



**INTENSIFIED  
TB CASE FINDING  
AT FACILITY LEVEL**

**4**

# **STOP TB FIELD GUIDE**

**Stop TB Partnership**



# 4

## **STOP TB FIELD GUIDE**

---

**INTENSIFIED  
TB CASE FINDING  
AT FACILITY LEVEL**



## StopTB Field guide 4: Intensified TB Case Finding at Facility Level

Copyright © 2018

by the Stop TB Partnership, hosted by the United Nations Office for Project Services

Global Health Campus  
Chemin du Pommier 40  
1218 Le Grand-Saconnex  
Geneva, Switzerland

All rights reserved. No part of this publication may be reproduced, in any form or by any means, without prior permission of the Stop TB Partnership.

**Design:** Miguel Bernal and Diana Schwalb

**Photo credits:** Miguel Bernal, Shehzad Noorani and Stella Rajagukguk

A digital version of this publication is available on [stoptb.org/resources](https://stoptb.org/resources)





# STOP TB **FIELD GUIDE**

INTENSIFIED TB CASE FINDING AT  
**FACILITY LEVEL**





# CONTENTS

## INTENSIFIED TB CASE FINDING AT FACILITY LEVEL

Purpose of this document	7
Acknowledgements	8
Abbreviations	11
1. INTRODUCTION: Why focus on case finding at facility level?	12
2. DESIGNING INTENSIFIED CASE FINDING INTERVENTIONS AT FACILITY LEVEL	18
2.1 Baseline assessment: Who are the people being missed and where are they?	20
2.2 Selecting the regions / provinces / states / districts to implement facility-based ICF	21
2.3 Facility management buy-in and site assessment	21
2.4 Selecting the location(s) within health facilities for TB screening	23
2.5 Selecting the screening and diagnostic processes	23
2.6 Staffing	25
2.7 Linkage to diagnosis and treatment	29
2.8 Ensuring ownership and accountability	29
3. EXPERIENCES IN FACILITY-BASED SCREENING ACROSS SETTINGS	34
3.1 General outpatient departments and waiting/reception/entrance areas	34
3.2 Specialized outpatient services	35
3.3 Antenatal clinics and paediatric clinics	35
3.4 HIV clinics	35
3.5 Inpatient care services	36
3.6 Primary health care facilities	36
3.7 Occupational health clinics	36
3.8 Drug treatment clinics and harm reduction programmes	37
3.9 Multi-facility screening	37
4. ISSUES AND CHALLENGES	42
4.1 Staff-related challenges	43
4.2 Issues related to linkage to treatment	43
4.3 Resource-related issues	43
4.4 Patient-related issues	44
4.5 Process/algorithm-related issues	44
5. MONITORING AND EVALUATION	47
5.1 Measuring project impact	47
5.2 Measuring programmatic/operational indicators	48
5.3 Data management	48
6. FURTHER READING: Publications on facility-based ICF projects	51
References	52



4

INTENSIFIED TB  
CASE FINDING  
AT FACILITY LEVEL



## **PURPOSE OF THIS DOCUMENT**

This document is one in a series of 11 field guides produced by Stop TB Partnership in collaboration with the Global Fund to Fight AIDS, Tuberculosis and Malaria, KIT Royal Tropical Institute, Interactive Research and Development Global (IRD), and multiple global experts and implementation partners. These field guides rely on practical experiences and expertise of implementers and are meant to help national TB programmes and other TB programme managers to identify the best strategies for finding people with TB who are missed by routine health services.

This document is not to be treated as guidance, but rather as a collection of considerations, tools, experiences and examples that highlight the successes and challenges in implementing effective TB case-finding interventions and may assist in their planning.

Public health facilities are crucial partners in implementing programmes that aim to find missing people with TB. This field guide describes the key steps for launching a case-finding intervention at facility level and presents examples of engaging with various types of facilities.

This field guide has gone through extensive peer review by the agencies and individuals acknowledged below. It presents a range of examples from peer-reviewed literature and implementation practice. Where not cited, examples are provided by TB REACH.



## Acknowledgements

The production of these field guides represents a significant effort, bringing together more than 60 experts from over 30 different institutions globally in the spirit of partnership to help address a major barrier in the TB response: the fact that millions of people with TB are still missed by the current routine health systems.

The development of the guides was generously supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria as part of the Strategic Initiative on TB: Address specific barriers to finding missing tuberculosis cases, develop innovative approaches to accelerate case finding, and scale up tools and approaches. The Strategic Initiative is implemented by the Stop TB Partnership together with International Research and Development Global, Pakistan, and KIT Royal Tropical Institute, Netherlands

The writing of these field guides was coordinated by Marina Smelyanskaya, under the guidance of Jacob Creswell. The core writing team consisted of (in alphabetical order) Mirjam I Bakker, Lucie Blok Andrew J Codlin, Jacob Creswell, Lisanne Gerstel, Ali Habib, Manjot Kaur, Liesl PageShipp, and Marina Smelyanskaya. Many others contributed to writing sections of different guides as well as reviewing them. A list of the writers and reviewers is presented below.

Many of the contributors attended a consultation in Amsterdam, Netherlands, in June 2018, to review and refine the draft of this guide. We thank the team at KIT Royal Tropical Institute for their support in organizing the consultation and review meeting and all participants for their time, ideas, and insights.

- Ramya Ananthakrishnan, REACH (Resource Group for Education and Advocacy for Community Health) India
- Sandra Alba, KIT Royal Tropical Institute, Netherlands
- Uliane Appolinario, The Global Fund to Fight AIDS, Tuberculosis and Malaria, Switzerland
- Mirjam I. Bakker, KIT Royal Tropical Institute, Netherlands
- Mercedes Becerra, Harvard Medical School, USA
- Stela Bivol, Center for Health Policies and Studies, Moldova
- Lucie Blok, KIT Royal Tropical Institute, Netherlands
- Frank Bonsu, National Tuberculosis Control Programme, Ghana
- E. Jane Carter, Warren Alpert Medical School, Brown University, USA
- Andre J Codlin, Friends for International TB Relief, Vietnam
- Jacob Creswell, Stop TB Partnership, Switzerland
- Luis Cuevas, Liverpool School of Tropical Medicine, UK
- Salah Edine-Ottmani, Morocco
- Carlton Evans, Innovación Por la Salud Y Desarrollo (IPSYD), Asociación Benéfica PRISMA, Perú
- Elizabeth Fair, Curry International Tuberculosis Center, University of California, San Francisco, USA
- Lisanne Gerstel, KIT Royal Tropical Institute, Netherlands
- Elmira Gurbanova, WHO, Azerbaijan
- Dr. Stephen John, Janna Health Foundation, Nigeria
- Peter Hansen, The Global Fund to Fight AIDS, Tuberculosis and Malaria, Switzerland
- Kyung Hyun Oh, Head, Korean Institute of Tuberculosis, Korea

- Kekeletso Kao, FIND, Switzerland
  - Manjot Kaur, Interactive Research and Development, India
  - Aamir Khan Executive Director, International Research and Development Global, Pakistan
  - Amera Khan, Technical Officer, Stop TB Partnership, Switzerland
  - Daniele Chaves Kuhleis, Brazil
  - Daisy Lekharu, The Global Fund to Fight AIDS, Tuberculosis and Malaria, Switzerland
  - Lynette Mabote, AIDS and Rights Alliance for Southern Africa (ARASA), South Africa
  - Fariyah Malik, Pakistan
  - Anna Mandalakas, Baylor College of Medicine and Texas Children's Hospital, USA
  - Enos Masini, WHO, Kenya
  - Thulani Mbatha, Interactive Research and Development, South Africa
  - Christina Mergenthaler, KIT Royal Tropical Institute, Netherlands
  - Peter Mok, Independent Consultant, Malaysia
  - Monde Muyoyeta, Centre for Infectious Disease Research in Zambia
  - Sreenivas Nair, Stop TB Partnership, Switzerland
  - Sode Novatus Matiku, New Dimension Consulting (NEDICO), Tanzania
  - Drusilla Nyaboke, Republic of Kenya National Tuberculosis, Leprosy and Lung Disease Program, Kenya
  - Chidubem Ogbudebe, KNCV Tuberculosis Foundation, Nigeria
  - Madhukar Pai, McGill Global Health Programs, McGill International TB Centre, Canada
  - Liesl PageShipp, Interactive Research and Development, South Africa
  - Zhi Zhen Qin, Stop TB Partnership, Switzerland
  - Oriol Ramis, Spain
  - M. D'Arcy Richardson, USA
  - Ataulhaq Sanaie, UK
  - Melissa Sander, Tuberculosis Reference Laboratory Bamenda, Cameroon
  - Anna Scardigli, The Global Fund to Fight AIDS, Tuberculosis and Malaria, Switzerland
  - Simon Schaff, Desmond Tutu TB Centre, Department of Paediatrics and Child Health, Stellenbosch University, South Africa
  - Bogdana Shcherbak-Verlan, PATH, Ukraine
  - Marina Smelyanskaya, Stop TB Partnership, Switzerland
  - Robert Stevens, UK
  - Pedro Suarez, Management Sciences for Health, USA
  - Guy Stallworthy, USA
  - Ajaykumar Thirumala, Independent Public health laboratory consultant, India
  - Stephanie M. Topp, James Cook University, Australia
  - Pillar Ustero, Switzerland
  - Brittney van de Water, Harvard Medical School, USA
  - Frank van Doren, CheckTB! Netherlands
  - Wayne van Gemert, Stop TB Partnership, Switzerland
  - Kristian van Kalmthout, KNCV Tuberculosis Foundation, Netherlands
  - Shibu Vijayan, PATH, India
  - Luan Vo Nguyen Quang, Friends for International TB Relief/Interactive Research and Development, Vietnam
  - Ashvini Vyas, Asha Kalp, India
  - Eliud Wandwalo, The Global Fund to Fight AIDS, Tuberculosis and Malaria, Switzerland
  - William Wells, USAID, USA
  - Mohammed Yassin, The Global Fund to Fight AIDS, Tuberculosis and Malaria, Switzerland
  - Ingrid Zuleta, KIT Royal Tropical Institute
- The field guides were edited by Fiona Stewart and Marina Smelyanskaya.
- Design was done by Miguel Bernal in coordination with Nina Saouter.
- Photography for the guides was contributed by Miguel Bernal and Shehzad Noorani.
- The time and expertise of all the contributors listed are gratefully acknowledged by the Stop TB Partnership.



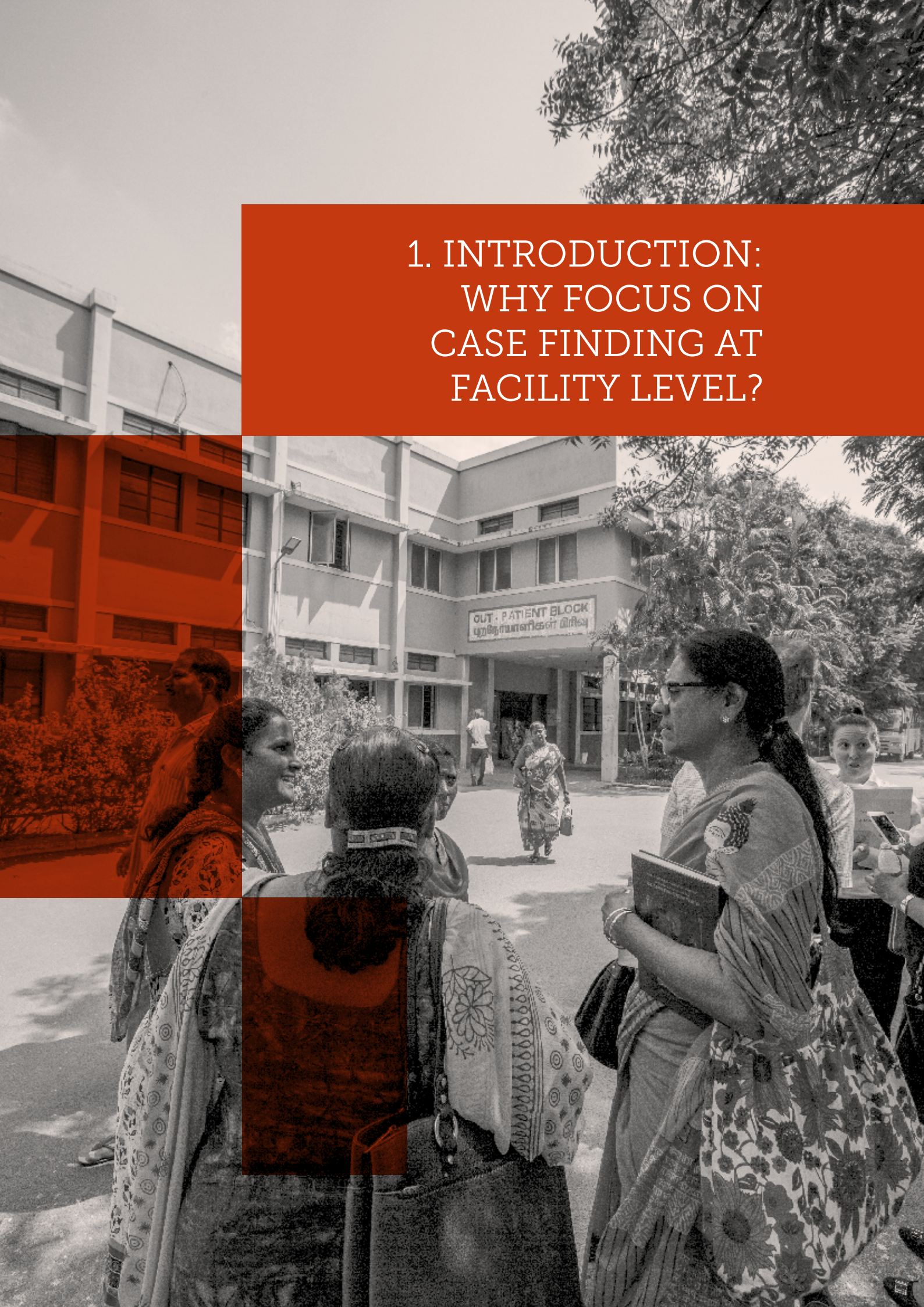




# Abbreviations

<b>ACF</b>	Active case finding
<b>COS</b>	Cough officer screening
<b>CXR</b>	Chest X-ray
<b>DR-TB</b>	Drug-resistant tuberculosis
<b>DST</b>	Drug-susceptibility testing
<b>FBS</b>	Facility-based screening
<b>ICF</b>	Intensified case finding
<b>LTFU</b>	Loss to follow-up
<b>M&amp;E</b>	Monitoring and evaluation
<b>MDR-TB</b>	Multidrug-resistant tuberculosis
<b>MoH</b>	Ministry of Health
<b>NCD</b>	Non-communicable disease
<b>NTP</b>	National tuberculosis programme
<b>OPD</b>	Outpatient department
<b>PHC</b>	Primary health care
<b>PLHIV</b>	People living with HIV
<b>PWID</b>	People who inject drugs
<b>QI</b>	Quality Improvement
<b>QIT</b>	Quality Improvement Team
<b>RCH</b>	Reproductive and child health
<b>SOP</b>	Standard operating procedure
<b>TB</b>	Tuberculosis
<b>WHO</b>	World Health Organization





# 1. INTRODUCTION: WHY FOCUS ON CASE FINDING AT FACILITY LEVEL?

OUT-PATIENT BLOCK  
புறநோயாளிகளின் மருத்துவமனை



It is well-recognized that relying exclusively on passive case finding – a modality in which people with tuberculosis (TB) symptoms present voluntarily at health care facilities – not only misses opportunities to diagnose TB and initiate treatment, but also contributes to increased disease severity and mortality (1). On the other hand, provider-initiated systematic screening for active TB and other facility-based interventions that incorporate aspects of enhanced and active case finding (ACF) strategies are cost-effective and should be scaled up to achieve global goals for the prevention and control of TB (2). In 2005, a review of over 100 ACF interventions carried out within

health care systems from the 1930s until 2001 concluded that targeted case finding activities are often the most cost-effective when programme designers use local epidemiologic data to identify appropriate populations and settings (2). The 2005 review was updated in 2013 in order to evaluate additional evidence with which to assess yield in different settings and risk groups. The 2013 research team analysed 601 papers and abstracts related to 26 risk categories and settings for ACF and concluded that facility-based interventions, particularly in inpatient settings and HIV clinics, have high potential screening yields, especially in high incidence populations (3).



In practice, facility-based interventions may lead to the identification of up to a third of the people with TB who are missed. Results on health-seeking behaviour from a study carried out during the TB Zambia Prevalence survey (2012–2014) found that 34.9% of 6,708 participants who reported at least a history of chest pain, cough and fever for 2 weeks or more had sought care for their symptoms at a health facility. The study also found that the average time from the onset of symptoms to first care-seeking was 3 weeks for presumptive TB cases. One of the conclusions drawn in the study was that the Zambian health system was missing opportunities to diagnose TB among those who sought care within the walls of health facilities (4).

Box 1 lists some settings within a facility where screening projects can be implemented. Section 2.2, later in the field guide, describes approaches to analysing and selecting facilities during the project design phase.

1. General outpatient departments (OPDs)
2. Specialized outpatient services (e.g. mental health, non-communicable diseases [NCDs], reproductive and child health [RCH], etc.)
3. Antenatal and paediatric clinics, immunization, nutrition, etc.
4. HIV clinics
5. Inpatient care services for patients whose condition requires admission to hospital
6. Primary health care facilities
7. Occupational health clinics
8. Drug treatment clinics
9. Inpatient services
10. TB clinics (i.e. targeting family members/friends who accompany TB patients)

*These facilities can be public or private.*

An intensified case finding (ICF) approach at facility level tends to have high access to patients and thus high potential yields. Accordingly, facility-based ICF may require the least amount of effort among ACF interventions, but with the largest potential for impact. Even if individuals who present at a health facility are not part of a specific group considered to be at higher risk for TB, they can still be screened for TB in a less labour-intensive and logistically challenging manner than with other ACF methods. Furthermore, failure to screen for TB at facilities where high-risk TB populations might be seeking care for other concerns represents an unforgivable missed opportunity to identify and treat people with TB who have yet to be diagnosed. However, it is important to note that ICF at facility level should not be the sole strategy used to diagnose people with TB. Although many may be identified through

comprehensive ICF at facility level, some people will remain undiagnosed if other types of outreach are not instituted, particularly in places where access to health services is poor.

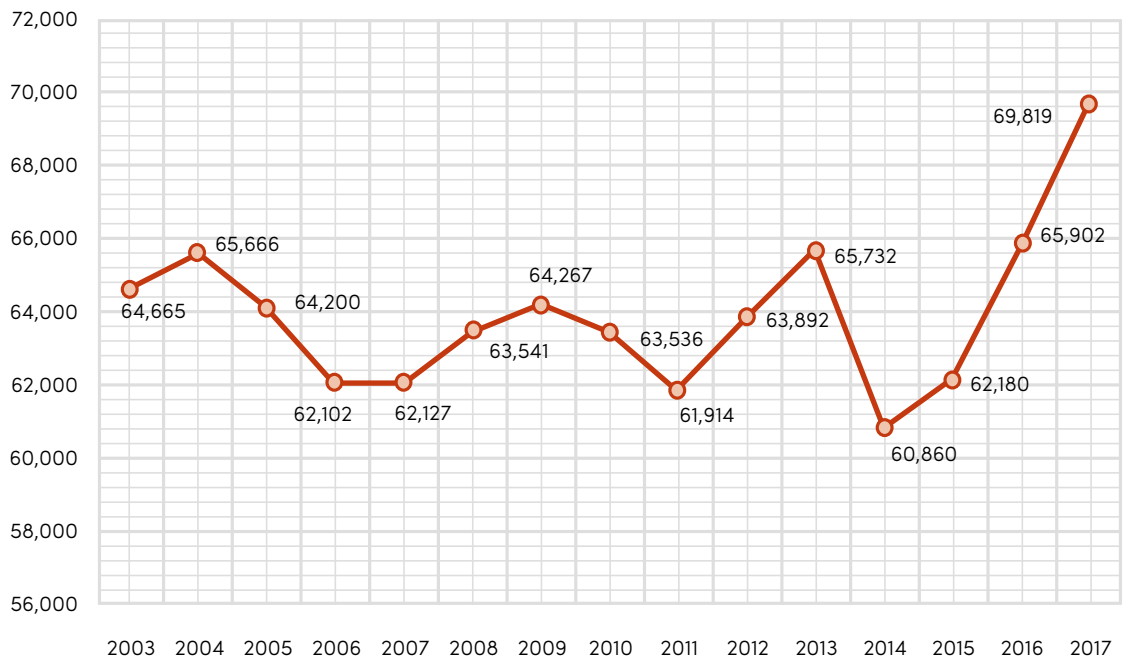
Two South African studies have shown that low rates of TB screening and testing at health facilities (especially at primary care clinics) contribute significantly to the number of missed TB patients, illustrating the potential for optimized facility-based screening (5,6). First, a cross-sectional sub-study carried out between 2012 and 2013 under the XTEND trial in South Africa enrolled 3,604 patients exiting 40 primary health care (PHC) clinics. The investigators found that even though 70% of those patients had reported cough, only 23% had been asked to give a sputum sample for TB testing (5). A second study was performed at 20 randomly selected PHC clinics in a high-burden district

of South Africa. The results showed that the health system missed 63–79% of people with TB who were seeking care for TB-related symptoms and 90–100% of those attending a clinic for other reasons (6). These studies indicate that, if passive case finding approaches are correctly implemented, a significant number of people with TB can be “found”; but when systematic and proactive provider-initiated screening takes place, results can be significantly improved.

In Afghanistan, the National TB Programme (NTP) implemented targeted ACF interventions in six provinces from October 2011 to December 2012, including facility-based screening at 47 Basic Medical Unit (BMU) health facilities. More than 2 million people were screened and 5,046 people with smear-positive TB were detected, representing a 0.3% screening yield. Most of the people with TB notified (81.7%) during this period were identified in health facilities (7).

The National TB and Leprosy Programme (NTLP) in Tanzania implemented facility-based ICF between April 2016 and December 2017. During the first year, two regions (Dodoma and Mbeya) with 12 intervention facilities each were involved in the intervention. From July 2017, the facility-based ICF initiative was rolled out to 14 more regions, covering 16 of the 30 regions in the country and all formal health facilities. The initial results showed an over 100% increase in TB case notifications in most of the intervention facilities. Furthermore, following 18 months of facility-based ICF implementation, the country’s TB notifications for all cases had increased by 12.4% – from 62,180 cases in 2015 to 69,819 cases in 2017. These data are also reflected in Figure 1.<sup>1</sup>

**Figure 1. Trends in TB case notification in Tanzania 2003–2017**



<sup>1</sup> Preliminary data from Program Quality and Efficiency Project in Tanzania received from the Global Fund to Fight AIDS, TB and Malaria in July 2018.









## 2. DESIGNING INTENSIFIED CASE FINDING INTERVENTIONS AT FACILITY LEVEL



## 2. DESIGNING INTENSIFIED CASE FINDING INTERVENTIONS AT FACILITY LEVEL

A set of fundamental considerations may be taken into account at the outset of designing an ICF/facility-based screening (FBS) project. This section explores these considerations, presenting key questions to address in order to better understand the central issues at play in ICF project design at facility level (see Box 2); each

consideration is examined in detail in the following sub-sections. These considerations can serve as an entry-point checklist, as well as a step-by-step guide to process planning. Although some of these steps can be followed concurrently, planners should ideally work through them in sequential order.

Box 2.

### Key considerations for facility-level ICF interventions

#### 1. Baseline assessment: Who is being missed and where?

- What are the regions / provinces / states / districts with low TB case notifications?
- What are the barriers to notifying more TB cases?
- What are the characteristics of populations at risk of TB?

#### 2. Selecting the regions / provinces / states / districts to implement facility-based ICF

- Which TB stakeholders and implementing partners should be involved?
- Which health facilities will implement facility-based ICF?
- What are the training needs in these regions / provinces / states / districts?

#### 3. Local management buy-in

- Are there any policy documents with guidelines on facility-based ICF?
- Which local TB stakeholders should be involved?
- How can facility-based ICF be part of daily discussions at the health facility?
- How can the index of suspicion for TB be raised among health workers?

#### **4. Selecting the location(s) within health facilities for TB screening**

- What is the patient flow at the facility?
- Where in the patient flow will the screening take place?
- Are there specific locations within the facility where ICF may be more efficient and/or effective?
- Should TB screening be conducted in all units of the health facility?

#### **5. Selecting the screening and diagnostic processes**

- How will the screening be done?
- What will the screening process and algorithm look like?

#### **6. Staffing**

- Who will do the screening?
- What are the staffing considerations?

#### **7. Linkage to diagnosis and treatment**

- How will patients be linked to diagnosis from the service delivery points?
- How will patients be informed of their test results?
- How will patients be linked to treatment and ongoing adherence support?
- What is needed to ensure TB diagnostic services are carried out on a daily basis?
- Is there a need for monitoring and evaluation (M&E) tools for recording and reporting presumptive TB cases, TB diagnostics and TB treatment services?

#### **8. Lab networks**

- Do labs in the selected region/supporting the selected facilities have sufficient capacity to support increased testing loads?
- What are the potential sample transport networks to facilitate faster results?

#### **9. Integration with other screening programmes at the health facility, e.g. HIV screening**

- Are there any other screening programmes at the facility, e.g. HIV, diabetes, breast and cervical cancer screening, etc.?
- How can TB screening be integrated with other screening services?

#### **10. Ensuring ownership and accountability**

- Has the ownership and chain of accountability been clearly outlined?

#### **11. Developing an M&E framework**

- Do project metrics align with the overall goals of the screening project?
- Do the metrics align with NTP policies and expectations (and donor expectations where applicable)?

## 2.1 Baseline assessment: Who are the people being missed and where are they?

National or subnational baseline assessments will help implementers learn about the areas where TB programmes might be missing people with TB. Such assessments can be carried out by analysing routine TB notification data, and by collecting information about existing barriers in TB case detection as well as possible solutions to increase TB case detection and notification.



The following types of data may be useful for assessment:

- What are the regions / provinces / states / districts with low TB case notification?
- What are the characteristics of populations at risk for TB?
- What are the barriers to TB case notifications?
- What are possible solutions for increasing TB case detection?

The introductory field guide in this series presents some strategies that implementers can use to conduct the assessment based on existing data. This step also helps implementers to identify the populations that are being missed.



These questions can be asked when looking at population-level data:

- Are the undiagnosed people expected to be primarily urban or rural?
- Where do they live, work and gather?
- What are their preferences related to health care access, including their preference for public vs. private health care systems?
- Can they be defined as TB key populations?

## 2.2 Selecting the regions / provinces / states / districts to implement facility-based ICF

The second step after conducting the national or subnational baseline assessment is to select the basic geographies where facility-based ICF will be implemented. These will differ by country and may be regions, provinces, states or districts. Depending on available resources and the findings of the baseline assess-

ment, some countries may decide to implement facility-based ICF country-wide or instead consider a phased approach. Selection may also depend of the availability of stakeholders and implementing agencies/partners who are ready to take on the implementation of ICF at facility level in these geographies.



The following questions may be useful to consider at this stage:

- Which TB stakeholders and implementing partners should be involved?
- Which health facilities will implement facility-based ICF?
- What are the training needs in these regions / provinces / states / districts?

For more information on mapping, planning and stakeholder selection, please see the introductory field guide in this series.

## 2.3 Facility management buy-in and site assessment

Once a tentative facility selection has been made, the next step should be a detailed site assessment that includes meetings with the facility management. The importance of gaining local management buy-in for the facility-based ICF project cannot be underestimated. Facility management needs to be completely

on board before a facility can be selected for a screening project. Negotiations with management and operational staff constitute a key early step for any facility-based ICF project. Each type of facility has its own unique strengths and challenges that implementers need to understand (see Box 3).

During the site assessment, planners should consider the following key questions about the facility:

- What are management's priorities?
- What are the coordination mechanisms to be followed by the facility staff?
- Above the facility level, is there a local or national campaign around finding "missing people" with undiagnosed TB?
- What other case-finding activities are taking place in communities surrounding the facility?
- What other partners and stakeholders are involved in TB case-finding activities, diagnosis and treatment?
- Are training resources available for various cadres of health facility staff?
- What training, if any, has the staff received around TB screening?
- Who is being screened and by whom?
- What is the percentage of people identified with presumptive TB/confirmed TB?
- What screening algorithm is already in place at the site, if any?
- Is an infection control plan available?
- Is there a standard operating procedure (SOP) for sputum collection?
- Are laboratory services available for TB diagnosis? If not, what are the challenges?
- What diagnostic tests are being used? Where are they performed?
- Is there a lab on site or do samples need to be transported after they are collected?
- What sample transportation mechanisms are in place (non-diagnostic facilities)?
- What is the information system linking diagnosis to treatment?
- Are there any existing issues around initial loss to follow-up (LTFU) that need to be understood and addressed?
- How are screening and diagnostic tests funded?
- Does the lab utilized have enough throughput to handle an increased sample load?
- How and where is TB treatment initiated?
- How long does it take to initiate TB treatment once the diagnosis is confirmed?
- What data are routinely collected? How are data reported and collated?
- What is the treatment dropout rate and what mitigation mechanisms exist?
- Is there a functional facility Quality Improvement Team (QIT)? If yes, how are they improving the quality and efficiency of TB case detection?

## 2.4 Selecting the location(s) within health facilities for TB screening

Health facilities differ in terms of type, level, size and reporting structure. Due to these characteristics, patient flows will differ from one facility type to another. For each facility type, it is important to identify the optimal point in the patient flow to conduct TB screening. Experience from implementing facility-based ICF in Tanzania and Kenya shows that TB screening may be carried out at each point of contact with a patient and could incorporate all rooms of an OPD; all specialized clinics, e.g. HIV, diabetes, RCH, TB; the laboratory, pharmacy, insurance window, inpatient wards; and even the labour ward. This is something to discuss not only with the management, but also

with the staff of the facilities selected, as they may have some additional insights. For example, staff might know that patients usually form a queue just prior to opening hours, which could be a good opportunity for triaging patients with TB symptoms in crowded OPDs. In Bihar, India in 2014, the effect of triage in the crowded outpatient areas of 164 PHCs showed a significant improvement in both TB symptomatic screening and sputum-positive case detection compared to the previous two years. TB symptomatic screening increased by 18% from 2012 figures and 25% from 2013 figures, and sputum-positive case detection increased by 30% from 2012 and 37% from 2013 (8).



The following questions may be useful to consider at this stage:

- What is the patient flow at the facility?
- Where in the patient flow will the screening take place?
- Are there specific locations within the facilities where ICF may be more efficient and/or effective (which facilities, which specific location(s) within the facility)?
- Should TB screening be conducted in all units of the health facility?
- Who can be the focal person for TB ICF at the facility or in each unit/department of the facility?

## 2.5 Selecting the screening and diagnostic processes

Once the target populations and screening sites have been decided, the next step is to determine the screening and diagnostic processes. Decisions regarding the most appropriate algorithm should be based on the population being screened, coupled with the availability and cost of screening and diagnostic modalities. In effect, efforts to optimize the screening yield (i.e. the total number of people with TB found/total number of clients screened) may need to be

balanced by resource constraints. The choice of algorithm may be informed by existing site data, other local data, and/or international experience (particularly regarding key populations). It is critical that the screening algorithm and yield at each step of the process be captured and frequently reviewed in order to optimize the ultimate screening yield. If a more efficient process is identified, project implementers should be prepared to course correct or even alter the algorithm.





The usual screening algorithm commences with a verbal symptom screen, for which a combination of symptoms is used depending on the country guidelines and HIV prevalence. Although verbal screening may be regarded as simple and cost-effective, it is highly subjective and user-dependent. It is also often just an “add-on” to busy staff members’ tasks and therefore may not be performed optimally.

### Screening

In many settings, screening via digital chest X-ray (CXR) may be implemented. CXR can be more sensitive than symptom screening and is not “operator-dependent” in the same way as a symptom screen; however, CXR is not specific and follow-up testing is required to make a TB diagnosis. Considerations for using CXR as a screening tool include cost and existing infrastructure. Regarding cost, a high daily throughput may be required to justify the additional costs of CXR. However, CXR screening may be a useful triage to reduce the number of Xpert cartridges used. The number of hours of operation for X-ray machines should be considered due to potential infrastructure constraints, especially in cases of government-owned equipment and/or systems. Digital CXR with computer-aided detection (CAD4TB) with a chosen cut-off may increase efficiency significantly; spot sputum samples can be taken immediately based on the CAD score with no need to wait for a CXR reading. For more information on CXR, please refer to the relevant field guide in this series.

### Diagnosis

Regardless of whether a verbal screen or CXR is used, a TB diagnosis needs to be made by smear microscopy, Xpert molecular testing, or culture. Unfortunately, many facilities still only have access to smear microscopy. Culture is prohibitively expensive and logistically challenging in many settings, with a 4- to 6-week turnaround on results. Every effort should be made to use Xpert testing at a minimum for facility-based screening. It is critical that optimal sputum samples be sent for testing. Screeners need to be trained in sample collection; in previous TB REACH projects, the use of videos (9) has been shown to assist both staff and patients in obtaining optimal sputum samples. Every effort should be made to take a spot sputum sample. However, for those who cannot expectorate, a sputum bottle may be given for them to collect an early morning specimen. It is critical that strong linkages are established with the laboratory prior to screening and that the laboratory has the capacity to process an increased number of tests. It is essential for there to be close tracking of sputum samples sent, timely and accurate results from the laboratory, and linkage of results back to the screening programme. For more information on Xpert testing, sputum collection and laboratory networks, please see the laboratory field guide in this series.

Not all patients with TB will be bacteriologically confirmed. Therefore, provision should be made for all symptomatic patients or those with an abnormal CXR to be reviewed by a medical officer who may diagnose “clinical TB” and elect to start TB treatment based on a combination of history, symptoms and CXR, if available. All patients diagnosed with TB on smear or clinically should have a specimen sent for Xpert testing in order to determine rifampicin susceptibility. All patients should have universal access to drug-susceptibility testing (DST).

## 2.6 Staffing

### Creating a project plan

Once the population has been defined and the location and algorithms have been determined, the next step is to bring together these elements in a clear, specific plan. For example, a project may plan to screen “all males between the ages of 15 to 45 visiting the reception area between 8 AM and 8 PM on all hospital working days”. This framework will allow for further decisions to be made on the staffing complement. This level of detail will also ensure clarity for all personnel regarding the roles and responsibilities to implement the algorithm and reach the maximum number of people who need TB screening at a particular health facility. The project plan should form an integral part of the training process.

At this stage, decisions need to be made on the staff cadre that will lead the screening, after which it is necessary to systematically plan along three process steps: employment model, training, and ensuring ownership and accountability.

### Staff cadres for screening

FBS is a package of services and thus may involve many different staff cadres, such as lay staff, other health care workers, nurses and physicians. However, it is important to identify which cadre will be responsible for implementing the various components of the screening cascade. Below is a short discussion on the staff types that have been considered to carry out ICF at the facility level:

#### Community health care workers

In the majority of ongoing facility-based ICF projects, screening is performed by community health care workers, paramedical staff and community health volunteers. A TB REACH-supported project in Karachi, Pakistan used community health workers to screen 469,896 people attending 54 private clinics. Mobile phones were used to offer incentives to the screeners and enhance reporting. The intervention tested 1.8% of attend-

ees (those with TB symptoms) and diagnosed 2,416 cases of TB (0.5% screening yield) – almost four times more than the year before in the same administrative areas (10). The Ebonyi project in Nigeria has effectively utilized paramedical staff and volunteers to screen and refer people with symptoms suggestive of TB for diagnosis (11). This cadre of personnel with no formal health care education but with training in particular areas of health care delivery is a viable and sustainable fit for screening projects in high-burden countries, because costs associated with this cadre are lower than with other staff types. The Ebonyi project was recognized to have the additional benefit of providing livelihoods to unemployed paramedics and graduates in the community.

#### Medical staff (nurses and physicians)

For ICF to succeed at the facility level, there should be a focal person for TB screening who can be identified as a champion for each department to take full responsibility for all TB screening in each respective unit. Nurses and physicians may be involved in initial screening, but there are few examples of projects that have done this with any marked success. The Ghana NTP implemented nurse-initiated screening in general OPDs, HIV clinics and diabetes clinics in Accra between 2010 and 2013. Among those screened, rates of TB were highest among HIV patients (995 per 100,000, or 1% screening yield). The case-finding intervention did not demonstrate an increase in TB case notification in the intervention population compared to the control population and even showed a downward trend (12). This unexpected result could possibly be attributed to variations in screening across facilities and programmatic challenges involved in executing a screening programme over a long period of time. In a multi-centre study at five district hospitals in Nigeria, nurses were trained to

interview all adults (with cough for more than 2 weeks) visiting the participating clinics and to request sputum samples from them. The study found 209 TB patients from among the 1,202 participants, representing a 17% screening yield (13). There are a few minor advantages to utilizing physicians for the initial screening: First, it can be administratively simple if doctors are the first point of contact for the patient in the facility, and second, clinical decision-making – if required – can take place on the spot. However, these advantages are outweighed by the reality that physicians' time is at a premium, especially in high-burden settings with poor doctor/patient ratios.

### Staffing models

Once the staff cadre has been selected, further decisions must be made regarding the employment model, for example, the use of part-time versus full-time staff, type of remuneration, and strategies for placement. The project context should direct the choice of model: using existing health staff for screening, hiring part-time staff, or hiring full-time staff (see Figure 2). These three models offer an increasing level of direct influence and performance management, but also require an increasing investment of resources (e.g. new contracts, liabilities, administrative support, etc.).

Figure 2.

### Staffing models

**EMPLOYMENT MODELS FOR FACILITY-BASED SCREENING**

**Existing facility staff:**

- Training and incentives to screen
- Buy-in from management and agreement on accountability and performance

**Hire part-time screening staff:**

- Need to give training and salary with/without screening incentives
- Simpler (compared to full-time staff) contracts and administration

**Hire full-time staff:**

- Need to give training and salary with/without screening incentives
- Need to manage formal contracts, admin support, union issues, etc.

### Using existing staff

There have been instances of facility administration requesting that the screening project use existing staff, who would then be able to increase their earnings. However, there can be a number of disadvantages to this approach, for example, potentially distracting staff from their other work in the facility or the complexities of setting up accountability mechanisms. Issues of equity with other staff

need to be considered. This option could be considered if quality can be assured, but it must form part of the negotiation process with facility management. Existing community volunteers and peer educators in the community can also be helpful in screener recruitment (please see the field guide on community case finding that discusses community engagement in more detail).

## Hiring additional support

In a screening project implemented in Kotri, Pakistan, the facility's laboratory staff found themselves overwhelmed by the three-fold increase in TB samples generated by an ICF project at facility level. The project team responded by hiring additional lab staff to support the facility.<sup>2</sup> The Ebonyi project in Nigeria experienced similar human resource challenges. The underfunded Nigerian health system had a dearth of health care workers, and the regular health care workers in the project facilities felt overburdened to take on the extra duties associated with the screening project. To address this, the project implementers engaged adjunct staff to supplement the regular staff and also provided small incentives to the regular workers (14).

## Staff remuneration

A key consideration is staff remuneration, which can be based on a fixed salary, performance-based incentives, or a mixture of the two. Various projects include incentives for health workers for identifying cases and/or ensuring treatment completion.



An analysis of 51 FIDELIS projects implemented in 18 countries between 2003 and 2007 demonstrated that projects using incentives as a strategy had a higher median additional case-finding rate than projects that did not.<sup>3</sup> The study also concluded that projects using incentives had a significantly lower median cost per additional case (US\$ 84/case) than projects without incentives (US\$ 180/case) (15).

For more information about incentives, please see the introductory field guide in this series.

## Training

Whichever staffing model is chosen, it is important to build in a strong training element that encompasses the start-up phase and ensures continuous, on-the-job training and mentorship (see Box 4 for examples). A broader group of facility staff (beyond just the screeners, e.g. laboratory staff) may be included in the training. As in most projects, it is important to be aware of the learning curve and be prepared for setbacks during the early months of the project. Since many programme staff and health care workers are unaccustomed to ACF strategies, capacity-building should be carried out prior to the commencement of screening activities.

In high-burden settings, training on TB screening and other aspects of ACF can also be incorporated into health worker continuing education and accreditation courses that are the part of the national health system in order to ensure sustainability.

<sup>2</sup> From interviews with project team

<sup>3</sup> Fund for Innovative DOTS Expansion through Local Initiatives to Stop TB (FIDELIS) is funded by the Canadian International Development Agency (CIDA) and managed by The International Union Against Tuberculosis and Lung Disease (The Union).

1. Basic training on TB (especially if the lay people and providers utilized as screeners have not screened for TB before)
2. Cough hygiene and infection control measures, including protection of the screeners themselves
3. Sputum induction and collection (if ultrasonic nebulizers are used for sputum induction, then basic life support training should also be included)
4. Data collection, entry and linkage to notification
5. Communication skills
6. Counselling skills, with special focus on the importance of adherence and treatment completion
7. Technical skills as needed, e.g. for operating the CXR equipment
8. Training on other programmatic SOPs as needed (e.g. on processes around diagnosis and clinical referral in the facility)
9. Basics of occupational health and safety to ensure that providers are aware of the risks associated with sputum collection and potential increased exposure to TB

### Processes and accountability

Strong processes are essential to setting up a chain of accountability. The screening team's role should be clear to everyone involved in the day-to-day work at the facility. For example:

- **Location:** Where are they placed?
- **Other tasks:** What do they do when client flow is slow?
- **Integration:** How does their work fit into the hospital/facility flow of tasks?

It is also very important for the screening staff to understand linkages between the various screening-related systems in the facility. Areas that should be clarified for the project team include:

- Where is the verbal screening conducted?
- Where do patients submit a sputum sample?
- What is the sputum transport process?
- Who receives the sputum samples at the lab?
- What is the turnaround time?
- Who will collect the test result?
- Who decides on diagnosis?
- Who will inform the patient and how?
- What is the next step after the client is diagnosed?

One linkage tool used successfully by some projects is a referral note – an easily identifiable paper slip that indicates the client’s status, e.g. as screened, tested, referred. The referral note follows the client and sputum sample from site to site. Hospital consultants and lab staff should be periodically sensitized on facility-based ICF activities and other related issues, including NTP guidelines. For more detail on this issue, please see Section 3 (“Issues and challenges”) in this field guide and also the field guide on informational systems and linkages in this series.

## 2.7 Linkage to diagnosis and treatment

Even the most well-executed screening project cannot be regarded as successful if people diagnosed with TB do not promptly commence appropriate TB treatment. In all interventions, emphasis should be placed on the most rapid reporting of results and linkage to treatment. This is one of the most important indicators of a successful facility-based ICF programme. There are instances where screening projects have not recorded and reported indicators on screened patients linked to diagnosis

and/or treatment. The Ebonyi screening project described above had a screening yield of 0.6%, but only 82% of the diagnosed cases (1,182 patients) were registered and treated (14). In other words, the project missed the opportunity to treat 188 “additional” people they found (all forms) and 99 “additional” people who were identified as smear-positive. This early LTFU, which refers to a diagnosed patient failing to start treatment, reveals gaps in the health system.

## 2.8 Ensuring ownership and accountability

A common mistake is to consider a facility-based ICF project as a standalone entity. Screening activities are part of the larger universe of the facility, the dynamics of which are closely linked to the project and strongly influence the screening project’s outcomes. Therefore, for ICF to be successful at facility level, it needs to have strong owners and champions within the facility management. When designing and implementing an ICF intervention at facility level, it is critical for the roles and responsibilities to be built on a good understanding of the specific political, infrastructural and communication dynamics at play within a given facility. This process of building ownership should form part of the overall negotiation process with facility management. This is a continuous rather than one-time process, which goes

through the stages of building early buy-in, establishing agreements, providing ongoing support, navigating transitions, and scaling up to other units in the facility after success has been demonstrated in one unit. It is also important to be aware that the screening project may add to the existing facility workload and may require investment of additional facility resources. Therefore, management discussions should include establishing agreement over which existing facility resources can be used for the FBS project and what additional resources need to be secured. Managing such additional ties will continue to be an important consideration for the project’s expansion to new facilities. Box 5 provides a checklist to illustrate what accountability and ownership might look like in a facility-based ICF project.

The following checklist outlines ideal project ownership for a facility-based ICF project:

- The facility management is aligned with NTP guidelines and/or local government recommendations.
- Roles and responsibilities for the different aspects of the intervention (technical leadership, administrative decision-making, and data management) have been clearly agreed upon between the project team and facility management; Memorandums of Understanding (MoUs) to this effect have been signed.
- The project reporting structure is unambiguous and has bidirectional agreement.
- There are strong advocates/champions for facility-based ICF within the facility management.
- There is an understanding of what facility infrastructure can be used by the ICF project, what additional resources will need to be secured, and who is contributing these resources.
- There is some clarity on the project's future: how long will it continue, what it will transition into, whether it will be expanded to other units, and so forth.













### 3. EXPERIENCES IN FACILITY-BASED SCREENING ACROSS SETTINGS



# 3. EXPERIENCES IN FACILITY-BASED SCREENING ACROSS SETTINGS

Though it is a desirable goal, implementation experience has shown that it may not be possible to screen all patients attending the facility. Therefore, an informed approach can help to select specific departments within a facility or clinics where screening efforts will be focused. Considerations include an understanding of patient movement through the facility, prevalence estimates among clients visiting each area, and logistics. After reviewing the steps in Section 2, these engagement activities should be clearer to implementers. This section provides short descriptions of project experiences from facility-based screening interventions in various settings, such as:

- General OPDs and waiting/reception/entrance areas (at all types of facilities, including pharmacies and laboratories)
- Specialized outpatient services (e.g. mental health, NCDs, lung clinics, RCH, etc.)
- Antenatal clinics and paediatric clinics
- HIV clinics
- Inpatient care services
- PHC facilities
- Occupational health clinics
- Drug treatment and other clinics that serve people who use drugs
- Mobile services

## 3.1 General outpatient departments and waiting/reception/entrance areas

Within a health facility, the greatest numbers of people are likely to congregate in the waiting rooms/areas, reception and entrance areas and around registration desks. These settings are often the most cost-efficient screening locations because there is access to a high volume of patients waiting for any of the facility services (including laboratories and pharmacies). The same is true for general OPDs, which are the first stop for patients visiting the facility for the first time in most high-burden settings. In one of the earliest examples of ICF at facility level, symptom screening was carried out among 87,845 general OPD patients at six district hospitals in Kenya between 1979 and 1982. The project identified 2,299 people

with symptomatic TB, of which 4.7% were found to have culture-positive TB (16). Existing hospital staff were trained to question all new patients visiting the facility via a simple, symptom-based questionnaire. As part of the TB-REACH-supported project described above, a project in Karachi, Pakistan trained community lay people to assess patients and visitors in family clinic waiting areas and the hospital's OPD, using an interactive algorithm on mobile phones. The screeners received cash incentives for case detection and screened 81,700 people in the OPD between January and December 2011. They found 273 people with TB (0.3% screening yield), who were then linked to Pakistan's NTP (10).

## 3.2 Specialized outpatient services

Contrary to what might be assumed, TB screening is not always carried out by default at chest clinics. Intensive TB screening should be ensured in those settings that are already used by patients who are at a high risk for TB, such as chest clinics and diabetes clinics. “Bidirectional” screening for diabetes and TB has been recommended in high-burden countries, as diabetes increases the risk for TB and adversely affects TB treatment outcomes (17,18). However, few examples of screening projects implemented at diabetes clinics have shown high yields (12). It may be that patients attending diabetes clinics may be at a lower risk for TB than people with undiagnosed diabetes because they are already in care.

## 3.3 Antenatal clinics and paediatric clinics

Women and children remain particularly vulnerable to TB. Low rates of TB detection in women have been associated with sociocultural factors, low socioeconomic status of women, and the pressure for women to regard family matters as more important than their own health. Furthermore, TB may hold additional stigma for women, and women may encounter cultural barriers such as being unable to travel to a clinic without a male relative (19). A study from India concluded that women tended to visit health facilities for immunization and their children’s well-being rather than for their own health (20). Thus, programmes may consider targeting women at clinics closer to their homes, and clinics focusing on their children’s health (e.g. immunization clinics). Interventions aimed at integrating TB case finding in other clinics, such as antenatal clinics, have proven to be acceptable and have also been recommended in Malawi and South Africa (21). A cross-sectional hospital-based study in Dar es Salaam, conducted from October 2007 to June 2008, screened women who attended family planning clinics and brought children in for child health services. Of the 749 women who reported cough of any duration, 27 were found to be smear-positive (the yield from people with symptoms suggestive of TB was 2.7%) (22). For more detail on case finding among children, please see the field guide in this series on finding missing children with TB.

## 3.4 HIV clinics

HIV is associated with delays in TB diagnosis, and HIV clinics are among the highest yield settings due to the increased risk for TB among people living with HIV (PLHIV) (23,24). WHO’s 2013 guidelines for systematic screening strongly recommend that PLHIV be systematically screened for active TB at each visit to a health facility (25). While detection of TB in HIV-positive patients is difficult, it can be improved by a combination of ICF and laboratory testing using sensitive diagnostics. Cameroon’s NTP implemented an ICF intervention at facility level at HIV clinics in northwest Cameroon. The project increased case detection by using a combination of strategies, including intensive TB screening for PLHIV attending health centres, increasing the number of samples sent for testing, and implementing the Xpert MTB/RIF assay to increase the sensitivity of lab diagnoses. In two years of operation, this project (part of TB REACH Wave 4) was able to increase the number of people with symptoms suggestive of TB being tested at the project labs from an average of 1,674 per quarter to an average of 4,043 per quarter. This increase in testing led to a consequent increase in the number of bacteriologically-confirmed TB cases – from an average of 210 per quarter to an average of 330 per quarter (26).

## 3.6 Primary health care facilities (PHCs)

Similar to general OPDs, PHCs may be the first point of care for many patients with missed opportunities for diagnosing their TB. These two types of facilities are sometimes used interchangeably, but differ from a screening perspective. General OPDs are often located within larger facility settings, so linkages to diagnosis and treatment may be easier – although this cannot be taken for granted. PHCs are generally standalone entities and hence require more infrastructure-related considerations (e.g. patient transport and/or sputum transport). India's National TB Institute (NTI) ran a 9-month intervention to identify people with chest symptoms across primary health institutes in Bangalore district. A process of systematic symptom screening performed by medical officers identified 25 TB cases (0.3% screening yield) from among 9,302 patients (29).

## 3.5 Inpatient care services

There may be a large burden of unsuspected pulmonary TB comorbidity among inpatients with communicable or non-communicable diseases, and screening in an inpatient care system represents an opportunity to better evaluate this connection. In a prospective study performed by the University Teaching Hospital, Lusaka, Zambia, newly admitted adult inpatients who were able to produce sputum were screened for pulmonary TB using microscopy and automated liquid culture. Of the 900 inpatients screened (70.6% of whom were also PLHIV), 202 had culture-confirmed TB (22% screening yield) (27). However, evidence on the cost-effectiveness of inpatient screening is limited. A Taiwan-based nonprofit, Changhua Christian Hospital, implemented a cough officer screening (COS) protocol between 2004 and 2006. Of 19,836 inpatients screened, 184 were diagnosed with TB, but only 42 of those could be attributed to the COS protocol (Physicians identified the other 142 before the COS "alarm") (28). Screening in inpatient settings should be considered once the burden estimation in admitted patients is understood. The example from Taiwan suggests that the internal medicine ward may be a good source of missing patients. However, for this type of screening, patient permissions with signed consent forms (parental consent for paediatric inpatients) are especially important so as to ensure that the screening is not perceived as involuntary.

## 3.7 Occupational health clinics

In certain settings, routine occupational health screening provides an opportunity to screen for TB. This is particularly important and may even be a legislative requirement when employees are exposed to workplace hazards that increase their risk for TB. Workers at greatest risk are those exposed to silica dust during rock and sandblasting, such as miners, quarry workers and stone cutters. Employer-based clinics play an essential role in screening for TB. Not only do they fulfill a legislative requirement to screen for occupational TB, but they may also be more accessible for migrant labourers than the public sector. A study of the experiences of Mozambican miners in South Africa noted that these miners, similar to other migrants, rely less on public health care systems and more on mining company clinics for care-seeking (30). Please see the field guides on key populations and private sector engagement in this series for more detail on case finding among miners and other key populations.



## 3.8 Drug treatment clinics and harm reduction programmes

People who inject drugs (PWID), or other locally identified high-risk substance users, may be at an increased risk for TB and should be screened. A group of researchers in Ukraine examined the correlation between injecting drug use, HIV infection and TB/HIV coinfection in Kiev City in 2004, observing that the prevalence of TB/HIV coinfection in the project area increased from 6% in 2002 to 10% in 2004 and that injecting drug use was the strongest independent predictor of HIV infection (i.e. those reporting injecting drug use were 31.4 times more likely to be HIV-positive than those not reporting injecting drug use) (31).

Recognizing the important relationship between TB and drug use, WHO, UNAIDS and the UN Office on Drugs and Crime (UNODC) issued a set of guidelines to better coordinate TB care among drug users (32). Drug treatment clinics may serve as a location to carry out FBS in these populations. In a cross-sectional study conducted in 2012 at methadone maintenance clinics and harm-reduction facilities affiliated with Shiraz University of Medical Sciences in southern Iran, PWID visiting the facilities were screened for pulmonary and latent TB infection. Of the 263 PWID who consented to participate in the study, five were diagnosed with TB (2% screening yield), and an additional 29 participants had abnormal CXR findings (33). In 2002, a mobile radiographic screening programme was launched in Rotterdam to respond to high rates of TB among drug users and homeless persons. During the project (2002–2005), 206 individuals with TB were notified among drug users and homeless persons, representing 11.4% of the total case load of 1,811 in Rotterdam. As a result of the project, TB infection prevalence among the key risk groups declined from 80% in 2002 to 45% in 2005 (34).

## 3.9 Multi-facility screening

Sometimes the context may warrant an FBS project that is implemented in multiple types of facilities at once. For example, in Nigeria, the Centre for Development and Reproductive Health (CDRH) Enugu and the Ebonyi State Tuberculosis Control Programme implemented a TB REACH Wave 3 project for intensified TB screening among women attending antenatal and maternal child health clinics in health facilities, PLHIV attending HIV clinics, outpatient attendees, and rural populations in the project's local government areas. The screening procedures for all clinics were identical, and screeners screened all patients and attendants visiting the various facilities. They screened 218,751 people, identifying 1,447 with TB (14).

Another TB REACH project in Afghanistan screened women attending OB/GYN services and drug treatment clinics, as well as in communities and in schools. While the project did not succeed in finding significant numbers of women with TB, it identified, for example, that community screening activities were more successful than those at OB/GYN clinics due to insufficient provider involvement in these settings. In such a multi-facility approach, the data can be used for course correction. Yields from different locations can be used to determine next steps in optimal facility selection. Similarly, yields in different locations within a facility can be compared. Figure 3 is an example of different yields from a few different sites in the same facility.

Figure 3.

## Variable yields at different sites in the same facility

**Civic Hospital: Screening and Cases Identified by Location at Site**

December 1, 2016 – August 31, 2017

	Total OPD Count*	Number Screened		Number Presumptive		Samples Collected		Number MTB+		On Treatment		Yield
Medicine OPD/Filter	121130	39702	33%	1613	4%	1089	68%	22	2%	10	45%	1%
Medicine Ward	23980	14356	60%	733	5%	680	93%	42	6%	15	36%	6%
Surgical OPD	53340	27097	51%	1374	5%	1016	74%	12	1%	6	50%	1%
Surgical Ward	20720	9560	46%	314	3%	265	84%	1	0%	1100%		0%
Gynae/Obs OPD	47090	30223	64%	1574	5%	1103	70%	15	1%	10	67%	1%
Chest OPD	38260	24988	65%	1267	5%	983	78%	49	5%	24	49%	4%
Emergency (ER)	86450	27786	32%	1084	4%	785	72%	16	2%	9	56%	1%
Diabetic OPD	23630	12190	52%	580	5%	561	97%	1	0%	0	0%	0%
Registration Desk	83250	44862	54%	2264	5%	1894	84%	37	2%	14	38%	2%
Other	41470	49831	120%	2288	5%	1728	76%	13	7%	65	58%	5%
Doctor Referral								130		68	52%	
<b>Total</b>	<b>539320</b>	<b>280602</b>	<b>52%</b>	<b>13091</b>	<b>5%</b>	<b>10104</b>	<b>77%</b>	<b>438</b>	<b>4%</b>	<b>222</b>	<b>51%</b>	<b>3%</b>



Another example from Tanzania embodies how commitment at national, regional and facility level can boost case finding. The first TB prevalence survey in 2013 revealed that TB prevalence in Tanzania was 528/100,000 population and not 182/100,000; accordingly, the country was missing over 100,000 TB cases annually. To address this gap, a Quality Improvement (QI) initiative for increasing TB case detection was introduced in June 2016, with a focus on identifying all presumptive TB patients presenting in health facilities through universal screening. Other activities included strengthening TB diagnostic services, training and on-site mentorship of all health workers from all departments/units of the facilities.

After 18 months of implementation, most of the intervention facilities had functional focal persons in place, and QI in TB case detection had become a permanent and key agenda item for regional and district TB programmes' quarterly meetings and TB/HIV coordination meetings. QI activities for TB case detection were fully integrated into health facility QITs, constituting a permanent agenda item for QITs, Work Improvement Teams, clinical meetings and Continuous Medical Education. Facilities were using data to set targets for TB screening and incident cases in the health facility and in different sections. Most of these facilities doubled their TB notifications, and TB case notifications in the country increased by 12.3% – from 62,180 cases in 2015 to 69,819 in 2017.<sup>4</sup>

<sup>4</sup> Preliminary data from Program Quality and Efficiency Project in Tanzania received from the Global Fund to Fight AIDS, TB and Malaria in July 2018









STARTET  
HIER  
Aurubis





## 4. ISSUES AND CHALLENGES



## 4. ISSUES AND CHALLENGES

A 2013 paper by Golub and Dowdy (35) is essential reading for FBS screening implementers. The paper summarizes the key challenges associated with TB screening under four headings: i) TB disease and diagnostic yield; ii) TB risk and resource availability; iii) TB screening strategies; and iv) outcomes and impact measurements of screening programmes. Operations-related challenges can be organized under seven themes:

- Staff-related challenges
- Resource-related challenges
- Patient-related challenges
- Diagnostics-related challenges
- Algorithm-related challenges
- Linkage-related challenges
- M&E-related challenges

For each theme, the following subsections present frequently encountered issues along with suggested approaches and questions to ask. The following list of challenges is not comprehensive; each project will of course have its own unique set of challenges. Project managers are encouraged to use their own understanding of on-the-ground realities to build their action plans. Following these subsections, Figure 4 presents an infographic put together recently by a TB project manager in Pakistan to explain her approach to the challenges around low screening and diagnosis yield in a large-scale facility-based ICF project.

## 4.1 Staff-related challenges

Issue	Possible reasons and some suggested approaches
<b>Screening staff are demotivated (screening targets not met, high rates of attrition).</b>	<ul style="list-style-type: none"> <li>• Is it an issue related to technical abilities? Expect a learning curve; more training may be needed.</li> <li>• Are the reimbursements adequate?</li> <li>• Look at the issue through a systemic lens (Is the app working? Have the forms/vouchers run out? Is the facility administration supportive?)</li> <li>• Is fear of getting TB infection minimized?</li> <li>• Plan regular check-in meetings to identify warning signs and address issues early.</li> </ul>
<b>Facility staff (doctors, lab staff) are not participating in linking screening to testing and treatment.</b>	<ul style="list-style-type: none"> <li>• Were facility staff trained on guidelines? Expect a learning curve; more training may be needed.</li> <li>• Were facility staff prepared for the additional workload? Are they being compensated for the additional workload?</li> <li>• Is it a question of differential remuneration between facility staff and screening staff?</li> <li>• Do existing staff feel threatened by the additional hired staff?</li> </ul>

## 4.2 Issues related to linkage to treatment

Issue	Possible reasons and some suggested approaches
<b>Screening yield is satisfactory, but number tested and treatment yield are low.</b>	<ul style="list-style-type: none"> <li>• What are the possible bottlenecks?</li> <li>• Is the screening team linking people with symptoms suggestive of TB to the testing services, or do they need more training and/or motivation?</li> <li>• Is it an issue at the facility staff end? (See Section 4.1)</li> <li>• Is it an issue related to informational systems?</li> <li>• Is it a sample transport issue?</li> <li>• Is it a resource issue (e.g. shortage of Xpert cartridges/referral forms)?</li> </ul>

## 4.3 Resource-related issues

Issue	Possible reasons and some suggested approaches
<b>There are resources available to fund screening projects, but not for diagnostics or treatment.</b>	<ul style="list-style-type: none"> <li>• Consider fundraising from local donors and communities.</li> <li>• Consider crowd-funding.</li> <li>• Consider linking to other facilities where diagnosis and treatment services are underutilized.</li> </ul>



## 4.4 Patient-related issues

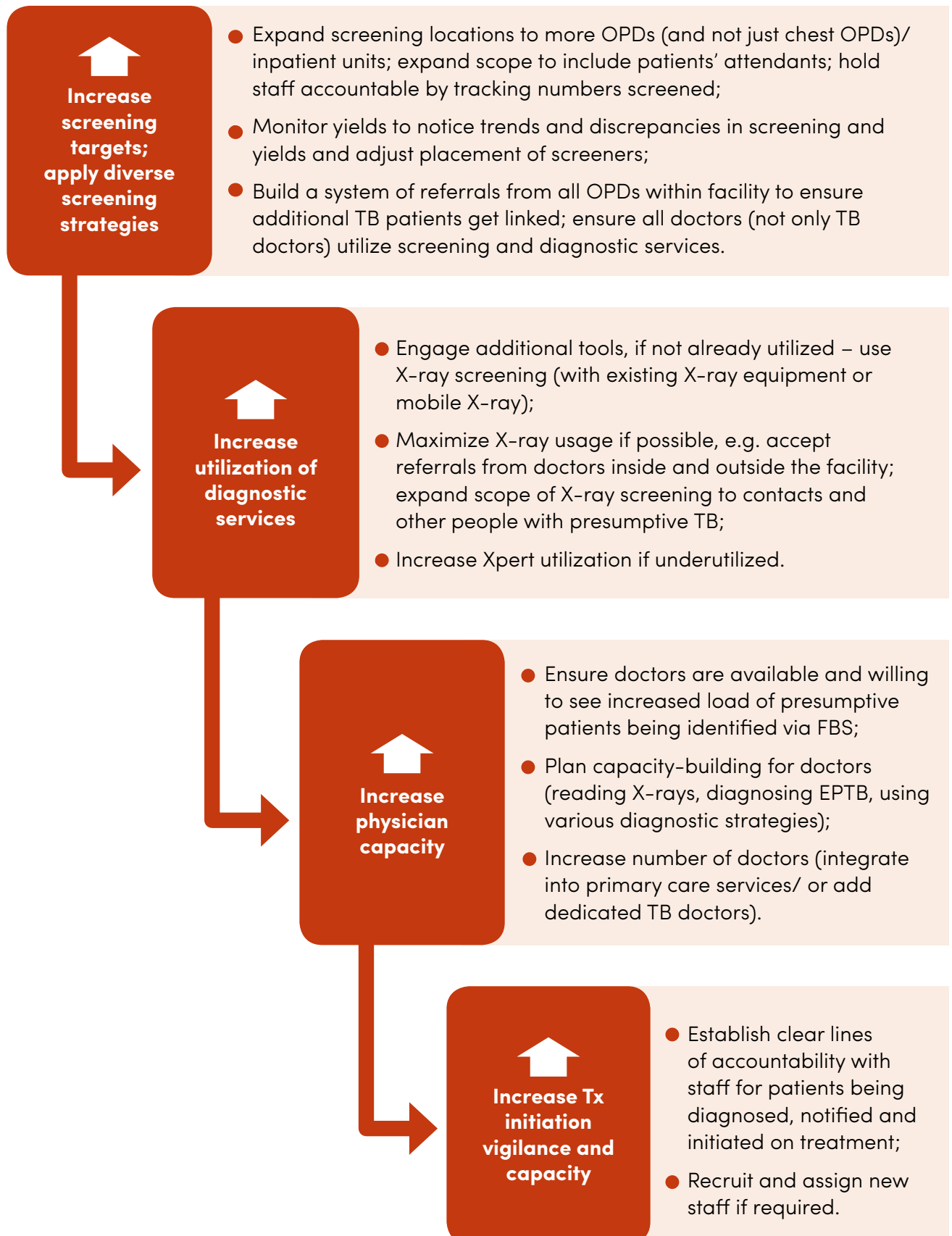
Issue	Possible reasons and some suggested approaches
<p><b>Patients not accessing screening services; low footfall through screening.</b></p>	<ul style="list-style-type: none"> <li>• Does the programme have a clear understanding of the patient-related issues?</li> <li>• Are gender barriers preventing women from accessing services?</li> <li>• Are facilities' working hours inconvenient for patients?</li> <li>• Are transport costs prohibitive?</li> <li>• Are screening staff/facility staff intimidating?</li> <li>• Has the issue of stigma been adequately addressed?</li> <li>• Has awareness been raised about the availability of screening? Or is more outreach required?</li> </ul>

## 4.5 Process/algorithm-related issues

Issue	Possible reasons and some suggested approaches
<p><b>There is uncertainty over which algorithm to use.</b></p>	<ul style="list-style-type: none"> <li>• Review literature, other projects e.g. TB REACH and local data.</li> <li>• Collect and analyse data regularly to assess the algorithm and be prepared to change if required.</li> </ul>
<p><b>There is limited budget for testing (e.g. Xpert).</b></p>	<ul style="list-style-type: none"> <li>• Choose the most efficient algorithm e.g. CXR can be used to "triage" those who should receive Xpert in order to save tests.</li> </ul>
<p><b>There is lack of adherence to the algorithm.</b></p>	<ul style="list-style-type: none"> <li>• Adherence to the algorithm requires careful monitoring throughout the project and process measures put in place to measure it, particularly if there are resource constraints.</li> </ul>

Figure 4.

## A project manager's action plan to address low screening and diagnosis yields







## 5. MONITORING & EVALUATION

Achieving lasting success in the global fight against TB will require the development and implementation of TB screening strategies that are both efficient and effective. The success of facility-based ICF projects can be measured at both the individual and the population level. However, the ultimate objective of active screening for TB is to reduce transmission, as this can then lead to population-level reductions in TB burden and TB mortality. This section provides an overview of strategies for measuring a project's impact as well as its programmatic and operational success, and offers programmatic tools that can be used for M&E.

## 5.1 Measuring project impact

Measuring the impact of a project is an assessment of project effectiveness. One of the main challenges in evaluating facility-based interventions is to determine whether patients would have been diagnosed regardless of the specific intervention, that is, to define the additional yield of the project. This can be measured in several ways, for example:

Example	Indicators to measure at baseline and post project	Measurement process
#1	Number of people diagnosed with TB at the facility in the time periods before and after implementation	Primary data collection by project team and third-party agencies
#2	Population-level mortality, incidence and prevalence indicators	National and subnational surveys, reports, modelling to measure epidemiological impact

There has been some recent discussion around the impact (or lack thereof) of ACF projects on national-level indicators and whether successful pilot projects are difficult to reproduce at national level due to their high cost and lack of human resources (36). However, it is important to recognize that the aim of ACF (and facility-based ICF) interventions may not necessarily be a scale-up to the entire population, but rather to change the epidemiology of a specific target group, to provide a proof of concept to shape public health policy, or to reach groups currently not accessing care. Project impact measurement, therefore, should not be generic, but tailored to align with the specific goals of the screening.



## 5.2 Measuring programmatic/operational indicators

Measuring programmatic indicators is an assessment of project efficiency. The well-established M&E cascade should form the basis of any such framework that measures project efficiency:

- Number of patients being screened
- Number of people with symptoms suggestive of TB identified through symptom screening and/or CXR
- Number of sputum samples sent for testing (sampling yield)
- Number of samples tested (testing yield)
- GeneXpert machine utilization rates (total number of Xpert tests performed on each machine/total capacity of each GeneXpert machine)
- Number of samples testing MTB+ and RIF+ (screening yield)
- Number of patients diagnosed who are linked to treatment
- Data entry completion rates
- Number of people with TB who complete treatment

Each of these metrics can be linked to screeners' performance and, in turn, to performance-based incentives. Examples of such metrics include CXRs done per day, screening yield per screener, and sampling yield per screener.

## 5.3 Data management

Standard practices for programme M&E should include regular team meetings to review operational challenges, data, patients, yields, errors and targets. All components should be considered simultaneously, including the cascade, testing data and treatment data. Appropriate documentation, including development of SOPs, can ensure clarity on all issues, especially roles, linkages and challenges. Frequent internal assessments are also recommended.

### Data systems

The importance of a robust system of data collection and analysis cannot be overemphasized. Along with finding and treating the missing cases, the ICF project team is also tasked with generating the evidence needed for strategic decision-making at scale, including at the

level of donors and public health policy makers. Whether a project is using mHealth or paper-based systems for data collection, it is important to have clarity on a few issues:

- Types of data being collected, including specific indicators (e.g. utilization of GeneXpert machines, yield per screener, CXRs per site) and level of disaggregation for each indicator (e.g. by gender, age, location)
- Data collection process, including points in the patient flow and specific locations in the facility where data are collected
- Types of forms, fields in the mHealth application
- How and how frequently the data link to case notification as well as to programmatic course correction points

### Use of data for quality monitoring

Quality check mechanisms are critical and can save significant time downstream. The screening team, especially the supervisors, need to be trained to recognize and track early “warning signs” around important metrics, including sample quality, turnaround times, patient feedback, and costs, and to alert the project leadership whenever project quality issues need to be addressed. Such warning signs will of course be unique to every project but can be thought of in terms of a set of critical questions, for example:

- What is the expected number of clients to be screened per day?
- What is the expected screening yield?
- What is the expected proportion of presumptive samples to be tested each day, and the presumptive case yield at each step in the cascade (e.g. screening yield, sampling yield, linkage to diagnostics)?
- What is the expected diagnosis yield and proportion of diagnosed TB patients to be linked to treatment?
- What are the losses (and reasons thereof) moving through each of the steps in the patient cascade, e.g. losses between presumptive TB cases identified and samples submitted for testing, losses between samples submitted and those actually tested?
- What is the minimum GeneXpert utilization expected per day or per week?
- What is the expected number of patients to be screened per day per site?

### Activities to improve data when implementing intensified TB case finding at facility level

- Supportive supervision and mentorship on facility-based ICF by TB coordinator
- Monthly health facility information exchange meeting to discuss facility-based ICF programme
- Use of TB data collected for improvement of services; problem-solving; and monitoring performance of TB case finding in the facility
- Consistent recording of all presumptive TB cases in the presumptive TB register
- Use of data to develop trends in TB case finding in the facility and dissemination to health workers
- Display of graphs and data tables on TB ICF at facility level using, but not limited to, the following parameters: monthly/quarterly trends; referring sections/source; targets vs achievements, etc.



## 6. FURTHER READING: PUBLICATIONS ON FACILITY-BASED ICF PROJECTS



Some project examples and publications have been mentioned and described throughout this field guide, with references indicated for further reading. Additional publications that may provide useful context around ICF at the facility level are listed below; web links to where the papers can be accessed have been embedded in the text:

- A 2007 paper from a team of researchers from the London School of Hygiene and Tropical Medicine and Zimbabwe's National Institute of Health Research analysing the effect of a TB screening intervention at 22 occupational health clinics in Harare over 2 years: [Epidemiology of tuberculosis in a high HIV prevalence population provided with enhanced diagnosis of symptomatic disease](#)
- A 2008 paper on a year-long experimental study with 126 public general hospitals and clinics to test the impact of a strategic referral and testing system: [Increasing tuberculosis case detection through intensive referral and tracing in Hunan, China](#)
- A 2010 cluster-randomized trial that compared the TB screening yield of a mobile clinic and a door-to-door survey in the same community in Harare: [Comparison of two active case-finding strategies for community-based diagnosis of symptomatic smear-positive tuberculosis and control of infectious tuberculosis in Harare, Zimbabwe \(DETECTB\)](#)
- A 2012 paper that describes findings from five clinics in China and recommends bi-directional screening for TB and diabetes: [Screening patients with diabetes mellitus for tuberculosis in China](#)
- An operational retrospective review on TB notification data from a Lusaka urban health centre before and after the introduction of a digital CXR service: [Changes in tuberculosis notifications and treatment delay in Zambia when introducing a digital X-ray service](#)
- A 2013 paper that offers useful insights on how to systematically approach programmatic implementation: [Programmatic approaches to screening for active tuberculosis](#)
- A 2011 prospective analysis of TB diagnostic services at five PHC facilities in Uganda 1 year after the introduction of a real-time, electronic performance-monitoring system: [Evaluating tuberculosis case detection via real-time monitoring of tuberculosis diagnostic services](#)



## References

1. Den Boon S, Verver S, Lombard CJ, Bateman ED, Irusen EM, Enarson DA. Comparison of symptoms and treatment outcomes between actively and passively detected tuberculosis cases: the additional value of active case finding. *Epidemiol Infect.* 2008;136(10):1342–9. doi:10.017/S0950268807000106
2. Golub JE, Mohan CI, Comstock GW, Chaisson RE. Active case finding of tuberculosis: historical perspective and future prospects. *Int J Tuberc Lung Dis.* 2005;9(11):1183–203. PMID: 16333924
3. Shapiro AE, Chakravorty R, Akande T, Lonroth K, Golub JE. A systematic review of the number needed to screen to detect a case of active tuberculosis in different risk groups. Geneva: World Health Organization; 2013. Available from: [http://www.who.int/tb/Review3NNS\\_case\\_active\\_TB\\_riskgroups.pdf](http://www.who.int/tb/Review3NNS_case_active_TB_riskgroups.pdf)
4. Chanda-Kapata P, Kapata N, Masiye F, Maboshe M, Klinkenberg E, Cobelens F, et al. Health seeking behaviour among individuals with presumptive tuberculosis in Zambia. *PLoS ONE.* 2016;11(10):e0163975. doi:10.1371/journal.pone.0163975
5. Chihota VN, Ginindza S, McCarthy K, Grant AD, Churchyard G, Fielding K. Missed opportunities for TB investigation in primary care clinics in South Africa: experience from the XTEND trial. *PLoS ONE.* 2015;10(9):e0138149. doi:10.1371/journal.pone.0138149
6. Kweza PF, Van Schalkwyk C, Abraham N, Uys M, Claassens MM, Medina-Marino A. Estimating the magnitude of pulmonary tuberculosis patients missed by primary health care clinics in South Africa. *Int J Tuberc Lung Dis.* 2018;22(3):264–72. doi:10.5588/ijtld.17.0491
7. Sanaie A, Mergenthaler C, Nasrat A, Seddiq MK, Mahmoodi SD, Stevens RH, et al. An evaluation of passive and active approaches to improve tuberculosis notifications in Afghanistan. *PLoS ONE.* 2016;11(10):e0163813. doi:10.1371/journal.pone.0163813
8. The effect of triage in improving screening of TB symptomatic and sputum positive case detection in crowded outpatient settings – experience from 164 primary health centres in Bihar, India. Chennai: Damien Foundation India Trust. Available from: <http://damienfoundation.in/projects/research/Absrtact-For-TB-%20Conference-Bihar.pdf>
9. Good sputum, better diagnosis [Video]. South Africa: Interactive Research & Development; 2015. Available from: <https://vimeo.com/irdresearch/good-sputum-sa-english>
10. Khan AJ, Khowaja S, Khan FS, Qazi F, Lotia I, Habib A, et al. Engaging the private sector to increase tuberculosis case detection: an impact evaluation study. *Lancet Infect Dis.* 2012;12:908. doi:10.1016/S1473-3099(12)70116-0
11. TB REACH. Nigeria: Ebonyi State Tuberculosis and Leprosy Control Programme. Geneva: Stop TB Partnership. Available from: <http://www.stoptb.org/assets/documents/global/awards/tbreach/w3docs/EBONYI%20STATE%20TB%20AND%20LEPROSY%20CONTROL%20PROGRAMME%20Nigeria.pdf>
12. Ohene SA, Bonsu F, Hanson-Nortey NN, Toonstra A, Sackey A, Lonroth K, et al. Provider initiated tuberculosis case finding in outpatient departments of health care facilities in Ghana: yield by screening strategy and target group. *BMC Infect Dis.* 2017;17(1):739. doi:10.1186/s12879-017-2843-5.
13. Abdurrahman ST, Lawson L, Blakiston M, Obasanya J, Yassin MA, Anderson RM, et al. Are patients with pulmonary tuberculosis who are identified through active case finding in the community different than those identified in healthcare facilities? *New Microbes New Infect.* 2017;15:35–9. doi:10.1016/j.nmni.2016.10.002

14. Oshi DC, Omeje JC, Oshi SN, Alobu IN, Chukwu NE, Nwokocha C, et al. An evaluation of innovative community-based approaches and systematic tuberculosis screening to improve tuberculosis case detection in Ebonyi State, Nigeria. *Int J Mycobacteriol.* 2017;6:246–52. doi:10.4103/ijmy.ijmy\_91\_17
15. Hinderaker SG, Rusen ID, Chiang CY, Yan L, Heldal E, Enarson DA. The FIDELIS initiative: innovative strategies for increased case finding. *Int J Tuberc Lung Dis.* 15(1):71–76.
16. Auloch JA, Swai OB, Edwards EA, Stott H, Darbyshire JG, Fox W, et al. Studies of case-finding for pulmonary tuberculosis in outpatients at 4 district hospitals in Kenya. *Tubercle.* 1985;66:237–49.
17. RNTCP National Strategic Plan for TB 2017–2025
18. Jeon CY, Murray MB. Diabetes mellitus increases the risk of active tuberculosis: a systematic review of 13 observational studies. *PLoS Med.* 2008;5(7):e152. doi:10.1371/journal.pmed.0050152
19. Johansson E, Long NH, Diwan VK, Winkvist A. Gender and tuberculosis control: perspectives on health seeking behaviour among men and women in Vietnam. *Health Policy.* 2000;52:33–51.
20. Balasubramanian R, Garg R, Santha T, Gopi PG, Subramani R, Chandrasekaran V, et al. Gender disparities in tuberculosis: report from rural DOTS programme in South India. *Int J Tuberc Lung Dis.* 2004;8(3):323–32.
21. Sangala WT, Briggs P, Theobald S, Squire SB, Kemp J. Screening for pulmonary tuberculosis: an acceptable intervention for antenatal care clients and providers? *Int J Tuberc Lung Dis.* 2006;10(7):789–94.
22. Ngadaya ES, Mfinanga GS, Wandwalo ER, Morkve O. Pulmonary tuberculosis among women with cough attending clinics for family planning and maternal and child health in Dar Es Salaam, Tanzania. *BMC Public Health.* 2009;9:278. doi:10.1186/1471-2458-9-278
23. Storla DG, Yimer S, Bjune GA. A systematic review of delay in the diagnosis and treatment of tuberculosis. *BMC Public Health.* 2008;8:15. doi:10.1186/1471-2458-8-15
24. Kranzer K, Houben RM, Glynn JR, Bekker LG, Wood R, Lawn SD. Yield of HIV-associated tuberculosis during intensified case finding in resource-limited settings: a systematic review and meta-analysis. *Lancet Infect Dis.* 2010;10(2):93–102. doi:10.1016/S1473-3099(09)70326-3
25. Systematic screening for active tuberculosis: principles and recommendations. Geneva: World Health Organization; 2013. Available from: [http://www.who.int/tb/publications/Final\\_TB\\_Screening\\_guidelines.pdf](http://www.who.int/tb/publications/Final_TB_Screening_guidelines.pdf)
26. TB REACH. Optimizing TB case detection among high-risk populations using Xpert MTB/RIF in Northwest Cameroon. Geneva: Stop TB Partnership. Available from: <http://www.stoptb.org/assets/documents/global/awards/tbreach/w4docs/Tuberculosis%20Reference%20Laboratory%20-%20Bamenda%20&%20National%20TB%20Programme,%20Cameroon.pdf>
27. Bates M, O’Grady J, Mwaba P, Chilukutu L, Mzyece J, Cheelo B, et al. Evaluation of the burden of unsuspected pulmonary tuberculosis and co-morbidity with non-communicable diseases in sputum producing adult inpatients. *PLoS ONE.* 2012;7(7):e40774. doi:10.1371/journal.pone.0040774
28. Lin CH, Tsai CH, Liu CE, Huang ML, Chang SC, Wen JH, et al. “Cough officer screening” improves detection of pulmonary tuberculosis in hospital in-patients. *BMC Public Health.* 2010;10:238. doi:10.1186/1471-2458-10-238



29. Seetha MA, Rupert Samuel GE, Parimala N. Improvement in case-finding in district tuberculosis programme by examining additional sputum specimens. *Indian J TB*. 1990;37:139–44.
30. Barwise K, Lind A, Bennett R, Martins E. Intensifying action to address HIV and tuberculosis in Mozambique’s cross-border mining sector. *Int J Health Serv*. 2013;43(4):699–719.
31. Van der Werf MJ, Yegorova OB, Chentsova N, Chechulin Y, Hasker E, Petrenko VI, et al. Tuberculosis–HIV co-infection in Kiev City, Ukraine. *Emerg Infect Dis*. 2006;12:766–8.
32. WHO, UNAIDS, UN Office on Drugs and Crime. Policy guidelines for collaborative TB and HIV services for injecting and other drug users – an integrated approach. Geneva: World Health Organization; 2008. Available from: [http://whqlibdoc.who.int/publications/2008/9789241596930\\_eng.pdf](http://whqlibdoc.who.int/publications/2008/9789241596930_eng.pdf)
33. Honarvar B, Lankarani KB, Odoomi N, Roudgari A, Moghadami M, Kazerooni PA, et al. Pulmonary and latent tuberculosis screening in opiate drug users: an essential and neglected approach for harm-reduction facilities. *J Addict Med*. 2013;7(4):230–5. doi:10.1097/ADM.0b013e31828d05ab
34. de Vries G, van Hest RA, Richardus JH. Impact of mobile radiographic screening on tuberculosis among drug users and homeless persons. *Am J Respir Crit Care Med*. 2007;176(2):201–7.
35. Golub JE, Dowdy DW. Screening for active tuberculosis: methodological challenges in implementation and evaluation. *Int J Tuberc Lung Dis*. 2013;17(7):856–65. doi:10.5588/ijtld.13.0059
36. Koura KG, Trébucq A, Schwoebel V. Do active case-finding projects increase the number of tuberculosis cases notified at national level? *Int J Tuberc Lung Dis*. 2017;21(1):73–8. doi:10.5588/ijtld.16.0653











This document is one in a series of 11 field guides produced by Stop TB Partnership in collaboration with the Global Fund to Fight AIDS, Tuberculosis and Malaria, Interactive Research and Development Global (IRD), KIT Royal Tropical Institute, and multiple global experts and implementation partners. The field guides rely on practical experiences and expertise of implementers and are meant to help national TB programmes and other TB programme managers to identify the best strategies for finding people with TB who are missed by routine health services.



Global Health Campus  
Chemin du Pommier 40  
1218 Le Grand-Saconnex  
Geneva, Switzerland



Realizing the full potential of the internet, along with universal access to research and education, fully participating in culture, to drive a new era of development growth, and productivity; this plan may be freely copied and reproduced, provided that it is not done so for commercial gain and the source is mentioned.