FEDERAL MINISTRY OF HEALTH

REDAID NIGERIA

Clinical and Programmatic Handbook on Integrated Service Delivery of Tuberculosis, Community-acquired Pneumonia and Chronic Obstructive Pulmonary Disease using the WHO Practical Approach to Lung Health Strategy in Nigeria

Piloting an innovative integrated Tuberculosis and Practical Approach to Lung health services in hard-to-reach communities of southern Nigeria (Project POTENTIALS)

Stop TB Partnership TB REACH

hosted by UNOPS

FOREWORD

Lung diseases remain a major health challenge in Nigeria, causing significant illness and death. Tuberculosis (TB), pneumonia, asthma, and chronic obstructive pulmonary disease (COPD) are among the most common respiratory conditions affecting people of all ages.
TB is a serious infectious disease that mainly affects the lungs. Nigeria has one of the highest burden of TB, sixth globally and first in Africa, with many people going undiagnosed and untreated, leading to preventable infections and deaths. Pneumonia is another major concern, especially among children, the elderly, and individuals with weakened immune systems. It is a leading cause of childhood deaths, with many cases occurring in children under the age of two. COPD, a progressive lung disease often linked to smoking and air pollution, is also widespread but frequently goes unrecognized. Meanwhile, asthma, a long-term condition that makes breathing difficult, affects millions of Nigerians and disrupts daily life by causing hospital visits, school absences, and reduced productivity.

To address these pressing health challenges, this Clinical and Programmatic Handbook on Integrated Service Delivery of Tuberculosis, Community-Acquired Pneumonia, Asthma, and Chronic Obstructive Pulmonary Disease using the WHO Practical Approach to Lung Health (PAL) Strategy has been developed to guide the pilot implementation of integrated service delivery for these respiratory diseases. The handbook provides evidence-based guidance to serve as a resource for training and standard operating procedures (SOPs) to support healthcare workers in delivering integrated, patient-centered lung health services. It also emphasizes the critical linkages between facility-based and community-based interventions within the frameworks of national health programs such as the National Tuberculosis, Leprosy, and Buruli Ulcer Control Program (NTBLCP) and the Non-Communicable Disease (NCDs) Control Program within the ambit of the three-tiered structure of Nigeria's healthcare system.

By strengthening surveillance, coordination, and service delivery, this initiative aligns with the Sustainable Development Goals (SDGs)—particularly SDG 3, which aims to reduce the burden of communicable and non-communicable diseases and achieve universal health coverage. I therefore enjoin all relevant stakeholders, including healthcare professionals, policymakers, and implementing partners, to use this handbook to enhance lung health services in Nigeria. Through collective efforts, we can improve early diagnosis, ensure effective treatment, and ultimately reduce the burden of lung diseases in the country.

Dr. Daniel Egbule
Chief Executive Officer, RedAid Nigeria

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LIST OF CONTRIBUTORS

NAME	DESIGNATION	ORGANISATION
• Adesigbin Clement Olufemi	Acting National Coordinator	NTBLCP
• Agu Chibuike	External Consultant	Alex Ekwueme Federal University Teaching Hospital, Abakaliki
• Alobu Isaac	Executive Director	Delta STBLCP
• Bakpa Onajohwo Francis	Program Manager	NTBLCP
• Chijioke-Akaniro Obioma	National Monitoring & Evaluation Focal Person	University of Benin (UBTH)
• Egbagbe Elizabeth (Prof.)	Consultant Pulmonologist	NTBLCP
• Ekwueme Obioma	Monitoring and Evaluation	Delta State
• Eruaga Benjamin	Consultant Pulmonologist	NCDs Control Program, FMOHSW
• Etta Jeanette Nneka	Director	RedAid Nigeria
• Eze Chinwe	Director Monitoring, Evaluation, Accountability and Learning	Federal Medical Centre, Asaba
• Idaboh Ogenetega	Consultant Paediatrician	Edo STBLCP
• Igbinigie Osagie Matthew	Program Manager	Delta STBLCP
• Imoniero Goodluck	M&E Officer	Edo State
• Imuetinyan Godfrey	Chairman , Association of Nigeria Private Medical Practitioners (ANPMP)	CDRH
• Jose Michael Bryan	NPO, South-South Region	WHO
• Murphy-Okpala Ngozi	Program Manager	RedAid Nigeria
• Njoku Martin	Program Manager	RedAid Nigeria
• Nwafor Charles	Director of Programs	RedAid Nigeria
• Ojobor Kenneth Chijioke	Program Manager	NTBLCP
• Olushola Ogunmola	Deputy Director	Project HOPE
• Omogbeme Stella	Consultant Pulmonologist	NCDs Control Program, FMOHSW
• Ozi Ahmad Muhammad	National Coordinator	UBTH
• Sadoh Ayebo (Prof.)	Consultant Paediatrician	NCDs Control Program, FMOHSW
• Urhioke Ochuko	Deputy Director and Head, Childhood TB Unit	Department of Child Health, University of Benin Teaching Hospital
• Ugwu Chukwuebuka	External Consultant, National M&E Unit	NTBLCP

FINAL EDITORS

- Ngozi Murphy-Okpala
- Chinwe Eze
- Agu Chibuike

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LIST OF ACRONYMS

AI-CXR - Artificial Intelligence-based Chest X-Ray
CAP - Community-Acquired Pneumonia
COPD - Chronic Obstructive Pulmonary Disease
CXR - Chest X-Ray
DOTS - Directly Observed Treatment, Short-course
DQA -Data quality assessment
FEV1 - Forced Expiratory Volume in 1 Second
HCP - Healthcare Provider
HCW - Healthcare Worker
HIV - Human Immunodeficiency Virus
HMIS - Health Management Information System
ISD - Integrated Service Delivery
NCDs - Non-communicable diseases
NGO - Non-Governmental Organization
NTP - National Tuberculosis Program
NPHCDA - National Primary Health Care Development Agency
NTBLCP - National Tuberculosis and Leprosy Control Programme
OSDV - On-site Data Verification
PAL - Practical Approach to Lung Health
PHC - Primary Health Care
PTB- Pulmonary Tuberculosis
TB - Tuberculosis
WHO - World Health Organization

EXECUTIVE SUMMARY

The "Clinical and Programmatic Handbook on Integrated Service Delivery of Tuberculosis, Community-Acquired Pneumonia, and Chronic Obstructive Pulmonary Disease using the WHO Practical Approach to Lung Health Strategy in Nigeria" serves as an essential resource for frontline healthcare workers at all levels. It aims to improve the prevention, diagnosis, treatment, and rehabilitation of patients affected by tuberculosis (TB), community-acquired pneumonia (CAP), asthma, and chronic obstructive pulmonary disease (COPD) through an integrated service delivery approach.

Objectives and Scope

This handbook provides practical guidance for frontline healthcare workers at all levels of care—community, primary, secondary, and tertiary—ensuring the delivery of high-quality, patient-centered services for TB, CAP, and COPD. It focuses on strengthening health system through effective linkages between healthcare facilities and community-based activities within the scope of national disease control programs. By emphasizing collaboration among health care workers, communities, state and non-state actors, this handbook facilitates the seamless integration of respiratory disease management into existing healthcare structures. It is our hope that lessons from its implementation will inform national policy improvements and support potential nationwide scale-up.

Project POTENTIALS

This handbook is the first output from Project POTENTIALS, a patient-centred and gender-responsive pilot project funded by the TB REACH Wave 11 grant, and initiative of STOP TB Partnership. Intentionally designed to provide comprehensive lung health services through the integration of service delivery for multiple respiratory conditions, viz TB, CAP and COPD, the project also aims to address their major risk factors, cigarette smoking and indoor air pollution. It will also deploy cutting edge digital technology such as AI-enabled chest x-rays, spirometer and hand-held expiratory flow meters to enhance identification of asymptomatic patients who may be missed otherwise. Extra efforts will be made to ensure vulnerable children are not missed.

Project POTENTIALS will be implemented in five underserved Local Government Areas (LGAs) across Delta and Edo states, utilizing active case-finding activities both at the community and health facility levels, including private and public healthcare facilities at all tiers to expand access to comprehensive lung health services. Embedded within Nigeria's National Tuberculosis, Leprosy, and Buruli Ulcer Control Programme (NTBLCP), this project is hinged on strong collaboration with the National Non-Communicable Diseases (NCD) Control Program, as well as their state-level counterparts, including the State Primary Healthcare Development Agencies (SPHCDA) in both project states.

Rational for Integrated Service Delivery (ISD)

The integration of TB, CAP, and COPD management is driven by shared risk factors, overlapping symptoms, and common comorbidities such as HIV, diabetes, and cardiovascular diseases. The ISD approach enhances diagnostic accuracy, reduces service fragmentation, and improves patient-centered care. It also helps minimize stigma, optimize resource utilization, and foster interdisciplinary collaboration, ultimately leading to better health outcomes.

Key Components of the Handbook

The handbook is organized into five modules, each covering essential aspects of integrated lung health service delivery:

- **Module 1:** Overview of Integrated Service Delivery using the WHO Practical Approach to Lung Health, including objectives, project background, and the rationale for ISD.
- **Module 2:** Clinical overviews of TB, CAP, and COPD, providing foundational knowledge for healthcare workers.
- **Module 3:** Screening and diagnosis protocols, including facility- and community-based screening tools, with specific algorithms for children, and adults.
- **Module 4:** Case management guidelines for TB, CAP, asthma, and COPD, along with referral pathways to ensure continuity of care.
- **Module 5:** Monitoring and evaluation framework, outlining key indicators, surveillance tools, and mechanisms for supportive supervision and data quality assurance.

Development Process

This handbook was developed through a rigorous and collaborative process involving:

- Establishment of a Technical Working Group (TWG) comprising key stakeholders.
- Virtual and in-person meetings for content development.
- Review of existing literature and global best practices.
- Stakeholder engagement to refine content.
- A final validation process to ensure technical accuracy and practical applicability.

By providing a standardized, evidence-based, and practical guide for healthcare workers, this handbook aims to champion a pathway to the provision of quality and accessible integrated lung health services in Nigeria. Its implementation is expected to contribute to improved respiratory health outcomes and support national and global TB control efforts.

Dr. Charles Nwafor
Director of Programs, RedAid Nigeria

MODULE 1

1.1 Overview of Integrated Service Delivery using Practical Approach to Lung Health

1.1.1 Background

Tuberculosis (TB), Community-Acquired Pneumonia (CAP), and Chronic Obstructive Pulmonary Disease (COPD) are major public health challenges in Nigeria. TB remains a leading infectious disease, driven by factors such as poverty, overcrowding, and limited access to healthcare, contributing to substantial morbidity and mortality. CAP, often resulting from bacterial, viral, or fungal infections, disproportionately affects vulnerable groups, including children under five and the elderly, leading to severe health outcomes if not promptly addressed. Similarly, COPD, a chronic and progressive respiratory condition primarily linked to tobacco smoke exposure and environmental pollutants, such as indoor air pollution imposes a growing burden on individuals and healthcare systems. Together, these conditions account for a significant portion of respiratory-related illnesses and deaths in Nigeria, underscoring the urgent need for effective prevention, early detection, and integrated management strategies. The World Health Organization (WHO) Practical Approach to Lung Health (PAL) strategy provides an integrated framework for the diagnosis, treatment, and management of these respiratory conditions.

Adapting the World Health Organization (WHO)'s Practical Approach to Lung Health (PAL) strategy in a project titled Piloting an innOvative inTegrated tubErculosis aNd Practical Approach to Lung health Services in hard-to-reach communities of southern Nigeria (P.O.T.E.N.T.I.A.L.S), RedAid Nigeria is innovatively piloting an integrated service delivery (ISD) model for improved identification, diagnosis and treatment of three (3) respiratory conditions; Tuberculosis (TB), Community-Acquired Pneumonia (CAP), and Chronic Obstructive Pulmonary Disease (COPD) while addressing their risk factors (specifically, Cigarette Smoking and Indoor Air Pollution). It also utilizes innovative portable digital devices such as Artificial intelligence enabled Chest X-rays (AI-CXR), COPD-6 electronic peak flow meters, and digital Spirometers to enhance prompt diagnosis of multiple disease conditions per patient contact.

1.1.2 About Project POTENTIALS

Project POTENTIALS represents a person-centered, gender-responsive and sustainable pragmatic approach to integrating services for TB and other lung conditions, with a focus on children, in southern Nigeria. This integrated active case-finding intervention will be implemented in 5 hard-to-reach Local Government Areas (LGAs) in 2 states in Southern Nigeria—Delta (Aniocha North & Ndokwa East) and Edo (Akoko Edo, Etsako Central & Ovia North-East). Service delivery entry points include both private and public health facilities cutting across all tiers (primary, secondary and tertiary) as well as community-based healthcare delivery points.

All project interventions are embedded within the routine National Tuberculosis, Leprosy and Buruli Ulcer Control Programme (NTBLCP) leveraging its solid programmatic structure to offer comprehensive integrated lung health services, while contributing to strengthening the national health system.

The Project is funded by the STOP TB Partnership Geneva Initiative's TB REACH Wave 11 grant aimed at promoting innovative ideas with the potential to reach more people and End TB. Project POTENTIALS is being implemented by RedAid Nigeria (RAN) in collaboration with the Centre for Development and Reproductive Health (CDRH). This wave 11 round of funding is focused on integrated lung health service delivery as close to the patients as possible and was made possible by the generous support and funding from Global Affairs Canada, with additional support from United States Agency for International Development (USAID), Foreign, Commonwealth and Development Office (FCDO) and The Bill and Melinda Gates Foundation.

1.1.3 Rationale for an Integrated Service Delivery (ISD) Approach

The rationale for integrated services delivery (ISD) for TB, CAP and COPD is based on several key considerations. The three diseases have shared risk factors such as smoking, poor ventilation, indoor (air) pollution and malnutrition among others. ISD will address these factors.

They also have similar symptoms making (mis-) diagnosis challenging. However, integrated services will facilitate comprehensive diagnostic evaluations. Furthermore, many of the patients with TB, CAP and COPD have comorbidities such as HIV, Diabetes, and Cardiovascular diseases hence, service integration ensures holistic care of the patients.

Integrated services reduces fragmentation, improve patient flow, and optimize resource utilization within healthcare systems. Integrated services can also provide patient-centered care, focusing on individual needs and preferences, rather than disease-specific silos.

Other justifications for ISD include stigma reduction, improved health outcomes, cost-effectiveness and enhanced collaboration among healthcare providers. By integrating services for TB, CAP, and COPD, healthcare systems can provide more comprehensive, efficient, and patient-centered care, ultimately improving health outcomes and reducing the burden of these diseases.

1.1.4 Overview of the Practical Approach to Lung Health (PAL) Strategy

Developed by the World Health Organization (WHO), the Practical Approach to Lung Health (PAL) is one of the strategies intended to overcome the challenge posed by weak health systems especially in low-income countries. PAL focuses on the most prevalent respiratory diseases at first-level health facilities – pneumonia, acute bronchitis and other acute respiratory infections, TB, and chronic respiratory conditions including chronic bronchitis, asthma and chronic obstructive pulmonary disease. PAL uses two main approaches to achieve integrated case-management of respiratory patients in primary health care: standardization of diagnosis and treatment of respiratory conditions, and coordination among health workers of different levels.

This ISD handbook was developed by RedAid Nigeria and CDRH in conjunction with NTBLCP and NCD Divisions of FMOH to assist all levels health and other government institutions, non-governmental organizations that want to introduce or adapt the PAL strategy into case-management practices in primary health care.

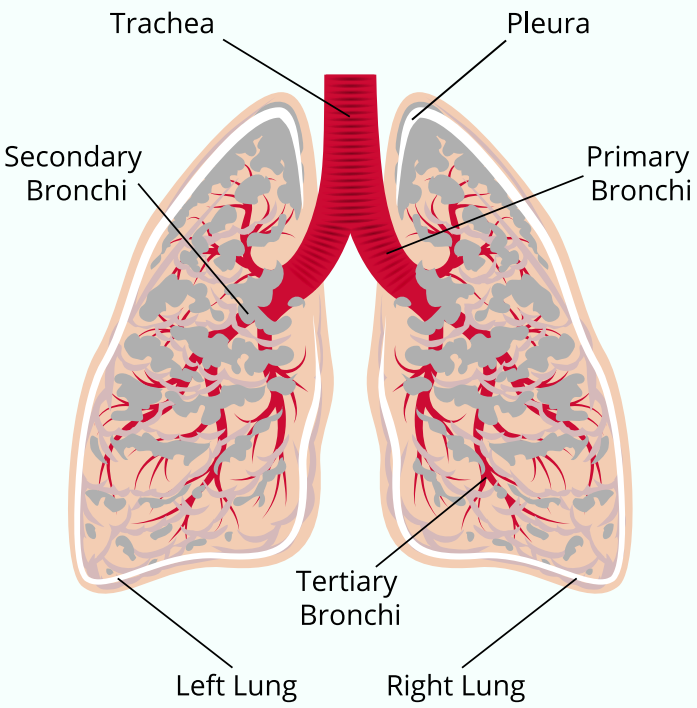
1.1.5 Objectives and Scope of this Handbook

This handbook offers practical guidance to frontline health care workers providing primary care services at all tiers of community, primary, secondary and tertiary point-of-care whose efforts are crucial to the achievement of global TB control goals and national targets for case management of respiratory conditions.

The objective of this handbook is to provide a public health approach and clinical guidance to the management of TB, CAP and COPD diseases. It aims at providing technical guidance and building capacity among health care workers (HCWs) on the provision of quality services for prevention, diagnosis, treatment, and rehabilitation of patients with these disease conditions.

Additionally, it aims at providing guidance on linking health facility and community-based activities for TB, CAP and COPD within the ambit of relevant national disease control programs such as the NTBLCP, Non-Communicable Disease (NCDs) Control Program and the National Primary Health Care Development Agency (NPHCDA) to ensure proper surveillance, coordination, oversight and overall health system strengthening for improved quality service delivery.

Towards this, it also calls for enhanced collaboration and coordination between the health care workers, communities, state and non-state actors, to realize universal coverage and comprehensive care for TB, CAP & COPD integrated service delivery. Lessons learned from this pilot project implementation are expected to influence national policy and practice, and guide nationwide scale-up, if successful.



1.2 Implementation of PAL Strategy in Healthcare and Community Settings

1.2.1 Implementation of PAL Strategy in Healthcare Facility Settings

Below (Figure 1) depicts ISD Implementation of PAL strategy in healthcare setting in a flow chart format for TB, CAP and COPD diseases management.

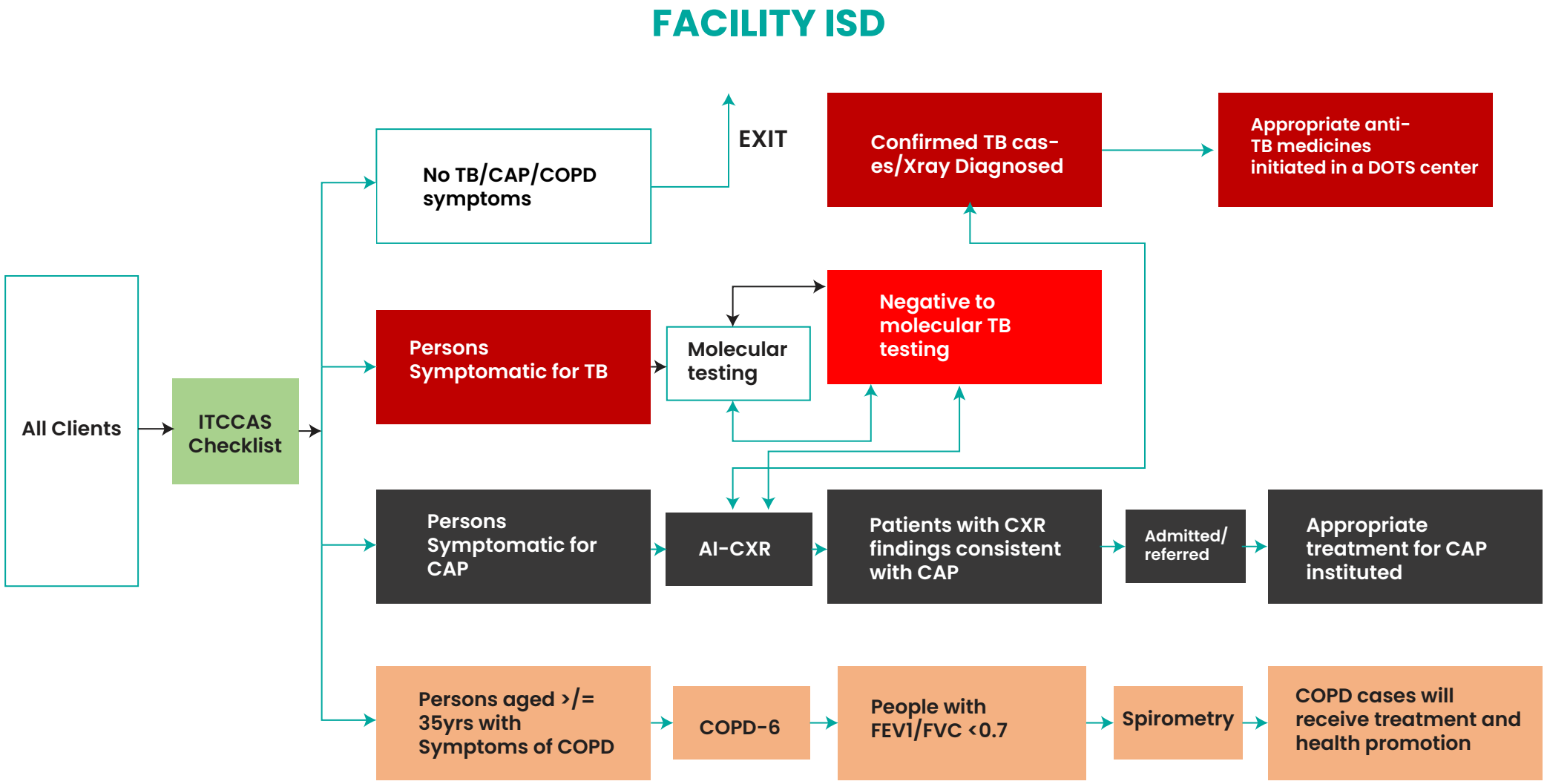


Figure 1: Integrated Service Delivery Implementation of PAL strategy in Health care facility setting

1.2.2 Implementation of PAL Strategy in Community Settings

Below (Figure 2) is the ISD Implementation strategy in Community setting in a flow chart format for TB, CAP and COPD diseases management.

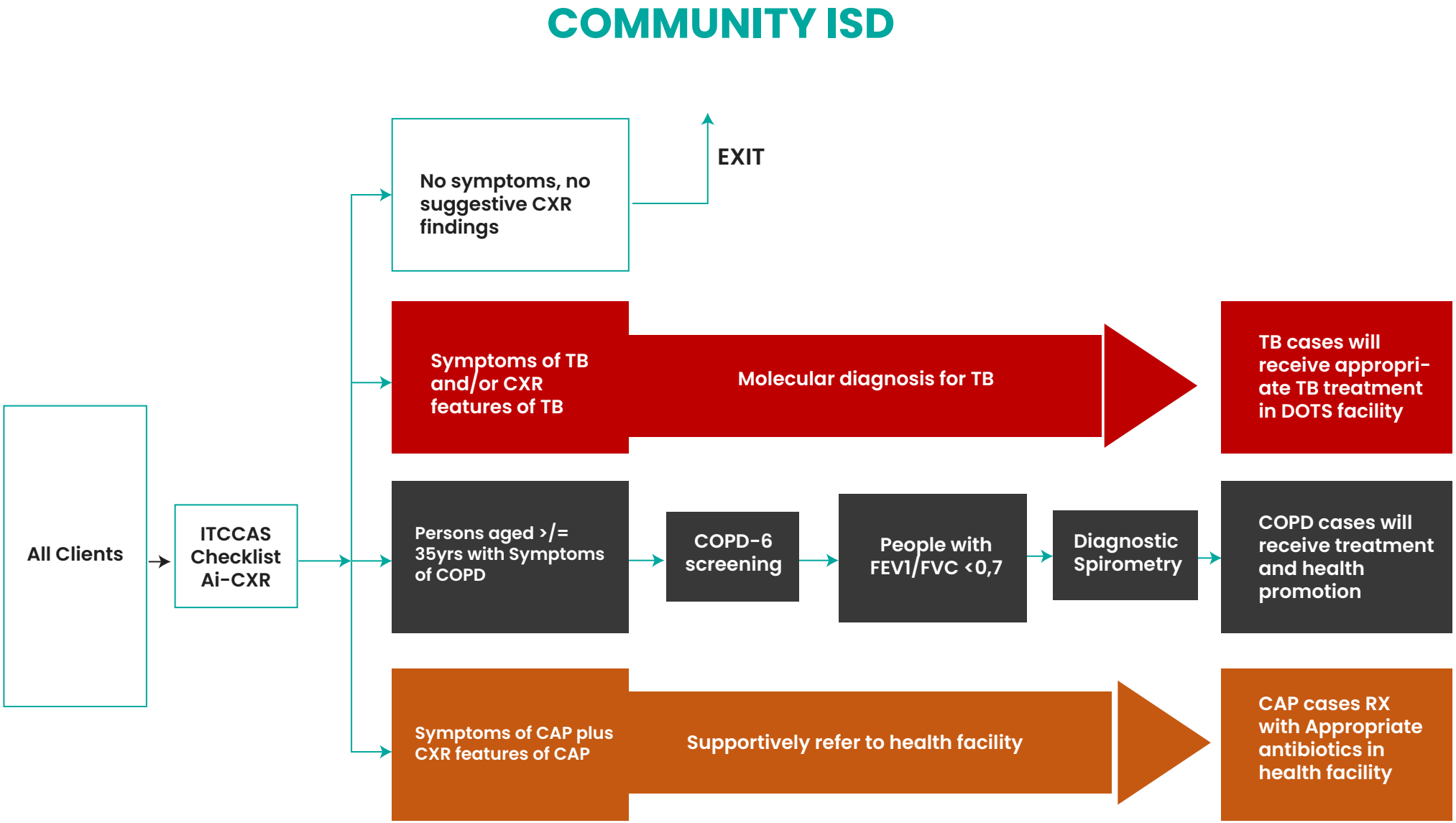


Figure 2: Integrated Service Delivery Implementation of PAL strategy in Community setting

1.2.3 Recommended list of Equipment and supplies for implementation of PAL Strategy

Table 1: Essential Equipment for the implementation of PAL in PHC

Essential Equipment for Primary Health Centers:

1. Source of oxygen and accessories for oxygen administration
2. Pulse oximeter
3. Peak flow meter
4. Spacers*
5. Masks
6. Spirometer
7. Metered-dose inhalers for bronchodilators

*Very essential for asthma

1.2.4 Recommended list of Essential Medicines required for provision of ISD

Table 2: list of essential medicines required for provision of ISD

Analgesics, Antipyretics

1. Paracetamol 500-1000mg; (Children: 10-15mg/kg)
2. Diclofenac 50-100mg
3. Ibuprofen, 200-400mg

Antiallergics, Antihistamines

4. Promethazine, tablet 25 mg (very essential for Asthma)
5. Chlorphenamine, tablet 4 mg

Anti-inflammatory Steroids

6. Prednisolone, tablets 5 mg
7. Hydrocortisone, ampoule 100 mg for IV injection

Antibacterials

8. Amoxicillin caps, 250-500 mg (children: susp: 30mg/kg)
9. Amoxicillin + Clavulanic Acid, tablets 500 mg + 125 mg (Amoxiclav)
10. Erythromycin (or equivalent), tablet 250 mg, 500 mg
11. Clarithromycin tab 500mg

Medicines for Asthma, COPD, and Chronic Rhinitis

12. Salbutamol, metered-dose inhaler 100 µg/dose
13. Budesemide- Formoterol inhaler, 6mcg/250mg

Anti-TB Medicines: See the national guideline.

1.2.6 Health Promotion and Patient Education in ISD for TB, CAP and COPD

Communicating health education messages to patients and their families is an integral part of health services delivery at all levels of the health system. Health workers should give counselling at each contact with patients attending a health facility for any reason. It is the responsibility of health personnel to relieve the anxieties of patients and their relatives, answer their questions and explain, in clear and suitable language, the diagnosis, the necessary investigations, treatment, follow- up and preventive measures.

Health education messages should be adapted to the situation, including the cultural background and educational level of patients and families, the type and stage of respiratory disease, and the professional level of the health worker. The messages should be repeated at each contact with patients receiving long-term treatment. Provide patients with available health promotion materials and tools.
Cigarette smoking and indoor air pollution are the major risk factors for TB, CAP and COPD and should be the main thrust of patient education at every contact of service delivery.

A. Cigarette smoking

Cigarette smoking is a major risk factor for both lung diseases and heart problems, impacting overall health and well-being. It contributes to the development of COPD, lung cancer, and heart disease, all of which can lead to severe disability and premature death. Smoking weakens the immune system, making individuals more vulnerable to infections such as TB and CAP, which become more severe and harder to treat. The harmful chemicals in cigarette smoke damage lung tissue over time, causing chronic cough, shortness of breath, and wheezing. These chemicals also trigger airway inflammation and narrowing, making it difficult for air to move in and out of the lungs, leading to reduced lung function, frequent infections, and long-term respiratory complications.

In light of these dangers, health workers at PHCs should play an important role in educating patients about the risks of smoking and the benefits of quitting. Quitting smoking improves lung function, lowers the risk of severe infections, reduces the likelihood of developing certain cancers, and promotes better lung and heart health. It also increases life expectancy and saves money that would have been spent on cigarettes, contributing to overall well-being. Health promotion efforts should include raising awareness, and providing counseling. Patients should be advised on various quitting strategies, such as nicotine replacement therapy, behavioral counseling, and support groups. Additionally, discouraging smoking in public places helps protect non-smokers from the harmful effects of secondhand smoke. Every encounter with a smoker is an opportunity to provide guidance and support toward quitting, ultimately benefiting not only the individual but also their families and communities.

Indoor air pollution

Another major, but often overlooked cause of respiratory diseases is indoor air pollution. In rural and low-income communities, many households rely on firewood, charcoal, and kerosene for cooking, releasing smoke and harmful gases into their homes. Others face dust, smoke, and chemical exposure at work, which can damage the lungs. Long-term exposure increases the risk of TB, CAP, and COPD. Breathing in smoke and fumes regularly can cause chronic cough, difficulty breathing, chest tightness, and frequent respiratory infections. It can also worsen asthma and COPD, leading to more hospital visits and a poorer quality of life. Infants, children, pregnant women, and older adults are especially vulnerable to its harmful effects.

To reduce indoor air pollution, people should cook outside when possible or ensure proper ventilation by opening windows and doors. Switching to cleaner fuels like gas or electricity can significantly lower smoke levels. In workplaces with high dust or chemical exposure, wearing face masks and working in well-ventilated areas is essential. PHC workers play a crucial role in educating communities about the dangers of indoor air pollution and promoting simple, practical solutions. They should advocate for better home ventilation, reduced exposure to harmful chemicals, and safer workplace conditions. By making small but important changes, families and workers can protect their lungs, reduce disease risk, and improve overall health.

Table 3: Main Skills for Effective Communication with Patients

1. Ask Questions and Listen
- To understand the patient's medical history.
- To assess the patient's current knowledge about their disease.
- To identify and help solve any issues the patient may have with treatment.

2. Demonstrate a Caring, Respectful Attitude
- To build trust and motivate the patient to comply with treatment.

3. Praise and Encourage the Patient
- To boost the patient's confidence and reinforce positive behavior or progress.

4. Speak Clearly and Simply
- To ensure the patient understands and remembers key messages about their disease and its treatment.

5. Encourage the Patient to Ask Questions
- To foster open communication and address any doubts or concerns the patient may have.

6. Ask Questions to Check the Patient's Understanding
- To confirm the patient knows exactly what to do regarding treatment and preventive measures.

MODULE 2

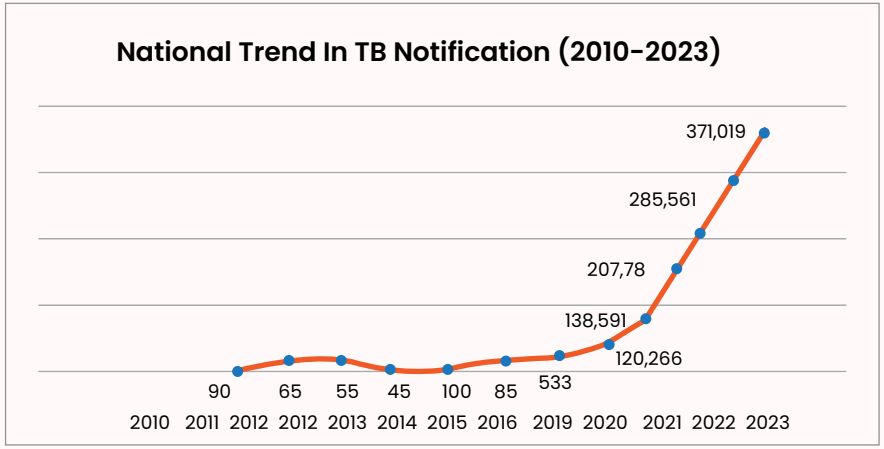
Overview of Tuberculosis, Community Acquired Pneumonia and Chronic Obstructive Pulmonary Diseases

2.1 Overview of Tuberculosis

A. Epidemiology of Tuberculosis

Tuberculosis (TB) is a chronic, infectious disease caused by bacteria generally referred to as Mycobacterium tuberculosis complex. It mainly affects the lungs but can also affect other organs; TB is mostly an airborne disease. It is transmitted when individuals inhale the droplets that contain the organisms expelled into the air by TB patients. TB organisms can be expelled when individuals cough, sneeze, talk, sing or spit.

Nigeria has the 6th highest burden of TB patients globally and highest in Africa and treatment coverage rate remains low at just 24%. In 2023, the incidence of TB in Nigeria was reported at 219 cases per 100,000 people, and the disease claims the lives of 268 individuals daily. According to the Global Tuberculosis Report 2024, Nigeria is one of the countries with the highest burden of tuberculosis (TB). Nigeria is estimated to have about 40% of its TB cases go unreported each year. Each of the undiagnosed TB patients is capable of infecting 10 – 15 persons every year. All efforts must be put in place to find all the missing TB cases. The trend in the notification of TB cases is shown in Figure 3a. It is estimated that 12-15% of adult cases are children, yet Nigeria currently reports 8% although the trends show an increase in notification as shown in Figure 3b.



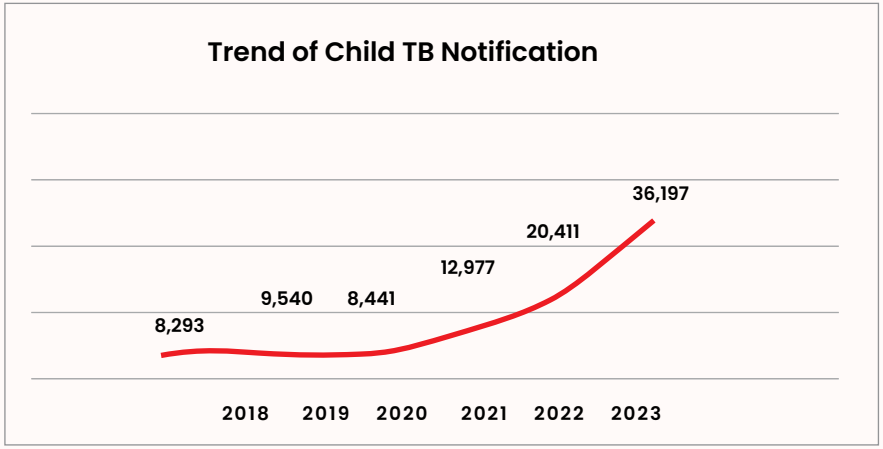


Figure 3: Figure 3a: Notification of all TB cases in Nigeria. Figure 3b shows trend of Childhood TB

B. Factors that increase the risk of developing TB

Adult Presumptive TB case

This is a person who presents with symptoms or signs suggestive of TB. The commonest symptom of pulmonary TB is productive cough for 2 weeks or more, which may be accompanied by other respiratory symptoms.

However, any person living with HIV (PLHIV) is considered a presumptive TB if he/she presents with cough of any duration. Absence of fever or cough does not exclude a diagnosis of TB, particularly in immuno-compromised patients e.g. PLHIV, cancer, patients or malnourished individuals.

Other respiratory symptoms may include shortness of breath, chest pain, and coughing up blood (haemoptysis). Regardless of the site of disease, there are usually constitutional symptoms present, such as fever, night sweats and weight loss. Symptoms or signs of EPTB depend on the site(s) involved (Table 3).

Table 4: Symptoms of Tuberculosis

Pulmonary	Constitutional Symptoms	Extra- Pulmonary
• Cough • Coughing up sputum or blood • Pain in the chest when breathing or coughing	• Fever • Chills • Night sweats • Loss of appetite • Weight loss • Weakness or easy fatigability • Malaise (a feeling of general discomfort or illness)	The symptoms depend on part of body affected by tuberculosis (TB) disease such as: • TB of the spine may cause pain or swelling in the back. • TB of the kidney may cause blood in the urine. • Meningeal TB may cause headaches, persistent fever, neck stiffness, vomiting, irritability, convusions or loss of consciousness. • TB of the Lymph nodes(Lymphadenitis) may cause swelling and painless lymph nodes, often at the base of the neck and may drain pus • AbdominalTBmay cause abdominal enlargement, ascites and abdominal mass • Osteoarticular TB (TB of the bones /joints) ma cause bone/joint pain, bone swelling, limitation of movement

Child Presumptive Case of TB

TB is presumed in a child if one or more of the following is present:

a. Persistent cough of 2 weeks or more (or current cough in children living with HIV)
b. Prolonged fever of 2 weeks or more with or without drenching night sweats, weight loss or failure to gain weight or failure to thrive
c. A history of contact with an adult/adolescent TB case or someone with chronic undiagnosed cough is important.
d. Other symptoms that may be present include loss of appetite, reduced playfulness/fatigue, haemoptysis (blood-stained sputum), and behavioral changes (irritability, confusion or agitation).

Physical findings (signs) may include:

a. Acute or chronically ill-looking
b. Varying levels of wasting
c. Febrile (fever above 37.4 oC)
d. Pallor
e. Leg oedema (swollen lower limbs)
f. Enlarged lymph nodes around the neck greater than 2 cm in diameter

Bacteriologically Diagnosed TB Case

This refers to a presumptive TB case from whom a biological specimen tests positive by smear microscopy, culture or WHO-recommended rapid (such as such as Xpert MTB/RIF). Also known as laboratory or microbiologically confirmed tuberculosis case.

Clinically Diagnosed TB Case

Clinically diagnosed TB refers to a presumptive TB case that is not microbiologically confirmed but has been diagnosed with active TB by a clinician who has decided to give the patient a full course of anti-TB treatment.

Latent Tuberculosis (Latent TB)

This is defined as a state of persistent immune response to stimulation by Mycobacterium tuberculosis antigens with no evidence of clinically manifest active TB. There is no gold standard test for LTBI

C. Risk factors for developing Tuberculosis

There are certain factors that are associated with the risk of exposure to the causative organism, the risk of being infected and the risk of development of disease. The interplay of these factors is important in the epidemiology of TB as shown in Figure 5

a. Risk of exposure, depends on:

• Presence of untreated pulmonary TB Patient
• Duration of contact with untreated patient
• Poor ventilation/or overcrowding

b. The following group of persons are at increased risk of developing TB

- Under-nutrition/Malnutrition
- HIV infected individuals at an increased risk of TB (risk 7.5% per year, cumulative risk up to 50% in a lifetime)
- Smoking
- Extremes of age (Young children and the elderly)
- Patients with chronic systemic illnesses like diabetes mellitus, renal diseases, and cancers.
- Patients on prolonged intake of steroids
- Patients using cytotoxic drugs
- Chronic alcoholism
- History of exposure/work in quarry industries
- Individuals with chronic lung diseases such as COPD

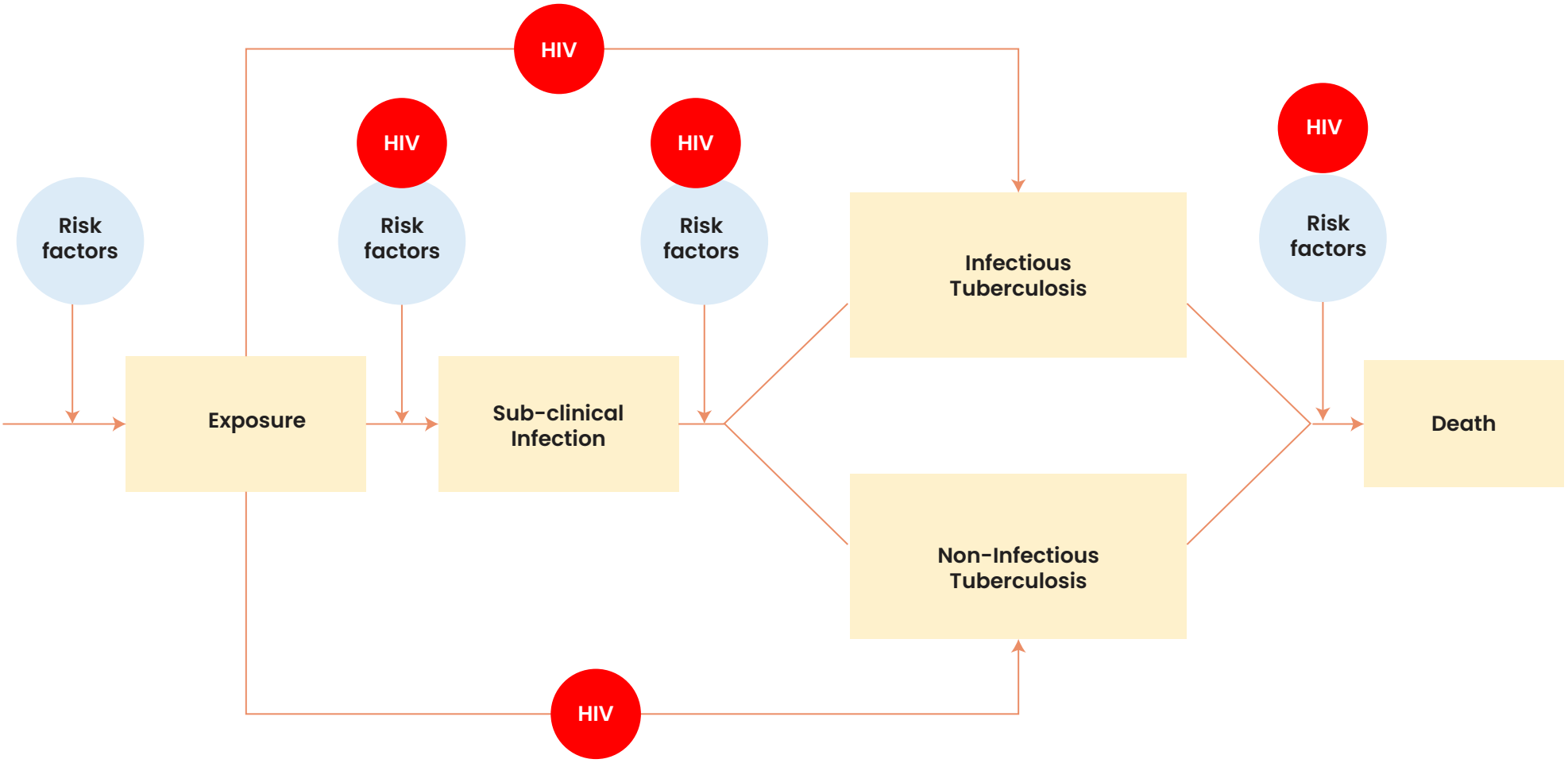


Figure 4: A model for epidemiology of TB

D. Prevention strategy

Prevention of TB can be accomplished through the following strategies

- Health education and promotion
- Specific protection through BCG vaccination, Tuberculosis preventive therapy (offered to eligible persons among those who have been exposed to a case of TB)
- Early identification and treatment
- Prevention of complications and disabilities

2.2 Overview of Community Acquired Pneumonia

A. Epidemiology of Community Acquired Pneumonia

Pneumonia is the inflammation of lung parenchyma (lower airway) due to micro-organisms such as bacteria, viruses and fungi. Clinically, it is also defined as a condition typically associated with fever, respiratory symptoms, and evidence of lung involvement, either by physical examination or the presence of abnormal chest x-ray.

B. Case Definition and burden of disease

Case Definition

Community-acquired pneumonia (CAP) is defined as pneumonia in a previously healthy individual who acquired the infection outside a health facility or develops the illness within 48 hours of admission into a health facility.

Pneumonia can also be classified as "acute" (less than two weeks duration) or "chronic". Chronic pneumonias tend to have either a mycobacterial (usually Tuberculosis) or fungal cause.

CAP is a leading cause of death among young children, elderly and immunocompromised persons. It accounts for 15% of all-cause mortality of children globally. In adults, CAP reaches 14 cases per 1000 persons with up to 50% of cases requiring inpatient hospitalization and the mortality rate reaching up to 0.7 per 1000 persons per year. 138 million new episodes of clinical pneumonia occur in children under 5 years of age annually with 1.7 million of these being of sufficient severity to be life-threatening requiring hospitalization. Nigeria has the highest mortality due to pneumonia in the world with 162,000 child deaths annually in 2018. In Nigeria, in 2018 about 3% of children under the age of 5 years were reported with symptoms of acute respiratory infection. 81% of pneumonia deaths occur in children younger than 2 years.

C. Aetiology of CAP and Risk factors for CAP

Causes of CAP

CAP is caused by infectious agents which get to the lungs through the airway via inhalation (through breathing) or by the haematogenous route (through the blood). Bacterial causes include S. pneumoniae, H. influenzae type b, Staphylococcus aureus and Klebsiella pneumoniae, non-typhoidal Salmonella species, and non-typeable H. influenzae. Atypical bacterial causes include Mycoplasma pneumoniae and Chlamydophila pneumoniae.

Bordetella pertussis is an important cause of severe lower respiratory tract infection, particularly in unvaccinated infants. Viruses which commonly cause pneumonia include respiratory syncytial virus (RSV), influenza A, B and C virus, parainfluenza viruses 1, 2, 3 and 4, adenovirus (ADV), human metapneumovirus (HMPV), and human rhinovirus. Measles virus is an important cause of severe pneumonia in malnourished unvaccinated children. Other aetiologic agents include human cytomegalovirus (CMV) and Pneumocystis jirovecii which are important, particularly in immunocompromised.

Risk factors for CAP

There are risk factors which predispose people to develop CAP.

In children these include:

a. Lack of exclusive breast feeding
b. Malnutrition (Micro/Macro nutrient deficiency)
c. No immunization (PCV, Penta, Measles)
d. Overcrowding
e. Poor ventilation
f. Prematurity/Low birth weight
g. Premature rupture of membrane
h. Indoor air pollution (smoking, fossil fuel)
i. Immunodeficiency diseases like: HIV, Children on steroid
j. Zinc Deficiency

The risk factors for CAP in adults are

a. Age greater 65
b. Chronic Cigarette Smoking
c. Chronic Alcoholism
d. Immunosuppression (Steroid, DM)
e. Comorbidity (COPD, DM)
f. Nursing home residents

Table 5: Symptoms and signs of pneumonia

General Symptoms of Pneumonia (All Ages)

- Fever
- Cough
- Fast breathing

Symptoms and Signs in Specific Age Groups

1. Newborns

- Symptoms:
- Poor feeding
- Vomiting
- Lethargy
- Irritability
- Abdominal distension
- Convulsions

2. Under-5 Children

Specific Signs:

- Tachypnoea (fast breathing)
- Nasal flaring
- Chest wall indrawing
- Grunting
- Cyanosis (bluish discoloration of the skin or lips)
- Crepitation (crackling sound in the lungs during breathingAreas of dull percussion note (in older children)

3. Adults

Symptoms:

- High fever with chills
- Persistent cough (may produce brown, greenish, yellow, or blood-streaked mucus)
- Difficulty breathing
- Chest pain (especially when breathing or coughing)
- Fatigue or weakness
- Loss of appetite
- Sweating and shivering

Signs:

- Tachypnoea
- Cyanosis (severe cases)
- Reduced chest expansion on the affected side
- Crackles or crepitations heard during lung auscultation
- Dull percussion note over the affected area

D. Prevention of CAP

CAP can be prevented by instituting the following measures:

- General health promotion- this includes hand washing, good cough etiquette, avoidance of smoke, cessation of smoking, use of cleaner fuels for cooking (avoid cooking with fossil fuel), adequate ventilation, avoidance of overcrowding including physical distancing, wearing of masks, adequate nutrition including exclusive breastfeeding for infants below 6 months of age,
- Specific protection- immunization prevents pneumonia due to specific causative organisms. BCG prevents tuberculosis, Pentavalent vaccine prevents CAP due to haemophilus influenza type b and pertussis, Pneumococcal conjugate vaccine given to both children and adults prevents CAP due to streptococcus pneumonia while measles vaccine prevents measles pneumonia.
- Covid vaccine is very important in the elderly. Chemoprevention for specific causative agents is important as in Cotrimoxazole prevention therapy in PLWHA and tuberculosis preventive therapy
- Early diagnosis and treatment with use of appropriate tools such as pulse oximetry and oxygen
- Other measures are management of complications, and rehabilitation.

2.3 Overview of Chronic Obstructive Pulmonary Diseases (COPD)

A. Epidemiology of Chronic Obstructive Pulmonary Diseases

The 2023 Global initiative for COPD defines it as a heterogeneous lung condition characterized by chronic respiratory symptoms (dyspnea, cough, expectoration and or exacerbations) due to abnormalities of the airways (bronchitis, bronchiolitis) and or alveoli (emphysema) that cause persistent, often progressive, air flow obstruction.

B. Case Definition and burden of COPD

Case Definition of COPD

COPD should be considered in any patient who has dyspnea (difficulty in breathing), chronic cough or sputum production and/or a history of exposure to risk factors for the disease, but spirometry that demonstrates the presence of a post-bronchodilator FEV1/FVC<0.7 is mandatory to establish the diagnosis of COPD.

Chronic dyspnea is the commonest symptom of COPD. Cough with sputum production is present in up to 30% of patients. Symptoms may vary from day to day and may precede the development of airflow obstruction by many years. Airflow obstruction may also be present without chronic dyspnea and or cough or sputum and vice versa.

COPD is the 3rd leading cause of death in the world. Estimated global prevalence of COPD is 11.7% (95% CI 8.4% - 15.0%). Estimated 3 million deaths annually from COPD accounting for about 6% of all death globally. The BOLD 1 Study by Obaseki et al. (2015) found a prevalence of 7.7% in Ile- Ife, Nigeria. With the increasing prevalence of smoking in developing countries, the prevalence of COPD is expected to rise over the next 40years. The WHO estimates 1.1 billion smokers worldwide, increasing to 1.6 billion in 2025. In low- and middle-income countries rates are increasing at an alarming rate.

C. Aetiology, Mode of Transmission, and Risk factors of COPD

The risk factors for COPD can be divided into 2 groups: Host factors and the Exposure factors.

a. Host factors:

- Aging – commoner in elderly
- Sex – males
- Poorly treated Asthma
- Infections (Example Pulmonary TB)

b. Exposure factors:

- Smoking; cigarette smoking, passive smoking
- Indoor Pollution – cooking indoors (exposure to biomass fuel)
- Occupation - occupational dust and chemicals

Factors that influence COPD progression

- Age and
- Gender (male)
- Exposure to particles
- Socioeconomic status
- Poorly treated Asthma
- Infections example, chronic bronchitis, and PTB

D. Prevention of COPD

COPD can be prevented by applying the following strategies:

- Cigarette Smoking cessation
- Reducing indoor air pollution
- Reduction of Occupational Exposure
- Early diagnosis and treatment
- Vaccination with influenza and pneumococcal conjugate vaccines to prevent lower respiratory tract infection (Influenza vaccination every year should be offered to all patients with COPD and Pneumococcal vaccination every 5 years).
- Pulmonary Rehabilitation: this includes occupational rehabilitation, exercise conditioning, breathing strategies, nutrition counseling, patient education on managing the disease, counseling and or support groups.

MODULE 3
Integrated Lung Conditions Symptoms Screening

3.1 Integrated Lung Conditions Symptoms Screening Checklist

All screening algorithms commence with identifying the presenting symptoms, irrespective of age (children/adult), setting (facility-based/community-based), or with/without the use of portable digital AI-CXR. Specific algorithms for each scenario are described below.

Table 6: Integrated TB, CAP, COPD and Asthma Symptom (ITCCAS) Checklist

Symptom	TB	CAP	COPD	Asthma
cough < 2 weeks		✓		
cough ≥ 2weeks	✓		✓	✓
Chest pain		✓		
Fever	✓	✓		
Night sweats	✓			
weight loss	✓			
Wheezing/whistling sound			✓	✓
Cigarette Smoking			✓	
Pronged exposure to biomass fuel (e.g. firewood)			✓	
Fast breathing or difficulty in breathing		✓	✓	✓
History of contact with a chronically coughing adult or a TB patient	✓			

The commonest form of TB is TB of the lung (pulmonary TB). However, TB can occur in other parts of the body (extra-pulmonary TB) including:

- TB adenitis: Asymmetrical, painless, non- tender lymph node enlargement for more than one month
- TB Pleural Effusion - Signs of respiratory distress, reduced breath sounds and chest movement on affected side
- Malabsorption TB - Abdominal swelling/distension with or without ascites, palpable masses, diarrhoea, absorption, severe weight loss), fever, night sweat
- TB meningitis - Headache, irritability/abnormal behaviour, vomiting (without diarrhoea), lethargy/reduced level of consciousness/loss of consciousness, convulsions, neck stiffness
- TB of the Spine - Deformity of spine e.g. gibbus, lower limb weakness/paralysis

3.2 CHILDREN: Integrated Screening and Diagnosis of TB, CAP, COPD for Children

ASSESS AND CLASSIFY THE SICK CHILD AGE 2 MONTHS UP TO 5 YEARS

ASSESS

ASK THE MOTHER WHAT THE CHILD'S PROBLEMS ARE

• Determine if this is an initial or follow-up visit for this problem.

- If follow-up visit, use the follow-up instructions on **TREAT THE CHILD** chart

CHECK FOR GENERAL DANGER SIGNS

A Child with any general danger sign needs UkotNi attention; complete the assessment and any pre-referral treatment immediately so referral is not delayed.

ASK:
• Is the child able to drink or breastfeed?
• Does the child vomit everything?

LOOK:
• See if the child is lethargic or unconscious
• See if the child is

If child is convulsing now, treat convulsion

THEN ASK ABOUT MAIN SYMPTOMS:
Does the child have cough or difficult breathing?

IF YES, ASK:

LOOK, LISTEN, FEEL:
•Count the breaths in one minute.
• Look for chest in-drawing.
• Look and listen for stridor.
• Look and listen for wheezing
- If wheezing, has the child had a similar episode in the

CHILD MUST BE CALM

Classify COUGH or DIFFICULT BREATHING

• For how long?

• If coughing for more than 14 days,
ask if the child has weight loss, fever, night sweats

•If there is contact with any adult or adolescent with chronic cough

•Look to see if child has swollen glands,

•Weigh and determine if weight is appropriate

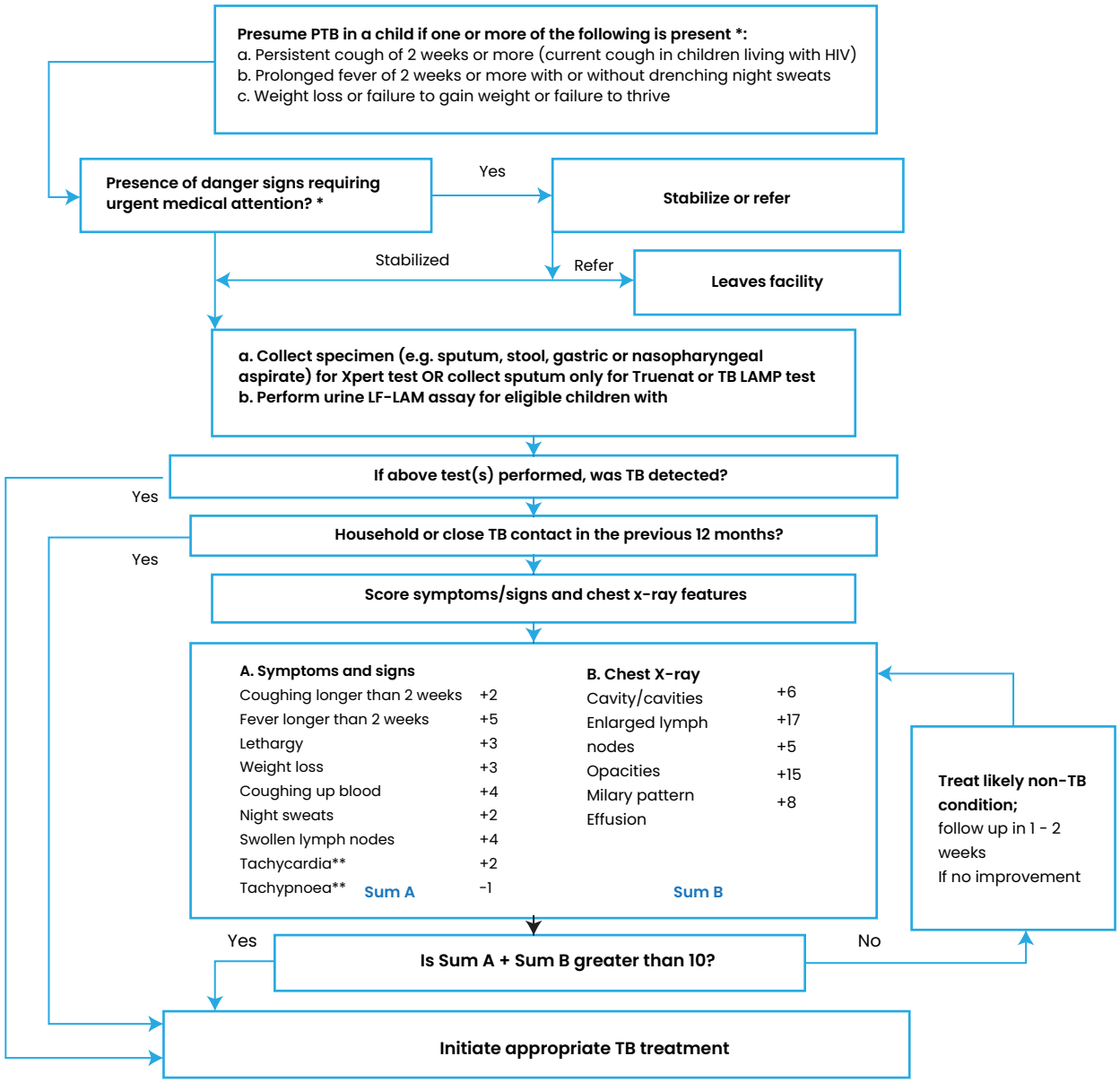
Classify

CLASSIFY (IDENTIFY TREATMENT)

USE ALL BOXES THAT MATCH THE CHILD'S SYMPTOMS AND PROBLEMS TO CLASSIFY THE ILLNESS

SIGNS	CLASSIFY AS	IDENTIFY TREATMENT (Urgent pre-referral treatments are in bold print)
• Any general danger sign or • Chest in-drawing or • Stridor in calm child.	SEVERE PNEUMONIA OR VERY SEVERE DISEASE	• Give first dose of an appropriate antibiotic: IV Amoxicillin 150mg/kg in 3 divided doses and IV Gentacin 5-7.5mg/kg once daily OR IV Cefuroxime 150mg/kg/day in 3 divided doses and IV Gentacin 5-7.5mg/kg once daily • If wheezing, give a dose of inhaled bronchodilator • Refer URGENTLY.
• Cough less than 2weeks • Fever • Fast Breathing Respiratory rate/min of: AGED < 2 months: ≥ 60b/m Age 2-11months: ≥ 50b/m Age 1-5years: ≥ 40b/m Age 5 years: 30b/m	PNEUMONIA	• Give oral antibiotic for 5 days • If wheezing, give a trial of inhaled bronchodilator* for up to three times and re-classify for cough or difficult breathing. • If child has had an episode of wheezing in the last 12 months, refer for assessment for Asthma (page 37) • Soothe the throat and relieve the cough with a safe remedy • Advise the mother when to return immediately • Follow-up in 2 days
No signs of pneumonia or very severe disease	COUGH OR COLD	• If wheezing give an oral bronchodilator for 5 days • If child has had an episode of wheezing in the last 12 months, refer for assessment Soothe the throat and relieve the cough with a safe remedy. • Advise mother when to return immediately. • Follow-up in 5 days if not improving
Has one or more: • Cough of > 2wks • Prolonged fever • Weight loss • Household Contact • Neck/Spine Swelling	PRESUMPTIVE TUBERCULOSIS	A. Collect specimen (e.g. sputum, stool, gastric or nasopharyngeal aspirate) for Xpert test OR collect sputum only for Truenat or TB LAMP test. B. Perform urine LF LAM assay for eligible children with HIV • Go to page 35 • Follow NTBLCP Algorithm for children 0-9 years.

3.2.1 Facility-based Diagnostic Algorithm for TB in children 0-9 where X ray is Available



*Where digital x-ray with artificial intelligence is suggestive of TB, manage as presumptive TB with chest x-ray interpreted by a trained clinician.

Figure 5: Facility-based Diagnostic Algorithm for TB in children 0-9 where X ray is Available

Extracted from the current Desk Guide for Prevention, Diagnosis and Treatment of Tuberculosis in Children and Adolescents in Nigeria (4th edition)

3.2.2 Facility-based Diagnostic Algorithm for TB in children (0-9 years) & Adolescents where X-ray is Not Available

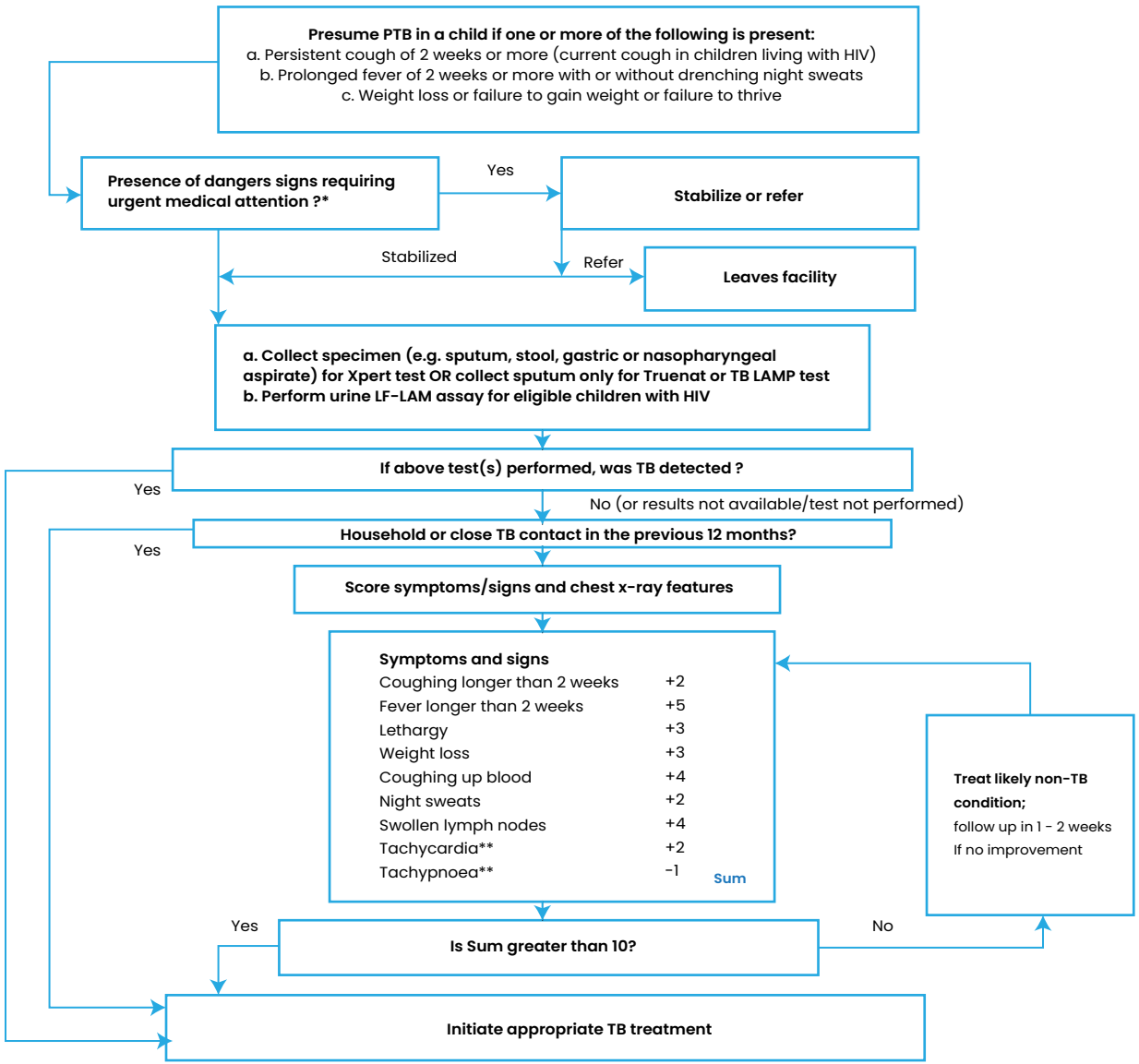


Figure 6: Facility-based Diagnostic Algorithm for TB in children (0-9 years) and Adolescents where Xray is Not Available

Extracted from the current Desk Guide for Prevention, Diagnosis and Treatment of Tuberculosis in Children and Adolescents in Nigeria (4th edition)

3.3 ADULTS: Integrated Screening and Diagnosis of TB, CAP, COPD for the general population

3.3.1 Facility-based Integrated TB, CAP, COPD and Asthma Symptom (ITCCAS) Screening Checklist ONLY

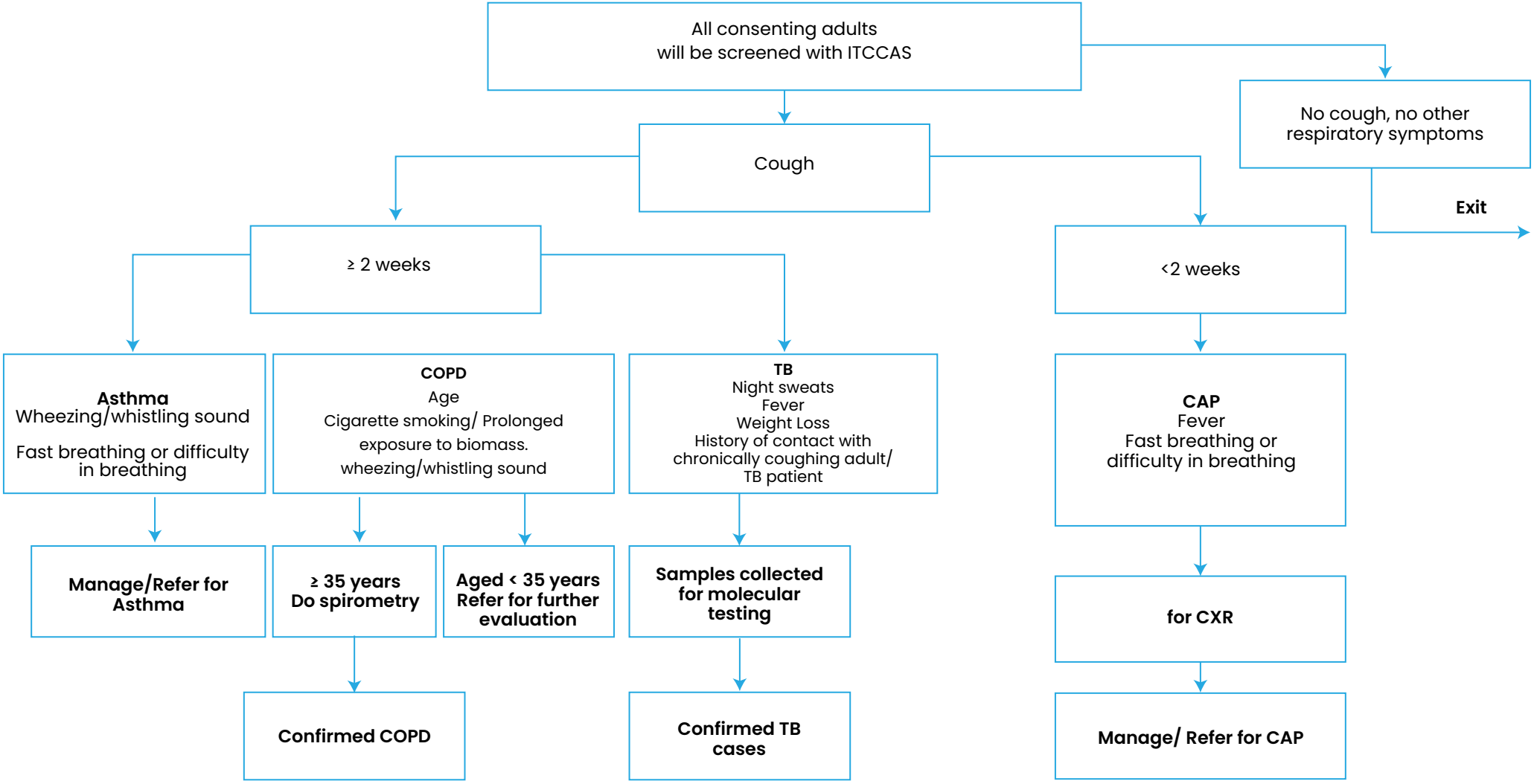


Figure 7: Algorithm for the Use of ITCCAS Checklist alone at health facilities

3.3.2 Community-based Parallel Integrated TB, CAP, COPD and Asthma Symptom (ITCCAS)

All consenting outreach attendees undergo: Integrated TB, CAP, COPD screening

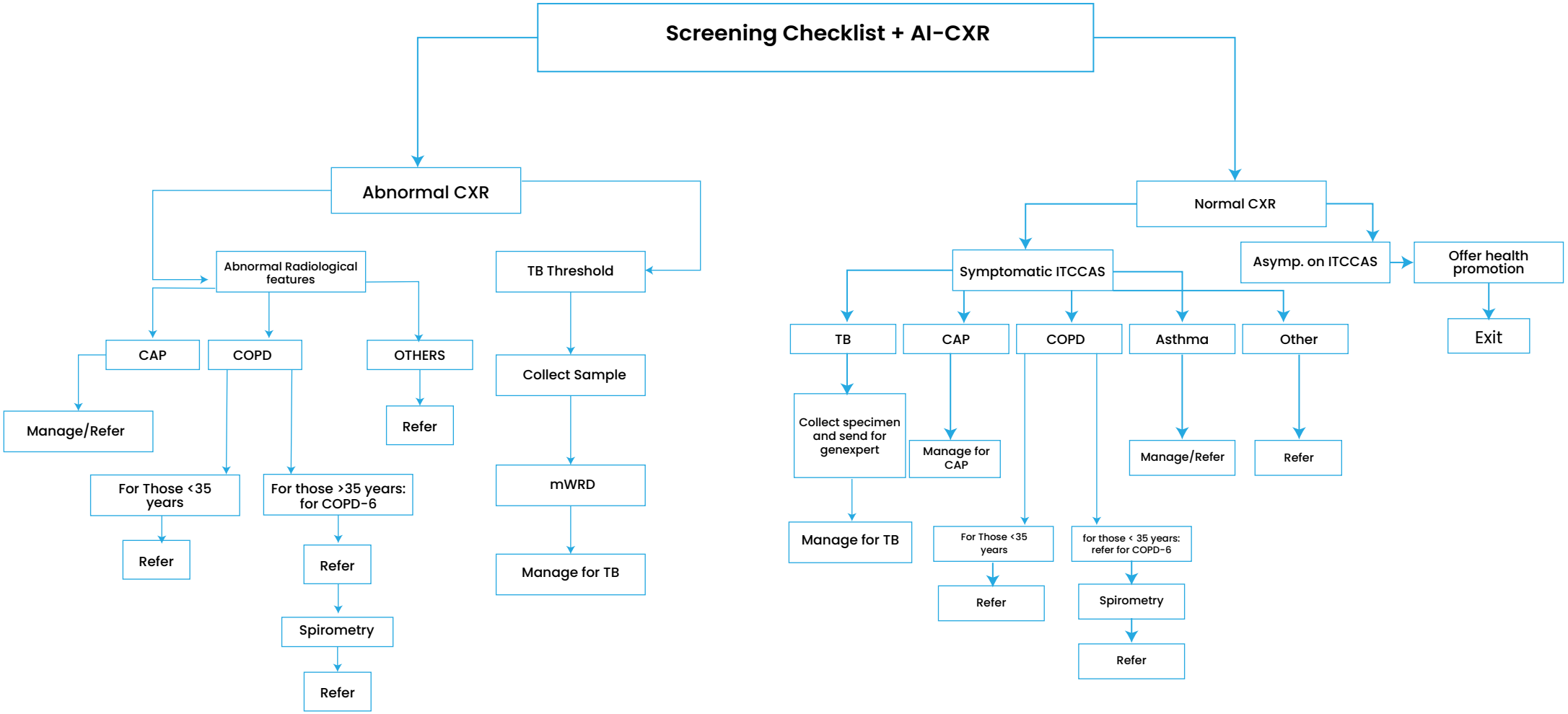


Figure 8: Algorithm for the Use of ITCCAS Checklist + AI-CXR at the community level

3.4 Integrated Lung Health ISD Flowchart

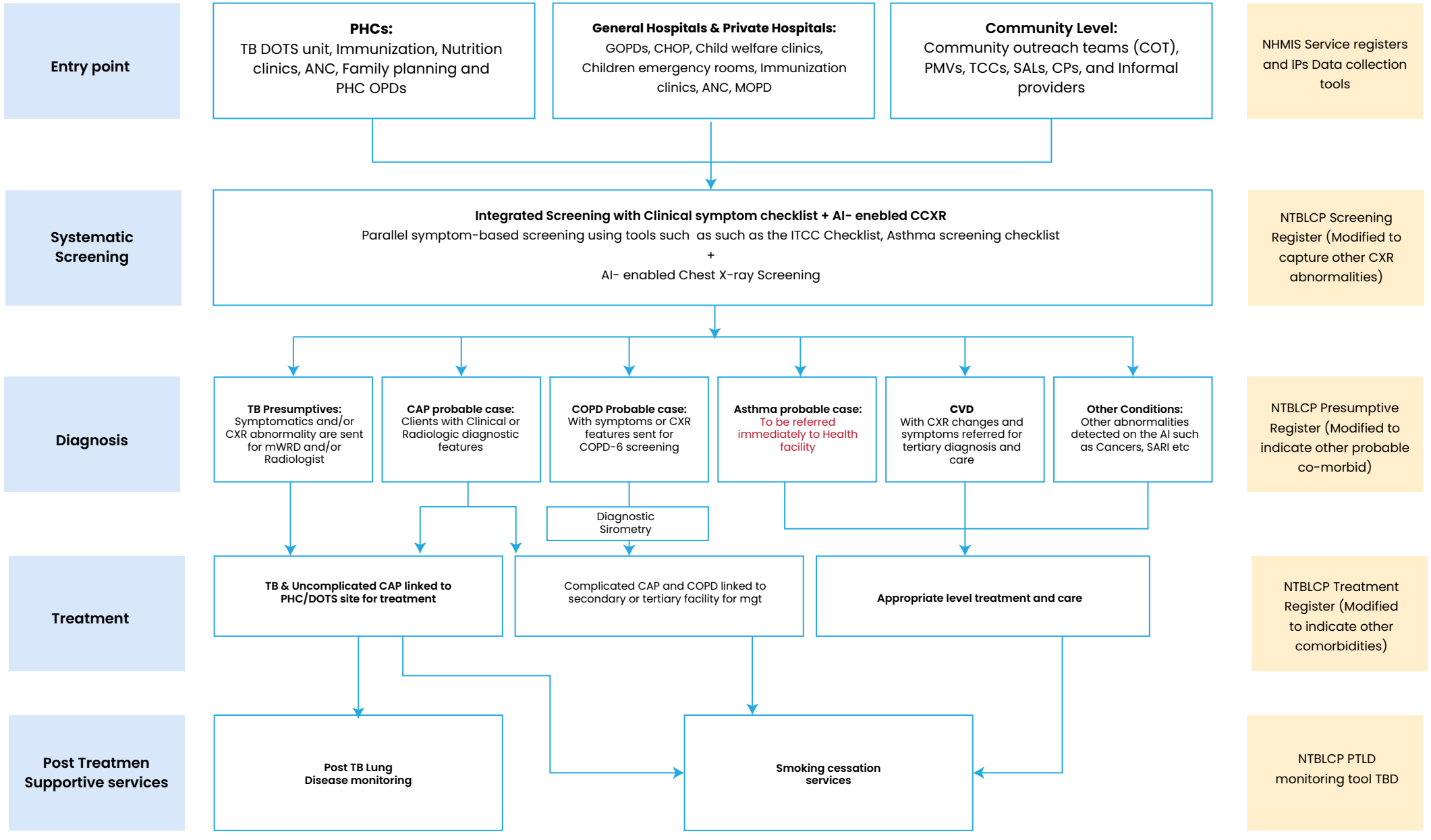
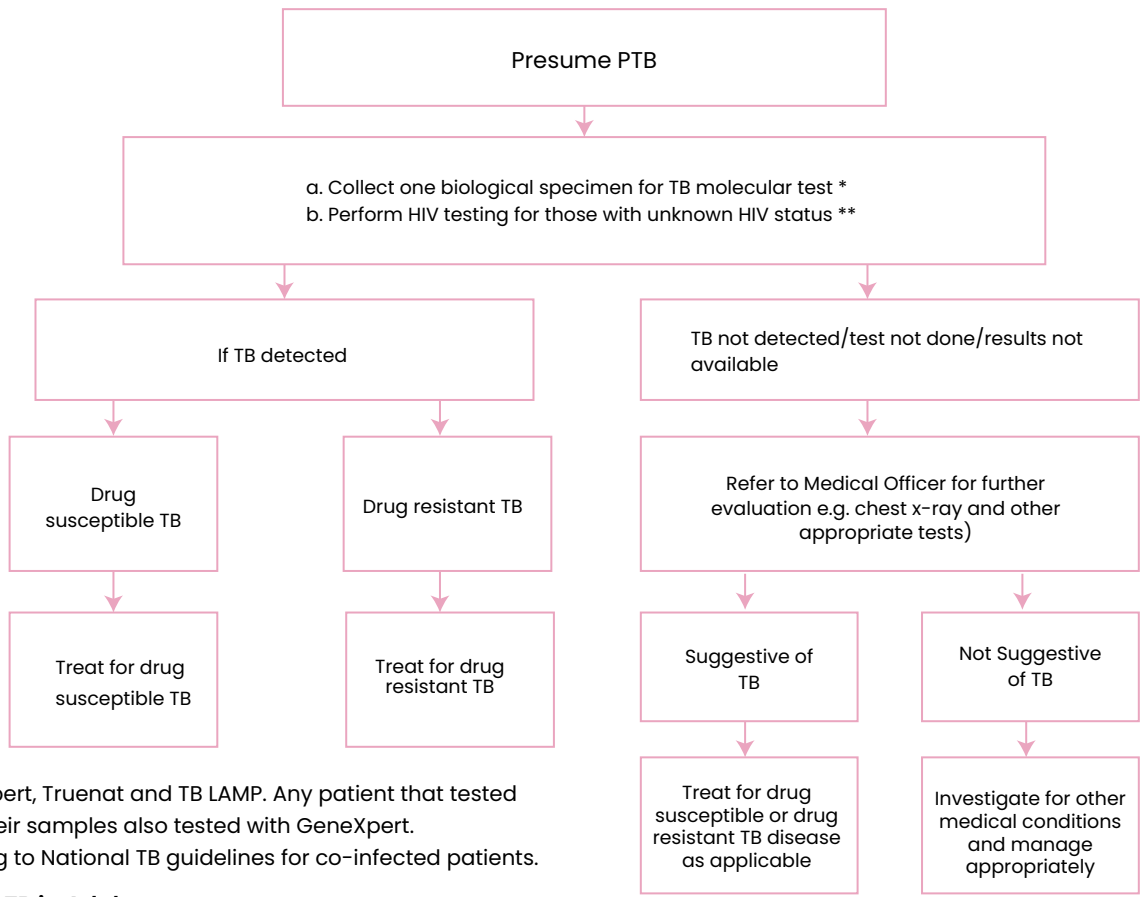


Figure 9: Integrated lung health ISD Flowchart

4.1 If TB Diagnosed: Case Management for Tuberculosis



*TB molecular tests include GeneXpert, Truenat and TB LAMP. Any patient that tested positive for TB LAMP should have their samples also tested with GeneXpert.
** If HIV positive, manage according to National TB guidelines for co-infected patients.

Figure 10: TB Treatment strategies

Treatment of Drug Susceptible TB in Adults

The mainstay of drug susceptible TB treatment is directly observed therapy (DOTS) using a combination of:
- Four drugs during the intensive phase of treatment and
- Two drugs for the continuation phase

Please refer to NTBLCP guidelines for details on medication and recommended regimen.

Treatment of Drug-Resistant TB in Adults

Contact the State TB programme/LGA TBLS if you diagnose any case of drug-resistant TB.

4.2 If Pneumonia Diagnosed: Case Management for Community Acquired Pneumonia

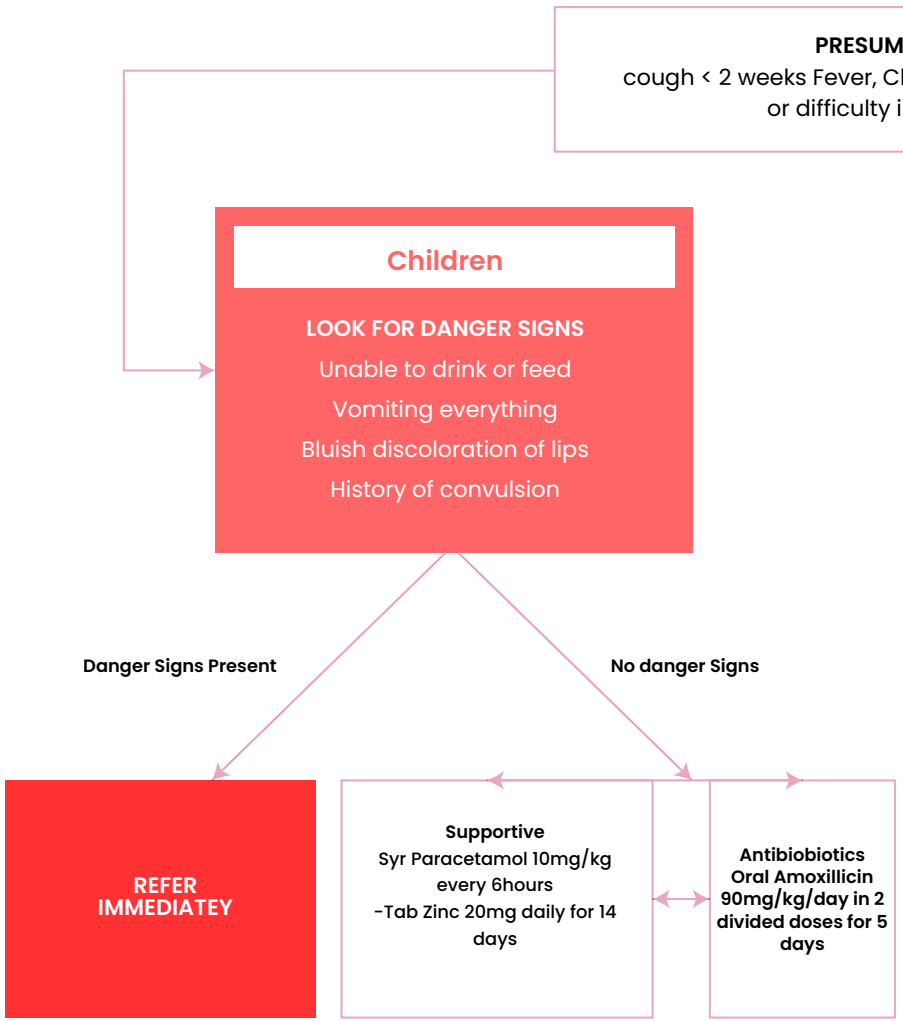


Figure 11: CAP Treatment

Adult

Assess CRB 65 score
Confusion: =1
Respiratory rate: one point if the rate is 30 breaths per minute or more=1
Blood pressure: one point if systolic BP is 90 mmg or less, or diastolic BP is 60 mmHg or less=1
Age 65 or older=1

PLEASE NOTE: Severe pneumonia should be referred to tertiary health Diastollic BP <60mmHg, RR> 30 cycle/mm, more than 1 lobal involvement on CXR. SPO2 < 88% in room air

	Preferred treatment	Alternative (if intolerant of, or allergic to, preferred treatment)
Community treatment	**Amoxicillin 500 mg-1 g tds PO**	**Doxycycline 100 mg od (after 200mg loading dose) PO or clarithromycin 500 mg bd PO**
Hospital treatment: low severity (CrB-65 = 0-1)	**Amoxicillin 500 mg tds PO (or same dose IV if oral treatment not possible)**	**Doxycycline 100 mg od (After 200 mg loading does) PO or Clarithromycin 500 mg bd PO**
Hospital treatmeat: moderate severity (CrB-65 = 2)	**Amoxicillin 500 mg-1 g tds PO and clarithromycin 500 mg bd PO If oral treatment not possible: amoxicillin**	**Doxycycline 100 mg od (After 200 mg loading dose) PO or Levofloxacin 500 mg od PO or Moxifioxacin 400 mg od PO**

4.3 If Asthma Diagnosed: Case Management for Asthma

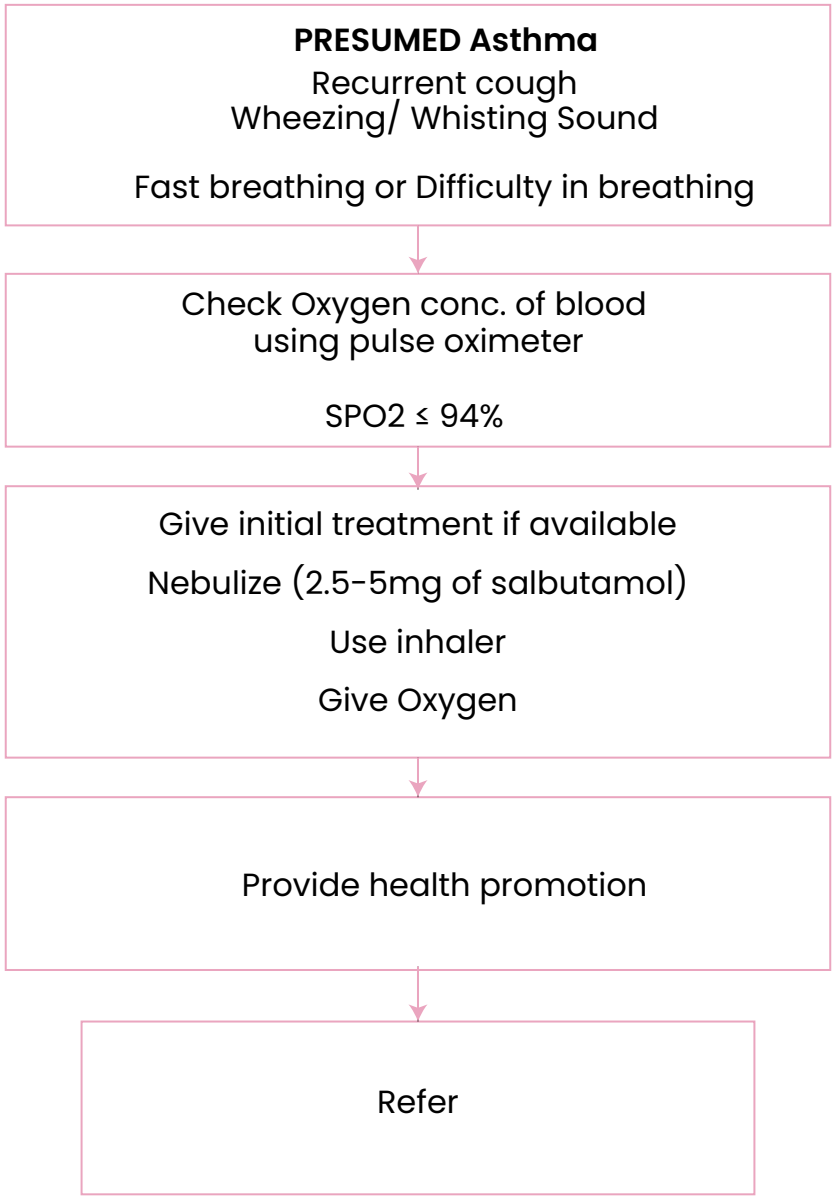


Figure 12: Asthma Management

4.4 If COPD Diagnosed: Case Management for COPD

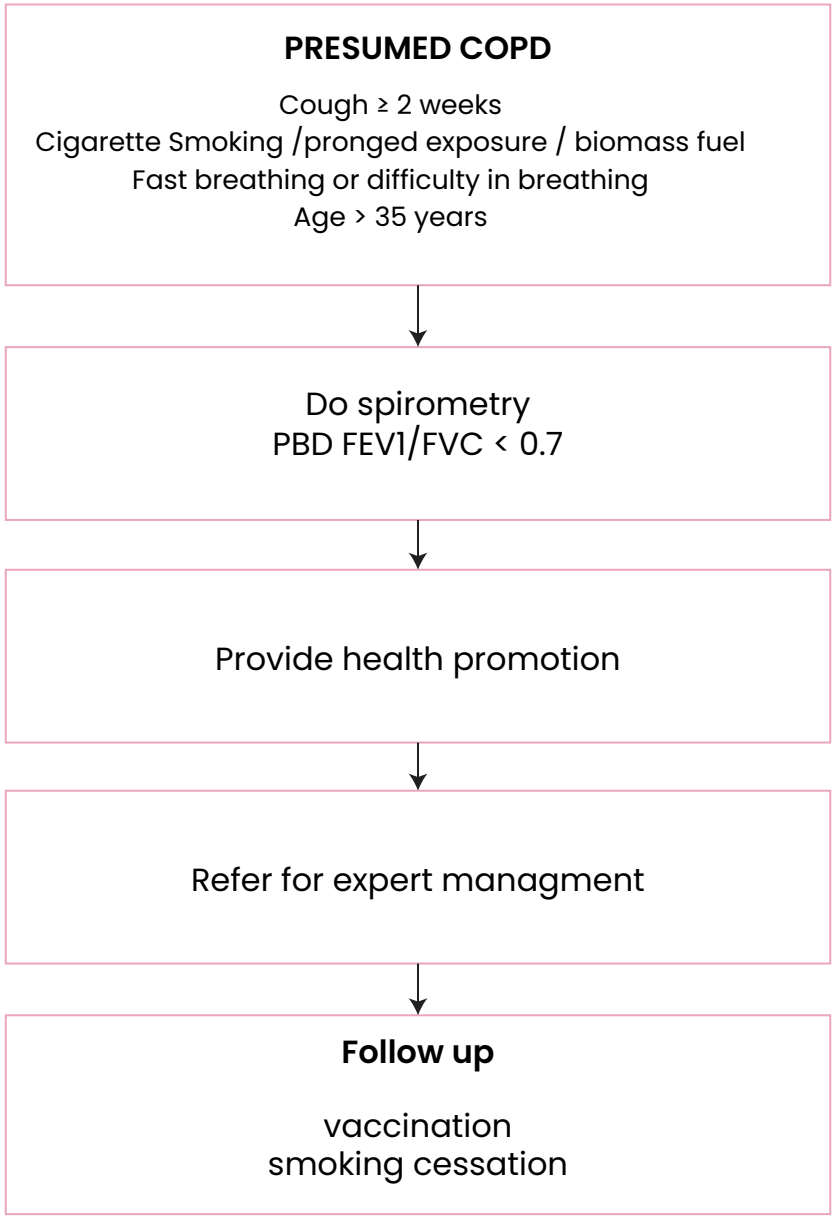
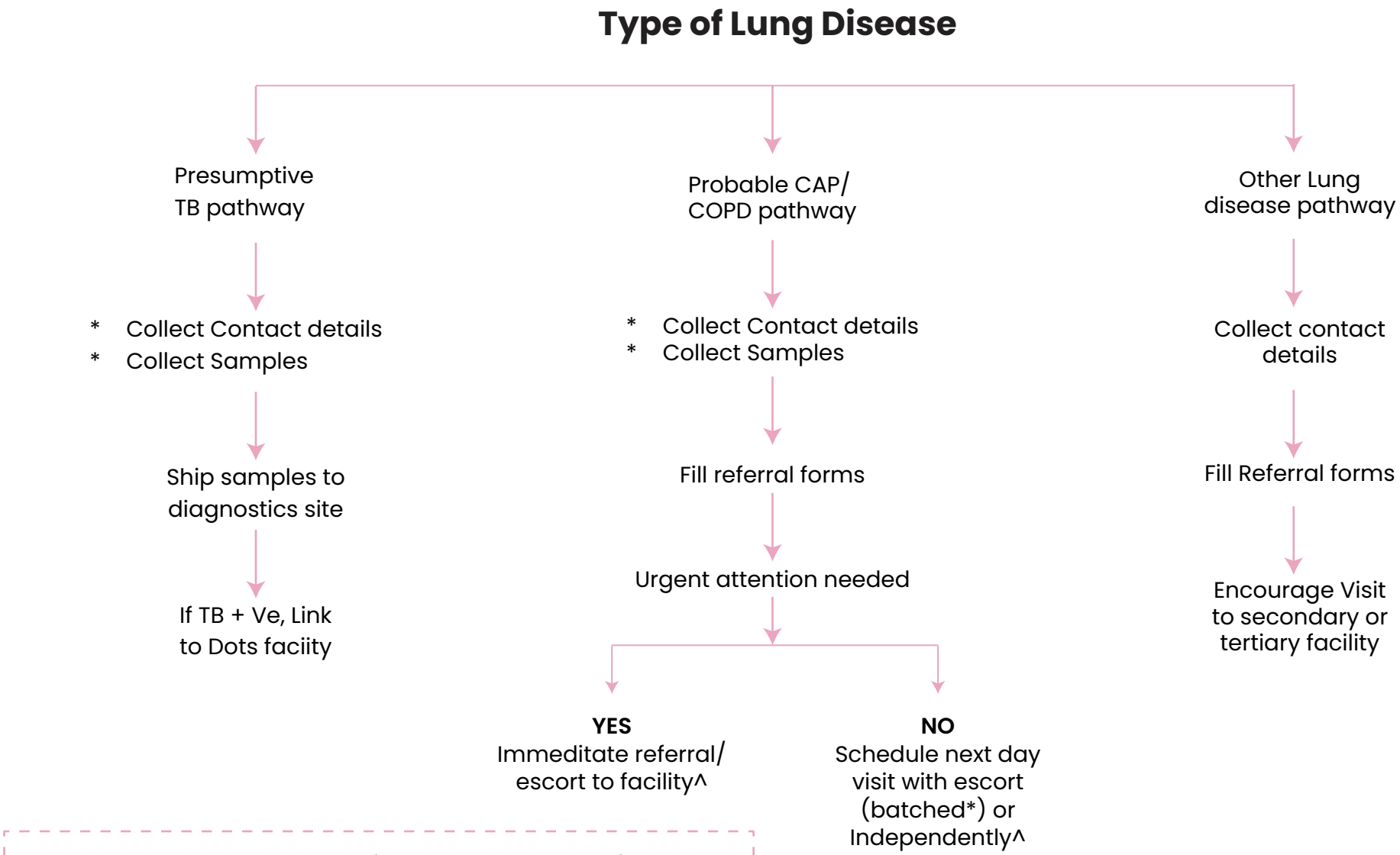


Figure 13: COPD Management

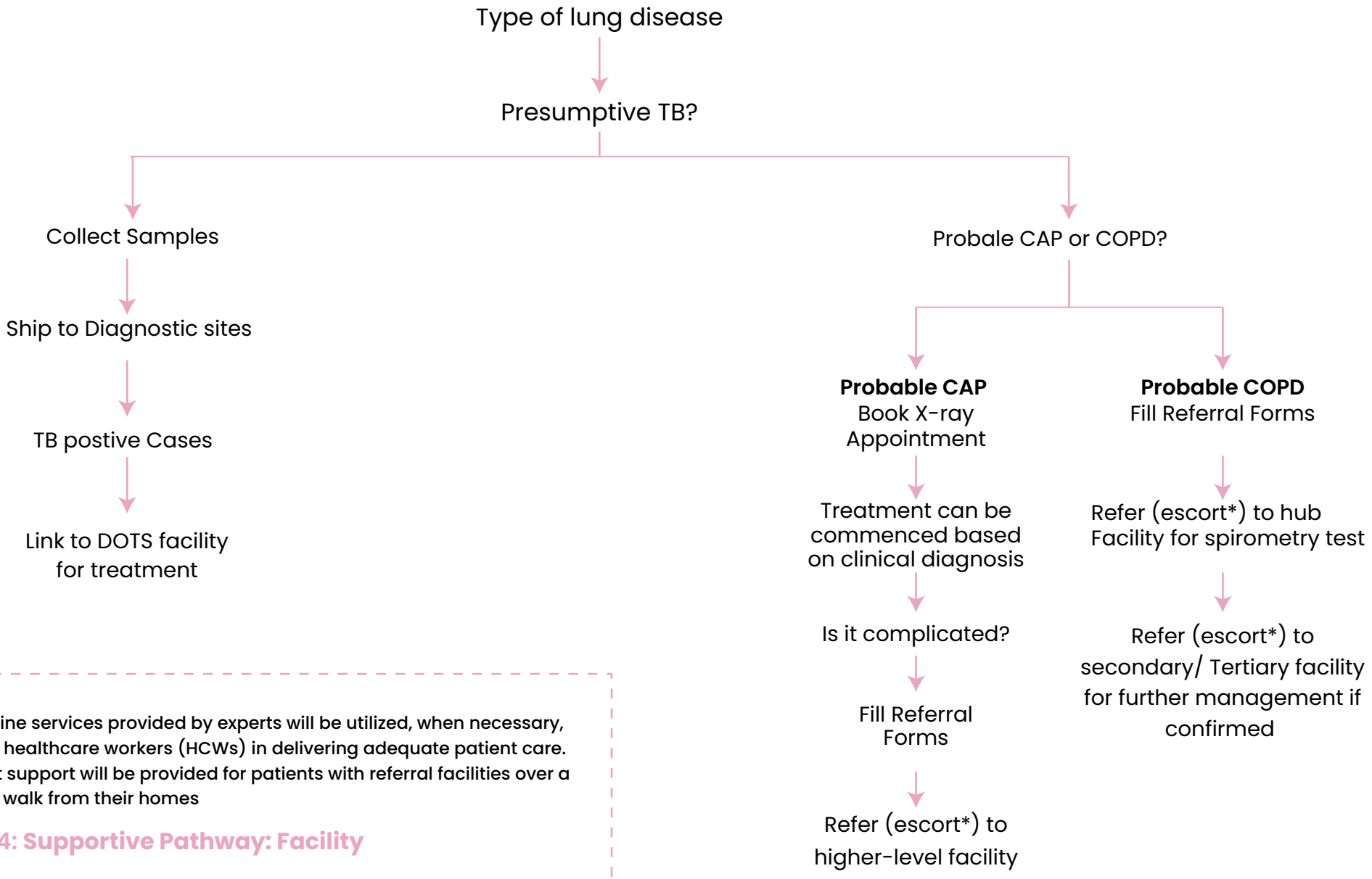
Supportive Referral Pathway: Community



*Batched escort: Non-emergency cases will convene at an agreed location on agreed date and time. The CHW will escort them to the referral facility.
^Transport support will be provided for patients with referral facilities over a 15-minute walk from their homes

Figure 13: Supportive Referral Pathway: Community

Supportive pathway: Facility



Telemedicine services provided by experts will be utilized, when necessary, to support healthcare workers (HCWs) in delivering adequate patient care.
*Transport support will be provided for patients with referral facilities over a 15-minute walk from their homes

Figure 14: Supportive Pathway: Facility

4.5 If YES to Cigarette Smoking:

5As model of Clinical interventions to initiate Smoking Cessation in a Primary Care setting within 3-10mins.

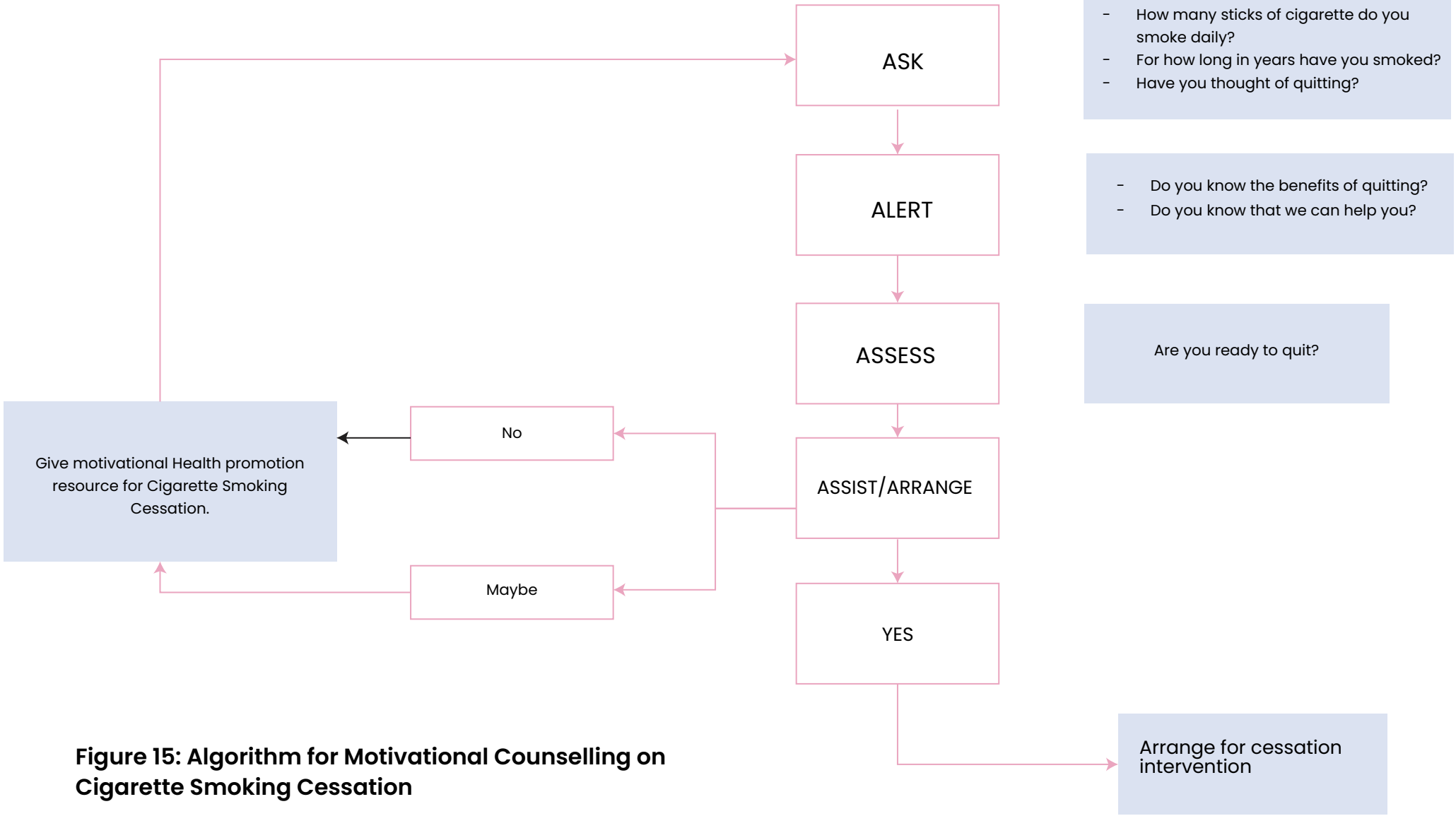


Figure 15: Algorithm for Motivational Counselling on Cigarette Smoking Cessation

4.6 Social Behaviour Change Communication for Health Promotion and Patient Education

Social Behaviour Change Communication (SBCC) is a strategic approach that applies behavioral science and communication principles to influence knowledge, attitudes, and social norms at individual, community, and institutional levels. It utilizes diverse communication channels to drive and sustain positive health behaviors through a systematic process.
It has three core elements include:

1. Communication: Understanding the target audience's needs, motivations, and preferences to develop tailored messages and strategies across different communication channels
2. Social change: Shifting how issues are defined and perceived, increasing public participation, influencing policies, and transforming social attitudes and behaviors.
3. Behaviour change: Implementing interventions that make adopting healthier behaviors easier and more feasible while ensuring positive and sustainable outcomes.

For health promotion and patient education, SBCC aims to empower individuals and communities to make informed health decisions and adopt healthier behaviours.

Application of SBCC in Cigarette smoking control and Indoor Air Pollution Prevention

Cigarette smoking and indoor smoke from fires are major risk factors for certain disease conditions like tuberculosis, COPD and lung cancer. Cigarette smoking is a leading cause of heart and respiratory diseases like chronic obstructive airway disease. SBCC can be used to educate and encourage behaviour change by emphasizing the dangers of smoking and the benefits of quitting.

Key Messages for Smoking Cessation

Disadvantages of Smoking

- Increased risk of lung cancer, COPD, and worsening of asthma symptoms.
- Higher likelihood of developing cardiovascular diseases.
- Reduced lung function and overall health deterioration.
- Financial burden due to continuous cigarette purchases.

Benefits of quitting smoking cigarettes

- Lower risk of developing smoking-related diseases.
- Improved lung function and overall respiratory health.
- Reduced risk of heart disease and stroke.
- Increased life expectancy and improved quality of life.
- Financial savings from not purchasing cigarettes.

Behaviour change strategies

- One-on-one counseling and support groups to help individuals quit.
- Community-led advocacy to create smoke-free environments.

Indoor air pollution

Indoor air pollution, caused by household cooking fuels (such as coal and firewood) and chemical fumes from cleaning agents, is a significant contributor to respiratory illnesses. Addressing this requires education on safer cooking practices and reducing exposure to harmful pollutants.

Key Messages for Reducing Indoor Air Pollution

Sources of Indoor Air Pollution:

- Household cooking with solid fuels (firewood, charcoal, kerosene).
- Poor ventilation in kitchens and living areas.
- Occupational exposure to dust, chemicals, and car fumes.

Strategies to Reduce Indoor Air Pollution:

- Use cleaner cooking alternatives such as gas or electric stoves where possible.
- Cook outdoors or ensure adequate ventilation (open windows and doors).
- Reduce exposure to occupational dust and chemical fumes by wearing protective masks and using air purifiers.
- Implement workplace safety measures to minimize exposure to toxic air pollutants.

Behaviour change strategies for Reducing Indoor Air Pollution

- Community education programs on safe cooking practices and clean energy use.
- Promotion of improved stoves and alternative fuels.
- Advocacy for workplace policies that protect employees from hazardous fumes.
- Encouraging home ventilation improvements through social marketing campaigns.

MODULE 5
Monitoring and Evaluation Framework for Integrating TB and other Lung disease Services

5.1.1 Introduction

Effective monitoring and evaluation (M&E) are critical to the success of any integrated health program. Module 5 of this guideline focuses on establishing a robust M&E framework to assess the performance and outcomes of integrating tuberculosis (TB), community-acquired pneumonia (CAP), chronic obstructive pulmonary disease (COPD) and other lung disease services.

This module provides a systematic approach for tracking progress, measuring the effectiveness of interventions, and ensuring accountability. The framework leverages standardized indicators, recording and reporting tools, and an integrated data management system to support evidence-based decision-making and continuous program improvement.

The M&E system is aligned with the existing structures and systems of the NTBLCP and NPHCDA. However, to ensure that additional tasks and planned activities are effectively monitored and evaluated, the existing M&E system has been adapted to include supplementary indicators and tools specific to the integrated approach.

By streamlining M&E processes across TB, CAP, COPD and other lung diseases services, the framework aims to foster a culture of learning and innovation while ensuring that quality care reaches all beneficiaries.

5.1.2 Objectives of the M&E System

The objectives of the M&E system for the integrated TB and other lung disease services are:

1. Track the implementation and effectiveness of integrated service delivery in communities and health facilities.
2. Measure the quality of care, patient outcomes, and program impact for TB and other lung diseases.
3. Ensure data-driven decision-making to enhance program design and implementation.
4. Identify gaps, challenges, and opportunities for continuous program improvement.

5. Promote accountability and transparency among stakeholders through regular reporting and feedback.
6. Strengthen health system capacity for integrated service delivery through systematic learning and innovation.

This framework serves as a guide for all stakeholders involved in the integrated lung health program, ensuring alignment with national health goals and global best practices.

5.2 Integrated Lung Health Program Monitoring Indicators

Monitoring indicators form the backbone of the M&E framework. This section outlines key performance indicators for tracking outputs and outcomes of integrated TB and other lung disease services. These indicators are designed to be aligned with national and global health priorities.

Table 7: Integrated Lung Health Program Monitoring Indicators

INDICATOR	**DEFINITION** How is it calculated?	**DATA SOURCE** How will it be measured?	**FREQUENCY** How often will it be measured?	**RESPONSIBLE PERSON(S)** Who will measure it?	**REPORTING** Where will it be reported?
Number of people who received integrated screening for TB and other lung diseases	Count of people simultaneously screened for TB and other lung diseases	TBR WV 11 integrated TB/Lung Disease register	Monthly	DOTS FP, Community Health Workers & Screening Officers	TBR WV 11 integrated TB & other lung diseases monthly summary form (MSF)
Number of presumptive TB cases identified	Count of people identified with signs and symptoms of TB	NTBLCP Presumptive TB register	Quarterly	LGTBLS	NTBLCP quarterly TB case finding reports
Percentage of presumptive TB cases tested/evaluated for TB	Count of people simultan Numerator: Total number of presumptive TB cases tested/evaluated for TB Denominator: Total number of presumptive TB cases identified during the period	NTBLCP Presumptive TB register	Quarterly	LGTBLS	NTBLCP quarterly TB case finding reports

Number of probable CAP cases identified	Count of people identified with signs and symptoms of CAP on screening	TBR WV 11 integrated TB/Lung Disease register	Monthly Quarterly	LGA HMIS officer	NHMIS MSF TBR WV 11 integrated TB & other lung diseases monthly summary form (MSF)
Number of probable COPD cases identified	Count of people identified with signs and symptoms of COPD on screening	TBR WV 11 integrated TB/Lung Disease register	Monthly Quarterly	LGA HMIS officer	NHMIS MSF TBR WV 11 integrated TB & other lung diseases monthly summary form (MSF)
Number of co-morbid presumptive TB and probable case of other conditions identified	Count of co-morbid presumptive TB and probable case of CAP, COPD, Asthma, URTIs, etc	NTBLCP Presumptive TB register^ TBR WV 11 integrated TB/Lung Disease register	Quarterly	LGTBLS	NTBLCP quarterly TB case finding reports^
TB case notification	Count of total number of TB cases notified during the project period	LGA/Facility TB treatment register	Quarterly	LGTBLS	NTBLCP quarterly TB case finding reports
TB treatment success rate	Numerator: Total number of TB cases cured + completed treatment Denominator: Total number of TB cases notified within the project period	LGA/Facility TB treatment register	Quarterly	LGTBLS	NTBLCP quarterly TB cohort reports
Community Acquired Pneumonia cases detected	Count of total number of Community Acquired Pneumonia cases detected during the period	NHMIS General Outpatient Register TBR WV 11 integrated TB & other lung disease register	Monthly Quarterly	LGA HMIS (M&E) Officers	NHMIS MSF TBR WV 11 integrated TB & other lung diseases monthly summary form (MSF)
Percentage of CAP cases confirmed with Chest X-ray	Numerator: Total number of CAP cases confirmed with X-ray Denominator: Total number of CAP cases notified within the period	NHMIS General Outpatient Register TBR WV 11 integrated TB & other lung disease register	Monthly Quarterly	LGA HMIS (M&E) Officers	NHMIS MSF TBR WV 11 integrated TB & other lung diseases monthly summary form (MSF)
New COPD cases detected	Count of total number of new cases of COPD detected	TBR WV 11 integrated TB & other lung disease register	Monthly Quarterly	LGA HMIS (M&E) officers	TBR WV 11 integrated TB & other lung diseases monthly summary form (MSF)

Percentage of new COPD cases confirmed with spirometer	Numerator: Total number of new COPD cases confirmed with spirometer Denominator: Total number of COPD cases notified within period	TBR WV 11 integrated TB & other lung disease register	Monthly Quarterly	LGA HMIS (M&E) officers	TBR WV 11 integrated TB & other lung diseases MSF
Number of people with TB/CAP comorbidity	Count of total number of people diagnosed with both TB and CAP	Facility TB treatment register^ TBR WV 11 integrated TB & other lung disease register	Monthly Quarterly	LGTBLS/LGA HMIS (M&E) officers	TB Quarterly Reporting template^ TBR WV 11 integrated TB & other lung diseases MSF
Number of people with TB/COPD comorbidity	Count of total number of people diagnosed with both TB and COPD	Facility treatment register^ TBR WV 11 integrated TB & other lung disease register	Monthly Quarterly	LGTBLS/LGA HMIS (M&E) officers	TB Quarterly Reporting template^ TBR WV 11 integrated TB/Lung Disease monthly summary form
Number of people with TB/CAP/COPD comorbidity	Count of total number of people diagnosed with the triple comorbidity -TB, CAP and COPD	TBR WV 11 integrated TB & other lung disease register	Monthly Quarterly	LGTBLS/LGA HMIS (M&E) officers	TB Quarterly Reporting template^ TBR WV 11 integrated TB/Lung Disease monthly summary
Number of people with TB/other lung disease comorbidity	Count of total number of people diagnosed with TB and any other lung disease- Asthma, URTI etc	Facility TB treatment register^ TBR WV 11 integrated TB & other lung disease register	Monthly Quarterly	LGTBLS/LGA HMIS (M&E) officers	TB Quarterly Reporting template^ TBR WV 11 integrated TB/Lung Disease monthly summary form
Percentage of confirmed CAP cases that received appropriate antibiotic treatment or were referred (for severe cases)	Numerator: Total number of confirmed CAP cases that were treated with appropriate antibiotics Denominator: Total number confirmed CAP cases	TBR WV 11 integrated TB & other lung disease register	Monthly	LGA HMIS (M&E) officer, Community Health Workers & Screening Officers	TBR WV 11 integrated TB/Lung Disease monthly summary form
Percentage of identified COPD cases linked for further management	Numerator: Total number of newly confirmed COPD cases who were linked for treatment Denominator: Total number of confirmed COPD cases	TBR WV 11 integrated TB &	Monthly	LGA HMIS (M&E) officer, Community Health Workers & Screening Officers	TBR WV 11 integrated TB & other lung diseases MSF

Percentage of confirmed COPD patients that received health promotion intervention for smoking cessation and/or indoor air pollution	Numerator: Total number of COPD cases that received health promotion intervention for smoking cessation and/or indoor air pollution Denominator: Total number of confirmed COPD cases within the period.	TBR WV 11 integrated TB & other lung disease register	Monthly	LGA HMIS (M&E) officer, Community Health Workers & Screening Officers	TBR WV 11 integrated TB & other lung diseases MSF

All data will be disaggregated by age, sex and intervention sites- Facility/Community.
Commcare App, a digital case management tool will be used for real time data tracking for this pilot project.

5.2.1 Integrated Recording and Reporting Tools for Routine Surveillance

Accurate and timely data collection is essential for monitoring and decision-making. This section highlights the integrated recording and reporting tools developed for routine surveillance across TB and other lung disease services. These tools include:

- Standardized patient registers and forms.
- Digital platforms for real-time data capture.
- Tools for recording and reporting service delivery metrics, treatment outcomes, and follow-up data.

The integration of these tools will ensure seamless data collection, minimize duplication of efforts, and improve data consistency across disease programs

Table 8: Key Recording and Reporting tools used at the Community and Facility levels

SN	Tools	Type	Site of Use	Data Requirements	Frequency of Entry
1	ITCC Checklist	Recording	Community/ Facility	Records of presenting signs and symptoms	Each time a person is screened
2	Commcare App and q-Track	Recording & Reporting	Community /Facility	Records of screening, diagnosis, management, and follow-up data.	Each time a person is screened, and follow-up data is available for update
3	Integrated TB and other Lung diseases Register*	Recording	Community/ Facility	Records of patients presenting with symptoms of TB and/or other lung diseases, outcome of diagnosis and type of treatment provided	Each time a client with signs and symptoms of TB and/or other lung diseases is identified

4	NTBLCP Presumptive TB Register#	Recording	Facility	Records of patients presenting with symptoms of TB.	Each time a presumptive TB case is identified
5	Specimen Examination Request Form	Recording	Community/ Facility	Request for GeneXpert MTB/RIF assay, AFB smear microscopy and Culture/LPA investigations for patients	Each time specimens are sent for TB examinations to the laboratory.
6	TB specimen shipment forms	Recording	Community/ Facility	Movement status of specimen	When moving specimen
7	Referral forms	Recording	Community/ Facility	Records of probable cases of TB and/or other lung diseases referred from the community and severe cases referred for expert management	Each time a client is referred
8	NHMIS OPD Register Recording	Recording	Facility	Records of patients presenting at the health facility	Each time a client presents at the facility
9	NTBLCP TB LGA/Facility treatment register#	Recording	Facility	Patients' primary information, treatment records and progress	Each time a DS-TB Case is initiated on treatment
10	TB Patient Treatment Cards	Recording	Facility	TB Patients primary information, treatment records and progress	Each time a DS-TB Case is initiated on treatment.
11	Patient OPD Cards/Folders	Recording	Facility	Other patients' primary information, treatment records and progress	Each time a patient with other conditions is initiated on treatment.
12	LGA Quarterly Report on TB case finding form	Reporting	LGA/State/ National	Report on TB cases detected in a quarter by category	Quarterly Annually
13	Quarterly TB cohort report form	Reporting	LGA/State/ National	Report on treatment outcome of TB cases started on treatment 9-12 months earlier	Quarterly Annually

14	NHMIS Monthly summary form^	Recording	Facility	Report on cases of CAP (<5 years) and CAP (<5 years) and Asthma detected in a month	Monthly
15	TBR WV 11 integrated TB and other lung diseases monthly summary form*	Recording	Community/ Facility	Report on cases of TB and other lung diseases detected in a month	Monthly

***Implementing Partner supplementary tools to bridge gaps in existing tools for diseases of interest.**

5.2.2 Integrated Data Management System for Accountability and Learning

An integrated data management system fosters transparency, supports cross-disease analysis, and promotes evidence-based planning to achieve program goals. This emphasizes the role of a centralized data management system in driving accountability and learning. The system supports:

- Data collection using appropriate data collecting tools including digital tools for real-time data monitoring
- Data access across different programs and levels.
- Data validation and quality assurance processes.
- Analysis for generating actionable insights.
- Feedback mechanisms to inform program adjustments and policy decisions.

5.2.3 Supportive Supervision, OSDV and DQA

Regular joint supportive supervisions will be conducted to provide guidance, mentorship, and technical assistance to staff at various levels of program implementation. Supervisions will focus on capacity building, improving performance, and fostering a collaborative environment. Key elements will include identifying challenges, providing feedback, and encouraging problem-solving to enhance the quality of service delivery and adherence to program standards.

In addition, regular on-site data verification (OSDV) and periodic data quality assessment (DQA) will be conducted to ensure accuracy, completeness, and reliability. These exercises will help to identify discrepancies, strengthen data quality, and build trust in reported results.

Data Harmonization: Monthly/Quarterly joint data harmonization meetings involving LGTBLS, HMIS officers, and NCD desk officers will be held to ensure the quality and alignment of collected data with program objectives, while facilitating data sharing across program units.

Review Meetings: Regular program review meetings with key stakeholders across disease programs will be conducted to provide progress updates, foster reflection and learning, and support evidence-based program adaptations when necessary.

Evaluation: Periodic process and outcome evaluation will be conducted using the routinely collected data. The impact evaluation of PAL activities will be conducted at the end of the project through a research study.

TBR WAVE 11 Integrated Lung Disease Date Management Flow Chart

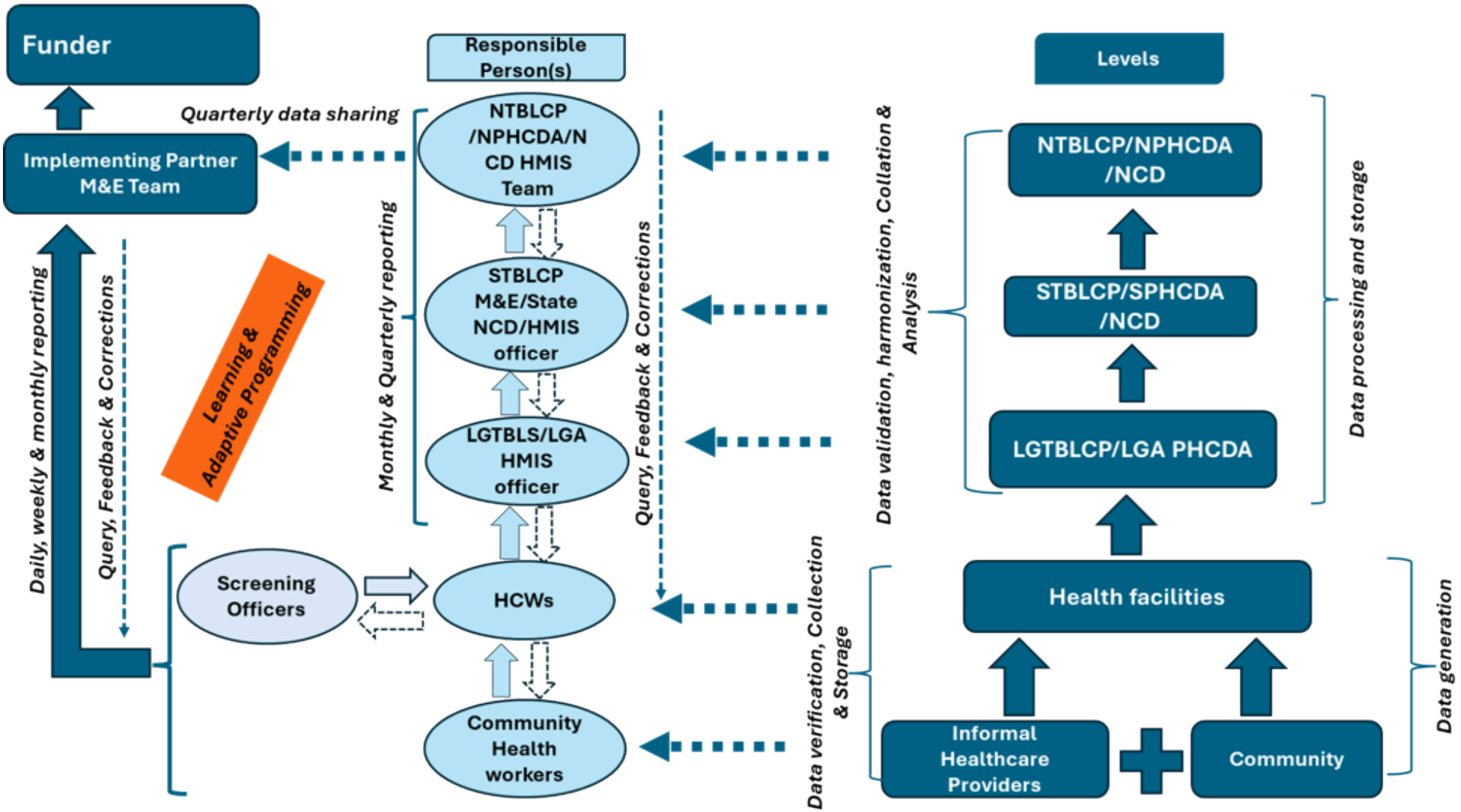


Figure 16:**TBR WAVE 11 Integrated Lung Disease Date Management Flow Chart**

COPD Screening Using a handheld Peak Expiratory Flowmeter device (COPD-6)

Participants are eligible for a COPD screening test if they are over 35 years of age and have answered 'YES' to at least one of the following questions:

- **Do you (currently or formerly used to) smoke cigarettes?**
- **Do you or have you had prolonged exposure to biomass fuels e.g. firewood?**
- **Do you cough (up sputum or mucus most days) for ≥ 2weeks?**
- **Do you have difficulty breathing/fast breathing?**
- **Do you wheeze or make a whistling sound while breathing?**

Preparing the handheld Peak Expiratory Flowmeter device for use

The handheld Peak Expiratory Flowmeter devise is designed for multiple uses when used with one-way valves: Attach the one-way valve on to the mouthpiece. The COPD-6 device is now ready for use.

A new one-way valve should be used with each new patient.

Using the handheld Peak Expiratory Flowmeter device

1. The subject should be sitting comfortably.
2. Press the grey button to turn the COPD-6 device on.
3. Enter the subject's age by pressing the 'up' or 'down' arrow and, when the correct age is displayed, press the 'enter' button.
4. Enter the subject's height by pressing the 'up' or 'down' arrow and, when the correct height is displayed, press the 'enter' button.
5. Enter the subject's gender by pressing the 'up' or 'down' arrow and press 'enter'.

6. Instruct the subject to take as deep a breath as possible, sit up straight, insert the device between their lips and blow as hard and fast as they can and continue blowing until the beep sounds at six (6) seconds.

7. The results will be displayed in the window. By pressing the 'up' and 'down' arrows the display will show FEV1, FEV6, FEV1/FEV6 and lung age*.

8. An exclamation mark (!) will appear if a cough was detected, the effort was too short, had a slow start, or if the result measured was unnaturally high or low. The test should be redone.

9. It is important to repeat the test to get reproducibility of results. It is recommended that 3 tests are undertaken.

10. Then the best result is recorded in the integrated screening registers (electronic & paper records) including FEV1, FEV6 and FEV1/FEV6.

Interpret Result and Recommended Action

- FEV1/FEV6 <.75 – recommend spirometry for diagnostic testing
- FEV1/FEV6 > .75 (green zone) – Refer for further evaluation. Also provide health promotion material if exposed to either risk factor, cigarette smoking or indoor air pollution.

***Lung Age:** The lung age is a calculated estimate of the age of a non-smoker with the same forced expiratory volume as the person being tested. Thus, it is a simple way of explaining lung test results to cigarette smokers to encourage them to quit smoking.

DESCRIPTION OF METHODOLOGY OF DEVELOPING THE HANDBOOK

Virtual Meetings and Formation of Technical Working Group (TWG)

The process of development of the handbook began with two virtual meetings designed to establish a structured approach. The inaugural meeting introduced the Technical Working Group (TWG) and defined the objectives and scope of the project. A work plan was finalized to ensure alignment with the goal of integrating tuberculosis (TB), community-acquired pneumonia (CAP), and chronic obstructive pulmonary disease (COPD) management into the handbook.

To facilitate content development, the TWG created three specialized sub-committees, each assigned to a key thematic area: (1) Training and Capacity Building Materials, (2) Standard Operating Procedures (SOPs) and Social and Behavior Change Communication (SBCC) Patient-Facing Materials, and (3) Monitoring and Evaluation (M&E) Framework. These sub-committees were responsible for developing relevant content and ensuring that the handbook covered certain aspects of lung health management. The second virtual meeting focused on drafting a simplified version of the Integrated Tuberculosis, CAP, and COPD Symptoms (ITCCAS) Checklist and developing a table of contents in preparation for the upcoming physical meeting.

Sub-committee leads:

1. Training and capacity building materials - Isaac Alobu
2. SOPs and SBCC patient-facing materials - Dr. Francis Bakpa
3. M&E Framework - Dr. Obioma Chijioke-Akaniro

Physical Meeting for Content Development

A four-day physical meeting was held in Asaba, one of the project's pilot states. The meeting had presentations, group work, brainstorming sessions, document reviews, and content development activities. An external consultant facilitated the process, beginning with an overview of the project by the project lead.

On the first day, participants were divided into five working groups, each focusing on a specific aspect of TB management: TB Symptoms, Screening, Diagnosis, Treatment, and Post-TB/Lung Disease Management. Each group identified key barriers to the implementation of the Practical Approach to Lung Health (PAL) at both facility and community levels, particularly in their local contexts. They proposed recommendations to address these barriers, which were later reviewed and refined on the last day of the workshop.

Document Review and Drafting

During the physical meeting, TWG members conducted a comprehensive document review to ensure the handbook was aligned with international best practices. Relevant literature and existing guidelines, such as Brazil's PAL-GARD and South Africa's PALSA Plus, were reviewed. This review process helped in refining the content to ensure that it was evidence-based and practical for implementation.

Stakeholder Engagement and Drafting Process

The development of the handbook was a collaborative effort led by RedAid Nigeria, and involving key stakeholders from various organizations. Participants included representatives from the Federal Ministry of Health (FMOH), particularly the National Coordinators of the Non-Communicable Disease Division and the National Tuberculosis and Leprosy Control Programme (NTBLCP). Other stakeholders included representatives from the World Health Organization (WHO), State TB Programme Managers from Edo and Delta States, as well as pulmonologists, academics, and private sector experts. These individuals contributed to the drafting process, ensuring that the content was comprehensive and practical.

REFERENCES

1. World Health Organization. Practical Approach to Lung Health (PAL): A primary health care strategy for the integrated management of respiratory conditions in people five years of age and over. Ottmani S-E, Scherpbier R, Pio A, Chaulet P, Aït Khaled N, Blanc L, Khaltaev N, Raviglione M, editors. 2005.
2. Ogunniyi TJ, Abdulganiyu MO, Issa JB, Abdulhameed I, Batisani K. Ending tuberculosis in Nigeria: a priority by 2030. BMJ Glob Health. 2024
3. British Thoracic Society (BTS) Guidelines for the Management of COPD (2023).
4. Nigerian National Noncommunicable Disease Policy (2021).
5. Global Initiative for Chronic Obstructive Lung Disease (GOLD) Report (2024).
6. World Health Organization (WHO) Package of Essential Noncommunicable Disease Interventions (PEN) for Primary Health Care (2020).
7. World Health Organization. Global Tuberculosis Report 2024. WHO, 29 Oct. 2024, iris.who.int.
8. Federal Ministry of Health Nigeria. (2021). NTBLCP National Tuberculosis, Leprosy and Buruli Ulcer Management and Control Guidelines (Seventh Edition).
9. Federal Ministry of Health Nigeria. (2023). Desk Guide for Prevention, Diagnosis and Treatment of Tuberculosis in Children and Adolescents in Nigeria (4th edition)
10. Oxford Handbook of Respiratory medicine 4th Edition
11. PALSA Plus. Guidelines: Practical Approach to Lung Health in South Africa—Management of HIV. Primary Care Management of Respiratory Diseases and HIV and AIDS. December 2024.
12. Obaseki, D. O., Erhabor, G. E., Gnatiuc, L., Adewole, O. O., Buist, S. A., & Burney, P. G. (2015). Chronic Airflow Obstruction in a Black African Population: Results of BOLD Study, Ile-Ife, Nigeria. COPD: Journal of Chronic Obstructive Pulmonary Disease, 13(1), 42–49. https://doi.org/10.3109/15412555.2015.1041102
13. São José, Bruno Piassi de, Ricardo de Amorim Corrêa, and Paulo Augusto Moreira Camargos. PAL-GARD. Brazil. GUIDE. 2011
14. Caritas Nigeria. The Use of AI-enabled Portable Digital X-ray Machines for Integrated Screening of Tuberculosis, Cardiovascular Diseases, and Chronic Respiratory Diseases in Community-settings

FEDERAL MINISTRY OF HEALTH

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Piloting an innovative integrated Tuberculosis and Practical Approach to Lung health services in hard-to-reach communities of southern Nigeria (Project POTENTIALS)

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