

Tuberculosis control in complex emergencies



**World Health
Organization**

Regional Office for the Eastern Mediterranean

Tuberculosis control in complex emergencies



**World Health
Organization**

Regional Office for the Eastern Mediterranean

WHO Library Cataloguing in Publication Data

World Health Organization. Regional Office for the Eastern Mediterranean
Tuberculosis control in complex emergencies / World Health Organization. Regional Office for the Eastern Mediterranean
p. - (WHO Regional Publications, Eastern Mediterranean Series; 34)

ISBN: 978-92-9274-647-6

ISBN: 978-92-9274-648-3 (online)

ISSN : 1020-041X

I. Tuberculosis – prevention & control 2. Emergencies 3. National Health Programs 4. Communicable Disease Control I. Title II. Regional Office for the Eastern Mediterranean III. Series

(NLM Classification: WF 200)

This publication was originally published under ISBN: 978-92-9022-121-0, 978-92-9022-122-7

© World Health Organization 2015

All rights reserved.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

Publications of the World Health Organization can be obtained from Knowledge Sharing and Production, World Health Organization, Regional Office for the Eastern Mediterranean, PO Box 7608, Nasr City, Cairo 11371, Egypt (tel: +202 2670 2535, fax: +202 2670 2492; email: emrgoksp@who.int). Requests for permission to reproduce, in part or in whole, or to translate publications of WHO Regional Office for the Eastern Mediterranean – whether for sale or for noncommercial distribution – should be addressed to WHO Regional Office for the Eastern Mediterranean, at the above address: email: emrgoegp@who.int.

Design, layout and printing by WHO Regional Office for the Eastern Mediterranean, Cairo, Egypt

Cover photo credit: International Organization of Migration

Cover photo shows Syrian refugees in Jordan.

Contents

Foreword	5
Acknowledgements	6
1. Introduction	7
1.1 Background.....	7
1.2 Lessons learned	9
1.3 Programme management.....	10
2. Management tools and governance	12
2.1 Contingency plan	12
2.2 Preparedness plan	12
2.3 National strategic plan for TB control.....	13
2.4 Governance	13
3. Key interventions	14
3.1 Acute phase (first 3 months).....	14
3.2 Post-acute/recovery (after 3 months).....	14
3.3 Protracted crises/countries with protracted emergencies.....	15
4. TB control functions	17
4.1 Laboratory component	17
4.2 Management of MDR-TB cases in post-acute phase.....	21
4.3 Contact investigation.....	21
4.4 Addressing prevention.....	22
4.5 Infection control.....	23
4.6 Supply of anti-TB medicines during emergencies	23
4.7 Monitoring and evaluation tools	24
5. Guiding principles in TB case management	28
5.1 Treatment categories	28
5.2 Monitoring and evaluation: key elements	29
5.3 Outcome definitions.....	30
6. Funding	31
Annex 1. Definitions	32
Annex 2. Checklist to assess the possibilities for implementing a TB programme in a complex emergency	35
References	36
Further reading	36

Foreword

In our times, emergencies and disasters have forced millions of people to leave their homes and move within and across national borders. In regions such as the WHO Eastern Mediterranean Region, continued conflict and civil disturbance in several countries have had grave impact on public and social services. Evidence shows the serious public health consequences for populations affected by complex emergencies. When essential public services break down, the risk of disease intensifies and morbidity and mortality rates rise. However, complex emergencies also provide unique opportunities for public health professionals to develop and implement innovative disease prevention and control strategies.

Tuberculosis is an infectious disease which thrives in the conditions generated by complex emergencies. As the risk of disease transmission increases, pressure on the delivery of tuberculosis care services grows, and the health system must find ways to sustain case detection, avoid default of patients on treatment and minimize the risk of drug resistance. The WHO End TB Strategy, adopted by the World Health Assembly in 2014, is an innovative, ambitious yet health system-oriented approach to the global epidemic. Translating the vision of the strategy into operational effectiveness during complex emergencies, through guidance that can be used by health workers in field, is essential.

The delivery of disease prevention and care services during complex emergencies is a multisectoral responsibility, and prevention and control of tuberculosis is thus a challenging task for health managers and workers alike. The WHO Eastern Mediterranean Region has considerable experience in providing tuberculosis care during emergency conditions, and it is appropriate therefore that WHO has developed a guide for tuberculosis control in complex emergencies based on this experience. This publication is intended to make the work of health planners and health workers easier and more productive, providing information on management of tuberculosis programmes, case detection and treatment.

The guide provides a practical reference for tuberculosis control managers endeavouring to provide tuberculosis control and care services in complex emergencies. It is based on lessons learnt through implementation of tuberculosis control programmes in several countries of the Region. I hope the guide will be useful to health programme managers and planners, health workers and other stakeholders in public health care delivery in emergencies. Tuberculosis is preventable and curable. Conflict and population movement as a result of emergencies in areas where we work should not stop us from ensuring that tuberculosis cases are detected in a timely manner and people receive quality care.

Dr Ala Alwan

WHO Regional Director for the Eastern Mediterranean

Acknowledgements

This publication was developed by Mohamed A. Aziz, Novvera Ansari, Amal Bassili, Rudi Coninx, Salah-Eddine Ottmani (World Health Organization), Aleksander Galev, Marwan Naoum (International Organization for Migration) and Lasha Gogvadze (International Federation of Red Cross and Red Crescent Societies).

Other contributors to development and review of the publication were as follows.

WHO: Nada Al Ward, Samiha Baghdadi, Annemieke Brands, Erwin Cooreman, Ahmad El Ganainy, Soleil Labelle, Christian Gunnenberg, Wisam Mahdi, Jaouad Mahjour, Firdosi Mehta, Ezzeddine Mohsni, Aayid Munim, Martin Opoka, Ghulam Nabi Kazi, Karam Shah, Ireneaus Sindani, Dashir Suleiman, Martin van den Boom.

National tuberculosis programmes: Afghanistan: Khaled Seddiq; Egypt: Essam Elmoghazy, Alaa Mokhtar; Iraq: Dhafer Hashim; Somalia: Abukar Ali Hilowle; Sudan: Hiba Kamal Hamad-ElNeel; Pakistan: Ejaz Qadeer; Yemen: Amin Noaman Al Absi.

International Organization for Migration: Nenette Motus

United Nations High Commission for Refugees: Heiko Hering, Allen Gidraf Kahindo Maina, Marian Schilperood.

Egyptian Red Crescent Society: Magda Fathy El Sherbiny

Consultants: Nadine Nathalie Ezard, Helko Hering, Khaled Sultan Khalil, AbdiHamid Warsame, Ammar Zeindan, Francesco Checchi.

I. Introduction

I.1 Background

According to the *World disasters report (1)*, it is estimated that >270 million people live in countries with complex emergencies. In the same year (2012), 45.2 million people were reported as refugees or displaced people, 7.6 million of them due to conflict or persecution (2).

Complex emergencies are characterized by a breakdown of public services, including those for health, poor logistic networks, destruction of infrastructure and disruption of societal relations (3); they are usually related to political conflict or natural disaster. In such an environment, the public and social services that cover essential needs, such as access to safe water, basic foods or sanitation, become inaccessible for a large part of the population. Even access to already prescribed medicines for long-term treatment of chronic communicable diseases, such as HIV infection, or noncommunicable diseases, such as diabetes, might be interrupted. In addition, affected populations often have malnutrition and an increased burden of communicable diseases and of mental health problems. This is particularly pronounced among vulnerable population groups, such as children, women, elderly people and socially disadvantaged individuals. In these circumstances, the problem of tuberculosis (TB) control is exacerbated, because of the increased number of vulnerable people and because of the collapse of health services in general, and thus of the specialized care and prevention services needed for TB.

The interruption of drug supplies often results in irregular intake of the necessary medicines by patients. This leads to an increase in treatment defaulting, low cure rate, higher numbers of patients with relapse, and increased risk of developing drug-resistant TB. In some complex emergency settings, the response of the international community involves many agencies, including United Nations agencies and a range of nongovernmental organizations that provide a wide range of care services to affected populations, including TB care. In such situations, it may not be possible to provide sound TB care and prevention services, due to lack of adherence to national or standard guidelines, suboptimal diagnostic procedures, inappropriate treatment regimens, poor adherence by patients to treatment, and inadequate measures to monitor and evaluate patients.

Despite these difficulties, TB care and prevention programmes continue to be implemented in complex emergency/crisis settings, and in some countries in fragile circumstances or unstable political conditions. TB control has been included in the

international responses to relieve suffering in many major humanitarian crises, such as the 2004 South-Asian tsunami, 2010 Pakistan floods, and 2011 drought in the Horn of Africa.

The World Health Organization (WHO) and the international TB community consider TB in complex emergencies a major challenge for control of the disease in the affected country or area, and beyond. Guidelines for TB control in refugee settings (4) were developed and distributed worldwide through the WHO regional offices and international partners. Improving TB control in complex emergencies has been promoted through many regional and international meetings, workshops and courses on health issues in complex emergency settings.

In June 2011, the Strategic and Technical Advisory Group for TB control (STAG-TB) held its 11th meeting in Geneva, Switzerland. The STAG-TB members recognized that complex emergency events may have a negative effect on TB care and prevention services. The Eastern Mediterranean Region, the WHO region with the highest number of countries frequently experiencing complex emergencies, has gained significant experience in implementing TB care and prevention services, especially in Afghanistan, Somalia, Syrian Arab Republic and Yemen. Despite these experiences, TB control in complex emergencies has not been sufficiently evaluated or documented. As a result, the WHO Regional Office for the Eastern Mediterranean was requested by STAG-TB to carry out an evaluation of TB control in complex emergencies and define a framework and strategic directions.

In March 2012, the Regional Office organized an international consultation to review the models of TB care and prevention services that have been so far implemented in countries with some form of complex emergency. Subsequently, by identifying and documenting successful approaches and interventions and learning from past experiences, a framework for TB care and prevention in these settings was developed. The aims of this publication are to provide guidance on the main TB control functions and activities in complex emergency settings and improve TB prevention and care measures¹. It is intended to be used by decision-makers and policy-makers, national TB control programmes, international agencies, donors, nongovernmental organizations, community-based organizations, medical professionals, primary health care workers, and research institutions².

¹ Treatment guidance is based on *Treatment of tuberculosis: guidelines for national programmes*, fourth edition. Geneva: World Health Organization; 2010.

² The terms used in this publication are defined in Annex 1.

1.2 Lessons learned

The lessons learned from implementation of TB control in complex emergencies highlight significant strengths and weaknesses.

Strengths

- TB care and prevention programmes can be successfully implemented even in complex emergency settings.
- Appropriate coordination among the various stakeholders involved in TB control programmes is paramount and contributes significantly to the success of TB control implementation (5).
- International guidance on implementing basic TB care and prevention services among refugees has been developed and made available for government and non-government entities.
- TB control services can be well-structured with a central unit, an intermediate level, and integration of TB services at primary health care levels.
- The preservation of drug-supply logistics contributes significantly to the success of the control programme.

Weaknesses and challenges

- There is no global policy document on the organization of TB control services in complex emergencies.
- TB is not systematically included in the agenda for health sector coordination during the response to complex emergencies.
- Preparedness and contingency plans for the acute phase of a complex emergency are usually not considered by the national TB control programmes during development of their national strategic plans.
- Most emergencies occur in poor countries with a high TB burden, which usually have less capacity to mitigate the impact of a complex emergency.
- There is a high risk during the acute phase that the existing TB services will be disrupted, and consequently, TB patients will not receive proper treatment due to drug stock-outs and/or difficulty in accessing treatment services.
- Delayed identification of patients who have interrupted their treatment regimen poses a major risk to the success of any TB control programme during an emergency and beyond.

1.3 Programme management

Good managerial practices are needed to implement a TB control programme successfully in complex emergency settings. An entity whose role is to develop and strengthen the technical capacities of the programme, and ensure its appropriate management, must be identified. This entity should be one of the stakeholders involved in TB control activities. Whenever possible, it should be the national programme of the affected country or the main health agency engaged in the emergency response; otherwise, it could be a national or international agency involved in development and implementation of TB control programmes.

This entity will:

- conduct the required assessments of the TB control situation;
- ensure adequate linkages with the health cluster;
- identify priority areas of intervention related to the TB control programme, in line with the findings of the assessment;
- take appropriate action to ensure the continuity of treatment services during the acute phase of a complex emergency event;
- refer to the national contingency plan for TB control, if present;
- develop an action plan during the acute phase, in line with the contingency plan in the country setting where it is available, and provide input to the strategic response plan;
- adapt relevant guidelines and develop standard operating procedures adapted to the context of the complex emergency;
- ensure functioning of TB laboratory activities;
- establish a structure to carry out and follow all the functions/activities of TB control during the complex emergency;
- organize training of the health staff involved in provision of care and prevention services;
- ensure drug procurement and management;
- supervise implementation of care and prevention activities;
- ensure implementation of a sound monitoring and evaluation system for the TB control programme;
- establish appropriate mechanisms to coordinate the related activities with the various stakeholders involved in TB control efforts;
- develop in collaboration with the main stakeholders a strategic plan for TB control;

- ensure funding for TB control is forthcoming, through emergency or flash appeals, as well as through development of proposals that will be submitted to donors for financial support;
- include TB control in the national and international initiatives undertaken to rehabilitate health services in areas affected by the complex emergency; and
- ensure populations affected by complex emergencies (displaced, refugees) are integrated into the national plan.

2. Management tools and governance

2.1 Contingency plan

A contingency plan is a management tool used to ensure that adequate arrangements are made in anticipation of a crisis or worsening of a current one. This is achieved primarily through engagement in a planning process leading to a plan of action, together with follow-up actions.

The TB contingency plan should include the following items:

- identification and contact details of the national TB control programme focal point for the contingency plan;
- specification of the measures that should be taken to address the prevention of critical data loss; these processes and procedures should be followed strictly by all personnel in the event that an imminent disaster/crisis has been recognized;
- identification of the different levels of the programme that should be involved in the response;
- description of a bottom-up planning process with clear roles and responsibilities of each level; and
- detailed standard operating procedures for all aspects of TB care and prevention, including the required procedures for diagnosis and treatment.

2.2 Preparedness plan

A preparedness plan is defined as knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to anticipate, respond to and recover from the impacts of likely, imminent or current hazard events or conditions.

In disaster or crisis situations, TB response should be incorporated into the health cluster initiatives (at global, regional and country levels). This should be a component of the national strategic plan for TB control. The national health strategy and national strategic plan for TB care and prevention should define ways of preserving the minimum acceptable level of TB control services, including uninterrupted drug supply, in the event of a complex emergency that destroys the existing health infrastructure. They should also include broad determination of the coordination of all stakeholders.

2.3 National strategic plan for TB control

A national strategic plan should cover a specific period and be based on a sound situation analysis that results in identification of any gaps. It should have clearly defined goals, include well specified objectives, and identify clear strategic interventions and activities to reach the objectives and contribute to achieving the goals. The strategic interventions need to be consistent with the objectives as well as with the gaps identified through the situation analysis. Moreover, a national strategic plan should include a detailed budget, a monitoring and evaluation component, a detailed operational plan (covering a short period of time), and a technical assistance plan. Countries with a protracted crisis, fragile status, or frequent natural disasters must include a preparedness plan in their national strategic plan.

The adaptation or modification of the national strategic plan will depend on the magnitude and duration of the emergency. It is important to highlight that developing a contingency plan with flexible goals, objectives and targets in case of emergency is essential. However, national TB goals and objectives should remain the same. Moreover, TB control needs to be included in the strategic health plan that is established for the areas affected by complex emergency.

2.4 Governance

Strengthening the national TB control programme should be a key strategic objective. The programme should take the leadership and the responsibility to develop fundamental elements of TB care and prevention, such as strategic plans and guidelines, and define emergency preparedness measures. TB control should be integrated into the health cluster system in the acute and chronic phases of complex emergencies through a set of measures such as:

- designating a national TB control programme focal point for emergencies;
- participation of the national TB control programme in the health cluster meetings; and
- involvement of stakeholders around specific issues, for example, patient tracing, cross-border activities, as well as ensuring TB is included in health cluster guidelines and emergency plans.

3. Key interventions

3.1 Acute phase (first 3 months)

During the first few days of the acute phase of an emergency, including natural disasters, an initial rapid assessment is performed; TB should be included in this assessment. Based on this assessment, the following interventions should be carried out.

- Conduct a situation analysis to i) assess the estimated number of patients already on treatment, and ii) map health facilities where TB diagnosis and treatment are still functional in addition to trained human resources.
- Establish a mechanism to ensure continuity of treatment in the health facilities providing TB treatment services.
- Secure an uninterrupted supply of TB drugs and pre-positioning drugs where there is a high risk of supply disruption.
- Ensure that TB guidelines are available in all health facilities; additional specific standard operating procedures might be developed and distributed.
- Ensure linkages with other health programmes for collaborative efforts, such as with the vaccination, nutrition, HIV/AIDS and other communicable diseases programmes.
- Ensure that health workers are fully informed about the antibiotics that must be exclusively used in TB treatment and not for any other indication.
- Ensure coordination with all present partners and stakeholders dealing with health-related issues in the affected area.
- Inclusion of TB in the health cluster response, as well as in the initial/subsequent health-assessment activities.
- Ensure that funds needed for TB control during the acute phase are included in the emergency appeals.
- Mobilize experts to assist with evaluation of the TB control situation and drafting of proposals depicting the specific response activities that need to be implemented.

3.2 Post-acute/recovery (after 3 months)

The following interventions are necessary in the post-acute phase of an emergency.

- Restore the services of the national TB control programme, including drug supply and management.

- Make available trained TB staff for affected locations (e.g. laboratory technicians).
- Organize supervision wherever and whenever possible.
- Establish (or re-establish) a tracking mechanism to retrieve the data of registered TB patients.
- Rehabilitate TB control infrastructure/services in the areas affected by the disaster/crisis.
- Address multidrug-resistant TB (MDR-TB) in order to trace patients with interrupted treatment and to ensure appropriate infection control measures.
- Disseminate key messages to partners and communities about where to access TB diagnosis and treatment.
- Involve the existing network of community health workers in TB care and control efforts.
- Include the TB situation in the post-disaster needs assessment.
- Inform the health cluster/sector about the availability of human resources, diagnostic capacity and the drug procurement system.
- Actively pursue involvement of the affected community (leaders and health workers) in TB control efforts.
- Establish communication and support with the well functioning national TB control programmes in the region.
- Adapt the national plan and budget for TB control activities to strengthen services at the national level.
- Ensure that funds needed for TB control during the post-acute phase are included in donor proposals.

3.3 Protracted crises/countries with protracted emergencies

The following interventions are necessary in protracted emergencies.

- Maintain national TB control programme leadership.
- Include TB in the rapid assessment or any other situation analysis (e.g. mapping and identification of local partners).
- Strengthen national TB control programme capacities at the national as well as local level.
- Evaluate resource availability and identify funding gaps.

- Integrate TB care and prevention services in primary health care and in community initiatives to reach affected populations.
- Establish a task force for TB control that will identify and define the roles and responsibilities of stakeholders, develop standard operating procedures and training materials, and define national guidelines on minimum services packages.
- Integrate TB care and prevention into the package that will be developed for the provision of basic health services in primary health care settings.
- Ensure uninterrupted supply of TB drugs.
- Mobilize resources, including funds, at national and global levels.
- Prepare a contingency plan.
- Improve case finding through different means, such as moving beyond households in camps for internally displaced persons (IDPs) or use of mobile clinics in areas without fixed health facilities.
- Develop/update strategic planning for TB control.

4. TB control functions

4.1 Laboratory component

Evaluation and mapping of the laboratory facilities that are still functioning in the area should be part of the initial TB control assessment. If possible, laboratory specialists should be involved in the situation assessment. During the early stage of the acute phase, all efforts should be made to avoid interruption of treatment for those already diagnosed with TB (see Tables 1 and 2 for regimen and duration (6)). However, later on and whenever it is possible, diagnosis should be resumed, by sputum smear microscopy and Gene-Xpert (see Tables 3 and 4 and Fig. 1).

The TB programme manager should work with the partners and stakeholders in securing availability of:

- human resources
- laboratory supplies and equipment
- laboratory equipment management
- referral mechanisms for laboratory testing
- sputum and blood samples collection, packaging and shipment
- results/template issuance and delivery to the referral health facility
- external and internal quality control
- linkages with technical support from the non-affected regions in the country, regional or global entities
- appropriate funding for the level of laboratory support needed to sustain the programme.

It is assumed that by the end of the acute phase and beginning of the post-acute phase, all diagnostic procedures for new cases, whether susceptible or resistant, should be resumed. In addition, internal and external laboratory quality control and quality assurance programmes should be in place. Linkages with regional or global supra-national laboratories should be established to support quality assurance of laboratory diagnosis in the affected areas.

Table 1. Registration group, regimen and duration

Registration group	Regimen	Duration
New case	2HRZE/4HR	6 months ^a
Retreatment case ^b	2HRZES/1HRZE/5HRE	8 months

^a For TB meningitis, osteo-articular TB and TB in special situations, refer to the national guidelines.

^b Only for countries that do not have access to rapid molecular testing (Xpert MTB/RIF), refer to the national guidelines.

E, ethambutol; H, isoniazid; R, rifampicin; S, streptomycin; Z, pyrazinamide.

Table 2. Dosing of TB medicines

Anti-TB drugs	Daily treatment (mg/kg)	
	Children (<25 kg)	Adults
Isoniazid	10 (7–15), max 300 mg daily	10 (4–6), max 300 mg daily
Rifampicin	15 (10–20), max 600 mg daily	15 (8–12), max 600 mg daily
Pyrazinamide	35 (30–40)	35 (20–30)
Ethambutol	20 (15–25)	20 (15–20)
Streptomycin	15 (12–18), max 1g daily	15 (12–18), max 1g daily

Table 3. Minimum follow-up of sputum during treatment (6)

Investigation	Baseline (diagnosis)	Intensive phase			Continuation phase		
		1 month	2 months	3 months	4 months	5 months	6 months/ end of treatment
Smear	✓		✓	✓ ^b		✓ ^c	✓
				If smear+, obtain culture DST		If smear+, obtain culture DST	If smear+, obtain culture DST
Xpert (if possible)	✓		Smear exam for follow up			Smear exam for follow-up	Smear exam for follow-up
Culture	✓ ^a					^d	Culture if smear+, 6 months DST, if smear+, 6 months
DST	✓ ^a					^d	^d

^a In case of retreatment or high risk of MDR-TB.

^b If patient remains smear positive at 2 months, the next smear should be performed at 3 months.

^c In case of patients who had sputum checked at 3 months and became smear negative, there is no need to repeat at 4 months. All other patients should have sputum smear performed at 4 months.

^d If smear-positive.

Table 4. Management of new patients who interrupted treatment

Length of treatment	Length of interruption	Sputum result at return	Treatment outcome	Classification at return	Treatment action and registration
<1 month	<2 weeks	Not needed	–	–	Continue treatment at the point it was stopped
	2–7 weeks	Not needed	–	New	Start treatment
	≥8 weeks	Not needed	–	New	Start treatment
1–2 months	<2 weeks	Not needed	–	–	Continue treatment at the point it was stopped
	2–7 weeks	Smear+	–	–	Restart treatment
		Smear–	–	–	Continue treatment at the point it was stopped
	≥8 weeks	Smear+/-	Lost to follow-up	Treatment after loss to follow-up	Start retreatment, perform DST and give new number
≥2 months	<2 weeks	Not needed	–	–	Continue treatment at the point it was stopped
	2–7 weeks	Smear+	Give new number	Other	Start retreatment, perform DST
		Smear–	–	–	Continue treatment at the point it was stopped
	≥8 weeks	Smear-/+	Lost to follow-up	Treatment after loss to follow-up	Start retreatment, perform DST, give new number

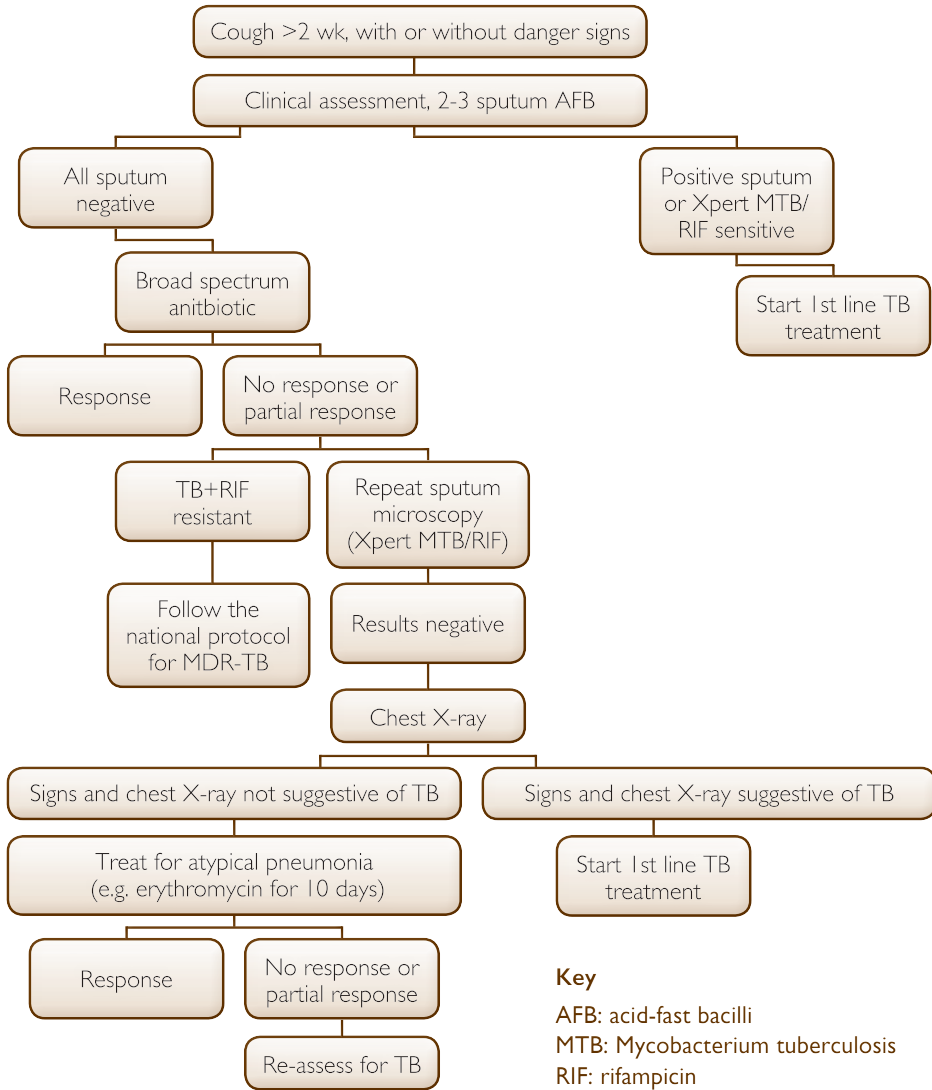


Fig. 1 Diagnostic algorithm for pulmonary and pleural TB in settings with low risk of MDR-TB

4.2 Management of MDR-TB cases in post-acute phase

In settings with pre-existing MDR-TB activities, the following actions need to be undertaken.

- Re-establish TB culture and drug-susceptibility testing (DST) capacities.
- Establish laboratory capacities to use new and easy-to-use diagnostic tools, such as Gene-Xpert machines.
- Re-establish TB infection control measures in the laboratories and in all health facilities related to the MDR-TB management programme.
- Establish tracing systems for patients with treatment interruption.
- Choose the most appropriate treatment modality for the given set-up (hospital or ambulatory).
- Ensure appropriate procurement of second-line TB medicines.

4.3 Contact investigation (7)

Patients with pulmonary TB, especially those whose sputum samples are smear-positive, can transmit TB to others. People who live in the same household or share the same enclosed space for long periods are at great risk of becoming infected and developing active TB. The risk of infection is highest in household contacts who are children aged <5 years or people living with HIV.

In high HIV prevalence settings, TB contact investigations are an opportunity for both TB and HIV case finding. A referral system needs to be developed with the HIV programme. The following activities are recommended for inclusion in HIV programmes:

- systematic counselling and HIV screening for TB patients (except during the acute phase of the emergency, when HIV screening is discouraged);
- voluntary counselling and testing of TB patients, and if positive, provision of appropriate HIV prevention, treatment and care services, including antiretroviral therapy; and
- cotrimoxazole prophylaxis for eligible people living with HIV who have active TB.

Early diagnosis and appropriate treatment of TB through contact investigation can prevent the development of extensive pulmonary lesions and decrease the risk of transmission of *Mycobacterium tuberculosis*.

Household contacts are people who have shared the same enclosed living space with the index case for one or more nights or for frequent or extended periods during the day during the 3 months before commencement of the current treatment period.

All household contacts of patients with confirmed TB should be screened for TB without delay.

Close contacts are people who are not in the household but have shared an enclosed space with the index case, such as a social gathering place, workplace or facility, for extended periods during the day during the 3 months before the commencement of the current treatment period.

It is recommended that contact investigation be conducted for household and close contacts when the index case has any of the following characteristics:

- sputum smear-positive pulmonary TB;
- clinical or radiological confirmation of extensive lung disease (i.e. cavities on chest X-ray, or haemoptysis);
- MDR-TB or extensively drug-resistant (XDR) TB (proven or suspected).

To implement appropriate TB contact investigation, a specific algorithm should be developed by the national TB control programme to screen and evaluate contacts. If the index case is infected with a strain sensitive to isoniazid, or (if DST results for the index case are not available) the country resistance to isoniazid is low, contacts with no active TB who are HIV positive or aged <5 years should receive isoniazid preventive therapy.

In settings of high HIV prevalence, and with populations at risk, it is recommended that all household and close contacts of active TB patients are counselled and tested for HIV and receive appropriate treatment according to the test outcomes.

4.4 Addressing prevention

TB prevention activities should include basic elements of communication and social mobilization.

- Members of affected communities should be informed of TB symptoms and of the availability of free diagnosis and treatment through the distribution of printed material, such as leaflets and banners, at public gathering places as well as health facilities.
- Community members (and activities where possible) should be identified and equipped with basic information about availability of, and facilities for, TB diagnosis and treatment.

- TB tests should be available for people living with HIV.
- Cotrimoxazole preventive therapy should be available for people living with HIV.

4.5 Infection control

Infection control should be implemented at both facility and household levels. To ensure effectiveness, the national TB control programme and partners should develop guiding notes on infection control for health facilities and households. Training for health staff and care workers should include infection control components. Community level infection control should include raising the awareness of patients through intensive information, education and communication, administrative control in health facilities and IDP camps related to keeping people with cough separate (until TB is confirmed and, if confirmed, until sputum conversion from positive to negative), and preserving cough hygiene. Environmental measures to ensure better ventilation at the facility and household levels should be implemented. If needed, provision of protective measures and supplies for care providers and volunteers, particularly related to MDR TB/HIV coinfection, e.g. N95 respirators.

4.6 Supply of anti-TB medicines during emergencies

Shortages of TB medicines can occur, and may be more frequent and more serious in complex emergency settings. The patient TB treatment kit has already been adopted by many organizations and national authorities as a reliable, standardized, inexpensive, appropriate and readily available source of the medicines and health equipment urgently needed in complex emergencies. Its contents are calculated to meet the needs for one patient for 6 months. To facilitate simpler drug procurement and management in an early phase of a crisis, it is advisable to use the patient kit.

The following principles should be followed to ensure appropriate drug procurement and management:

- policy and legal framework (national medicine laws including registration);
- selection (includes products used and treatment regimens);
- procurement (includes quantification of needs);
- distribution (includes receipt of shipment into country);
- use (includes compliance/adherence by prescriber and patient); and
- management support (includes management information system, quality assurance, human resource needs, basic and in-service training and monitoring and supervision).

All efforts should be made to include TB drugs in the existing regional supply hubs (UN humanitarian response depots) for emergency drugs and medical supplies in order to ensure the ability to move the drugs rapidly to the areas affected in an emergency (depots currently exist in Accra, Kuala Lumpur, Dubai and Panama City).

4.7 Monitoring and evaluation tools

All efforts should be made to keep the existing registers and records up to date, including patient treatment cards.

Additional or adapted tools in each setting of a complex emergency

A short checklist for risk assessment and mapping is used for situation analysis that will be integrated into the tool for rapid assessment of communicable diseases in emergencies and incorporated into the contingency plan (see Annex 2).

The checklist incorporates minimum data as follows:

- number and location of displaced populations (mapping and tracking of IDPs/refugees);
- number and location of TB patients within displaced populations;
- number of cases of TB and MDR-TB at risk of treatment interruption when the emergency occurred;
- amount of human resources, supplies, equipment and infrastructure expected to be affected;
- pre-crisis TB epidemiological and programme data from the host and displaced populations, if cross-border movements happen (e.g. prevalence, incidence, DOTS – the basic package that underpins the Stop TB Strategy, population coverage, treatment success rate and drug-resistance data); and
- crisis data (e.g. type, duration, mortality rate, nutritional status, population movement, demographics, overcrowding and security).

This information will provide the baseline data to plan and monitor activities and document the progress of TB control activities in the future.

Minimum core variables and other characteristics of the surveillance system in each setting

National TB control programmes should make every effort to maintain the existing surveillance system, while focusing on aggregated data during the emergency. The

following core variables are proposed for use during the emergency situation in different settings:

- number of cases by treatment category including MDR-TB, proportion of patients kept on treatment, and proportion of patients who interrupted their treatment;
- report completeness; and
- number and identification of centres that have reported drug stock-out.

Patients who interrupted their treatment should continue the treatment as soon as possible based on the information provided in Table 4.

Data flow across levels and frequency of reporting

Under stable conditions, the same characteristics of the existing surveillance system will be maintained in terms of frequency, data flow, electronic or paper-based records, and individual patient or aggregated data. As part of preparedness, engaged nongovernmental organizations and other partners should be trained in monitoring and evaluation.

In natural disasters and acute emergencies, the following are recommended for data flow and frequency of reporting.

- Change frequency of reporting to weekly until situation stabilizes.
- Focus on a reduced number of indicators.
- Conduct rapid TB assessment (8).
- Shortcut the routine flow of reporting (e.g. go straight to the TB treatment centre, coordinate directly with nongovernmental organizations).
- Ensure the health cluster coordinator, during health cluster meetings (usually weekly), alerts regional or district health officers who oversee wider health issues about TB cases that need to be kept on treatment.

Human and financial resources for monitoring and evaluation/ surveillance

- Use the mapping and situation analysis results to identify human resource gaps and needs.
- Follow an integrated approach to use, whenever possible, existing human resources, such as from nongovernmental and other organizations.
- Train staff of nongovernmental organizations and other human resources engaged in affected areas according to the training agenda established by the management entity.

- Conduct resource mobilization at national and international levels during the acute and post-acute phases.
- Ensure national TB control programme alerts the health cluster to include TB in the flash appeal and other resource mobilization options by providing information on ‘Number of TB patients on treatment in this area’ and ‘Number of TB patients at risk of treatment interruption’, particularly for outreach/ response to acute events.
- Early in the initial rapid assessment (<72 h) develop an action plan that includes funding for monitoring and evaluation to be incorporated into the health cluster resource mobilization plan.

Modifications in the monitoring and evaluation processes in each setting of a complex emergency

In natural disasters and the acute phase of complex emergencies, it is suggested that the following are organized and carried out by the TB management entity.

Focus on priorities: i) retrieving information on TB patient data, drugs and reagents, functional status of TB management units and human resources situation; and ii) ensuring engagement of all care providers including nongovernmental organizations and those practising in the private health sector. The international mission for rapid assessment during the acute phase of an emergency will take place within the context of the work of the UN health cluster.

Supervision: Conduct more frequent supervision of facilities and laboratories (e.g. every 2 weeks); use the standard checklist and apply the same data quality assurance mechanisms as under normal circumstances; disseminate and emphasize what to do for different periods of treatment interruption (e.g. 1 week, 1 month); and emphasize the use of the patient TB identification card.

Review meetings and missions: Hold more frequent meetings on the TB situation than under normal circumstances and as part of the health cluster activities.

Data analysis and reporting: Focus on the number of TB cases on treatment, stratified by category of TB.

Additional or adapted indicators in the monitoring and evaluation framework

The following indicators should be reported on.

Input indicators

- Presence of updated preparedness plan (once in the beginning)
- Presence of adapted strategic plan (including contingency plan, once in the beginning and whenever there is a change in the strategic plan)

Process indicators

- Number of functioning diagnostic centres in the areas affected by the complex emergency (once in the beginning and whenever the emergency situation is changed)
- Number of health centres providing TB treatment in the areas affected by the complex emergency (once in the beginning and whenever the emergency situation is changed)
- Number of community health workers involved in TB treatment support in the affected areas (once in the beginning and whenever the emergency situation is changed)
- Number of laboratories diagnosing TB and their capacities (once in the beginning and whenever the emergency situation is changed)

Output indicators

- Cases notified in the affected areas in absolute number (weekly in acute phase and quarterly in post-acute phase)
- Cases kept on treatment out of those detected before the occurrence of the complex emergency event in the affected areas (number, %) (once in the beginning)
- Cases lost to follow-up (monthly reporting)
- Number of TB suspects tested among IDPs/refugees in the affected areas (number) (monthly however in some situations this indicator is reported weekly)
- Number and percentage of units without stock-out of TB drugs (number, %) (weekly)

Outcome indicators

The usual outcome indicators (case detection, case notification rates and treatment outcome) will be used. In case of difficulty in having an accurate denominator, due to the situation and constant population movement, absolute numbers can be used instead of rates. Comparison of all indicators before and during the emergency situation should be performed regularly. Results of such comparison should be used as a rough indicator of the effect of the emergency on TB control.

5. Guiding principles in TB case management

5.1 Treatment categories

- New cases are patients who have never had treatment for TB, or have taken anti-TB drugs for <1 month.
- Retreatment cases (previously treated patients) are patients who have received anti-TB drugs in the past for 1 month or more. They are further classified by the outcome of their most recent course of treatment (relapse, failure, lost to follow-up). See Table 5 for management of retreatment patients who interrupted treatment (6).

Drug resistance should be determined in all previously treated patients before initiation of their new treatment, using either conventional DST or the molecular method (Xpert MTB/RIF) according to the national guidelines.

Table 5. Management of retreatment patients who interrupted treatment

Length of treatment	Length of interruption	Sputum result at return	Treatment outcome	Classification at return	Treatment action and registration
<1 month	<1 month	Not needed	–	–	Continue retreatment at the point it stopped
>1 month	4–7 weeks	Smear+	–	–	Restart treatment, perform DST
		Smear–	–	–	Continue retreatment at the point it stopped, perform DST
	≥8 weeks	Smear+/-	Lost to follow-up	Treatment after loss to follow-up	Restart the retreatment, give new number, perform DST

5.2 Monitoring and evaluation: key elements

For optimal functioning of the TB programme, the minimum data collected should include the following:

- number and location of people affected
- number and location of TB patients among affected population
- number of TB cases at risk of treatment interruption
- information on human resources, supplies, equipment and infrastructure in the affected area
- pre-crisis TB epidemiological and programme data from displaced and host populations (e.g. prevalence, incidence, DOTS population coverage, treatment success rate)
- crisis data (e.g. type, duration, mortality rate, nutritional status, population movement, demographics, overcrowding, security).

Additional indicators, comparing to the standard programme, include:

- contingency plan available; adapted strategic plan containing preparedness plan
- number of functioning diagnostic centres in the affected areas
- number of health centres offering TB treatment in the affected areas
- number of patients receiving TB treatment by community support in the affected areas
- cases notified in the affected areas, by type, and by form – pulmonary smear-positive or negative, extra-pulmonary, new and retreatment cases, number and percentage of children affected
- number of units without drugs in the affected areas.

The same outcome definitions should be reported as in the standard monitoring and evaluation protocol; forms should be in accordance with the WHO definitions and reporting framework for tuberculosis (9).

5.3 Outcome definitions (9)

Outcome	Definition
Cured	A pulmonary TB patient with bacteriologically confirmed TB at the beginning of treatment and who was smear- or culture-negative in the last month of treatment and on at least one previous occasion.
Treatment completed	A TB patient who completed treatment without evidence of failure but with no record to show that sputum smear or culture results in the last month of treatment and on at least one previous occasion were negative; either because tests were not done or because results are unavailable.
Treatment failed	A TB patient whose sputum smear or culture is positive at month 5 or later during treatment.
Died	A TB patient who dies for any reason before starting or during the course of treatment.
Lost to follow-up	A TB patient who did not start treatment or whose treatment was interrupted for 2 consecutive months or more.
Not evaluated	A TB patient for whom no treatment outcome is assigned. This includes cases transferred out to another treatment unit as well as cases for whom the treatment outcome is unknown to the reporting unit.
Treatment success	The sum of cured and treatment completed.

6. Funding

The national strategic plan for TB control should include a budget component specifying the financial needs. This budget has to be established in coordination with the partners and stakeholders involved in TB care and prevention. Actions need to be undertaken to advocate for funding the strategic plan; the advocacy efforts should target national authorities and potential donors.

Funding for TB control should be included in any initiative launched for rehabilitation of health services in areas with complex emergency, at national or international level. Sound targeted proposals, consistent with the national strategic plan, should be developed to apply for funding in the framework of bilateral and/or multilateral cooperation. Regular reports must be: i) developed according to the progress made in implementation of TB care and prevention activities, and ii) forwarded to the donors who are financially supporting the TB programme.

TB proposals should be included in the flash appeal and in the strategic response plan. A strategic response plan is prepared for any humanitarian crisis that requires international support from more than one agency. The plan includes the shared vision or strategy to respond to the assessed needs, and serves as the basis for carrying out and monitoring the collective response.

The flash appeal is a tool for structuring a coordinated humanitarian response for the first 3–6 months of an emergency. It provides a concise overview of the proposed urgent life-saving activities to assist the population in need. The flash appeal is triggered by the UN Humanitarian Coordinator within 1 week of an emergency.

The national strategic plan consists of two parts: i) a country strategy, with narrative, strategic objectives and indicators; and ii) the health cluster plans with accompanying projects that detail how the strategy will be implemented and how much it will cost.

All necessary efforts should be made to avail appropriate funds to continue TB care and prevention efforts, especially in a complex emergency.

Annex I.

Definitions

Complex emergency

1. A humanitarian crisis in the country, region or society where there is total or considerable breakdown of authority resulting from internal or external conflict, and which requires an international response that goes beyond the mandate or capacity of any single agency and/or the ongoing UN country programme. (Inter-Agency Standing Committee (IASC). http://reliefweb.int/sites/reliefweb.int/files/resources/3D153DA3049B322AC1256C30002A9C24-ocha__orientation__handbook_on__.html)
2. Complex emergencies are situations of disrupted livelihoods and threats to life produced by warfare, civil disturbance, and large movements of people, in which any emergency response has to be conducted in a difficult political and security environment. (Environmental health in emergencies and disasters: a practical guide. Geneva: World Health Organization; 2002 http://www.who.int/environmental_health_emergencies/complex_emergencies/en/)

Fragile state

Low income country characterized by weak state capacity and/or weak state legitimacy, leaving citizens vulnerable to a whole range of shocks. A fragile state is significantly susceptible to crisis and conflicts.

Protracted emergency

Recurrent natural disasters and/or conflict, longevity of food crises, breakdown of livelihoods, and insufficient institutional capacity to react to the crises.

Acute phase of emergency

Usually refers to the first 3 months of an existing complex emergency.

Health cluster

A group of agencies, organizations and/or institutions working together to provide a humanitarian response for health.

A group of agencies, organizations and/or institutions working together towards common objectives – to address needs in a particular sector (such as health). (Adapted from WHO)

A cluster is essentially a sectoral group and there should be no differentiation between the two in terms of their objectives and activities; the aim of filling gaps and ensuring adequate preparedness and response should be the same. (IASC. http://www.who.int/hac/global_health_cluster/guide_glossary_of_key_terms/en/)

Flash appeal

A flash appeal is an inter-agency humanitarian response strategy to a major disaster that requires a coordinated response beyond the capacity of the government plus any single agency. The appeal addresses acute needs for a common planning horizon, normally up to 6 months. (IASC. www.humanitarianinfo.org/iasc/downloaddoc.aspx?docID=5257)

Cluster lead agency

An agency/organization appointed by the IASC/emergency relief coordinator to take on a leadership role within the international humanitarian community in a particular sector/area of activity, to ensure adequate response and high standards of predictability, accountability and partnership, and to serve as provider of last resort when necessary.

Contingency planning

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. Glossary of humanitarian terms, 2008. <http://www.who.int/hac/about/reliefweb-aug2008.pdf>)

Preparedness plan

The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to anticipate, respond to, and recover from the impacts of likely, imminent or current hazard events or conditions. (UN International Strategy for Disaster Reduction)

OCHA

Office for the Coordination of Humanitarian Affairs for the UN. OCHA is the part of the UN Secretariat responsible for bringing together humanitarian actors to ensure a coherent response to emergencies. OCHA also ensures there is a framework within which each actor can contribute to the overall response effort.

Household contact

A person who has shared the same enclosed living space with the index case for one or more nights or for frequent or extended periods during the day, during the 3 months before commencement of the current treatment episode. (Recommendations for investigating contacts of persons with infectious tuberculosis in low- and middle-income countries. Geneva: World Health Organization; 2012.)

Close contact

A person who is not in the household but has shared an enclosed space with the index case, such as a social gathering place, workplace or facility, for extended periods during the day, during the 3 months before commencement of the current treatment episode. (Recommendations for investigating contacts of persons with infectious tuberculosis in low- and middle-income countries. Geneva: World Health Organization; 2012.)

Annex 2.

Checklist to assess the possibilities for implementing a TB programme in a complex emergency

The following elements should be assessed before making a decision to implement a TB programme in complex emergency settings.

- Data from the refugee or displaced population indicate that TB is an important health problem
- Overall mortality is less than 1 per 10 000 population per day
- Availability of basic needs of water, adequate food, shelter and sanitation
- Availability of essential clinical services and basic drugs for common illnesses
- Basic health services are accessible to a large part of the population, so that TB suspects can be identified and appropriate investigation or referral arranged
- Existence of political commitment at various levels of relevant leaderships
- Availability of community organizations to support TB programme activities in communities (e.g. treatment adherence, defaulter tracing and contact investigation)
- Possibility to secure funding for TB programme activities for at least 18 months
- Opportunity of linkages with the existing health system
- Availability of a lead agency to coordinate TB care and prevention activities
- Availability of or possibility to recruit health staff for TB care and prevention activities
- Availability of laboratory resources (human resources and equipment)
- Availability of health facilities to accommodate very ill TB patients
- Existence of TB care and prevention guidelines already in use

References

1. World disasters report 2012: focus on forced migration and displacement. Geneva: International Federation of Red Cross and Red Crescent Societies; 2012.
2. UNHCR statistical year book 2012. Geneva: United Nations High Commissioner for Refugees; 2012.
3. OCHA orientation handbook on complex emergencies. New York: United Nations; 1999.
4. Connolly MA, Gayer M, Ottmani S, editors. Tuberculosis care and control in refugee and displaced populations. An interagency field manual, 2nd edition. Geneva: World Health Organization; 2007.
5. Mauch V, Weil D, Munim A, Boillot F, Coninx R, Huseynova S, et al. Structure and management of tuberculosis control programmes in fragile states – Afghanistan, DR Congo, Haiti, Somalia. *Health Policy*. 2010;96(2):118–27.
6. Treatment of tuberculosis: guidelines for national programmes, fourth edition. Geneva: World Health Organization; 2010.
7. Recommendations for investigating contacts of persons with infectious tuberculosis in low- and middle-income countries. Geneva: World Health Organization; 2012.
8. Rapid health assessment of refugee and displaced populations, 3rd edition. Paris: Médecins Sans Frontières; 2006.
9. Definitions and reporting framework for tuberculosis – 2013 revision, updated December 2014. Geneva: World Health Organization; 2013.

Further reading

A field manual. Communicable disease control in emergencies. Geneva: World Health Organization; 2005.

Agutu WO. Short-course tuberculosis chemotherapy in rural Somalia. *East Afr Med J*. 1997;74(6):348–52.

Barr RG, Menzies R. The effect of war on tuberculosis: Results of a tuberculin survey among displaced persons in El Salvador and a review of the literature. *Tubercle Lung Dis*. 1994;75(4):251–9.

Bastian I. The tsunami of tuberculosis. *Med J Aust*. 2005;182(6):263–4.

- Bieberly J, Ali J. Treatment adherence of the latently infected tuberculosis population (post-Katrina) at Wetmore TB Clinic, New Orleans, USA. *Int J Tuberc Lung Dis.* 2008;12(10):1134–8.
- Biot M, Chandramohan D, Porter JDH. Tuberculosis treatment in complex emergencies: are risks outweighing benefits? *Trop Med Int Health.* 2003;8(3):211–8.
- Chapin E, Daniels A, Elias R, Aspilcueta D, Doocy S. Impact of the 2007 Ica earthquake on health facilities and health service provision in southern Peru. *Prehosp Disaster Med.* 2009;24(4):326–32.
- Coninx R. Tuberculosis in complex emergencies. *Bull World Health Organ.* 2007;85(8):637.
- Control of communicable diseases. In: *Public Health Guide for Emergencies.* Johns Hopkins Bloomberg School of Public Health, International Federation of Red Cross and Red Crescent Societies. 2008, Johns Hopkins and the International Federation of Red Cross and Red Crescent Societies. 284–371.
- Doveren R. Why tuberculosis control in an unstable country is essential: desperate TB patients embrace DOTS in Angola. *Int J Tuberc Lung Dis.* 2001;5(5):486–8.
- Drobniewski FA, Verlander NQ. Tuberculosis and the role of war in the modern era. *Int J Tuberc Lung Dis.* 2000;4(12):1120–5.
- Electronic recording and reporting for tuberculosis care and control. Geneva: World Health Organization; 2012.
- Gele AA, Bjune GA. Armed conflicts have an impact on the spread of tuberculosis: the case of the Somali Regional State of Ethiopia. *Confl Health.* 2010;4:1.
- Gibson N, Boillot F, Jalloh H. The cost of tuberculosis to patients in Sierra Leone's war zone. *Int J Tuberc Lung Dis.* 1998;2(9):726–31.
- Global tuberculosis control: WHO report 2011. Geneva: World Health Organization; 2011.
- Glossary of humanitarian terms. Reliefweb; 2008.
- Goe LC, Linton JA. Community-based public health interventions in North Korea: one non-governmental organization's experience with tuberculosis and hepatitis B. *Public Health.* 2005;119(5):347–52.
- Gustafson P, Gomes VF, Vieira CS, Jensen H, Seng R, Norberg R, et al. Tuberculosis mortality during a civil war in Guinea-Bissau. *JAMA* 2001;286(5):599–603.

Health Cluster Guide. A practical guide for country-level implementation of the Health Cluster, Inter-Agency Standing Committee. Geneva: World Health Organization; 2009.

Hehenkamp A, Hargreaves S. Tuberculosis treatment in complex emergencies: South Sudan. *Lancet*. 2003;362(Suppl):s30–1.

Heldal E, Cruz JR, Arnadottir T, Tardencilla A, Enarson DA. Successful management of a national tuberculosis programme under conditions of war. *Int J Tuberc Lung Dis*. 1997;1(1):16–24.

Ibrahim KM, Laaser U. Resistance and refugees in Pakistan: challenges ahead in tuberculosis control. *Lancet Infect Dis*. 2002;2(5):270–2.

Jafari NJ, Radfar MH, Ghofrani H. Incidence of infectious diseases one month after the Bam earthquake (2004). *J Med Sci (Pakistan)*. 2007;7(4):597–602.

Kasis I, Lak L, Adler J, Choni R, Shazberg G, Fekede TD, et al. Medical relief operation in rural northern Ethiopia: addressing an ongoing disaster. *Isr Med Assoc J*. 2001;3(10):772–7.

Keus K, Houston S, Melaku Y, Burling S. Field research in humanitarian medical programmes. Treatment of a cohort of tuberculosis patients using the Manyatta regimen in a conflict zone in South Sudan. *Trans R Soc Trop Med Hyg*. 2003;97(6):614–8.

Khan FA, Smith BM, Schwartzman K. Earthquake in Haiti: is the Latin American and Caribbean region's highest tuberculosis rate destined to become higher? *Expert Rev Respir Med*. 2010;4(4):417–9.

Kumar R. SP3-51 Access to TB patients of directly observed therapy (DOTS) during natural disasters in Bihar, India. *J Epidemiol Community Health*. 2011;65:A422.

Martins N, Kelly PM, Grace JA, Zwi AB. Reconstructing tuberculosis services after major conflict: experiences and lessons learned in East Timor. *PLoS Med*. 2006;3(10):e383.

Médecins Sans Frontières, Partners In Health. Tuberculosis. Practical guide for clinicians, nurses, laboratory technicians and medical auxiliaries. Paris: Médecins Sans Frontières; 2013.

Miner MC, Burns-Grant G, DeGraw C, Wallace C, Pozsik C, Jereb J. Integrated preparedness for continuity of tuberculosis care after Hurricanes Gustav and Ike: Louisiana and Texas, 2008. *Public Health Rep*. 2010;125(4):518–9.

Myint NW, Kaewkungwal J, Singhasivanon P, Chaisiri K, Panjapiyakul P, Siriwan P, et al. Are there any changes in burden and management of communicable diseases in areas affected by Cyclone Nargis? *Confl Health*. 2011;5(1):9.

Ndongosieme A, Bahati E, Lubamba P, Declercq E. Collaboration between a TB control programme and NGOs during humanitarian crisis: Democratic Republic of the Congo. *Bull World Health Organ*. 2007;85(8):642–3.

Policy Development and Studies Branch. OCHA and slow-onset emergencies. OCHA Occasional Policy Briefing Series – No. 6. UN Office for the Coordination of Humanitarian Affairs; 2011.

Porter J, Kessler C. Tuberculosis in refugees: a neglected dimension of the ‘global epidemic of tuberculosis’. *Trans R Soc Trop Med Hyg*. 1995;89(3):241–2.

Recommendations for investigating contacts of persons with infectious tuberculosis in low- and middle-income countries. Geneva: World Health Organization; 2012

Refugee health: an approach to emergency situations. Paris: Médecins Sans Frontières.

Salama P, Spiegel P, Talley L, Waldman R. Lessons learned from complex emergencies over past decade. *Lancet*. 2004;364:1801–13.

Singh P, editor. FOCUS: complex emergencies, 2009, SEARO.

Tuberculosis and complex emergency in Lebanon. 2006, Lebanon National Tuberculosis Programme (<http://www.slideworld.org/patient/slideshow.aspx/Directive-95/viewslides.aspx/-TUBERCULOSIS--and-COMPLEX-EMERGENCY-in-LEBANON-ppt-101337>).

Wakabi W. Health care a casualty in Kenyan crisis. *CMAJ*. 2008;178(7):818–9.

WHO emergency response framework. Geneva: World Health Organization; 2011.

WHO’s response, and role as the health cluster lead, in meeting the growing demands of health in humanitarian emergencies. Report by the secretariat. Geneva: World Health Organization; 2011.

Tuberculosis control is a major public health challenge in complex emergencies. The aims of this publication are to provide guidance on the main tuberculosis control functions and activities in complex emergency settings and improve tuberculosis prevention and care measures. It is intended to be used by decision-makers and policy-makers, national tuberculosis control programmes, international agencies, donors, nongovernmental organizations, community-based organizations, medical professionals, primary health care workers, and research institutions.

