in transmission of *M. tuberculosis* in both health care facilities and other non-health care congregate settings, such as correctional facilities, refugee and asylum centres. Natural ventilation is preferred in resource-limited settings where there is high risk of *M. tuberculosis* transmission. However, the use of mixed-mode ventilation, mechanical ventilation or high-efficiency particulate air (HEPA) filters may be more appropriate in settings where natural ventilation is not suitable because of climate (such as cold climate) or other constraints, or where resources are sufficient to procure and maintain more sophisticated systems. Natural ventilation is also the preferred system in settings with no constant electricity supply.

4.5.5 Install germicidal ultraviolet systems

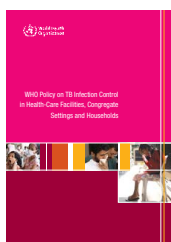
Some areas at high risk for TB transmission may benefit from the installation of germicidal ultraviolet (GUV) devices, including those where there are likely unsuspected or underdiagnosed people with TB, especially in areas where clean air circulation may be challenging. GUV devices do not replace indoor ventilation but complement it. GUV should be properly designed, installed, operated and maintained in order to have its rays reaching the maximal amount of space and air while avoiding eye exposure which may cause vision loss (macular degeneration, cataract).

WHO references

The following publications are recommended for additional reading on technical aspects not included in this guide:



WHO guidelines on tuberculosis infection prevention and control, 2019 update. Geneva: World Health Organization; 2019 (<https://apps.who.int/iris/bitstream/handle/10665/311259/9789241550512-eng.pdf?ua=1>, accessed 1 September 2021).



WHO policy on TB infection control in health-care facilities, congregate settings and households. Geneva: World Health Organization; 2009 (https://apps.who.int/iris/bitstream/handle/10665/44148/9789241598323_eng.pdf?sequence=1, accessed 1 September 2021).

TB infection control measures

The measures to prevent and control TB infection are administrative, environmental and individual. The set of administrative measures is the first and most important component of any TB infection prevention and control strategy. These measures aim to reduce exposure and therefore reduce TB transmission through administrative interventions, such as triage and patient separation systems (i.e. management of patient flows to promptly identify and separate people with presumptive TB), prompt initiation of effective treatment and respiratory hygiene.

Environmental measures aim at reducing the concentration of infectious particles in the air to make it less infectious. This can be obtained through the use of three principles: (i) dilution (natural or

mechanical ventilation), (ii) filtration (through HEPA filters) and (iii) disinfection (GUV). Individual respiratory protection measures (particulate respirators) are designed to further reduce the exposure for health workers and other people at risk of TB and other airborne pathogens present in the air.

WHO recommendations

Recommendations on TB infection prevention and control

Recommendations on administrative controls

1. Triage of people with TB signs and symptoms, or with TB disease, is recommended to reduce *M. tuberculosis* transmission to health workers (including community health workers), persons attending health care facilities or other persons in settings with a high risk of transmission. (Conditional recommendation based on very low certainty in the estimates of effects)
2. Respiratory separation/isolation of people with presumed or demonstrated infectious TB is recommended to reduce *M. tuberculosis* transmission to health workers or other persons attending health care facilities. (Conditional recommendation based on very low certainty in the estimates of effects)
3. Prompt initiation of effective TB treatment of people with TB disease is recommended to reduce *M. tuberculosis* transmission to health workers, persons attending health care facilities or other persons in settings with a high risk of transmission. (Strong recommendation based on very low certainty in the estimates of effects)
4. Respiratory hygiene (including cough etiquette) in people with presumed or confirmed TB is recommended to reduce *M. tuberculosis* transmission to health workers, persons attending health care facilities or other persons in settings with a high risk of transmission. (Strong recommendation based on low certainty in the estimates of effects)

Recommendations on environmental controls

5. Upper-room GUV systems are recommended to reduce *M. tuberculosis* transmission to health workers, persons attending health care facilities or other persons in settings with a high risk of transmission. (Conditional recommendation based on moderate certainty in the estimates of effects)
6. Ventilation systems (including natural, mixed-mode, mechanical ventilation and recirculated air through HEPA filters) are recommended to reduce *M. tuberculosis* transmission to health workers, persons attending health care facilities or other persons in settings with a high risk of transmission. (Conditional recommendation based on very low certainty in the estimates of effects)

Recommendations on respiratory protection

7. Particulate respirators, within the framework of a respiratory protection programme, are recommended to reduce *M. tuberculosis* transmission to health workers, persons attending health care facilities or other persons in settings with a high risk of transmission. (Conditional recommendation based on very low certainty in the estimates of effects)
-

4.6 Supplies and logistics

Minimum response

4.6.1 Ensure emergency supply of TB drugs, other main commodities and equipment

All drugs and other main commodities and equipment for TB care (including the management of adverse reactions) and prevention forecasted during the preparedness phase should be validated and then promptly supplied from the commencement of emergency operations, ideally through the emergency coordination structure and the NTP. If necessary, pre-determined quantities of TB drugs, main commodities and equipment (see [Annex 2](#)) should be used, and transport and storage arranged to ensure uninterrupted supply to the final point of care. Furthermore, a well-designed system has to be established for the transport of biological samples to laboratories for diagnosis.

Comprehensive response

4.6.2 Streamline procurement supply management with the NTP

Once access to TB care and prevention is fully ensured, its supporting procurement supply management should be integrated into the NTP system to avoid discrepancies and duplications, and to take advantage of the economy of scale. In this stage, quantities should be calculated according to real needs, and their storage and distribution properly arranged.

4.7 Monitoring and evaluation

Ongoing monitoring and periodic evaluations are both very important practices to assess the activities and performances in TB prevention, treatment and care against the expected achievements.

Monitoring is based on routine data collection which aims to:

- Monitor the health care of people with TB and share information with them and health facilities.
- Monitor programme performance and guide policy decisions.

Data collection, reporting and analysis are based on recording and reporting of people with TB in standard forms to be identified during preparedness according to standard case definitions (see [Annex 8](#)).

Minimum response

4.7.1 Ensure monitoring of people with TB and service performance

The set of forms, registers and reports identified during preparedness should be made available in adequate quantities (see [Annex 2](#)) and used in order that each patient's treatment and overall performance of the TB services are monitored.

The clinical monitoring of each patient's treatment and the management of treatment interruptions are described in [Annex 9](#) and [Annex 10](#), respectively; the evaluation of their final treatment outcome is through the definitions in [Annex 8](#).

The monitoring of the performance of TB services is through the main indicators shown in [Annex 6](#); the two most important performances being the successful treatment and detection of people with TB.

Treatment success requires a more challenging analysis of a group of people diagnosed and treated during the same period of time (usually a quarter). Consequently, overall treatment success can be assessed only after all people with TB in that group (cohort) have passed their planned treatment completion date and all registering units have reported; such as the number (and percentage of the total) of people with TB successfully treated from those registered for treatment during 1 January–31 March (drug-susceptible people with TB treated for six months) can be analysed at the earliest only in October. The above analysis helps in understanding how effective are the TB services delivered and informs the policy and management of changes that are needed (see [Annex 3](#) for examples).

The detection of people with TB during a period of time could be evident after all registering units have reported their cases at the end of that time; such as the number (and percentage of the expected ones) of people with TB detected during 1 January–31 March would be evident already in April. During the minimum response, monitoring of detection will be influenced by case finding prioritization to the people with already known TB or those severely ill (see section 4.12).

4.7.2 Pursue mechanisms for internal review and action among all partners

The sharing of data between all partners is the basis for effective coordination and resource allocation (65). With this purpose, non-identifying data should be shared regularly in accordance with the agreed schedule with the central coordination structure dealing with the emergency. Main indicators could be used to document TB risk and service performance (see section 4.2 and [Annex 6](#)) to all partners and for discussion on joint actions for improvement.

All TB data produced should feed into the NTP which aims at contributing to the completeness of NTP data while ensuring protection of individuals and confidentiality of data.

4.7.3 Conduct supervisory visits

All TB services centres should be visited on a regular basis in a frequency that depends on the emergency setting, the available resources and the schedule decided by the coordination structure. Community leaders should be engaged in the supervision team to ensure acceptance by the community. The sample checklist in [Annex 4](#) may help in undertaking a TB supervision visit by less experienced staff and jointly with other programmes.

Comprehensive response

4.7.4 Include TB within the essential services reviewed during humanitarian setting evaluations

Humanitarian interventions need periodic evaluations that follow UN standards (66) and guidelines (67,68) and aim for impartial analysis of expected and unexpected results achieved and the relevance, context, cause-and-effect and contribution of emergency operations. The main agency responsible for emergency operations decides the evaluation at a time dependent on the level of the emergency, involves all main stakeholders, applies specific terms of reference, analyses secondary and primary data from the field and performs public reporting. Time and resource constraints usually limit such evaluations to essential operations and services, with TB services included as part of quality of health care provided at all levels with social determinants of the population affected by the emergency.

4.7.5 Conduct periodic external TB reviews

Periodic reviews of TB services in emergency settings are essential. They may be part of country comprehensive NTP reviews (69) or organized ad hoc because of changes in humanitarian operations, that need to justify additional resources or a request by the overall emergency coordination structure. All concerned stakeholders should be coopted in appraising the TB interventions in relation to the overall emergency operations and the need for long-term sustainability solutions.

4.8 Engagement of communities, civil society organizations, and other health providers

Minimum response

4.8.1 Engage communities, civil society organizations and community health providers

The first step for the effective engagement of civil society organizations and community members, including people with TB and their families, is the analysis of the situation:

- What are the main barriers to the delivery of TB services?
- Can community-based TB activities address the identified barriers?
- Are there any key players and structure for community-based TB activities?
- What are the strengths, weaknesses, opportunities and threats for their utilization?

Based on the above analysis, specific community-based activities could be assigned, such as:

- Referral of community members diagnosed with TB and in need of continuing treatment
- Referral of community members with presumptive TB
- Support for treatment adherence through peer support, education and individual follow-up
- Home-based care for people with TB and related diseases
- Assistance in compliance with TB infection control measures
- Communication for raising awareness, changing behaviours, and reducing stigma and discrimination
- Local mobilization and advocacy.

Quality implementation of the above activities depends on the adequacy of the policies and guidelines given, i.e. simple enough and in a language that lay people can follow. Local capacities may need to be enhanced through training and mentoring. Community leaders are key players.

Community health workers and community volunteers could play an essential role in TB prevention, treatment and care at the community level. Formal or informal education should be provided to enhance their capacity to fulfil a clear job description (see [Annex 11](#) for examples). Emergency-affected populations may have members with medical education who could be employed.

Community-based TB interventions should be monitored through indicators selected on specific needs to assess (inputs, process, outputs, outcomes, impact) and to report (back to the community, to donors, to media among others). Two indicators are considered essential:

- i. Percentage of people with TB diagnosed after referral by community health workers/community volunteers over the total diagnosed in the catchment area.
- ii. Percentage of people with TB successfully treated with the support of community health workers/community volunteers over the total treated in the catchment area.

Comprehensive response

4.8.2 Engage private and unengaged public health providers

Assigning private and unengaged public (non-NTP) health providers for TB prevention, treatment and care is particularly challenging in emergency settings and requires some conditions to be in place: such as defined national PPM guidelines (as expected under preparedness, see section 3.3.6) with operational models in place; implementing agencies willing to act as intermediaries; and the NTP having oversight and support capacity.

Some key steps should be followed for engaging private and unengaged public (non-NTP) health providers:

- Validating the mapping of private providers (specialists and general practitioners, hospitals, institutions, pharmacies, informal and traditional care providers, others) done during preparedness.
- Selecting providers for partnerships based on the needs, and a signed consensus agreement.
- Mutually agreeing on the respective tasks and responsibilities (see Table 5).
- Developing and disseminating operational guidelines and educational materials.
- Mutually agreeing on the indicators to monitor and evaluation procedures.

Table 5: Responsibilities to discuss and agree with the private and unengaged public (non-NTP) health providers

Task	Key agency for emergency	Private/and unengaged public (non-NTP) health providers	Private practitioners	Private laboratories	Other care providers
Clinical tasks		Identify people with presumptive TB			
		Collect sputum samples			
		Refer people with presumptive TB			
		Notify/record people with TB			
		Supervise treatment			
		Perform rapid diagnostic tests			
		Make diagnosis			
		Prescribe treatment			
	Information, communication and awareness building about the disease				
Public health tasks		Identify/supervise caregivers			
		Follow up on 'lost to follow-up' people with TB			
		Train care providers			
		Treatment supervision			
		Quality assurance for laboratories			
		Monitoring and evaluation			
		Drugs and other supplies management			
	Provide financing and regulations				

4.9 Communication

Minimum response

4.9.1 Ensure effective TB risk communication

The central coordination structure for an emergency usually has the overall responsibility and expertise for risk communication. However, the TB programme may be requested to contribute (in consideration of the stigma attached to the disease) on specific needs; the availability of a TB messaging toolkit could be of great help (see section 3.3.7).

Comprehensive response

4.9.2 Ensure that TB risk communication is tailored to updated needs

TB communication activities should cover all the different phases of a humanitarian emergency, be flexible enough to adapt to changing objectives applied to different target audiences, adopt strategies, and develop and implement activities/tools (see overview and examples in [Annex 5](#)). Communication on TB should continue to be aligned with the emergency coordination structure, based on professionalism and evidence, and measured on its impact.

4.10 Research

Minimum response

4.10.1 Conduct documentation research

Research during the acute phase of an emergency could be limited to: simple documentation/stories on the experiences of those affected by TB and their caregivers; good practices that could be useful to respond to urgent needs; and design comprehensive care and communications.

Comprehensive response

4.10.2 Conduct research in humanitarian settings

The whole spectrum of research can be considered in an emergency setting, taking into account the additional resources available, assuring that ethical considerations regarding potential benefit and harm are reviewed, and ensuring that the research question is relevant to refugee and other populations and to the wider context of public health evidence-building in humanitarian settings. Operational research (on strategies, interventions, tools or knowledge which can improve programme performance and/or health care delivery) is often the most appropriate research in this setting. Also critical is that the decision to undertake research activities is agreed upon among all stakeholders, including the affected communities, and that it is conducted in coordination with the NTP and with the permission and under the supervision of a national or international ethical committee. The preliminary results of research undertaken in these settings should be shared among all stakeholders even before publication for the purpose of improving the services provided to the affected populations and their host communities.

The elements for the success of undertaking research in this setting include clear research questions and plan, dedicated staff and resources, well maintained database, documentation and final translation into policy and practice (70).

4.11 Durable solutions and other specific situations

Some TB priority actions are described below in preparation of repatriation, local integration, resettlement of people with TB (permanent solutions to their status of refugees or displaced people) or their relocation. Other situations at risk of TB treatment interruption should be also considered, such as the phasing out of all emergency operations or their handing over to another coordination entity. All these situations may require sharing of data on people with TB and their safe transport.

Comprehensive response

4.11.1 Implement voluntary repatriation, local integration, resettlement and relocation

Permanent solutions may be found for refugees and other displaced people, such as their voluntary repatriation to their homeland or integration in the local community or resettlement into another country; in some circumstances, the temporary solution is relocation into another emergency setting. The implementation of all these solutions has to prioritize the preservation of their medical needs that could be met by ensuring access to effective health services during transit to and arrival at the country/location of destination. Those under TB treatment should receive special attention (71).

The general advice is to postpone any transfer until the completion of the intensive phase of the TB treatment, i.e. when clinical management is easier and the person with TB is no longer infectious. However, such a decision should be taken together with the person with TB in accordance with the ethical principle of autonomy in deciding where he/she would receive treatment.

A number of actions should be taken before repatriation, resettlement¹⁷ or relocation (Table 6):

Table 6: Actions to be taken for repatriation, resettlement or relocation of people with TB

Preparation	To the person with TB
Appraise on the health system of the country of destination: access to health services (organization, health insurance and cost recovery, cultural competence, social support), NTP policies and guidelines, map of TB services, availability of TB drugs and related services	Inform the person with TB about the health system and TB services in the country of destination
Identify and contact relevant health services managers and focal points for medical referral	Provide information material on TB disease and treatment and access to TB services in the country of destination
Establish mechanisms and share medical information confidentially	Provide the person with TB referral notes and up-to-date medical records
Support intake of TB drugs	Supply each person with TB with an adequate quantity of TB drugs ^a

^a Drug supply should be provided for one to three months depending on the referral arrangements.

17 Resettlement countries may have specific policies on receiving people with TB or with a history of TB; the majority require that the TB is treated prior to travel.

Persons with drug-resistant TB have additional reasons to have their transfer delayed, such as their prolonged infectiousness, expensive drugs of short shelf life and cold chain requirements, drug intake under supervision, laboratory and instrumental monitoring, frequent adverse effects and need for support. Before repatriation or relocation of people with TB, it is an ethical obligation to ensure the following:

- There is a clear understanding and formal agreement with the country or service to take over all treatment and support duties for the drug-resistant patient
- Patient is no longer infectious
- Treatment should be with oral drugs only, and ensure that all TB drugs for the prescribed regimen, without exception, are readily available at the receiving service
- Transfer process for the patient is of very short duration and under medical supervision
- All instrumental monitoring is available at the receiving service
- All treatment, its monitoring and patient support will be provided free-of-charge.

4.11.2 Phasing out/handover

The phasing out (72) of emergency operations, temporary or permanent, may occur after the emergency needs are met. In this case, any needed operation could be handed over to the local system of the host country. For handover cases, affected populations have to be urgently relocated to other areas.

The success of phasing out TB emergency operations relies on a good plan that ensures smooth and timely transition and final evaluation with lessons-learned. Such a plan should take into account the specific causes of disruption and its anticipated duration and have two important issues to clarify:

- i. How people with TB already on treatment will complete it.
- ii. When and how to discontinue TB diagnostic and treatment services.

The continuation of TB treatment is a priority and any arrangement that does not permit it should not be acceptable. The referral system of people with TB should be clarified and verified. A reserve of anti-TB drugs should be held on site to secure the supply of drugs for each patient for a minimum 3-month treatment to take with them.¹⁸ The risk that these drugs will “leak” into the community should be evaluated and minimized. All information should be made ready to guide the continuation of treatment after referral. If the NTP takes over the operations, all patient data should be shared (respecting data protection principles) for patient follow up and final evaluation.

The decision of when to stop diagnostic services and new enrolments to TB treatment is difficult and depends on the referral arrangements above for people with TB. It is considered ethically correct and useful to offer TB diagnostic tests even if treatment is not immediately available.

4.11.3 Consider various approaches necessary for patient data sharing

Different approaches may be considered in sharing information on persons with TB between different countries, including direct communication between the NTP managers (telephone, e-mail, WhatsApp) or mediated by WHO, UNHCR, IOM or NGOs or through the International Health Regulations (IHR)

18 Such time should be between one and three months depending from the referral arrangements.

network or regional-developed mechanisms (see system of the WHO Regional Office for Europe)¹⁹. Any of these mechanisms could be instrumental for sharing patient data between the hosting country and the repatriation or resettlement country while ensuring data protection (see below). Respective national policies for data sharing will need to be respected with regard to this process.

The protection of personal data is considered a fundamental right, including in the context of cross-border health care. To share data, some requisites as listed below are requested (73):

- **Informed consent from the individual:** it should be explicit and unambiguous (through a clear affirmative act given freely); it can be written, electronic or oral; silence or inactivity cannot be considered as consent. Parental consent could be accepted for children below 16 years of age.
- **Lawfulness, fairness and transparency** on data processing.
- **Limited purpose:** the data are to be collected for a specific explicit and legitimate purpose and cannot be used for other purposes.
- **Minimal data:** means that people with TB should be asked only for the information that is needed and relevant for the purpose for which data are collected.
- **Accuracy:** there should be a control to ensure that the collected data are accurate.
- **Limited storage:** data can only be stored for a limited period, except for archiving and scientific research purposes.
- **Integrity and confidentiality:** data have to be processed in a manner that minimizes risks to confidentiality and ensures integrity of data (which means ensuring its consistency and accuracy, as opposed to data corruption).
- **Accountability:** who collects the data is accountable that the collection was according to the above principles and is bound to secrecy.
- **Patient's access:** people with TB must be able to have access to a copy of all their data, namely their health record, either on paper or electronic format.

4.11.4 Ensure safe transport of people with TB who are infectious

From an infection control perspective, the transport of any person with TB who is infectious should not occur until completing three months of treatment or until he/she is documented to be no longer infectious. Under special circumstances, the transport of a person with TB who is likely to be infectious could be considered but only on carriers without other passengers and where infection control measures are feasible. Ground transport (ambulance or private carrier) is therefore preferable to air transport (74), even for short flights.

The following measures should be taken:

Managerial measures

- Ensure the availability of transportation with infection control measures in place.
- Agree in advance with all stakeholders a detailed travel protocol covering the country of departure, of arrival and all transit points.
- Ensure that all documents (travel, clinical) are collected and ready for consultation by the border authorities.

19 Dara M, Sulis G, Centis R, et al. Cross-border collaboration for improved tuberculosis prevention and care: policies, tools and experiences. *Int J Tuberc Lung Dis.* 21(7):727–36.

Administrative measures

- Avoid any delay in transport and any exposure to the public in shared waiting areas.
- Provide complete information to all personnel involved.

Environmental measures

- Ensure a supplemental recirculating ventilation unit that passes air through HEPA filter.²⁰
- If non-recirculating ventilation exists, ensure that there is maximum inflow of outdoor air from the cab (front of vehicle), over the patient, and out the rear window or rear exhaust fan, if available.
- If possible, physically isolate the cab from the rest of the vehicle; at least, have few to no other passengers and have the patient separated from the driver.
- Have the person with TB wear a surgical mask that covers both the mouth and nose.

Personal protection measures

- Have personnel wear a particulate respirator.
- Have personnel follow the standard universal precautions (such as wear gloves, place disposables in a biohazard bag or a sealed plastic bag) when handling potentially infectious materials and avoid the creation of aerosol suspensions of mycobacteria.

B) Emergency response in TB care and prevention services

TB prevention, diagnosis, treatment and care are under a continuous process of revision and updation as new tools, interventions and strategies are discovered and new evidence is made available. The progress towards universal access to existing tools and socioeconomic development are expected to be enhanced by such innovations that would enable the achievement of the End TB targets.

The following sections describe various interventions in TB prevention, diagnosis, treatment and care as per the latest WHO recommendations at the time of publication of this guide. **This overview of recommendations is aimed at assisting NTPs and their partners engaged in humanitarian emergencies in revising their policies and guidelines for more appropriate implementation.**

Each section features the most updated references for easy consultation and for in-depth coverage of more complex technical aspects. New recommendations that are expected to come in the future can be accessed by the readers of this guide on the WHO website.²¹

4.12 Case finding

Case finding aims at rapidly detecting those with the highest likelihood of having active TB and therefore need to undergo diagnostic evaluation; this to promptly start treatment for TB disease or infection. Case finding could be passive, i.e. people self-reporting to health services, or active, i.e. the systematic screening of people outside the health services. Passive case finding requires people with TB to be aware of their symptoms and access health services on their own. Active case-finding

20 HEPA filters trap 99.97% of the dust particles $\geq 0.3 \mu\text{m}$ in diameter, i.e. also those carrying the mycobacteria

21 Tuberculosis (TB). World Health Organization [website] (<https://www.who.int/health-topics/tuberculosis>).

requires clearly-defined groups of populations and procedures for their systematic screening. Both passive and active TB case finding require trained health workers and access to reliable laboratory services. The way TB case finding can be organized during an emergency response depends on the increasing capacities of reaching out in the community.

Minimum response

4.12.1 Detect people with TB among people accessing health services

Equitable access to TB diagnostic and treatment services should be ensured at the earliest stage of any humanitarian emergency. This is possible through good advance preparation (see section 3.3.3) and further validation (see section 4.3.1). Access through existing health services may have to be complemented when there are significant gaps in their quantity and/or quality, especially in relation to the special needs of the population to be served.

4.12.2 Identify people who are currently on TB treatment among new arrivals

Health screening at points of entry or at transit points is a recommended practice. This is an opportunity to identify people who are already on TB treatment (and also on treatment for other chronic conditions such as HIV and diabetes). The most appropriate method will depend on the context (including setting up of health screening and availability of health staff, the time the population spends before moving on). At a minimum, the population should be informed that those with any chronic medical conditions should notify a health provider at the point of entry or transit location. If possible, all households should be individually seen in privacy and asked about specific health conditions that warrant continuing treatment. Attention should be paid to the particular needs of women and girls, and opportunities for health screening with privacy. Details of those already on TB treatment should be obtained with informed consent to facilitate appropriate referral and follow-up.

4.12.3 Screen all close contacts of people with TB and people living with HIV

People with the highest likelihood of being infected with TB bacteria are household contacts (especially infants and children) and people living with HIV. All people with TB should be interviewed, their close contacts traced as per recommended practices (see later in this chapter) and then assessed. People living with HIV should be screened for TB disease at each visit to the health facilities.

Box 11: Importance of systematic screening of TB contacts among Syrian refugees in Jordan

In response to the influx of displaced Syrians since 2011, the NTP of Jordan with the support of UNHCR and WHO introduced in 6 centres for systematic screening of contacts of the refugees diagnosed with pulmonary TB and registered by the IOM. A retrospective study of 481 contacts of 76 new people with pulmonary TB screened in March 2011-May 2014 for TB active disease and latent infection (by interviewing on indicative symptoms, chest radiography and tuberculin skin testing) revealed that 2.1% had active TB disease and 24.1% had LTBI. In children under 5 years of age, the prevalence of TB and LTBI was much higher than among adults. These results emphasize how important it is for host countries to implement systematic TB contact tracing among refugees.

Source: Hosten E, Mehta M, Andre E, Rumman KA, Van der Linden D. Tuberculosis contact-tracing among Syrian refugee populations: lessons from Jordan. *Confl Health*. 2018; 12:25 (<https://conflictandhealth.biomedcentral.com/track/pdf/10.1186/s13031-018-0164-y.pdf>).

Comprehensive response

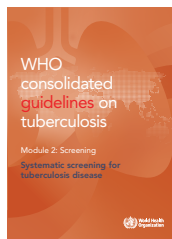
4.12.4 Systematically screen all people at risk for TB

In a stabilized emergency phase, systematic screening for TB disease has to be expanded from screening of TB close contacts and people living with HIV to all other people at risk, such as:

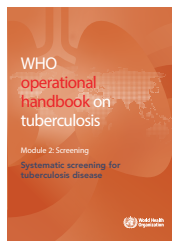
- Previously treated for TB
- Exposed to silica; have untreated fibrotic lesion seen on chest radiography
- People with other comorbidities that place them at increased risk of TB (such as diabetes mellitus)
- People in correctional facilities and penitentiary institutions
- All populations affected by the emergency, with priority to people seeking health care and coming from countries with a TB prevalence of 100 per 100 000 population.

WHO references

The following publications are recommended for additional reading on technical aspects not included in this manual:



WHO consolidated guidelines on tuberculosis. Module 2: screening – systematic screening for tuberculosis disease. Geneva: World Health Organization; 2021 (<https://www.who.int/publications/i/item/9789240022676>, accessed 1 September 2021).



WHO operational handbook on tuberculosis. Module 2: screening – systematic screening for tuberculosis disease. Geneva: World Health Organization; 2021 (<https://www.who.int/publications/i/item/9789240022614>, accessed 1 September 2021).

Systematic screening for TB disease

Screening for TB disease always starts by checking indicative signs and symptoms that vary with age. The presence of one or more of the signs and symptoms listed in Table 7 should be further evaluated for TB and other diseases.

Table 7: Clinical screening for TB disease

Infants/children	Adolescents/adults
<ul style="list-style-type: none">• Current cough• Fever• Poor weight gain• History of TB contact	<ul style="list-style-type: none">• Current cough• Fever• Weight loss• Night sweats

Chest radiography and WHO-approved molecular rapid diagnostic tests can be added to the clinical algorithm to improve accuracy. Computer-aided detection software programmes may be used in place of human readers for interpretation of digital chest radiography.

In adults and adolescents living with HIV, the C-reactive protein (using a cut-off of >5mg/L) may be also used to screen for active TB. C-reactive protein is a generic indicator of inflammation that can be measured in capillary blood collected via a finger-prick at the point of care. It could replace clinical symptom-based screening among people living with HIV who are new in care and not yet on ART.

Investigating contacts of people with TB

Ideally, household and close contacts should be interviewed by persons who are familiar with the social and cultural context, speak the same language and maintain respect and confidentiality. They can be health care providers, community volunteers or even former people with TB. All contact details should be registered, including the type and result of their medical evaluation and treatment decision.

- Each TB patient should be interviewed as soon as possible after diagnosis (generally within one week) to elicit the names of household and close contacts. Occasionally, a second interview is useful to elicit additional contacts.
- Investigations should be also conducted for people with TB who have died, if information can be gathered from family members.
- Focus should be on household members, but people in other settings in which there was a close exposure should also be considered.
- If possible, the home of the TB patient should be visited; this will help to identify and evaluate the contacts and circumstances of exposure; identify the need for social support; ensure that all contacts will report to the health facility for medical evaluation; provide family counselling and education.

WHO recommendations

Recommendations on screening for TB in targeted populations

1. Systematic screening for TB disease may be conducted in the general population in areas with an estimated TB prevalence of 0.5% or higher.
 2. People living with HIV should be systematically screened for TB disease at each visit to the health facility.
 3. Household contacts and other close contacts should be systematically screened for TB disease.
 4. Systematic screening for TB should be conducted in correctional facilities and penitentiary institutions.
 5. Current and former workers in workplaces with silica exposure should be systematically screened for active TB.
 6. In settings where the TB prevalence in the general population is 100/100 000 population or higher, systematic screening for TB disease may be conducted among people who are seeking health care or who are in health care and who have a risk factor for TB.
 7. People with an untreated fibrotic lesion seen on chest radiography may be systematically screened for TB disease.
 8. Systematic screening for TB disease may be conducted for subpopulations with structural risk factors for TB. These include urban poor communities, homeless communities, communities in remote or isolated areas, indigenous populations, some migrants, refugees, IDPS and other vulnerable or marginalized groups with very poor access to health care.
-

Recommendations on tools for screening for TB

9. Systematic screening for TB disease may be conducted among individuals 15 years of age and older using a symptom screen, chest radiography, or molecular WHO approved rapid diagnostic tests, alone or in combination.
 10. Adults and adolescents living with HIV should be screened for TB with a clinical algorithm; those who report any one of the symptoms of current cough, fever, weight loss or night sweats may have active TB and should be evaluated for TB and other diseases (WHO-recommended four symptom screen).
 11. C-reactive protein using a cut-off of >5mg/L may be used to screen for active TB among Adults and adolescents living with HIV.
 12. Chest radiography may be used to screen for active TB among adults and adolescents living with HIV.
 13. WHO-approved rapid molecular diagnostic tests may be used to screen for active TB among adults and adolescents living with HIV.
 14. Adult and adolescent in people living with HIV in medical wards where TB prevalence is >10% should be tested systematically for TB with a WHO-approved rapid molecular diagnostic test.
 15. Among Individuals under 15 years of age who are close contacts of someone with TB, systematic screening for TB disease should be conducted using a symptom screen including any one of the following: cough, fever, poor weight gain; or chest radiography; or both.
 16. Children under 10 years of age who are living with HIV should be screened for TB using a symptom screen including any one of the following: current cough, fever, poor weight gain, or close contact with a TB patient.
 17. Computer-aided detection software programmes may be used in place of human readers for interpretation of digital chest radiography in screening and triage for TB disease.
-

4.13 Diagnosis of TB disease

The effective management of TB relies on the rapid diagnosis of TB, rapid detection of drug resistance and rapid initiation of an effective treatment regimen. This requires access to rapid and accurate detection tests, as well as rapid and accurate drug susceptibility testing (DST) for all people with TB. This would be possible through a network of TB laboratories that use modern methods of diagnosis (such as molecular methods and liquid culture), have efficient referral systems, use electronic data and diagnostics connectivity, use standard operating procedures and appropriate quality assurance processes, adhere to biosafety principles for all testing, and have sufficient human resources.

Minimum response

4.13.1 Use diagnostic algorithms translated into appropriate languages

Effective and efficient TB diagnostic algorithms are key components of a diagnostic cascade designed to ensure that people with TB are diagnosed accurately and rapidly, and are promptly placed on appropriate treatment. The diagnostic algorithms chosen during preparedness should be translated and displayed in the health facilities to ensure the understanding of all health workers and improve communication with people speaking a language different from that spoken in the hosting country.

4.13.2 Arrange early access to laboratory diagnostic testing

Laboratory services should be ensured from the first day of the emergency, as people already on TB treatment and those severely ill need to be monitored for their treatment response or exclusion of TB disease. WHO-recommended molecular rapid TB diagnostics should be used as the initial diagnostic test to detect TB and rifampicin resistance in individuals being evaluated for pulmonary and extrapulmonary TB. All these investigations can be arranged in the field with the support of an efficient system of collection, storage and safe transport (75) of sputum specimens (see Annex 12).

4.13.3 Arrange access to existing radiological services for additional investigations

Further investigations for TB may include chest radiography, additional clinical assessments or bacteriological culture. Access to chest radiography could be arranged through identification and agreement in advance for collaboration with radiological services that are closest to the emergency setting.

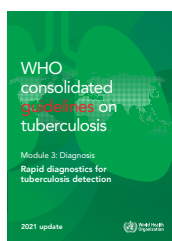
Comprehensive response

4.13.4 Assess the initial capacity of TB diagnostic services

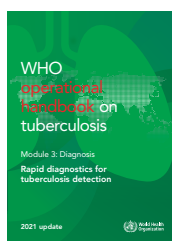
The initial capacities in TB diagnosis (laboratory, radiography) should be re-assessed over time to conform to the changing burden (number and location of the population to serve), the availability of resources (decreasing, increasing) and the foreseen duration of the needs.

WHO references

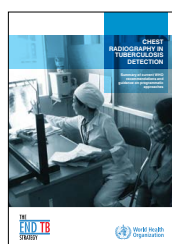
The following publications are recommended for additional reading on technical aspects not included in this manual:



WHO consolidated guidelines on tuberculosis. Module 3: diagnosis – rapid diagnostics for tuberculosis detection 2021 update. Geneva: World Health Organization; 2021 (<https://www.who.int/publications/i/item/who-consolidated-guidelines-on-tuberculosis-module-3-diagnosis---rapid-diagnostics-for-tuberculosis-detection>, accessed 1 September 2021).



WHO operational handbook on tuberculosis. Module 3: diagnosis – rapid diagnostics for tuberculosis detection 2021 update. Geneva: World Health Organization; 2021 (<https://www.who.int/publications/i/item/who-operational-handbook-on-tuberculosis-module-3-diagnosis---rapid-diagnostics-for-tuberculosis-detection>, accessed 1 September 2021).



Chest radiography in tuberculosis detection. Summary of current WHO recommendations and guidance on programmatic approaches. Geneva: World Health Organization; 2016 (<http://www.who.int/iris/bitstream/10665/252424/1/9789241511506-eng.pdf?ua=1>, accessed 1 September 2021).

Diagnosis of TB disease

TB disease is diagnosed using a number of tools, starting from the medical history, physical examination and laboratory testing. Other investigations may be required in addition, depending on the results of the initial investigations and location of the TB lesion.

Medical history

The following medical history elements are compatible with TB disease:

- Recent or past history of TB exposure, infection or disease including diagnosis/treatment of TB infection/disease; contact with people with TB.
- Conditions weakening the immune system:
 - Medical: HIV infection, diabetes mellitus, neoplasms, medical treatment with corticosteroids or certain other medications, silicosis, malnutrition.
 - Behavioural: smoking tobacco, alcohol and other substance abuse; environmental (country of origin, housing, occupation); other risks.

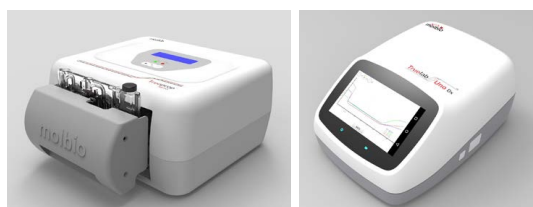
The following general symptoms are compatible with TB disease: unexplained weight loss; loss of appetite; night sweats; fever; fatigue. Other signs depend on the part of the body affected by TB. If in the lungs (pulmonary TB), the specific signs are: coughing for ≥ 2 weeks; coughing with blood (haemoptysis); chest pain.

Rapid molecular testing

Technologies in TB diagnosis have rapidly advanced over the years, and the setting of humanitarian emergencies may provide the opportunity and justification for use of more recently-developed tests that can be used at peripheral level with minimum infrastructure and ensure sensitivity and speed of obtaining results. At present, the WHO has approved the following molecular²² tests for rapid diagnosis of TB and drug resistant TB (with differing sensitivity and specificity parameters):

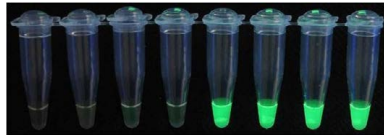


Xpert® MTB/ RIF and Xpert MTB/RIF Ultra (Cepheid, Sunnyvale, United States of America [USA]): analyse sputum specimens for the presence of TB and rifampicin resistance; are based on an automated polymerase chain reaction technology using cartridges and a electricity-operated device; are suitable for level I laboratories and give results in less than two hours.

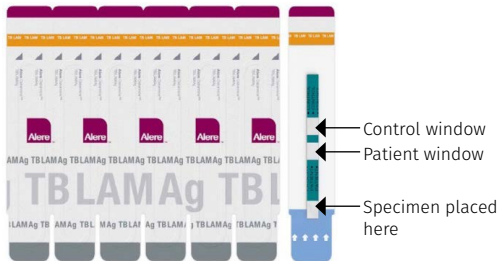


Truenat™ MTB, MTB Plus and MTB-RIF Dx tests (Molbio Diagnostics, Goa, India): analyse sputum specimens for the presence of TB and rifampicin resistance; are based on polymerase chain reaction technology using two battery-operated devices; are suitable for peripheral level laboratories; and give results in less than one hour.

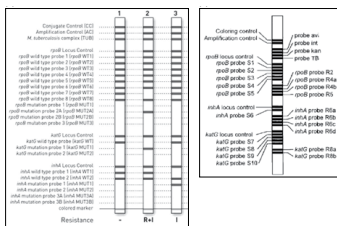
22 i.e. analysing the TB's deoxyribonucleic acid (DNA).



Loop-mediated isothermal amplification (TB-LAMP; Eiken Chemical, Tokyo, Japan): analyses sputum specimens for the presence of TB only; is based on the direct visualization under UV light; are suitable for level I laboratories; and give results in less than one hour.



Lateral flow lipoarabinomannan assay (LF-LAM) test (Alere Determine™ TB LAM Ag, USA): analyses the presence of a TB antigen in the urine; is based on a strip technology; is suitable for the point-of-care level; and gives results in 25 minutes.

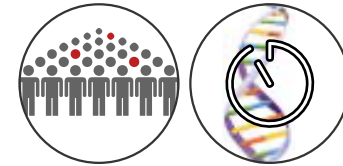
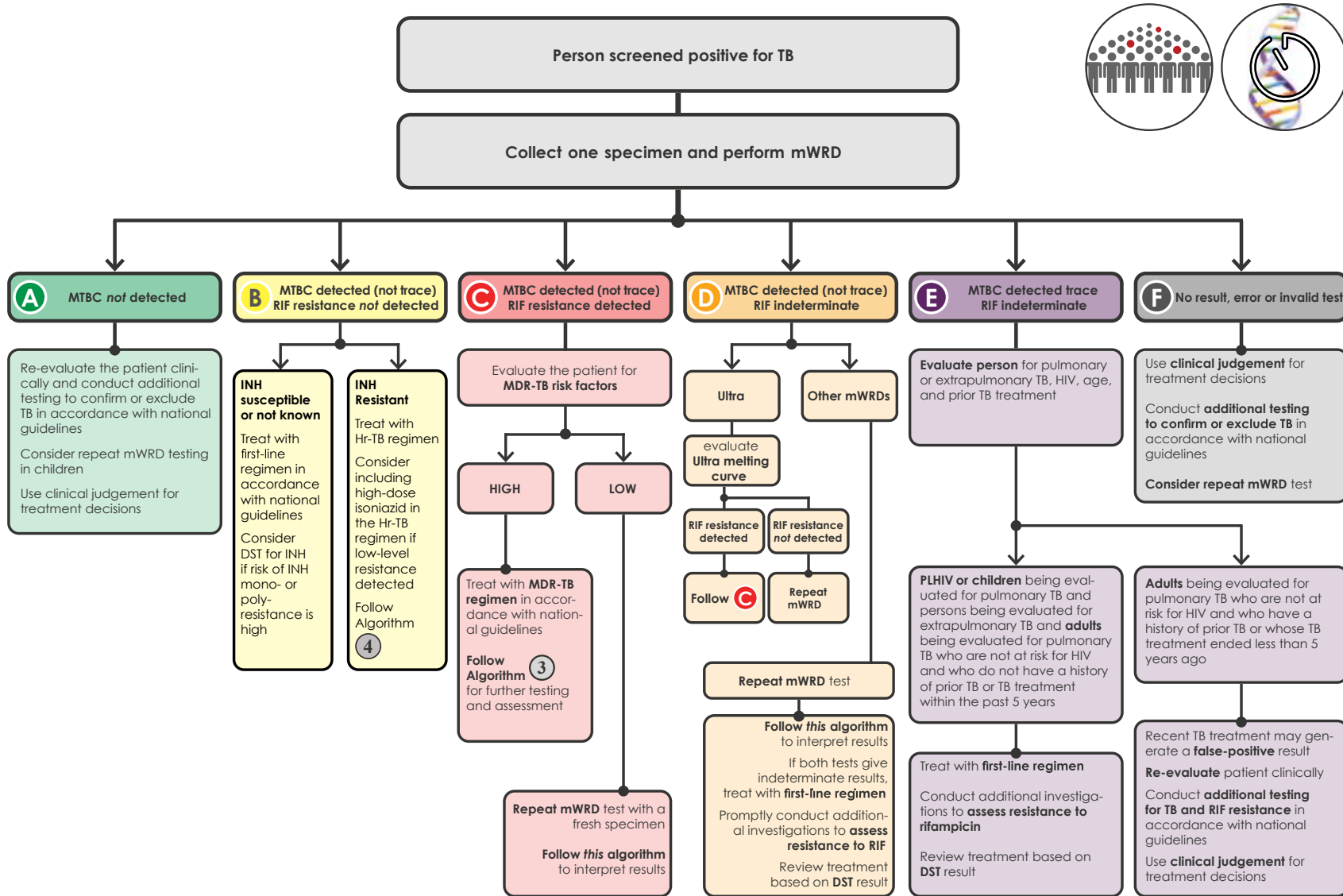


Line-probe assays (GenoType® MTBDR*plus* and GenoType® MTBDR*sl*, HAIN Lifescience, Nehren, Germany; non-tuberculous mycobacteria +MDRTB Detection Kit, NIPRO Corporation, Osaka, Japan): analyse positive TB specimens (sputum, culture) for the presence of TB and resistance to first-line TB drugs (rifampicin, isoniazid) or second-line TB drugs (fluoroquinolones, second-line injectable drugs); are based on DNA amplification technology using an electricity-operated device; are suitable for level III laboratories; and give results in five hours.

Conventional sputum-smear microscopy (recommended through light-emitting diode fluorescent microscope) (76) and culture remains necessary for monitoring the response of a patient to treatment. Conventional culture and DST are still needed to detect resistance to many other important TB drugs, such as pyrazinamide, bedaquiline and delamanid, as well as for testing of a full-range of respiratory and non-respiratory specimens.

The above laboratory investigations are variably considered in four diagnostic models and adaptable algorithms that the WHO proposes for implementation taking into account the epidemiological situation (i.e. high prevalence of drug-resistant TB or HIV). The algorithm recommended for all settings is presented in Figure 13).

Figure 13: Example of algorithm with molecular WHO-recommended rapid diagnostic as initial test for TB



Chest radiography

A chest radiography with posterior-anterior projection is used to detect chest abnormalities. Lesions may appear anywhere in the lungs and may differ in size, shape, density and cavitation. These abnormalities may suggest TB, but cannot be used to definitively diagnose TB. Chest radiography with lateral views are helpful for diagnosing TB among children.

WHO recommendations

Recommendations on using laboratory rapid testing for diagnosis of TB

Recommendations on Xpert MTB/RIF and Xpert Ultra as initial tests in adults and children with signs and symptoms of pulmonary TB

1. In adults with signs and symptoms of pulmonary TB, Xpert MTB/RIF should be used as an initial diagnostic test for TB and rifampicin-resistance detection in sputum rather than smear microscopy/culture and phenotypic DST. (Strong recommendation, high certainty of evidence for test accuracy; moderate certainty of evidence for patient-important outcomes).
 2. In children with signs and symptoms of pulmonary TB, Xpert MTB/RIF should be used as an initial diagnostic test for TB and rifampicin-resistance detection in sputum, gastric aspirate, nasopharyngeal aspirate and stool rather than smear microscopy/culture and phenotypic DST. (Strong recommendation, moderate certainty for accuracy in sputum; low certainty of evidence for test accuracy in gastric aspirate, nasopharyngeal aspirate and stool)
 3. In adults with signs and symptoms of pulmonary TB and without a prior history of TB (≤ 5 years) or with a remote history of TB treatment (> 5 years since end of treatment), Xpert Ultra should be used as an initial diagnostic test for TB and for rifampicin-resistance detection in sputum, rather than smear microscopy/culture and phenotypic DST. (Strong recommendation, high certainty of evidence for test accuracy)
 4. In adults with signs and symptoms of pulmonary TB and with a prior history of TB and an end of treatment within the last 5 years, Xpert Ultra may be used as an initial diagnostic test for TB and for rifampicin-resistance detection in sputum, rather than smear microscopy/culture and phenotypic DST. (Conditional recommendation, low certainty of evidence for test accuracy)
 5. In children with signs and symptoms of pulmonary TB, Xpert Ultra should be used as the initial diagnostic test for TB and detection of rifampicin resistance in sputum or nasopharyngeal aspirate, rather than smear microscopy/culture and phenotypic DST. (Strong recommendation, low certainty of evidence for test accuracy in sputum; very low certainty of evidence for test accuracy in nasopharyngeal aspirate)
-

Recommendations on Xpert MTB/RIF and Xpert Ultra as initial tests in adults and children with signs and symptoms of extrapulmonary TB

6. In adults and children with signs and symptoms of TB meningitis, Xpert MTB/RIF or Xpert Ultra should be used in cerebrospinal fluid (CSF) as an initial diagnostic test for TB meningitis rather than smear microscopy/culture. (Strong recommendation, moderate certainty of evidence for test accuracy for Xpert MTB/RIF; low certainty of evidence for test accuracy for Xpert Ultra)
 7. In adults and children with signs and symptoms of extrapulmonary TB, Xpert MTB/RIF may be used in lymph node aspirate, lymph node biopsy, pleural fluid, peritoneal fluid, pericardial fluid, synovial fluid or urine specimens as the initial diagnostic test for respective form of extrapulmonary TB rather than smear microscopy/culture. (Conditional recommendation, moderate certainty of evidence for test accuracy for pleural fluid; low certainty for lymph node aspirate, peritoneal fluid, synovial fluid, urine; very low certainty for pericardial fluid, lymph nodes biopsy)
 8. In adults and children with signs and symptoms of extrapulmonary TB, Xpert Ultra may be used in lymph node aspirate and lymph node biopsy as the initial diagnostic test for lymph nodes TB rather than smear microscopy/culture. (Conditional recommendation, low certainty of evidence)
 9. In adults and children with signs and symptoms of extrapulmonary TB, Xpert MTB/RIF or Xpert Ultra should be used for rifampicin-resistance detection rather than culture and phenotypic DST. (Strong recommendation, high certainty of evidence for test accuracy for Xpert MTB/RIF; low certainty of evidence for Xpert Ultra)
 10. In HIV-positive adults and children with signs and symptoms of disseminated TB, Xpert MTB/RIF may be used in blood, as an initial diagnostic test for disseminated TB. (Conditional recommendation, very low certainty of evidence for test accuracy)
-

Recommendations on Xpert MTB/RIF and Xpert Ultra repeated testing in adults and children with signs and symptoms of pulmonary TB

11. In adults with signs and symptoms of pulmonary TB who have an Xpert Ultra trace positive result on the initial test, repeated testing with Xpert Ultra may not be used. (Conditional recommendation, very low certainty of evidence for test accuracy)
12. In children with signs and symptoms of pulmonary TB in settings with pretest probability below 5% and an Xpert MTB/RIF negative result on the initial test, repeated testing with Xpert MTB/RIF in sputum, gastric fluid, nasopharyngeal aspirate or stool specimens may not be used. (Conditional recommendation, low certainty of evidence for test accuracy for sputum and very low for other specimen types)
13. In children with signs and symptoms of pulmonary TB in settings with pretest probability 5% or more and an Xpert MTB/RIF negative result on the initial test, repeated testing with Xpert MTB/RIF (for total of two tests) in sputum, gastric fluid, nasopharyngeal aspirate and stool specimens may be used. (Conditional recommendation, low certainty of evidence for test accuracy for sputum and very low for other specimen types)
14. In children with signs and symptoms of pulmonary TB in settings with pretest probability below 5% and an Xpert Ultra negative result on the initial test, repeated testing with Xpert Ultra in sputum or nasopharyngeal aspirate specimens may not be used. (Conditional recommendation, very low certainty of evidence for test accuracy)
15. In children with signs and symptoms of pulmonary TB in settings with pretest probability 5% or more and an Xpert Ultra negative result on the first initial test, repeated one Xpert Ultra test (for a total of two tests) in sputum and nasopharyngeal aspirate specimens may be used. (Conditional recommendation, very low certainty of evidence for test accuracy)

Recommendations on Xpert MTB/RIF and Xpert Ultra as initial tests for pulmonary TB in adults in the general population either with signs and symptoms of TB or chest radiograph with lung abnormalities or both

16. In adults in the general population who had either signs or symptoms of TB or chest radiograph with lung abnormalities or both, the Xpert MTB/RIF or Xpert Ultra may replace culture as the initial test for pulmonary TB. (Conditional recommendation, low certainty of the evidence in test accuracy for Xpert MTB/RIF and moderate certainty for Xpert Ultra)
17. In adults in the general population who had either a positive TB symptom screen or chest radiograph with lung abnormalities or both, one Xpert Ultra test may be used rather than two Xpert Ultra tests as the initial test for pulmonary TB. (Conditional recommendation, very low certainty of evidence for test accuracy)

Recommendations on Truenat MTB, MTB Plus and Truenat MTB-RIF Dx in adults and children with signs and symptoms of pulmonary TB

18. In adults and children with signs and symptoms of pulmonary TB, the Truenat MTB or MTB Plus may be used as an initial diagnostic test for TB rather than smear microscopy/culture. (Conditional recommendation, moderate certainty of evidence for test accuracy)
19. In adults and children with signs and symptoms of pulmonary TB and a Truenat MTB or MTB Plus positive result, Truenat MTB-RIF Dx may be used as an initial test for rifampicin resistance rather than culture and phenotypic DST. (Conditional recommendation, very low certainty of evidence for test accuracy)

Recommendations on using chest radiography for TB diagnosis

Chest radiography is an important tool for diagnosing childhood TB

- Chest radiography is useful in diagnosing pulmonary and extrapulmonary TB in children in combination with clinical and exposure history, evidence of TB infection and microbiological testing. If possible, PA and lateral chest radiography views should be obtained for children.

An abnormal chest radiography is an indication for full diagnostic evaluation

- All people with unexplained findings suggestive of TB on chest radiography should be evaluated for TB with a bacteriological diagnostic test.
- Chest radiography can be used as a supplementary diagnostic aid, although the specificity is low.
- A bacteriologically confirmed diagnosis is always preferred.

Chest radiography can improve the efficiency of using the Xpert MTB/RIF assay

- Chest radiography and further clinical assessment can be used to triage who should be tested with the Xpert MTB/RIF assay to reduce the number of individuals tested and the associated costs, as well as to improve the pretest probability for TB and, thus, the predictive value of the Xpert MTB/RIF assay.

Chest radiography can assist in diagnosing TB among people living with HIV

- Chest radiography can assist in diagnosing TB among people living with HIV. It is particularly useful for ruling out TB disease before providing treatment for latent TB infection.

Chest radiography helps rule out active TB before treating latent TB infection

- Chest radiography used in combination with symptom screening has the highest sensitivity for detecting TB and, thus, should be used to exclude active TB before initiating treatment of latent TB infection.
 - Individuals with any radiological abnormality or TB symptoms should be investigated further for active TB and other conditions.
 - Chest radiography is a necessary screening tool to identify survey participants eligible for bacteriological examination; in recent surveys, chest radiography has proven essential for detecting a large proportion of prevalent people with TB.
-

4.14 Treatment of drug-susceptible TB and patient support

All people diagnosed with TB should receive effective treatment and support for adherence through a package of interventions tailored to individual needs and actual resources and conditions for implementation.

Minimum response

4.14.1 Provide treatment to newly diagnosed people with TB, prioritizing those who are severely ill

At the onset of an emergency, hundreds of people per day may access a centre where services are still not well organized and local capacities are stretched due to competing priorities (i.e. to meet basic needs such as drinking water, food, housing). Under these conditions, priority should be to continue

treatment for people already on TB treatment and to start treatment of severely ill new people with TB. Their treatment is both an ethical obligation and a public health intervention aiming at preventing further development of drug resistance and minimizing TB transmission within the community.

Detecting people already on TB treatment or new people with severe TB could be done during the initial triage described in section 4.12. Hopefully, people with TB arriving in an emergency setting bring their medical records documenting previous investigations, diagnosis, type and progress of treatment; they also may bring the drugs of their treatment. These people with TB should be immediately put on the same treatment previously prescribed or, when not documented, as per national guidelines, while waiting for a clinical and programmatic assessment.

Comprehensive response

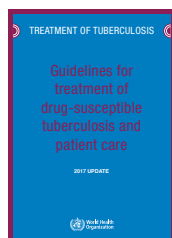
4.14.2 Provide treatment and support to all people with TB

Full access to the most effective TB treatment and support must be ensured as soon as possible to all people with TB detected through screening or self-reporting to health services (see section 4.12). They should be accurately diagnosed, appropriately treated and effectively supported to adhere to treatment.

Part of the specialized care that drug-resistant people with TB may require is surgery as adjunct to the medical treatment. These people should be referred to good surgical services with well trained and experienced surgeons.

WHO references

The following publications are recommended for additional reading on technical aspects not included in this manual:



Guidelines for the treatment of drug-susceptible tuberculosis and patient care, 2017 update. Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/bitstream/handle/10665/255052/9789241550000-eng.pdf>, accessed 1 September 2021).

Treatment and support to people with TB

Treatment

TB treatment is based on a combination of drugs to be taken at the same time (to overcome drug resistance²³), daily and for many months (to overcome the slow growth of mycobacteria). Treatment regimens have a shorter intensive phase with many drugs (to rapidly kill the many mycobacteria) and a longer continuation phase with less drugs (to kill any remaining few mycobacteria that are still multiplying).

23 *M. tuberculosis* can undergo spontaneous genetic mutations; drug-resistant TB occurs due to lesions caused by these mutated mycobacteria that survived inadequate treatment (secondary resistance) or were already drug resistant when inhaled from another patient (primary resistance).

The treatment for drug-susceptible TB is based on first-line, highly safe and effective, all oral, TB drugs. These are combined in a standardized treatment regimen, irrespective of the bacteriological status and HIV status, to be taken daily as shown in [Annex 13](#). WHO recommends the use of fixed-dose combinations (FDCs) of TB drugs; seen as a means to optimize TB management operations (easier prescriptions, smaller number of pills to ingest). There is proven evidence of equivalent absorption with FDCs. The formulations and dosages by weight band of TB drugs and their availability in the international market can be found on the Global Drug Facility and WHO websites.

Patient-centred care and support

All people with TB should receive patient-centred care and support aiming to maximize treatment adherence and enabling early detection of people with TB who are not responding to treatment. This could be difficult to organize during the acute phase of a humanitarian emergency but it should be introduced as soon as possible. Recommendations on the type of patient-centred care and support to be provided are summarized in [Annex 14](#).

Monitoring treatment

All people with TB should be monitored regularly to assess their response to therapy and identify adverse drug effects and comorbidities. The TB drugs included in the treatment regimen determine what monitoring tests are needed, see [Annex 9](#). During the treatment, a written record of all medications given, bacteriological response and adverse effects should be maintained for each patient.

Management of treatment interruption

A TB patient who interrupts treatment should be contacted as soon as possible after the treatment is missed (i.e. within a day during the intensive phase and within a week during the continuation phase) and placed back on treatment as described in [Annex 10](#). A thorough assessment should be done on the reasons for missing treatment and on the type of support given before to place the patient back on treatment.

Management of adverse reactions

All people with TB should be clinically monitored because of the few who may suffer severe adverse drug effects and should be promptly detected and treated, occasionally in a hospital (see [Annex 15](#)). Health personnel should teach people with TB how to recognize the most common adverse effects and urge them to report it, and ask about their occurrence to any person with TB at every visit. The adverse effects, with their most suspected TB drugs and management strategies can be found in WHO technical publications.

Active TB drug safety monitoring and management (aDSM)

aDSM is the active and systematic clinical and laboratory assessment of people with TB on treatment with second-line TB drugs. It monitors the occurrence of serious adverse events²⁴ through systematic collection of clinical and laboratory data, their reporting to the national authority responsible for pharmacovigilance (77,78). Contributions to the national aDSM may also be expected from emergency services caring for people with drug-resistant TB.

24 A serious adverse event can lead to death or a life-threatening experience; to hospitalization or prolongation of hospitalization; to persistent or significant disability; or to a congenital anomaly.

WHO recommendations

Recommendations on treatment of drug-susceptible TB

1. In people with drug-susceptible pulmonary TB, 4-month fluoroquinolone-containing regimens should not be used and the 6-month rifampicin-based regimen 2HRZE/4HR remains the recommended regimen (Strong recommendation, moderate certainty in the evidence).
 2. The use of fixed-dose combination tablets is recommended over separate drug formulations in treatment of people with drug-susceptible TB (Conditional recommendation, low certainty in the evidence).
 3. In all people with drug-susceptible pulmonary TB, the use of thrice-weekly dosing is not recommended in both the intensive and continuation phases of therapy, and daily dosing remains the recommended dosing frequency (Conditional recommendation, very low certainty in the evidence).
 4. In people with drug-susceptible pulmonary TB who are living with HIV and receiving antiretroviral therapy during TB treatment, a 6-month standard treatment regimen is recommended over an extended treatment for 8 months or more (Conditional recommendation/very low certainty in the evidence).
 5. In people with tuberculous meningitis, an initial adjuvant corticosteroid therapy with dexamethasone or prednisolone tapered over 6–8 weeks should be used (Strong recommendation, moderate certainty in the evidence).
 6. In people with tuberculous pericarditis, an initial adjuvant corticosteroid therapy may be used (Conditional recommendation, very low certainty in the evidence).
 7. In people who require TB retreatment, the category II regimen should no longer be prescribed and drug-susceptibility testing should be conducted to inform the choice of treatment regimen (Good practice statement).
-

4.15 Treatment of drug-resistant TB

The considerations for the treatment of people with drug-resistant TB should be similar to the treatment received by people with drug-susceptible TB. People with drug-resistant TB have the same right to health, an ethical obligation that should overcome any objective difficulties to diagnose and treat drug-resistant TB. Even more important is ensuring treatment adherence through a package of interventions tailored to their individual needs and actual resources and conditions for implementation.

People with drug-resistant TB require specialized care, which usually cannot be organized during an emergency, especially at its onset. It is thus most appropriate to refer these patients to adequate services outside the emergency setting.

Minimum response

4.15.1 Provide treatment to newly diagnosed people with TB, prioritizing those who are severely ill

People with TB (detected during the initial triage described in section 4.12) should be immediately put on the same treatment documented as previously taken or, when not documented, on a treatment designed on empirical basis, using a regimen that is likely to be effective and can be later adjusted according to DST results, once they become available.

Comprehensive response

4.15.2 Provide treatment and support to all people with TB

Full access to the most effective TB treatment and support must be ensured as soon as possible to all people detected with TB, even those with drug-resistant TB, through screening or self-reporting to health services (see section 4.12).

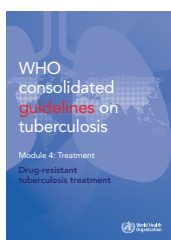
Surgery as adjunct to medical treatment may be required as part of specialized care for people with drug-resistant TB. Such people should be referred to good surgical services with well trained and experienced surgeons.

4.15.3 Provide TB palliative care

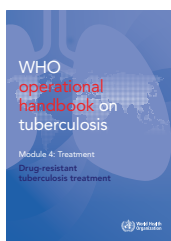
People with drug-resistant TB are at high risk of suffering due to their disease, toxicity of treatment and sequelae of both. Those with extensively drug resistant (XDR) TB have even more limited options for effective treatment and should be prioritized for palliative care; these people usually remain infectious and have to be cared under proper infection control measures at home or in a health facility. The detection of people with drug-resistant and Extensively drug-resistant TB (XDR-TB) depends on the absorption capacity of the health services to identify and take responsibility, which is developed only during the stabilization phase of an emergency.

WHO references

The following publications are recommended for additional reading on technical aspects not included in this manual:



WHO consolidated guidelines on tuberculosis. Module 4: treatment – drug-resistant tuberculosis treatment. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/9789240007048>, accessed 1 September 2021).



WHO operational handbook on tuberculosis. Module 4: treatment – drug-resistant tuberculosis treatment. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/9789240006997>, accessed 1 September 2021).

Treatment and support to people with drug-resistant TB

TB treatment is based on a combination of drugs to be taken at the same time (to overcome drug resistance²⁵), daily and for many months (to overcome the slow growth of mycobacteria). Treatment regimens have a shorter intensive phase with many drugs (to rapidly kill many mycobacteria) and a longer continuation phase with less drugs (to kill any remaining few mycobacteria that are still multiplying).

Drug-resistant TB treatment is based on the use of second-line TB drugs (while some first-line TB drugs can be also used sometimes), which are classified further into three groups (A, B and C) of different combinations in designing effective treatment regimens. Treatment standards recommended by the WHO for each different form of drug resistance are shown in [Annex 13](#).

Surgery is a recognized adjunct to medical TB treatment in the form of elective partial lung resection (lobectomy or wedge resection) that, in people with drug-resistant TB, may reduce the amount of lung tissue with intractable pathology and bacterial load, thus improving prognosis.

People with drug-resistant TB who require longer treatment duration with stronger drugs, should receive carefully-designed, individualized people-centred care and support for treatment adherence (see [Annex 14](#)), be frequently and comprehensively monitored for adverse drug effects (see [Annex 15](#)), carefully managed in treatment interruptions (see [Annex 10](#)) and data carefully recorded (see section 3.3.5).

WHO defines palliative care as the prevention and relief of suffering of people with TB and their families facing problems associated with this life-threatening illness. It is applicable early in the course of the illness in conjunction with other therapies that are intended to prolong life and provide accompaniment for the patient and family throughout the course of the illness. Even after the patient's death, palliative care is available for bereaved family members (79).

Palliative care can be physical, psychological/emotional/spiritual, in planning and coordination, and in communication. It should involve the family of people with TB, prevent and mitigate stigma and discrimination, and provide access to social protection mechanisms. Proper identification, evaluation, treatment and application of measures may often require consultation with specialists. Palliative care should be integrated with and complement prevention, early diagnosis and treatment of serious or life-limiting health problems at all levels.

WHO recommendations

Recommendations on treatment of drug-resistant TB

Regimen for rifampicin-susceptible and isoniazid-resistant TB

1. In people with confirmed rifampicin-susceptible, isoniazid-resistant TB, treatment with rifampicin, ethambutol, pyrazinamide and levofloxacin is recommended for a duration of 6 months. (Conditional recommendation, very low certainty in the estimates of effect).
 2. In people with confirmed rifampicin-susceptible, isoniazid-resistant TB, it is not recommended to add streptomycin or other injectable agents to the treatment regimen. (Conditional recommendation, very low certainty in the estimates of effect).
-

25 *M. tuberculosis* can undergo spontaneous genetic mutations; drug-resistant TB occurs due to lesions caused by these mutated mycobacteria that survived inadequate treatment (secondary resistance) or were already drug resistant when inhaled from another patient (primary resistance).

Shorter all-oral bedaquiline-containing regimen for MDR/RR-TB

1. A shorter all-oral bedaquiline-containing regimen of 9–12 month duration is recommended in eligible people with confirmed MDR/RR-TB who have not been exposed to treatment with second-line TB medicines used in this regimen for more than 1 month, and in whom resistance to fluoroquinolones has been excluded. (Conditional recommendation, very low certainty in the evidence)

Longer regimens for MDR/RR-TB

1. In people with MDR/RR-TB on longer regimens, all three Group A agents and at least one Group B agent should be included to ensure that treatment starts with at least four TB agents likely to be effective, and that at least three agents are included for the rest of treatment if bedaquiline is stopped. If only one or two Group A agents are used, both Group B agents are to be included. If the regimen cannot be composed with agents from Groups A and B alone, Group C agents are added to complete it. (Conditional recommendation, very low certainty in the estimates of effect)
 2. Kanamycin and capreomycin are not to be included in the treatment of people with MDR/RR-TB on longer regimens. (Conditional recommendation, very low certainty in the estimates of effect)
 3. Levofloxacin or moxifloxacin should be included in the treatment of people with MDR/RR-TB on longer regimens. (Strong recommendation, moderate certainty in the estimates of effect)
 4. Bedaquiline should be included in longer MDR-TB regimens for individuals aged 18 years or older. (Strong recommendation, moderate certainty in the estimates of effect)
 5. Bedaquiline may also be included in longer MDR-TB regimens for individuals aged 6–17 years. (Conditional recommendation, very low certainty in the estimates of effect)
 6. Linezolid should be included in the treatment of people with MDR/RR-TB on longer regimens. (Strong recommendation, moderate certainty in the estimates of effect)
 7. Clofazimine and cycloserine or terizidone may be included in the treatment of people with MDR/RR-TB on longer regimens. (Conditional recommendation, very low certainty in the estimates of effect)
 8. Ethambutol may be included in the treatment of people with MDR/RR-TB on longer regimens. (Conditional recommendation, very low certainty in the estimates of effect)
 9. Delamanid may be included in the treatment of people with MDR/RR-TB aged 3 years or more on longer regimens. (Conditional recommendation, moderate certainty in the estimates of effect)
 10. Pyrazinamide may be included in the treatment of MDR/RR-people with TB on longer regimens. (Conditional recommendation, very low certainty in the estimates of effect)
 11. Imipenem–cilastatin or meropenem may be included in the treatment of people with MDR/RR-TB on longer regimens. (Conditional recommendation, very low certainty in the estimates of effect)
 12. Amikacin may be included in the treatment of people with MDR/RR-TB aged 18 years or more on longer regimens when susceptibility has been demonstrated and adequate measures to monitor for adverse reactions can be ensured. If amikacin is not available, streptomycin may replace amikacin under the same conditions. (Conditional recommendation, very low certainty in the estimates of effect)
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13. Ethionamide or prothionamide may be included in the treatment of people with MDR/RR-TB on longer regimens only if bedaquiline, linezolid, clofazimine or delamanid are not used, or if better options to compose a regimen are not possible. (Conditional recommendation against use, very low certainty in the estimates of effect)
 14. P-aminosalicylic acid may be included in the treatment of people with MDR/RR-TB on longer regimens only if bedaquiline, linezolid, clofazimine or delamanid are not used, or if better options to compose a regimen are not possible. (Conditional recommendation against use, very low certainty in the estimates of effect)
 15. Clavulanic acid should not be included in the treatment of people with MDR/RR-TB on longer regimens. (Strong recommendation against use, low certainty in the estimates of effect)
 16. In people with MDR/RR-TB on longer regimens, a total treatment duration of 18–20 months is suggested for most people with TB; the duration may be modified according to the patient's response to therapy. (Conditional recommendation, very low certainty in the estimates of effect)
 17. In people with MDR/RR-TB on longer regimens, a treatment duration of 15–17 months after culture conversion is suggested for most individuals; the duration may be modified according to the patient's response to therapy. (Conditional recommendation, very low certainty in the estimates of effect)
 18. In people with MDR/RR-TB on longer regimens containing amikacin or streptomycin, an intensive phase of 6–7 months is suggested for most individuals; the duration may be modified according to the patient's response to therapy. (Conditional recommendation, very low certainty in the estimates of effect)

The bedaquiline, pretomanid and linezolid (BPaL) regimen for MDR-TB with additional fluoroquinolone resistance

1. A treatment regimen lasting 6–9 months, composed of bedaquiline, pretomanid and linezolid (BPaL), may be used under operational research conditions in people with MDR-TB that is resistant to fluoroquinolones, who have either had no previous exposure to bedaquiline and linezolid or have been exposed for no more than 2 weeks. (Conditional recommendation, very low certainty in the estimates of effect)

Recommendation on monitoring response to MDR-TB treatment using culture

1. In people with MDR/RR-TB on longer regimens, the performance of sputum culture in addition to sputum smear microscopy is recommended to monitor treatment response (strong recommendation, moderate certainty in the estimates of test accuracy). It is desirable for sputum culture to be repeated at monthly intervals.

Recommendation on surgery for people on MDR-TB treatment

1. In people with MDR-TB, elective partial lung resection (lobectomy or wedge resection) may be used alongside a recommended MDR-TB regimen. (Conditional recommendation, very low certainty in the evidence)
-

Recommendations on care and support of people with drug-susceptible or drug-resistant TB

1. Health education and counselling on the disease and treatment adherence should be provided to people on TB treatment. (Strong recommendation, moderate certainty in the evidence)
 2. A package of treatment adherence interventions may be offered to people on TB treatment in conjunction with the selection of a suitable treatment administration option. (Conditional recommendation, low certainty in the evidence)
 3. One or more of the following treatment adherence interventions (complementary and not mutually exclusive) may be offered to people on TB treatment or to health care providers: a) tracers and/or digital medication monitor (conditional recommendation, very low certainty in the evidence); b) material support to the person with TB (conditional recommendation, moderate certainty in the evidence); c) psychological support to the patient (conditional recommendation, low certainty in the evidence); d) staff education (conditional recommendation, low certainty in the evidence).
 4. The following treatment administration options may be offered to people on TB treatment: a) Community- or home-based directly observed treatment is recommended over health facility-based or unsupervised treatment (conditional recommendation, moderate certainty in the evidence). b) Treatment administered by trained lay providers or health care workers is recommended over treatment administered by family members or unsupervised treatment (conditional recommendation, very low certainty in the evidence). c) Video-observed treatment (VOT) may replace directly observed treatment when the video communication technology is available, and it can be appropriately organized and operated by health care providers and people with TB. (conditional recommendation, very low certainty in the evidence)
 5. People with MDR-TB should be treated using mainly ambulatory care rather than models of care based principally on hospitalization. (Conditional recommendation, very low quality evidence)
 6. A decentralized model of care is recommended over a centralized model for people on MDR-TB treatment. (Conditional recommendation, very low certainty in the evidence)
-

People with the highest likelihood of being infected with TB bacteria are household contacts (especially infants and children) and people living with HIV. All people with TB should be interviewed, their close contacts traced as per recommended practices (see later in this chapter) and then assessed. People living with HIV should be screened for TB disease at each visit to health facilities.

4.16 TB preventive treatment

TB preventive treatment (TPT) consists of a course of one or more TB medicines given with the intention of preventing the development of TB disease. TPT is only given to people who are infected with TB bacteria or who may have been exposed to it and are at a higher risk of developing TB disease than the general population. TPT is considered as one of the most critical public health measures to protect both individuals and the community from TB. WHO recommends TPT for people living with HIV, childhood contacts, as well as all household contacts, and other people at risk (with specific clinical or social conditions) as these groups with the highest risk of developing active TB disease would receive the highest benefit from preventive TB treatment. Their TB risk is amplified under a humanitarian emergency.

While very important, TPT services may exceed the initial TB programme capacity and systematic screening (of household contacts and people living with HIV) should be prioritized for the identification and prompt treatment of those with active TB disease.

Comprehensive response

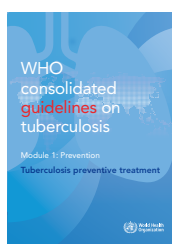
4.16.1 Provide TB preventive treatment to people living with HIV, child contacts, household contacts and other people at risk

All people living with HIV and contacts of people with TB should be screened for active TB disease and those without it (either drug-susceptible or drug-resistant) should start TPT. People living with HIV should receive at least six months of isoniazid (isoniazid preventive treatment – IPT), without prior tuberculin skin test (TST), and regardless of previous TB treatment, current ART, degree of immunosuppression and status of pregnancy (when applicable).

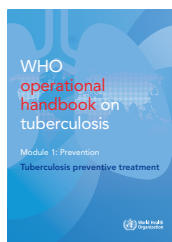
In TB contacts, TPT depends on the drug resistance profile of their contact.

WHO references

The following publications are recommended for additional reading on technical aspects not included in this manual:



WHO consolidated guidelines on tuberculosis. Module 1: prevention – tuberculosis preventive treatment. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/9789240001503>, accessed 1 September 2021).



WHO operational handbook on tuberculosis. Module 1: prevention – tuberculosis preventive treatment. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/9789240002906>, accessed 1 September 2021).

Testing for TB infection

LTBI is the presence of immune response in the absence of active disease. It is shown by a positive TST or interferon-gamma release assay (IGRA) test. TST measures the immune response intradermally (usually of the forearm palm); the Mantoux method consists of a single injection of tuberculin (combination of mycobacterial antigens) and the induration due to the immune response is measured after 48–72 hours. The test is considered positive when the induration is ≥ 5 mm in diameter in people with immune depression (HIV, severe malnutrition) or otherwise when ≥ 10 mm. IGRA measures the immune response in a single sample of blood and provides the result in 24–48 hours. Either TST or IGRA can be used to test for LTBI.

TB preventive treatment

There are different TB preventive treatment approaches based on the drug resistance profile as shown in [Annex 16](#).

WHO recommendations

Recommendations to identify populations for LTBI Testing and TPT

People living with HIV

1. Adults and adolescents living with HIV who are unlikely to have active TB should receive TPT as part of a comprehensive package of HIV care. Treatment should also be given to those on antiretroviral treatment, to pregnant women and to those who have previously been treated for TB, irrespective of the degree of immunosuppression and even if LTBI testing is unavailable.
2. Infants aged <12 months living with HIV who are in contact with a person with TB and who are unlikely to have active TB on an appropriate clinical evaluation or according to national guidelines should receive TPT.
3. Children aged ≥12 months living with HIV who are considered unlikely to have active TB on an appropriate clinical evaluation or according to national guidelines should be offered TPT as part of a comprehensive package of HIV prevention and care if they live in a setting with high TB transmission, regardless of contact with TB.
4. All children living with HIV who have successfully completed treatment for TB disease may receive TPT.

Household contacts (regardless of HIV status)

5. Children aged <5 years who are household contacts of people with bacteriologically confirmed pulmonary TB and who are found not to have active TB on an appropriate clinical evaluation or according to national guidelines should be given TPT even if LTBI testing is unavailable.
6. Children aged ≥5 years, adolescents and adults who are household contacts of people with bacteriologically confirmed pulmonary TB who are found not to have active TB by an appropriate clinical evaluation or according to national guidelines may be given TPT.
7. In selected high-risk household contacts of people with MDR-TB, preventive treatment may be considered based on individualized risk assessment and a sound clinical justification.

Other people at risk

8. People who are initiating anti-TNF treatment, or receiving dialysis, or preparing for an organ or haematological transplant, or who have silicosis should be systematically tested and treated for LTBI.
9. Systematic LTBI testing and treatment may be considered for prisoners, health workers, immigrants from countries with a high TB burden, homeless people and people who use drugs.
10. Systematic LTBI testing and treatment is not recommended for people with diabetes, people who engage in the harmful use of alcohol, tobacco smokers and underweight people unless they also belong to other risk groups included in the above recommendations.

Recommendation on testing for LTBI

1. Either a TST or IGRA can be used to test for LTBI.
-

Recommendations on TPT options

1. The following options are recommended for the treatment of LTBI regardless of HIV status: 6 or 9 months of daily isoniazid, or a 3-month regimen of weekly rifapentine plus isoniazid, or a 3 month regimen of daily isoniazid plus rifampicin. A 1-month regimen of daily rifapentine plus isoniazid or 4 months of daily rifampicin alone may also be offered as alternatives.
2. In settings with high TB transmission, adults and adolescents living with HIV who have an unknown or a positive LTBI test and are unlikely to have active TB disease should receive at least 36 months of daily isoniazid preventive therapy (IPT). Daily IPT for 36 months should be given whether or not the person is on ART, and irrespective of the degree of immunosuppression, history of previous TB treatment and pregnancy in settings considered to have a high TB transmission as defined by national authorities.

4.17 TB among individuals below 15 years of age

The UNHLM on TB calls for the treatment of at least 3.5 million children, including 115 000 children with drug-resistant TB between 2018-2022, and to provide 4 million children with TPT (8).

Infants, children and young adolescents²⁶ are 5–10 times more likely than adults to develop active TB disease after infection, due to their immature immune system.²⁷ Those developing active disease usually do so within one year following infection, which is why TB among children is an indicator of recent and ongoing TB transmission in the community. Those with active TB disease are also at increased risk for disseminated forms of TB, such as miliary TB and TB meningitis. Immunosuppressive conditions, such as HIV infection and undernutrition, may also play a role in the progression to TB disease and its severity. Preventive measures for the above are BCG vaccination of neonates and TPT for children and young adolescents.

Asymptomatic neonates born to mothers with bacteriologically confirmed pulmonary TB should receive TPT after TB disease is excluded, and should be regularly followed to verify the absence of TB. Infants remaining asymptomatic, without immunological evidence of TB at the end of TPT, and HIV-negative, should be BCG-vaccinated using a normal infant dose.

Minimum response

4.17.1 Ensure TB treatment for all individuals below 15 years of age with known TB and those at risk

The higher vulnerability of individuals below 15 years to TB infection and disease places them as a priority group for prevention, early detection, diagnosis and treatment of TB.

During the initial triage (see section 4.10), all children identified on TB treatment should be placed back on it and those with compatible signs and symptoms should be assessed for active TB disease. In addition, TB screening should be conducted among all children who are living with HIV, who have severe acute malnutrition (SAM) and those who are in contact with a patient with infectious TB.

26 TB prevention and care may differ for individuals <15 years of age (the age by which the lungs have completed most of their physiological development). The <15-year age group is categorized into: infants (<1 year), children (1–<10 years) and young adolescents (10–14 years).

27 The natural history of childhood intra-thoracic tuberculosis: a critical review of literature from the pre-chemotherapy era. *Int J Tuberc Lung Dis* 8(4): 392-402.

4.17.2 Ensure BCG vaccination of all infants as soon as possible after birth

Ensure that BCG vaccination is included in the overall immunization programme activities and administered at birth.

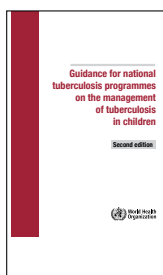
Comprehensive response

4.17.3 Provide TB preventive treatment to at risk individuals below 15 years of age

Infants, children and young adolescents who are HIV-positive or household TB contacts should be screened for active TB disease and those without TB disease should start TPT. Shorter regimen options are preferred for children, including 3HR (3 months of daily isoniazid and rifampicin) for HIV-uninfected contacts and CLHIV on efavirenz-based ART regimens weighing up to 25 kg and 3HP (3 months of weekly isoniazid and rifapentine) for older household contacts. 6H (6 months of daily isoniazid) is currently still the most suitable TPT option for CLHIV on other ART regimens. Other appropriate regimens should be used if the child is exposed to drug-resistant TB (for more details see section 4.16 and [Annex 16](#)).

WHO references

The following publications are recommended for additional reading on technical aspects not included in this manual:



Guidance for national tuberculosis programmes on the management of tuberculosis in children. Second Edition. Geneva: World Health Organization; 2014. (https://apps.who.int/iris/bitstream/handle/10665/112360/9789241548748_eng.pdf, accessed 1 September 2021).

Note: The updated guidelines along with an operational handbook on the management of TB in children and adolescents will be published in the first quarter of 2022, which will replace the 2014 guidance.



BCG vaccines: WHO position paper – February 2018. Weekly Epidemiological Record, N. 8, 23 February 2018 (<https://apps.who.int/iris/bitstream/handle/10665/260306/WER9308.pdf?sequence=1>, accessed 1 September 2021).

TB screening and diagnosis in individuals below 15 years of age

Individuals below 15 years of age, either living with HIV or not, can be effectively screened for TB through specific signs and symptoms (see Table 7 on page 65); absence of these symptoms generally excludes the presence of active TB disease. On the contrary, the presence of one or more of the above signs and symptoms requires a number of investigations to rule out TB disease.

Diagnosis of TB among individuals below 15 years requires a comprehensive evaluation that includes the following investigations:

- Physical examination.²⁸
- Medical history, including exposure to person with TB.
- Bacteriological diagnosis through Xpert MTB/RIF or Xpert Ultra, rather than smear microscopy/culture and phenotypic DST, using specimens appropriate for collection in children,²⁹ (such as induced sputum, gastric aspirate, nasopharyngeal aspirate and stool),³⁰ or site-specific specimens for extrapulmonary TB (such as cerebrospinal fluid, lymph node biopsy). Xpert MTB/RIF or Xpert Ultra may be repeated when initially negative and with pretest probability of 5% or more (i.e. an estimated TB prevalence $\geq 5\%$ in the population).
- Chest radiography (if available).
- Tuberculin skin testing (if available).
- HIV antibody testing, to be offered to all children evaluated and confirmed with viral testing (such as polymerase chain reaction test).
- Other investigations relevant for suspected pulmonary TB and suspected extrapulmonary TB.

Infants and children with pulmonary TB disease do not shed TB bacteria in their respiratory secretions to the extent that adults do; therefore, a negative Xpert MTB/RIF or microscopy result does not exclude TB disease and should be repeated if feasible. It should be noted that at best less than 30% of childhood TB is diagnosed through microbiological testing. If the microbiological testing is negative, or cannot be done, diagnosis can be based on clinical parameters. Additional investigations may also help the diagnosis of TB disease among children, such as the chest radiography (with findings such as hilar lymphadenopathy, upper lobe infiltrates, or a miliary lung disease pattern) (80), spine radiography (Pott's disease), cerebrospinal fluid collected by lumbar puncture (TB meningitis), and fine-needle aspiration/biopsy (lymph node TB). The new operational handbook on the management of TB in children and adolescents 2022 will include examples of integrated treatment decision algorithms for children below ten years of age, for settings with or without access to chest radiography. These algorithms will combine bacteriological testing, chest X-ray features and clinical signs and symptoms to support health care workers to make a decision on whether or not to start a child on TB treatment.

Treatment and support to individuals with TB below 15 years of age

Treatment

TB drugs meant for adults are also used in individuals below 15 years of age; however, their faster metabolism requires the calculation of dosages by body weight; usually, dosages are higher than in adults, but better tolerated. The use of child-friendly FDCs is recommended. In infants aged 1–3 months, doses may need to be adjusted for the increased possibility of toxicity and should be referred to a clinician experienced in paediatric TB.

28 Physical examination should include evaluation of malnutrition through the measurement of weight-for-length and weight-for-height Z-score recommended for children aged <2 years and 2–4 years of age.

29 Young children, even some older children, are unable to expectorate like adults and alternative specimens should be considered.

30 Xpert MTB/RIF or Xpert Ultra investigation of stools may provide a good alternative for other more invasive specimen collection methods, which are challenging in young children and require specific expertise.

TB treatment for individuals below 15 years of age depends on the type and severity of the disease, the living conditions, and presence of drug resistance. A [rapid communication](#) released by the World Health Organization (WHO) Global Tuberculosis Programme has announced important updates to guidance on the management of tuberculosis (TB) in children and adolescents. This includes new recommendations on diagnostic options, treatment regimens, including the use of a four-month treatment regimen (shortening the continuation phase to two months) for children and adolescents aged between 3 months and 16 years with non-severe TB. Detailed guidance on assessing eligibility for this regimen will be provided in the 2022 operational handbook.

Other updates from the rapid communication regarding treatment include:

- In children with MDR/ RR-TB of all ages:
 - A recommendation to use bedaquiline as part of the shorter, all oral bedaquiline-containing regimen (conditionally recommended by WHO in 2020) or as part of longer treatment regimens.
 - A recommendation to use delamanid as part of longer treatment regimens.
 - These recommendations make it possible to design all-oral regimens for children of all ages.
- A recommendation on the use of a shorter intensive regimen composed of 6 months of isoniazid, rifampicin, pyrazinamide and ethionamide in children and adolescents with microbiologically confirmed or clinically diagnosed TB meningitis, presumed to be drug susceptible, as an alternative to the currently recommended 12 month regimen.

Treatment for individuals below 15 years living with HIV

For individuals below 15 years living with HIV, TB treatment is guided by the same principles and uses the same drugs used for treatment of adults living with HIV (see section 4.19). Individuals below 15 years living with HIV who are receiving TB treatment may require modification in their antiretroviral therapy (ART) and closer monitoring. Current national HIV treatment guidelines, or if unavailable, WHO guidelines should be referenced for specific recommendations on ART management for TB and HIV coinfection treatment.

Patient-centred care and support

All children with TB disease, especially in emergency settings, are at high risk for undernutrition and require nutritional support. This includes early efforts to continue breastfeeding (until at least 24 months of age where possible) and to ensure adequate nutrient intake based on the availability and affordability of local foods. Additional energy requirements that are particularly important during the intensive phase of treatment are best met through additional household foods, provided as part of a balanced varied diet. Infants under six months of age flagged due to concerns about malnutrition or growth failure require referral to a therapeutic feeding programme. If this is not available or feasible, breastfeeding mothers should be given support to optimize breastfeeding. Nutritional supplementation cannot be given directly to an infant under six months of age but can be provided for the lactating mother.

Individuals below 15 years, their parents, other family members, and other caregivers should be informed about TB, the importance of completing treatment and the support needed and available to adhere to it. Attending a school is very important for education and socialization, and should be kept-up as much as possible while preserving infection control measures. The approach for treating TB among adolescents (10–19 years of age) is the same as that for adults. However, adolescents are at particular risk for poor treatment adherence and special attention should be paid to prevent

non-adherence and lost to follow-up (such as engagement to become active participants in their treatment plan; individualized and family counselling).

Addressing the issues mentioned above, the rapid communication on the upcoming guidelines on the management of TB in children and adolescents also highlights as a key update that in high TB burden settings, decentralized and family-centred, integrated services may be implemented to improve TB case detection and the uptake of TB preventive treatment.

Monitoring treatment

Monitoring TB treatment in children should be more frequent than in adults because of the need to reassess body weight (hopefully increasing under the effect of successful treatment) and to readjust the drug dosages according to weight gain.

Management of adverse reactions

While the occurrence of adverse events should be monitored, serious ones are less common among children compared to adults. Isoniazid may cause symptomatic pyridoxine deficiency, which presents as neuropathy, particularly in severely malnourished children and children living with HIV on ART. Supplemental pyridoxine (5–10 mg/day) is recommended for children living with HIV or malnourished children being treated for TB.

BCG vaccination

BCG is a live attenuated vaccine derived from *M. bovis* that is recommended at birth for all healthy neonates in countries or settings with a high TB incidence; if BCG vaccine cannot be given at birth, it should be given at the earliest opportunity. In countries with low TB incidence, BCG vaccination may be considered for neonates of high-risk groups as well as for unvaccinated TST- or IGRA-negative children, adolescents and adults also at high risk for TB. BCG revaccination is not recommended, even if the TST reaction or result of an IGRA is negative.

In general, BCG vaccination is contraindicated for persons with immunodeficiency, including infants exposed to immunosuppressive treatment in utero or via breastfeeding. In populations with high HIV prevalence, the BCG vaccine is recommended in: (i) neonates born to women of unknown HIV status (benefits of BCG vaccination outweigh the risks); (ii) neonates of unknown HIV status born to HIV infected women, if without clinical evidence suggestive of HIV infection, regardless of whether the mother is receiving ART; (iii) neonates with HIV infection confirmed by early virological testing, but with BCG vaccination delayed until ART has been started and the infant confirmed to be immunologically stable (CD4 >25%).

Management of neonate born to a mother with TB

Infants may acquire TB from their mother through the placenta, aspiration of infected amniotic fluid, or airborne contact after birth. About half of the children born to mothers with active pulmonary TB develop the disease during the first year of life if TPT is not given. Multiple organs (including lungs, liver, and/or central nervous system) are usually involved.

Infants born to mothers with TB should be clinically assessed and treated if found with TB disease. If well, they should receive TPT. Breastfeeding should continue, while proper infection control measures should be enforced to prevent TB transmission from the mother. BCG vaccination should be postponed until TPT is completed to avoid fatal disseminated BCG disease.

Neonates born to HIV-positive mothers have reduced risk of TB when on highly active antiretroviral therapy; BCG vaccination should be withheld.

WHO recommendations

Note: Some of the listed recommendations will be adjusted in the updated 2022 WHO consolidated guidelines on tuberculosis: Module 5: Co-morbidities, vulnerable populations and people-centred care – Management of tuberculosis in children and adolescents

Recommendations on algorithms to rule out TB disease in children

1. The absence of any symptoms of TB and the absence of abnormal chest radiographic findings may be used to rule out TB disease among HIV-negative household contacts aged ≥5 years and other risk groups before preventive treatment.

Recommendations on diagnosis of TB in children

2. In children with signs and symptoms of pulmonary TB, Xpert MTB/RIF should be used as an initial diagnostic test for TB and rifampicin-resistance detection in sputum, gastric aspirate, nasopharyngeal aspirate and stool rather than smear microscopy/culture and phenotypic DST. (Strong recommendation, moderate certainty for accuracy in sputum; low certainty of evidence for test accuracy in gastric aspirate, nasopharyngeal aspirate and stool)
 3. In children with signs and symptoms of pulmonary TB, Xpert Ultra should be used as the initial diagnostic test for TB and detection of rifampicin resistance in sputum or nasopharyngeal aspirate, rather than smear microscopy/culture and phenotypic DST. (Strong recommendation, low certainty of evidence for test accuracy in sputum; very low certainty of evidence for test accuracy in nasopharyngeal aspirate).
 4. In adults and children with signs and symptoms of TB meningitis, Xpert MTB/RIF or Xpert Ultra should be used in cerebrospinal fluid (CSF) as an initial diagnostic test for TB meningitis rather than smear microscopy/culture. (Strong recommendation, moderate certainty of evidence for test accuracy for Xpert MTB/RIF; low certainty of evidence for test accuracy for Xpert Ultra)
 5. In adults and children with signs and symptoms of extrapulmonary TB, Xpert MTB/RIF may be used in lymph node aspirate, lymph node biopsy, pleural fluid, peritoneal fluid, pericardial fluid, synovial fluid or urine specimens as the initial diagnostic test for respective form of extrapulmonary TB rather than smear microscopy/culture. (Conditional recommendation, moderate certainty of evidence for test accuracy for pleural fluid; low certainty for lymph node aspirate, peritoneal fluid, synovial fluid, urine; very low certainty for pericardial fluid, lymph nodes biopsy)
 6. In adults and children with signs and symptoms of extrapulmonary TB, Xpert Ultra may be used in lymph node aspirate and lymph node biopsy as the initial diagnostic test for lymph nodes TB rather than smear microscopy/culture. (Conditional recommendation, low certainty of evidence)
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7. In adults and children with signs and symptoms of extrapulmonary TB, Xpert MTB/RIF or Xpert Ultra should be used for rifampicin-resistance detection rather than culture and phenotypic DST. (Strong recommendation, high certainty of evidence for test accuracy for Xpert MTB/RIF; low certainty of evidence for Xpert Ultra)
 8. In HIV-positive adults and children with signs and symptoms of disseminated TB, Xpert MTB/RIF may be used in blood, as an initial diagnostic test for disseminated TB. (Conditional recommendation, very low certainty of evidence for test accuracy)
 9. In children with signs and symptoms of pulmonary TB in settings with pretest probability below 5% and an Xpert MTB/RIF negative result on the initial test, repeated testing with Xpert MTB/RIF in sputum, gastric fluid, nasopharyngeal aspirate or stool specimens may not be used. (Conditional recommendation, low certainty of evidence for test accuracy for sputum and very low for other specimen types)
 10. In children with signs and symptoms of pulmonary TB in settings with pretest probability 5% or more and an Xpert MTB/RIF negative result on the initial test, repeated testing with Xpert MTB/RIF (for total of two tests) in sputum, gastric fluid, nasopharyngeal aspirate and stool specimens may be used. (Conditional recommendation, low certainty of evidence for test accuracy for sputum and very low for other specimen types)
 11. In children with signs and symptoms of pulmonary TB in settings with pretest probability below 5% and an Xpert Ultra negative result on the initial test, repeated testing with Xpert Ultra in sputum or nasopharyngeal aspirate specimens may not be used. (Conditional recommendation, very low certainty of evidence for test accuracy)
 12. In children with signs and symptoms of pulmonary TB in settings with pretest probability 5% or more and an Xpert Ultra negative result on the first initial test, repeated one Xpert Ultra test (for a total of two tests) in sputum and nasopharyngeal aspirate specimens may be used. (Conditional recommendation, very low certainty of evidence for test accuracy)
 13. In adults and children with signs and symptoms of pulmonary TB, the Truenat MTB or MTB Plus may be used as an initial diagnostic test for TB rather than smear microscopy/culture. (Conditional recommendation, moderate certainty of evidence for test accuracy)
 14. In adults and children with signs and symptoms of pulmonary TB and a Truenat MTB or MTB Plus positive result, Truenat MTB-RIF Dx may be used as an initial test for rifampicin resistance rather than culture and phenotypic DST. (Conditional recommendation, very low certainty of evidence for test accuracy)
 15. In HIV-positive children, adolescents and adults, LF-LAM is recommended to assist the diagnosis of active TB:
Inpatient settings:
 - With signs and symptoms of TB (pulmonary and/or extrapulmonary) (strong recommendation, moderate certainty in the evidence about the intervention effects); or
 - With advanced HIV disease or who are seriously ill (strong recommendation, moderate certainty in the evidence about the intervention effects); or
 - Irrespective of signs and symptoms of TB and with a CD4 cell count of less than 200 cells/mm³ (strong recommendation, moderate certainty in the evidence about the intervention effects).
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In outpatient settings:

- With signs and symptoms of TB (pulmonary and/or extrapulmonary) or seriously ill (conditional recommendation, low certainty in the evidence about test accuracy); and
 - Irrespective of signs and symptoms of TB and with a CD4 cell count of less than 100 cells/mm³ (conditional recommendation, very low certainty in the evidence about test accuracy).
16. Xpert MTB/RIF may be used as a replacement test for usual practice (including conventional microscopy, culture, and/or histopathology) for testing of specific non-respiratory specimens (lymph nodes and other tissues) from children suspected of having extrapulmonary TB (Conditional recommendation, very low quality of evidence)
 17. Xpert MTB/RIF should be used in preference to conventional microscopy and culture as the initial diagnostic test in testing cerebrospinal fluid specimens from children suspected of having TB meningitis (Strong recommendation given the urgency of rapid diagnosis, very low quality of evidence)
 18. Chest radiography is useful in diagnosing pulmonary and extrapulmonary TB in children in combination with history, evidence of TB infection and microbiological testing
 19. Routine HIV testing should be offered to all people, including children, with presumptive and diagnosed TB (Strong recommendation, low quality of evidence.)

Recommendations on treatment of TB in children

1. Children with suspected or confirmed pulmonary TB or tuberculous peripheral lymphadenitis who live in settings with low HIV prevalence and/or low prevalence of isoniazid resistance and children who are HIV-negative, can be treated with a three-drug regimen (HRZ) for 2 months followed by a two drug (HR) regimen for 4 months at the dosages specified in Recommendation 8 (Strong recommendation, moderate quality of evidence).
 2. Children with suspected or confirmed pulmonary TB or TB peripheral lymphadenitis and/or children with extensive pulmonary disease, living in settings where the prevalence of HIV is high and/or the prevalence of isoniazid resistance is high should be treated with a four-drug regimen (HRZE) for 2 months followed by a two-drug regimen (HR) for 4 months at the dosages specified in Recommendation 8 (Strong recommendation, moderate quality of evidence)
 3. Infants aged 0–3 months with suspected or confirmed pulmonary TB or tuberculous peripheral lymphadenitis should be promptly treated with the standard treatment regimens, as described in recommendation 9 or 10. Treatment may require dose adjustment to reconcile the effect of age and possible toxicity in young infants. The decision to adjust doses should be taken by a clinician experienced in managing paediatric TB (Strong recommendation, low quality of evidence)
 4. Streptomycin should not be used as part of first-line treatment regimens for children with pulmonary TB or tuberculous peripheral lymphadenitis (Strong recommendation, moderate quality of evidence)
 5. Children with suspected or confirmed tuberculous meningitis and children with suspected or confirmed osteoarticular TB should be treated with a four drug regimen (HRZE) for 2 months, followed by a two-drug regimen (HR) for 10 months, the total duration of treatment being 12 months. The doses recommended for the treatment of tuberculous meningitis are the same as those described for pulmonary TB (Strong recommendation, low quality of evidence)
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Recommendations on prevention of TB in children

BCG vaccination

- 1.1 In countries or settings with a high incidence of TB and/or high leprosy burden, a single dose of BCG vaccine should be given to all healthy neonates at birth for prevention of TB and leprosy. If BCG vaccine cannot be given at birth, it should be given at the earliest opportunity thereafter and should not be delayed, in order to protect the child before exposure to infection occurs.
 - 1.2 Countries with low incidence of TB or leprosy may choose to vaccinate neonates selectively in groups at high risk for TB and/or leprosy. High-risk groups to be considered for vaccination include the following: i) Neonates born to parents (or other close contacts/ relatives) with current or previous TB or with leprosy; ii) Neonates born in households with contacts to countries with high incidence of TB and/or high leprosy burden; iii) Neonates in any other locally identified risk group with TB and/or with leprosy disease.
 - 1.3 In older age groups, BCG vaccination is recommended for: i) unvaccinated TST- or IGRA-negative older children, adolescents and adults from settings with high incidence of TB and/or high leprosy burden; ii) unvaccinated TST- or IGRA-negative older children, adolescents and adults moving from low to high TB incidence/ leprosy burden settings; iii) unvaccinated TST- or IGRA-negative persons at risk of occupational exposure in low and high TB incidence areas (e.g. health-care workers, laboratory workers, medical students, prison workers, other individuals with occupational exposure).
 - 1.4 Migrants from high TB incidence countries, who are moving to low-incidence countries, if not already vaccinated, should be tested for *M. tuberculosis* infection. Vaccination is not required. However, if returning to the country of origin, consultation should be sought about whether BCG vaccination is needed.
 - 1.5 Revaccination is not recommended even if the TST reaction or result of an IGRA is negative. The absence of a BCG scar after vaccination is not indicative of lack of protection and is not an indication for revaccination.
 - 1.6 BCG vaccination is contraindicated for persons with congenital cell-mediated or severe combined immunodeficiency, immunodeficiency syndromes (e.g. HIV/AIDS, known or suspected congenital immunodeficiency, leukaemia, lymphoma or other malignant disease) and for people undergoing immunosuppressive treatment (e.g. corticosteroids, alkylating agents, biological response modifiers, antimetabolites, radiation). Infants exposed to immunosuppressive treatment in utero or via breastfeeding should not receive BCG vaccination.
 - 1.7 People living with HIV, including children, should not receive BCG vaccination. However, those who are receiving ART, are clinically well and immunologically stable (CD4% >25% for children aged 5 years) should be vaccinated.
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- 1.8 In populations with high prevalence of HIV infection, the BCG vaccine is recommended in:
 - i) neonates born to women of unknown HIV status (benefits of BCG vaccination outweigh the risks);
 - ii) neonates of unknown HIV status born to HIV infected women, if they have no clinical evidence suggestive of HIV infection, regardless of whether the mother is receiving ART;
 - iii) neonates with HIV infection confirmed by early virological testing, but with BCG vaccination delayed until ART has been started and the infant confirmed to be immunologically stable (CD4 >25%).
 - 1.9 Asymptomatic neonates born to mothers with bacteriologically confirmed pulmonary TB should receive TPT if TB disease has been excluded, and should be regularly followed to verify absence of TB. If an infant remains asymptomatic, has no immunological evidence of TB at the end of TPT, and is HIV-negative, BCG vaccination should be provided using a normal infant dose.

Identification of people for LTBI testing and TPT

1. Infants aged < 12 months living with HIV who are in contact with a person with TB and who are unlikely to have active TB on an appropriate clinical evaluation or according to national guidelines should receive TPT.
2. Children aged ≥ 12 months living with HIV who are considered unlikely to have active TB on an appropriate clinical evaluation or according to national guidelines should be offered TPT as part of a comprehensive package of HIV prevention and care if they live in a setting with high TB transmission, regardless of contact with TB.
3. All children living with HIV who have successfully completed treatment for TB disease may receive TPT.
4. Children aged < 5 years who are household contacts of people with bacteriologically confirmed pulmonary TB and who are found not to have active TB on an appropriate clinical evaluation or according to national guidelines should be given TPT even if LTBI testing is unavailable.
5. Children aged ≥ 5 years, adolescents and adults who are household contacts of people with bacteriologically confirmed pulmonary TB who are found not to have active TB by an appropriate clinical evaluation or according to national guidelines may be given TPT.
6. Infants and children living with HIV who have poor weight gain, fever or current cough or who have a history of contact with a person with TB should be evaluated for TB and other diseases that cause such symptoms. If TB disease is excluded after an appropriate clinical evaluation or according to national guidelines, these children should be offered TPT, regardless of their age.
7. The absence of any symptoms of TB and the absence of abnormal chest radiographic findings may be used to rule out active TB disease among HIV-negative household contacts aged ≥ 5 years and other risk groups before preventive treatment.

Testing for LTBI

1. Either a TST or IGRA can be used to test for LTBI
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TPT

1. The following options are recommended for the treatment of LTBI regardless of HIV status: 6 or 9 months of daily isoniazid, or a 3-month regimen of weekly rifapentine plus isoniazid, or a 3 month regimen of daily isoniazid plus rifampicin. A 1-month regimen of daily rifapentine plus isoniazid or 4 months of daily rifampicin alone may also be offered as alternatives.
2. In settings with high TB transmission, adults and adolescents living with HIV who have an unknown or a positive LTBI test and are unlikely to have active TB disease should receive at least 36 months of daily isoniazid preventive therapy (IPT). Daily IPT for 36 months should be given whether or not the person is on ART, and irrespective of the degree of immunosuppression, history of previous TB treatment and pregnancy in settings considered to have a high TB transmission as defined by national authorities.

4.18 TB among pregnant women

TB among pregnant women is associated with a six-fold increase in perinatal deaths and a two-fold risk of premature birth and low birth weight; HIV coinfection increases the risk of maternal and infant mortality by almost 300% (81). Therefore, TB treatment for pregnant women should start whenever its probability is moderate to high.

Minimum response

4.18.1 Ensure TB diagnosis and treatment of all pregnant women

Systematic screening for active TB should be considered for pregnant women as part of antenatal care. When there is indication of TB, diagnosis and treatment should be promptly provided.

Diagnosis and treatment of TB among pregnant women

Diagnosis of TB among pregnant women is conducted as for other adults; TST using purified protein derivative is safe and chest radiography can be undertaken with suitable shielding which limits fetal exposure to radiation to harmless levels.

A number of TB medicines are not harmful to the fetus despite their capacity to cross the placenta. Others, such as amikacin (Am), streptomycin (S), ethionamide (E) Prothionamide (Pto) are clearly contraindicated during pregnancy. Consequently, the treatment of pregnant women with any drug-resistant TB should be based on individualized regimens carefully designed by specialized services and after providing counselling on the potential risks that the prescribed TB medicines have on the fetus.

After delivery, breastfeeding should **not** be discouraged as the concentration of TB drugs in breast milk is too small to be harmful to the nursing newborn.

Table 8: WHO recommended standard TB treatment regimen by drug resistance

TB by drug resistance	Recommended treatment regimen
Drug-susceptible	2HRZE / 7HR
Resistant to H	6(H)REZ-Lfx ^a
Rifampicin-resistant (RR) Multidrug resistant (MDR) Extensively drug-resistant (XDR)	Individualized treatment regimen not containing Am, S, Eto and Pto

^a When REZ fixed-dose combination formulation is used, H could be added; when Lfx cannot be used, the rest of treatment could be prescribed.

Am = amikacin, S = streptomycin, Eto = ethionamide and Pto = Prothionamide

4.19 TB and HIV

People living with HIV are at higher risk of developing TB disease from a TB infection (10% each year instead of during a lifetime as for HIV-negative people), of dying from it, and of getting recurrent TB after being cured. TB is a major cause of morbidity and mortality among people living with HIV. Pulmonary sputum smear-negative and extrapulmonary forms of TB are common among people living with HIV and so TB diagnosis can be challenging in this population. The latest available diagnostic technology (such as molecular WHO-approved rapid diagnostic tests for TB (mWRDs) and LF-LAM) should therefore be made available. TB treatment requires careful management in combining TB and ARV drugs together.

Emergency-affected populations are at higher risk of contracting TB and HIV, and special consideration should be given to the overall coordination of TB interventions with other interventions towards TB related comorbidities (see sections 3.1 and 4.1), and the effective implementation of WHO-recommended activities to reduce HIV-related TB (TB/HIV) (Table 9) (82).

Table 9: WHO-recommended activities to reduce TB/HIV

Reduce TB in people living with HIV and initiate early ART

- a. Intensify TB case-finding and ensure high quality TB treatment
- b. Initiate TB preventive therapy and early ART
- c. Ensure control of TB Infection in health care facilities and congregate settings

Reduce HIV in people with presumptive and diagnosed TB

- a. Provide HIV testing and counselling to people with presumptive and diagnosed TB
- b. Provide HIV prevention interventions for people with presumptive and diagnosed TB
- c. Provide co-trimoxazole preventive therapy for people with TB living with HIV
- d. Ensure HIV prevention interventions, treatment and care for people with TB living with HIV
- e. Provide ART for people with TB living with HIV

Minimum response

4.19.1 Screen all people living with HIV for active TB disease and place them on TB treatment

People living with HIV are a priority target for TB screening and treatment even during the acute phase of an emergency; they should be systematically screened for active TB at each visit to a health facility and promptly placed on TB treatment if necessary. Tools for screening for TB among people living with HIV include the WHO-recommended symptom screen comprising: current cough, fever, night sweats and weight loss; chest radiography, C-reactive protein, LF-LAM, chest radiography and mWRD in high burden settings depending on infrastructure.

4.19.2 Screen all people with presumptive or diagnosed TB for HIV and place them on ART

All people with presumptive or diagnosed TB should be offered HIV testing according to the WHO recommended 5 Cs (consent, confidentiality, counselling and pretest information messages, correct results and connection or linkage) (83). WHO recommends that all people with HIV are also offered HIV partner services which include voluntary provider-assisted referral so that their sexual and drug-injecting partners may be tested and linked to HIV prevention and treatment. Key populations, including those diagnosed with HIV and those who are HIV negative, should also be presented with social network-based approaches where HIV testing can be offered to their sexual, drug-injecting partners and social contacts who are at high ongoing risk for HIV. Moreover, people with TB with recent exposure or an inconclusive HIV diagnosis should be encouraged to retest. Those at high ongoing risk of HIV should be retested at least annually. ART should be started for all people with TB living with HIV regardless of their CD4 count.

4.19.3 Provide co-trimoxazole preventive therapy to all people living with TB/HIV

Co-trimoxazole preventive therapy should be given routinely to all people living with HIV and active TB disease, regardless of CD4 counts, until discontinuation criteria for adults or individuals below 15 years of age.

4.19.4 Provide minimum HIV preventive measures

The minimum HIV preventive measures recommended in humanitarian settings should be ensured to all people with presumptive and diagnosed TB (42).

Comprehensive response

4.19.5 Provide TB preventive treatment to all people living with HIV

All people living with HIV screened for active TB disease and found without it should start TPT, without prior TST and regardless of previous TB treatment, current ART status, degree of immunosuppression and status of pregnancy (84). In TB contacts, TPT depends on the drug resistance profile of their contact.

4.19.6 Provide comprehensive HIV preventive measures

All comprehensive HIV preventive measures recommended in humanitarian settings should be ensured to all people with presumptive and diagnosed TB (85).

Box 12: Strengthening TB and TB/HIV response among refugees in the East and Horn of Africa subregion

The East and Horn of Africa subregion is host to more than 4.6 million refugees. The majority are from South Sudan, but there are also significant numbers from Burundi, the Democratic Republic of Congo, Eritrea, Somalia and Sudan. TB is the most common presenting illness among people living with HIV, including those taking ART, and it is the major cause of HIV-related deaths.

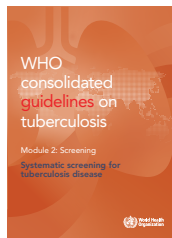
The UNHCR has been working with the Intergovernmental Authority for Development (IGAD) as the subrecipient of a 21-month multicountry Global Fund grant to scale up TB/HIV services among refugees living in 13 camps in Djibouti, South Sudan, Sudan and Uganda and those moving across borders. The grant, covering also Eritrea, Ethiopia, Kenya and Somalia, complemented existing government and UNHCR-supported programmes.

Through the grant, coordination improved among all stakeholders working with refugees as well as between the HIV and TB national programmes; procurement and supply management was strengthened; GeneXpert machines were made available for timely case detection and access to treatment. In 2020, across Djibouti, South Sudan, Sudan and Uganda, UNHCR trained more than 1000 health workers and 1500 community health workers in stigma reduction, active case finding and TB/HIV care and treatment, treatment adherence (using reminder calls), tracing people lost to follow-up; laboratory technicians were trained on the use of GeneXpert. During 2020 in the refugee camps, 2252 persons were newly diagnosed with TB (any form); 92–100% of these were voluntarily tested for HIV and 100 percent of those found with HIV were linked to ART; the treatment success among those with TB/HIV (2018 cohort) was 77–93%.

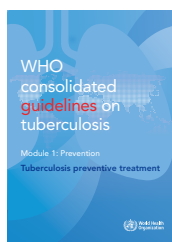
Source: Personal communication. UNHCR Regional Bureau for East and Horn of Africa and the Great Lakes Region, June 2021.

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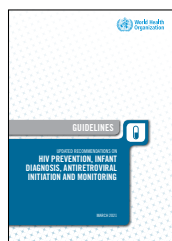
The following publications are recommended for additional reading on technical aspects not included in this manual:



WHO consolidated guidelines on tuberculosis. Module 2: screening – systematic screening for tuberculosis disease. Geneva: World Health Organization; 2021 (<https://www.who.int/publications/i/item/9789240022676>, accessed 1 September 2021).



WHO consolidated guidelines on tuberculosis. Module 1: prevention – tuberculosis preventive treatment. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/9789240001503>, accessed 1 September 2021).



Updated recommendations on HIV prevention, infant diagnosis, antiretroviral initiation and monitoring. Geneva: World Health Organization; 2021 (<https://www.who.int/publications/i/item/9789240022232>, accessed 1 September 2021).

Treatment and support for people with TB/HIV

Treatment

Among people living with HIV, treatment for TB is the same as that for HIV-negative people. The most important element to consider is the possibility of interactions between antiretrovirals (ARVs) and TB medicines. When the diagnosis of TB and HIV are simultaneous, TB treatment should be initiated first and followed by ART as soon as possible within the first two weeks of TB treatment, regardless of CD4 cell count. When ART is added to ongoing TB treatment, there is a possibility of immune reconstitution inflammatory syndrome (IRIS)³¹ (86).

Some considerations for the treatment of drug-resistant TB:

- Drug-resistant TB among people living with HIV is associated with higher mortality: early diagnosis of both conditions, prompt initiation of treatment for both and close monitoring of treatment uptake are essential.

31 IRIS is the exaggerated inflammatory reaction to mycobacteria that may occur when the immune system begins to recover under ART. IRIS is usually mild to moderate, but may be severe in rare cases. It generally presents within three months of the initiation of ART and is more common with a low CD4 cell count (<50 cells/mm³). IRIS could be deadly in its severe form; and its diagnosis and treatment are complex and require an experienced clinician.

- TB drugs and ARVs can have adverse effects: response to therapy and adverse effects should be closely monitored.
- The management of these people should be delegated to a specialist.

Interaction of ARV drugs with TB medicines

A number of interactions between ARV drugs and TB drugs usually require readjustment of ART while maintaining the same TB treatment; the priority is treating the main life threatening disease for a person living with HIV. Technical details can be found in the latest recommendations on the use of ARV drugs (86).

WHO recommendations

Recommendations on TB screening relevant to HIV

1. People living with HIV should be systematically screened for TB disease at each visit to a health facility (existing recommendation: strong recommendation, very low certainty of evidence)
 2. Among adults and adolescents living with HIV, systematic screening for TB disease should be conducted using the WHO-recommended four symptom screen and those who report any one of the symptoms of current cough, fever, weight loss or night sweats may have TB and should be evaluated for TB and other diseases (existing recommendation: strong recommendation, moderate certainty of evidence).
 3. Among adults and adolescents living with HIV, C-reactive protein using a cut-off of >5mg/L may be used to screen for TB disease (new recommendation: conditional recommendation, low certainty of evidence for test accuracy).
 4. Among adults and adolescents living with HIV, chest radiography may be used to screen for TB disease (new recommendation: conditional recommendation, moderate certainty of evidence for test accuracy).
 5. Among adults and adolescents living with HIV, molecular WHO-recommended rapid diagnostic tests may be used to screen for TB disease (new recommendation: conditional recommendation, moderate certainty of evidence for test accuracy).
 6. Adult and adolescent in people with HIV in medical wards where the TB prevalence is >10% should be tested systematically for TB disease with a molecular WHO recommended rapid diagnostic test (new recommendation: strong recommendation, moderate certainty of evidence for test accuracy).
 7. Among children younger than 10 years who are living with HIV, systematic screening for TB disease should be conducted using a symptom screen including any one of current cough, fever, poor weight gain or close contact with a TB patient (new recommendation: strong recommendation, low certainty of evidence for test accuracy).
-

Recommendations on TPT in people living with HIV

1. Adults and adolescents living with HIV who are unlikely to have active TB should receive TPT as part of a comprehensive package of HIV care. Treatment should also be given to those on antiretroviral treatment, to pregnant women and to those who have previously been treated for TB, irrespective of the degree of immunosuppression and even if LTBI testing is unavailable.
2. Infants aged <12 months living with HIV who are in contact with a person with TB and who are unlikely to have active TB on an appropriate clinical evaluation or according to national guidelines should receive TPT.
3. Children aged ≥12 months living with HIV who are considered unlikely to have active TB on an appropriate clinical evaluation or according to national guidelines should be offered TPT as part of a comprehensive package of HIV prevention and care if they live in a setting with high TB transmission, regardless of contact with TB.
4. All children living with HIV who have successfully completed treatment for TB disease may receive TPT.

Recommendations on diagnosis of TB in people living with HIV

Recommendations on Xpert MTB/RIF

1. In HIV-positive adults and children with signs and symptoms of disseminated TB, Xpert MTB/RIF may be used in blood, as an initial diagnostic test for disseminated TB. (Conditional recommendation, very low certainty of evidence for test accuracy)

Recommendations on using LF-LAM

In inpatient settings, LF-LAM should be used to assist in the diagnosis of active TB in HIV-positive adults, adolescents and children with:

- Signs and symptoms of TB (pulmonary and/or extrapulmonary) (strong recommendation, moderate certainty in the evidence about the intervention effects); or
 - Advanced HIV disease or serious illness (strong recommendation, moderate certainty in the evidence about the intervention effects); or
 - Irrespective of signs and symptoms of TB and with a CD4 cell count of less than 200 cells/mm³ (strong recommendation, moderate certainty in the evidence about the intervention effects).
-
- Particulate respirators, within the framework of a respiratory protection programme, are recommended to reduce *M. tuberculosis* transmission to health workers, persons attending health care facilities or other persons in settings with a high risk of transmission. (Conditional recommendation based on very low certainty in the estimates of effects)
-

In outpatient settings, LF-LAM should not be used to assist in the diagnosis of active TB in HIV-positive adults, adolescents and children with:

- TB symptoms not assessed (strong recommendation, very low certainty in the evidence about test accuracy);
- TB symptoms absent and CD4 cell count unknown or greater than or equal to 200 cells/mm³ (strong recommendation, very low certainty in the evidence about test accuracy);

and

- TB symptoms absent and CD4 cell count 100–200 cells/mm³ (conditional recommendation, very low certainty in the evidence about test accuracy).

Recommendations on treatment of TB in people living with HIV

1. People with TB with known positive HIV status and people with TB living in HIV-prevalent settings should receive at least 6 months of rifampicin-containing treatment regimen. (Strong recommendation, high quality of evidence)
The optimal dosing frequency is daily during the intensive and continuation phases. (Strong recommendation, high quality of evidence)
 2. It is recommended that people with TB who are living with HIV should receive at least the same duration of TB treatment as HIV-negative people with TB. (Strong recommendation, high grade of evidence)
 3. In people with drug-susceptible pulmonary TB who are living with HIV and receiving antiretroviral therapy during TB treatment, a 6-month standard treatment regimen is recommended over an extended treatment for 8 months or more. (Conditional recommendation, very low certainty in the evidence)
 4. ART should be started as soon as possible within two weeks of initiating TB treatment, regardless of CD4 count, among people living with HIV. (Strong recommendation, low- to moderate-certainty evidence for adults and adolescents; Strong recommendation, very-low-certainty evidence for children and infants)
-

4.20 TB and nutrition

Undernutrition weakens the immune system, which is a significant risk factor for developing TB as well as a major determinant of the severity and outcome of infection (87). Undernutrition also increases the risk of drug toxicity, poor adherence to treatment, relapse and death, even among those on treatment. Conversely, TB can cause undernutrition. Active TB disease often causes severe weight loss, due to reduced appetite, nausea and abdominal pain; as well as nutrient losses and micronutrient deficiencies from vomiting and diarrhoea, and metabolic alterations caused by the disease and drug therapy (such as vitamin B6 under isoniazid).

In addition, the economic burden of TB includes the direct costs (medical and non-medical expenses) and indirect costs (loss of productive time usually associated with reduced income) associated with seeking care and undergoing treatment. This contributes to household food insecurity which in turn impacts treatment adherence and outcomes.

Undernutrition or lack of adequate weight gain under TB treatment can be an indication of clinical severity with possible comorbidities and/or poor treatment response with increased risk of death and TB relapse. Undernutrition contributes to poor immunologic response. Conversely, gaining weight

is probably a sign of response to TB treatment and an indication to readjust the dosages of TB medicines prescribed per body weight.

Food and nutrition interventions as part of a package of care, treatment and support services for people with TB are a cost-effective investment.

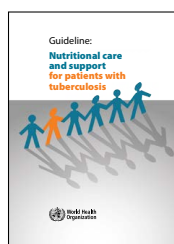
Minimum response

4.20.1 Assess nutrition and provide counselling and support to all people with TB

All individuals with active TB should undergo nutritional assessment as an entry point for identifying persons that require particular counselling and support. This allows health care providers to classify nutritional status and choose appropriate interventions. People with inappropriate food choices and eating behaviours could benefit from nutrition counselling and/or nutrition education. All individuals with active TB who are undernourished should receive the same nutritional care and support as other individuals without TB and of similar nutritional status through referral to available nutritional services.

WHO reference

The following publication is recommended for additional reading on technical aspects not included in this manual:



Guideline: Nutritional care and support for patients with tuberculosis. Geneva: World Health Organization; 2013 (https://www.ncbi.nlm.nih.gov/books/NBK189867/pdf/Bookshelf_NBK189867.pdf, accessed 1 September 2021).

Nutritional assessment, counselling and support

Nutritional assessment

Body mass index (BMI)³² is the most commonly used indicator of nutritional status among adults ≥ 19 years of age, while BMI-for-age-and-sex Z-score is used among individuals aged 5–18 years (88). Weight-for-length and weight-for-height Z-score are recommended indicators respectively for individuals aged < 2 years and 2–4 years of age, with mid-upper arm circumference (MUAC)³³ being used to identify people with TB in need of life-saving nutrition management (89).

Nutrition assessment among people with TB (and individuals below five years in their households) should be done at the initiation of TB treatment and then repeated regularly:

- Five years of age and above: measurement of weight and height for calculation of BMI for age.

32 It is an indicator of body thinness and fatness and calculated by dividing the person's weight (in kilograms) by the square of the height (in metres).

33 MUAC measures the circumference of the left upper arm in centimetres. It is taken at a point midway between the tip of the shoulder and the elbow. It is a proxy measure of nutrient reserves in muscle and fat that are not affected by pregnancy or oedema and are independent of height.

- 6–59 months of age: measurement of weight and height or length and plotting Z-score relative to growth standards; additionally, determining MUAC and presence of nutritional oedema
- Pregnant women: measurement of MUAC
- Identification of history of recent weight loss or failure to gain weight
- Evaluation of clinical/biological, psychological, social/economic and dietary factors that impact nutritional status.

Note: nutritional status should be re-assessed regularly during treatment; failure to gain weight during TB treatment should trigger further clinical assessment (such as resistance to TB drugs, poor adherence, comorbid conditions).

Nutrition counselling and education

Nutrition counselling and education delivered individually or in a group, help to manage or modify food choices and eating behaviours. Among people with TB, the focus should be on:

- Nutritional needs, dietary preferences, meal planning, symptoms and side effects management, in relation to adherence to medications and retention in clinical care.
- Continuation of breastfeeding (until at least 24 months of age where possible) for all individuals aged >2 years diagnosed with TB to ensure adequate nutrient intake in addition to the provision of age-appropriate diverse diet on the basis of locally available and affordable foods.
- Water, sanitation and hygiene: safe food preparation and storage, and other hygiene and sanitation practices.
- Linkages and two-way referrals to be established between health clinics and community level services such as persons living with HIV and/or TB support groups, mother-to-mother support groups.
- Exploration of potential socio-economic and gender issues by identifying barriers to access for men, women, boys and girls, and adherence to both clinical and community services and support (such as clinic hours not suitable for working age men and women; child care responsibilities are more likely to fall on women that may impede follow-up).

Nutritional support

Nutrition and related support to people with TB who are undernourished is the same as for all others without TB and with similar nutritional status. Support should be given after referral to available nutritional services. It consists of the provision of specific therapeutic or supplementary feeding support consisting of ready-to-use therapeutic food (RUTF), ready-to-use supplementary foods or fortified blended food (FBF) to be given for a limited duration decided by a set of anthropometric entry and exit eligibility criteria in line with national protocols:

- RUTF to individuals who meet criteria for severe acute malnutrition (weight-for-height or length Z-score <-3 in individuals of 6–59 months; BMI/age Z-score <-3 in individuals of 5–19 years of age); BMI <16 in adults).³⁴ Many adults are unable to consume large amounts of RUTF, so a combination of RUTF with FBF and facilitated access to locally available nutritious food through cash or voucher assistance is frequently recommended.
- FBF and ready-to-use supplementary foods to complement locally available nutritious foods to individuals who meet criteria for moderate acute malnutrition (weight-for-height/length Z-score <-2 and >-3 in 6–59 months; BMI/age Z-score <-2 in individuals of 5–19 years of age; BMI >16 but <18.5 in adults).

³⁴ Many adults are unable to consume large amounts of RUTF, so a combination of RUTF with fortified blended food is frequently recommended.

Measures to promote household food security and self-reliance

All affected households should be referred for socio-economic assessment using existing mechanisms of vulnerability assessment to determine eligibility for additional support, **regardless of their nutrition status**. Such support should consist of:

- In-kind and/or cash assistance or linkage to other social protection initiatives to help alleviate poverty, offset out-of-pocket or opportunity costs of accessing treatment and care and compensate the individual for loss of income while ill. Using an individualized approach time-limited support may be necessary until the health status improves and income generating activities can resume. This should be provided after assessment of household socio-economic status with or without other vulnerability criteria.
- Economic strengthening and livelihood services and support at the community level (such as microfinance, vocational training and evidence-based interventions) to improve food security based on local conditions.

Nutrition assessment, counselling and/or support need to be combined for best results as each on its own is not sufficient for optimal health/nutrition outcomes.

4.21 TB and other main comorbidities

Diabetes mellitus, mental health disorders and alcohol/other substance use disorders are other common morbidities among populations affected by humanitarian emergencies. As a consequence, there could be frequent TB comorbidities that require early diagnosis and management during TB treatment. With this purpose, TB interventions should be coordinated with all other interventions towards TB related comorbidities (see sections 3.1 and 4.1).

Minimum response

4.21.1 Screen and treat all people with known TB for comorbidities

All known people with TB taken under care during a humanitarian emergency should be screened and treated, if necessary, for diabetes mellitus, mental health disorders, alcohol and other substance use disorders as part of a comprehensive care package enabling the management of TB treatment towards completion and cure.

Comprehensive response

4.21.2 Screen and treat all people with TB for comorbidities

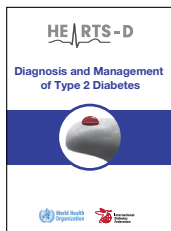
At the time of TB diagnosis, all new people with TB should be screened for diabetes mellitus, mental health disorders, alcohol and other substance use disorders. If any of these conditions is identified, it should be properly treated through early interventions and linkages with existing specialized services.

4.21.3 Provide smoking cessation measures

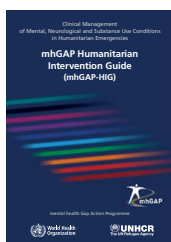
Smoking tobacco (active and passive) increases the risk for TB disease, relapse and death due to its negative effects to the airway's local immune defences (90). Smoking cessation measures should be tracked especially among people with TB and their close contacts.

WHO references

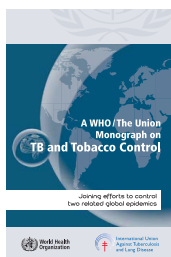
The following publications are recommended for additional reading on technical aspects not included in this manual:



HEARTS-D. Diagnosis and management of type 2 diabetes. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/who-ucn-ncd-20.1>, accessed 1 September 2021).



mhGAP Humanitarian Intervention Guide (mhGAP-HIG): Clinical management of mental, neurological and substance use conditions in humanitarian emergencies. Geneva: World Health Organization; 2015 (https://apps.who.int/iris/bitstream/handle/10665/162960/9789241548922_eng.pdf;sequence=1, accessed 1 September 2021).



A WHO / the Union monograph on TB and tobacco control: joining efforts to control two related global epidemics. Geneva: World Health Organization & International Union against Tuberculosis and Lung Disease.2007 (<https://apps.who.int/iris/handle/10665/43812>, accessed 1 September 2021).

TB and other main comorbidities

Diabetes mellitus

A person with TB should be screened for diabetes mellitus at the time of TB diagnosis and monitored during the whole intensive phase of TB treatment or, if not possible, at least during the first two weeks of treatment (91). Standard TB treatment is recommended for drug-susceptible and drug-resistant TB; however, because of diabetes, individuals have to be carefully assessed for drug resistance at the start of treatment and monitored for failure and relapse after treatment completion.

During the comprehensive response, screening of people with diabetes for TB may be cost-effective among those from high TB prevalence settings and is recommended to be done through Xpert MTB/RIF; those with negative results should be educated about their higher TB risk.

Mental health disorders

Psychosis, depression and anxiety are common comorbidities among people with TB. Adults and children who have been affected by conflict are expected to have them even more frequently. Early detection and proper management of such conditions contribute significantly to effective management of TB towards treatment completion and cure (92,93).

In addition to experiencing a humanitarian emergency and a disease such as TB, psychosis and depression may be an adverse effect of TB medications. Psychosis may occur under treatment with cycloserine and isoniazid, rarely with fluoroquinolones, especially with decreased renal function. Depression may be consequent to cycloserine, fluoroquinolones, isoniazid, ethionamide and prothionamide.

Alcohol and other substance use disorders

Emergency-affected populations, due to their disadvantaged social situation, may consume more alcohol and other substances as a consequence of social emargination and suffering (91). The consumption of alcohol and other substances (psychotropic) is associated with higher risk of TB infection (social mixing patterns), TB disease (weakening of the immune system due to direct toxicity or indirectly) and poor TB treatment outcomes (94,95). Such evidence also exists among people with or without HIV infection, who use drugs and inject drugs.

Screening of people with TB for substance use disorders is recommended at the time of TB diagnosis through the Alcohol, Smoking, and Substance Involvement Screening Test (96). People with TB and alcohol use disorders³⁵ should receive similar treatment as other people with TB but carefully monitored for treatment adherence, failure and appearance of adverse effects due to liver sufferance.

Interviewing people with TB to detect the use of psychotropic substances and screening for TB of people who use drugs should be part of the integrated services delivered at the field level. Integrated services can vary from multiple services delivered at a single venue (preferable) to services delivered at multiple venues through effective referral and coordination mechanisms. The service model should be always chosen to ensure a people-centred approach. During the comprehensive response, people who use drugs and inject drugs, with or without HIV infection, should be targeted for full access to a comprehensive package of harm reduction, which includes the prevention, diagnosis and treatment of TB, through collaborative TB and HIV activities (97,98).

The treatment for drug-susceptible or drug-resistant TB among people who use drugs should be carefully guided by the patient's clinical condition and the possibility of drug side-effects and interactions. Additional recommendations to consider for the successful management of TB among people who use drugs, are:

- Avoid law enforcement and criminalization practices that drive away people who use drugs from prevention and care services.
- Ensure the availability of clinical expertise to manage people with TB who use drugs.
- Consider special needs due to age, sex and sexual orientation.
- Ensure effective infection control measures as with any patient with TB disease.
- Establish social protection schemes to benefit people with TB who use drugs.
- Ensure special efforts in combating the cumulative stigma of TB, HIV and use of illicit drugs.
- Involve NGOs and civil society organizations to influence community structures and governmental institutions.

35 Alcohol use disorder is operationally defined by an Alcohol Use Disorders Identification Test (AUDIT) ≥ 8 points.

Smoking tobacco

The most recommended and simple approach for smoking cessation is ABC which stands for Ask, Brief advice and Cessation support (99):

- **A**sk: ask and document smoking status
- Provide **B**rief advice: personalized advice on how to stop smoking regardless of whether or not there is a willingness to
- Provide **C**essation support: recommend and arrange support for psychological nicotine dependence, prevention of weight gain, others.

4.22 TB and emerging diseases with potential for pandemic spread

Infectious diseases of epidemic or pandemic proportions may coexist in a humanitarian emergency and have health, economic, social and security consequences (100,101). Morbidity and mortality are increased by the disease and indirectly by the disruption of the health care and prevention services, with greater effect when medical conditions have similar transmission and clinical presentation, such as COVID-19 and TB (102).

Better surveillance and reporting systems have sped up and improved the scientific understanding of the complexity and dynamics of epidemic-prone diseases, including COVID-19 and how to also respond to it in humanitarian emergency settings (103–105) and in relation to TB (106).

Minimum response

4.22.1 Ensure continuity of TB services

All measures, especially those targeted under the minimum response, should be taken to ensure the continuity of TB services, including prevention, diagnosis, treatment and care for people in need. The TB workforce should be trained on emerging infectious diseases, and even be used as additional resource for other airborne communicable diseases, especially for infection control, active case finding and contact tracing. Uninterrupted procurement and supply of TB medicines and diagnostics should be properly planned and monitored. The simultaneous testing of both TB and the emerging disease (especially that with clinical similarities), could reduce diagnostic delays and be included in the diagnostic algorithm. The experience under the COVID-19 pandemic has shown the relevance and feasibility of simultaneous testing by using the same laboratory platforms (Xpert assay). TB treatment should not be delayed, unless potential drug-drug interactions with TB medicines are foreseen.

4.22.2 Protect people seeking TB care and health workers

Standard precautions (107) and airborne TB infection control measures (administrative, environmental and of personal protection, see section 4.5) should be strictly implemented. Additional measures to be taken as observed during the COVID-19 pandemic are:

- Reducing health facility visits and encounters between the people seeking health care and health staff (working in laboratories, health facilities and communities), i.e. the exposure to people with diagnosed or undiagnosed infectious disease:
 - Reducing TB follow-up visits. This could be done by spreading out the appointments on specific days or times and/or using digital communication technologies (see [Annex 7](#)).
 - Supplying people under treatment with increased quantities of TB medicines.

- Adopting special precautions when collecting and transporting biological samples.

Comprehensive response

4.22.3 Screen patients for pandemic illness

Systematic screening for pandemic illness should be conducted among all people in contact with the health services to promptly isolate and treat such a condition.

Resources

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- Enhancing Learning & Research for Humanitarian Assistance: <https://www.elrha.org/>
- Global Drug Facility: <http://www.stoptb.org/GDF/default.asp>
- Global Fund to Fight AIDS, Tuberculosis and Malaria: <https://www.theglobalfund.org/en/>
- Global Laboratory Initiative: <http://www.stoptb.org/wg/gli/>
- Health Resources Availability Monitoring System (HeRAMS): (<https://www.who.int/hac/herams/en/>)
- Integrated Refugee Health Information System (iRHIS): (<https://his.unhcr.org/home>)
- International Committee of the Red Cross: www.icrc.org
- International Federation of Red Cross and Red Crescent Societies: www.ifrc.org
- International Organization for Migration: www.iom.int
- International Union Against Tuberculosis and Lung Diseases: <https://www.theunion.org/>
- Médecins Sans Frontières: www.msf.org
- Save the Children: <https://www.savethechildren.org/>
- SIASP Program, Systems for Improved Access to Pharmaceuticals and Services, e-TB Manager: <http://siaspprogram.org/tools-and-guidance/e-tb-manager/>
- Special Programme for Research & Training in Tropical Diseases: https://www.who.int/tdr/research/tb_hiv/en/
- Systems for Improved Access to Pharmaceuticals and Services, QuanTB – Tuberculosis Medicines Quantification Tool: <http://siaspprogram.org/quantb/>
- Stop TB Partnership: <http://www.stoptb.org/>
- United Nations High Commissioner for Refugees: <https://www.unhcr.org/>
- United Nations, Sustainable Development Goals: <https://unstats.un.org/wiki/display/SDGeHandbook/Home>
- World Health Organization. WHO's global tuberculosis database: <https://www.who.int/teams/global-tuberculosis-programme/data>
- World Health Organization, Global TB Programme: <https://www.who.int/tb/en/>
- World Health Organization, WHO online tool for choosing populations and algorithms to be screened for active TB disease: https://wpro.shinyapps.io/screen_tb/
- World Health Organization, WHO online tool for second-line TB drug estimation and request: http://www.who.int/tb/challenges/mdr/greenlightcommittee/sld_estimation_&_request_tool.xls

Mobile applications

- United Nations High Commissioner for Refugees, Emergency Handbook, Apple Store (<https://itunes.apple.com/us/app/emergency-handbook/id1129267288?mt=8>) and Google Play (<https://play.google.com/store/apps/details?id=org.unhcr.emergency>)
- World Health Organization, Global TB report, Apple Store (<https://apps.apple.com/us/app/tb-report/id1483112411>) and Google Play (https://play.google.com/store/apps/details?id=uk.co.adappt.whotbreport&hl=en_us)
- World Health Organization. WHO's global tuberculosis database, Apple Store (<https://apps.apple.com/us/app/tb-report/id1483112411>) and Google Play (https://play.google.com/store/apps/details?id=uk.co.adappt.whotbreport&hl=en_us)
- World Health Organization, Prevent TB, Apple Store (<https://testflight.apple.com/join/uYpbPnx4>) and Google Play (<https://play.google.com/store/apps/details?id=com.duretechnologies.apps.android.ltbigt>)
- World Health Organization, Compendium of WHO guidelines App, Version 2.0, 52.3 MB. Global Innovative Services Inc, Apple Store (<https://apps.apple.com/ch/app/the-compedium/id1355153408>), Google Play (<https://play.google.com/store/apps/details?id=com.gisvcs.thecompendium&hl=en>)
- World Health Organization, TB Chatbots: TB facts (<https://www.tb-facts.org/>), Isoniazid-resistant TB treatment (<https://www.hr-tbguidelinesbot.org/>)

Annex 1: SDGs, End TB Strategy, UNHLM on TB, UN progress report

Sustainable Development Goals; TB-related goal, target and indicator by 2030

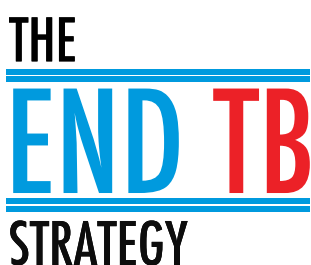


Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

Indicator 3.3.2: TB incidence per 100 000 population

End TB Strategy indicators and targets; 3 targets by 2030 and 2035













Reduction in number of TB deaths (compared with 2015):
by 90% in 2030 and by 95% in 2035

Reduction in TB incidence rate (compared with 2015):
by 80% in 2030 and by 90% in 2035

TB-affected families facing catastrophic costs due to TB (%):
0% in 2030

UN high-level meeting on TB

1		Providing diagnosis and treatment with the aim of successfully treating 40 million people with TB from 2018 to 2022, including 3.5 million children , and 1.5 million people with drug-resistant TB ;	6		Enabling and pursuing multisectoral collaboration at the global, regional, national and local levels;
2		Preventing TB for those most at risk of falling ill, through the rapid scaling up of access to testing and the provision of preventive treatment, so that at least 30 million people receive preventive treatment by 2022 , with specific targets for children, household contacts and people living with HIV;	7		Addressing the economic and social determinants of the disease; promoting an end to stigma and all forms of discrimination, including through the protection and promotion of human rights and dignity; and providing special attention to the poor, vulnerable and communities especially at risk ;
3		Mobilizing sufficient and sustainable financing , with the aim of increasing overall global investments for ending TB, and reaching at least US\$ 13 billion a year by 2022 , with an additional US\$ 2 billion a year for TB research ;	8		Advancing research and innovation through global collaboration including through WHO mechanisms, and networks ;
4		Overcoming the global public health crisis of multidrug-resistant TB through actions for prevention, diagnosis, treatment and care;	9		Requesting the Director-General of WHO to continue to develop the multisectoral accountability framework and ensure its timely implementation no later than 2019;
5		Improving policies and systems on each country's path towards achieving and sustaining universal health coverage ;	10		Requesting the Secretary-General of the UN, with the support of WHO, to provide a progress report in 2020 on global and national progress, which will serve to inform preparations for a comprehensive review by Heads of State and Government at a high-level meeting in 2023 .

10 priority recommendations of the UN Secretary-General's Progress Report on TB

10 PRIORITY RECOMMENDATIONS OF THE UN SECRETARY-GENERAL'S 2020 PROGRESS REPORT

ON TB FOR ACTIONS NEEDED TO ACCELERATE PROGRESS TOWARDS GLOBAL TB TARGETS



1. Fully activate high-level leadership to urgently reduce TB deaths and drive multisectoral action to end TB



2. Urgently increase funding for essential TB services including the health workforce



3. Advance universal health coverage to ensure all people with TB have access to affordable quality care and resolve underreporting challenges



4. Address the drug-resistant TB crisis to close persistent gaps in care



5. Dramatically scale up provision of preventive treatment for TB



6. Promote human rights and combat stigma and discrimination



7. Ensure meaningful engagement of civil society, communities and people affected by TB



8. Substantially increase investments in TB research to drive technological breakthroughs and rapid uptake of innovations



9. Ensure that TB prevention and care are safeguarded in the context of COVID-19 and other emerging threats



10. Request WHO to continue to provide global leadership for the TB response, working in close collaboration with Member States and other stakeholders, including to prepare for a high-level meeting on TB in 2023, that aligns with the high level meeting of the e General Assembly on universal health coverage also to be held in 2023

Annex 2: Quantification of TB drugs and other main commodities

Examples of quantification of TB drugs

Calculating TB drugs required for a single patient

Item	Treatment	Dose/day (n)	Total days (n)	Drug quantity
Examples for single drug:				
Z 400 mg tab	Intensive phase ^a	4 tabs	7 days x 8 weeks	224 tabs
Bdq 100 mg tab	Intensive phase ^b	First 2 weeks: 4 tabs qod After: 2 tabs qod	6 days + (3 days x 22 weeks)	156 tabs (24+132)
Example for fixed-dose drug combination:				
HR 150/75 mg tab	Continuation phase ^a	4 tabs	7 days x 16 weeks	448 tabs

qod = every other day

^a Treatment regimen adopted: 2(HR)ZE / 4(HR)

^b Treatment regimen adopted: 6 Bdq_(e m)-Lfx/Mfx-Cfz-Z-E-Hh-Eto /5 Lfx/Mfx-Cfz-Z-E

Calculating the total order requirement for a TB drug

A	Tablets for new people with TB	+
B	Tablets for ongoing people with TB	=
C	Total tablets (A+B)	+
D	Tablets for reserve stock (20% of C)	=
E	Total tablets required (C+D)	-
F	Total tablets in stock	=
	Total tablets to order (E-F)	

Electronic tools available for easy calculation

- GDF TB medicines dashboard on quantification, procurement and supply processes <http://www.stoptb.org/gdf/medicinesdashboard/>
- WHO second-line TB drug estimation and request tool (http://www.who.int/tb/challenges/mdr/greenlightcommittee/sld_estimation_&_request_tool.xls)
- QuanTB – Tuberculosis Medicines Quantification Tool (<http://siapsprogram.org/quantb/>)
- e-TB Manager (www.etbmanager.org).

Example of quantification of other main commodities for TB

Item	Reference unit	Quantity per unit	Notes
Tuberculin skin testing			
Purified protein derivative, 5 TU/0.1 ml, vial 1 ml	Person to test	1	0.1 ml per test
Interferon-gamma release assay			
Sputum collection			
Sputum container	Presumptive TB patient	2	2 containers per 1 sputum investigation
Sputum container	Ongoing TB patient	3	1 container each per 3 sputum examinations
Forms and registers (if not already using electronic case-based reporting for TB through national TB/health surveillance systems)			
Presumptive TB register	Health facility/year	1	
TB laboratory request form	Person with presumptive TB	1	
TB laboratory register for smear microscopy and Xpert® MTB/RIF	Laboratory/year	1	
Unit register of drug-susceptible people with TB	Health facility/year	1	
Unit register of drug-resistant people with TB	Health facility/year	1	
TB treatment card	New TB patient	1	
Quarterly report on TB case registration	Health facility/year	12	3 copies per 4 quarters
Quarterly report on TB treatment outcomes	Health facility/year	12	3 copies per 4 quarters
TB identity card	New TB patient	1	Needed even if using an electronic register
TB referral/transfer form	TB patient to refer/transfer	1	Needed even if using an electronic register

Pre-determined TB commodities for 10 000 people

Estimated burden	Note
10 000 population	Population to be covered
10 new people with TB	Equivalent to 100 people with TB/100 000 people per year
50 close TB contacts	5 close contacts for each person with confirmed TB
100 people with presumptive TB	10 people investigated for each person with confirmed TB

Item	Unit	Quantity
Treatment of drug-susceptible TB (56–70 kg body weight)		
2(RHZE)	Tab 150–75–400–275 mg	2080
4(RH)	Tab 150–75 mg	4160
TB preventive treatment (56–70 kg body weight)		
4(RH)	Tab 150–75 mg	20 800
Tuberculin skin testing		
Tuberculin purified protein derivative, 5 TU/0.1 ml, vial 1 ml	Vial	5
Syringe 1 ml, disposable	Syringe	50
Sputum collection		
Sputum container, plastic, wide mouth, screw cap, volume of 80 ml	Container	250
Microscopy		
Microscope slides	Slide	250
Filter papers	Paper	25
Pencils	Pencil	3
Waterproof marker pens	Pen	2
Plastic bags W 200 mm x L 300 mm	Bag	125
Wooden applicator sticks	Stick	500
Nitrile gloves (pairs of 25 small, 50 medium, 25 large)	Gloves	100
Lens cleaning tissue	Tissue	25
Immersion oil bottle 100 ml	Bottle	1
Denatured alcohol 96%	Litre	1
Carton of 50 tabs of stable chlorine disinfectant	Carton	2
Carton of 150 paper towels	Carton	8
LED microscopy		
Auramine stain solution reagents	Kit	1
Auramine stain decolourization solution	Litre	2
Auramine stain counterstaining solution	Litre	2
Ziehl Neelsen light microscopy		
Ziehl Neelsen stain solution (Strong Carbol Fuchsin 1% solution)	Litre	1.5
Ziehl Neelsen decolourization solution (3.0% HCl/alcohol)	Litre	1.5
Ziehl Neelsen counterstaining solution, (Methylene blue 0.1%)	Litre	1.5
Xpert® MTB/RIF molecular testing		
Xpert® MTB/RIF kit of 50 tests	Kit	4
Xpert® MTB/RIF Calibration kit for GXIV-4	Kit	1

LF-LAM		
Determine TB LAM Ag test	Kit (100)	1
Xpert MTB/RIF		
Xpert MTB/RIF cartridges	Kit (50)	1
Waste management		
Formalin solution	Litre	0.25
Phenol	Kg	0.25
Isopropanol	Litre	1
Safety box for liquids (2 litres)	Pack of 30	1
Waste container for solid (10 litres)	Pack of 6	1
Waste container for liquids (4 litres)	Container	1
TB infection control		
Particulate respirators	Respirator	600
Surgical masks	Mask	300

Source: Adapted from: Global Drug Facility. Aprile 2021 Medicines Catalog. Geneva: Stop TB Partnership, 2021 (<http://www.stoptb.org/assets/documents/gdf/drugsupply/GDFMedicinesCatalog.pdf>) and Global Drug Facility. June 2021 diagnostics catalog. Geneva: Stop TB Partnership, 2021 (<http://www.stoptb.org/assets/documents/gdf/drugsupply/GDFDiagnosticsCatalog.pdf>).

The availability of a standardized fully-oral treatment regimen for MDR-TB opens the possibility to easily consider it in the pre-determined list of TB commodities. The requirement of MDR-TB drugs can be calculated by multiplying the quantities needed for one treatment (shown in the table below) by the number of treatments estimated for the population to be covered.

Item	Unit	Quantity
Treatment of one person with MDR-TB (adult, 56–70 kg body weight)^a		
Bdq	Tab 100 mg	156
Lfx	Tab 500 mg	616
Cfz	Tab 50 mg	616
Z	Tab 400 mg	1232
E	Tab 400 mg	924
Hh	Tab 300 mg	336
Eto	Tab 250 mg	504

^a 6 Bdq_(6m)-Lfx-Cfz-Z-E-Hh-Eto / 5 Lfx-Cfz-Z-E.

Example of TB emergency preparedness plan

(i) Situation analysis

- Country information
- Risks being planned for triggers, and areas and number of people likely to be affected
- Immediate needs that populations are likely to have, factors exacerbating vulnerabilities, coping mechanisms
- Existing in-country response capacities, gaps and constraints.

(ii) Objectives and strategic interventions

- Objectives to be achieved
- Strategic interventions for each objective
- Principles and criteria behind each strategic intervention, and how it complements the national response strategy.

(iii) Activities

- Activities under each strategic intervention, achievement indicators and targets
- How to address cross-cutting (such as sex, age) and context-specific issues (such as laws and regulations).

(iv) Implementation arrangements

- Coordination with the humanitarian coordination structure and other stakeholders
- Operational roles, responsibilities and accountabilities
- Operational support arrangements:
 - Assessments of needs
 - Management of information
 - Monitoring response
 - Common service areas (such as transport, logistics, telecommunication, information technology)
 - Safety and security
 - Communication and advocacy.

(v) Preparedness gaps and actions

- Gaps in preparedness identified and actions agreed with other stakeholders to strengthen preparedness.

(vi) Funding requirements

- Budget required to strengthen preparedness.

Annex 3: Main causes and possible solutions for poor programme performance

Main causes for poor programme performance	Some possible solutions
Insufficient detection of TB	
Less people with TB detected	<ul style="list-style-type: none"> • Intensify TB contact tracing • Improve access to and quality of laboratory services (including transport of samples and access to radiology) • Ensure correspondence between laboratory and treatment registers of people with TB • Engage other health providers (such as informal and traditional care providers) • Improve diagnosis of TB among children
TB incidence overestimated	<ul style="list-style-type: none"> • Reassess TB risk
High case fatality rate	
Late diagnosis	<ul style="list-style-type: none"> • Investigate cultural barriers to accessing health services • Promote referral of people with respiratory symptoms by community health workers • Intensify TB contact tracing • Improve communication with laboratory services • Promote community awareness on TB symptoms
Comorbidities	<ul style="list-style-type: none"> • Strengthen TB/HIV collaborative activities • Ensure early detection and treatment of severe malnutrition • Strengthen staff knowledge and skills
High failure of TB treatment	
Poor adherence to treatment	<ul style="list-style-type: none"> • Hold interviews with people with TB and their families • Ensure people-centred care • Engage communities and civil society organizations • Provide support to people with TB and families • Strengthen tracing of people not reporting for TB treatment
Drug resistance	<ul style="list-style-type: none"> • Ensure access to rapid drug susceptibility testing and TB drugs • Ensure prompt referral to adequate drug-resistant TB services
Wrong treatment prescription	<ul style="list-style-type: none"> • Improve staff knowledge and skills • Strengthen supervision of health facilities
Poor drug quality/trading in drugs	<ul style="list-style-type: none"> • Assess drugs manufacturers, distribution and storage • Consider international procurement platforms • Investigate local markets

High loss to TB treatment follow up

Barriers to access TB services	<ul style="list-style-type: none">• Identify the barriers and provide people-centred care• Provide support to people with TB and families
Poor quality of TB services	<ul style="list-style-type: none">• Ensure all necessary resources are available• Improve staff knowledge, skills, cultural competence and motivation• Engage communities and civil society organizations• Strengthen supervision of health facilities
Poor referral of people with TB	<ul style="list-style-type: none">• Improve communication with people with TB and their families• Provide needed support (such as for drug supply, documentation, transport)• Improve coordination and communication with centres of referral• Use NGOs for mediation
People with TB moving in and out of the area	<ul style="list-style-type: none">• Improve health education• Engage communities and civil society organizations

High number of TB treatment outcomes not evaluated

Poor recording and reporting	<ul style="list-style-type: none">• Ensure completeness and quality of reporting• Strengthen supervision of health facilities
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Annex 4: Example of a checklist for TB supervision

Item to check	Indicative reference
About the supervision visit	
Name and location of the centre visited	
Date of the visit	
Name of the supervisor	
Review of the outpatient register	
1a) Number of people with presumptive TB in the last quarter	$(1a/1b) \times 100 = 8\text{--}10\%$
1b) Number of outpatients seen in the last quarter	
Review of the laboratory register	
2a) Number of people with presumptive TB found positive	$2a = 1b$
2b) Number of people with presumptive TB investigated in the last quarter	$(2a/2b) \times 100 = 10\%$
2c) Number of slides processed for diagnosis in the last quarter or number of Xpert assays processed for diagnosis in the last quarter	$2c/2b = 2$ $2c/2b = 1$
2d) Is the laboratory register filled in correctly and satisfactory?	
Review of the TB treatment register	
3a) Number of new sputum smear-positive people with TB registered in the last quarter	$3a = 2b$
3b) Number of new people with TB registered in the last quarter by sex	male/female = 1:1
3c) Number of estimated new people with TB in a quarter ^a	$(3b/3c) \times 100 = 100\%$
3d) Number of new people with TB that were treated successfully	$3d/3b \times 100 = \geq 90\%$
3e) Number of new people with TB that died	$3e/3b \times 100 = 0\%$
3f) Are treatment regimens correctly prescribed and satisfactory?	
3f) Is the laboratory register filled in correctly and satisfactory?	
Review of TB treatment cards	
4a) Are the TB treatment cards filled in correctly and satisfactory?	
Review of supplies	
5a) Is the supply of drugs and other commodities adequate?	
Observe health workers	
6a) Are workers' behaviour and information given to people appropriate?	
6b) Is health education provided?	
6c) Are the contacts of people with TB traced and investigated?	
6d) Are people with TB who are lost to follow-up contacted on time and retrieved?	

Interview with four people with TB

7a) What disease do you suffer from and how did you get it?

7b) About TB: is it curable? How long is the treatment?

7c) Are you satisfied with the services provided?

Results

8a) Description of the problems identified

8b) Analysis of the causes and possible solutions

8c) Recommendations

^a The number of new people with TB in a quarter can be roughly calculated by applying the TB incidence rate in the country of origin (estimated by WHO) to the emergency-affected people and dividing it by four (to calculate for one quarter).

Annex 5: Overview and examples of TB communication

Examples of key TB communication objectives in emergencies, by audience, strategy and activities/tools

Objective	Target audience	Strategy	Activity/tool
Increase awareness of TB symptoms to enhance early TB detection, initiation and/or continuation of treatment	Community health workers	Educational communication	Organize training workshops and distribution of flip charts indicating the most important TB symptoms Convene monthly meetings for coordination
	Community	Educational communication	Distribute posters indicating the most important TB symptoms Convene periodic meetings with community leaders
Inform about the risk of TB to combat stigma and isolation of affected populations	General population	Social mobilization	Convey press-releases Produce TB spots, radio interviews Establish a hotline for public enquiries

Communication with media

The central coordination structure of a humanitarian emergency usually benefits from having specific officers in-charge of communicating with the media. Either through a communication officer or directly, if requested and previously agreed by the central coordination structure, communicating with the media is an art that needs to be understood. Media may transmit messages that can generate humanitarian assistance and positive public behaviour. Media can also be the instrument of criticism and scrutiny. To strengthen partnerships with the media, it is critical to understand their structure, main characteristics, accessibility and interests before an event. The main recommendation is that interactions with media should take into account their features (structure, main characteristics, accessibility and interests), the sensitivities of the emergency-affected community, and the political situation in the host country.

National TB programmes should defer to communication leads during emergencies. In general, the following guidance is important:

- **Anticipate.** Be proactive – show interest and willingness to share information.
- **Minimize ambiguity.** Deliver concise, timely and clear information on facts rather than processes.
- **Treat media equally.** Do not discriminate because of size, penetration or ideology; local, national or international coverage; broadcast or print.

- **Adapt information to the media.** TB and emergency are seen differently from the perspective of local versus international media.
- **Find common interests.** Generally, journalists are not specialists; help them understand and become interested.
- **Pay attention to media demands.** Address their demands but do not tell them how they should do their work.
- **Monitor coverage.** Providing information is no guarantee that it will be published. Keep track of what is or not published or broadcast. Also keep track of other related publications/broadcasts which can inform your communication activities as required.
- **Know the decision makers.** In important cases, approach and establish alliances with news editors and directors. They decide the what, how and when of the news.
- **Identify their interests.** Understand the business and ideology of each medium.

Communication with the emergency-affected population and general public

Education on the nature of TB disease, how it is diagnosed, treated and prevented may turn emergency-affected people and the general public into active participants and key partners in TB prevention, treatment and care. Language and cultural background and literacy level barriers should be encompassed. Some examples of key educational messages should be embedded within general emergency planning, and TB programmes can develop in advance materials that are adapted to key populations.

Table 10: Some key TB messages for the affected population and general public during an emergency

Emergency-affected population	General public
If you have been on TB treatment, go to the closest facility	
Everybody can get TB; fortunately, it can be completely cured	TB does not respect borders: closing borders will not stop disease spread; access to prevention and care services will
Children can be infected by their parents and caregivers ill with TB, but the diagnosis of TB among children is difficult. It is important to screen all children who are in contact with a person with TB and ensure appropriate treatment to prevent and/or treat TB.	
TB bacteria spread through the air when people with untreated pulmonary TB cough, sneeze or spit.	
If you have more than two weeks of cough, fever, night sweats, unexplained weight loss, please see a health provider; these are common symptoms of TB.	

Emergency-affected population	General public
<p>If you wait too long to see a doctor, then your TB illness may become severe, be more difficult to cure and you may infect many people around you.</p>	
<p>Diagnosis and treatment of TB are free of charge.</p>	
<p>To be cured of TB, you must take all your medicines for all months as prescribed to you, even after you feel well.</p>	<p>All people sick with TB should be helped and supported; by doing this, everybody will be protected from TB.</p>
<p>If medicines are taken irregularly, TB disease will return in more severe forms requiring new medicines that are stronger and have to be taken for a very long duration.</p>	
<p>You will not be infectious after your first month of treatment; but before the laboratory confirms it, please cover your mouth and nose with tissues, a sleeve, or a flexed elbow or hand any time you cough or sneeze.</p>	

Annex 6: Indicators for TB monitoring and evaluation

Indicator	Calculation	Type	Assessment	Source	Remarks
Indicators of TB burden					
Incidence rate	New and relapse people with TB x 100 000 population	Impact	Annually	WHO estimate	Based on national population-based prevalence surveys where available
Mortality rate ^a	Deaths from TB/100 000 population	Impact	Annually	WHO estimate	Based on available national vital registration, if available
Indicators of service performance					
TB notification rate ^b	New and relapse people with TB notified/average population x 100 000 population	Impact/ outcome	Monthly, quarterly, annually	District register	Disaggregated by sex, age group (0–4, 5–14, 15–24, 25–34, 35–44, 45–54, 55–64, 65+) and HIV status
Case detection ratio	New and relapse people with TB registered x 100/new people with TB estimated	Outcome	Quarterly, annually	Quarterly reports of TB case finding and WHO estimated incidence	
Percentage of treatment enrolment	New and relapse people with pulmonary TB (bacteriologically confirmed) registered for treatment x 100/new and relapse people with pulmonary TB (bacteriologically confirmed)	Output	Quarterly, annually	District TB laboratory register and TB treatment register	

Indicator	Calculation	Type	Assessment	Source	Remarks
Sputum positivity rate	New and relapse people with TB (bacteriologically confirmed) x 100/total new people with respiratory symptoms investigated	Output	Quarterly, annually	TB laboratory register	
Bacteriological confirmation rate	New and relapse people with pulmonary TB (bacteriologically confirmed) x 100/total new and relapse pulmonary TB cases registered	Output	Quarterly, annually	TB treatment register	
Percentage of initial lost to follow-up cases	New and relapse people with pulmonary TB registered for treatment x 100/total new pulmonary TB cases (bacteriologically confirmed)	Output	Quarterly, annually	TB laboratory register and TB treatment register	
Eligible TB contacts who started LTBI treatment	People who started LTBI treatment because eligible	Output	Quarterly, annually	Register of TB contacts	
Percentage of new and relapse people with TB not evaluated for treatment outcome	New and relapse people with TB not evaluated for treatment outcome x 100/new and relapse people with TB registered for treatment	Outcome	Quarterly, annually	Quarterly reports of treatment outcome	
Treatment success rate	New and relapse people with TB successfully treated x 100/total new and relapse TB cases registered for treatment	Outcome	Monthly, quarterly, annually	National Tuberculosis Programme (NTP) records	

Indicator	Calculation	Type	Assessment	Source	Remarks
Percentage of people with TB lost to follow-up	New and relapse people with TB lost to follow-up x 100/new and relapse people with TB registered for treatment	Outcome	Quarterly, annually	NTP records	
TB case fatality rate ^c	Number of TB deaths/total number of people with TB notified for treatment x 100	Outcome	Monthly, quarterly, annually	Facility register	Disaggregated by sex, age group (0–4, 5–14, 15+), HIV status and TB drug resistance
People with TB in need receiving social support	People with TB receiving social support	Output	Quarterly, annually	NTP records	
MDR/RR-TB case detection rate	New people with MDR/RR-TB notified x 100/new people with MDR/RR-TB estimated	Outcome	Annually	NTP records	
MDR treatment success rate	People with MDR-TB successfully treated x 100/people with MDR-TB registered for treatment	Outcome	Quarterly, annually	District TB treatment register	
Percentage of people living with HIV screened for active TB	People living with HIV screened for TB x 100/total people living with HIV	Output	Quarterly, annually	HIV services records	
Percentage of people living with HIV newly enrolled in HIV care who started on TB preventive therapy	People living with HIV newly enrolled in HIV care and started on treatment for LTBI x 100/people living with HIV newly enrolled in HIV care	Output	Quarterly, annually	HIV records	

Indicator	Calculation	Type	Assessment	Source	Remarks
Percentage of registered new/relapse people with TB with documented HIV status	$\frac{\text{New and relapse people with TB registered who had an HIV test result recorded in the TB register} \times 100}{\text{new and relapse people with TB registered in the TB register}}$	Output	Quarterly, annually	NTP records	
Percentage of registered new/relapse people with TB documented as HIV-positive	$\frac{\text{New and relapse people with TB documented HIV-positive} \times 100}{\text{total new and relapse people with TB having documented HIV status, either positive or negative}}$	Output	Quarterly, annually	NTP records	
Percentage of HIV-positive new/relapse people with TB placed on ART during TB treatment	$\frac{\text{HIV-positive new and relapse people with TB started on TB treatment who are already on or started on ART during TB treatment} \times 100}{\text{HIV-positive new/relapse people with TB registered}}$	Output	Quarterly, annually	NTP records	
Case fatality rate among HIV-positive new/relapse people with TB	$\frac{\text{HIV-positive new and relapse people with TB died during TB treatment} \times 100}{\text{total HIV-positive new and relapse people with TB registered for treatment}}$	Outcome	Quarterly, annually	NTP records	
Percentage of HIV-positive new/relapse people with TB who received co-trimoxazole preventive therapy	$\frac{\text{HIV-positive new and relapse people with TB registered who started or continued on co-trimoxazole preventive therapy during TB treatment} \times 100}{\text{HIV-positive new and relapse people with TB registered}}$	Output	Quarterly, annually	NTP records	

Indicator	Calculation	Type	Assessment	Source	Remarks
Percentage of new/relapse TB cases among children <5 years	New and relapse people with TB by age group and sex x 100/total new and relapse people with TB	Outcome	Quarterly, annually	NTP records	
Children <5 years household TB contacts and eligible who started LTBI treatment	New and relapse people with TB by age group and sex x 100/total new and relapse people with TB	Outcome	Quarterly, annually	NTP records	
Indicators of service coverage					
Coverage of TB rapid diagnosis	Number of new and relapse people with TB diagnosed by WHO-recommended rapid test/total number of new and relapse people with TB notified x 100	Process	Monthly, quarterly, annually	TB laboratory register	
Coverage of drug susceptibility testing for fluoroquinolones and second-line injectable agents	Number of people with TB notified with rifampicin resistance with results of drug susceptibility testing for fluoroquinolones and second-line injectable agents/total number of people with TB notified with rifampicin resistance x 100	Process	Monthly, quarterly, annually	TB laboratory register	
Coverage of HIV testing	Number of new and relapse people with TB notified with documented HIV status/total number of new and relapse people with TB notified x 100	Process	Monthly, quarterly, annually	Facility register	

Indicator	Calculation	Type	Assessment	Source	Remarks
Coverage of TB contact investigation	Number of contacts of people with TB who were evaluated for TB/total number of contacts of people with TB identified x 100	Process	Monthly, quarterly, annually	Facility register	
Coverage of LTBI treatment	Number of people living with HIV and children <5 years household contacts of TB cases who started LTBI treatment/total number of people living with HIV and children <5 years household contacts of people with TB people with TB x 100	Process	Monthly, quarterly, annually	Facility register	Analysed separately for each of the two groups

^a Death from any reason that occurred after diagnosis of TB.

^b Proxy of TB incidence; TB notification rate could be compared with the national TB programme country figures or recalculated for 1000 population and compared with other disease rates under the SPHERE system.

^c Death from any reason that occurred during TB treatment.

Annex 7: Uses of digital technologies in TB care and prevention

The decision to apply digital technology is linked to availability of computers, other tools and technical support/backstopping, local access to mobile broadband Internet and smartphones having video capacity.

Digital technology	Intervention
Electronic case-based recording	Analysis of risk factors Monitoring and evaluation
Electronic database of health care facilities	3.3 Planning for TB interventions
Online platform for the management of drugs and other commodities	3.4 Supply and logistics
Online platform for cross-border communication	3.5 Monitoring and evaluation
Distance learning for the health workforce	Human resources; community-based and other health providers
Diagnostic, clinical and treatment literacy aids	Human resources; community-based and other health providers
Social media channels	Engagement of affected people and communities, civil society organizations, other health providers Communication
Online platform for communication between laboratory and health facility/clinician	Diagnosis
Transport of biological specimens by drones	Diagnosis and screening
Digital radiology	Diagnosis and screening
Telemedicine	Diagnosis and treatment
Use of mobile phone to trace TB contacts	Case finding
Use of mobile phone to communicate with people with TB: <ul style="list-style-type: none"> – short messaging service (SMS) – video observed treatment (VOT) and psycho-social support 	Treatment of TB
Event monitoring device for medication support	Treatment of TB
Electronic surveillance of adverse events (aDSM)	Treatment of drug-resistant TB
Electronic transfers (such as cash, vouchers)	Support to people with TB and their families

Sources:

Digital health for the End TB Strategy: an agenda for action. Geneva: World Health Organization; 2015 (https://www.who.int/tb/areas-of-work/digital-health/Digital_health_EndTBstrategy.pdf, accessed 26 August 2021).

Handbook for the use of digital technologies to support tuberculosis medication adherence. Geneva: World Health Organization; 2017 (<http://apps.who.int/iris/bitstream/10665/259832/1/9789241513456-eng.pdf>, accessed 26 August 2021).

Annex 8: TB case definitions

Case definitions by TB diagnosis

Every person is diagnosed with TB according to the affected anatomical site, drug resistance status and history of previous treatment.

Condition	Definition
Anatomic site of the disease	
Pulmonary ^a	Lesions in lung parenchyma or tracheobronchial tree (including miliary TB)
Extra-pulmonary	Lesions in organs other than the lungs, such as pleura, lymph nodes (including intra-thoracic mediastinal and/or hilar nodes), abdomen, genitourinary tract, skin, joints and bones, meninges, any other
Drug resistance status	
Drug susceptible	TB caused by <i>M. tuberculosis</i> strains not resistant to TB drugs
Monoresistant	TB caused by <i>M. tuberculosis</i> strains resistant to one first-line TB drug only (other than isoniazid and/or rifampicin)
Polydrug resistant	TB caused by <i>M. tuberculosis</i> strains resistant to more than one first-line TB drug (other than isoniazid and/or rifampicin)
Rifampicin-resistant (RR)	TB caused by <i>M. tuberculosis</i> strains resistant to rifampicin. These strains may be susceptible or resistant to isoniazid (i.e. MDR-TB), or resistant to other first-line or second-line TB medicines
Multidrug resistant (MDR)	TB caused by <i>M. tuberculosis</i> strains that are resistant to at least both rifampicin and isoniazid
Pre-extensively drug resistant (pre-XDR) ^b	TB caused by <i>M. tuberculosis</i> strains that fulfil the definition of MDR/RR-TB and are also resistant to any fluoroquinolone ^c
Extensively drug resistant (XDR) ^b	TB caused by <i>M. tuberculosis</i> strains that fulfil the definition of MDR/RR-TB and are also resistant to any fluoroquinolone and at least one additional Group A drug ^c (see also in Abbreviations and acronyms)
History of previous TB treatment	
Person with new TB	Person who was never treated for TB or has taken ≤1 month treatment in the past

Person with previously-treated TB	<p>Person who has received ≥ 1 month of TB drugs in the past</p> <p>These people are further classified by their past treatment outcome:</p> <ul style="list-style-type: none"> • Relapse:^d person previously treated for TB, declared cured or treatment completed at the end of the treatment, and is now diagnosed with TB again (either a true relapse or a new episode of TB caused by reinfection) • Treatment after failure: person previously treated for TB and treatment failed • Treatment after loss to follow-up: person previously treated for TB who was declared lost to follow-up at the end of his/her most recent course of treatment • Other previously treated: person previously treated for TB but with unknown or undocumented treatment outcome
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Person with unknown TB history	Person with TB who does not fit into any of the categories listed above
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^a A person with both pulmonary and extra-pulmonary TB is classified as having pulmonary TB.

^b Meeting report of the WHO expert consultation on the definition of extensively drug-resistant tuberculosis. 27-29 October 2020. Geneva: World Health Organization, 2020 (<https://apps.who.int/iris/rest/bitstreams/1327986/retrieve>).

^c Fluoroquinolones include levofloxacin and moxifloxacin as currently recommended by WHO for inclusion in longer regimens. Group A drugs include levofloxacin or moxifloxacin, bedaquiline and linezolid; therefore XDR-TB is MDR/RR-TB that is resistant to a fluoroquinolone and at least one of bedaquiline or linezolid (or both). Group A drugs may change in the future; therefore Group A terminology is appropriate here and it will apply to any Group A drugs in the future.

^d People with relapsed TB; it is difficult to know if true relapses or new episodes of TB are added to people with new TB to calculate TB incidence.

Other aspects considered to further categorize a patient diagnosed with TB include: bacteriologically confirmed or clinically diagnosed TB, presence of comorbidities, including HIV status (HIV-positive, HIV-negative, HIV unknown), diabetes, tobacco or alcohol use, and nutritional status, if known.

Case definitions by TB treatment outcome

People with TB are further classified by the outcome of their treatment; the new definitions introduced in 2021 and described below are applied to both drug-susceptible and drug-resistant TB.

Cured	A person with pulmonary TB bacteriologically confirmed at the beginning of treatment who completed treatment as recommended by the national policy, with evidence of bacteriological response ^a and no evidence of failure
Treatment completed	A person who completed TB treatment as recommended by the national policy, whose outcome does not meet the definition for cured or treatment failed
Treatment failed	A person whose TB treatment regimen needed to be terminated or permanently changed ^b to a new regimen or treatment strategy
Died	A person who died for any reason before starting TB treatment or during the course of TB treatment

Lost to follow up	A person who did not start TB treatment or whose treatment was interrupted for two consecutive months or more
Not evaluated	A person for whom no TB treatment outcome was assigned ^c
Treatment success	The sum of cured and treatment completed

^a "Bacteriological response" refers to bacteriological conversion with no reversion. "Bacteriological conversion" describes a situation in a person with bacteriologically confirmed TB where at least two consecutive cultures (for drug-resistant TB and drug-susceptible TB) or smears (for drug-susceptible TB only), taken on different occasions at least 7 days apart, are negative. "Bacteriological reversion" is where at least two consecutive cultures (for drug-resistant TB and drug-susceptible TB) or smears (for drug-susceptible TB only), taken on different occasions at least 7 days apart, are positive either after the bacteriological conversion or in people without bacteriological confirmation of TB.

^b Reasons for the change include: (i) no clinical response and/or no bacteriological response (see note before); (ii) adverse drug reactions; or (iii) evidence of additional drug resistance to medicines in the regimen.

^c This includes people "transferred out" to another treatment unit and those whose treatment outcome is unknown; however, it excludes those lost to follow-up.

Source: Meeting report of the WHO expert consultation on drug-resistant tuberculosis treatment outcome definitions, 17–19 November 2020. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/rest/bitstreams/1336957/retrieve>, accessed 26 August 2021).

Annex 9: Investigations recommended to follow up on TB treatment

Investigation	TB treatment/month of investigation	
	Drug susceptible/resistant to H	Any other drug-resistant TB
Clinical evaluation (with nutritional evaluation)	Monthly	Monthly Month 3, 6, 12 after end
Sputum smear microscopy	Month 2, 5, end	Monthly Month 3, 6, 12 after end
Bacteriological culture	When no response to treatment Month 6	Monthly Month 3, 6, 12 after end
Drug susceptibility test	When culture positive	When culture positive
Chest radiography		Month 6, 12, end
Serum glucose	Month 1	Month 1
HIV counselling and testing	Month 1 Repeat if necessary	Month 1 Repeat if necessary
Mental health assessment	Month 1	
Liver function		Month 1 Monthly (if Bdq)
Kidney function, electrolytes		Month 1
Thyroid function		Month 1, every three months (if Eto, Pto)
Haemoglobin, blood count		Month 1, every three months (if Lzd)
Vision function		Month 1, repeat if necessary (if E or Lzd)
Audiometry		Monthly (if on injectables)
Electrocardiogram		Month 1, 2, 4, 8, 12, end (if Bdq, Mfx, Cfz, Dlm)

Bdq = Bedaquiline; Cfz = Clofazimine; Dlm = Delamanid; E = Ethambutol; Eto = Ethionamide; Lzd = Linezolid; Mfx = Moxifloxacin; Pto = Prothionamide

Annex 10: Management of TB treatment interruption

Treatment interruption		Actions on return of the patient			
Time	Length (weeks)	Sputum investigation	Treatment	Patient registration	
				Previous	New
Any phase of treatment	<2	Not needed	Continue previous treatment from the point it was stopped	Continue under previous registration	
	2-7	Smear negative	Restart previous treatment		
		Smear positive	Start new treatment based on drug susceptibility test results		
≥8		Smear negative	Restart previous treatment	Lost to follow up	Treatment after loss to follow up
		Smear positive	Start new treatment based on drug susceptibility test results		

Source: Adapted from CDC. Chapter 6 – Treatment of Tuberculosis Disease. In Core Curriculum on Tuberculosis: What the Clinician Should Know (<https://www.cdc.gov/tb/education/corecurr/pdf/chapter6.pdf>) and Médecins Sans Frontières and Partners in Health. Tuberculosis: Practical guide for clinicians, nurses, laboratory technicians and medical auxiliaries. 2017 Edition. ISBN 978-2-37585-018-3 (<https://medicalguidelines.msf.org/viewport/TUB/latest/tuberculosis-20321086.html>).

Annex 11: Examples of TB tasks for community health workers

Main TB task	Activity
Early identification of TB patient	<ul style="list-style-type: none"> • Seek out persons in the community who have signs or symptoms of TB, and refer them to the health centre • Coordinate with health staff to identify all contacts of persons with confirmed active TB • Trace and refer all close/household contacts of persons with active TB to health staff, with special attention to people living with HIV, childhood contacts and contacts of persons with MDR/RR-TB • Ensure that all referred contacts are checked by a physician and are aware of the results of that consultation and any next steps, (including provision of preventive TB treatment or treatment for disease)
Treatment support	<ul style="list-style-type: none"> • Supervise and support the patient in taking TB drugs • Provide reminders on main signs/symptoms of adverse drug effects and frequency and schedule of monitoring visits to people receiving treatment • Motivate the patient about the importance of continuing treatment for themselves and their contacts, and of the aim of cure and help seek out other psycho-social support, as needed/available • Help enrol people with TB in, and/or distribute any nutritional support or other social support to people with TB and their families, and help ensure that there is no loss or misuse of resources
Patient and family support	<ul style="list-style-type: none"> • Identify psychological barriers or challenges that may have an impact on the ability to initiate and continue treatment to cure • Communicate and coordinate with health staff and others on the provision of all necessary social and psychological support • Communicate effectively with people with TB and provide supportive, encouraging messages to them throughout their treatment
Monitoring progress of treatment	<ul style="list-style-type: none"> • Remind people with TB about follow-up visits needed to health facility • Accompany or help the person with TB to attend follow-up health facility and/or laboratory visits, and liaise with any relevant other partners who are able to assist

Main TB task	Activity
Social mobilization	<ul style="list-style-type: none"> • Provide education on TB to the community, working with community leaders, volunteers and/or for people with TB/persons affected by TB, or community-based organizations • Provide special attention to persons at high risk of TB • Take advantage of other campaigns and activities occurring in the neighbourhoods or households to help promote attention to TB and the catastrophic social and economic costs that TB can cause, especially if not addressed early • Identify and help dispel misperceptions about TB, and stigma or discrimination occurring for those affected by TB
Tracing people with TB lost to follow-up	<ul style="list-style-type: none"> • Inform the health staff as soon as the patient misses a day of treatment • Help to locate the patient, determine the reason for missed treatment, and enable them to re-initiate treatment following directions provided by the health staff • If a patient has had to relocate, seek information on his new location and inform health services to enable follow-up
Screening for TB infection	<ul style="list-style-type: none"> • Coordinate with the health staff to refer all persons requiring TB screening as per latest guidance • Ensure that all people referred were seen at the health service • Participate in any community-based screening organized by health facility staff or partners
Administration/ monitoring of TPT	<ul style="list-style-type: none"> • Ensure that TPT is taken regularly • Provide health information and motivational support to enable completion of treatment • Help in providing any available support to those taking preventive treatment
Management of TB drugs	<ul style="list-style-type: none"> • If it is a local practice, collect the needed quantity of TB drugs from the health facility physician or nurse • Store medications appropriately if providing community-based care
TB recording and reporting	<ul style="list-style-type: none"> • Record and report all patient visits with accuracy on time, and submit as per guidelines in TB patient cards that are in use, and maintain the patient card

Annex 12: Collection, storage and transport of biological specimens for TB

The accuracy and reliability of any laboratory test depends firstly on the quality of the specimen collected. Before processing, all specimens should be checked for quality and if accepted, recorded in the laboratory register. Transport of specimens if required, should be properly organized and results should be accurately recorded.

Collection

Collecting sputum specimens represents a significant hazard since coughing produces potentially infectious aerosols. Therefore, take specific measures to minimize exposure to health workers or other people, such as:

- never organizing sputum specimen collection in laboratories, toilets or washrooms, waiting areas, reception rooms, or any other enclosed space where people congregate.
- collecting sputum outdoors wherever possible, as infectious droplets will get rapidly diluted and the sun's ultraviolet light can rapidly inactivate the TB bacilli.
- using ventilated sputum collection rooms (or booths) as a safe alternative to outdoor collection if proper modes of ventilation are ensured during the expectoration and appropriate decontamination and disinfection procedures are routinely conducted.

Promote the production of quality sputum specimens by:

- training health workers to provide proper instructions to people with TB.
- using posters and leaflets to display instructions on sputum production.
- supervising every patient's first specimen collection to help the patient understand the procedure (the health worker should stand behind the patient and the produced aerosol).

Collect sputum specimens:

- in appropriate sterile, disposable containers. Screw caps must fit tightly to avoid leakage. 50 ml polypropylene centrifuge tubes are preferred.
- after discussing the following collection procedures with the patient:
 - Emphasize the nature of the desired specimen.
 - Inform the patient that nasal secretions and saliva are not sputum.
 - Explain that the desired specimen is to be obtained from the lower airways and lungs and is produced by a deep cough.
 - The specimen is thick, mucoid, white-yellow and sometimes blood-tinged.
 - Instruct the patient not to touch the inside of the collection container or lid with their fingers or other objects.
- after identifying the patient properly. Prepare two study labels (three for patient-collected samples) with the screening and/or patient identification number, date and time of collection, sputum

specimen number (#1 or #2, or N/A if Visit 2 or Visit 3) and visit number for which the specimen is being collected. Place one study label on the tube/container in which the sputum will be collected.

- by asking the patient to stand, if able.
- by giving the patient a glass of water (bottled or boiled) to rinse the mouth free of food particles. Instruct the patient to rinse twice.
- by asking the patient to produce sputum, after rinsing mouth as described above. Use a demonstrator glass and tube/container to show the patient the procedure if this will help.
 - Take a deep breath.
 - Hold breath for a moment.
 - Cough deeply and vigorously at the same time as the breath is coming out.
 - Release sputum into the labelled tube/container by holding it to the lower lip and gently releasing the specimen.
 - Close the tube/container tightly with the screw-on lid without touching the inside of the lid. Avoid spills or soiling the outside of the container.
- by instructing the patient to take several deep breaths and hold the breath momentarily, if the patient cannot cough spontaneously. Repeating this several times may induce coughing.
- by inducing sputum production through aerosol inhalation, if a patient is unable to spontaneously expectorate a sputum sample.

After the specimen is collected complete the Laboratory Specimen Requisition Form. For LF-LAM, collect midstream urine in a fresh standard urine collection container.

Storage

Sputum specimens should be delivered to the laboratory and processed on the same day they are collected; if this is not possible, they should be properly stored:

- Check that the tube is tightly capped, properly labelled, and that the screening and/or subject identification on the tube matches the screening and/or subject identification on the requisition form.
- Refrigerate the sputum specimen at 2–8°C until ready for transport to the laboratory (refrigeration reduces the growth of contaminant bacteria in the specimen); if a refrigerator is not available, specimens can be held in coolers with ice packs.

Fresh urine specimens can be processed within eight hours if kept at room temperature. Otherwise, depending on the days of delay:

- If the test is to be run within three days, refrigerate the urine specimen at 2–8°C.
- If the test is delayed more than three days, freeze the urine specimen (-20°C or colder).

Transport and packaging

- Sputum specimens should be delivered to the laboratory on the same day it is collected, if possible.
 - Morning specimens should reach the laboratory in the morning or early afternoon so that they can be processed on the same day.
 - Late afternoon specimens should either arrive at the laboratory on the same day, for processing the next day, or early during the following morning, for processing that same day.

- End-of-day specimens that are collected when transport is not available, may be stored in the site's refrigerator overnight, but must be delivered to the laboratory early the following morning.
- If specimens are to be transported at longer distances, they must be delivered as soon as possible, but no later than 48 hours from the time of collection. These specimens must be kept in the refrigerator and transported on ice. Arrange a pick-up time which will allow the specimens to be delivered on a working week day, unless the laboratory is open also on other days; notify the laboratory beforehand.
- Before transporting the specimens, each transport box should be checked to ensure that:
 - the total number of sputum tubes/containers in the box corresponds to the number of laboratory specimen requisition forms;
 - the screening identification number or subject identification number on the container/tube corresponds to that on the laboratory specimen requisition forms; and
 - the laboratory specimen requisition form contains all required information for each patient.
- When this verification is complete, put the specimens in the transport container with ice packs. Triple packaging is required to safely transport infectious material:
 - Container wrapped in absorbent material (cotton or paper towels)
 - Secondary packaging (such as Ziploc® bag)
 - Shock-resistant outer packaging.
- Additional requirements for local or international transport.
 - Local transport: can be done by various means, such as courier, health facility vehicles, other means of transport such as motorcycles, or hand delivery. All persons transporting specimens should be provided with training on biosafety and have spill kits accessible in case of accidents. All transporters should follow local regulations where applicable.
 - International transport: requires proper packaging according to carrier specifications for shipping infectious materials and must comply with international regulations.

Annex 13: TB treatment options by drug resistance

WHO recommends a number of standardized TB treatment regimens to be selected based on drug resistance. They are subject to periodic review based on emerging drugs and clinical practices. Their composition must always be validated and possibly readjusted for each patient by a physician with TB expertise.

Table 11: WHO recommended standard TB treatment regimen by drug resistance

Type of TB according to drug resistance	Recommended treatment regimen
Drug-susceptible	2HRZE / 4HR
Resistant to H	6(H)REZ-Lfx ^a
Rifampicin-resistant (RR)	Shorter, all-oral regimen: ^b
Multidrug resistant (MDR)	4–6 Bdq _(6m) -Lfx/Mfx-Cfz-Z-E-Hh-Eto / 5 Lfx/Mfx-Cfz-Z-E (only eligible people)
	Longer regimen: ^c
	18 Bdq _(6m) -Lfx/Mfx- Lzd-Cfz/Cs (only eligible people)
	Individualized treatment regimen
Extensively drug-resistant (XDR)	Individualized treatment regimen
	6–9 Bdq-Pa-Lzd ^c (only under operational research)

^a When REZ fixed-dose combination formulation is used, H could be added; when Lfx cannot be used, the rest of the treatment can be prescribed.

^b The shorter regimen is of 4-month duration with the possibility of extending to 6 months if the patient remains sputum smear-positive or culture-positive at the end of the fourth month. Bdq is used for 6 months.

^c In many people with TB, the standard regimen should be modified to individualized regimen that differs in composition and duration to enhance effectiveness or safety. Bdq = Bedaquiline, Cfz = Clofazimine, Cs = Cycloserine, E = Ethambutol, H = Isoniazid, Hh = high-dose isoniazid, Lzd = Linezolid, Mfx = Moxifloxacin; Pa = Pretomanid PAS = Para-aminosalicylic acid, R = Rifampicin, S = Streptomycin, Z = Pyrazinamide.

A rapid communication released by WHO announced updates to the treatment regimen for people with drug-susceptible TB.³⁶ A review of evidence has shown similar performance both in terms of efficacy and safety of a new 4-month treatment regimen (composed of rifapentine, isoniazid, pyrazinamide and moxifloxacin), compared to the current standard regimen. The new regimen, which is shorter, effective and all-oral, should be preferred for many patients and also in NTPs, allowing faster cure and easing of burden on both people with TB and the health care system. Shortened treatment has the potential to improve adherence and reduce patient and health system costs. Detailed guidelines

36 Treatment of drug-susceptible tuberculosis: rapid communication. June 2021. Geneva: World Health Organization, 2021 (<https://apps.who.int/iris/rest/bitstreams/1350979/retrieve>).

for this new regimen will be available later in 2021. The feasibility of the 4-month treatment regimen for drug-susceptible TB will have to be studied in humanitarian settings.

The shorter regimen for MDR/RR-TB that comprises only oral TB drugs, must contain Bdq and is recommended for all people who have: (i) laboratory confirmed MDR/RR-TB; (ii) never been exposed to second-line TB drugs of this regimen (or for less than one month); and (iii) been excluded to have resistance to fluoroquinolone.

The longer regimen for MDR/RR-TB is prescribed to all people with MDR/RR-TB who are not eligible for the shorter regimen. Its composition should be validated for each patient and adapted to ensure that at least four effective drugs are used during the first 6-month intensive treatment and three effective drugs are used in the continuation treatment of 12 months or more; Group C drugs can be added to replace ineffective Group A and Group B drugs.

The treatment regimen for XDR-TB should preferably be designed for each patient. It should consist of a standard regimen only under: operational research and specific conditions: ethical approval; patient-centred care and support; pre-defined eligibility criteria; patient informed consent; good clinical practice; aDSM; treatment monitoring; outcome evaluation; and comprehensive, standardized data collection.

Annex 14: Recommended people-centred care and support

Patient-centred TB care is tailored to people's values and needs, aims to cover all their health needs and is based on a partnership under which the most convenient ways to receive treatment are chosen by people with TB and their caregivers together.

Health education and counselling for disease and treatment adherence

A package of treatment adherence interventions (complementary and not mutually exclusive) to be selected based on the assessment of the individual patient's needs, the provider's resources and conditions for implementation:

- a. Tracers, i.e. communicating with people with TB (such as directly through home visits or indirectly through SMS or telephone calls)
- b. Material support (such as food, financial incentives or transport fees)
- c. Psychological support
- d. Staff education

Treatment administration options (in order of preference):

- a. Directly observed treatment (DOT) administered by trained lay providers or health care workers at community level
 - b. Video-observed treatment (VOT) if supporting technology is available and appropriately organized
 - c. DOT administered by health care workers at health facility level
 - d. DOT administered by family members
 - e. Unsupervised treatment
-

Annex 15: Adverse drug effects, suspected agents and requested level of care

Adverse effect	Suspected agent(s)	Level of care	
		Primary	Secondary/ tertiary
Minor (do not require interruption of treatment)			
Anorexia, nausea, abdominal pain	Z, R, H	X ^a	
Drowsiness	H	X	
Metallic taste	Eto/Pto , Clr, FQs	X	
Orange/red urine	R	X	
Joint pain (arthralgia)	Z	X*	
Burning, numbness or tingling sensation in the hands or feet (peripheral neuropathy)	H	X*	
Superficial fungal infection and thrush	FQs , other antibiotics	X	
Major (do require interruption of treatment)			
Anorexia, nausea, abdominal pain	Eto, Pto, PAS, Bdq H, E, Z, Amx/Clv, Cfz, Dlm		X
Joint pain (arthralgia)	Z, Bdq, FQs		X
Burning, numbness or tingling sensation in the hands or feet (peripheral neuropathy)	Cs, Lzd, H S, Km, Am, Cm, H, FQs, rarely Eto/Pto, E		X
Skin rash with or without itching (allergic reaction and anaphylaxis)	Any drug		X
Gastritis and abdominal pain	PAS, Eto, Pto, Cfz FQs, H, E, Z		X
Diarrhoea and/or flatulence	PAS , Eto/Pto		X
Dizziness, vertigo and nystagmus (vestibular toxicity)	S, Km, Am, Cm , Cs, FQs, H, Eto, Lzd		X
Deafness, tinnitus (vestibular toxicity)	S, Km, Am, Cm , Clr		X
Visual impairment (optic neuritis)	E , Eto/Pto, Lzd, Cfz, rifabutin, H, S		X
Haematological abnormalities	Lzd		X
Arrhythmias, unexplained fainting (QT prolongation)	Bdq, Dlm, FQs , Cfz		X
Jaundice (hepatitis)	Z, H, R, Eto/Pto , PAS		X

Adverse effect	Suspected agent(s)	Level of care	
		Primary	Secondary/ tertiary
Decreased urine output (renal toxicity)	S, Km, Am, Cm		X
Electrolyte disturbances (hypokalaemia and hypomagnesaemia)	Cm, Km, Am, S		X
Muscle pain or cramping, weakness (lactic acidosis)	Lzd		X
Dysglycaemia and hyperglycaemia	Gfx , Eto/Pto		X
Constipation, weight gain, puffy face, hoarseness (hypo-thyroidism)	Eto/Pto, PAS		X
Gynaecomastia	Eto/Pto		X
Alopecia	H, Eto/Pto		X
Headache	Cs, Bdq		X
Depression	Psychological and socioeconomic circumstances, chronic disease, Cs , FQs, H, Eto/Pto		X
Suicidal ideation	Cs , H, Eto/Pto		X
Psychotic symptoms	Cs, H , FQs		X
Seizures	Cs, H, FQs		X
Tendonitis and tendon rupture	FQs		X

^a If symptoms persist or worsen, consider this a major effect; agents more frequently responsible are indicated in **bold**.

Am = Amikacin, Amx/Clv = Amoxicillin/Clavulanate, Bdq = Bedaquiline, Cfz = Clofazimine, Clr = Clarithromycin, Cm = Capreomycin, Cs = Cycloserine, Dlm = Delamanid, E = Ethambutol, Eto = Ethionamide, FQs = fluoroquinolones, Gfx = Gatifloxacin, H = Isoniazid, Km = Kanamycin, Lzd = Linezolid, PAS = Para-aminosalicylic acid, Pto = Protionamide, R = Rifampicin, S = Streptomycin, Z = Pyrazinamide.

Annex 16: TB preventive treatment

Treatment for people with drug-susceptible TB infection

A number of recommended options can be chosen for the treatment of drug-susceptible TB infection depending on the epidemiological situation.

Treatment regimen	Dosage	Notes												
6H ^a	Adults: 5 mg/kg Children: 7–15 mg/kg Max 300 mg	<ul style="list-style-type: none"> • First choice in those living in high TB incidence areas • First choice for people living with HIV • Children/adults • Increase dose to 9H for those living in low TB incidence areas • Increase dose to 36H among people living with HIV with positive or unknown TST 												
3–4R	Adults: 10 mg/kg Children: 10–20 mg/kg Max 600 mg	<ul style="list-style-type: none"> • For those living in low TB incidence areas • Interferes with antiretroviral drugs 												
3HR	Adults: 5 mg/kg + 10 mg/kg Children: 7–15 mg/kg + 10–20 mg/kg Max 300 mg + 600 mg	<ul style="list-style-type: none"> • For those living in high TB incidence areas • Children/adolescents <15 years • Increase dose to 4R for those living in low incidence areas • Interferes with antiretroviral drugs 												
3H ₇ -Rpt ₇	<table border="0"> <tr> <td>H</td> <td>Rpt</td> </tr> <tr> <td>2–11 years: 25 mg/kg</td> <td>10–13 kg = 300 mg</td> </tr> <tr> <td>≥12 years: 15 mg/kg</td> <td>14–24 kg = 450 mg</td> </tr> <tr> <td>Max 900 mg</td> <td>25–31 kg = 600 mg</td> </tr> <tr> <td></td> <td>32–49 kg = 750 mg</td> </tr> <tr> <td></td> <td>≥50 kg = 900 mg</td> </tr> </table>	H	Rpt	2–11 years: 25 mg/kg	10–13 kg = 300 mg	≥12 years: 15 mg/kg	14–24 kg = 450 mg	Max 900 mg	25–31 kg = 600 mg		32–49 kg = 750 mg		≥50 kg = 900 mg	<ul style="list-style-type: none"> • For those living in high and low TB incidence areas • Children/adults • Interferes with antiretroviral drugs
H	Rpt													
2–11 years: 25 mg/kg	10–13 kg = 300 mg													
≥12 years: 15 mg/kg	14–24 kg = 450 mg													
Max 900 mg	25–31 kg = 600 mg													
	32–49 kg = 750 mg													
	≥50 kg = 900 mg													

^a Also called isoniazid preventive therapy (IPT); H = isoniazid; R = rifampicin; Rpt = rifapentine.

Treatment for people with drug-resistant TB infection

The use of difficult-to-manage long-duration TB drugs for treating latent drug-resistant TB infection should be carefully considered based on the intensity of exposure, certainty of source case, information on the drug resistance pattern of the source case and potential adverse events. Such treatment should be prescribed by a specialist who will have the following approach:

- Treat only household contacts who are at high risk, such as children, those receiving immunosuppressive therapy and people living with HIV.
- Always confirm latent drug-resistant TB infection before treatment.
- Monitor closely for adverse events and adherence to treatment.
- Monitor closely for the development of active TB disease for at least two years.
- Choose a treatment regimen based on reliable information on the drug resistance profile of the source case.
- Prescribe levofloxacin or moxifloxacin (unless the source case is resistant to them) for 6, 9 and 12 months based on clinical judgement.³⁷

³⁷ The duration of treatment is uncertain because evidence is still limited.



For further information, please contact:

Global Tuberculosis Programme

World Health Organization

20, Avenue Appia CH-1211 Geneva 27 Switzerland

Web site: www.who.int/tb

